

pine tie) lasted from fifteen to twenty-five years. It could not be considered good practice, on account of the loss through evaporation, to use less than eight pounds of creosote oil per cubic foot of wood. In the United States the American Creosoting Company, in creosoting some eight or nine million ties per annum, leave in these ties about eight pounds per cubic foot of wood. The actual figures used in this work are:

2½ gallons of creosote oil for a 6" x 8" x 8' tie.

3½ gallons of creosote oil for a 7" x 9" x 8½' tie.

Although in the treating of these ties the old English minimum of eight pounds per cubic foot is closely adhered to, these ties are treated by the Lowry process. This process is to inject in the tie an amount of oil in excess of the specified amount to be left in the tie (2½ gallons of creosote oil for a 6" x 8" x 8' tie), this amount running up to 3½ gallons for oak and as high as 5 to 6 gallons for pine, and sometimes even higher. The excess amount of oil is withdrawn by high vacuum, only the specified amount of oil being left in the tie. This means that the thoroughness of the penetration of the wood is as good as when twelve to fifteen pounds of oil are used by the common creosoting process, whereas actually only about eight pounds per cubic foot is left in the wood.

The most important element in creosoting wood is a thorough and deep penetration of the creosote oil. Although the old English practice for railway ties was to use from eight to ten pounds per cubic foot, in order to get better penetration present railway practice requires more than this. Ties treated by the ordinary creosoting process means the use of extra oil. By the Lowry process fully as good results are obtained, if not better, with less oil.

The most important element in creosoting timber is to have the timber properly prepared before the injection process is started. It was formerly the practice in the United States to steam timber and artificially season it. It has been proven, however, that steaming is bad practice. It is important to season the timber in air before the creosoting is started. Thoroughly air seasoned timber not only can be more thoroughly penetrated with creosote, but is stronger than green timber. To have thorough air seasoning, it is, of course, necessary to provide the ties sufficiently in advance of the time at which they are to be treated. For beech, birch, maple, jack pine, etc., the seasoning period ranges from five to eight months.

The world's highest-head water-power plant is now nearing completion at Martigny, Canton Wallis, Switzerland. The fall utilized is 5,400 feet, and the pipes conveying the water from the head of the fall to the power-house, a distance of three miles, are specially remarkable. The pressure gradually increases with the fall till the lowest part is reached, where the pipe, having to withstand 2,500 pounds per square inch, had to be made of special ingot-pressed steel. The turbines, which are of the Pelton type, have a total rating of 15,000 h.p. and it is of interest to note that, with the 5,400-foot head, only about 30 cubic feet of water per second will be necessary to develop the full 15,000 h.p. output of the station.

The Toronto Exhibition Grounds, the scene every year of the great Canadian National Exhibition, contains buildings to the value of \$2,500,000. Its paved streets and street and interior lighting equipment has no rival on this continent. Over 40,000 lamps are in use during exhibition period.

COAST TO COAST.

Winnipeg, Man.—Complete reorganization of the high-pressure plant, including electrification of the whole equipment, is contemplated by the board of control. At present the whole plant is operated by gas engines supplied with gas from a producer plant in the building. The big container is falling into disrepair and the necessity of making repairs has brought to a head the proposition to change the plant so that electricity, of which the city has so much at small cost, will be the mainstay in operating the immense high-pressure pumps, while gas will be used only as a "standby." Acting on a specific recommendation from City Engineer Ruttan, the board is calling for tenders for two new pumps, which will add 20 per cent. to the pumping capacity of the present plant. It is the intention, when the new pumps are installed, to proceed with repairs to the big gas retainer, which is not in very good shape. The new pumps will supply any temporary deficiency in pumping power while the gas container is being repaired, as they will be connected with the electric power. When this is completed, it is proposed to proceed gradually to change the present equipment of the pumps so that they may be operated directly by electric power, but can be shifted to gas power on a moment's notice. It is estimated that the electrification of the plant would cost in the neighborhood of \$50,000, but this amount would soon be saved by cutting off the constant cost of keeping up fires for the gas producer plant. Tenders are being called for two styles of pumps, one style to have a capacity of 360,000 Imperial gallons per minute at a pressure of 150 pounds to the square inch, while the other is to have a capacity of 180,000 gallons per minute at a pressure of 300 pounds. The efficiency of each will be about the same. Another proposal is that the gas producer plant should be cut out altogether when the plant is electrified and that the "standby" gas engines should be operated with gas from the street railway company's gas plant. A 12-inch main is laid to the high-pressure plant, and the big container would hold enough of this gas to operate the engines for any time that the high-pressure is likely to be required.

Sault Ste. Marie, Ont.—Another international question re-opening the rather vexed issue of division of international water powers is involved in an application received by the Dominion Government at Ottawa from the Michigan Superior Power Company. It came through the United States Secretary of War, with the suggestion that the two governments refer it to the joint International Waterways Commission. What is sought by the company is the privilege of damming St. Mary's River at Sault Ste. Marie in order to increase the flow of water to the works of the Michigan, Lake Superior Company at the American Soo. Compensation works to prevent the levels of Lake Superior being injuriously affected are proposed. The application is accompanied by plans and profiles of the proposed work and the compensative undertakings in connection with it. The matter doubtless will go to the Waterways Commission for full investigation, but it is evident that there will be objections not only from American standpoint, but also from navigation interests on the Canadian side. It is divined that the dam will have the effect of diverting much water which now flows through the Canadian channels, and also furnishes power to the Lake Superior Company. In many respects it is similar to the Chicago drainage canal scheme, which, it will be recalled, was vigorously combatted by the Canadian Government and ultimately rejected. A. C. Boyce, M.P., who is in Ottawa, when told of the proposal, stated that the American interests already have a larger slice of the water, the arches of the interna-