

FOREST CLEARING.

Those who are laudably endeavoring to stop the wholesale destruction which has been carried on in clearing out the forests of this country will be glad to hear that the lumber manufacturers of the northwest have decided that the work of cutting off the valuable timber of the northwestern states must now be retarded. Their reasons for coming to this decision are not from any love of the beauty or the benefits which the forests confer on the country, but simply because they find that it is not paying them to clear off the forests at the rate they have been doing, and that if continued it will pay them still less. They have overstocked all the markets, and as a consequence prices have sunk so low that the trade has become comparatively unprofitable. In this way the destruction of the forests has unintentionally received a check, and before the havoc is resumed perhaps the matter of their better preservation may receive the attention of the national legislature.

It is time that the subject did receive attention. The commissioner of agriculture has shown that the supply of various kinds of timber will be exhausted within a very few years if the present rate of consumption is kept up. In the state of Maine pine will only last four years and spruce 15, and the pine forests of Michigan and Minnesota will be cleared out in 10 years, and those of Wisconsin in 20. Already lumbermen are turning their attention to other states. According to Governor Berry they "are pouring into the state of Arkansas every day from Michigan and Wisconsin." The saw mills in that state have more than quadrupled since 1880, and the production of lumber there is twenty times greater than it was just seven years ago.

As before pointed out, the question of preserving a proper proportion of forests for the benefit of the climate, the streams, the soil, and indeed the general good of the country, is a national one. Private individuals cannot reasonably be expected to sacrifice their rights and interests for the good of the community at large without due compensation. To the lumbermen the forest is just so much money as soon as he can clear it out and place it in the market, but in the northwest he finds he cannot do that profitably and so he has called a halt; however, he will be up and at it again so soon as the markets improve, quite regardless of any other result than simply what the lumber will bring. And no one can blame him; it is not his duty to preserve the forest, but that of the nation or the state.

MECHANICAL INVENTIONS.

HEATING RAILWAY CARS.—An improvement bearing on the present manner of heating railway cars has been patented by Mr. Michael Hurly, of Quebec, Canada. The invention relates to safety couplings for connecting steam conducting pipes, the two sliding parts of the coupling being connected together by a spiral spring, to secure a more perfect steam tight joint, etc.

NEW TRUCK.—A railway car truck has been patented by Mr. James E. Squire, of Glencoe, Ontario, Canada. Its construction is such that the load rests upon the periphery of the wheels in succession as they come under the tread, thus diminishing friction; the wheels are intended to turn only half as often as ordinary trucks with the same speed, so that less oil will be required and there will no danger of hot boxes.

TWO WHEELED VEHICLES.—An improvement in two wheeled vehicles has been patented by Mr. John C. Bach, of Hillsdale, Mich. This invention is designed to meet a want widely felt since two wheeled carriages have recently become very fashionable. The body is so pivoted as to oscillate at its rear end, and a centrally arranged spring is so made to operate that the body is protected from the swing of the horse so as to prevent the forward and backward rocking motion of the rider.

ILLUMINATION OF STEAM BOILERS.—The lighting up of the interior of steam boilers was long suggested. It has lately been carried into practical operation by the Patent Steam Boiler Company, London. They arrange lights within the boiler in such a way that the cascades, currents, and miniature whirlpools of the water

may be clearly observed. It is believed that useful information will be derived from observations touching the cause of priming, the best modes of separating steam from water, etc.

DELICATE CALIPERS.—A micrometer calipers have been patented by Mr. Leopold L. Remacle, of New York city. While it can be folded compactly and used to measure considerable spaces, it will likewise measure twentieths and thousandths of inches. A screw works longitudinally in a U-shaped frame, and the rimmed head of the screw is divided into measures against this head, when the calipers are in use, is brought down a pivoted straightened rule. The pitch of the screw being one-twentieth of an inch, and its rimmed head being marked off into parts, any required measurement as low as thousandths of an inch can be readily obtained.—*Sci. Am.*

CUTTING HARDWOOD.

