

REPORT OF THE COMMITTEE ON THE CRITERIA AND NOMENCLATURE OF THE MAJOR DIVISIONS OF THE OCEAN BOTTOM.

INTRODUCTION.

The International Association of Physical Oceanography in its meeting in Edinburgh on 18 September 1936, adopted a resolution authorizing the establishment of a Committee to study the Criteria and Nomenclature of the Major Divisions of the Ocean Bottom.

The Committee was presided over by Dr. T. WAYLAND VAUGHAN, Director of the Scripps Institution of Oceanography, the Secretary was Vice Admiral J.D. NARES, President of the International Hydrographic Bureau.

The Report of the Work done by this Committee was published in 1940 as Scientific Publication N° 8 and was recently received by the International Hydrographic Bureau.

The following is a brief summary of the replies to the Circular-Letter which posed certain questions relative to the subjects of interest to the Committee.

1) The Norwegian Hydrographer, Rolf KJÆR, presented a tabulation showing some modifications proposed to Special Publication N° 22 of the International Hydrographic Bureau. They are as follows :—

NORGE — NORWAY — NORVEGE

- | | |
|---|-----------------------------------|
| A | Fastlands-hylde, Fastlands-sokkel |
| B | Sokkel-helding, Sokkel-skråning |
| C | Øy-hylde, Øy-sokkel |
| D | Øysokkelskraning |
| E | Banke |
| A | Basseng, Bekken |
| B | Fordypning |
| C | Renne, Grøft |
| D | Dyp, Djup |
| E | — |
| A | Hevning |
| B | Rygg |
| C | Platå, Flak |
| D | — |
| E | — |
| F | — |
| A | Kamm |
| B | Grunn |
| C | Rev |
| D | Topp, Båe |
| E | Snag |
| A | Kjel, Gryte |
| B | Fure, Renne |
| C | Dal |
| A | Tørfall |

He proposed further to replace the name *Denmark Strait* by the name of *Greenland Strait* as the latter is more in use by those fishermen and sealers of Norwegian nationality who most frequent those waters.

2) Captain KÜRZE, Director of the *Nautische Abteilung der Kriegsmarine*, transmitted a Report of Professor Georg WüST of the *Institut für Meereskunde*. In this is found an account of the distinction generally made by German geographers between the words designating the primary divisions: deep-sea troughs (Tiefsee-mulden) deep-sea basins (Tiefseebecken) and deep-sea trenches (Tiefseegräben). The first have a shape which is bounded by the slope of the continental shelves and the great longitudinal ridges; they are divided into basins of more or less rounded or elliptical shape by the transverse ridges (Rücken) and rises (Querswellen). In some of these deep-sea basins are sunk extensive but relatively narrow depressions with steep brinks, which, when they exceed 6000 meters depth, it is customary to call *deep-sea trenches* (Gräben).

The author recommends the general adoption of this nomenclature for these primary divisions of the deep sea and the acceptance of the principles recognized by the 7th International Geographical Congress in 1899.

For the secondary divisions, such as those designated by the expression *deep* (German "Tief" - french "fossés") and which is used for the denomination of smaller limited areas of more than 5500 to 6000 meters depth, the personal denominations of the names of vessels or oceanographers who discovered them might be retained; the same is true for the point of greatest depth in a deep, which should then be designated by the term "depth" (German "Tiefe", french "Profondeur").

The author gives a table showing the proposals for the nomenclature of the forms of oceans, having depths of more than 4000 meters (pages 19 to 22 and pages 123 and 124). This differs very little from that which is given in the *Hydrographic Review* Vol. XIII, N° 2 of November 1936, page 55.

3) The International Hydrographic Bureau requested the advice of Director de Vanssay. The latter considered that several of the troughs denominated by Dr. WüST, particularly in the Pacific, are not as yet sufficiently well known and do not appear to be well-defined

The same is true of a number of basins designated by that author.

4) M. COT, Ingénieur Hydrographe Général, transmitting the recommendations of the French Hydrographic Service, without disapproving the system proposed by Dr. Georg WüST, considers it relatively complicated and susceptible to modifications when the bathymetric soundings shall have become more numerous. He considers it advisable that the system of denominations adopted for submarine relief should be the same for oceanographers and mariners. He does not consider it opportune to change the denominations at present in use to replace them by others which would be based on our present rather imperfect knowledge of the relief.

5) Captain G.S. BRYAN, Hydrographer of the United States Navy submitted a report.

He does not believe that the oceanographer and the mariner can adopt the same designations and the same limits for the oceans and seas; the former are interested particularly in the bottom relief; the latter in the phenomena on the surface.

