WOOD-WORKING CHIPLETS.

BY JOB.

MR. OWNER, call down your fireman. Don't you know that those vast volumes of dense black smoke that issue from your smokestack every 20 or 25 minutes, means something very serious in the way of a draft on your profit account? Ask your fireman why such volumes of black smoke, which is simply coal heated enough to drive it apart, but not enough to burn it, should be sent out to blacken the landscape. Ten chances to one he cannot tell you why. He may not even know that these regular eruptions mean a loss to you.

All the same they do. It is a double-ended loss, too, a regular two-edge-cut-both-ways knife that chisels away your profits at a fearful rate. In the first place, he shovels in too much coal at one time, having let the fire burn too long without replenishing. In the second place, he throws in the fresh coal in a heap here, a heap there, and a heap over yonder, instead of spreading thinly and evenly over the whole bed of fire. The unusual quantity of cold fuel reduces the heat in the furnaces, lowers the steam pressure for a time, and causes a loss. Then the heaps become heated enough to allow unburned coal to pass up the chimney. That causes another loss. In this way the bad method of feeding the fire simply uses up the heat, which ought to make steam out of the water in the boiler, to volatilize and carry away the coal that ought to be used in making steam.

See? You ought to if you do not. Your chimney belches out thousands of cubic feet of half gaseous coal every day, wasting the money you paid for the coal, shortening the service it performs for you, subjecting your plant to unnecessary wear and tear and dirt, and all because your fireman, left to his own devices and ignorant of what he is doing, goes on shoveling coal in the wrong way, at the wrong time, and in wrong quantities. Call him in. Call him down.

The subject of firing leads directly up to the question of the general building, use and treatment of steam boilers. Here is a table compiled by an inspection and insurance company, showing the number of explosions of steam boilers, giving a summation of the results of bad construction, bad treatment and bad management in general for 12 years :—

Year.	Explosions.	Killed.	Injured.
1879.....	132	208	213
1880.....	170	259	535
1881.....	159	251	313
1882.....	172	271	359
1883.....	184	263	412
1884.....	152	254	251
1885.....	155	220	278
1886.....	185	254	314
1887.....	198	264	388
1888.....	246	331	505
1889.....	180	304	433
1890.....	226	244	351
Total....	2,159	3,123	4,352

Of course, this is only a partial table, made up from the records of a single company, with no attempt to make it absolutely complete. It is an instructive, really a destructively instructive, showing. Look over it and then set about finding whether your own steam plant is not in such a shape that it is a promising, or threatening, candidate for a front place in the record of catastrophes for 1891. Foresight with steam is far better than hindsight.

NATIONAL FORESTRY PAYS.

THE government of France has expended $30,000,000 so far in re-foresting, and it is estimated that $34,000,000 more will be necessary before the mountain slopes are re-clothed and the farming lands reclaimed, and all because the State did not interfere in time to prevent the consequences brought about by the greedy private owners. It is not generally known that in Europe every State owns more or less forest property, which under a competent administration, yields a large revenue. Prussia appropriates annually $8,000,000 for her present administration, but she receives $14,000,000 in return, leaving a net revenue of $6,000,000, and all German States, as well as Austria, Italy and France have a net income of $1.50 to $4 from every acre they have in forest growth.

ADVICE FOR YOUNG FOREMEN.

FIRST, don't be self-conceited; this is one of the commonest diseases of young foremen. At first, no doubt, you will be modest and careful enough, but after one month has rolled by, and you find the shop is not a total wreck under your management, modesty will very likely give way to a satisfaction that will make you ridiculous if you don't check it. Don't ever let in the idea that you have done better than others could do, and don't imagine that the shop couldn't run without you. There are lots of sensible men in every shop, who size the boss up very correctly. They will know just what your calibre is, and you can't fool them. Therefore don't try. Don't ever pretend to know it all. If your men are convinced that you are fairly well informed they will respect you. But they will instantly detect and despise any false pretences in this line. Moreover, when you really do know a thing, show it by your actions rather than by words.

Don't be afraid to ask advice when necessary. There are men in that shop, I'll be bound, from whom you can learn a big lot. Therefore, when you are "stuck" on some problem that would puzzle anybody, don't be ashamed to seek counsel of some level-headed man in the shop. He can probably help you; and, if the problem is a hopeless one, you at least have the comfort of good company in your perplexity. But don't ask advice habitually or needlessly; and, if possible, counsel in each case with the man who is to do the work in question. Don't go over his head to some one else; it hurts his feelings, and don't work well. When, for instance, a difficult pattern is to be made, full of novel and peculiar features, consult the head molder as well as the pattern-maker. Above all things, don't fall into the habit of always leaning on the same man, or the same two or three men for advice; it will ruin you all.

