



TERMINOLOGY OF SUBMARINE RELIEF

by

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The following paragraphs are quoted from Circular-Letter N^o 21-H of 1924 which the Bureau issued with a view to securing data for a terminology of submarine relief in all the various languages used by Hydrographers:-

“1. The Bureau has received a suggestion from the Director of the Italian Hydrographic Institute proposing the adoption of standard terminology in the various languages for such submarine and topographical coastal features as would be useful in the compilation of Sailing Directions and Charts. It appears to the Directing Committee, however, that the various countries should themselves select a word or words in their own languages which represent the feature described by means of standard definitions, and that any attempt on the part of the Bureau to undertake more than the drawing up of proposed definitions is undesirable, as it would create inevitably more uncertainties than it would prevent.

“2. In the domain of Oceanography the time would appear to be ripe for the adoption of terms, in each language, by means of which certain elementary features of Submarine Relief (or configuration of the bottom of the Ocean) may be characterised, on account of the great development and wide application of Sonic Depth-finding, and the consequent increase in data which eventually will be available to establish such configuration definitely.

“Should agreement be reached with reference to a basis for the principal submarine forms, it would prove valuable as a foundation for a later agreement with reference to the other definitions referred to in paragraph 1.

“3. The 7th International Geographical Congress, which was held in Berlin in 1899, appointed a Committee on the *Nomenclature of Sub-oceanic features*. This Committee met at Wiesbaden in April, 1903, under the Chairmanship of the late Prince ALBERT OF MONACO, and it decided that the principal forms of Submarine Relief should be designated by the names used on the Bathymetric Chart prepared by Dr. SUPAN and published in Petermanns Mitteilungen in 1899. In 1903, Dr. SUPAN inserted in the same publication a list of the terms and definitions adopted in Germany for Submarine Relief, together with French and English terms allocated thereto.

"The 8th International Geographical Congress, which was held at Washington in 1904, adopted these definitions and terms.

"4. The Directing Committee herewith submits the results of certain subsequent attempts which have been made to reach agreement as to terminology for the principal forms of submarine relief.

"(a) The German terms are those of Dr. SUPAN, which were drawn up in 1903. They are distinguished by (*G.*) in the list.

"(b) The English terms (*E.*) are those proposed by Dr. HUGH ROBERT MILL, and were used in the first edition of the *General Bathymetric Chart of the Oceans*, 1904.

"(c) The French terms (*F.*) are based on those of Dr. SUPAN, and are those adopted by the French Sub-Committee assembled in Paris on 27th May, 1910, for the purpose of establishing the terminology to be used in the second edition of the *General Bathymetric Chart of the Oceans*, 1912.

"(d) The Portuguese terms (*P.*) are those suggested by RAMOS DA COSTA, and published in "*Noções Geraes de Oceanographia*," Lisbon, 1910.

"(e) The Spanish terms (*S.*) are those published in the pamphlet entitled *Modelado Submarino* by D. RAFAEL DE BUEN, Madrid, 1923, in which the proposals of Señor DANTIN CERECEDA are discussed, which proposals were made at the Meeting of the Spanish Assembly for the Advancement of Science, held at Bilbao, and published in a pamphlet entitled *Nomenclatura española de las formas del modelado submarino*, 4th Volume, Part 1.

"(f) The Italian terms (*I.*) recently put forward by the Director of the Hydrographic Institute of the Royal Italian Navy, are based on those put forward by the Committee of the Berlin Congress, 1899, together with those proposed by Prof. A. ISSEL in the *Annali Idrografici*, Volume IV, 1903-4, and also those discussed by Prof. G. RICCHIERI at the Genoa Congress, April, 1924.

"5. The Directing Committee has now drawn up proposed definitions and has tentatively assigned English and French terms thereto, which terms are, of course, subject to revision by the States Members concerned.

The original definitions are shown on the left in Roman characters, and those proposed by the Directing Committee are given on the right in *italics*, together with the terms assigned to them.

"6. The collated results are submitted to the States Members for suggestions, amendment or correction. It is proposed that the terms resulting from this examination of the question shall be adopted as the standard terminology for submarine relief for use in Hydrography."

We are confronted, at the outset, by the consideration that in an international terminology, such as proposed, of the forms of the ocean bottom, the principal value is oceanographic because, in Hydrography, there are symbols, soundings and abbreviations to indicate, on hydrographic charts, the particular features of value to navigators, whereas the deeper forms interest him practically only insofar as echo-sounding may ultimately enable him to check his position at sea, out of sight of permanent aids to navigation. This

is an evergrowing possibility but not as yet to be realized, owing to the paucity of deep-sea soundings beyond the continental shelf. At any rate, the Sailing Directions concern themselves more especially with the soundings in both primary and secondary forms, and with dangers to navigation as shown on hydrographic charts in the secondary forms.

The following is a summary of the discussions by the States Members in response to the Circular-Letter. Included in these are certain definitions drawn up by a Committee of Italian scientists, at Milan, in December, 1924, the President of which was Captain Luigi TONDA, Director of the Hydrographic Institute of the Royal Italian Navy, now a member of the Directing Committee of the International Hydrographic Bureau. The proceedings of this Committee were published in the *Rivista Marittima* for January, 1926.

