pressures of air were used but finally it was found that, to thoroughly dry the ground, 12 to 18 lbs. were necessary.

It was here that one laborer got his first lesson in physics. He was a foreigner who worked as a bricklayer's helper. When he went into the tunnel for his 8-hour shift he took his lunch with him, part of which consisted of a bottle of tea. The bottle had an air-tight screw top. After he had drunk his tea, he screwed the top tight on, quite unconscious that he was imprisoning a pressure of 18 lbs. to the square inch. To his astonishment there was a small explosion in his pocket when he come out of the tunnel into normal pressure.

After the introduction of compressed air, the work proceeded without any hitch or trouble. The needle-beam was used. About 9 feet of sewer was completed each day in each heading.

Shaft No. 3.—The earth in shaft No. 3 at 41 + 00 was composed of sand at the top, changing to blue clay about 15 feet down. The shaft was 33 feet in depth; therefore the tunnel was all in clay. Surface water was encountered in very small quantities. The shaft was



Pipe Sewer.

located on top of the bank of a small ravine. Tunneling was begun, as before, from north and south ends of the shaft. The south tunnel emerged at the foot of the bank into the 100 feet of open cut mentioned above; 32 feet of this 100 feet were constructed of tile segment block. This segment block made a pretty sewer with a smooth surface. The 100 feet were to have been constructed of this material, but after 32 feet, brick was substituted for the reason that, the sewer being at the bottom of a steep bank the blocks had to be carried down to it, and owing to the weight of the blocks this handling was slow and difficult and many of them were broken.

When the open cut was finished, the sewer was continued in tunnel. The surplus was taken up shaft No. 3. In two cases short lengths of sewer had to be open cut because in these places pockets of wet gravel came below the roof of the excavation, and caused the roof to give way before it could be supported. In this end of the tunnel sheeting was used in the roof nearly the whole way.

At the north end of the shaft the ground was composed of clay and tunneling proceeded at a rate of 6 feet to 8 feet a day. Very little sheeting had to be used in the roof. Everything was going smoothly when suddenly the roof caved in so quickly that the workmen had scarcely time to escape from the heading. A pocket of sand was the cause of this. The extent of this pocket was not known and the contractors, not wishing to take any chances, decided to open cut. A shaft 30 feet long and 70 feet deep was necessary to repair the damage. The heading was picked up and the work proceeded to the end of the contract at the stand-by tanks. This shaft was at 44 + 90.

In the whole of the work referred to above, *i.e.*, the north section from the outlet section to the stand-by tanks at Bloor Street, the manholes for the large sewer are 500 feet apart, and for the small tile sewer 300 feet apart. Fig. 8 is a section of one of the small manholes.

Throughout this long and difficult piece of work the headings from the different shafts met almost exactly in line and grade. This instrument work was a great credit to the resident engineer, Mr. T. L. Lamb, who is now on active service with the Canadian forces.

HYDRO-ELECTRIC EXTENSION AT SOUTH FALLS, ONT.

The Hydro-Electric Power Commission of Ontario has under way the extension of a power plant on the south branch of the Muskoka River. This plant, located at South Falls, and formerly operated to supply the town of Gravenhurst, had a single unit with a capacity of 450 k.w. It is being enlarged by the addition of a 750 k.v.a. unit. Excavation work was recently commenced and most of the equipment has been ordered.

Provision was made in the design of the existing plant for such an extension, and the installation of the latter does not alter the previous arrangement.

A wood stave pipe line, 100 ft. long, will connect the existing headworks with about 60 ft. of steel penstock leading to the new unit. The head gate mechanism, steel penstock, turbine, governor and relief valves are all being supplied by the William Hamilton Company, Limited, of Peterborough, Ont., the generator and transformers by the Canadian General Electric Company, Limited, Toronto, and the wood stave pipe line was supplied by the Pacific Coast Wood Stave Pipe Company, Limited, and is being laid by the Commission. Orders for the switchboard equipment have not yet been placed.

The extended plant will supply the towns of Gravenhurst, Bracebridge and Huntsville.

RECENT PRODUCTION OF GOLD AND SILVER IN ONTARIO.

Returns made to the Ontario Bureau of Mines for the nine months ended September 30th, 1915, show an increase in value of gold of \$1,\$84,093 and a decrease in value of silver of \$2,051,760. The gold districts of Northern Ontario, the report says, are fulfilling the prediction made several years ago that they would make good the loss caused by the waning of the silver mines of Cobalt. Thus, the combined value of the gold and silver output of the first nine months of the present year was only \$167,661 less than for the same portion of 1914, notwithstanding the fact that the yield of silver fell off over 20 per cent. Part of this decrease is due to the low prices which prevailed during the whole nine months, but which, however, made a sharp recovery in November.

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