Be calm and deliberate. No matter what emergencies arise, don't act, or give orders, or talk at all without giving yourself time to think. I have often had a perplexing job come into the shop, or a bad break occur, late in the afternoon, that paralysed me. In such a case I always looked it over cooly and deliberately, and gave no sign of what I thought of it, or what I intended to do. In fact, I didn't know; but, ten chances to one, an hour's study after supper, when I had time to think, would clear away the difficulty, and in the morning I would go at the job so easily that they all thought I intended from the start to do it that way.

In such cases it generally pays pretty well to note carefully and silently any suggestions that may be dropped by any of the men; I have learned a lot in this way.

Keep your temper, don't ever speak roughly to your men; no treatment can be too good for a good Canadian machinist. If a man is not good enough to be well treated, you don't want him. And don't ever get angry at a hard job, or a poor tool, or an accident—it makes the men laugh at you.

STEAM MOTIVE POWER IN 1700.

THE discoveries which are from time to time made in the Egyptian tombs authorize the belief that many of the inventions and machines of the present day were known to the ancients and used by them. A correspondent who is curious in such things, sends us the subjoined extract from the "History of China," Pere du Halde, which was published in 1741 (folio edition). It is certainly nothing less than a miniature locomotive and steamboat which was here noticed. The extract is taken from a description given by Du Halde of the various inventions made by the Jesuit missionaries in China for the instruction and amusement of the Emperor Kanghi, who died in 1722. The inventions there described were about the beginning of the eighteenth century :—"The pneumatic engines did no less excite his Majesty's curiosity. They caused a wagon to be made of light wood, about two feet long, in the middle whereof they placed a brazen vessel full of live coals, and upon them an eolipile, the wind of which issued through a little pipe upon a sort of wheel, made like the sail of a windmill. This little wheel turned another with an axletree, and by that means the wagon was set a running for two hours together; but for fear there should not be room enough for it to proceed constantly forwards, it was contrived to move circularly in the following manner: To the axletree of the two hind wheels and at the end of this beam another axletree passed through the stock of another wheel, somewhat larger than the rest; and accordingly, as this wheel was nearer or further away from the wagon, it described a greater or lesser circle. The same contrivance was likewise applied to a little ship with four wheels; the eolipile was hidden in the middle of the ship and the wind issuing out of two small pipes, filled the little sails, and made them turn around a long time. The artifice being concealed, there was nothing heard but a noise like wind, or that which water makes about a vessel."—*The Engineer.*

THE BOTANY OF TREES.

TIMBER trees are known botanically as exogens, or outward growers, because the new wood is added underneath the bark outside that already formed. The whole thing consists of (*a*) Pith in the centre, which dries up and disappears as the tree matures. (*b*) Woody fiber, or long, tapering bundles of vascular tissue, forming the duramen or heart-wood, arranged in rings, of which one is considered to represent a years growth, and interspersed with medullary rays or traverse septa, these consisting of hard, flattened plates of cellular tissue, known to carpenters as silver grain, felt, or flower, and showing most strongly in oak and beech. After the tree is a few years old, the heart-wood becomes comparatively dry and hard from the compression produced by the newer layers. (*c*) Alburnum or sap-wood, which is the immature woody-fiber recently deposited. In coniferous trees the sap-wood is only distinguishable when dry by a slight greenish tinge; when wet, it holds the moisture much longer than the heart-wood, and can be detected in that way. (*d*) The bark, which is a protecting coat on the outside of the tender sap-wood. It receives additions on the inside during the autumn, causing it to crack and become very irregular in old trees. The mode of growth is as follows: In the spring the moisture is absorbed and rises through the stem as sap to form the leaves; during summer the leaves give off moisture and absorb carbon, which thickens the sap; in autumn the sap descends inside the bark, and adds a new layer of wood to the tree.

NOT CARELESSNESS.

AN IDEA as to what opinions some *practical* men have as to what is, and what is not carelessness in the management of a steam boiler, is furnished by evidence recently given by an expert engineer, when under examination in regard to a boiler explosion. He was asked, "How did the explosion occur? Was it on account of carelessness?" He replied "No, *there was no carelessness about it.* The boiler was simply worn out." So that running a worn out boiler, liable to explode any day and to kill a few dozen people, was not carelessness in the sworn judgment of an engineer! Probably he thought it showed carefulness. It certainly proved that more care was taken to create a terrible risk than to avoid it, and that carefulness over a few dollars caused criminal carelessness about human life, as do most boiler explosions.

TRADE NOTES.

The following is the description of a new two-spindle borer just constructed by the Cant Bros. Co., of Galt, Ont: It is designed to perform with accuracy and in one operation, that class of work in which two holes can be bored at any given distance and angle, as in dowelling, chair, cabinet and other similar work, thus effecting a very great economy of time and labor. In most of those hitherto constructed, the angle has been from the horizontal to the perpendicular, one bit being thus brought exactly above the other. But in this one the two bits are mounted in an adjustable head which swivels around one of them, so that they may be set at an angle from the horizontal line of the table. The range of adjustment is from a horizontal to a perpendicular.