which will also supply the cement. Tests have recently been made of the sand and gravel from the various pits, chiefly the McCorkell pit, which will provide much of the aggregate. Other pits, including the Gauthier and the Webster, have been practically abandoned while others are being investigated. It is planned to put the material through a screening and crushing plant and to re-mix it before delivery to the contractors.

The reader is referred to previous articles, mentioned above, for details concerning the sections adopted for various portions of the concrete aqueduct; the location of meters, weirs, blow-offs, and the gradients adopted along the line. Fig. 4 shows four test sections, the standard sections used being the arch for gravity flow portions and the circular for portions under pressure.

It is estimated that the 1915 operations will involve an expenditure of about $1,700,000. There are many smaller contracts, such as the erection of an engine shed at Deacon (the first station of the railway, out of Winnipeg), the supply of equipment for screening and crushing plants, additions to rolling stock for the railway, etc., to be included in this year's undertakings. Contracts, totalling $135,907, were let late in January to a number of Canadian firms for varied plant and equipment, including locomotives, excavators, rock crushers, screens, boilers, engines, pumps, and railway cars. In February, a contract was awarded to the Progress Construction Company, Winnipeg, for the construction of a 3-stall engine house at Deacon. In March, Mr. F. Windels, of St. Boniface, Man., got a contract for the construction of a large number of camp buildings.

It is estimated that the construction will cover a period of about four seasons. When completed, the system will be self-supporting, the annual cost of maintenance of the aqueduct and the total expense connected with its operation being estimated in the Board of Consulting Engineers' report at $40,000.

ANNUAL CONSUMPTION OF PORTLAND CEMENT IN CANADA.

The following figures relating to Canada's consumption during recent years of Portland cement were prepared by the Department of Mines:—

	Canadian.		Imported.		Total.
Calendar year.	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.
1910	4,753,975	93	349,310	7	5,103,285
1911	5,692,915	90	661,916	10	6,354,831
1912	7,132,732	83.3	1,434,413	16.7	8,567,145
1913	8,658,805	97.1	254,093	2.9	8,912,988
1914	7,172,480	98.7	98,022	1.3	7,270,502

In the last five years the coal used in metallurgical coke manufacture has averaged around 65,577,000 tons, yielding 43,983,000 tons of coke, valued at $111,736,000. Of this total, 14,767,000 tons were used in by-product coke ovens, yielding, besides the coke, 54,491,000 cubic feet of gas, 94,306,000 gallons of tar, and $9,190,000 worth of ammonia.

The chief function of a locomotive head lamp is to warn persons on the track ahead that a train is approaching. A lamp having a centre-beam intensity of 500 candle-power can be seen 25 miles away by a person of average height, therefore it will give 25 minutes' warning of the approach of a train running at 60 miles an hour on a straight track, with nothing to obscure the light.

OBSERVATIONS OF SOME EUROPEAN WATER PURIFICATION AND SEWAGE DISPOSAL PLANTS.

NUMEROUS descriptions have been presented in recent years by American engineers of European practice in water purification, in sewage disposal and in laboratory control. As a rule they are the result of observations made during a summer trip, and they generally relate to a few of the most prominent or latest developments—a few only of the many there are to see, in peaceful times, in the different countries. The summer of 1914, especially the latter part of it, was fraught by many difficulties in this respect and current literature does not record much new information relative to further investigations. The few visiting engineers who did succeed in following to any considerable degree their summer schedule, however, have described some rather unique developments. One of these is Edward Bartow, whose observations contained in a paper read recently before the Illinois Section of the American Waterworks Association. The writer enumerates many difficulties encountered owing to the war, but the following observations will be found interesting:

Hamburg was the first city visited. The water supply is taken partly from the Elbe River and partly from wells. The waterworks are located on the river above the city, but, the Elbe being a tidal water, at times the sewage-polluted waters of the river reach the intake. It is customary only during the ebb tide to pump the water into the large settling basins. Altona, which adjoins Hamburg down the river, obtains its water supply from a point below the sewers of both cities. Reversing the practice of Hamburg, Altona pumps water into its purification works only during the flood tide. The Elbe River through Hamburg and Altona is therefore like a large tank disposing of the sewage which is passed into it. The only treatment Hamburg sewage receives is screening through revolving screens composed of aluminum bars about one foot long, placed about one centimeter (a little less than one-half inch) apart. The flow of the water in the river averages 1,200 cubic meters per second. The dry-weather flow of the sewage is 3 to 4 cubic meters per second, and the wet-weather flow 20 cubic meters per second, so that there is ample dilution to prevent any nuisance, and to allow the water to be satisfactorily purified for drinking purposes. At the water purification plant alum is used as a coagulant prior to sedimentation. It is thought that Hamburg has the only purification plant on the continent where a coagulant is allowed. The water, after passing through large sedimentation basins, is filtered through slow sand filters. These filters are uncovered, and in winter are covered with ice. Owing to the fact that there is a prejudice against the use of water taken from the river, the water department is endeavoring to develop a ground water supply. A number of wells have been sunk, and considerable water obtained, but the Hamburg authorities are handicapped by the fact that there is not sufficient area in Hamburg for proper development of ground waters. Hamburg is unable to extend its well system into Prussia, and, for the disposal of its sewage, has purchased from Prussia an island in the lower Elbe. The situation is similar to one in this country, where New York City cannot go outside of New York State to Connecticut or New Jersey for its water supply. The ground water obtained by Hamburg contains so much iron that iron removal plants have been constructed.

While the sewage from the city of Hamburg itself is easily disposed of by the dilution method, several of the