CABLE-WAYS FOR LOGGING.

THE work of hauling logs, as an important part of lumbering, has called forth some of the best engineering skill of the country. We have already described in these columns the piece of engineering enterprise put into operation within the past few months by Gilmour & Co., of Trenton, so that they might bring the logs from their Nipissing limits with the greatest ease and least expense. In this case the distance from the limits to the mill is somewhat over 200 miles, and there is at times a log haul of over 300ft. long and about 40ft. lift. Those who have personally inspected the Gilmour experiment say that it has worked charmingly.

Logging by cable is another method that has received a good deal of consideration from engineers. In a late number of the Northwestern Lumberman, Mr. Met L. Saley, in his chatty chapter, "Salmagundi," tells of what is known as Kelliher's system of moving logs by cable. Kelliher, it appears, is a Maine man, who has lost two or three fingers in his battles with logs, and this fact, combined with a considerable experience, no doubt, has set his mind thinking along these lines. It is not chronicled, however, that he has yet brought his cable system to a very high degree of perfection. It is described as being somewhat sluggish in its movements, and to quote Saley's description, "The cable was heavy, and when you tried to do it up in a coil so that it could be hauled away to another field of action, was the time when the men would become tired on short notice." Then there is a Glover & Chandler's steam logger, which made its debut in Northern Michigan about six months ago, but so far it has only met with indifferent success.

A cable-way on a more elaborate scale than anything that has yet been attempted proved the subject of a paper at the recent annual convention of the American Society of Civil Engineers at Niagara Falls in June last. The author of the paper is Mr. Richard Lamb, an associate member of the society. What he has to say we will let him tell in his own words, thus:

"The problem that confronted the writer was to design a cable-way that could be operated at least half a mile, and with the power placed upon a boat or car located at a navigable point. It should gather in the logs for at least 500 feet on either side of the cable-way proper, and by its means bring the logs to navigation at a reasonable cost for operation. It was necessary that such a system should be easily and cheaply moved from place to place as the total area of forest to be cleared at any one setting would not require much time. Trees had to be used as supports, as they are the only practicable foundation to be found in the swamp. It was evident that any steam system would have to be worked in practically a straight line. To attempt to find trees in a straight line would be difficult if the distance apart was not great, but after running a number of lines it was found that in a forest of ordinary density a practically straight line could be gotten with trees at from 100 to 225 feet apart. The writer's system was designed for long spans in consequence.

"Iron brackets in the shape of a T are used for passing by the trees and for supporting the cable. The T iron bar straddles a 1½ x ½ inch iron pipe driven into the tree at a height of about 13 feet from the ground. Dogs on the ends of the arms attached to the T iron bar are driven into the tree on either side, and a chain wrapped around the arms and held from slipping by upset knobs keeps the arms from spreading. The chain also serves to hold an iron snatch-block.

"A swinging sheave is hung from the end of the T iron bar on which is an iron band curved rearwardly and downwardly, which acts as a fender and also replaces the hauling cable should it become disengaged from the hanging sheave. The steel saddle at the end of the T bar is provided with boiler steel U plate. Two wedges pass through the U plate and saddle in opposite directions to each other. By means of these wedges the U plate clamps the main gable rigidly to the saddle. On the head tree two sheaves are placed, on either side, and on the tail tree a 2-foot steel sheave is chained.

"The endless ½-inch pulling cable, made of nineteen strands of steel wire, is passed through the sheaves on the head tree and on the brackets and around the large sheaves on the tail tree. Two turns are made around a two-foot elliptical grooved sheave, run by a twenty-five H. P. reversible engine for a ½-mile line. After the ½-inch cable is out, the main cable is hauled into the swamp by steam power by means of the hauling cable.

"The cars are made with a hanging frame supported by a horizontal axle passing between the wheels. By this arrangement the hanging frame can remain vertical even when the car is climbing the steep grade of the catenary on approaching the saddles and when passing over them. The hauling cable is attached rigidly to the swinging frame at a point located so as to clear the swinging sheave, and the hauling cable is practically parallel with the bearing cable at all parts of the line.

