

the boards; and $\frac{1}{8}$ -inch thicker than dry sizes required. Do not allow stained or damaged sap to be put into oak dimension and expect to get first-class prices for such material. A small quantity of poor material in a car will create trouble and cause dissatisfaction with the whole car-load.

In the manufacture of plain oak squares, especially in long lengths, the saws should be kept in good fix and in perfect line with the table or carriage of the machines, and there should be no end play in the boxes of the mandrils. Otherwise, the squares produced will be poorly manufactured, not square, scant at one end, and no one to blame, but the manufacturer.

Second:—The manufacture of dimension material for furniture and chair stock from bolts cut for this purpose (or an independent dimension factory not in connection with a saw-mill).

In cutting a plain oak, such as squares, etc., cut bolts as long as can be handled, and the timber will allow, taking into consideration defects and the crooks in the timber. Long squares and other plain oak dimension bring more money than short, and in slabbing up the bolts cut any defect out and still have the short stock. It is my opinion that the most profitable plain oak that can be made from small bolts is squares, and the longer and larger they can be made, the more can be realized from them. Begin by cutting the largest sizes you have sale for, and if any are found that will not make perfect squares in the sizes cut for, cut them down to fit sizes that can be used. After the squares have been cut to proper lengths, have them piled on yard, throwing out all poor ones, and piling them crosswise, allowing as much as an inch air-space between each of them, and putting good foundations under them. We pile them out in open air and think we dry them quicker, and as well, as if under sheds. Leave two feet space between all piles or squares. When dry enough to ship, take them down, inspect them carefully, tie them up in bundles of suitable number to each for handling, and load them as tied up. If not ready to load and room is needed, cover them well when tied up, as they will damage after being bundled if the rain is allowed to fall on them.

In the manufacture of quartered oak dimension lumber from bolts, such as chair backs, seat stock, table tops, etc., our experience is that it is best to cut the blocks into the lengths required for the bill, for the reason that we are surer of getting absolutely straight blocks and avoid twisted grain blocks, as satisfactory figure cannot be produced out of twisted grain logs. Cut them as long as possible, to get blocks of straight grain and free from defects, on account of price for long lengths. We invariably get more of the short and narrow pieces than we can take care of. Never put a piece of partly plain dimension into shipments when figure is wanted all over the boards. Do not allow stained sap in shipments. It will reduce the quality and standing of your dimension and get you as a manufacturer in bad repute with the consuming trade. Especially is this the case in quartered stock, which goes into high-class articles when finished. Never allow shipments to contain red oak where white oak is specified. Make pieces all full enough, both in thickness and width, to dress as required after kiln drying and suit the purpose for which made and sold.

In other words, make your stock right, put up a fair grade, get a price that you can afford to manufacture and sell at, for a fair profit, load it out right and insist on the payment of invoices without deductions. If you are dealing with a fair consumer you will get what is due you, and if you do not get what is due you which you will learn by experience, pass your customer up and look for those who will do the

right thing. There are plenty of them. I know from what I have seen that some manufacturers of dimensions are not half as careful, as they should be with their grading and manufacture. If the pieces have not been cut thick enough, and the man loading discovers this to be the case, send them back for remanufacture, and save freight and the giving away of poor pieces. Likewise is this the case with regard to faulty or defective pieces. I saw on a consumer's yard not many months ago a car-load of squares that were poorly manufactured and defective, which the consumer had turned down for good cause, and would not have the shipment at any price. The same consumer showed me another car of $2\frac{1}{2}$ -inch squares, containing about 12,000 pieces, of which only 25 pieces had been culled. The balance was entirely satisfactory. He made no claim for cullage, but gave the shipper full settlement; and gave him an order for 15 cars of squares at \$8 per thousand above the price at which the other party wanted to sell. I mention this simply to show the difference in results of properly manufactured and graded stock and that which is otherwise.

WOODS FOR VEHICLES.

The United States Forest Service has been conducting a series of tests on vehicle woods. These tests were made on three manufactured parts; spokes, wagon poles, and axles.

The material tested was of the grades in common use. Buggy spokes were of the grades A, B, C, D, E, and culls, for the Sarven wheel. In this selection, the primary object was to determine whether the grading system was compatible with the strength and toughness of the spokes, and also to ascertain the relative strength and toughness of white and red hickory spokes. Five hundred spokes constituted the series. The poles were of two grades of oak and one grade of Southern pine. Part of the common oak poles were trussed. Forty poles were tested. The axles were of hickory and maple of three designs, thimble, skein, thimble skein trussed, and long sleeve skein trussed. There were eight axles of each species and each design, making forty-eight in all. The object in this series was to obtain the comparative strength of the two woods and of the different constructions.

The results from the spoke tests show more than 50 per cent. error in the present grading system, which is largely due to the traditional prejudice and consequent discrimination against red hickory. No red spokes are now allowed in the A and B grades, yet these tests show that a large proportion of the red spokes now included in the lower grades should be, because of their strength and toughness, included in the highest grades. The resilience factor which is determined by maximum load and toughness varies directly with the weight, showing that best criterion for judging the utility of spokes is the weight. It is also shown by the tests that, weight for weight, the red and mixed spokes are fully as strong as the white ones. Of defects serious enough to affect the strength those near the centre of the spokes are considerably more damaging than the defects near the ends. A study of the tested spokes as they now appear at the Purdue University laboratory would give much practical information to commercial graders. These tests will be supplemented by another series on spokes manufactured of sound dead hickory which occurs in considerable quantity in the South, and is not now used for this purpose.

The tests on the wagon poles brought out several important points. The present manner of attaching poles could be much improved since the construction at the hounds is much