

quantities of valuable timber, the manufacture of which is rapidly increasing, to meet the wants of the Pacific coast and islands. Much of this lumber will find its way east to the treeless prairies.

As to Canadian's method of lumbering, when circumstances will permit, we pile or skid before the snow becomes too deep. When the snow is deep we draw direct from the stump to the lake or river. Our style of living in the shanty, and, in fact, the building itself differs in the various parts of the country. Until very recently, particularly in the lower St. Lawrence, the fare of the shantyman was very primitive, the commonest tea being quite a luxury, and the only variety in the bill of fare was that it consisted of pea soup, bread, pork and beans for dinner, the same, with the addition of tea for supper, and either, less the pea soup, for breakfast. On the St. Maurice, for many years, the living has been good and substantial, with comfortable shanties provided with stove, tables and bunks, the cooking being usually done in an outside compartment. The shantyman's conditions however, is improving with the times.

Our shanty-men, whether English or French, as a rule, are as good axemen, and expert drivers and canoe-men, as can be found in any country. Our people are well up in dam building, as well as in making slides and clearing away the rivers to facilitate driving. Our rivers, as a general thing, being very precipitous and rapid, require extensive improvements, especially for the running of square timber.

Mr. Hale, of Sherbrooke, gave an amusing history of a stick at the Forestry Congress in this city in 1882. "An example of the far-reaching benefit of arboriculture, I will give the history of probably the first importation of any new variety of tree ever made into the eastern townships. Many years ago a solitary horseman might have been seen wending his way from the central part of Vermont, bearing in his hand a riding stick broken from a tree as he left his home. His destination was Lennoxville, and in due course of time he arrived, and taking up his abode at a farmhouse about one mile east of the village, stuck his now useless stick in the ground. Like Aaron's rod, in due time it budded and grew apace—a scion of the then unknown white willow. From this little stranger have come all the original magnificent trees, for which Lennoxville and the surrounding country, have been so long and so justly famous, and which have done so much towards clothing the country sides for miles around, with its rich and luxuriant foliage; into many other towns and villages have they spread, until the offspring of this embryotic willow might be numbered by the thousands."

TWO CANADIAN WOODS.

I can hardly let the occasion pass without a reference to two of our woods, the first because of its usefulness to the poor aborigine, whose heritage we possess; it served to cover his wigwam, and was the material for his canoe, to aid locomotion; the latter, the great wood of commerce.

The white birch, or boleau, has within a few years become of some value when found within easy reach, having been turned to account for the manufacture of spools and spool wood for thread makers, the white part of the wood only being used. It is made into squares, varying from one inch, in eighths, to say, two inches, and three or four feet long. Many shiploads have been shipped to England and Scotland the past few years, principally from the lower St. Lawrence. The red, or heart, being worthless to the spoolmakers, either used as fire wood or left to rot. There are vast quantities of this wood in the interior too far from navigation or rail to be of any value. It is mostly found on poor soil, mixed with balsam, small spruce and cedar. It makes good firewood when dry. The bark is useful to the Indian for the making of his canoe; the vessel for retaining the sap of the maple; his drinking cup and the cover of his wigwam. The yellow birch provides a cough remedy by boiling the sap down to a syrup; and, lastly, though not least, it furnishes the proverbial birch-rod, which, though almost obsolete, sometimes does good service, even in these days of advanced ideas. Vast quantities of the dwarf or black birch have been used as withes in rafting logs, some concerns using as many as thirty or forty thousand in a season, each of them representing a young tree; but little of this is done at present.

We now come to what every lumberman considers the king of the forest, in grandeur, usefulness and value, the white or cork pine, or *pinus strobus* of the scientists, the tree of all others that serves more purposes than we can enumerate. Among them the tiny match, the mast for the great ship, the frame of the sweet sounding piano, and wherever a soft, easy-working wood is wanted, either in the arts, the workshop, or the factory, there it is to be found. As an article of commerce, it far surpasses in value and quantity that of any other wood, if not of all sorts put together. It supplies more freight for vessels coming into the St. Lawrence than any other commodity; it gives more employment to wage-earning men than any industry in our country, except agriculture. It employs more capital in manipulating it from the time the men leave for the woods in the fall, to make, haul and drive the logs and timber to the mills—the building of mills for sawing, the construction of barges and steamboats to convey it to market, as well as the large amount of freight furnished to railroads, the erection of factories to convert it to the various uses to which it is put. It is safe to say, that the value of the output of pine lumber alone, produced in Canada, is at least \$25,000,000, or two and a half times as much as that of any other manufacturing industry, and, when we consider that 60 per cent. is paid for labor, and that, nearly all to men, representing a large population, you can readily see how important it is, either by legislation or otherwise, to protect and conserve the source of this great factor in our prosperity. How can we extol sufficiently this monarch of the forest that we are so much indebted to? The tree when growing in the open country is of little or no value, except as a shade tree, its literal branches reaching almost to the ground, it is in the dense forest we have to look for the great tree of commerce, where nature acts the pruner. There the branches decay and drop off, the trunk shoots upward high above its neighbors, seeking that which it was deprived of below—light and air. By this action of nature we get our clear pine, so much prized by mechanics. As the branches drop off, the wood grows over them, and we get the stately tree carrying its size well up, and often attaining 60 or 70 feet to the branches. I once saw a tree that measured 40 inches in diameter 70 feet from the ground, without a knot or defect visible in this space. Naturally, however, it is very rare to get a log or the best of timber without finding knots or defects as you get near the heart, the remains of the dead branches that fell off during the tree's youth. My experience teaches me that white pine is of slow growth. The smallest trees that ought to be taken for saw logs or timber should be at least fourteen inches at the butt. This would take not less than fifty years to produce, and such a tree as I have before described as much as one hundred and fifty; more than three inches in twenty years. Large groves of pine are usually found on poor light soil, I think, consequently, that the bulk of the pine found under such circumstances is apt to be punky or defective for the want—so to speak—of nourishment. The best pine is usually found on stronger soil mixed with hardwood. It is unpleasant to contemplate the want of this valuable timber. Once gone it is gone forever, and cannot be reproduced in our or our children's time, as unlike mineral or the other products of the soil, the quantity produced from these are limited by the amount of labor employed in producing them. Perhaps, however, time will find a substitute in some artificial wood, or employ metal to take its place.