"It became necessary, however, to design a system that practically would not be limited as to the distance it could be operated. To this end an electric cable-way was built. As economy and ease in moving depended being able to use few supports, or, in other words, long spans in the forest, it was evident that no system of traction was available. The direction of the force should be parallel to the bearing cable. This suggested the use of ½-inch cable, made fast at both ends, to be supported at the tree brackets by a narrow saddle, so designed as to enable the cable to change its course and not to become disengaged when the car passed over it.

"The motor is made with the car like the steam cable-way, with a hanging frame having attached to it an elliptically grooved sheave which is revolved by means of a newly patented worm or wedge gearing, driven by a 5-kilowatt electric motor with vertical shaft, all attached to the swinging frame of the car. By taking a couple of turns of the ½-inch cable around the elliptical grooved sheave, when the motor revolves the gearing, the sheave winds up, and at the same time plays out on the ½-inch cable, thus pulling along the car.

"When it reaches the bracket, the small cable is lifted from the saddle momentarily, and the car can take a new course. Hence we are not limited to running in a straight line. The main cable is used as the conductor. It is insulated at the brackets by micanite placed between the saddle and the iron T bar, and the current is prevented from passing down the frame of the motor by a micanite insulator at the point on the frame where the axle-box joins the frame proper. The points of the insulator are each provided in their construction with hoods to shed water.

"The worm or wedge gear deserves special mention. It was invented in 1891 by a Mr. Welsh, of the Glen Cove Machine Company. It differs from an ordinary worm gear in that it has 25 per cent. more contact surface, moves two teeth of the gear wheel at each revolution of the worm, and works on the principle of a wedge rather than an incline plane. The worm gear especially made for this electric motor is designed to work both ways, and has ball-bearings at either end of the worm, to lessen the friction and thrust. The gear wheel, worm and ball-bearings are encased in a jacket filled with oil. Thus the minimum loss in power is effected between the electric motor and the elliptical grooved wheel. The electric motor is run at 1,340 revolutions per minute, giving a speed to the motor proper, with the gearing, of six miles per hour, which is the desirable speed for logging purposes. The current is taken from the main cable through the wheels, thence through the axle to the axle-box of the hanging frame. Here an insulated copper wire connects it with the rheostat. The return current is passed through the axle of the elliptical grooved wheel; thence on the ½-inch wire to the brackets; thence on a wire down the trees to the ground.

"In the system now built 220 volts are used. The trial was made at the works of the Trenton Iron Co., Trenton, N. J., along the banks of the Deleware and Hudson Canal. It was found that the heavy logs could be pulled from a distance up to the cable, by the same method as employed in the steam system. When two motors are used, the empty cars are switched off the cable and motors are exchanged, the motor which hauled the empties taking back the loaded ones, and vice versa. This system of electrical cable-way can be used for an endless variety of purposes."

THE MANUFACTURE OF LUMBER.

WITH all the progress that has been made in methods of manufacture of goods from other natural products, in the judgment of Hardwood, we are yet a long way behind in the matter of transmuting the trees of the forest into a product for merchandizing. The saws of the ancients, our co-temporary goes on to say, were blades of metal with serrated edges, the points of which were sharpened in the same way as now. There has been a certain amount of improvement in the blade by changing the shape of the teeth and making it thinner and of more uniform thickness, and perhaps of better temper. It is even problematical if these are not rather a return to an age of lost arts preceding an era of barbarism which held sway for a few centuries.

The up-and-down saw mill of to-day is built on precisely the same principles as the pioneer mill of Gottlieb Muller, erected on the banks of the river Rhine in the 13th century, though instead of one saw it carries two or more in a gang. The only new principle that has been applied to the gate saw mill is the oscillating movement in the gang. There have been great improvements in the application of power, and the gang edger and trimmer have been added. But these are all in the interest of speed and increased output rather than in the real manner of making the lumber or improving the quality of its manufacture.

The question is raised whether there are half a dozen lumber manufacturers in the country who can tell, or even give an intelligent guess, as to the number of thousands of feet of their annual cut that is reduced by bad manufacturing. The only persons who have any adequate knowledge of this subject are the expert lumber inspectors who do actual grading by quantities, and many of them, while they know that it is considerable, have not given the subject sufficient thought to be able to say what the percentage really amounts to. The good judges assert that it is not less than 5%, and there are those who firmly declare it is more. Call it 5% of the entire cut of the country and think of the enormous amount this is.