

THE BY-PRODUCTS OF SAWMILLING.

IN the early days of lumbering in this country lumbermen could, with some reason, perhaps, exercise less or more prodigality, both when at work in felling the tree and likewise when cutting it into lumber. At a more remote time when the primary matter was to clear the land, that it might be seeded down to provide sustenance for man and beast, there was little else to do than to get rid of the timber in the quickest way possible, which was usually to cremate it. Time has worked many changes, and the small economies of business need to be exercised to-day by the lumbermen as much as by any other class of business men. Under the caption of "By-Products of Sawmilling" a writer in *Hardwood* enlarges quite profitably on this subject. He says: "The average operator of a sawmill relies for his profit on the good lumber he is able to turn out. He measures the chances of loss and gain wholly by the percentage of clear stock his logs will cut, and the price of such lumber in market. The mill culls are waste anyway, and if he gets within a moderate percentage of the cost of his common and shipping culls, he congratulates himself upon his closeness in figuring and economy in operating his mill. His profits necessarily depend upon his ability to get enough for his high-grade lumber to cover the greater part of the cost of his logs and all his profit."

"It is not difficult to figure out something ahead in this, by assorting his lumber so that it will run well to good, but such liberality not uncommonly defeats itself, for when the stock gets into market, and is inspected under the buyer's severer construction of the rules, the unlucky shipper very likely finds that he has a heavy freight to pay on much of it that will not bring cost at the delivery point. More than one saw mill enterprise that promised fairly enough in the beginning has landed the owner in bankruptcy because the timber would not make enough clear lumber to carry it. And are they not falling around us every day for a like reason?"

"This result is largely due in nearly every case to the neglect of the by products of the saw mill. Many mill operators look upon anything but lumber as unworthy their attention, and so they run everything that will not make boards or plank or dimension stock that is fit to ship into the conveyor and up the incline, to the slab pile or refuse burner."

"Thousands yes, millions of dollars of as good profit as was ever made has been thrown away in this fashion, and few that lost it could tell where it had gone. They may know that they got back for their lumber less than the timber and sawing cost, and that their operation as a whole was a losing one, but they do not realize that the gain which would have served to turn the scale might readily have been made out of the stuff they burned up to get out of the way."

"No saw mill man can be said to have fully mastered his business until he has learned that every cent he is able to get out of stock that will not bear shipment, or sell at a profit, is so much made. It all goes to swell the profits, because the stuff must be made in order to make the good lumber of which it is the refuse. All the by-products of the saw mill have this advantage, that they are the savings from what is practically worthless, and hence their cost represents only the labor put into them after they pass the saw. It is the conversion of the useless into the valuable, and so long as the bare expense of the manipulation costs less than the value of the resulting product, there is money in it."

"This is a matter which has received more attention in the pine mills than among those sawing hardwoods, for one reason because the former are larger establishments as a rule, and are operated in a more scientific way. With many hardwood producers, the sole problem they undertake to solve is to get a certain quantity of logs into such shape that they are marketable, and to get the money for them. Their prime object does not seem to be so much to make the largest possible profit, as to turn their investment into cash quickly. This is a condition made necessary sometimes by the limited capital available, but it rapidly grows into a habit, and many never get beyond it. They begin and end their career as saw mill men without developing the scientific side of their business at all, being content with merely buying trees and logs, cutting them with more or less

economy into boards and plank, and burning everything that will not make such lumber."

"The notion is widely prevalent among such operators that small mills are incompatible with the requirements of economy, and that in order to take advantage of the chances for profit in the close utilization of material a big mill with all imaginable appurtenances is a necessary prerequisite. This is a mistake. The man cutting five or six thousand a day is just as able to take care of the waste as one cutting four or five times as much."

The writer has in mind now a little single circular mill, located at a place which it has practically created, and where there is no other business, cutting from six to eight thousand feet a day, where the principle of working up the waste is carried out in detail. Besides the regular outfit of machinery, it has a band saw for making felloes, a sawing table, a lathe for making chair legs and for turning wood into various irregular shapes, cross-cut saws, etc. The result is that no cull stock is shipped from this mill, and what is left of the slabs and edgings needs very little grinding to make it as fine as sawdust. The owners have no difficulty in realizing a good profit from rather inferior logs, and their books show that a good deal of it comes from what they save out of the waste."

"In some large mills what is ordinarily regarded as the refuse becomes the basis of a distinct business. The waste is sold by the saw mill man at a certain price, small of course, and the buyer takes it and works it up. Every piece big enough to make a pill-box is saved and utilized, and even when the cost of the material is added a good profit remains. In many cases this plan of utilization will prove practicable and economical, relieving the mill man of the details attending the working up of his refuse stock, and furnishing another man with the means of making money."

