

AXE AND AXEMEN.

The axe is the emblem of pioneer-ship, and the precursor of settlement and development. It builds the cabin and levels the forest, making way for the plow, the farm and the city. Its antiquity is untraceable. It was known to our primal ancestors of the stone and bronze ages in the form which comes unchanged to us. Though the progress of mechanics and metal working has brought many advantages in the process of making, it is yet the axe that our great grandfathers hammered out at the anvil, with only the hammer marks ground out and a polish added. Contrary to the general supposition, the axe is an instrument of skill, and the expert axeman looks as closely to the fitness of the bevel of his blade, the form of his helve, the length and shape of blade and pole and the weight of his axe for the purpose contemplated, as the fencer to his foil. The weight of the axe is arbitrary and dependent upon the choice of the axeman for the purpose intended. If the object to be cut is small timber which may be severed at from one to half a dozen blows, an axe with a long, thin blade and as little bevel as is compatible with strength is chosen, and at every stroke the blade is buried to the helve. If the purpose be to fell large trees or cut heavy timbers, and this same axe is used, it bites deeply in its strokes, but the chip remains in the timber after the incisions and many more blows are required to dislodge it than were necessary to its formation; therefore, for this purpose an axe having a thick, heavy bevel and cutting much less deeply is selected. The bevel, now acting as a wedge, forces out the chip at the same stroke by which the incision is made.

Many manufacturers ignoring the full value of this principle, have attempted to make an axe for general purposes with an average bevel. This, as well as the introduction of double-bitted axes, is a doubtful improvement. Experience teaches that the poll is not only useful in itself, but the essential in giving the proper force and direction to the blade.

The most important essential to a good axe is the helve, which, by its proper form and flexibility, not only secures skill, but adds materially to the ease and endurance of the workman. In general, machine-made handles do not possess the qualities requisite to good helves.

The axe, like its cousin german, the sword, has fallen from its high estate, and no more is borne as the emblem of power and unity, dangles, formidable, at the saddle-bow of chivalry, or rushingly crushes through crested helm and cap of steel. The saw, too, has robbed the broad axe of its glory, and the hewers are fast becoming things of old. But even yet a reverence is paid their skill, and when some great timbers which must be true in every line and straight in form and grain are wanted, some one of the old men, now always an old man, is hunted up, and with skill, his truth of eye and hand, and the long, thin shavings that fall from the broad edge of his axe as from a plane, are themes of wonder to the younger generations of artisans.

Observation develops the fact that large men are as a rule inferior to small ones as axemen, and it is no unusual thing to find the address of the latter accomplishing feats which baffle the more powerful efforts of the former. A true eye and the ability to strike each alternate blow in precisely the same place are the highest qualifications, and, with a moderate amount of strength and great endurance, make in the end the chieftain's skill—an acquirement which happily bid fair to possess an active market value in our country for generations to come.—C. G. T. in Industrial world.

A SAW LOG'S STORY.

A correspondent of a New York paper has evidently been going the rounds of a Saginaw saw mill. He thus describes what he saw:—Up the Saginaw in a wide region reached either by the river or its tributaries, the great pine saw log, often three feet in diameter, has its birth. Pine forests, now rapidly thinning out, once covered several thousand square miles around the headwaters. Entering that lumber region in the late autumn, the lumbermen establish camps, round which during the whole winter long the axes resound, the tall trunks fall, and in sections are rolled to the adjacent

streams for the spring floods to bear away. Floating down the main river, the "boom men" pick out each owner's logs, as identified by the brand, and gather them inside the booms, which may be curiously described as long tree-trunks chained together at the ends, often enclosing a smooth water surface of several acres. The coves of the Saginaw—called locally "bayous," a term borrowed from the lower Mississippi—are especially adapted for the gathering and organization of these log armies. The military metaphor, indeed, has peculiar fitness here, for the logs are mustered, side by side in companies, held together by a rope fastened to each log by a device not unlike the domestic clothespin. As these logs down the stream are worked up by the tireless mills, these upper booms are drawn upon for more, until the freezing river finds them quite empty, and another winter comes on to yield its fresh supply.

But the saw log's story becomes most dramatic as it nears the mill and, loosed from the restraining rope, is steered into the glade of open water that leads up to the wooden slide. Enter now the great lumber mill, and we shall be in at the saw log's death. Down the slide on a wooden railroad runs a heavy truck, fitted with two cross lines of heavy iron teeth. With a plunge it dashes below the water, still holding its place on the rails. Then three giant logs are floated above it. At a signal the steam is let on, the machinery reversed, the strong chain holding the truck tightens, and the truck itself begins to ascend. The sharp teeth catch the logs, which in a trice, are lifted dripping from the water, whirled up like twigs 100 feet to the mill, and rolled off opposite the first set of saws. These saws are two in number; one set below is of the buzz variety, perhaps six feet in diameter, and cutting, therefore, through a three-foot log; but as this semi diameter is often insufficient for a big log, a second and a smaller "buzz," placed above and in front of the first, cuts the slice which otherwise might still hold fast the slab. One of the largest logs weighs a number of tons, and human strength alone would never suffice to turn it after one of its sides has been "slabbed."

