

ART. IX. — OBSERVATIONS ON THE CURRENTS IN THE GULF OF
ST. LAWRENCE, AND THEIR DANGER TO NAVIGATION. — BY JOHN J. FOX.

(*Read May 10, 1886.*)

THE remarks in this short paper are deduced from personal experience and observation, after a residence of thirty years at the Magdalen Islands, in the capacity of Chief Officer of Customs.

Seldom a year passes but we have to record the loss of some valuable ship and cargo, with human life, by stranding on the Islands and coasts of the Gulf of St. Lawrence, which, on official enquiry, is attributed to imperceptible currents unknown to the shipmaster, not laid down in the charts and sailing directions now in use.

A general ignorance appears to exist among navigators respecting the force and direction of the tides and currents in this locality, which may in some measure be accounted for by the fact that fifty years have now elapsed since the last survey of the Gulf was made by officers of the British Navy. And it would appear that their observations were confined more to the shore tides than to the currents in mid-channel; some additions have since been made, but the basis is the old survey.

The local currents of the Gulf are created and influenced by various agencies, such as winds, specific gravity, changes of atmosphere and equilibrium. Their existence, force and direction are difficult to ascertain; are very deceptive, and being very irregular are consequently the more dangerous to navigation. They appear to have periods of comparative quiescence and activity. Those born of the winds change with it.

The ice that accumulates in the Gulf during the winter months, combined with the immense volume of fresh water discharged into it in the spring from the St. Lawrence and other rivers by the melting of the snow, decreases its saltness and

specific gravity. It also increases its altitude and bulk, and being lighter than the water below floats on its surface and forms a current, which to find its equilibrium sets down in a southerly direction towards Capes Ray and North into the Atlantic ocean.

The ice generally disappears about the middle of May and forms again in such quantity by the end of December as to obstruct navigation.

There are three channels or entrances into the Gulf from the Ocean: one is to the north of Newfoundland through the Straits of Belle Isle, another to the south of Newfoundland, and the third is through the Strait of Canso.

The channel generally used by ships bound to the Ports of Quebec and Montreal, is that to the south of Newfoundland, between Capes Ray and North, and to which these observations, are chiefly intended to apply.

This channel is about fifty miles wide. Twelve miles east from Cape North lies the Island of St. Paul, and forty-five miles in a northwesterly direction are the Magdalen Islands, the distance from thence to the Island of Anticosti is about eighty miles. These Islands lie directly in the track of vessels, bound to Ports in the Gulf.

From Anticosti to the northern end of the Straits of Belle Isle the distance is about three hundred and forty miles. This Strait is twelve miles wide at its northern entrance, and about one hundred miles at its southern, between Cape George, Newfoundland, and Cape Whittle, Labrador, through which is the route taken by the Ocean Steamships from Europe to Quebec during the summer months.

A branch of the Polar current sets in a southwesterly direction through the Straits of Belle Isle, and is stronger on the north, or Labrador coast, than on the south or Newfoundland, the water being deeper there, its velocity is influenced by the winds, and greater in spring and autumn than in summer, when southwest winds prevail with increased temperature. This occasionally creates a surface current setting to the north-east; the colder current below setting through south-west, or in the opposite direction.

Various opinions are held with regard to Icebergs drifting through this strait into the Gulf of St. Lawrence, the correct one appears to be that bergs are occasionally found about its northern entrance. A few years ago one was found aground off Forteau Bay in twenty-five fathoms of water with an elevation of seventy feet above the sea, but Icebergs are rarely, if ever, seen in the Gulf, to the southwest of Anticosti.

A dangerous current sets into the Gulf from the Atlantic Ocean between the Newfoundland and Nova Scotia coasts, and often proves fatal to Ships about Cape Race. It is formed by the Polar Current setting down from the north on one side, and an offset from the Gulf Stream setting in from the southwest on the other.

This current, after passing Cape Race, and along the south coast of Newfoundland, enters the Gulf in a northerly direction, between Cape Ray and Cape North, flowing towards the Island of Anticosti. Its velocity is increased with winds from a south to east direction, it frequently precedes the wind, causing very high tides, and giving warning to the observer on shore of an approaching gale, before any indications are given of it by the Barometer. After passing Cape Ray it is traversed obliquely by the Polar Current, setting down through the Straits of Belle Isle, and deflected to the southwest, then coming in contact with the shoal grounds around the Magdalen Islands, it divides; one portion running to the southwest along the south side of those Islands, and the other continuing its northerly course up towards the Island of Anticosti until coming in proximity to the south shore of that Island, it curves to the westward and falls into the River St. Lawrence current setting out to the southeast.