The following are (1) the definitions adopted by the International Geographical Congress; (2) *in italics*, the definitions as modified, and in the form of proposals, by the International Hydrographic Bureau, and (3) the comments, criticisms or proposals of the States Members as to the Bureau's definitions.

I. PRIMARY OR FIRST MAGNITUDE FORMS.

1. Forms of the Margins of the Ocean.

A. CONTINENTAL SHELF

(Plateau continental).

The definition originally proposed was :-

“Zone of the continental margin which slopes gently to a depth of about one hundred fathoms, or two hundred metres, from the line of permanent immersion and is then nearly always followed by a more or less abrupt declivity which is known as the Continental Talus.”

Definition proposed by the International Hydrographic Bureau in its Circular-Letter :-

“Zone of the continental margin to a depth of about one hundred fathoms, or two hundred metres, from the line of permanent immersion.”

PROPOSALS OF STATES MEMBERS AS TO BUREAU'S DEFINITION “A”.

GREAT BRITAIN proposes :

“Zone of the Continental Margin bounded on the one side by the line of permanent immersion, and on the other by a steeper declivity known as the Continental Slope, this change of gradient usually occurring at a depth of about 100 fathoms or 200 metres.”

JAPAN proposes :

“Zone of the Continental Margin which slopes gently to a depth of about one hundred fathoms or two hundred metres, from the line of permanent immersion.”

U. S. OF AMERICA :-

The Hydrographic Office proposes: "The Zone of the Continental Margin "which extends from the line of permanent immersion to the Continental "Shoulder."

The U. S. Coast and Geodetic Survey proposes: "Zone of the Continental "Margin extending from the line of permanent immersion to the depth, usually "100 fathoms or 200 metres, where the latter begins to slope abruptly toward "the ocean depth."

THE ITALIAN COMMISSION proposes:

"The Continental Shelf is that part of the Continental Massif which, "from the limit of permanent immersion, descends in a gentle slope to where "the declivity becomes rather steep, and which occurs, generally, at a depth "of about 200 metres."

In view of these many suggestions, the Bureau therefore proposes the definition of the Continental Shelf as:

"Zone of the Continental Margin extending from the line of permanent "immersion to the depth, usually of about 100 fathoms or 200 metres, where there "is a marked or rather steep descent toward the ocean depth."

B. CONTINENTAL TALUS.

(Talus Continental)

Definition proposed by the International Hydrographic Bureau in its Circular-Letter: *"The declivity from the lower edge of the Continental Shelf into "deeper water."*

D. INSULAR TALUS.

(Talus Insulaire)

Definition proposed by the International Hydrographic Bureau in its Circular-Letter: *"The declivity from the lower edge of the Insular Shelf into deeper "water."*

COMMENTS OF THE STATES MEMBERS AS TO THE BUREAU'S
DEFINITIONS "B" AND "D"

GREAT BRITAIN proposes that:

"The word 'Slope' should be substituted for the word 'Talus' wherever it "occurs. Strictly speaking, the geological meaning of 'Talus' is a slope com- "posed of debris fallen from higher ground above and is not *any* slope "however formed. There is no proof that the Shelf is bordered by a slope "always composed of debris, though it is probably the case in some places."

JAPAN proposes:

"The more or less abrupt declivity from the lower edge of the Continen- "tal Shelf into deeper water."

(Note. For Japanese definition of Insular Talus substitute the word "Insular" for "Continental" in the above).

NETHERLANDS proposes :

"I suggest the change 'lower' in both of the proposed definitions into 'outer'."

U. S. OF AMERICA.

The Hydrographic Office proposes to substitute the word "Shoulder" for "Talus" in both definitions, as the latter is "geologically used in its proper Latin meaning to designate a formation at the base of a cliff or slope."

Definition proposed by the ITALIAN COMMISSION :

"The Continental Talus is the portion of the Continental Massif beyond the edge of the Continental Platform which descends rapidly to a greater depth."

(*Note.* It seems to be accepted, in some countries, that the declivity of the Talus, or Slope, or Shoulder is "usually abrupt." It would not seem that in the definition it should be stated whether it is abrupt or gentle, thus leaving it to include both. The proposed British word "Slope" implies a more gentle declivity than the proposed American term "Shoulder", which implies abruptness. It is not necessary, but quite otherwise, that the term adopted for submarine relief should be identical with those used in geography, geodesy or geology. The word "Talus" was adopted by the I. H. B. on the principle which it always accepts of a word used by the greatest number of States Members. It would be acceptable to this Bureau to substitute the words "Continental Declivity" or "Insular Declivity" for the confusion in English which results from the Bureau's proposal of "Talus" and the English and American proposals of, respectively, "Slope" and "Shoulder." The general term "Declivity" includes all types. It might be well to include the word "Talus" in the secondary forms to denote the debris at the foot of the declivity, if any exists. The suggestion of the Netherlands Hydrographer to change the Bureau's definition from "lower edge" to "outer" edge is an excellent one).

