

*Section No. 4a.—Engineer C. E. Macnaughten, in charge.*

From lower end of Allumette lake, about 6 miles above Pembroke to foot Allumette island, a distance of about 24 miles.

As Mr. Macnaughten had just completed section No. 3 of Montreal district instructions were issued to him at the beginning of September, 1905, to survey the above-mentioned part of the Ottawa river.

Work commenced on September 12, making a survey of the shore line, surveying the islands in the Lower Narrows, also Morrison's and Moffat's islands, and on down through the lower lake and Paquette rapids to the foot of Allumette island.

The islands in Paquette rapids were located and traversed, and in December Bellows bay, Cranberry lake and the east end of Allumette island were surveyed.

Levels were carried along and bench marks established. Both shores and island were contoured for all possible combinations of improvements and raised water surface.

Soundings of that wide stretch of the river were commenced, at the beginning of December as soon as the ice was considered safe enough to carry men and teams. Unfortunately, on account of the mild weather and swift currents, large areas did not freeze sufficiently and soundings had to be taken there from boats, which in cold weather is slow and difficult work. Altogether over 14,300 soundings were taken, and the work completed about the middle of January, 1906.

*Section No. 4.*

Engineer G. L. Griffith, who resigned in February, 1905. Replaced by Mr. A. J. Matheson, Mem. Can. Soc. C.E. From the head of Des Joachims rapids to Fort Coulonge is a distance of about 86 miles.

The survey work of this section was very heavy. The river is very wide for long stretches and dotted with islands. It involved a large amount of triangulation apart from the regular traverses on both sides of the river forming the base lines for developing contours and for taking soundings.

At Des Joachims rapids, which were surveyed in great detail, it was decided to investigate a short cut from the head to the foot of the rapids through what is known as the McConnell Lake valley, which is supposed to have been, at one time, an old branch of the river, having a length of about 4½ miles. Of this distance, McConnell lake occupies about 2 miles in length of deep water, with an average width of nearly 1,000 feet, the valleys above and below connecting with the river being relatively low ground. This was developed sufficiently to enable a comparison to be made with the main river route.

From the foot of the rapids down for a distance of about 28 miles, there is a magnificent stretch of river, called the 'Deep river,' with a good wide channel over 40 feet in depth. This did not require very close sounding, nor very many contours on account of high banks.

But below that stretch the river becomes more shallow and widens into a lake called the Upper Allumette, containing numerous shoals and over 200 islands, with a tortuous channel reaching to the lower Narrows. All the islands were surveyed and contoured, the shoals and all channels carefully sounded and investigated as to the best possible route for the waterway.

Below Allumette lake is Allumette island, where the river divides into two channels, the South or Pembroke channel, and the North or Culbute channel.

About the end of August, 1905, it was found that party No. 4 could not undertake the survey of these two channels and complete them early in 1906, as desired. Therefore, Mr. Matheson was instructed to limit his survey to the Culbute channel, and Mr. Macnaughten was directed to survey the Pembroke branch, as previously stated.

The contours, cross-sections, soundings, levels, &c., of the Culbute channel and Coulonge lake were completed in January, 1906, the men were discharged and office work begun at Ottawa by the engineers.