ELECTRIFICATION OF MOUNT ROYAL TUNNEL.

Another stage in the construction of the Canadian Northern terminal and tunnel has been reached, with the letting of the contract for the electrification of both. The contract, which involves a sum of half a million dollars, calls for the complete electrification of the tunnel and terminal, seven electric locomotives and about eight cars for the local service being provided, while the system will be such that it can be extended at any time to any part of the service. Yards near the Back River will be opened, giving track facilities for changing the electric locomotives for steam and vice versâ, and within a year from now trains are expected to be running.

In the construction of the tunnel beneath Mount Royal there have been many new features and much to attract the attention of the engineering world. These features have been currently described in previous issues of *The Canadian Engineer*. Readers will also remember the announcement early in June of a world's record in tunneling in connection with the piercing of the mountain. In the electrification another record will be marked. Of all the great railway systems of the world using electricity for the operation of their terminals, there is not one which has not adopted this system only after previously using steam. The Canadian Northern terminal in Montreal, therefore, will be the first to be operated entirely by electricity from the commencement. No steam locomotive-drawn trains will enter the tunnel. Specially constructed electric locomotives will be exchanged for the steam engines at the Back River yards. For the local service between Montreal and the Model City there will be some eight multiple-unit cars of very heavy construction similar to those in use in some of the New York subways.

The contract, which has been let to the Canadian General Electric Co., provides for the installation of the system at a cost of about half a million dollars.

The installation of this electrically operated system will ensure the entire absence of Canadian Northern locomotives in or near the city, none coming closer than the yards near the Back River. On reaching these yards trains approaching Montreal will have their steam locomotives exchanged for electric motive power, which will take them to the terminal station to be opened on Dorchester Street. In the city there will, of course, be no steam engines as the railway enters and leaves only by way of the tunnel.

Progress on the tunnel construction has of late been rapid, despite the very hard rock now being encountered, and it is practically certain that the headings will meet well before the end of the year. There remains but 2,000 feet of rock separating the two headings, and this is being bored at the rate of 200 feet each week. Already a mile of tunnel has been completed, this being a broadening and enlarging of the heading to a height of 22 feet and a width of 30 feet.

In connection with the electrification of this tunnel it might be mentioned that the same company who will supply its electrical equipment also secured the order from the Canadian Pacific Railway for the electrification of the Castlegar branch in the Kootenay Division. Heavy power locomotives are to be used in this case also, and the voltage adopted is 2,400 volts in both.

Canada is one of the three principal mica-producing countries of the world, the others being India and the United States. The average value of the mica produced annually in Canada during the last ten years has been about $185,000.

FELDSPAR.

According to reports in the Economic Minerals and Mining Production of Canada, by J. McLeish, feldspar is employed at the present time almost entirely in the pottery industry (where, in a finely ground form, it is mixed with the clay to act as a flux), or in the enamelling of cooking and similar utensils. Attempts are being made, also, to utilize the mineral as a source of potash, of which it contains as high as 14 per cent.

Feldspar has been mined in Canada since the year 1890, and the present average annual production is 12,000 tons. Practically the whole of the output is exported to the United States, where it is consumed in the New Jersey and Ohio potteries. Almost the entire production of Canadian feldspar is derived from the province of Ontario—the principal mines being located in the county of Frotenac, about twenty miles north of the town of Kingston on the St. Lawrence River. A few small deposits, also, have been worked in the Parry Sound district, in the vicinity of the Muskoka lakes. Formerly feldspar was mined to some extent, also, in the province of Quebec—the deposits being located in Ottawa county. No development of these properties has taken place during recent years—the distance from the United States factories rendering mining unprofitable. One mine in this region yields a remarkably pure white feldspar, which is in demand for the manufacture of artificial teeth.

Veins or dykes of pegmatite (a rock having feldspar as its main constituent) are of common occurrence throughout large areas in both Ontario and Quebec, and have in some instances been mined for the mica which they often carry. These deposits vary in width from mere stringers of a few inches to massive bodies of over a hundred feet. Such deposits, while, at the present time, often too remotely situated, or containing too many impurities in the way of accessory minerals to allow of the feldspar being employed for pottery purposes without considerable expensive cleaning, constitute large reserves of the mineral, which may ultimately prove of value as a source of potash or for other purposes.

The addition of trass slightly retards the setting of mortars and concretes, increases their resistance to water, greatly increases the strength of mixtures gauged with lime-water, and decreases the detrimental effect of soap solution. Lime-water increases the strength of trass mortars, but has no influence on the strength and water-tightness of mixtures which do not contain trass. Soap solution renders mortars and concretes water-tight and diminishes the hardening of mortars without trass, which weakening effect is counteracted by the addition of trass.

Scientific methods are giving great exactness to processes for hardening valuable tools and drills. Uniform and easily controlled heating is necessary, and this is easily obtainable with the electric furnace. A special form recommended has a crucible 8 ins. square and 12 ins. deep, lined with firebrick surrounded by heat-insulating material in a sheet-iron case. This crucible contains the heating bath, the temperature of which is regulated by a transformer for varying the voltage, and a pyrometer gives quick and accurate determinations of the degree reached. The bath varies with the temperature required. A mixture of barium chloride and potassium chloride is used for hardening carbon steel, at 750 deg. to 1,000 deg. C., the proportion of barium chloride increasing with rise in temperature, and this salt alone being advised for high-speed steel, at temperatures up to 1,300 deg. The crust of salt which adheres to the tool, preventing oxidation, falls off in the cooling liquid.