The Directing Committee, therefore, withdraws the terminology and definitions proposed in the Circular-Letter and now substitutes the following :-

B. CONTINENTAL DECLIVITY.

The declivity from the outer edge of the Continental Shelf into deeper water.

D. INSULAR DECLIVITY.

The declivity from the outer edge of the Insular Shelf into deeper water.

C. INSULAR SHELF.

(*Socle*)

An Insular Shelf is an elongated plateau which acts as a support for islands grouped together as an Archipelago.

Definition proposed by the International Hydrographic Bureau in its Circular-Letter : "Zone of the margin of an island or group of islands to a depth of about 100 fathoms or 200 metres from the line of permanent immersion."

PROPOSALS OF STATES MEMBERS AS TO BUREAU'S DEFINITION "C"

DENMARK :-

Remarks : "I find it unnecessary to have definitions for both Continental Shelf and Talus and Insular Shelf and Talus. When is a land surrounded by water an island, and when a continent? Is, for instance, Iceland an island and Greenland a continent? I have the honour, however, to forward terms in Danish for both proposed expressions."

GREAT BRITAIN :-

Proposes : "Zone of the Insular Margin bounded on one side by the line of permanent immersion and, on the other, by a steep declivity known as the Insular Slope, this change of gradient usually occurring at a depth of about 100 fathoms or 200 metres."

JAPAN :-

Proposes : "Zone of the margin of an island or a group of islands which slopes gently to a depth of about 100 fathoms or 200 metres from the line of permanent immersion."

U. S. OF AMERICA :-

The Hydrographic Office proposes : "The Zone of the Insular Margin which extends from the line of permanent immersion to the Insular Shoulder".

The Bureau therefore proposes the same definition as that given for Continental Shelf, substituting the word "Insular" for "Continental."

E. BANK.
(*Banc*)

The Bureau, realising the confusion which has arisen in the past in the various Sailing Directions as to the distinction between a Bank, a Reef and a Shoal suggests that, in future, such confusion should be obviated by the inclusion of Bank under "I. *Primary or first order forms*", "1. *Forms of the Margins of the Ocean*", while Reef and Shoal remain under secondary forms, as now. The primary conception of bank would thus be a form of Insular Shelf or Plateau on which there are, however, no island, archipelago, or land formations projecting above the surface and over which the depth of water is relatively shallow, but sufficient for surface navigation. It may be of any material and may act as a support for such secondary formations as shoals or sunken reefs dangerous to navigation. It may also act as a support to other forms usually designated as "fishing banks," of great value commercially, but in no way dangerous to surface navigation.

On hydrographic charts the soundings, danger lines and contours of depth give plain indication of any permanently submerged dangers to navigation. When, however, any such bank is relatively small in area and the secondary formation (reef or shoal) bares at low water or projects above the surface at

all stages of the tide, special symbols are used on hydrographic charts to indicate their exact character so that, in such cases, the use of the designation "bank" should, in the future, in the interests of hydrography and navigation, be avoided in favour of such designations as "reef" or "shoal."

There remains to be considered the general usage which exists of calling outlying deposits of sand by the name of banks, but such usage would not be objectionable if designated by two words, such as "sand bank," "mud bank", *etc.*, as giving the idea of possibility of gradual change by the action of currents. They may be connected with the adjacent shore with slightly deeper water between and may or may not uncover. The hydrographic symbols take cognizance of such features, but on the other hand, the term Bank should not be used in the sense of "coral bank" or "rocky bank." The proper designation in such cases should be Reef, the definition of which is: "A rocky or coral elevation which is dangerous to navigation and which may uncover."

The Bureau considers that the above is the practical consensus of the opinions of various Hydrographers who have discussed the definitions which were submitted by the Bureau for their approval.

The following definition is therefore proposed for Bank as a *first magnitude form* :

E. BANK.

(*Banc*)

Now proposed by the I. H. B.: *A plateau of any material over which the depth of water is relatively small but sufficient for surface navigation, and of the same type as an Insular Shelf or Plateau, but on which there is no island or archipelago projecting above the surface of the water. It may act as a support for any secondary formation, such as shoals or reefs which may be dangerous to navigation.*

2. Depressions in the bottom of the high seas.

There have been a number of comments, suggestions and criticisms from various sources as to the definitions proposed, which are as follows :

A. BASIN.

(*Bassin*)

The definition as originally proposed was :

"Submarine cavity of approximatively circular configuration in which, therefore, two horizontal dimensions are nearly equal."

Definition proposed by the International Hydrographic Bureau in its Circular-Letter :

"Large submarine cavity of more or less circular, elliptical or oval form."

THE ITALIAN COMMISSION proposes :

"A large cavity with a more or less circular contour."

The Bureau thinks it essential that the word "cavity" be qualified by the word "submarine" therefore, sees no reason to change the definition as proposed.

B. TROUGH.

(Dépression)

The definition as originally proposed was :

"A long and broad excavation with gently sloping sides and occasionally "divided into basins."

Definition proposed by the International Hydrographic Bureau in its Circular-Letter :

"A long and broad depression with gently sloping sides."

THE ITALIAN COMMISSION proposes :

"A large, elongated, wide cavity with gently sloping sides."