Just here comes in a beautiful piece of powerful mechanism. At the touch of a lever a stout beam, armed with iron teeth, rises by the forest Titan's side. It snatches the wood, and in less time than words can tell it the log is tumbled over, and the framework rushing back and forth with amazing speed, has driven the edges of the tree athwart the saws, until the once rough stick stands forth a symmetrical square. Then, in another instant it is shifted before the "gang," a set of ordinary upright saws placed an inch apart, and often with 30 or even 35 blades. Below an ordinary circular planer revolves in front of the gang and smoothes the lower edges of the boards. The immense piece of timber is run through in a few moments, and what was five minutes before a rough tree trunk is transformed into the inch boards of commerce. Nor does the work end here; for the slabs are passed to a new machine which grasps them with almost human intelligence, and whatever part of them can be made so become laths. Other machines take the harder woods, ash, elm, or oak, and convert them with equal speed into staves, barrel heads and shingles; and finally the otherwise useless debris passes to the turnace to feed the fires of the engine. There is seen little or no sawdust around the Saginaw lumber mills for the reason that it is all used for the furnace flames; and, in general, the cycle of utilities by which one branch of the great industry is made to feed or supplement another seems as rounded as human ingenuity can make it.

Sometimes, particularly in the more modern mills, the routine as described is varied by lifting the logs from the river on an endless chain; and a number of minor mechanisms fill out the devices by which the lumber is cut and distributed. One ingenious machine working double emery wheels, sharpens the buzz saws on both sides of the teeth during a single revolution, and requires no attention beyond simply the fastening of the saw upon it and unfastening after the work is done. Another flattens out, by a clever mechanical expedient, the teeth of the saw, so as to cut a wider rent and prevent

clogging as the cut becomes deeper; finally, a system of elevated railroads takes the lumber-laden trucks and distributes the boards at the points in the yard or on the wharf whence they are to be shipped. Some additional conception of the size and importance of the industry may be derived from the fact that the Michigan Central railway company takes away from one station here one hundred car loads of lumber for each day of the working season, to say nothing of the large quantities shipped from the river by the Flint & Pere Marquette Railroad line, and even large shipments by the lake barges.—The Wood-worker.

HARDWOOD FLOORING.

The use of beech, birch, and maple has been restricted to a few specific purposes, but the example of the builders of the new Flint Mill at Fall River, in flooring with these woods, will probably be followed by others. The narrow Southern pine planks that have been so long and extensively employed for flooring require to be culled with great care to insure an even floor. They must be straight grained, or they will bend and splay by use, splintering into short slivers dangerous to the feet, and collective of all the stuff and fibrous dirt with which they come in contact. The heart of the pine is especially open to this objection. But a beech or maple floor will wear evenly and smoothly, and has greater endurance for heavy rolling weights than that of the Southern pine. It is more cleanly, and is not so readily inflammable.

The birch when properly seasoned under cover, or kiln dried at a heat not sufficient to vaporize its contained oil, makes a durable and evenly wearing floor. This cheaply estimated wood is really elegant also for furniture purposes. It shows well in cabinet work alternated maple or apple, and it is fully as valuable for drawers and chests in defending the contents from moths as is the red cedar. The best qualities of birch timber come from the black birch or the yellow birch, the white birch wood being too open or porous for fine finish or durability; and the yellow and black birch grows also to a larger size generally.

The New York Evening Post says that the new building of the Pacific Mills at St. Lawrence, Mass., is to be floored with hard wood, some 300,000 feet to be used, and that other mills throughout Massachusetts, Rhode Island, and Connecticut, have also ordered this hard wood flooring, and it is very evident that Southern pine flooring will find a serious competitor. A good hard pine mill floor board, free of sap and coarse knots, will cost about \$28 per thousand feet in large lots, according to the quality, while hard wood flooring will cost from \$30 to \$32 per thousand feet all dressed and delivered.—Scientific American.

THE POWER OF WATER.

The properties of water are only partially understood by those who have never seen it under high pressure. The Virginia City Water Company get their supply from Marlette Lake on the Tahoe side of the mountain. They get it through by a long tunnel, and are then on the crest of a high mountain opposite Mount Davidson, with Washoe Valley between. To cross this valley by a flume would be almost impossible, so the water is carried down the mountain side to the bottom, and crosses under the V. & T. Railroad tract, on the divide between Washoe and Eagle valleys, then up again to the required height in iron pipes. The depression created in the line of carriage is 1,720 feet, and the pressure on the pipes is 800 pounds to the square inch. One pipe is 11 inches in diameter, and is quarter inch iron lap welded, and 18 feet long, with screw joints. There is little trouble from it, but the other, which is twelve inches diameter, and is riveted pipe, makes more or less trouble all the time. The pipe is laid with the seam down, and whenever a crack is made by the frost or sun warping it, or from any other cause, the stream pours forth with tremendous force. If the joint is broken open, of course the whole stream is loose and goes g down the mountain, but usually the escape is very small. The break last week was less than five-eighths of an inch in diameter, and yet the water in the flume was lowered an inch and a half by it, and the pressure went down fifteen or twenty pounds.

Captain Overton says that fifty inches of water went through it. It has been probably a year in cutting out, and was made by a little stream hardly visibly to the naked eye, that escaped through a joint and struck the pipe two or three feet off, eating away the iron until the pressure inside broke it through. When such a break occurs the noise can be heard for half a mile, and the earth shakes for hundreds of feet around. A break the size of a knitting needle will cut a hole in the pipe in half an hour. Such breaks are repaired by putting a band around the pipe, pouring in melted lead, and tamping it in. Such a stream bores through rock like a sand blast. The flying water is as hard as iron, and feels rough like a file to the touch. It is impossible to turn it with the hand, as it tears the flesh off the bones, and if fingers are stuck into the stream, with the point up, the nails are instantly turned back, and sometimes torn loose from the flesh.—Reno Gazette.

G. B. HALL & Co., Quebec, have sent out a member of the firm to explore the island of Newfoundland with the view of ascertaining the extent of its timber wealth, and its adaptability for utilization.

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