Science and Art.

Boucherie's System of Preserving Wood.

This is a subject of great and growing importance, especially as our vast forests are disappearing so rapidly before the great demands made upon them for railway engineering, shipbuilding, and all the other arts in which timber is largely employed. Wood is peculiar in its character; it possesses the quality of being easily worked into any form by cutting tools, and is so light, elastic, strong and fibrous that we never can dispense with its use for a great many purposes. But although it is so well adapted to many objects in engineering, nautical and civil architecture, it inherits the defect common to all organic productions, of liability to early decay by slow combustion when exposed to the influence of the weather—heat, air, and moisture. Some large and valuable ships have been rendered unseaworthy by dry rot, in a very short period after they were set afloat; the sleepers of railways have to be renewed about every seven years; plank roads in four years; and the strongest and best timber bridges have but a short term of existence.

Some substances, such as paint and pitch, have been employed from time immemorial to preserve timber by protecting the surface, mechanically, from air and moisture; but as decay or rot in wood is a chemical change, the best agents for preserving it appear to us to be those of a chemical nature. It is to this principle of wood preservation that the minds of men of science have been mainly directed of late years, and with very gratifying results in a number of cases.

The common method employed in treating wood chemically is to place it in an iron cylinder, exhaust all the air from its pores, and then force in an antiseptic agent under pressure. The Kyanizing and Burnettizing processes derive their names from two inventors, who have used different chemical agents in treating timber. The former employed corrosive sublimate; the latter chloride of zinc, as described on page 93, this Vol., Scientific American. Another process has also been alluded to in our columns, namely, that of Dr. Boucherie, of France, an illustration of which we are gratified to find in a late number of *La Science Pour Tous*, published in Paris, from which we have made the accompanying free copy of the figure, and free translation of the description.

The nature of this process consists in impregnating the timber, in logs, by the pressure of a column of the antiseptic liquor, which is made to force itself into all the pores of the timber with no other apparatus than an elevated tank, a pipe, and a hood for the log, and which, if it operates as effectually as is stated by our Paris cotemporary, can be economically conducted in the midst of our forests.

A represents a hogshead containing sulphate of copper placed upon the top of the butt of a cut tree, B. The liquor in A was intended to percolate, as it were, through the pores of the wood, to displace the sap. It was an ineffectual and clumsy arrangement. The next method, and that which is now practiced in France, is represetned by the tanks, C L, on the top of stages, D D. From tank C, containing a solution of sulphate of copper, a pipe leads to a cut log on the ground, on the butt end of which there is a wooden disk, having an opening to receive the pipe, E; a spike, *f*, fastens it firmly to the log, leaving a small space between them, which is filled around the outside with hemp packing saturated with tallow. The liquor is now admitted by opening a cock placed on the foot of the pipe, and the pressure of the column forces the solution through the log, driving the sap before it; and when it (the solution) appears coming out at the other end of the log the operation is completed.

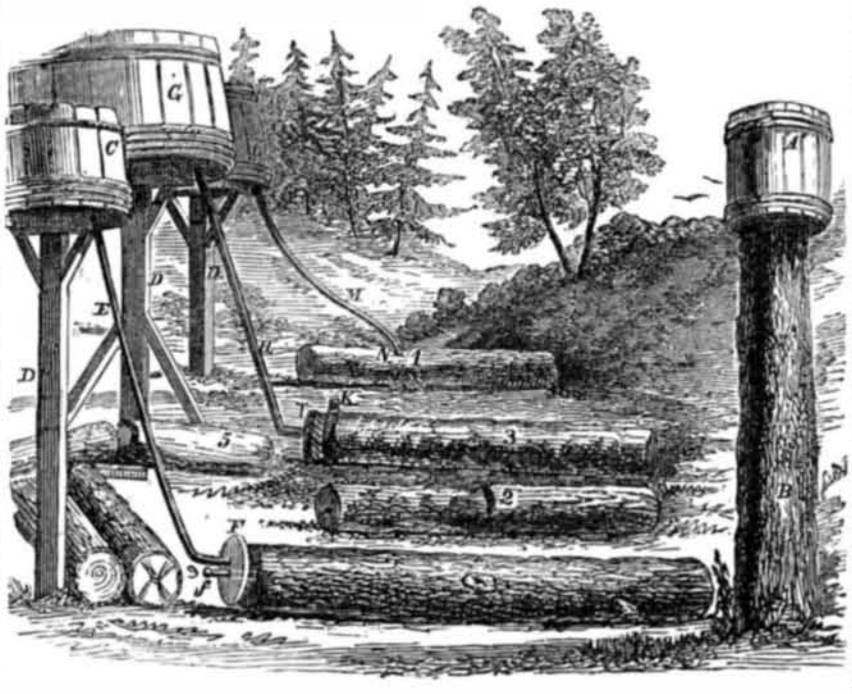
The log 2 has a deep notch cut in the middle, and is supported at three points; two blocks at the ends are afterwards removed, as shown by log 5, and the notch allowed to spread open. This space is now packed round with hemp *gasket*, and the two ends then raised, as shown by fig. 1, where pipe M, from tank L, enters the log at N, and the liquor is then allowed to force itself from the middle to the enas of the log without the use of a shield like F.

These are the two methods representing Dr. Boucherie's process in *La Science Pour Tous*. A more convenient plan would be the use of a permanent elastic hood, I, of india rubber, connected with pipe H of tank G, and secured to log 3 by a clamp, K. This hood can be employed for various sizes of logs, and be taken off and put on with facility.