The Bureau sees no reason to change its definition as proposed.

C. TRENCH.

(Fosse)

The original definition was :

"A long depression relatively narrow and with very steep sides, the continental side of which is more elevated than the seaward side. A Trench is really nothing more than a secondary form of the great oceanic depressions, but owing to its considerable length and depth it must be considered as a form of first magnitude."

The International Hydrographic Bureau proposed in its Circular-Letter :

"A long and narrow depression with steep sides."

THE NETHERLANDS proposes to add the word "relatively" before the word "steep."

THE ITALIAN COMMISSION proposes :

"A long and narrow cavity with steep sides, usually near a continent or a chain of islands."

The Bureau is of the opinion that the words "usually near a continent or a chain of islands" is merely explanatory and not a part of the definition. It, however, accepts the modification made by the Netherlands, which would make the definition now read :

"A long and narrow depression with relatively steep sides."

D. DEEP.

(Fosse)

The original definition was :

"The deepest portion of a submarine depression."

The International Hydrographic Bureau proposed in its Circular-Letter :

"The well-defined deepest area in a submarine depression".

THE NETHERLANDS proposes to add after the word "area", the words "of at least 5400 metres (3000 fathoms) depth." The comments of Captain LUYMES are as follows :

“According to my opinion it is necessary to put a minimum limit to a “deep because such is the current use. Up to the present it has been exclusively used for the greatest ocean depths, and then always with a local indication, in most cases, by a surname (*e. g.* ‘Challenger deep,’ ‘Tuscarora deep’). The proposed limit is in accordance with ‘Science of the Sea,’ by G. HERBERT FOWLER, page 206.”

THE ITALIAN COMMISSION proposes :

“The surface of the bottom of the lowest part of the depression of a cavity which is very deep.”

The Bureau does not consider that the definition should be modified.

The definition remains, therefore, as follows :-

“*The well-defined deepest area in a submarine depression.*”

3. Elevations in the bottom of the high seas.

The comments, suggestions and criticisms from various sources are as follows :

A. RISE.

(*Seuil*)

The original definition was :

“A long elevation which rises gently at an angle of a few minutes whether long or broad and whatever may be its height. Rises are the axes of primordial lines of Submarine Relief, and if the bed of the ocean were to become dry land, they would take on the character of primary elevations by forming water sheds.”

The International Hydrographic Bureau proposed :

“*A long and broad elevation which rises gently from the ocean bottom.*”

THE NETHERLANDS proposal is as follows :

“The Dutch word ‘Welving’ agrees with the English word ‘Rise,’ but according to my opinion the French word ‘Seuil’ is not applicable to ‘a long and broad elevation which rises gently from the bottom of the ocean,’ and which may be surrounded by a great depth on all sides. The word ‘Seuil’ and the German word ‘Schwelle’ ought to be reserved for those elevations which close, to a certain extent, the access to an inland sea or even to a channel in an estuary. ‘Seuil,’ ‘Schwelle’ and the Dutch word ‘Drempel’ correspond, in common language, to the English word ‘threshold,’ and the submarine formation may be compared to a mountain pass.

“I therefore propose to add, after ‘A,’ a form of the ocean bottom to correspond to the English word ‘threshold,’ and the corresponding French word would be ‘Seuil,’ the German ‘Schwelle’ and the Netherlands ‘Drempel,’ with the definition ‘an elevation connecting two continents or islands and

“separating two basins by a depth less than those in either of them (*e. g.* the “Banda Sea, which has a depth up to 6000 metres and more and is separated from the Molucca Passage (depths of 4700 metres) by a ‘drempe’ between the “Soela Islands and Ombi major with a greatest depth of 1650 metres). This “sort of form is of great oceanographic signification.”

THE ITALIAN COMMISSION has put a question mark after the French word “seuil” as given by the French authorities, and proposes the definition :

“A form of the bottom in relief, long and wide, with gently sloping sides.”

The Bureau holds that the French and German authorities are the best judges of the words corresponding to the definition and, therefore, does not think that they should be changed.

The Netherlands proposal of the recognition of an elevation corresponding geographically to a peninsula is considered hereafter.

B. RIDGE.

(*Dorsale*)

The definition originally given was :

“A long elevation with steeper sides than those of a rise.”

The definition proposed by the International Hydrographic Bureau :

“*A long and narrow elevation with steeper sides than those of a rise.*”

A Ridge is the converse of a Trench (long and narrow), in the same way that a Rise is the converse of a Trough (long and broad).

THE ITALIAN COMMISSION proposes the definition :

“A form of relief of the bottom, long and narrow, with a steep lateral “declivity.”

The Bureau sees no reason to change its definition.

C. PLATEAU.

(*Plateau*)

The definition originally proposed was :

“An elevation with a flattened top but particularly steep sides.”

The definition proposed by the International Hydrographic Bureau :

“*An elevation with a more or less flat top and steep sides.*”

THE ITALIAN COMMISSION proposes the definition :

“A vast area in relief with a more or less circular or polygonal contour.”