As far as concerns the terminology for the shapes of bottom features, he approves the terms Troughs, Basins and Trenches and adopts for the term Trench the definition given by the International Hydrographic Bureau (*Hydrographic Review*, Nov. 1928, p. 17). He does not believe it advisable to specify any definite number for the depth to characterize the different divisions. He is in agreement with Dr. WüST for the adoption of the word "Depth" to characterize the point where the greatest depth is found but believes that the only name prefixed to these depths should be the numeral indicating the depth. The designation "Sac" shown under U.S.A. in the International Hydrographic Bureau tabulation "Terminology of Submarine Relief" should be omitted as it is not in general use in that country. To the word "Rise" he proposes an amendment to include the alternative designation "swell", which is in general use. He is of the opinion that geographical names should be given the major divisions of the ocean bottom, but that the assignment of names to the Deeps and Depths should be the prerogative of the discoverer.

The boundaries of the different primary divisions of the bottom should not be adopted until they are already well known.

The report invites attention to the publication of soundings N° 210 by the Hydrographic Office, the discovery of the Ramapo Bank, the article and the Bathymetric Chart of the South Pacific published by Captain L.R. LEAHY. It should be noted that the nomenclature used on this chart would have to be modified to bring it into agreement with the recommendations given in this paper.

For the rest the report is in general agreement with the proposals of Dr. G. WüST, such as they are reproduced in the Hydrographic Review of November 1936, Vol. XIII, N° 2, pages 46 to 55; with the exception of the following designations :—

Puerto Rico Trough (and *not* Trench)

Cayman Trough (and *not* Trench).

He also proposes other modifications :—

Sigisbee Deep, Tuscarora Deep, Ramapo Deep, Nero Deep, Fleming Deep, Bauer Deep, Byrd Deep.

The basin denominated *Peruvian* does not appear to be sufficiently well known; it would appear advisable to await further soundings. The same is true for the basins designated as *South Chilean*, and *Pacific South Polar Basin*.

The author, examining the publication N° 23 of the International Hydrographic Bureau: *Limits of Oceans and Seas*, recognizes the need of standardization from the point of view of the mariner. He disagrees however with the employment of the term "*Southern Ocean*". The introduction of a fourth ocean seems unnecessary and the fixation of its northern boundaries appears rather arbitrary. He expresses the concurrence of the Hydrographic Office of the United States of America in the proposals contained in this publication, with the exception of a few reservations on the question of those sub-divisions which are made to comprise a large part of the ocean in order to include in one sea the outlying islands. He gives for a certain number of seas the modifications to the boundaries which appear to him to be indicated.

6) P.M. von RIEL, Director of the Royal Netherlands Meteorological Institute of Amsterdam, has submitted a report to which is adjoined an appendix giving the definitions of the forms of submarine relief with their names in Dutch (these show several discrepancies from those which the International Hydrographic Bureau published in January 1932 on sheet 22 c). He proposes to add the English word "sill" (seuil) which appears to him to have a signification somewhat less general than the word "rise".

The expression Mulde (depression, trough) seems to him unnecessary as it corresponds to one single form only, which is found in the Atlantic Ocean. The expressions *Becken* and *Graben* (Basin and Trench) appear sufficient to designate the depressions. A special expression such as "Tiefe" (Depth) to designate the greatest depths sounded does not appear to him to be necessary.

He notes, in connection with the table of Dr. G. WüST, that between the basins of Guiana and Brazil, there is only a slight elevation, and it appears to him that the two might be combined under the name "American Basin". The same is true of several others in the three oceans.

P.M. van RIEL also proposes the designation *Mindanao graben* in place of *Philippinen Graben*.

7) The Rear Admiral and Chief Hydrographer of the Imperial Japanese Navy, S. KOIKE, is of the opinion that the terminology for the submarine relief proposed by Littlehales might be adopted, except in the cases where it differs from that given by the International Hydrographic Bureau, in 1932, in which case the latter is to be preferred.

He asks for the adoption of the term "Mansyu Deep" for the Trench in the Mariannes Basin (Mariana Trench) where a depth of 9814 meters has been sounded. He notes, for the rest, several corrections to be made to the column concerning Japan in Sheet 22 c published by the International Hydrographic Bureau.