It is stated that it takes from twenty-four hours to three days, according to the size of the logs, thus to impregnate them with the antiseptic liquor.

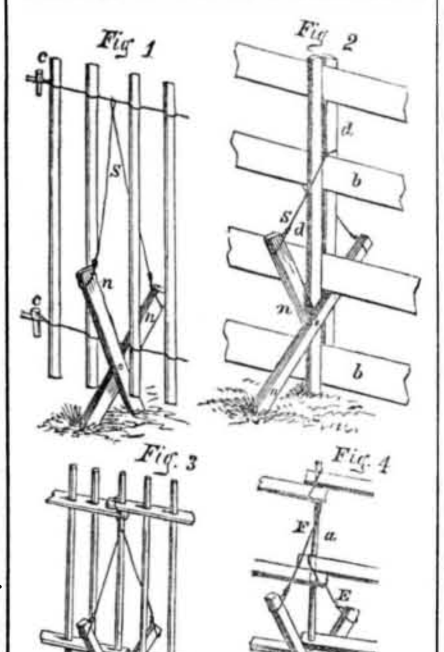
The solution employed by Dr. Boucherie is very weak, being formed of only about one pound of the sulphate of copper to one hundred gallons of water. As it displaces a great quantity of the sap, which is the real cause of fermentation and decay in the wood, a weak solution is held to be the best. Timber thus treated, it is stated, becomes harder and closer in the grain, and endures three times longer than the same kind not submitted to a like process.

THE PRESERVATION OF TIMBER.



Reyman's Field Fence.

The fence here illustrated in intended to dispense with posts, and, consequently, with the labor of setting the same, and provides as a substitute two stakes forming an X or cross, with their upper ends connected to each other and to the upper part of the fence, by a wire, or small metallic rod—the stakes and wire being so arranged that the act of driving the stakes into the ground secures together two adjacent panels of fence, and at the same time binds them firmly in the proper position and to the support, while the support itself is also completed by the operation. The construction was secured by patent on the 28th of March, 1856.



The following description, in the language of the inventor, not only very clearly sets forth the peculiarities of this novel system, but details some points of importance in the erection of wire and other fences generally.

Fig. 1 shows its application to a wire and picket fence, that is, a fence wherein the pickets are enclosed and secured by an iron rail, made by two or more wires twisted together.

In making this fence a well braced post—which it is preferable should be iron—is set at each end to secure the wires when strained between them. The small hand levers, *e c*, are used to twist the wires together as each picket is put in, and are revolved alternately in opposite directions, as occasion may require, to untwist the front part of the wires. As the fence progresses, a set of the stakes, *n n*, fastened by the guy wire S, are placed at intervals of 10 or 12 feet. These stakes should be about 4 feet long and 1 1-2 by 3 inches, and are placed at an angle of elevation of about 60°, and driven into the ground 12 or 14 inches. They are first driven but a few inches, when the wire, S, is fastened on, and they are then driven hard, thereby tightening the wire, S, and binding the fence firmly in the crotch. Sometimes the stakes are nailed together at their crossing, but this is generally found unnecessary in practice. These stakes are cheaply and easily replaced by new ones when rotted off; still it is well to soak them in a solution of blue vitriol in water, or dip them in hot coal tar as a preservative, before driving them in the ground.

For the purpose of holding and stretching the wires in making long pieces of fence, each double wire is passed through additional stakes, and pins are driven by their sides, to prevent them slipping easily. These stakes are driven into the ground at convenient distances, on the line of the fence. A prop of any convenient form holds the wires the proper distance apart, and from the ground. The pins by the side of the wires are kept just tight enough to let them slip gradually as they become too much strained when being twisted together.

The elasticity of the wood counteracts the effects of heat and cold on the wires; in fact, this fence is always the tightest in warm wet weather—a result caused by the swelling of the pickets, as has been found by actual experience.

Fig. 2 shows the application of this invention to a board fence. The boards being made into panels, they are lapped so as to bring the battens, *d*, opposite, enclosing the boards between them. The stakes cross each other with the battens between them. The upper part of the panels are bound together by the guy wire, S, passing once round the battens. Driving the stakes in this, as well as every other case, tightens the wire and binds every part together, and the battens are nailed to the stakes at each crossing. This fence is actually more solid than a common post and board fence, is much cheaper to put up, as there are no holes to dig or posts to set, and is very convenient to move from place to place.

Fig. 3 shows its application to what is known as a "ladder fence," the panels being simply lapped and connected together by a shouldered picket passing through all the rails. The end of the uppermost of the lower rails is, however, simply notched, and rests astride of the connecting picket. This allows the panels to be readily put together or taken apart, and also to be raised and lowered in fencing uneven ground. The guy wires encircle the upper rails, and the panels are in every respect firmly supported and bound together.

Fig. 4 shows its application to a "three rail fence," used only for fencing against large stock. To make this fence, the stakes are first driven a few inches, and the lower ends laid lapping in the crotch thus formed. A hole is next bored through the upper rail directly above the crossing of the stakes, in which is placed the standard, A, with two short wires fastened to it—one, E, near the middle, in a groove made for the purpose, and the other, F, on the upper tapering end. The second rails are fastened by being secured between the lower guy wire, E, and the standard, *a*, the groove preventing the weight of the rails from forcing the wire downwards. The upper rails are fastened in a similar manner, being looped in between the wire, F, and standard. Driving the stakes causes the wires to cut into the rails, and holds them very firmly.

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