

Niagara Town, Clifton and St. Catharines I found hickory almost the principal firewood, and piled up in every person's yard. At the manufactories in St. Catharines I learn they use imported hickory, and put their own in the fire, while west of them, on the line of the Canada Southern Railway, numerous sawmills were at work cutting hickory into spokes and hubs for the American market. I visited the mills myself, and saw them at work. One of the chief causes of our gross ignorance is the want of a Forestry Department and staff of competent men to enlighten the people. Each province owns its wild lands, and each settler his farm, and reckless waste and wanton destruction are the order of the day. The people are gradually becoming aware of the alarming waste caused by fire and the permanent change taking place in the climate. The probabilities are that the Dominion Government may take the matter up at an early day, and at least the worst features of the constant burnings be somewhat curtailed.

III. HARDNESS.

Nearly all the woods mentioned in the lists are hard when dry. Some of them are so hard that in daylight fire will be seen to fly from the axe when they are being cut for firewood. Ash, hickory, all the oaks, beech, hornbeam and ironwood become very hard when dry. Basswood, elm of the various kinds, willow, poplar, and some other woods, do not become so hard but they are very difficult to cut, as the axe will indent them but not start a chip, owing to their toughness.

IV. WOODS SUITED FOR CABINETMAKING AND FURNITURE.

In the foregoing remarks I have abstained from saying anything about the beauty of many of our woods and their great value for cabinetmaking and all kinds of furniture. Many woods, of great beauty for panels of doors and inside work in rooms, are to be had at a small cost in Canada. The more abundant of these woods are black ash, Douglas fir, black walnut, butternut, cherry, pine, cedar, birch, tulip-tree or white-wood, chestnut, white ash, maple, oak, sycamore, and some others. An examination of the articles of furniture, doors, &c., in the Exhibit on will illustrate this part of the subject better than I can, but these billets, which I now show you, will give you at least a faint idea of their varied appearance and contrast of colours. The Douglas fir, easily worked, and has that warmth of colour so admired in pitch pine, but is free from the resin that interferes with its working. Sycamore (*Platanus occidentalis*), black walnut, maple and ash are well known, and need only be mentioned; but one fact should not be lost sight of—that all these are easily worked, and of more value on that account. We have had logs of black birch, black walnut, black ash, basswood and slippery elm exposed to the English climate since spring, and there is not the least appearance of checking up to date in any of them. This to me is a fact that should not be lost sight of, as wood that dries without a flaw ought to be good.

V. COOPERAGE.

Oak seems to have the first place for wine and beer barrels, and Quebec staves have held their own for many years. Birch staves are found to be an excellent substitute for vinegar and many other barrels, and Mr. Mansone proved the other day that black ash is well adapted for the same purpose. Pine, cedar, and many other woods are suitable for dry barrels. In this line of business our easily worked woods are unapproachable.

VI. PULP FOR PAPERMAKING.

In conversation with a gentleman the other day, I discovered that large importations of wood pulp were being made from Norway and Sweden into England. Now, it may not be a surprise to any of my audience when I say that we have in Canada more land covered with poplar alone than the whole area of Norway, Sweden and Finland; that these poplar lands are in every province, and with the exception of the Northwest, are the poorest of the lands. As poplar (*Populus tremuloides*) grows rapidly, we can fill any orders that may be made upon us without exhausting the supply. Much of the spruce required for common purposes comes now from these same countries; and this, too, we can furnish, as a belt of spruce crosses the watersheds of all the rivers flowing into the Gulf and River St. Lawrence and Hudson's Bay.

VII. DETERIORATION AFTER CUTTING.

Many trees, under certain conditions, rot easily, while under other conditions, they are almost imperishable. Basswood was early considered a poor wood for fencing, as it rotted so easily. Observation showed that with the bark on it soon rotted, but without the bark it remained sound. The same thing is true of elm, but in a lesser degree. Beech rots very quick if exposed to the elements, but under shelter remains sound. If covered by water it will remain sound for a long time. Oak, if exposed to the weather, loses its sap wood, but the old wood remains sound for many years. I believe all young timber should either be put in water immediately after it is cut or put under shelter, as the young wood begins to rot very quickly if it is alternately wetted and dried. It follows, then, that deterioration takes place to a far greater extent than we imagine by letting young trees lie out in all weathers with their bark on, as they cannot resist wet without having been first dried.

