

Bridge at Edmonton, Alberta.

Edmonton is on the north side of the north branch of the Saskatchewan river, situated on the high table land above the deep valley of the river. On either side of the river, the higher plateau is at an elevation of about 190 ft. above the river level, & the slope toward the lower plateau, or narrow valley, is very sharp. On the south side of the river is South Edmonton, the terminus of the Calgary & Edmonton Ry., from which all freight for Edmonton & the northern districts has to be taken by waggons using ferries to cross the river.

In 1892, a survey was first made by the Dominion Government to select a site for a traffic bridge across the Saskatchewan at Edmonton. The location of the bridge was fixed nearly opposite the centre of the town, where roads, leading to the foot of the hills, existed, or could easily be built. It was first intended to build a highway bridge for general traffic only, & the location was made with this end in view. Subsequently the town of Edmonton offered a contribution of \$25,000 on condition that the Government would build a combined railway & traffic bridge. After some delay this was accepted & plans ordered. Tenders were called for the substructure & the contract awarded in Aug., 1897, to F. Lemoine, of Montreal. The contract for the superstructure has not yet been given, but it is expected it will be shortly.

The superstructure, as designed, consists of 4 through steel spans of the riveted type of girders, resting on 3 piers & 2 abutments. The length of each span is 170 ft. 11 in., the distance

yds. capacity daily, was used in removing the material. The caissons are built of British Columbia red fir. Piers no. 1 & no. 3 are founded on piles driven in the caissons, & cut off 5 ft. below low water level. The caissons were then filled in solid with Portland cement concrete from hard pan foundation.

After some borings & tests at pier no. 2, it was decided not to drive any piles there. The material underlying the gravel was found to be much harder than at piers nos. 1 & 3. Tests as to its bearing capacity showed that under a load of 350 lbs. to the sq. in., or 25 tons to the sq. ft., no signs of yielding were apparent. Concrete was deposited under water in the caissons, with a specially constructed box. When 2 or 3 ft. had been deposited in this way, the caissons were pumped out & the concrete continued in the dry up to low water level. From that level the body of the pier proper was started in a timber casing which was built up as the work progressed. A service bridge was built for piers nos. 1 & 2. For pier no. 3 the materials were brought by scows, a steel wire having been strung across the river for the handling of the scows.

As regards the materials used in the substructure, which, as mentioned before, is entirely built of concrete, the cement employed is the best Portland, finely ground. The tensile strength for most of the briquettes made, after 9 days' immersion in the water, was over 500 lbs. to the sq. in., the briquettes having been previously allowed to set 18 hours before immersion. Quite a number of tests gave a strength of over 650 lbs. to the sq. in. at that age. The weight per struck bushel was between 115 & 120 lbs., with a residue for several tests of not more than

resumed Mar. 27, 1898. From that time the work was pushed rapidly & completed June 20, 1898.

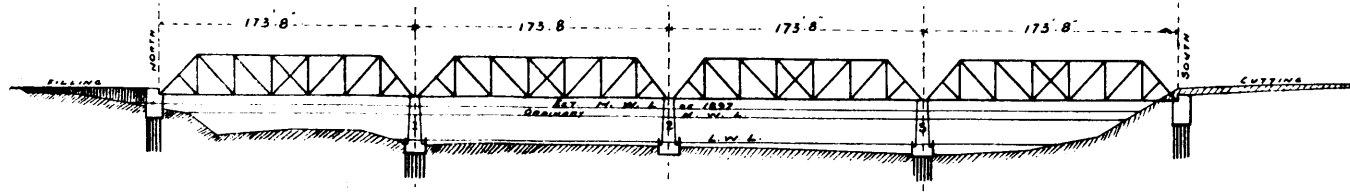
The work done & forming the nature of the contract was as follows: Building of 3 concrete piers & 2 abutments; excavation in foundations; piling in foundations; three caissons for piers; rip rapping; filling north approach; cutting south approach.

The illustration on this page shows a section of the river & side elevation of the bridge, scale 80 ft. to in.

Surveys, Construction & Betterment.

Brandon & Southwestern.—It was recently stated that surveys had been completed from Brandon southwest to Waskada, 90 miles, & that construction would begin at the southern end before Nov. 1, the date by which the extended charter required that it should be started. We have been unable to confirm these statements. The promoters & the reputed contractor do not answer enquiries addressed to them. We do not think any construction work has been done. If it has it was simply infinitesimal, to make a show of holding the charter. (Aug., pg. 156.)