The *Northwestern Lumberman* says:—A gentleman who has worked for many years among hardwoods, and who recently visited this office, gave some information that may be of value to others. In his opinion the best time to cut and stick hardwood lumber is in the summer, so it will get a good start at seasoning before cold weather comes on. Its tendency to check, he thinks, is due to the difference in the temperature of the inside of the wood and the surrounding atmosphere. Hickory is the most difficult wood to handle, and should not be worked in the spring months. Often when sawing it before the weather has become warm and settled, as soon as a hand saw enters a stick it splits from end to end. He would not cut hickory in August or September, as worms are liable to work in it if cut during those months. Why this is so he is unable to tell. He once visited a store-room of a large carriage shop, and on the floor under the wheels he noticed fine dust, which, upon inspection, proved to be worm dust from the hickory spokes. The wagons were painted, and the worm holes were so small that they could hardly be detected without the aid of a microscope. The worms delight in working in the hardest, finest wood. It is not the gentleman's theory that the wood is attacked from the outside, but that the worms propagate in the wood if cut in the season named. When once the worms show themselves in a piece of hickory, it is doomed. The powdering goes on, until at length the stick will break in two by its own weight. All hickory cut in August or September does not become wormy, but so much of it does that the gentleman thinks that by far the safest way is to cut it during the other months.

The Lumber Trade.

The following letter appeared recently in the *Toronto Telegram*:—

SIR,—Noticing your remarks in a recent issue about the dulness of the lumber trade, and that a large concern was said to be in difficulties, it would lead to the supposition that this branch of trade was in a shaky condition. If, however, it were known that one company at least, in which English capital is heavily invested, has been paying much more for the manufacture of its lumber, (something like \$30 per thousand more than current rates at other mills), occasioned by the employment of highly salaried officials, who know nothing practically about the business, it need not be wondered at that they are beset with "difficulties," but it does not necessarily follow that the lumber business is in a bad way. The writer is in a position to know that the production of lumber has been profitable for several years past, and that those engaged in the business—who have properly attended to it—have made money out of it; and that, although the coarser grades of lumber are at present somewhat heavy, and slow of sale, there is a fair margin on them, and, further, that both mill men and dealers generally are in a better condition financially at the present day than ever before.

LUMBERMAN.

A Swedish Match Factory.

At Jonkoping, Sweden, says an exchange, is the oldest and largest match factory in the world. It was established 100 years ago, and there are now to be seen specimens of the

matches used at the beginning of the present century, consisting of big fagots of wood furnished with a handle and a tip to dip in a bath of sulphur. The wood from which the present kind of matches is made is taken from the adjacent forests, which are divided into 50 sections. Every year one section is cut and then replanted with young trees. The trees are hewed into planks in the forest and cut into slivers in the factory. The boxes are made of the outside of trees. The factories are on the banks of lakes which are connected with one another by wide canals. Millions of matches are turned out each day. Some idea of where they all go to may be obtained from the statement that there are at least 250,000,000 of matches burned each day in the United States, or an average of five matches for each person.

THE LUMBER TRADE.

The *Quebec Chronicle* of Dec. 18th publishes a lengthy review of the lumber trade during the past season, of which the following is an extract:—As regards the stocks wintering, square white pine will be about 8,000,000 feet, but it must be remembered that there is not this year any old timber left behind in the Ottawa streams to come down next spring, and considering the reduced production contemplated, and the fact that it will be late next season before the bulk of the new wood can reach the market, it may be inferred that all of this quantity that is good enough to be shipped will be wanted for the spring vessels. The wintering stock of waney will be small, and it contains very little large wood. In oak and elm the wintering stock will be light, not more than about one-half that of last year in oak and about one-fifth in elm. The production of both pine and spruce deals will be curtailed at least one-third, probably one-half. We hear that the Montmorency establishments will not operate at all during the winter, and some other mills have also decided to shut down. These are favorable omens, and if the square timber manufacturers abide by their very distinct avowals as to a limited production the trade may come right again in time. Nature may be said to be working with these gentlemen in their own interests this season, for, if we are to believe the weatherwise, the present winter is going to be anything but favorable for lumbering operations, there being up to the present, no snow in the lumbering districts of Western Canada and the States, which will materially interfere with hauling to the different streams. Under all the circumstances, and from all we have been able to gather, we should hope that the end of next season will show that things have taken a turn for the better. This season has been depressing enough. We cannot close this review without alluding to the unfortunate financial difficulties which have seized upon certain lumber firms in this city, in which they have the sympathy of the community. We have, however, fortunately been free from any panic or very great fluctuation in value, and bad as things are, they might certainly have been worse.

Failures in the Lumber Trade.

