

HOME TRAINING IN CABINET WORK: THE TEXTURE AND QUALITIES OF NATURAL WOODS, THEIR INDIVIDUALITY AND FRIENDLINESS: FIFTH OF THE SERIES



WRITERS innumerable have expatiated, and justly too, upon the beauty of the trees—the trunk, the branches, the leaves, the shadows they cast and the shelter the branches and leaves afford to the birds. The mystery of the vast forests; even the cutting down of trees, the rafting of them down the streams to the mill, and, eventually, the singing of the saws that divide them into lumber, have been subjects for writings and poems that move and stir the soul. In this article I wish with all earnestness to comment upon the beauty of the trees when cut up into lumber. There is a charm as individualistic and as marked in the wood itself as is that of the trees in the forest. This beauty lies in the grain, or markings; the texture, or surface appearance; the natural shades, or colors; the marvelous varieties in grain and texture; the readiness with which they yield themselves to color treatment, and the results so attained. Many a worker in wood loses much of the joy he might have in his work by not making a study of these beautiful details. Is it not evident that he who loves to look at the wood upon which he is engaged will enjoy his work far more than one who sees no beauty in it? It is to help arouse this joy—that is one of the essential conditions of artistic work—that I wish briefly to comment upon the special beauties certain woods possess, and how best in the finishing processes to bring these into prominence and retain them.

And, in addition, there exists in wood a quality so satisfying that the proper use of it in the structural features of a house produces an effect of completeness which does away with the need of elaborate furnishings or decoration. I believe that one reason why so many people pile unnecessary furniture, pictures and bric-a-brac into their houses is because the *necessary* furniture, the woodwork (or other treatment) of the walls, and the color scheme as a whole are not interesting enough. This is a point that can hardly be too strongly emphasized in its bearing upon the creation of beautiful and restful surroundings in the home.

If the woodwork of your house is finished so that the natural

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beauty of the woods is enhanced; if the same thing were done in the furniture; and you then see that the color scheme of woodwork, furniture and hangings harmonize, you cannot fail to secure in each room a charm and beauty that is a great step accomplished towards the simplicity and restfulness that it is so desirable to gain. For let it never be forgotten that if a room is pleasing and restful, one of the highest and best of results has been attained.

IN the American Museum of Natural History in New York is one of the largest and finest collections of woods in America, possibly in the world. Every reader of *THE CRAFTSMAN* who cares enough for beauty to learn where new varieties of it may be seen, should avail himself of the privilege of studying this collection whenever he is in New York. A variety of trees from all parts of the world is shown, and each specimen, as a rule, consists of a portion of the trunk, just as it grew, a sawed section unpolished, and a section polished. For decades, and in some instances for centuries, these trees have been absorbing from the soil and atmosphere the elements necessary to their life. Slowly, so slowly that the eye alone could not record it, ring by ring has been added to their growth, the proper coloring matter absorbed, and the particles of which they are composed deposited in never-failing arrangement. Year after year, century after century, the same plan of structure was followed, until now, when a tree is cut down and its texture and color revealed, we find it harmonious with its species, yet individual in its possession of distinctive and personal qualities. It is this personal quality that gives such delight to the observant woodworker. There is absolutely as much difference between the personality of woods as there is in human beings. No two kinds of wood, and, stranger still, no two pieces of the same wood (as oak, chestnut or mahogany) are exactly alike.

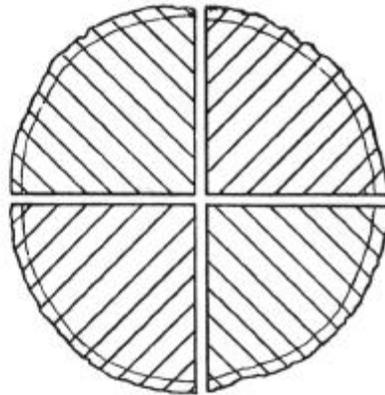
This peculiar charm of grain and texture in woods is owing to the way the tree builds up its cell structure. Each tree does this after its own fashion, and wood is called hard, soft, light, heavy, tough, porous, elastic or otherwise according to these cells. All are more or less familiar with the circular rings that appear when the tree is cut down, or as a log is sawed across. These rings or layers are deposited, one each year, on the outside. So it is apparent the oldest

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portion of the tree is on the inside. This old portion is what is known as the heartwood, and is tougher, heavier, and stronger than the younger wood or sap wood. Growths materially differ in spring and summer, and these differences are marked in the rings. In the Southern pines, for instance, the spring and summer growths are shown by solid bands.

