AIDS TO NAVIGATION ON THE HUDSON BAY ROUTE.

(Extract from an article by R.J. FRASER, ACTING ASSISTANT DIRECTOR, CANADIAN HYDROGRAPHIC SERVICE, and F.C. GOULDING SMITH, OFFICER-IN-CHARGE, HYDROGRAPHIC SURVEYS, HUDSON STRAIT, in *The Canadian Surveyor*, Ottawa, July, 1933, p.3).

The earliest aids to navigation in Hudson Bay and Strait, in addition to the first and very ancient mariner's chart, were stone cairns erected by the fur traders at the entrances to the harbours. These were followed by wooden framework beacons on prominent headlands or at river mouths.

Some of these beacons were 80 feet in height. Prominent among them were those at the mouths of the Churchill, Nelson and Moose rivers.

In older times it was an Indian, posted as lookout on a tall tree about the time the Company's ship was expected from England, who pointed out to the ship the entrance to the river.

The actual introduction of modern aids to navigation for the guidance of shipping on the Hudson Bay route took place in 1910 with the first Canadian Hydrographic Expedition, two years in advance of the development and construction work on the first ocean terminals at Port Nelson.

From 1912 to 1919 the department established and maintained lights, beacons and buoys in the estuary of the Nelson river; from 1913 to 1920 there were beacons in Hudson Strait some of which had remained unattended for 19 years.

Unquestionably the cost of marine insurance and of freight diminishes with the degree of safety of navigation, which accurate charts and adequate aids procure. The Hudson Bay route possesses a system of aids that has been declared by mariners to be second to none in the world. It consists of lights, buoys, radio stations, a patrol vessel and the nautical charts.

From the Atlantic Ocean to Churchill, a distance of 900 nautical miles, the voyage is made on four courses only. The route is wide, very deep, and remarkably free from shoals. For this reason no buoys are necessary except one which is placed immediately off the entrance to Churchill harbour.

Fog, though frequent, is usually of short duration. By taking a midchannel course through the eastern part of the strait, if fog comes on, a vessel can be stopped or proceed under reduced speed until it clears, according to conditions. The current follows the course of the strait on flood and ebb tide, and therefore a vessel is not liable to get into a dangerous position provided due attention is paid to the direction of the wind.

In the nearly 600 miles stretch from the entrance of Hudson Strait to the south end of Coats Island, in the north-east part of Hudson Bay, seven lights are established. These consist of a flashing white electric light on Resolution Island and a fixed electric light on Cape Hopes Advance, both of these being operated in conjunction with the radio stations. The remaining five are unwatched occulting acetylene lights and erected either on poles or on steel frameworks. They are situated at the following places.

On the east end of Wales Island; east and west ends of Charles Island; Nottingham Island, and at Cary's Swan Nest on Coats Island. On Hubbart Point on the west coast of Hudson Bay a similar acetylene occulting light has been established.

All these occulting lights are of similar type to those used on light-buoys and their illuminant is contained in a steel cylinder placed on the ground at the base of the light pole. Under favourable conditions they can be seen 15 or 18 miles away and are constructed to operate from 6 to 8 months.

Although the illuminating apparatus is supported on a single mast, the latest type of gas lamp has an illuminating power of over 150 candle-power. The flashing is automatic and the period of light is only one-sixth of that of the dark and extinguished period, which permits the life of the illuminant to be extended for a considerably longer period. The optical range of this type of unwatched automatic beacon light reaches sometimes 20 miles. Frost does not interfere with the gas nor with the mechanical operation of the lights.

The coast radio stations and radio direction-finding stations are owned by the Dominion Government and are operated by the Radio Branch of the Marine Department.

By the use of the coast radio stations a ship is enabled to receive messages pertaining to weather conditions and forecasts, ice reports, and reports on aids to navigation. These reports are broadcast daily and handled free of charge. This enables ships to remain in their home ports until conditions are reported favourable.

In Hudson Strait combined coast and direction-finding stations are situated on Resolution Island, Cape Hopes Advance, Nottingham Island and at Churchill. At the entrance to Chesterfield Inlet is a coast station, to which direction-finding equipment may be added as well.

During the season before last, the D. F. stations in Hudson Bay and Strait gave out 565 bearings and during the season just past, over 900 true bearings were given to ships on the Hudson Bay route. (The Canadian stations give approximately 38,000 of these bearings in a single year).