I believe that any attempt to ship our hardwoods to this country without a proper understanding of the subject will result in failure. Basswood sent to England in the usual way would be both an unsightly and an inferior wood, but if sawed into boards at once in Canada and dried would be both beauti-

ful and of excellent quality. Its natural colour is a light yellow, but it takes a stain so easily that it can be made of any colour. Our practical men know the great beauty of our common woods, but few know how to treat them to preserve their strength and colour. My own opinion is that only two plans can be adopted—soaking in water long enough to remove or change the character of the sap, or sawing up the wood into planks or boards and drying at once. Unless this is done you cannot expect to get such stock as our local manufacturers use. Deterioration by discoloration or incipient decay, or even by fungus growth, can easily be proved to arise from decomposition or fermentation of the sap or the albuminous matter laid up in the wood cells for the next year's growth. All the maples, birches, poplars, and lindens are noted for their loss of colour owing to these changes. The action of the winter's frost in the case of the maple changes the albuminous matter into cane sugar, while in the sap of the birch it produces grape sugar.

This would seem to indicate that the sap also undergoes fermentation when the tree is cut down and the logs are exposed to the weather. In removing the starchy matter from the cells we remove the chief cause of decay and of weakness, and must have a closer-grained, lighter, tougher, and more elastic wood.

By the present method of shipping square logs, one-fourth of the best part of the tree is left on the ground and another seventh is lost before it passes into the hands of the mechanic. In this way over one-third of the wood is wasted, and the old overgrown trees, with very inferior heartwood, are the only ones that reach the English market. If the plan indicated above were adopted, half-grown trees, as well as old ones, would be taken and sawed at once to the required thickness or size. After rejecting the heartwood, bark, and other useless portions, a material would be left which all practical men can see must far excel that now sold on the English market. Beauty of grain, toughness, and elasticity are combined in the wood of young trees and hence such ought to be chosen, and their supply in Canada is practically inexhaustible.

In speaking to an English audience composed of practical men, I feel bound to show that the superiority of English woods is not due to any inherent quality, but merely to the fact that you take the best of yours and get the worst of ours. Give our woods, grown under the same conditions, and of the same age as yours, the same treatment, and I have no fear for the results. The ash and oak I saw in Mr. Lucas's factory told their own tale, the bark being just as sound as the wood, showing conclusively that it was sawed up shortly after being felled. To be of any real value carriages must be constructed of well-selected and well-seasoned timber, and to all desiring such I would say look to Canada for your raw material.

VIII. AMERICAN VIEW OF THEIR TIMBER SUPPLY.

We are threatened with a want of sufficient quantity of timber to meet the actual necessities of life.

Twenty millions of people are living in dwellings chiefly constructed of wood. Their barns and outbuildings are of wood, and the fencing of their farms, more expensive than their other improvements, is of wood, and all these are perishable with time. Moreover, our sixty thousand miles of railroad consume annually immense quantities of timber. Twenty-one thousand six hundred cords of wood are daily consumed in running railway trains three hundred and twenty thousand miles each twenty-four hours. Sixty thousand miles of road require twenty-five hundred ties to the mile, and as they must be replaced every five years an annual consumption of thirty million ties is required. We will soon construct each year ten thousand miles of new road requiring twenty-five million more ties, and when we add to all these sources of forest destruction the wood required in the fencing of these railroads, the half-million telegraph poles which each year will be required, and the vast amount of the destruction of forests by flood or fire, we must be absolutely startled with the conviction that whole provinces of wood which have required a hundred years to grow are each year being swept away, while nothing is done by either public authority or private zeal to supply the place of that which is destroyed or protect in any measure that which exists. These are 'hard facts,' and whether people mind them or not to-day, they will give them some thought hereafter.

In France the forests were cut down with the utmost recklessness, and for the last thirty years her fertile valleys have been swept by terrible floods carrying away all kinds of property and covering the rich soil with gravel and sand. In Russia the forests are beginning to disappear, and a law is now in force making it illegal to use anything but coal for fuel on the railroads.

The timber lands of Germany are under the special protection of the Government, while in Japan every one who cuts down a tree is compelled at once to plant another.

The experience of these countries foreshadows that of our thoughtless men, and reckless corporations may go on stripping the land of its forests, but at last every one will be convinced of the necessity for a change.

PRACTICAL VIEWS FROM NEW BRUNSWICK.

