

A HANDBOOK OF WEATHER, CURRENTS AND ICE, FOR SEAMEN.*Publication M. O. 379 of the British Air Ministry Meteorological Office.*

(16 × 24 cm. - 154 pp., 34 figs. tables - H. M. Stationery Office, London 1935 - Price : 4s. od. net).

This manual, which was drawn up under the direction of Captain L. A. BROOKE SMITH, Marine Superintendent of the Meteorological Office, London, gives most comprehensive information concerning the weather systems of the oceans and tropical revolving storms, a description of general ocean currents, information on sea-ice and a chapter on Ocean Pilotage; it has been drawn up mainly with a view to meet the needs of navigating officers of the Merchant Navy.

Since the foundation of *The Marine Observer* in 1924, there has been marked progress in the regular transmission of weather information to seamen, and the present small manual is the outcome of *The Marine Observer's* work in this direction; in its compilation the staff of the Marine Division has used a large amount of information supplied by the seamen themselves and, in particular, by British voluntary marine observers.

Chapter I contains general remarks on the relation between air and sea, and formulates BUYS BALLOT'S Law.

Chapter II describes, by oceans, the various wind systems and their regimes. Chapter III is devoted to tropical revolving storms and in the fourth chapter the winds and weather in middle and high latitudes are studied. Chapter V explains the manner by which Weather Charts are constructed, while Chapter VI contains a study of the currents of the oceans. Chapter VII gives a description of sea-ice; Chapter VIII deals with pilotage along the ocean routes and the proper use of Pilot Charts.

Numerous meteorological tables are given in an appendix, with a Horn Card for the graphical study of the propagation of cyclones.

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THE NEWFOUNDLAND BANKS

by

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(Extract from the *Annales de Géographie*, Paris, 15th November, 1935)

The *Président-Théodore-Tissier*, oceanographic vessel of the OFFICE DES PÊCHES, made an exploratory voyage last autumn in the Newfoundland region. The object of this note is to set forth briefly, in connection with this voyage, some of the problems which arise regarding the morphology of the Newfoundland Banks, and to direct attention to the interest attached to the surveying and charting of the exact depths on the continental shelves.

THE NEWFOUNDLAND BANKS. — This name is given that portion of the continental shelf which extends south of the islands of Newfoundland and Cape Breton delimited with sufficient accuracy by the 100 fathoms depth line shown on the chart (Fig. 1). The Lawrentian Channel separates two groups of shoals.

(1) To the East, the Great Bank, the Green Bank, the St. Pierre Bank and the Bonnet Flamand, themselves separated by channels mostly reaching depths of 100 fathoms.

(2) To the West, the Misaine Bank, the Artimon Bank, the Banquereau, to mention the easternmost ones only.

The Banquereau and the St. Pierre Bank, which bound the southern part of the Lawrentian Channel, have depths of 50, 40 and even 30 m. The depths on the Great Bank lie between 60 and 95 m. practically all over it.

We have thus to do with a plateau submerged under a layer of water of 50 m. or so interrupted by the fissure of the Lawrentian Channel, the depth of which lies some-

where about 450 m., over a width, it is true, of some sixty miles. The eastern part of this floor is cut up to the North-West by several channels whose relative depth lies around 60 m., on an average width of some twenty miles. The relief of these banks is intricate in so far as may be judged from the chart and on the spot.

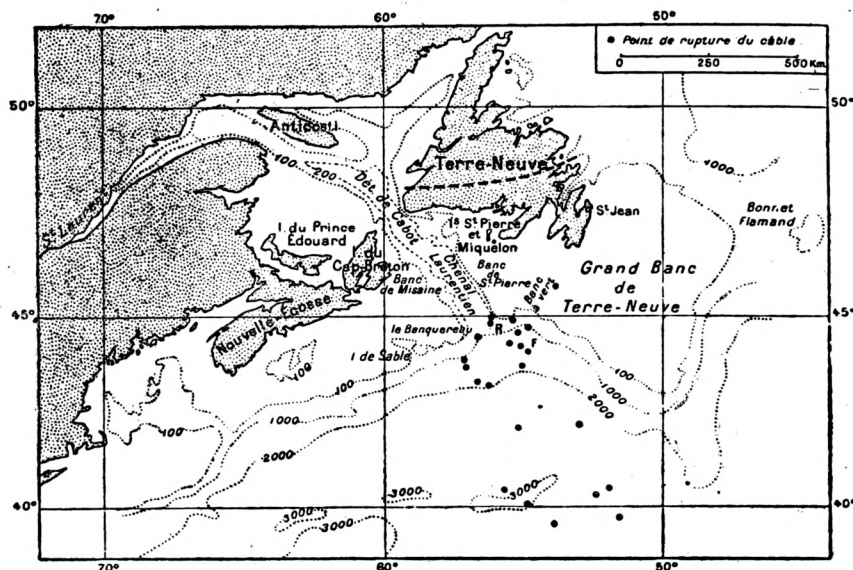


FIG. 1

Newfoundland region. - Scale on 45th parallel 1:21,000,000

According to Mr. GREGORY'S chart (art. quoted). The 200 fathoms depth line has been added according to Mr. SHEPARD (art. quoted in the Journal of Geodesy). The depth lines are numbered in fathoms (1 fathom = 1.83 m.). The pecked line to the south of Newfoundland represents the axis about which the island may have pivoted.

