the river at one point expanding into Lake St Peter, 20 m. long by 10 m. wide, with a practically uniform depth of 10 ft. Below Three Rivers the banks grow gradually higher until, after passing Quebec through a cleft in slate rocks of Cambrian age, the river widens, washing the feet of the Laurentian Mountains on its north shore; while a more moderately hilly country, terminating in the Shickshock Mountains of the Gaspé Peninsula, skirts its south shore.

From Kingston, at the head of the river, to Montreal, a distance of 170 m., navigation is limited to vessels of 14 ft. draught by the capacity of the canals. From Montreal to Quebec, 160 m., a ship channel has been dredged to a depth of 30 ft.; below Quebec the river is tidally navigable by vessels of any draught. The canals on the St Lawrence above Montreal have been enlarged to the capacity of the Welland canal, the improved system having been opened to commerce in the autumn of 1899. Instead of enlarging the Beauharnois canal, on the south side of the river, a new canal, the “ Soulanges,” was built from Coteau Landing to Cascades Point, on the north side, the Beau- harnois canal still being used for small barges. The locks of the enlarged canals are all 45 ft. wide, with an available depth of 14 ft. and a minimum length of 270 ft. The following table shows the canalized stretches in this portion of the river:—

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name. | From | To | Length in Miles. | Number of Locks. | Fall in Feet. |
| Galops | Head of Galops Rapids | Iroquois | 7½ | 3 | I5½ |
| River .... | .. |  | 4 |  |
| Rapide Plat | Head of Ogden Island | Morrisburg | 3⅔ | 2 | 11½ |
| River .... | .. |  | 10½ | ,. |  |
| Farran Point | Head of Croil Island | Farran Point | **I** | **I** | 3½ |
| River .... | ,. | .. | 5 | .. |
| Cornwall Canal . | Dickinson Landing | Cornwall | **II** | 6 | 48 |
| Lake St Francis | .. | **30½** |  |
| Soulanges . | Coteau Landing | Cascades Point | 14 | 4 | 82½ |
| Lake St Louis . Lachine | Lachine | Montreal |  | 5 | 45 |
|  |  |  | 109½ | 21 | 206 |

In the stretch between Montreal and Quebec the ship channel, begun by the Montreal Harbour Commissioners, has been assumed by the Dominion government as a national work, and improve­ments, involving extensive dredging, have been undertaken with the aim of securing everywhere a minimum depth of 30 ft. with a minimum width of 450 ft. The whole river from Kingston to the sea is well supplied with aids to navi- gation. In the dredged portions lights are arranged in pairs of leading lights on foundations sufficiently high and solid to resist the pressure of ice movement, and there is an elabo­rate system of fog alarms, gas-lighted and other buoys, as well as telegraphic, wireless and telephonic communication, storm signal, weather and ice reporting stations and a life-saving service.

Montreal, at the head of ocean navigation, the largest city in Canada, is an important distributing centre for all points in western Canada, and enjoys an extensive shipping trade with the United Kingdom, the sea-going shipping exceeding 1,500,000 tons, and the inland shipping approximating 2,000,000 tons, annually. Quebec is the summer port used by the largest steamers in the Canadian trade. There are numerous flourishing towns on both banks of the river, from\* Kingston, a grain trans­ferring port, to the sea. Large quantities of lumber, principally spruce (fir) and paper pulp, are manufactured at small mills along the river, and shipped over sea directly from the place of production. The mail steamers land and embark mails at Rimouski, to or from which they are conveyed by rail along the south shore.

The importance to Canada of the river St Lawrence as a national trade route cannot be over-estimated. As a natural highway between all points west of the Maritime Provinces and Europe it is unique in permitting ocean traffic to penetrate 1000 m. into the heart of a country. It is, moreover, the shortest freight route from the Great Lakes to Europe. From Buffalo

to Liverpool via New York involves rail or 7-ft. canal transport of 496 m. and an ocean voyage of 3034 nautical miles. Via Montreal there is a 14-ft. transport of 348 m. and river and ocean voyage of 2772 nautical miles. From Quebec to Liverpool by Cape Race is 2801 nautical miles, while the route by Belle Isle, more nearly a great circle course, usually taken between July and October, is only 2633 nautical miles. On the other hand the St Lawrence is not open throughout the year; the average time between the arrival of the first vessel at Montreal from sea and the departure of the last ocean vessel is seven months. From Kingston to Quebec the river freezes over every winter, except at points where the current is rapid. Below Quebec, although there is heavy border ice, the river never freezes over. For a few winters, while the bridge accommodation at Montreal was restricted to the old single-track Victoria bridge, railway freight trains were run across the ice bridge on temporary winter tracks. Efforts have been made to lengthen the season of navigation by using specially constructed steamers to break the ice; and it is claimed that the season of navigation could be materially lengthened, and winter floods prevented by keeping the river open to Montreal. Winter ferries are maintained at Quebec, between Prince Edward Island and Nova Scotia, and between Newfoundland and Sydney, Cape Breton. In the winter of 1898-1899 an attempt was made to run a winter steamer from Paspebiac to England, but it was not successful, principally because an unsuitable vessel was used. To pass through the field of ice that is always present in the gulf, in greater or lesser quantity, specially strengthened vessels are required.

The river above tide water is not subject to excessive flooding, the maximum rise in the spring and early summer months, chiefly from northern tributaries from the Ottawa eastward, being 10 ft. The Great Lakes serve as impounding reservoirs for the gradual

distribution of all overflows in the west. At Montreal, soon after the river freezes over each winter, there is a local rise of about 10 ft. in the level of the water in the harbour, caused by restriction of the channel by anchor ice; and in the spring of the year, when the volume of the water is augmented, this obstruction leads to a further rise, in 1886 reaching a height of 27 ft. above ordinary low water. To prevent flooding of the lower parts of the city a dike was in 1887 built along the river front, which prevented a serious flooding in

1899. Tides enter the Gulf of St Lawrence from the Atlantic chiefly through Cabot Strait (between Cape Breton and Newfoundland), which is 75 m. wide and 25o fathoms deep. The tide entering through Belle Isle Strait, 10 m. wide and 30 fathoms deep, is comparatively little felt. The tidal undulation, in passing through the gulf, expands εo widely as to be almost inappreciable in places, as, for example, at the Magdalen Islands, in the middle of the gulf, where the range amounts to about 3 ft. at springs, becoming effaced at neaps. There is also little more tide than this at some points on the north shore of Prince Edward Island. The greatest range is attained in North- umberland Strait and in Chaleur Bay, where it amounts to 1o ft. At the entrance to the estuary at Anticosti it has again the oceanic range of about 6 ft., and proceeds up the estuary with an ever- increasing range, which attains its maximum of 19 ft. at the lower end of Orleans Island, 650 m. from the ocean at Cabot Strait. This must be considered the true head of the estuary. At Quebec, 30 m. farther up, the range is nearly as great; but at 40 m. above Quebec it is largely cut off by the Richelieu Rapids, and finally ceases to be felt at Three Rivers, at the lower end of Lake St Peter, 760 m. from the ocean.

The St Lawrence provides ample water-power, which is being increasingly used. Its rapids have long been used for milling and factory purposes; a wing dam on the north side of Lachine Rapids furnishes electricity to Montreal; the falls of Montmorency light Quebec and run electric street cars; and from Lake Superior to the gulf there are numerous points on the tributaries to the St Lawrence where power could be used.

Nearly all the rivers flowing into the St Lawrence below Quebec are stocked with salmon *(Salmo salar),* and arc preserved and leased to anglers by the provincial government. In the salt