

**THE NAVIGATION OF THE LAKES AND  
NAVIGABLE COMMUNICATIONS  
THEREFROM TO THESEABOARD, AND TO  
THE MISSISSIPPI RIVER, AND RELATION  
OF THE FORMER TO THE LINES OF  
RAILWAY LEADING TO THE PACIFIC**

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The Navigation of the Lakes and Navigable Communications Therefrom to theseaboard, and to the Mississippi River, and relation of the former to the lines of railway leading to the Pacific by  
Edwin F. Johnson

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**EDWIN F. JOHNSON**

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## THE NAVIGATION OF THE LAKES, ETC.

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The subject which it is now proposed to examine is one of so great importance in a commercial and political view, that no apology is needed for inviting attention to it.

The character of the St. Lawrence chain of waters, their connection with the navigable routes to the seaboard, and their relation to the navigation of the Mississippi and its branches, has been the theme of so much that has been said and written within the last fifty or sixty years, that it may be deemed presumptuous to endeavor to add to the amount of information already possessed. All therefore that is intended in the present essay is to present, if possible, the subject in such a light as to render its importance more apparent and deserving the attention and serious consideration of the American public.

The two great drainage basins of the St. Lawrence and the Mississippi, which pour their surplus waters into the Atlantic at points so remote as the gulfs of Mexico and St. Lawrence, approach each other in the interior, so that for a distance of over twelve hundred miles their waters interlock and they have the same boundary.

These basins differ greatly in character, producing an equally marked difference in the navigation afforded by each. The chain of St. Lawrence waters is characterized by a series of fresh water lakes unparalleled in extent and elevated from one hundred to six hundred feet above the level of the Ocean. At a distance of nearly two thousand miles from the Gulf of St. Lawrence is the largest of these lakes, Lake Superior, elevated six hundred feet above the sea, the surplus waters of which form the St. Mary's river and its eastern extremity.

This river, after descending twenty-three feet, nearly, enters Lake Huron which is elevated five hundred and seventy-seven feet above the sea.

Upon a level with this lake, and connected with it by the straits of Mackinaw, is Lake Michigan.

The two last named lakes find an outlet by the St. Clair river at the southern extremity of Lake Huron, into St. Clair Lake. This latter discharges by the Detroit river into Lake Erie which has an elevation above the sea of five hundred and sixty-seven feet.

Lake Erie has for its outlet the Niagara river, which has a descent to Lake Ontario of 331 feet, nearly one half of which is vertical forming the grand falls of that river. From Lake Ontario, which is elevated two hundred and thirty-six feet above the sea, flows the St. Lawrence river proper, which, after a descent of 223 feet, meets the tides of the sea at Montreal thirteen feet above the sea level, that level not being attained until the river enters Lake St. Peters.

The St. Lawrence in its course from Lake Ontario to Montreal passes through two lesser lakes, formed by an expansion of its surface, viz. : Lake St. Francis, elevated 141 feet, and Lake St. Louis 59 feet above the sea level.

In addition to the lakes and rivers named, there are other waters in the St. Lawrence basin so situated as to be able to perform, or are now performing, an important part in the internal navigation of the country.

These are Lake Nipissing elevated sixty feet, nearly, above Lake Huron, and discharging its surplus waters by the French river into that lake. The Ottawa river connecting by one of its mouths with the St. Lawrence in Lake St. Louis on the southeast side of Montreal Island, a large and noble stream, stretching far into Northern Canada, and reaching by its Matewan branch to within four and a half miles of Lake Nipissing. Lake Simcoe discharging into the Georgian Bay of Lake Huron by the Severn river and elevated 137 feet above the latter lake, and Lake Champlain ninety-six feet above the sea, having for its outlet the Sorel or Chambly river, which enters the St. Lawrence at the head of Lake St. Peters

and a group of lakes in western New York, which have their outlet into Lake Ontario by the Oswego River, the eastern-most of which, Lake Oneida, is elevated one hundred and twenty feet above Lake Ontario.

The waters above described lie partly within the Canadas, and partly within the States. Of the lakes named, Michigan, Champlain and Oneida, lie wholly within the States. Superior, Huron, St. Clair, Erie and Ontario, lie partly in the States and partly in Canada; and the others named are Canadian lakes and their outlets, including that of Lake Champlain, are Canadian rivers.

The great difference in elevation of the lakes, as described, indicates that the rivers connecting them or flowing from them, have a descent in their natural condition unsuited to navigation. This is true of all of them excepting the St. Clair and Detroit rivers.

The obstacles to navigation in the others have been overcome to a certain extent. The descent from Lake Superior to Lake Huron is overcome, eighteen feet of it, by a canal one mile nearly in length, having twelve feet depth of water, with two locks of eight to ten feet lift each, three hundred and fifty feet length of chamber, and seventy feet wide.

Between Lake Huron and Lake Erie, at what are called the St. Clair Flats, a dredging of the channel has been found necessary to secure ten feet depth of water at the lowest stage of Lake Huron, and this must be repeated at still greater cost, the bottom being an indurated marl, to secure eleven to twelve feet, and here it may be said, once for all, that the surface of the great lakes varies from four to about five or six feet in extreme cases, depending upon the rains and snows in their basins, and amount of evaporation. These changes culminate, it is said, with some regularity every six and one third years. The period from the maximum or minimum to the next maximum or minimum, being twelve and two-thirds years nearly. Their surface levels at their outlets and at other points, also vary with the direction and force of the winds that sweep over their surface, and when thus disturbed, currents are formed in recovering their equilib-