

THE OTTAWA WATERWAY.

(Evening Journal, Ottawa.)

It is worth recalling the fact that the project of a navigable waterway from Montreal to Georgian Bay by way of the Ottawa river has been before the people for many years. Every one who knows anything of the history of transportation in Canada knows that the Ottawa route to the Huron country was in use by the Indians before the advent of Champlain. Not to labor the argument for the construction of the waterway, a glance at the map shows that the Ottawa route is the bee-line by water, so to say. It is remarked by the *Maritime Mining Record* that as long ago as the inauguration of the National Policy, and that was in the seventies, Sir Charles Tupper held out the hope that by means of the duty Nova Scotia would be able to secure Ontario as a market for her coal. 'The hopes have never been realized,' says the *Record*, 'wholly, it may be said, because of lack of transportation facilities. Coal cannot be sent to Ontario points without rehandling and reshipping at Montreal, and these are fatal to the looks of Nova Scotia coal, and by looks chiefly are all coals commonly judged. The construction and operation of the Georgian Bay canal would enable Nova Scotia operators to send coal into the very heart of the Dominion. The government lately intimated that it could not proceed with the work at present for lack of funds. Sir Robert Perks, a great engineer, construction contractor, has, it is understood, offered to construct the canal with government encouragement. This should not be withheld. The Boards of Trade of the Ottawa Valley have taken action, and these should be backed up by all the Boards of Trade in this province. The Georgian Bay Canal, with a sufficient depth of water, will probably prove of more value to Nova Scotia than the building of the G. T. F. Railway.'

The secretary of the Canadian Federation of Boards of Trade and Municipalities, Mr. A. J. Forward, publishes messages from municipal authorities and Board of Trade officials in a wide area. These messages express an unanimous approval of the project. From St. John, (New Brunswick), Caledonia, (Nova Scotia), Quebec, Three Rivers, Drummondville, Rouville, Lachute, (Quebec), Bruce Mines, Bonfield, Clinton, Sudbury, Callender, Sanit Ste Marie, Haileybury, Fort William Port Arthur, Kenora (Ontario), Neepawa, St. Boniface Killarney (Manitoba), and Calgary (Alberta), come declarations of approval. The projected Ottawa waterway is described in these messages as a national enterprise which must benefit the whole country. In the West the opinion is that it would bring about cheaper transportation of Western products. In the East it is recognized as a plan having the possibilities of an immense development of trade through Canadian outports.

Meantime the project, which has been obliged to stand for many years, is still obliged to stand. Sir Robert Perks has, it is true, published the proposal that the French River end of the work, which would bring lake traffic to North Bay, should be begun at once. There is evidence everywhere that the financial stringency of the last two years is passing, and it is permitted to us to hope that during the current fiscal year the Dominion revenues will have so much improved that the Dominion Government may be able to give serious attention to the growing demand for the opening up of the Ottawa waterway.

TUNNELING BY MACHINE.

The idea of a machine for cutting rock tunnels without drilling or blasting is no new thing. We are told by Rowland A. Philips, in *The Scientific American*, that since 1853 no less than sixty-nine patents have been granted on such machines. Only three have ever been constructed, however, and the latest, the rotary machine invented by Mr. Sigafos, of Denver, Col., bids fair to be successful. A full-sized machine has been working in Georgetown, Col., since January last. Says Mr. Philips in the article just mentioned:

"The machine complete, ready for work, weighs 29 tons, and its length is slightly in excess of 18 feet. This huge frame holds 10 crushing-heads, each carried on a 4 inch horizontal shaft and working on the same principle as a stamp mill, with the exception that the blows are given with the aid of springs instead of force of gravity. The entire fore part of the machine revolves as it cuts, thus cutting a full, clean bore, all the muck being flushed from the tunnel by means of a three inch stream of water, carried directly through the machine under 40 pounds pressure, and fed through 10 small nozzles, each of which sends a stream beside each crushing head. This constant revolution of the machine is its strong point, the body being run on a series of 'foot' wheels, 32 in all. The axles of these wheels—they are set in pairs—are arranged so they may be set at will, preventing the wheels from tracking. A simple twist sets them at an angle, and thus the whole machine moves forward or backward not unlike a huge screw.

"The ends of the cutter shafts carry tappets, which, as they revolve, are acted upon by a 5 foot cam. This draws back the tappets and releases them. In relation to the hardness of the rock these blows can be regulated and the drop varied from 4 to 12 inches by substituting other sized cams.

"Of these monster crushing heads there are 10, 8 on the outside of the revolving front and 2 in the centre. The cam has a long barrel-like hub, which permits the centre shafts being brought back without interfering with the others. Diametrically opposite cutters strike at the same time. The springs which lend the force to the blows are 5 feet long, 6 inches in diameter, and composed of a specially chilled inch steel. These cutting or crushing-heads, as they should be called—for the machine works on the principle of pulverizing the rock instead of cutting it—are 2 feet in diameter, the face of each being composed of a series of blunt teeth. These heads revolve about the axis of the machine as they strike, thus producing a grinding motion to the surface of the breast. In this one respect alone the rotary differs from all its competitors, and in doing so proves the wisdom of the method. Mr. Sigafos has always maintained that a sharp or edged tool is worthless in tunnel work.

"With an 8-inch drop these heads strike a blow of 4,000 pounds, 200 times a minute. This means that a total of 8,000 pounds is expended against the breast of the tunnel every 60 seconds. It is claimed that if each head penetrates but the thickness of a sheet of common writing paper at a blow, it will cut it at the rate of an inch a minute.

"In fact, the harder and more stubborn the rock, the more easily the machine will do the work, and it is doubtful if it would work at all in soft dirt or clay."

It is calculated that 24 hours' work with the machine, during which it will cut a distance of 120 feet, will cost in wages about \$24, whereas three shifts of 4 men each, costing \$65 in wages, besides as much more for powder,