

# CHARTING OF HUDSON BAY AND STRAIT

*With particular reference to the season of 1929.*

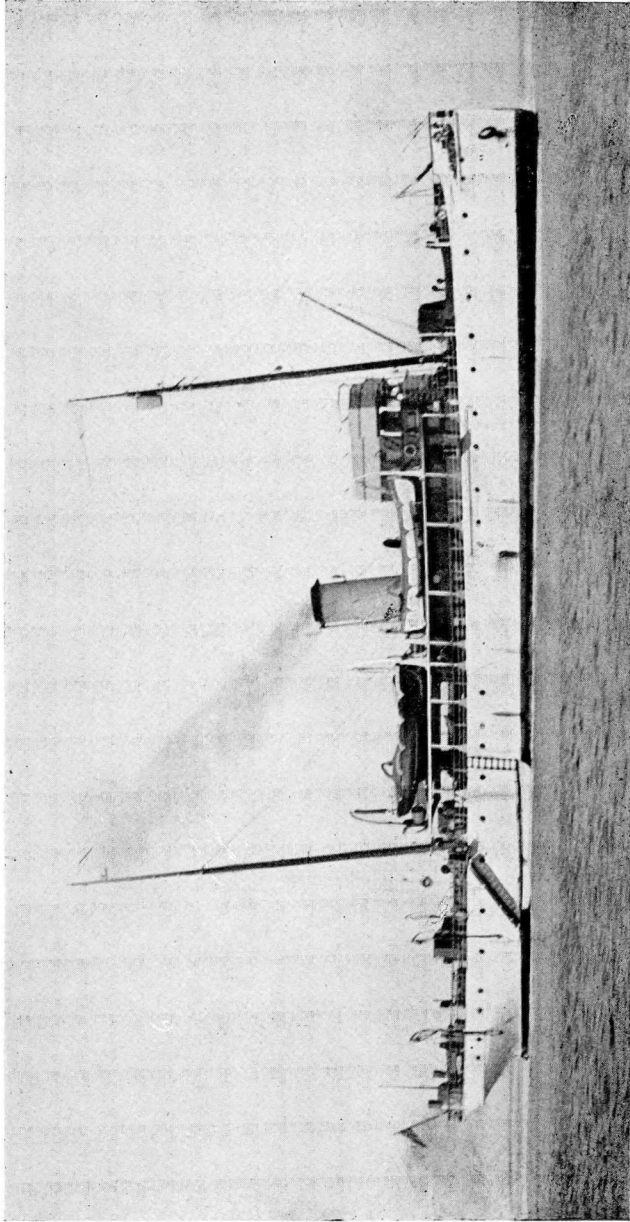
COMMUNICATED BY THE DIRECTOR OF THE CANADIAN HYDROGRAPHIC SERVICE