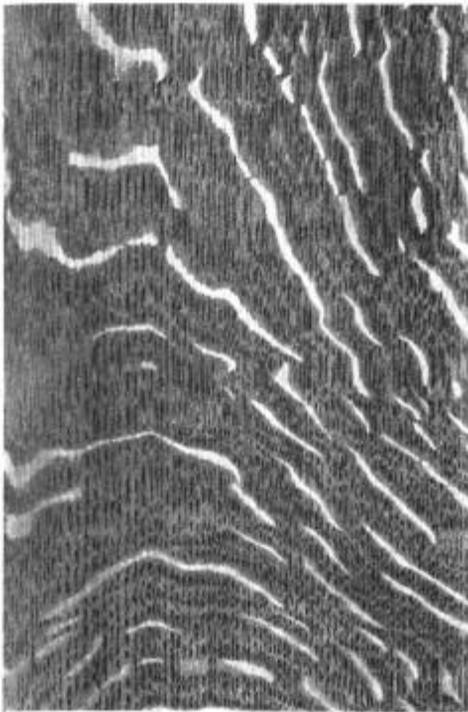
As a rule these cell structures and their corresponding markings are vertical, but there is a lesser system of cells equally important to the life of the tree, which extend horizontally. These are the cells that form the peculiar wavy lines seen in quarter-sawn oak, which cross the vertical rays, and are called medullary rays. These transverse rays are what bind the tree together. When one thinks of the hundreds of tons of weight the trunk of a tree is compelled to bear he cannot help wondering at its strength. It is these medullary rays

that bind the perpendicular fibers together and give this amazing strength. Were it not for them the tree would "telescope," as we sometimes see in the case of a tree of which the lower part of the trunk has decayed.



Cross section of tree-trunk showing method of quarter-sawing

ALL these matters, which at first sight may seem unimportant, have a practical bearing upon the art of cabinet-making. The young worker should know that, owing to the difference in density in the old and new rings, and also in the growths of spring and summer, some woods when cut have a strong tendency to split or "check." Others incline to warp badly, and still others, of softer fiber, if placed where there is much wear will "sliver" and soon present an uneven and unpleasing surface. To avoid this checking, warping and slivering some logs, when cut into boards, instead of being cut the whole width of the trunk are quartered and then sawn, as shown by the lines in the accompanying diagram. This is called quarter sawing. There are other woods that, in their very nature, do not warp easily, such as chestnut, pine, and mahogany, etc. These, for general purposes, therefore, are usually plain sawn. In the illustrations here-