"Another way is for the mill operator to furnish the machinery and the stock, and let out the job of working it up on shares or at an agreed price for the product. A shrewd, enterprising mechanic can usually be found who will gladly supply the skill, push and all needed help in keeping up the department for an interest in its results. By such methods as these, and others that will suggest themselves to a practical mill man, a deal of good money may be recovered from the slab pile that now represents nothing but loss to the owner. The machinery for working up wood into small shapes is not expensive, and it does not require such skill in handling as to make it difficult to secure competent men to operate it."

"The hardwood mill men are fortunate in having a larger variety of by-products than pine, where they are mainly lath and pickets, small pieces of pine being of little use for anything but kindling. But hardwoods of nearly all kinds can be worked up very closely, and made to yield a handsome revenue. They are used in so many shapes, and so largely in small pieces, that attention to the utilization of everything about a hardwood mill becomes of first importance. All mill owners cannot adopt the same plan, of course, but all should have some method of working the refuse into valuable by-products, as they may if they will but give the subject proper study."

"When everything possible has been made in the way of small articles of wood, there will still remain something of value in the residue—the sawdust, bark and chips that go into the furnace or the refuse burner. All this is material, just as good as an entire tree, for the manufacture of the numerous products derived from the destructive distillation of wood."

"In several places already large works are in operation turning out such things as wood alcohol, creosote, acetate of lime, pitch, ether, wood oil, and other things which sell readily and bring prices that show a large profit over the cost of making. There was an exhibit of an apparatus for this work, and of its products, in the Forestry Building at the World's Fair, which showed that remarkable results can be obtained with a comparatively small investment and at little cost. Figures are given in connection with it which indicate a profit of \$5 on the carbonization of one cord of wood, allowing \$2 as the cost of it, and a further margin if the wood-tar obtained is re-distilled. Using the refuse of saw mills,

which could be placed in the apparatus as cheaply as in a refuse burner, the margin ought to be large enough to make the process one of value to lumber makers. Possibly all mill owners might not find it practicable or advisable to carry the utilization of their waste material to this extent, but many of them might do so to their own profit and to the general advantage of the business."

BOILER EXPLOSIONS.

By E. W. LOCKWOOD, IN "TRADESMAN."

THE fundamental cause of explosion in steam boilers when traced to its origin is most generally found to be the result of foul and dirty boilers. By reason of mud, sediment and scale, the engineer is unable to properly secure the results desired, he must consequently force things, and as a result the shell of the boiler is overheated, expansion causes scale to give way, and the water striking the overheated plates creates a reaction which suddenly produces a strain upon the boiler. Something must give way and an explosion is the result. All this is due to the fact that the boilers were foul and in an unfit condition to do the work required of them. I lay down as a text this one fact: keep your boilers clean and you will have overcome the primary cause of explosions.

The world is constantly securing the results of brain energy of thinking men; improvements are daily being made; there is a constant and steady advance along the whole line of mechanical construction, which in the past decade has been so great that it is almost impossible to enumerate. Those improvements and inventions which have secured the most satisfactory results have been the simplest in construction and operation, and comparatively inexpensive to the user when the risk and loss of time are fairly considered.

One of the simplest in construction and operation for use in steam boilers, and the only one which will keep steam boilers absolutely clean and furnish pure water, has passed beyond the era of experiment and is an accomplished and recognized fact, and is the only appliance in the world which does and will do complete work to this end. Such an appliance is of inestimable value to the engineer, as it enables him to have complete control of his boiler and secure from it the best results possible and that without risk or danger.

The boiler being kept clean gives to the engineer a sense of security which he can never feel when operating foul and dirty boilers, and the time is not far distant when the demand for security from loss and risking of lives of engineers will become so strong that the proprietor of any establishment, who, from a miserable parsimoniousness, shall fail to have the life of his engineer properly protected in this and all other directions, will be looked upon by all right-thinking citizens as a criminal, and I am much mistaken if he shall not be so considered under the law.

TO COVER SUCTION PIPES.

IT is a very good plan to cover the end of the suction pipes to pumps or injectors, and, in fact, it is very necessary in most cases, unless the water is very clear, as it does not take much to clog up an injector, especially a small one. But do not make the mistake of putting a flat screen over the end of the pipe, as this does not give opening enough for the water to flow through. This must be very plain when we think the wires of which the screen is made occupy a portion of the space that the pipe covers, and, besides this, there is the friction of the water passing through the numerous holes through the screen, which is considerable if the water is passing at a great velocity. To be sure, at slow speed the friction may not be noticeable, but as the speed or velocity increases, it is very noticeable and must be taken account of or trouble will ensue from not having sufficient water for your pump or injector. The best form of a screen in a place of this kind, and the one recommended by injector makers, and others in similar business, consists really in a hemisphere of brass wire netting, the diameter of which is the same as the pipe which it covers. This makes a very cheap screen and one which gives a good margin for the friction of the water and for the clogging up of the holes in the screen by floating particles of dirt in the water.