At the radio stations in Hudson Strait, operators (two or three in each case) spend the winter at their posts, in order that bearings, directions and general assistance may be furnished to the last vessel to navigate the route in the fall and the first one to enter it in the spring. Like the northern police patrols, their year-round companions are a few Eskimo hunters and their families. They are, of course, in daily radio communication by short wave with Ottawa. Once the ice commences to make or move, the operators take up, as well, the duties of current observers, noting and recording the time and direction of movement of the ice fields. From these data the Tidal Branch of the Hydrographic Service is enabled to study the related movements of the tidal streams, from which, eventually, predictions and forecasts can be made and issued for the guidance of navigation on this route.

The patrol vessel *N. B. McLean* can rightly be included in the system of aids to navigation employed on the Hudson Bay route, for one of her principal functions is to render assistance to vessels along the route. In addition to a patrol service, similar to that of the ice patrol vessels in the Gulf of St. Lawrence, she combines the duties of a general marine department vessel, attending to the requirements of the route. Provisioning the radio stations and transporting radio operators to and from the stations, transporting radio equipment and assisting in the calibration of the D. F. stations are all part of her duties. She may be considered a mobile radio-telegraph and direction-finding station for, in addition to her equipment for radio broadcast of navigation conditions, she is equipped with a radio direction-finding apparatus of the latest type. She constitutes at times a most convenient supplementary D. F. station for the benefit of shipping in her vicinity.

The patrol is responsible also for the installation and maintenance of lights. A SPERRY gyroscopic compass and a complete salvage apparatus is also part of her modern equipment.

But of all aids to navigation none is more indispensable than the mariner's chart.

Quoting from a reprint from the *Shipping World:* "A chart is one of the essentials of the navigator, and the information concentrated on the surface of that sheet of paper is his guide to security. He relies upon it as he relies upon his compass, which is a mechanical device for taking advantage of a phenomenon of nature. The chart is not such: it is a work of human art, the result of information gathered from many sources and compiled with great care and accuracy".

During the years 1910-1914 the charting of Hudson Strait and Bay received a great impetus by the Canadian Hydrographic Expeditions under the command of the present Director and Hydrographer, Captain F. ANDERSON. In those years a number of modern charts were made in the region of James Bay also.

With the commencement of war in 1914 all charting work in Hudson Bay and Strait ceased and was not resumed until 1928 when a small hydrographic expedition was sent overland to Churchill to lay the foundation for future surveys and to survey the coast from Churchill harbour to Cape Churchill. During the following years (1929 to 1931) the Canadian Hydrographic Service vessel *Acadia* made four charts of the west coast of Hudson Bay between Cape Churchill and Egg Island, 90 miles to the northward. Also several lines of deep-sea soundings on the main routes in Hudson Strait and Bay were added to the existing chart.

Altogether the modern Canadian charts of the route are 25 in number, 10 of which are general and coastal and the others of harbours and anchorages. The whole undertaking will take many years to complete, and to accomplish it with the utmost economy

and efficiency hydrographic surveys are progressing year by year in accordance with a comprehensive plan.

The triangulation net of the central survey in Hudson Strait (that is the previously mentioned 100-mile stretch from Cape Prince of Wales to Charles Island) can be extended eastward or westward, and also across the straits to Big Island. From there it can be extended eastward and westward along the south coast of Baffin Island as occasion demands. In this connection an aerial photographic survey of the coast would be of immense value.

The ADMIRALTY PATTERN ECHO SOUNDER has been adopted for use by Canadian Hydrographic Service vessels.

The most modern type of this make of sounding machine (known as the ACADIA-CHALLENGER model) is named after both the Canadian Hydrographic vessel *Acadia* and the well-known British oceanographical vessel *Challenger* which, by the way, was engaged during the summer of 1932 in charting work on the Labrador coast.

Closely connected with the mariner's charts and other aids to navigation is the volume of "Sailing Directions for the Hudson Bay Route" which also is published by the Hydrographic Service of the Marine Department. This volume, which was issued for the first time in the spring of 1932, has been in great demand. It is a real encyclopædia of navigational knowledge about the northern route and it gives complete sailing directions for a ship from the Atlantic Ocean to the port of Churchill.