ORIGIN OF THE BANKS. — It is well known that the formation of the Banks has been attributed to material carried by drifting ice and dropped by it as it melts on approaching warmer waters. MURRAY sees in them the frontal moraine of the Canadian quaternary inlandsis, increased by subsequent supplies from drifting ice; but THOULET, after a trip to Newfoundland during which he noticed no iceberg laden with material, invoked the discharges of the ice-foot laden with fragments of rock resulting from freezing (1).

All assumptions as to the origin of the Banks must take into account their vast extent and the forms which certainly seem to be of glacial origin and which the work of the OFFICE DES PÊCHES is beginning to disclose. A complete and detailed charting seems to be indispensable here. At any rate one thing is certain, namely that the surface of the Banks is subjected to the action of the waves (2), that the stones which have been collected in the previous autumn at certain places of the surface of the Banks are rolled stones and that the troughs, which are calm areas, are generally coated with ooze. Thus whatever the origin of the formations of the relief of the Banks, it should be noted that the present tendency is towards a removal rather than towards an accentuation of the unevennesses.

THE LAWRENTIAN CHANNEL. — The origin of this channel also is open to discussion. Mr. GREGORY, on the ground of observations made in connection with the breaking of

(1) See a good description in Robert PERRET, *La géographie de Terre-Neuve*, Paris, 1913.

(2) According to NANSEN the action of the waves might be felt down to 80 m. (270 ft.). Commander BEAUGÉ, in command of the *Président-Théodore-Tissier*, indicates that, on the approach of bad weather, whelks disappear at certain places from the surface of the banks and bury themselves.

cables which occurred during the earthquake of 18th November 1929, asserts that we have here a tectonic trench (1).

The most important fact adduced is the double alignment along which breaking of the telegraph cables took place in the extension of the Lawrentian Channel. The soundings taken by the cable-ships at the sites of the breaks appear, in several instances, to be greater than the nearest soundings shown on the chart. It is true, however, that conditions of observation on the Banks are such that the correct juxtaposition of the positions is not absolutely guaranteed.

However the changes brought about on the bottom are attested by the fact that, occasionally at certain places, great lengths of the broken cables were found buried sometimes deeply. A fissure (*F* on chart) was notified. Its dimensions are 9 miles by 1 to 2 miles, its orientation parallel to the supposed lines of fracture, its bottom very uneven and constituted by black ooze mingled with stones.

Mr. SHEPARD considers the Lawrentian Channel as a glacial trough falsely described as tectonic trench (2). As a matter of fact the channel extends but to the edge of the continental shelf which forms the Newfoundland Banks. It is known that ice has passed through here as it did in the much vaster Lake Superior and Lake Michigan. The inner end of the deep part of the Gulf of St. Lawrence is situated at the point where the Saguenay River, a typical fjord, runs into it.

At first glance nothing seems to be against the Lawrentian Channel being of tectonic origin possibly reshaped by glaciation. The samples brought up from the bottom when searching for the broken cables (*R* on figure) seem to originate from a clay with rubble.

STUDY OF THE CONTINENTAL SHELF. — The Newfoundland Banks are but a part of the continental shelf the study of which everywhere raises interesting problems. The first bases for such study are satisfactory charts.

In this domain practically the whole is still to be done, not only on the Newfoundland Banks, but on the vaster expanse of the continental shelves. Nautical charts, the keeping up-to-date of which involves already a considerable amount of work, confine themselves to navigation and do not, as a rule, enter into the detail of configurations of interest to geographers. The investigation of submarine relief, which is still in an embryonic stage, requires, to be accurate, homogeneous charts, i.e. charts drawn up at the same moment by the same methods. In the United States surveys of this kind have been realized; examples thereof will be found in the books of Mr. SHEPARD, an expert on the question of submarine valleys (3).

France is represented in these investigations of the edge of the European and American shelves by the OFFICE DES PÊCHES, whose new research ship, the *Président-Théodore-Tissier*, launched in September 1933, drew up, in 1934, two charts to satisfy the needs of fisheries, both approximately on the scale 1:300,000, the so-called *Carte 2* of the western entrance to the English Channel and *Carte D* of the Newfoundland Banks (4).

Hopes may be entertained that this activity will make for better comprehension of the still very imperfectly known formations the exact definition of which would no doubt supply new data for the history of the continents (5).

(1) J. W. GREGORY, The earthquake off the Newfoundland Banks of 18th November 1929 (*The Geographical Journal*, Vol. 77, London, 1931).

(2) Francis P. SHEPARD, Glacial troughs of the continental shelves (*The Journal of Geology*, Chicago, Vol. 34, No 4, May-June 1931).

(3) Francis P. SHEPARD, *art. quoted.* — Submarine valleys (*Geographical Review*, January 1933). — American submarine canyons (*Scottish Geographical Magazine*, July 1934).

(4) *Edit.*, Ed. BLONDEL LA ROUGERY, Paris. — An outline will be found in the *Revue Maritime* of November 1935 of the method of charting used by the *Président-Théodore-Tissier* during her trip to Newfoundland.

(5) In proportion as the submarine relief becomes better known it will be possible to define more precisely the nomenclature of its formations. See in this connection: Commission Internationale pour l'Exploration scientifique de la Mer Méditerranée, *Manuel pour les observations océanographiques à la mer*. 1st Vol. III: *Morphologie et nomenclature du relief sous-marin* by Emm. DE MARTONNE.