Brockville, Westport & Sault Ste. Marie.—This line, which extends from Brockville, Ont., to Westport, 45 miles, has been considerably improved this season. The whole line has been relaid with cedar ties & largely reballasted. Cattle guards & culverts have been renewed with new timbers, several bridges have been entirely rebuilt, & the frame work of all water tanks has been reconstructed. (Nov., pg. 237.)



from centre to centre of piers being 173 ft. 8 in., & the total length of the bridge 694 ft. 8 in. The roadway is 18 ft. in width, & 2 foot passenger ways, each 4 ft. 4 in. wide, supported on brackets, are provided on both sides of the bridge. The same flooring is used for both trains & waggons. The clear height under the bridge at low water is about 30 ft.

The piers, which are made entirely of concrete, are of rectangular section, & at the top carry a cap of cut stone for the bridge girder plates. At the base, both up-stream & down-stream ends are rounded, & the ice cutter brought up with a slope of 1 to 1. The smallest section of the pier at the top is 7 ft. x 24 ft., & the largest section at base is 9.4 ft. by 35.4 ft. The caissons have a width of 14.6 ft., & an extreme length of 52.6 ft., the foundation area being 656 sq. ft.; the average total height of the piers from the foundation bed is 38 ft. The piers are not founded on rock, nor is there any available rock to be found in the location close to the surface. They are founded below the alluvial gravel deposit made by the river, on indurated clay, permanent in character, which is the same material as forms the foundation of the bluffs adjoining the river. This material is called by the miners hard pan or country rock. It varies very much in hardness, some spots being found relatively soft, some other places as hard as shale. Generally it crumbles to pieces when exposed to the air, excepting the hardest variety. At the bridge location the depth of the drift gravel is from 1 to 6 ft., the foundation bed level for the three piers averaging 8 ft. below low water level. A small dredge built for gold washing on the Saskatchewan, of about 150

1.7% after passing through a sieve of 2,500 holes per sq. in. The concrete is composed of 1 part of Portland cement by measure, $1\frac{3}{4}$ part of sand & 5 parts of stone; a special finer concrete for the surfaces being composed of 1 part Portland cement, $1\frac{1}{2}$ part of sand, 4 parts of broken stone. Some gravel was also mixed with the broken stone, but it required so much washing to get it free from silt & coarse coal particles, that very little of it was used. Mortar composed of 1 part of cement & 1 part of sand was used to flush all the surfaces along the timber casing. The facing was very successful, showing after the removal of the timber work a smooth dense surface without pits or irregularities.

As it was necessary to complete the piers before the high water in June, work on the 3 piers was pushed simultaneously & with rapidity. For this reason a great number of iron rods passing through the body of the pier were used to keep the casing from bulging out under loads of fresh concrete. After stripping off, these rods were cut flush with the face of the concrete & the ends painted over to keep them from rusting. The abutments were built well up into the river banks, the foundation bed being about 16 ft. above the river level. Piles were driven down to firm stratum & cut off 6 ins. above the formation level. A strong grillage was laid & well spiked on top of piles, & then the concrete was started, rammed around the head of the piles & between the pieces composing the grillage. No timber was left exposed. The abutments are rectangular in shape with short wing walls. Work, which had been started early in Sep., 1897, was stopped Nov. 9, 1897, on account of freezing weather, &

Canada Atlantic.—President Booth states that plans are being prepared for a Union Station in Ottawa to cost about \$130,000, & to accommodate the 3 lines now running into Ottawa. The station will extend from the present building at the canal basin over the vacant lot of land to Rideau St., with an entrance from Sapper's bridge. There will be a train shed in the rear. The lower floor will be used for waiting rooms, ticket offices & dining hall, & the upper floors will be devoted to railway offices. The building will be of stone & brick, & it is expected the work will be commenced early next spring.

The announcement was recently made that the New York Central had purchased the Lebanon Springs Ry. from Bennington, Vt., to Chatham, N.Y., 60 miles. The plan, as stated by a prominent railroad man, is to operate a road from the Canada Atlantic line to New York, by a route over the road for which a charter has been procured by the Canada Atlantic line to Burlington, thence to Rutland by the Rutland road, now controlled by the Central, thence over the Bennington & Rutland & Lebanon Springs Ry. to Chatham, & from there to New York by the Harlem road, owned by the Central.

In connection with the foregoing, General Manager Chamberlin of the C.A. says:—A survey party is at work on the C.A. right of way at Swanton, & the new road will connect with the C.A. system either at that point or at Alburg Springs. When this road is completed the route from Ottawa to New York, via the C.A. & connections, will be shortened by about 20 miles, & the running time, which is now 14 hours & 50 minutes, will be reduced considerably.