OTHER CANADIAN WOODS.

Hardwoods, to which I will briefly refer, that were once almost discarded, except for burning, are coming largely into use in consequence of the improved wood-working machinery that has been devised of late years, making the work of preparing and completing joiner work much more simple and easy than it was to do the same thing in pine when I served my time over 50 years ago, and when flooring, mortising, tenoning, sticking mouldings out of dry spruce with hard knots, was done by hand. The facilities also for reaching hardwoods and getting them to market will help to make up for the loss of this favorite material, which, I hope, is yet a long way off. I might say before closing this part of my subject that the magnificent cedar of British Columbia will, no doubt, largely take the place of white pine for

joiner-work. The Douglas fir will be a valuable substitute for our coarser woods, when they become scarce and high in price. A lumberman's life is not passed on a bed of roses, yet there is a charm about it to those who have the stamina to endure its hardships, and enjoy its excitements, that is not easily forgotten. Who, that has followed it, can forget the log drive from early morn to sun-down, kedging across the lake to the tune of the chanteur, or breaking the jam in the roaring cascade, whose noise is drowned by the yells and shouts of the crew on seeing the great mass move off, each great log as it were, trying to get ahead of its neighbor, until they reach still water. What excitement after the risk run and efforts made! Old lumbermen can and do look back to such scenes with much pride. What other business has so many contingencies connected with it, apart from the ordinary mishaps in trade?—sometimes too much snow, other times too little. On other occasions the ice or the floods carry away his booms and scatter the logs, to be often stolen by land pirates, who will secret his property, and annoy him in trying to find it.

As to the utility of the forest, though it may not attract the rain or influence its downfall, there can be no doubt as to its regulating the flowing of the waters by holding them back in the glades and swamps, sheltering the land from the fierce rays of the sun, preventing rapid evaporation to a great extent, and thus preventing oftentimes damaging floods and dried up streams. For the reasons advanced does it not behoove us to use our influence to bring about such legislation as will have the effect of preserving and protecting our forests, on which so much depends."

In concluding his address, Mr. Ward said that on the 15th of April last was the fiftieth anniversary of his entrance into a sawmill to work.

THE GAS ENGINE AND THE STEAM ENGINE JOINED.

REFERRING to the discussion of the gas engine question, a prominent engineer remarked in conversation that he failed to see why the gas engine and the steam engine should not be compounded, so to speak. He put the case something in this manner: In the gas engine one of the problems is to keep the cylinder reasonably cool, and in the steam engine to keep the cylinder hot. Now, suppose we have a gas engine running and jacket its cylinder with water, which is then used for boiler-feed water, thus saving the heat which is now thrown away. Then take the exhaust from the gas engine through the jacket of the steam cylinder, and, if necessary, as it probably would be, add a heating chamber for the steam to pass through just before reaching the cylinder, so that more heating force could be employed. Two such engines adapted to each other would probably mean a relatively small gas engine and a steam engine large enough to carry all the load in case the gas engine refused to work for any reason, and, arranged in this way, each would supplement the other so far as the proper distribution of heat is concerned. The proposition is a novel one, and there is a chance to do some thinking over it. Possibly someone may be so situated as to make it easy to try the plan and let us know the results.—American Machinist.

DAMAGE TO CHIMNEYS BY LIGHTNING.

AN investigation was recently carried on in Germany, by C. Carlo, upon the subject of the damage done by lightning to chimneys, both with and without lightning conductors. From a study of twenty-four cases, he draws the following conclusions:

1. Lightning very seldom strikes a chimney in such a way as to leave any perceptible effect.
2. The damage done by lightning to chimneys is in most cases inconsiderable; only in one case was a chimney actually destroyed, and in four cases only was the damage so great that it was necessary to pull the chimneys down.
3. Lightning strikes chimneys both with and without lightning conductors; the latter appear, however, to be struck oftener than the former. Of the cases reported on, two were with and fifteen without lightning conductors; in four cases it was not definitely known whether a conductor was in position or not.
4. In low, marshy grounds, lightning flashes seem to occur more often than in high and dry neighborhoods.
5. In one case only has lightning struck a steam boiler so as to necessitate repair.