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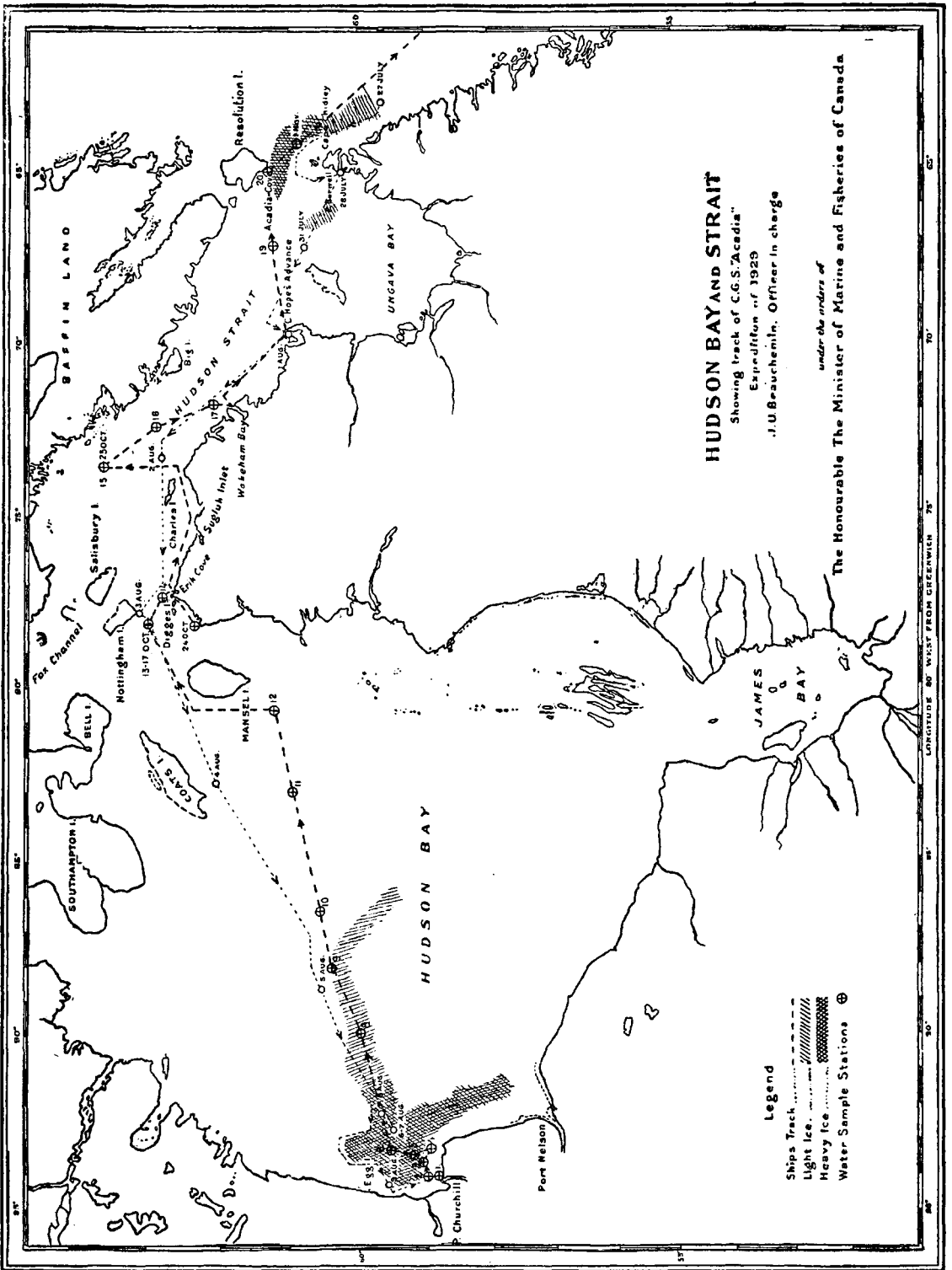
For three centuries following the discovery of Hudson Bay and the passage leading into it, made during that memorable voyage of Henry HUDSON in 1610, the waters of this region were navigated by various classes of vessels, chief of which were those of the fur traders of the Hudson Bay Company. In the earlier years of this age of bartering for furs, of Arctic exploration and the seeking of the storied North West passage, sailing craft were used. These were followed by the wooden-hulled steamers of a later period which in turn gave way to the powerful, steel sealing steamers of the present day, a type of vessel much more competent to force a passage through the ice fields. For the purpose of this trade one return voyage only was made into the Bay in the same season when possible; and on the basis of this limited, and often uncertain, voyaging in these waters, it could not be assumed that a regular commercial navigable route was practicable. The commercial possibilities, on a national scale, had yet to be investigated.

Accordingly, and with this object in view, an expedition under Commander GORDON was sent to Hudson Bay in 1884 and similarly in 1885 and 1886, and ten years later other expeditions followed to gather further information relating to the route and the natural resources of this region.

It was not, however, until the year 1910 that the Canadian Hydrographic Service commenced the charting of the route with the object of investigating the possibilities of a through steamship track for modern commercial cargo carriers from the Atlantic Ocean for the 960 miles to the proposed sites of new seaports on the west coast of the Bay, the examining of harbours and shelters along the way, and the ultimate production of modern accurate nautical charts for the information and guidance of mariners. That year the Canadian Government Ship *Stanley* landed Hydrographic Survey parties at the entrance to the Nelson River and Churchill Harbour, these parties returning overland in winter by dog train. In each of the four following years, 1911-1914, that is, until the outbreak of the war, the present Hydrographer and Director of the Canadian Hydrographic Service commanded expeditions to these regions with the Canadian Government Ship *Minto* and the Canadian Government Ship *Acadia*, the latter a powerful steel steamer of some 1100 tons displacement, built specially to meet survey requirements and to withstand the ice fields that might be met with in northern waters. During this five year period, charting operations and investigations regarding ice and meteorological conditions with regard to navigation, were proceeded with, including the following:- The charting of Churchill Harbour and the entrance to the Nelson River and approaches, extending to Cape Tatnam and from thence to Cape Henrietta Maria, the northwestern point of James Bay,



"ACADIA"



Capt. E. Anderson, Hydrographer

the coast between being checked and soundings taken. The salient points throughout Hudson Strait were definitely fixed, the principal islands sketched and harbours charted. In addition to the above, operations were carried out in the lower part of James Bay. As a result of the above expedition, 12 charts of Hudson Bay and Strait are available and black and white prints of James Bay.