The Bureau looks upon a plateau as being somewhat in the nature of a deeply submerged bank or a form of submerged table land, the relative flatness of which, and the steepness of the sides being the two marked features. It therefore sees no necessity to change its definition as proposed.

There are two other forms of elevation of submarine relief which the ITALIAN COMMISSION proposes to recognize by definitions :-

D. CULMINATING POINT.

(*Culmine. — Point culminant*).

Of which it gives the definition as "The highest part of a (submarine) relief, corresponding to the French words *Haut-fond* or *Sommet*, the German word *Höhe*, and the English words *Height* or *Summit*".

In its secondary form, as the highest part of a ridge or crest, this form is called a Shoal or Reef, but in its primary form, as here proposed, the Bureau regards its addition to the terminology of submarine relief as desirable and has included it in a special Circular-Letter dealing with this and similar questions (see below).

As to the second form proposed, the ITALIAN COMMISSION and the NETHERLANDS Hydrographer are both of the same opinion as to the recognition of a form of submarine relief corresponding to the definition (a) proposed by the Italian Commission as corresponding to a peninsula.

(a) "The form of submarine relief like a peninsula of dry land."
The corresponding definition of the Netherlands Hydrographer is:

(b) "A sub-elevation connecting two continents or islands, and separating "two basins by a depth less than either of them." The explanation of this is given under the comments of the Netherlands Hydrographer under 3.-A. *Rise (Seuil)*, and in a subsequent letter (21st February 1928) as corresponding to a (submarine) *Isthmus*.

For this form the Italian Commission proposes the word *Cuneo* (Coign), and the Netherlands Hydrographer the Dutch word *Drempel*, the corresponding English terms being, *Peninsula*, and *Isthmus* (submarine).

As a matter of fact "3. B. *Ridge (Dorsale)* might be held to do away with the necessity for recognising this form by the special definitions above, since it may be also applied to an elevation connecting two continents or islands.

The Italian Commission further proposes the word *Sacca* as a generic term to indicate a recess in the contour of submarine relief similar to a gulf in hydrography. They suggest that the corresponding word in English would be *Embayment*, and in German *Bucht*.

The Bureau has submitted the question of adopting the definitions and terms as given above in Circular-Letter N^o 2-H. of 23rd January 1928, and the following is the result:

Argentine, Brazil, Denmark, Germany, Greece, Italy, Japan, Netherlands, Portugal, Sweden, and the United States of America have approved the Italian proposal and have given the terms used by them which correspond to the definition.

Australia and Great Britain have voted against the proposal and have declined to give terms corresponding to the definition.

II. SECONDARY OR SECOND MAGNITUDE FORMS.

There are a number of proposals for changes in several definitions of second magnitude forms, as follows :

I. Elevations.

A. CREST.

(Crête)

The definition originally proposed was :

"A narrow rise of irregular longitudinal profile which resembles the crest of a mountain range."

Definition proposed by the International Hydrographic Bureau in its Circular-Letter :

"A narrow rise of irregular longitudinal profile which constitutes the top of an elevation of the sea-bottom."

THE ITALIAN COMMISSION proposes the definition as :

"A relief having the form of a chain of small size with an upper irregular profile."

THE DUTCH HYDROGRAPHER proposes adding to the definition proposed by the Bureau, before the word "irregular," the words "more or less," the modified definition thus now reading :

"A narrow rise of more or less irregular longitudinal profile which constitutes the top of an elevation of the sea-bottom."

The Bureau sees no objection to modifying the definition as above.

THE JAPANESE HYDROGRAPHER suggests that, after "A. CREST" there be added a

B. DOME.

(Dôme)

which he defines as :

"An elevation with a small ground area and steep slope."

The Bureau does not regard this as a form at all differing from the definition of a pinnacle, and therefore does not recommend its acceptance as being at all necessary.

B. SHOAL

(Haut-fond)

C. BANK

(Banc)

D. REEF

(Récif)

These three forms are of special importance to the Hydrographer but, as there has been great confusion in the past in the use of these terms, the Bureau seeks to make its proposals to secure uniformity more clear in the future. The first necessary step has already been proposed by the Bureau in

regarding a "Bank" as a primary form and in confining the designations "Shoal" and "Reef" as secondary forms, except in the special case of shifting forms of silt, sand, mud, gravel, *etc.*, for which, in its secondary forms, the word "Bank" should be used, but always as two words, the first of which is a qualifying one, *e. g.* "sand-bank", "gravel-bank," "mud-bank," *etc.* In this form it may constitute a danger to navigation and, being deposited by the action of currents, may be shifting in character, but is usually adjacent to, and connected with, the land formation.

THE NETHERLANDS HYDROGRAPHER proposes the word "Bar", but this is in the nature of a formation of the third order which is not included in the terminology of the ocean bottom.