There were rumours about the 18th of this month that another extensive lumber firm at Quebec had succumbed to the financial depression in the export trade. The liabilities are set down at a large figure, but the assets are said to be equally large, and there will be little if any loss.

The Beaver Lumber Company below Quebec has failed, and owes bank in Quebec & Montreal as well as other creditors \$108,000. About \$90,000 are due to the banks, which are all safely secured, but the other creditors are expected to fare badly.

Another Great Lumber Failure.

There was some commotion observable in financial circles at Montreal on Monday, on the news of the great lumber exporter of St. John, N. B., Mr. George F. Hood's suspension for a quarter of a million dollars. The information came privately, and has not been published yet, but it was well known at the bank of Montreal, with which Mr. Hood did some of his business. His account, however, was kept in the Bank of New Brunswick, where the most of his paper is held. The Bank of Montreal has

only \$30,000 of it maturing, and the authorities here do not anticipate any loss, as Mr. Hood shows a large surplus and is only asking time to pay in full.

HOW WOOD PULP IS MADE.

No other manufacturing interest has made greater progress in securing new raw materials during the last few years than paper makers. There has been such an enormous multiplication of books and newspapers in recent years that the invention of wood pulp is all that has prevented a great increase in the cost of paper.

The pulp which is used in the manufacture of the cheapest newspapers is simply ground wood, and its presence can be detected by letting a drop of nitric acid fall upon the paper. The acid unites with the resinous substance of the wood, and leaves a brown stain upon the paper. A large portion of the wood pulp now in use, however, is subjected to a chemical process which removes all but the pure fibre, and makes a material worth 4½ to 4½ cents per pound, whereas the ground wood pulp sells at 1½ to 2 cents. One of our walks this week shall be through a pulp mill.

The wood comes in perfectly free from bark, but otherwise resembles cordwood for burning. It cost at this mill is \$8 or \$9 per cord, and two cords of wood make a ton of pulp, worth \$35 to \$30. The log of wood first goes through a machine provided with a cylinder of oblique knives revolving against a bed knife like a hay cutter, which speedily converts the whole log into small chips. This machine thus cuts up 25 cords per day. A blower carries these chips through a pipe into an upper apartment, whence they are fed into huge boilers called "digesters." About three and one-half cords of wood are fed into one of these digesters, and the boiler is then filled up with caustic liquor composed of 60 parts of lime and 100 parts of soda and dissolved in hot water. The wood is boiled eight hours in these liquors under a pressure of 110 pounds. The pressure is then reduced to about 60 or 80 pounds, and the contents of the digester are blown into a receiving tank.

Being thus blown out under pressure, the fibres of the wood are disintegrated and resolved into separate particles. The receiving tank has a perforated bottom, and clean water is now let in and carries the liquor with the gum of the wood down through the perforations designed for the purpose. The apertures are then closed and clean water is again let in and mixed with the fibres. Meantime, the waste liquor from the digesters runs into reclaiming furnaces, which are simply huge pans arched over and lined with fire brick. These furnaces are fired to a great heat so as to evaporate the water and burn out the gum, thus recovering about 80 per cent. of the soda ash. The reclamation of this soda ash constitutes the entire profit of some mills.

The fibre which we left in the receiving tank immersed in a second bath of clean water after washing out the gum which had been loosened in the digesters, is now pumped into engines like the washers of a paper mill consisting of a huge tank about 21 feet in diameter one way by 7½ the other, and three feet deep. In this tank is a huge cylinder with a metallic fluted surface, which works against a similar fluted surface in the bottom of the tank. The cylinder occupies the radius of a circle of which the tank is the circumference, and the mass of pulp with which the tank is filled flows round and round in a constant current under the cylinder and out again. Clean water is flowing into the engines during the first 30 or 60 minutes of this process, and dirty water is flowing out at the same time in such a manner as to give the fibres a thorough washing. Bleaching powder is then put in and the pulp converted to the whiteness of driven snow.

The pulp is then run into the "stuff chest" or reservoir, from which it can be pumped into the final process as needed. The last process consists of mechanism very similar to a paper machine, upon which the pulp is run in a thin sheet over brass wire cloth so that the water drops through. The wire cloth bed of the machine has a lateral vibratory motion which lifts the fibres together and discharges them in the shape of a large continuous sheet of pulp ready for use by the paper-maker. The pulp is