Two years ago, in 1928, with the extension of the Hudson Bay Railway towards Churchill, the need for further work was felt and a hydrographic party went overland and conducted preparatory surveys along the west coast, covering the approaches to the harbour, building several large beacons, in anticipation of the renewed charting activities of an expedition planned for the following year.

To carry out the various duties to be executed on this expedition of 1929, the Canadian Government Ship *Acadia* was again detailed for the service; she fitted out at Halifax, N. S., provisioned for 6 months, and sailed from that port at midnight on the 15th. July, under the command of Mr. J. U. BEAUCHEMIN of the Canadian Hydrographic Service. With him were associated a staff of four hydrographic engineers, a medical officer, Sailing Master, Captain F. V. RYAN, and the ship's company of 45 officers and men.

The vessel arrived off the entrance to Hudson Strait on 28th. July and at Churchill on 9th. August, and remained in the vicinity of that port for nearly two and a half months, charting the approaches to the harbour. Leaving Churchill on 15th. October she returned to the Strait and was variously employed there until 1st. November, when she sailed southward to her home port at Halifax.

The work, carried out during the open season of 1929, included the charting on a suitable scale of that portion of the Hudson Bay coast extending from Churchill Harbour some 35 miles to Cape Churchill and northward and westward to Hubbard Point; the locating and establishing of principal stations for future surveys further along this coast to the northward; investigations of channels at the western end of Hudson Strait inside Digges Island; and the calibration of the newly established direction finding radio stations at Resolution Island, Cape Hopes Advance, Nottingham Island and Churchill, designed to furnish bearings to vessels navigating in this region to the terminal port on the western coast of the Bay. In addition, investigations of a practical scientific nature were carried out, such as obtaining samples of sea water at various depths, for the determination of the densities and temperatures in connection with movements of currents and marine biological research, and observations for the determination of more accurate values of the magnetic variations in a region so close to the magnetic pole.

During the course of the cruise the *Acadia* called at North Sydney in Cape Breton for coal and in Hudson Strait at Port Burwell, Wakeham Bay, Cape Hopes Advance, Nottingham Island and other points, conducting the various operations entrusted to the vessel and her staff. On arrival on 28th. July at Port Burwell, which place lies just within the eastern entrance of the Strait and is the most northerly point of the Labrador Peninsula, the hydrographers found company anchored there, in the two supply ships of

the Hudson Bay Trading Company, the S. S. *Nascopie* and the S. S. *Ungava*, and the Government steamer *Sambro*. These three vessels had all arrived there on the previous day. Incidentally, the hydrographic vessel picked up three aviators whose plane, the ill-fated *Untin Bowler*, had come to grief on its venturesome trans-Atlantic flight from Chicago to Berlin. The stranded airmen gladly accepted the accommodation offered on board the steamer and in less than two weeks' time they were landed at Churchill and bade a Godspeed on their way back to the cities of the south.

The *Acadia* was equipped with the latest devices for obtaining the various valuable data necessary in connection with the practical study of both hydrography and oceanography. In addition to the standard equipment for taking soundings in both shallow and deep waters with which all hydrographic vessels are ordinarily supplied, this ship was fitted with the latest type of sonic-sounding device, the British Admiralty pattern Echo-Sounder. With a range of from 10 to 800 fathoms this instrument permitted the taking of soundings at all speeds and under all conditions of weather and greatly assisted in the conduct of the charting features of the work. It was the first of its type to be installed in a Canadian Hydrographic vessel and throughout the cruise soundings were taken in depths varying from 10 to 500 fathoms and, in proceeding over thoroughly charted ground off the Nova Scotian coast, where reliable confirmations could be obtained as to the functioning of the device, it proved itself efficient as a depth measuring machine to a degree of precision of 98 ½ %.