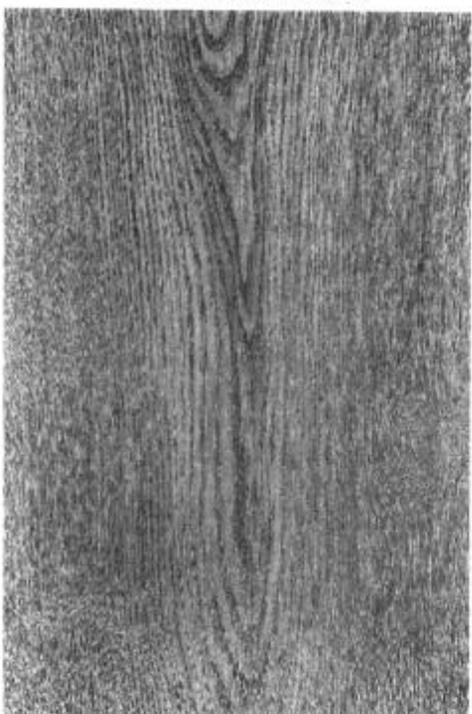
QUARTER-SAWED WHITE OAK



PLAIN-SAWED WHITE OAK



CHESTNUT



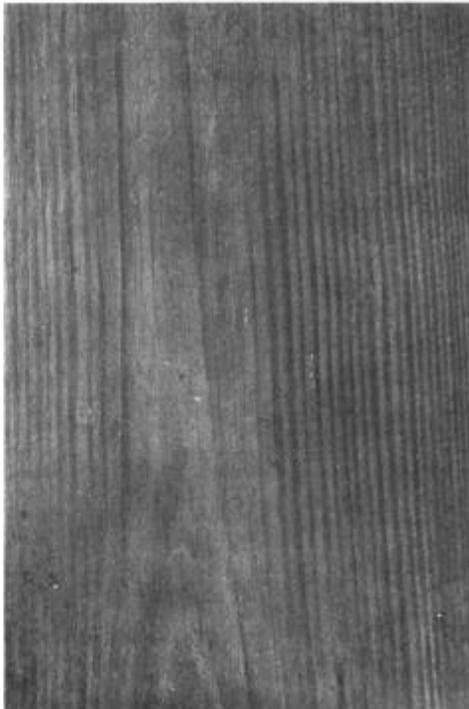
BROWN ASH



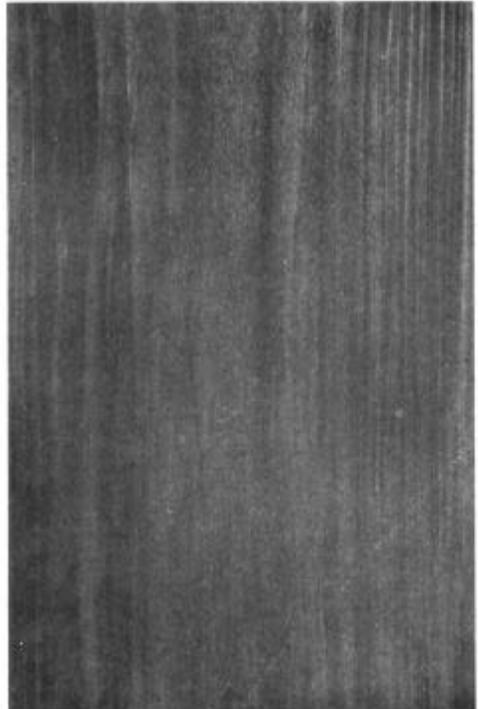
ROCK ELM



RED GUM



SOUTHERN PINE



CYPRESS

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with presented sections of seven different woods are shown, *viz.*: oak, chestnut, brown ash, rock elm, cypress, Southern pine and gum. Of our native woods these are the most generally used for furniture and house "trim"; the first four for furniture and the three latter for "trim" or "finishing."

Let us now, for a few moments, consider the question of wood sawing; why the different methods are followed on certain woods, and the objects that are attained.

The quarter-sawing method of cutting oak,—that is, the making of the cut parallel with the medullary rays, and thus largely preserving them, instead of cutting across them and thus destroying their binding properties, renders quarter-sawn oak structurally stronger, also finer in grain, and, as before shown, less liable to check and warp than when sawn in any other way. Its cost, however, is largely increased on account of the greater waste in sawing.

On the other hand plain sawn oak is an entirely different wood. It presents a marked coarseness of texture that relegates its use to purposes that do not demand finer and more pleasing qualities.

The long wide markings that are discernible in the accompanying illustrations of chestnut, pine, ash, etc., are entirely different from the "flake" of the quarter sawn oak, though both, commonly, are called "flakes." These are caused by the saw's cutting through the more solid portions of the yearly rings which extend the whole length of the trunk from bottom to top. To make clearer what I mean: If one holds in his hands a piece of wood of any of the kinds named, he can observe by looking at the ends, that these long flakes are portions of the yearly rings exposed by the cut of the saw. To distinguish these perpendicular flakes (that band the whole tree trunk) from the horizontal medullary "ray flakes," I shall call them "ring flakes"—from the yearly rings that cause them. So that in future when I speak of "ring flakes" and "ray flakes," the qualifying adjective will denote the kind of flakes meant.

When wood is sawn in the ordinary way, that is, with the "lay" of the yearly rings, the wood is called "plain sawn." The ring flake is produced only by plain sawing, while the ray flake is produced only by quarter sawing.