Mr. John D. Howe, of the firm of J. & J. D. Howe, furniture manufacturers, of St. John, New Brunswick, the designer of the magnificent wood trophy shown by the Government of

New Brunswick at the Colonial and Indian Exhibition, says: 'Authorities differ as to whether our supply of what is generally looked upon as our marketable lumber is diminishing. Be this as it may, we still have enormous supplies of these woods. Independent of these it is a well known fact that immense tracts of our lands are covered with most valuable woods generally considered of little value, but which will eventually yield a more profitable article of export than either pine or spruce, as the latter are now handled. The poplar, white birch, basswood, maple, and other deciduous varieties of our forests if cut and shipped in the ordinary manner of shipping spruce and pine, would in most cases prove a failure. In order to make their export a success their nature and peculiarities must be well understood, and a desirable amount of intelligence and skill brought to bear in their manufacture. We might as well attempt to send away our grass or grain as we take them off the fields, without curing, as to export these woods without seasoning and manufacturing into desirable sizes or articles for which they are best suited. Our poplar, which is very abundant, is valuable for many purposes; it is very white in colour, and of light weight. It becomes hard and tough when dry, and is susceptible of a very high degree of polish. On account of the hardness of this wood it is considered superior to pine or spruce, where narrow stock is required, for flooring and other interior finish. It can also be largely used for cabinetwork, tool handles, paper-pulp, and many other purposes.

Basswood, like the poplar, is even more liable to spoil after the tree is cut down. Like all other vegetable substances, there is not any remedy for it after decay sets in. The early stages of decay, or rotting of the sap, as it is called, should be carefully guarded against; it alike destroys the colour of the wood and the firmness of its grain. It destroys the qualities which render it so valuable for many purposes, such as carriage bodies, furniture, interior finish, &c. It takes walnut or mahogany stain equal if not superior to any other wood, and makes a pleasing finish in its natural colour—pale yellow.

The white birch, although not so liable as the basswood, poplar, and maple to deteriorate while green, or before the sap or moisture leaves it, requires careful treatment in order to preserve its strength and colour. The many purposes to which this valuable wood may be applied are too numerous to mention. Large quantities are now being shipped to Europe in the shape of spool bobbins blocks, &c. It is becoming exceedingly popular for first class flooring, and for this purpose should be cut on the rift rather than on the slash of the grain. Maple and beech are also excellent for flooring, but their chief value is for tool stocks and handles, agricultural implements, lasts, and an almost endless variety of articles requiring a strength and hardness that will resist wear.

The preference given to English plane stock and tool handles is not due (as the prevailing opinion puts it) to the material used by those makers being superior to ours. It is rather attributable to their proper method of treatment of it. The trees are cut down in the proper season, while the sap is down; they are then blocked out to suitable sizes and dried, not allowing the sun to check or dampness to heat or mould it. On no account is the log allowed to remain uncut for any length of time, either in or out of the water. There is not any class of woodwork where the proper cutting and curing of wood is of so great importance as in its preparation for wood-engraving. Our rock maple if prepared according to the foregoing observation, becomes dense and capable of receiving almost as large a number of lines to the inch as boxwood; in other words, it is suitable for fine work. If the same wood was allowed to remain in bulk for any length of time, even in the log or plank, or (worse still) a close pile, it would become worthless for wood-engraving.

Mr. Howe continues; 'It is to be regretted that the beauty and nature of our native woods have not been better understood and properly appreciated. This is probably due to their abundance, but it is not any reason why we should not make the most of what we have so plentiful. It is hoped that when it becomes apparent that we still possess a valuable supply of timber that it will not receive the same ruthless and greedy treatment that the pine, spruce, and hemlock have received in the past.'

In again referring to the proper preservation and seasoning of timber, while Mr. Howe's remarks apply to some lumber or material not exceeding three or four inches in thickness, the same cannot be applied to cases where it is used in larger bulk, as in the case of that used for shipbuilding. For these purposes another eminent authority says: 'The decay of woods by the growth of fungus, denominated dry rot, may be traced to the putrefying of the sap (as alluded to by Mr. Howe) when this has been left within the pores of the timber in the same condition as it exists in the living tree. The various means employed to arrest this destructive fermentation are either to wash out the sap by long soaking in water, aided by the action of the sun, to dry up the sap, either naturally by exposure to the sun and wind, or artificially by heated currents of air.' Nearly all authorities agree that there is great advantage in having our woods properly seasoned in this climate. A firm of dealers in wooden ware, writing from Liverpool recently, commented most strongly upon the subject, and stated that the advantage