For magnetic investigation work and to assist in navigation in a region where the directive force of the ordinary magnetic compass is greatly impaired the ship was equipped with a SPERRY Gyro-compass, the outstanding property of which is that it always points true North, and being non-magnetic is not affected by its comparatively close proximity to the magnetic pole. With this instrument the true bearing is always available for navigation purposes and by comparison with the standard magnetic compass the variation, or declination, was noted frequently on the voyage to and from Churchill and the values obtained for the variation were found to agree closely with those previously shown on the charts. An area of local magnetic disturbance, noted during previous voyages of the *Minto*, about 100 miles off Churchill and 10 miles in diameter was again crossed over by the vessel where the magnetic compass was deflected about 180 degrees. A vessel, unless equipped with a Gyro-compass, would find herself in an awkward position in overcast or foggy weather in navigating such an area.

In addition to Hydrography, the object of this expedition was to obtain as much allied information as possible, including physical oceanography or densities and temperatures of the water passed over. Very little is known about this feature of the waters of Hudson Bay, and the information acquired, used in conjunction with future observations, will be of considerable value with regard to hydrodynamics and fisheries, and deductions from which will assist in simplifying navigation in this region.

To obtain this information the ship was equipped with the latest pattern of NANSEN Stopcock reversing deep-sea water bottles of 1 ½ litres capacity,

each bottle being equipped with two NEGRETTI and ZAMBRA reversing deep-sea thermometers, registering from  $-2^{\circ}$  to  $+25^{\circ}$  Centigrade, each thermometer bearing a certificate from the National Physical Laboratory. NEGRETTI and ZAMBRA hydrometers were used to obtain the densities, the usual practice at  $60^{\circ}$  Fahrenheit being closely followed.

With the above equipment, samples and temperatures of sea water were obtained at some 20 stations in Hudson Bay and Strait at the surface and bottom and the following intermediate depths :- 25 - 50 - 75 - 100 - 150 etc. metres.

Unfortunately this equipment was not available when the *Acadia* sailed North or until her arrival at Churchill, thus observations were only possible on the homeward trip.

The lower temperature observed was in the middle of Hudson Bay where a temperature of minus  $1.75^{\circ}$  Centigrade was obtained.

Taking 1.024 as the coefficient of standard sea water density, it is to be noted that the average density of the water in Hudson Bay is 10% greater than that of standard sea water.

At Churchill a special investigation was made in order to determine at what period of each tide it would be possible to obtain fresh water for the steam plants to be erected in connection with the development of this new harbour.

The results obtained show that fresh water is available in Churchill Harbour on few occasions and then for only a relatively short period at low water.

In connection with the study of the surface currents in the Bay and Strait, a number of drift-bottles were released on the trip across and through the Strait. These bottles contained a record of the origin, date, latitude and longitude of the positions at which they were thrown overboard, and also instructions to whomsoever recovered them to communicate the fact and the details of the time and locality to the proper authorities. In this manner the course followed by a bottle may be determined and some additional knowledge respecting the direction of the current be gained.

#### ICE CONDITIONS NOTED DURING THE SEASON 1929.

Enroute to Hudson Bay numerous icebergs were sighted passing through Belle Isle Strait on 14th. July and proceeding up the Labrador coast, which was given a berth of about 25 miles. Slow speed was maintained with frequent stops owing to the foggy and rainy weather, and the presence of icebergs which were continually being passed. On 28th. July the first field ice was entered in the evening, about 60 miles southeast from Cape Chidley; this became closely packed at about 18 miles' distance off the cape, preventing further progress. However, on the following morning, the pack having opened up with the ebb tide, a fair passage offered North of the Button Islands and Port Burwell harbour was entered at noon.

Although field ice was sighted in the Strait, no difficulty was encountered in making a passage. A sharp lookout was kept owing to the presence of

icebergs and growlers, which latter are especially dangerous, being low in the water and difficult to detect. From Mansel Island at the west entrance to Hudson Strait, a northerly course was steered to avoid the ice fields prevalent in the early summer. Ice fields were entered about 100 miles North of Churchill and the same distance off the west coast, and these held the ship for two days. The wind having assumed a westerly direction, a fair passage was discovered about 20 miles off the coast, just inside the ice pack, which carried the ship to Churchill Harbour. On the previous day this passage was reported as being very narrow and hardly safe for the ship. Advice received at Churchill was to the effect that the ice fields extended many miles to the southward of the harbour, and with easterly winds, the harbour would be inaccessible owing to the ice being pressed close on shore.

Sea planes operated from the harbour of Churchill could keep approaching ships advised regarding ice conditions.