The comments of the Netherlands Hydrographer on the definitions for B. *Shoal* and C. *Bank*, are as follows :

"According to my opinion the choice of terms and definitions for these forms is very difficult because the seamen have for many years used these terms without discriminating sharply between them. Compare, for instance, the use of the word 'Bank' in Newfoundland Bank, which is a part of the continental shelf ; in Seine and Gettysburg Banks, which are ridges (I - 3 - B) in Saba Bank, which is a plateau ; in the expression sand-bank, which may dry at certain stages of the tide, *etc.* Neither the depth nor kind of bottoms have induced sailors to discriminate between the collective names of these elevations. To give further examples, the Dogger Bank and the Great Fisherbank in the North Sea have more depth than the Long Sand shoal and the Cerberus Sound in Long Island Sound, although according to the proposed definition a shoal is regarded to be less shallow than a bank. I have tried without success to find terms and definitions in accordance with those used by seamen and finally I prefer those proposed by the Committee, be it that several, by time-honoured names, do not respond to them."

The Bureau thinks that its proposal to regard "Bank" as a primary form of the margins of the ocean does away with the above objection.

The Bureau proposed, in its Circular-Letter, as a definition for "Shoal" :

"A part of the sea-bottom over which the water is relatively shallow."

THE ITALIAN COMMISSION proposes :

"An area at the bottom of the sea, rocky or sandy, lying at such a small depth that it involves a danger to navigation."

THE BRITISH HYDROGRAPHER proposes :

"A detached area, the depth over which creates a danger to surface navigation and which may be of any material excepting rock or coral."

THE JAPANESE HYDROGRAPHER proposes :

"A non-rocky elevation which is dangerous to navigation and which may uncover."

THE U. S. COAST AND GEODETIC SURVEY proposes :

"A non-rocky part of the sea-bottom over which the water is quite shallow and which may uncover."

Dr. G. W. LITTLEHALES states his ideas as follows :

“The word ‘Shoal’ is employed to denote a place of shallow depth from the standpoint of safety in navigation and is often a spot on a bank where the water is so shallow as to require the place to be distinctly delineated, and perhaps named, in order that navigators may be aware of it.”

THE HYDROGRAPHER OF THE U. S. NAVY proposes the definition :-

“As a rule, a detached area ; a shallow place in which any body of water is a menace to navigation. It may be of any material.”

The Bureau is of the opinion that its own definition is too vague and it now accepts the definition of the British Hydrographer as accurately defining what is meant by a shoal, as follows :

“A detached area the depth over which creates a danger to surface navigation and which may be of any material excepting rock or coral.”

D. REEF.

(Récif)

Definition proposed by the International Hydrographic Bureau :

“A rocky or coral elevation which is dangerous to navigation and which may uncover.”

This definition was universally accepted.

2. Depressions.

The following are the definitions proposed for secondary forms of depressions :

A. CALDRON.

(Gouffre)

The definition originally was :

“A narrow and small Deep.”

The definition proposed by the Bureau, in its Circular-Letter, is :

“A small deep of more or less circular, elliptical or oval form.”

THE ITALIAN COMMISSION proposes the definition :

“A small basin.”

The Bureau sees no objection to adding the word “Basin” to the definition, so that it will read as follows :

“A small basin or deep of more or less circular, elliptical or oval form.”

B. FURROW.

(Sillon)

The definition originally proposed was :

“Fissure in the form of a channel which penetrates into the continental shelf in a more or less perpendicular direction.”