The southwest stream, after passing the southeast end of the Magdalens, again divides, one portion swerving round to the north and west, up the Gulf towards the Bay de Chaleur, thence round the North Cape of Prince Edward Island, and enters the Straits of Northumberland, through which it flows towards the Strait of Canso. The other portion continuing its southwest course towards the East Cape of Prince Edward Island, and setting round that dangerous promontory, it runs westerly, and meeting the

stream through the Straits of Northumberland, turns southeasterly, and along the Nova Scotia coast towards the Strait of Canso, then past the Cape Breton coast, and out of the Gulf between Capes North and Ray, to the Ocean.

The Island of Anticosti divides the entrance to the River St. Lawrence into two channels, called north and south; through these the current from the river sets with great rapidity, in the spring with the melting snow, from two to three miles an hour. The polar current through the Straits of Belle Isle meeting this stream in the north channel, and striking it obliquely, causes those eddies, and counter currents, which are so often fatal to shipping on this much dreaded Island.

The south channel stream sets down from the river in a south and southeasterly direction, contracting and expanding in breadth, by the action of the winds, either to the east or west, and its influence is sometimes felt down the Gulf below the Magdalen Islands. On the twentieth of November, 1880, the steamship "Ottawa" of the Dominion Line, grounded in the "Cap de la Roche" Channel, between Montreal and Quebec, and a portion of her cargo was thrown overboard to lighten her. About four weeks afterwards some of this cargo was found upon the North Beach of the Magdalen Islands, proving, beyond doubt, the force and direction of this dangerous current.

During the summer solstice, when the water of the Gulf attains a high temperature, most of the currents met with there are surface currents and controlled by the winds. The cold Polar current, which sets to and fro from the Ocean, from its greater weight and density sinks below and becomes a submarine current, and a resort for the schools of codfish, mackerel, and herring, which abound in those waters.

To illustrate the influence these dangerous currents have upon ships navigating the Gulf of St. Lawrence, we will suppose a ship passing Cape Race and bound for Quebec with a southerly wind and clear weather. The master, after verifying her position, takes his departure and shapes his course up in a northerly direction, suddenly the weather becomes obscured by fog or snow-storm, which often occurs here, and not being aware of this northerly set

or current, he is carried by it ahead of his reckoning, and after passing Cape Ray encounters the Belle Isle current, setting down to the southwest, or obliquely across his track, and before he is aware of the danger, his ship is stranded upon the southeast end of the Magdalen Islands, to the westward of her course, when, by his reckoning, he supposes himself to be many miles from them. Or should he be so fortunate as to steer far enough north to clear the Magdalens (by the same causes), he may find his ship on the south shore of Anticosti, where wrecks so frequently occur.

To ships bound down the Gulf they are equally fatal. After leaving the River St. Lawrence through the south channel, and passing the southwest end of Anticosti, the ship's course down the Gulf is southeast by east; the southwest current from the Straits of Belle Isle, crosses this course and combining with the River St. Lawrence current, setting southerly, carries the ship ahead of her reckoning, and again to the *westward* of her supposed position, upon the northeast end of the Magdalens. Between the years 1868 and 1880, six ships were wrecked in this region, and fifty-five seamen perished, through the influence of these currents.

The ocean current which sets into the Gulf past Cape Race after passing the southeast end of the Magdalen Islands (as I have before observed) takes a northerly direction, and in thick weather is very dangerous to ships bound down the Gulf from New Brunswick Ports, these usually sail with a southwesterly wind, and after rounding the North Cape of Prince Edward Island shape a southeast by east course, so as to clear the south end of the Magdalens which (to use a nautical phrase) brings them sharp upon the wind on the starboard tack, consequently this northerly current runs obliquely to their course, and in light winds, not only retards their headway but sets them to leeward and on shore about the west end of the Magdalens, when the shipmaster by his reckoning judges himself to be at a safe distance to the westward of them. Between the years 1876, and 1881, four ships were stranded on the west end of those islands by the force of this current.

The meteorology of the Gulf of St. Lawrence, has somewhat changed during the past fifty years. Fogs and changes in atmos-

pheric temperature have become more frequent. The cold is less severe in winter, and the winds more variable and of shorter duration in summer, which no doubt has some influence upon the currents there. Many of the prominent land marks, laid down in the charts and sailing directions now in use, have also been washed away by the action of the sea, or submerged, which is misleading to the navigator.

This great commercial highway is traversed annually by a large fleet of magnificent steam and sailing ships, laden with costly merchandize and thousands of valuable lives, and the heavy losses annually incurred through the ignorance of navigators, of the force and direction of the currents crossing their track (which they assert are not laid down in their charts or sailing directions), shews the importance and necessity of a scientific survey being made without delay, to obtain by observation the information absolutely necessary for the safe navigation of the Gulf of St. Lawrence. This should be undertaken by the government, as the loss of every ship is a national loss, and falls upon the community.