

great rush of work at a critical time and the floors suffered. In East Cleveland at a later date, it became necessary to build waterproof joints at the hinges of the arch bridges.

The concrete in the floor slabs cost about \$12 per cu. yd. in place.

Now that the bridges are completed and have been two or more winters in service, the conclusions are as follow:—

1. Concrete can be made watertight, under low heads, for all practical purposes.
2. The mixing, placing and ingredients of concrete are subject to such a great number and variety of defects that only the keenest attention will secure an impervious structure.
3. Contraflexure temperature changes and settlements will produce cracks.
4. It is best to forestall cracks with predetermined joints.
5. Joints may be sealed against water if well designed.

On the underside of the bridge floors the concrete is protected from locomotive blasts by cast-iron plates, $\frac{1}{2}$ in. thick and 36 in. wide. They weigh 71 lb. per lin. ft. and cost \$5.23 per ft. in place.

AN IMPORTANT INDUSTRY.

An analysis of war orders shows that the orders placed through the Canadian shell committee and for other munitions account for \$254,000,000 of the \$394,000,000 worth of orders. The shell industry in Canada has grown to be a large one and is increasing rapidly in size and importance. According to a statement of General Bertram to the Canadian Manufacturers' Association convention at Toronto last month, 60,000 artisans are employed in Canada, drawing weekly wages of \$1,000,000 in 247 factories, manufacturing shells for the war arena. Orders for 9,000,000 shells have been placed here by the shell committee and for 8,100,000 cartridge cases, fuses, primers, and friction tubes. For these contracts orders have been placed for 170,000 tons of steel, 30,000 tons of lead and several thousand tons of other material. Canada will be shortly turning out 50,000 shells per day. The changes which were necessary in the equipment of the various factories by adding new machinery, or in the re-adjustment of existing plants, were made by the manufacturers themselves and at their own expense. These changes gave employment to many other factories which were not directly engaged in making ammunition.

In addition to the manufacture of several thousand tons of cordite and powder in connection with the present shell contracts, an important new industry has been initiated in the Dominion, viz., the utilization of the by-products from the coke ovens of the Dominion Iron and Steel Company at Sydney, N.S., for the manufacture of the high explosive, trinito-toluene. The revenue alone from the contract placed with this company will be nearly \$5,000,000. Other companies also are making similar materials.

The new rectangular filter bed which is to increase the capacity of the sewage disposal works at Regina by about fifty per cent. is now nearing completion and should be in operation in a week or so. The travelling distributor is now being erected. This bed differs from the others previously installed, the latter being of a circular type.

COAST TO COAST

Owen Sound, Ont.—The hydro-electric power line from Eugenia Falls has been practically completed. The poles average 60 to 70 ft. in length and are of Douglas pine from British Columbia.

Ottawa, Ont.—The Government Improvement Commission is macadamizing the Canal Road between Hartwell's Rocks and Hog's Bank. Stone retaining walls are also being placed along the sides of the Rideau Canal at this place.

Edmonton, Alta.—The city purchased Calgary's municipal paving plant last year for about \$19,000, but up to the present time the new owners have not been able to put it into service, owing to the lull in paving operations.

Glacier, B.C.—Although previously announced that the Roger's Pass Tunnel of the Canadian Pacific Railway would be electrified, it is now reported that a system of ventilation is being worked out which may permit the use of steam power.

Guelph, Ont.—The Page-Hersey Iron and Tube Co. are reported to have taken on a full staff of men after having been running shorthanded for some little time. It is possible that the company may establish a galvanizing plant at an early date.

Toronto, Ont.—At a cost of about \$62,000 a water-bound macadam roadway has been constructed by the York County road commission from the city limits easterly for a distance of about eight and a half miles. The work was done in sections and extended over a period of about three years.

Ottawa, Ont.—The total population of Canada at the beginning of the present year, according to an official estimate made by the Census Department, was 8,075,000. The growth of population since the census was taken in 1911 is officially estimated at approximately 850,000, or an average of about 200,000 per year.

Toronto, Ont.—The city has under consideration once again the construction of a duplicate waterworks system at Victoria Park. The scheme recommended by Mr. R. C. Harris, Commissioner of Works, about 18 months ago provides for an expenditure of about \$4,000,000. Our readers are referred to *The Canadian Engineer* for January 22nd, 1914, for a description of the proposed system.

Winnipeg, Man.—The Public Utilities Commission has ordered the operation of street cars over the Arlington Street bridge at the C.P.R. yard. A number of alterations will first be necessary. The intersection of the grade and level roadway on the bridge is to be lowered four inches to overcome the angle at the top of the grade, and the roadway paving is to be relaid in such a manner as to provide for proper transverse and longitudinal expansion.

Montreal, Que.—Mr. J. E. Aldred, president of the Shawinigan and Cedars Rapids Power Companies, reports a programme of progressive development both for the companies and the industries with which they are associated. It includes the construction of a transmission line which will link up Quebec with the Shawinigan power, the installation of additional machinery which will increase the capacity of the Cedars Rapids plant, the building of a tramway system for Three Rivers and its immediate district, and enlargements to be carried out at the plants of