TERMINOLOGY OF SUBMARINE RELIEF

TERMINOLOGIE DU RELIEF SOUS-MARIN

PROPOSED BY INTERNATIONAL HYDROGRAPHIC BUREAU. <i>Proposé par le Bureau Hydrographique International</i>	ARGENTINA <i>Argentine</i>	BRAZIL <i>Brésil</i>	CHINA <i>Chine</i>	DENMARK. <i>Danemark</i>	FRANCE	GERMANY. <i>Allemagne</i>	GREAT-BRITAIN <i>Grande-Bretagne</i>	GREECE. <i>Grèce</i>	ITALY. <i>Italie</i>	JAPAN. <i>Japon</i>	NETHERLANDS. <i>Pays-Bas</i>	NORWAY. <i>Norvège</i>	PORTUGAL.	SPAIN. <i>Espagne</i>	SWEDEN. <i>Suède</i>	U. S. OF AMERICA <i>E. U. d'Amérique (C. & G. S., H. O.)</i>
I. PRIMARY OR FIRST MAGNITUDE FORMS — FORMES PRIMAIRES OU DE PREMIÈRE GRANDEUR.																
1. FORMS OF THE MARGINS OF THE OCEAN — FORMES DES BORDS DE L'Océan																
A. CONTINENTAL SHELF.....	Planicie Continental	Planalto Continental	Hai Ê.	Fastlands-Sokkel.	Plateau Continental	Kontinental-Schelf.	Continental Shelf.	Ἡπειρωτική υφαλοκρηπίς	Piattaforma Continentale.	Rikahô.	Vastlandsplat.	Fastlands-fot.	Planalto Continental.	Planicie Continental.	Kustplatä.	Continental Shelf.
B. CONTINENTAL TALUS	Talud Continental.	—	Hai Pi.	Fastlands-Affald.	Talus Continental.	Kontinental-Abfall.	Continental Slope	Ἡπειρωτικὸν υφαλοπρηνεζ	Scarpa Continentale.	Rikuhôgai.	Vastlands glooing.	Fastlands-hall.	Talude Continental.	—	Kontinental sluttning.	Continental shoulder.
C. INSULAR SHELF	Planicie Insular.	Socalco.	Yen Tao Hai Ê.	Ö-Sokkel.	Socle.	Inselschelf.	Insular Shelf.	Ἠσιωτική υφαλοκρηπίς	Piattaforma Insulare.	Tôhô.	Insulair plat.	Ö-fot.	Planalto Insular.	Socle.	—	Insular Shelf.
D. INSULAR TALUS	Talud Insular.	—	Yen Tao Hai Pi.	Ö-Affald.	Talus Insulaire.	Inselabfall.	Insular Slope.	Ἠσιωτικὸν υφαλοπρηνεζ	Scarpa insulare.	Tôhôgai.	Insulaire glooing.	O-hallet.	Talude Insular.	—	—	Insular shoulder.
E. BANK	Banco.	Banco.	An.	Bank.	Banc.	Bank.	Bank.	Στηθός	Banco.	Tai.	Bank.	Bank.	Banco.	Banco.	Bank.	Bank.
2. DEPRESSIONS IN THE BOTTOM OF THE HIGH SEAS — DÉPRESSION DANS LE FOND DES HAUTES MERS.																
A. BASIN	Hoya ù Hoyo.	Bacia.	Hai Pên.	Bassin or Bekken.	Bassin.	Becken.	Basin.	Ἵφαλολεκανή	Bacino.	Kaibon.	Bekken.	Bassin, bekken.	Bacia.	Hoya.	Bassia.	Basin.
B. TROUGH.....	Hondonada.	Depressão.	Hai Yao.	Fordybning or Lavning.	Dépression.	Mulde.	Trough.	Ἵφαλοκυλὼν	Avvalamento.	Syúzyôkaibon.	Trog.	Innsökk.	Depressao.	Hondonada.	Djupränna.	Trough,
C. TRENCH.....	Foso.	Ravina.	Hai Hao.	Rende.	Fossé.	Graben.	Trench.	Ἵφαλοχαράδρα	Fossa.	Kaikô.	Slenk.	Renne.	Ravina.	Foso.	Djup.	Trench.
D. DEEP	Fosa.	Fossa.	Hai Yüang.	Dybeste Sted or Grube.	Fosse.	Tiefe.	Deep.	Ἵφαλοταφροζ ἡ Ἵφαλολακκός	Fondo abissale.	Kaien.	Diep.	Dyp.	Fossa.	Fosa.	Djup.	Deep.
E. SAC	Hoya.	Sacco Submarino.	—	Dyb.	—	Bucht.	—	Ἵφαλοκολλοζ	Sacca.	Teiwan.	Inbochting.	—	Saco	—	Säck.	Sac.
3. ELEVATIONS IN THE BOTTOM OF THE HIGH SEAS — ÉLÉVATIONS DANS LE FOND DES HAUTES MERS.																
A. RISE	Loma.	Soleira.	Hai Ti Ping P'o.	Banke or Hævning.	Seuil.	Schwelle.	Rise.	Ἵφαλοκρημνίον	Dorsale.	Kaibô.	Welving or Drempe	Hevning, terskel.	Soleira.	Loma.	Rygg.	Rise.
B. RIDGE	Espinazo,	Dorso.	Hai Ti Chai P'o.	Ryg.	Dorsale.	Rücken.	Ridge.	Ἵφαλοραχίς	Dosso.	Kairei.	Rug.	Rygg.	Dorso.	Espinazo.	Tröskel.	Ridge.
C. PLATEAU.....	Meseta.	Planalto.	Hai Ti Kao Yüan.	Plateau or Højde-drag.	Plateau.	Plateau.	Plateau.	Ἵφαλονησοζ (υφαλοροπεδιον)	Platea.	Kaidai.	Plateau.	Platä, flak.	Planalto.	Meseta.	Platä.	Plateau.
D. SUMMIT.....	Cûspide.	Alto-Fundo.	—	Højeste Punkt.	—	Höhe.	—	Κεφαλή (υφαλου)	Culmine.	Tyôten.	Plateau.	—	Cimo,	—	Höjd or Topp.	Summit or Culmination.
E. SUBMARINE PENINSULA	Cordon.	Cuneta or Cumiada Submarina.	—	Udlöber.	—	Vorsprung.	—	Ἵφαλοχερσοννησοζ	Cuneo.	Kaiter-Hantô,	—	—	Cordão.	—	Kil.	—
F. SUBMARINE ISTHMUS	—	—	—	Bro or Tærskel.	—	Schwelle or Rücken.	—	Ἵφαλισθμός	—	—	Drempe.	—	—	—	Sadel.	—
II. SECONDARY OR SECOND MAGNITUDE FORMS — FORMES SECONDAIRES OU DE SECONDE GRANDEUR.																
1. ELEVATIONS — ÉLÉVATIONS.																
A. CREST	Cresta.	Cristo.	Au Fêng.	Kam.	Crête.	Kamm.	Crest.	Σπαθὴ	Cresta.	Kaihô.	Kam.	Kam.	Crista.	Cresta.	Kam.	Crest.
B. SHOAL.....	Bajo.	Baixo.	Ch'ien T'an.	Grund or Flak.	Haut-fond.	Untiefe (Sandgrund).	Shoal.	Βραχέα	Secca.	Su.	Ondiepte.	Grunne.	Baixo.	Bajo.	Grund.	Shoal.
C. REEF (SUGG. ALSO SUNKEN REEF).....	⊙ Arrecife. Piedra.	Recife.	Chiao.	Rev.	Récif.	Riff.	Reef.	Χοιραδεζ (Σπηλαδεζ)	Scoglio e Scogliera.	Syô.	Rif.	Rev.	Recife.	Arrecife.	Klipprev.	Reef.
D. PINNACLE.....	Aguja.	Agulha.	Au Chiao.	Klippepids.	Aiguille.	Spitze.	Pinnacle.	Ἵφαλοβελοζ	Cupola e Guglia.	Sensyô.	Klip.	Bergspiss, undervannstinn.	Agulha.	Aguja.	—	Pinnacle.
E. SPUR	Cûna.	Esporão.	Ê Ling.	Udlöber.	Eperon.	Ausläufer.	Spur.	Ἵφαλεμβολον	Sprone.	Senkô.	Spoor.	Utlöper.	Esporão.	Cûna.	Rygg.	Spur.
2. DEPRESSIONS — DÉPRESSIONS.																
A. CALDRON	Caldera.	Caldeira.	Fu Hsing Ti.	Hul.	Gouffre.	Kessel.	Caldron.	Ἵφαλοκωνή (υφαλοπη)	Conca.	Kaihu.	Ketel.	Kjele.	Caldeira.	Caldera.	Kitteldjup.	Caldron.
B. FURROW	Caño.	Sulco.	Ê Ch'ü.	Fure.	Sillon.	Furche.	Furrow.	Ἵφαλοκλαξ	Soleo.	Kaikyo.	Voor.	Fure.	Sulco.	Caño.	Ränna.	Furrow.
C. VALLEY	Valle.	Valle.	Ê Ku.	Dyb.	Vallée.	Thal.	Valley.	Ἵφαλοκοιλιάζ	Valle sommersa.	Kaikoku.	Vallei.	Dal.	Valle.	Valle.	Dal.	Valley.
3. TIDAL ZONE — ZONE COTIÈRE QUI DÉCOUVRE A MARÉE BASSE.																
A. FORESHORE.....	Margen.	Faxa de praia.	Chau-Tai.	—	Estran.	Trockenfallend.	Foreshore.	Λιγιστοζ	Greto.	—	Droogvalling.	Törfall.	Zona Lavada.	Zona maritimo terrestre.	—	Foreshore.

