

A NOVEL CUTTING OFF MACHINE.

This is a band cut-off saw manufactured by Butterworth & Lowe, of Grand Rapids, Mich., who have improved on the construction and details, making the entire frame of iron and steel, and giving especial care to the counterbalancing and to reducing the friction to a minimum. The backbone of the machine, as well as the posts that carry the guide rollers, are of steel tubing; the yoke that carries the backbone is supported on trunnions that are cast solid with the base. The saw is maintained at a uniform tension by an adjustable coil spring, another sensitive adjustment controlling the position of the saw on the out end wheel. The guide rollers (between which the saw blade runs) can be adjusted to line the saw as desired, also to keep the saw teeth a proper distance from the edge of the rollers. Other adjustments also permit the use of saws two or even three feet shorter than commonly used on the machine. The frame is accurately balanced, and the use of a compensating sheave allows the saw and frame to be worked up or down at one point with the same force that is required at any other point. This force is very little, as the rope sheaves are fitted with roller bearings. The machine does not require a strong or special foundation, but can be bolted to the floor of the building. The log does not need logging or holding while being cut. The machine can be operated entirely by hand, requires no friction or other mechanical hoists to raise the saw and has positive adjustments at all points.

For wood pulp work it is especially adapted, as the cut leaves the sawed ends smooth and clean, the saw teeth traveling in straight and parallel lines and in only one direction. In using the ordinary circular cut-off devices, or coarse tooth drag saws, small flakes of sawdust loosen in grinding and work into the pulp. The violent jarring of ordinary drag saws is obviated by the use of this machine, which works smoothly and rapidly. The machines are at present made to carry wheels 28, 36, and 48 inches diameter, the size of wheels limiting the machine to about that diameter of log.

THE LAC INDUSTRY.

Lac, improperly called "gum lac," is produced in two very different ways: (1) through the puncture of various plants by certain insects (such as the lac of India, Persia and Madagascar), and (2) by an incision made in certain resinous trees (such as the lac of China and Japan).

Lac of India.—The Indian lac is collected from trees of very different genera—sacred fig, banyan, jujube, acacia, croton, etc. It forms under the influence of the sting of a hemipterous insect, the *Carteria lacca* or *Coccus lacca*. It is a gall insect of the cochineal kind, resembling a red louse, which, at the time of oviposition, fixes itself in great numbers upon the young branches of the above-named plants. These insects secrete a resinous and waxy substance which solidifies, in imprisoning the insects, and forms a thick crust that covers the epidermis of the branch attacked. The oviposition is effected during this transformation. The female dies, and her body becomes a

vesicle filled with a reddish liquid designed as food for the larvæ. Each female lays twenty eggs, which become larvæ and perfect insects and escape from the resinous stratum.

The collecting of the lac is done by gathering the

follows: The stick lac is broken in order to free it from the impurities that it contains (fragments of bark, wood, etc.) It is then put into tubs of water, in which the Indians bray it with their feet in order to wash it well. The water is renewed until it finally comes off clear (Fig. 3). The washed lac is then boiled with alkaline water in order to dissolve the color that it contains. The softened and melted resin rises to the surface of the bath, while the color, called "lac dye," is collected by decantation and is used for dyeing morocco leather and cashmere wools. The lac in paste is put into a long and narrow cotton bag that two Indians hold by the ends and twist in exposing it to a quick fire burning in an open grate (Fig. 4). The lac passes through the fabric and falls into a wooden trough, from which it is ladled by an Indian and poured in the form of a thin stratum over copper cylinders. Before the lac is completely dry, it is broken into irregular scales that are submitted to a moderate pressure. These scales are very thin, transparent, brittle, and of a golden reflection. Lac in threads is merely lac drawn out while it is melted to a pasty consistence. In commerce there are distinguished brown, red and yellow lac. The difference between these is due merely to their degree of coloration by the alkaline liquor, as we have just said.

