chances are that the information will get around to him, and that he will be "jacked up" about it.

The little, hard knot, that is not much in point of size, but has a degree of hardness that no amount of boiling will touch, makes trouble, too. It may be only a little nick that it breaks out of the knife edge, but that nick leaves its mark on the veneer, and that makes trouble. Then, to get rid of that nick, no matter what the size, involves grinding the full length of the knife till it disappears, and that costs money, as well as time, for those long knives that make up the business end of a rotary-cutting veneer machine are expensive articles. With all its worries, however, the veneer industry is a great and a growing one, and it really has no more troubles than any other industry, but they are of a somewhat peculiar character. By-and-by, when those in the industry get more accustomed to the peculiarities of these troubles, they will get simpler, and the task of operating a veneer machine will not present the obstacles to the ordinary mechanic that it does to-day. The industry is now at a stage where we might compare the expert veneer men to the expert sawyers in the early days of big sawmills, and, like in the sawmill industry, knowledge of how to master the difficulties will spread and their peculiarities will disappear.

REQUIREMENTS OF A VENEER PLANT.

One is sometimes asked by those contemplating the establishment of a plant to manufacture box shooks, crate slats, etc., what machinery is required. Such an enquiry is answered in "Veneers" in the following fashion. It should be understood that there is quite a difference existing between a veneer mill and one for cutting up box shooks. There is some sawed veneer made into box shooks, but the majority of veneer sawing is done in making fine quartered oak veneer, and it is very tedious, expensive work, requiring the finest kind of adjustment, and a veneer sawing mill is not convertible to any other use. The cheapest way to make veneer for thin box shooks and for crate slats, is to make it on a rotary veneer cutting machine, and the equipment required in a plant operating one veneer machine of this kind depends somewhat on the kind of work you want to do. In making veneer, pure and simple, it requires in the way of machinery a drag-saw to cut the logs into block lengths, a veneer machine, a veneer clipper, and, if you expect to dry your veneer artificially, a veneer dryer. To this may be added rip saws and cross-cuts for saw-sizing veneer; even if the majority of the box shooks are cut to proper size at the machine and the clipper, these are useful, because some of the waste can be worked over on the rip saws and cross-cut saws into other sizes. It is quite a common practice to include with a veneer plant a sawmill of some kind. Some use short-log mills, and some use one kind and some another, depending on the amount of work they expect to do with the sawmill end, and by having a small sawmill and rip saws and cross-cuts, you can, in addition to making veneer with such a plant, manufacture small dimension stock out of the cores from the veneer machine, and make lumber, too, if it is desired. This will probably be the cheapest and best equipment in the way of a veneer plant for making box shooks, crate slats, etc.; that is, have a rotary veneer machine, drag-saw, clipper, cross-cut and rip saws, and a small sawmill rig for working up material that doesn't work well in the veneer machine, thus converting the cores into strips of small dimension. Of course, a power plant equipment sufficient to drive the machinery is understood to be installed.

THE CANADIAN COOPERAGE INDUSTRY.

By James Innes.

Next to trapping and fishing, the cooperage industry is probably the oldest trade on the continent of America. Newfoundland is undoubtedly the cradle of the industry, as when the hardy Scotchmen and Frenchmen came there to gather in the harvest of the seas they had to have receptacles to hold their pickled herrings and salted codfish, and naturally used the packages they were accustomed to at home, the barrel. Barrels are still the principle packages used there for herrings for export, for seal oil, cod liver oil, pickling codfish, and tubs of every description for handling the green fish and shipping the dry fish.

While Chatham, Ont., can hardly claim to have had the first cooperage stock manufacturing mill, Iroquois probably having this honor, there is no doubt that Chatham was the first centre for manufacturing staves, hoops and heading by machinery on a large scale, and for thirty years has held this supremacy. Forty years ago it was also the largest market for oak staves. Old residents tell me that forty to fifty years ago McGregor's Creek at Chatham every spring was full of butt, pipe and hogshead staves, vessels being loaded there for Quebec, and in some cases going through to Great Britain. While oak staves are no longer manufactured to any extent in Canada, the oak being almost a thing of the past, the names, commercially, still linger, and Canada butts and Quebec pipe staves are still going forward from the Southern States to all parts of the world.

Twenty years ago there were more slack barrel staves made in Canada than the United States, nearly every station on the Michigan Central Railway from Essex to St. Thomas, from St. Thomas to Courtright, and on the Grand Trunk from Windsor to London, London to Sarnia, Sarnia to St. Mary's, having its stave mill. Dozens of these mills are now out of existence. Fifteen or twenty years ago a stave dealer would have no trouble to purchase fifty million staves in a few days; now it would be quite as difficult to purchase five. While at least 100,000,000 of staves at that time were yearly exported to the United States, now 10,000,000 is a good year's export. The consumption in Canada has, of course, increased; in fact, Canada in an ordinary year can use 90 per cent. of the output of staves, hoops and heading manufactured in the country.

Elm—the principal timber for slack staves and hoops, is fast disappearing; basswood, for heading, is almost a thing of the past, so that it is only a question of a short time when hardwood staves and heading, half-round or iron hoops will go to make the barrels of all kinds not requiring to hold liquids, while we will have to continue importing our oak staves from the United States. Unless the Government takes up the reforesting movement energetically and grows the timber necessary, fifty years from now we will have no timber to make cooperage stock, and a barrel will be a museum curiosity, instead of the most universally used, handiest and best package on earth for carrying liquids without leaking and solids without contamination.

UTILIZING THE REFUSE.

Sawdust shavings in the box factory are gold dust. They have got actual value, and, if you do not save them, you have got something yet to learn in the box business. I will cite an instance of this. In the upper peninsula of Michigan, in the 90's, I built a box factory. I did not know