Notes: ⊙ "Arrecife" is several rocks and "piedra" one rock.
 "Arrecife" se compose de plusieurs roches et "piedra" d'une seule roche.
 ⊠ British terminology differs from that of the Bureau in the word "slope" instead of "talus" and from the U. S. A. terminology in the word "slope" for "talus" or "shoulder."
 La terminologie britannique diffère de celle du Bureau; elle emploie le mot "slope" au lieu du mot "talus" et elle diffère de la terminologie américaine dans l'emploi du mot "slope" pour "talus" ou "shoulder."
 Chile does not give special terminology but uses the words "Saco del fondo" for 12E; "Alto-fondo" for 13D; "diqne de fonde" for 13F; "desplayar" for 113A.
 Le Chili ne donne pas de terminologie spéciale, mais il emploie les mots "Saco del fondo" pour 12E; "Alto-fondo" pour 13D; "diqne de fonde" pour 13F; "desplayar" pour 113A.
 Siam gives no terminology but uses the word "Chanfang" for "Foreshore."
 Le Siam ne donne pas de terminologie spéciale, mais il emploie le mot "Chanfang" pour "Estran."

The definition proposed by the Bureau, in its Circular-Letter, is :

"A fissure which penetrates into a continental or insular shelf in a direction more or less perpendicular to the coast line."

The Bureau considers that the words "in the form of a channel," used in the original definition, are explanatory, and might indicate a channel simply leading into danger.

THE ITALIAN COMMISSION proposes the definition :

"An elongated cavity of small size."

The Bureau sees no reason to change its definition.

C. VALLEY.

(Vallée)

The original definition proposed was :

"Submarine undulation which, without any possible doubt, is a prolongation across the continental shelf of the land valleys."

Definition proposed by the International Hydrographic Bureau, in its Circular-Letter is :

"A prolongation of a land valley into or across the continental or insular shelf."

THE ITALIAN COMMISSION proposes the definition :

"The submarine prolongation of a terrestrial valley."

The Bureau sees no reason to change its definition.

3. Tidal Zone.

A. FORESHORE.

In its Circular-Letter N^o 40-H of 1926, the Bureau requested the States Members to inform it of the word used by them to indicate the "Foreshore," or "that part of the sea shore which lies between high and low water mark at ordinary tide," or "the dry-at-low-water area." The replies of the various countries are given in the tabulation. It will be noted that the tabulation contains the designation for the forms of submarine relief from high water mark down to the greatest depth of the ocean.