In order to obtain white lac, it is necessary to have recourse to a chemical treatment by alkalis and to bleaching by pure alkaline hypochlorites, to which are added weak acids or oxygenated water.

The origin of Guatemala lac is identical with that of the lac of the Indies. The Madagascar lac is produced by the *Gascardia Madagascariensis*, which lives upon a tree of the order Lauraceæ. This lac is in spherical or ovoid masses (Fig. 2) traversed by a branch in the direction of the longer axis. The size of these reaches that of a pigeon's egg. The color of this lac is a grayish yellow. Its composition is similar to that of the Indian lac.

The Lac of China and Japan.—The lac of China and Japan is produced by incisions made in the trunk of the lac tree or varnish sumac (*Rhus vernicifera*), called "wrushi" by the Japanese. This tree is reproduced either by seeds or cuttings. It does not yield lac until it is eight or ten years old. The collecting is done as follows:

At about 30 cm. from the ground, the upper part of the bark is scratched with a knife (Fig. 1, No. 2) for a width of 3 cm. and a length of 6. With the instrument shown in No. 1 of Fig. 1, incisions 12 mm. in width are made in a horizontal direction in the bark, other incisions are made with the point found on the

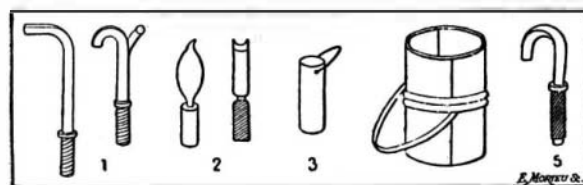


Fig. 1.—TOOLS AND APPARATUS USED IN THE WORKING OF LAC.

1. Rounded knives. 2. Knives. 3. Bamboo tube. 4. Bucket for lac. 5. Rounded knife.



Fig. 5.—PREPARATION OF COLORED LACS.

1. Bowl. 2. Mixing tool. 3. Method of operating. 4. Branch of sumac, showing incisions.

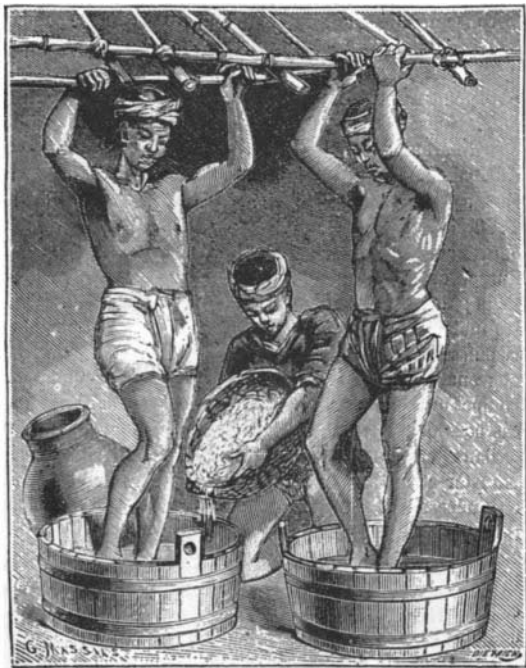


Fig. 3.—METHOD OF WASHING LAC.



Fig. 4.—PURIFICATION OF LAC.

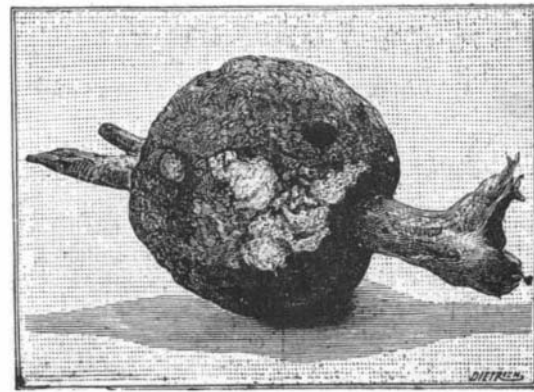


Fig. 2.—MADAGASCAR LAC.