Publication N° 8 contains in addition the following special articles :—

a) By Harold Ulric SVERDRUP, Director of the Scripps Institution of Oceanography at La Jolla (California) on the arctic regions and the history of the nomenclature which has been adopted for their oceanography.

b) by D. COT, Director of the French Hydrographic Service; on the nomenclature of the principal divisions of the ocean bottom and in particular of the basin of the western Mediterranean. He states in general that he does not see the necessity for a systematic denomination covering the whole of the oceans; this seems to him to be premature. He proposes for the basin of the western Mediterranean the name of *Algéro-Provençal Basin* for the great depression of nearly uniform depth which lies between la Provence, Corsica, Sicily, Algiers, Spain and the Balearic Islands and for the marginal seas the names *Tyrrhenian, Ligurian, Iberian* and *Alboran*.

c) by Thomas Wayland VAUGHAN, Director emeritus of the Scripps Institution of Oceanography and of the University of California, on the classification and nomenclature of the Submarine features of the Gulf of Mexico and the Caribbean Sea. There is adjoined a very beautiful Bathymetric Chart in colors of the Caribbean Sea to the mean scale of 1/2,872,238 prepared by the U.S. Hydrographic Office.

d) by Captain G.S. BRYAN, Hydrographer of the U.S. Navy, on the subject of the Bathymetric Chart of the North Pacific Ocean, for which the most recent data was collated from the numerous echo soundings obtained by the U.S.S. *Ramapo*. This beautiful chart in colour is joined to the report. It is to the scale of 1/13,600,000 on the parallel of 40° N. and the nomenclature proposed is indicated thereon in red letters.

e) by Lt. Colonel R.B. SEYMOUR SEWELL on the Indian Ocean. The author is in general agreement with Dr. Wüst for the nomenclature but is opposed to the proposal put forth by the International Hydrographic Bureau in its publication on the limits of oceans and seas, save for the Gulf of Bengal. He considers in fact that these limits should correspond to the submarine formations and he indicates those which seem to conform to the different seas and basins of the Indian Ocean. He does not approve the proposal submitted by Prof. WAYLAND VAUGHAN to replace the expression "Ridge" by the word "Swell". He asks for the maintenance or the adoption of the designations "*Murray Ridge*" and *Carlsberg Ridge, Carpenters Ridge Investigator Channel, Barren Island Ridge*. A diagrammatic chart indicates the names and the divisions proposed.

f) by P.M. van RIEL, Director of the Royal Netherlands Meteorological Institute of Amsterdam, on the bottom configuration of the Austral-Asian Archipelago. He gives an historical discussion of the designations which have been employed at various epochs; then, basing his proposals on a much more perfect knowledge of the bottom configuration resulting from the Siboga Expedition (1899-1900) and above all on the Snellius Expedition (1929-30) he presents a table and a schematic chart for the denominations which he believes should be adopted.

g) by N.A. MACKINTOSH, Director of Research, Discovery Committee on the nomenclature and the primary divisions of the Southern Seas. The author gives the terms generally adopted in the publications of the Discovery Committee and presents a schematic chart showing them.

h) by Håkon MOSBY, of the Geophysical Institute, Bergen, Norway, on the submarine features of the southern seas. The author submits proposals which differ slightly from the preceding and gives a chart on which they are indicated.

He employs the word "Ridge" when the bottom is less than 3,000 to 4,000 meters; and "swell" when it is more than 4,000 meters.

i) The President of the Committee, Dr. WAYLAND VAUGHAN, treating of the general discussion and the list of names attributed to the special submarine depths, gives the history of the nomenclature and its rules proposed since 1877 and summarizes the objections raised by some members of the Committee. He himself finds that certain basins proposed by Dr. Wüst in the eastern part of the North Atlantic are not sufficiently well defined. He shows also that certain names have been given to several different features and cites the example of the Nares Deep, which name was first attributed to the depths in the Pacific (1877)

and then in the Atlantic (1895). At other times the same feature has received several different names. In such cases only the first in point of view of time should be retained. He is of the opinion that *a catalogue of all these names which have been proposed is essential* and he has prepared a list of the names employed in the articles summarized above; then a list of the nomenclature employed for the Indian Ocean and the Pacific Ocean on the chart of Schott in his "Geographie des Indischen und Stillen Ozeans", by Murray in his "Summary of Results" Challenger Reports 1895, by Supan in 1899, by Schott in 1935 and by L.R. Leahy on his Bathymetric Chart of the Southern Pacific in 1938.

The volume contains also a reproduction in colours of the General Bathymetric Chart of the Oceans brought out by the International Hydrographic Bureau in 1939 on the Mercator projection to the scale of 1: 35,000,000 at the equator. A sheet of tracing paper is superposed on the chart giving the principal names proposed.

P. V.