While oak is so much improved by quarter sawing, chestnut loses all its beauty when so cut. Yet when plain sawn, as I shall shortly

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show, it is one of the most useful and beautiful of woods in house construction and trim. Southern pine when quarter sawn not only loses its beauty but becomes commonplace. Yet in so doing it gains a factor of durability that more than makes amends for its loss of beauty. For kitchen and other floors, where the thing to be desired is durability, rather than beauty, quarter sawn pine is very durable and makes a good floor. Plain sawn pine, when used for flooring, is soon worn in the softer parts of the "ring flake." This makes the harder parts break up into slivers, and also renders the surface uneven, both of which are undesirable. But when quarter sawn the edges of the ring flakes are exposed and this produces what is called "comb-grained" pine on account of its appearance. The prongs of the "combs" being upwards and tough, they resist wear successfully. Hence the use of comb-grained pine for flooring. Gum wood is desirable only when quarter sawn, as, when plain sawn, it is of little value on account of its tendency to warp. Quarter sawn this tendency is overcome, and, as is explained later in speaking of its color treatment, it becomes a most valuable and beautiful addition to our house-trim woods.

LET us now consider the color treatment of woods with a view to their practical uses, which will be commented upon as we proceed. In the treatment of woods that contain tannic acid, such as oak and chestnut, ammonia is the agent for chemical coloring, either by fuming or direct application. The tannic acid and ammonia combine and produce a chemical change which permanently and beautifully tones the wood without in any way injuring its texture or durability. In the case of woods that contain lime—and I speak now not as a chemist, but using the terms of the practical cabinet-maker, who, in such matters, speaks generally rather than with scientific accuracy,—the coloring agent to be used is chloride of potash.

There is a decided difference between the ordinary method of treating quarter sawn oak and the one I have so long followed. The aim has generally been to emphasize the ray flake, and where it was not prominent enough, or present in large enough quantity, to create it by means of added pigment,—in other words to paint it in. When this painted-in-flake is enameled,—varnished over—it is difficult to

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detect it from the real thing. In my experiments, however, I decided that a far more pleasing and beautiful result would be obtained by softening rather than heightening the distinctiveness of the flake. So for months I persisted in my endeavor to discover a way by which I could "bring together," harmonize, as it were, these two markedly contrasting features in the same piece of wood. This was finally effected by the use of ammonia, either by direct application or by fumes. The ammonia combines with the tannic acid in the oak to produce a chemical change, and thus "tone down" and color the flake to the desired shade. As far as I know this is the only practically successful method yet discovered to cope with the difficulties offered by the ray flake. Pigment applied to the surface of the flake has no appreciable result, as it is almost as hard and impenetrable as glass. In what I have written above I would not have it thought, because of this somewhat lengthy description of my own experiments, that I make any claim to the discovery of the use of ammonia. Many others have used it, and still do so, and others may have produced the same results on oak, but in my case it was the outcome of personal experimentation.

Of our native woods for house trim one of the most useful is chestnut. There are several reasons for this which I will briefly enumerate. 1. It has a varied and interesting grain. There is a greater variety, perhaps, in the grain of chestnut than in any other of the popular woods. The "ring rays" of chestnut are deposited in a characteristic fashion and this gives a peculiar charm all its own to the grain of this wood. 2. It is one of the woods that does not naturally incline to warp or check. The result is it "stays in place," a thing highly desired in house trim. 3. In itself it has a wonderfully interesting color quality. Some woods possess little color quality in themselves. Chestnut, on the other hand, is varied and lends itself to color treatment with a sympathy that seems more than merely chemical. By this I mean that after it has been fumed or otherwise treated there is still a distinctive and varied color quality of its own that is apparent through the new stain. When one learns to look for this the results are always interesting and sometimes surprising in their subtle suggestions. The most pleasing of these is a delicate grayish green. 4. It is well adapted for use in halls, living or billiard rooms, where strong and vigorous effects are desirable.

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The ring rays are strong and pronounced and it is thus eminently suitable for the rooms named. 5. It is one of the woods that is rich in tannic acid. Such woods respond readily to treatment with ammonia. As before explained, chestnut requires much less fuming than oak. This readiness of coloring is a desirable feature.

NOW, while chestnut, for the above reasons, is a good wood for house trim, it is not good for cabinet-making except where large and heavy pieces can be used. While it might make good tops for large dining tables, it is not strong enough for use in smaller pieces, such as chairs, which are subject to great strain.

Brown ash is a heavier wood and has a closer grain than chestnut. It is, therefore, better as a cabinet wood. It is especially desirable where green stains are to be used, and it also takes on a rich brown color.

