thick and one foot deep on the outside. The face of the wall has a batter of one-quarter of an inch to the foot and the back is plumb.

Three-quarter inch round rods of mild steel were used throughout with the exception of the backs of the counterforts where the tension strain to resist overturning was so great that it was considered best to use one and one-eighth inch round rods. The increased reinforcement required in the front of the wall, due to increased height, was taken care of by spacing the horizontal rods closer. The rods for the back of the counterforts were delivered from the rolling mills, cut the required length, while the three-quarter inch rods for the wall were delivered in thirty-two-foot lengths, which is the length of two spans with two feet for lap at the splice. This length is as long as could be conveniently loaded on cars. Care was taken that the joints in the adjacent rods did not come at one counterfort, this being accomplished to a large extent automatically by commencing each horizontal rod at the outer end of the wall. Splices in horizontal rods were made by giving a two-foot lap in all cases over a counterfort. Wherever possible, the end of all rods were hooked over a rod running at right angles to it.

After the excavation had been made for the foundation a layer of concrete about three inches thick was placed in the bottom to form a hard, uniform floor for the men to work on and to protect the clay from becoming worked up if the weather should be wet. It was not possible to erect any staging to do any work from the front of the wall on account of the closeness of the C.P.R., as is seen from Fig. 3. The form for the face was put in place and boarded to the top, the studding being allowed to extend to the three-inch base, which had been put in. The frames of the forms for the back and counterforts were put in place with just enough boarding to brace them strongly, these studs also being allowed to extend to the base. The ends of the studs may be bored out and the holes filled with concrete. On this frame was suspended the reinforcing steel, which was securely held in its proper position by wires and blocking. Figs. 4 and 5 show the reinforcing in place before concrete was put in. The concrete was mixed quite wet and dumped from a large bucket into chutes placed at short intervals along the wall. The boarding-up of the back of the wall and of the counterforts was kept only a short distance above the concrete so that an opportunity would be given the men to tamp the concrete. The carpenters and the tampers used the same staging and very little difficulty was experienced in getting the material well tamped and to present a smooth surface. The gravel used for the concrete was taken from a bar in the St. John River, was clean and sharp and consisted of quartz and granite stones and sand so mixed that it was not considered necessary to screen it or to add any other material. The concrete was composed of six parts of this gravel to one of cement. The wing wall was separated from the abutment by a vertical joint. It was not considered necessary to provide any other expansion joint in this length of wall. Fig. 6 shows a view of the back of the finished wall.

In the north or smaller wall there is 172.8 cu. yd. of concrete, 14,300 lbs. of steel rods, while the gravity walls would have required 324 cu. yd. of concrete. In the long or south wall there is 235.8 cu. yd. of concrete and 23,300 lbs. of steel rods, while in the gravity wall there would have been 478 cu. yd. of concrete. The actual cost of two walls was $6,817, and was constructed by contract for 82.5 per cent. of the cost of a gravity wall. The price paid per yard for reinforced concrete was about one dollar more than it should have been to be consistent with the price per yard of plain concrete. If the prices had been consistent the reinforced wall would have been constructed for 78 per cent. of the gravity wall.

Design of Abutments.—The abutments are of peculiar shape but do not present any particular difficulty, the general appearance of which may be seen in Figs. 3 and 7. They are of monolithic design, except for a small lug or wing on the side opposite to the large wing wall. The abutment is allowed to be partially submerged on side of the structure so little or no advantage could be gained by reinforcement.

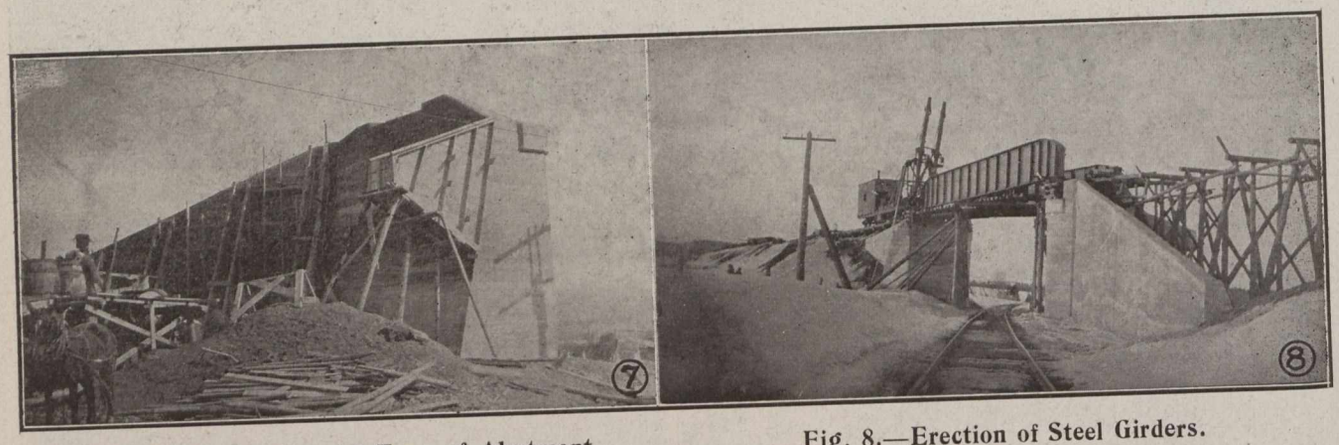

Fig. 7.—Showing Special Type of Abutment.

Fig. 8.—Erection of Steel Girders.

Fig. 8 shows the steel girders being placed in position by the derrick car of the Dominion Bridge Company.

The design and drawings were made by Mr. W. G. Bullock, bridge engineer for the railway company. The construction was in charge of Mr. B. M. Hill, division engineer, and Mr. F. W. C. Wetmore, resident engineer. The concrete work was done under contract by Mr. W. H. A. Hamilton, Mr. E. S. Haines, superintendent, and steel superstructure by the Dominion Bridge Company, to all of whom credit is due for the careful and energetic manner in which the work was carried out.

PROPOSED EDMONTON BRANCH, CAN. SOC. C.E.

An application to establish in Edmonton a branch of the Canadian Society of Civil Engineers has, according to report, been granted. On May 1st a meeting was held by the resident members of the Society to discuss the organization of the proposed branch.