Rock elm is somewhat of the same character as brown ash. It takes the same colors. Indeed for greens it has a special affinity and reveals rare qualities that give the colored wood the play of light and shade found in the most perfect and subtly colored silks. There is one peculiarity that belongs to this wood. It will be noticed on close observation that in the ring flake the lines have an irregular, jagged character that I have not found in other woods.

Red gum is a peculiar wood grown in the swamps of the Southern States. It is desirable only when quarter sawn, as before explained. When treated with a weak solution of iron rust it takes on a soft satin-like texture of variable color effects that is totally unlike any other wood known. For use as trim in sleeping rooms, or wherever the finer, quieter, softer effects are desired, no wood can surpass it.

Iron rust and oxide of iron are commonly supposed to mean the same things. Yet in practical experience we find a difference. Instead of purchasing oxide of iron at the chemists, we get from the foundry iron filings, or any small pieces of iron, or even rusty nails and throw them into acid vinegar or a weak solution of acetic acid. After they have remained for, say, forty-eight hours, the solution is strained off and diluted with water until the desired color effect is obtained.

Southern pine is a representative of many other pines found all over the country, which it would be better to designate as "hard"

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pinces. While there may be slight differences between hard pines grown in the different sections they are of trivial importance in practical building. For this purpose the wood is always plain sawn, this method bringing out the ring flake with which all observers of wood are so familiar. In all the hard pines the yearly rings are deposited in alternate hard and soft layers. The hard layers are caused by the deposition of fatty, resinous secretions, and appear as the darker lines. These do not take the color as readily as the softer parts, hence the pleasing diversity in the color effects of pine. Green and brown are the colors that produce the best results.

Cypress is a much smoother wood than pine, and though it does not contain such marked resin layers, it possesses a peculiar dark streakedness in the softer layers that, properly treated, produces in the wood an effect not unlike the satin texture of the gum wood, though not so subtle and delicate. Hence, while in comparison with pine the contrasts are not as striking, their very quietness makes them more to be desired in some cases. Cypress is especially good wood for outside use, such as in half timbering, etc., as it is not naturally inclined either to shrink or swell much. As builders term it, it "stands well." It also takes shingle stains well and at the same time reveals its own color qualities, just as I have explained that chestnut does. For outdoor use it is perhaps more pleasing than any other wood, the dark streaks and the fine color effects before referred to appearing well in the clear sunlight of out-of-doors.

THE drying of woods is not a thing to be attempted unadvisedly or indiscreetly. It demands knowledge, care, experience and constant watching. If the outside of lumber is dried too rapidly it produces what is known as "case-hardening." This is the solidification of the outside so that the moisture of the inside is confined. This causes the checking (splitting at the ends) and warping of the wood.

Experience demonstrates that in the first stages of drying, the air should not be too dry. To prevent this in the "dry-kiln" a small jet of steam is injected into the room so as to keep the air slightly moist. If this is properly done and the heat not too great at first the lumber will dry from the inside outwards, instead of on the outside

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first. This is the whole—or, at least, the chief—secret of the proper drying of woods.

It must not be overlooked, however, that science as yet has discovered no way of overcoming the prior necessity of “air-drying” all lumber before it goes into the kiln. By this is meant the piling of lumber out-of-doors so that the sun-warmed air may get to it and first “season” it, before any further artificial drying is attempted. Experimentalists have tried again and again to dispense with this process, on account of the time it consumes, but every attempt to subject “green” wood (wood not yet air-dried) to artificial drying processes has proven a failure, thus demonstrating that in some things, at least, Nature insists upon the observance of her own methods.

Quarter sawn oak is the hardest of all woods to dry, and requires the longest time. The reason for this is that the flat surfaces of the ray flakes being almost as impenetrable as glass prevent the moisture from escaping through them, and therefore it has to come out at the ends and sides. It is obvious how carefully and thoroughly this must be done, and that only men of large experience and trustworthiness can be placed in charge of such responsible work.

To ensure thoroughness all quarter sawn oak is carefully inspected again, after it leaves the dry-kiln, not only to see that it is ready for use, but also for the purpose of selecting the pieces best adapted to certain work, and that match well in color and grain. Woods with beautiful or special markings are set aside for extra fine work, and more ordinary pieces are used for the more ordinary work.

Then saw, chisel, planer and other tools do their work, and, in due time, after the scraper and smoother has done his part, the chair, table or other article is ready for the final coloring process, already described, which heightens, beautifies and renders permanent the texture and traceries bestowed by Nature.