THE NAMING OF NARES AND PUERTO RICO DEEPS

On 26th March 1875, H.M.S. *Challenger*, Captain Sir George S. NARES, while cruising between St. Thomas, Virgin Islands and the Bermudas, found a maximum depth of 3,875 fathoms = 7,087 metres situated in Lat. 19°42' N., Long. 65°07' W.

The *Physical Chart of the world showing the track and soundings of H.M.S. Challenger* 1873-76 which accompanies the report of this celebrated expedition, drawn up by Sir John MURRAY in 1885, places this sounding in a vast enclosed area including depths of from 3000 to 4000 fathoms and extending north from the Caribbean Islands to approximately lat. 29° N; this area corresponds to the deepest zone of the Western part of the North Atlantic Ocean. On this chart no special designation is given to this deep ocean area.

In 1888, Sir John MURRAY published in *The Scottish Geographical Journal* an article entitled: *On the Height of the Land and the Depth of the Ocean*, to which a bathymetric world-map, printed in colours and dated 1887, was annexed; in this study the author gives as the maximum depth of the North Atlantic Ocean, a sounding of 4561 fathoms = 8,341 metres, taken on 27th January 1883 by the U. S. Coast and Geodetic Survey vessel *Blake* (Lieut.-Commander Charles D. SIGSBEE) situated in Lat. 19°39.2' N., Long. 66°26.1' W. This sounding is about 75 miles west of the maximum depth obtained eight years previously by the *Challenger*. Sir John MURRAY's coloured map places the *Blake* sounding and that of the *Challenger* within the same 3,000 fathoms depth contour line surrounding the above-mentioned area of maximum depth.

In 1893, the Nautische Abteilung der Marineleitung, Berlin, published its *Weltkarte zur Uebersicht der Meerestiefen*, etc., and in 1899, Dr. Alexander SUPAN published in Part VIII of Petermanns Mitteilungen. his *Tiefenkarte des Weltmeeres*.

On these two German bathymetric charts the depth contour lines are in metres, and on them the area of maximum depth greater than 6000 metres is divided into two parts.

Dr. SUPAN states that he had wished to give purely geographical denominations to the different forms of submarine relief and, on his chart, the northern part of the area in which we are interested is included under the general legend: *Nord-amerikanisches Becken*, while the south part of the area, that which contains the two maximum North Atlantic soundings just mentioned, bears the name of: *Portorico-Graben*. (1)

On 18th January 1902, the U. S. brig *Dolphin* (Commander Albert GLEAVES) while sounding in these waters obtained the sounding which to-day is still considered to be the maximum depth of the Deep, namely, 4662 fathoms = 8525 metres, situated in Lat. 19°35.0' N., Long. 67°43.3' W.

The First Edition of the General Bathymetric Chart of the Oceans, published in 1904 by Prince Albert of Monaco, shows the three special soundings of 7,086, 8,341 and 8,526 metres, all included under the designation of "*Ravin de Puerto Rico*" and separated from the other deep area of the "*Bassin de l'Amérique du Nord*" (North American Basin) by soundings of 5,120 and 5,139 metres.

In his book: "The Depths of the Ocean" published in 1912, Sir John MURRAY inserted a bathymetric chart of the oceans showing the greatest Deeps. In addition, a

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(1) *Sir John Murray's bathymetric chart and Dr. Supan's Tiefenkarte had been presented to the 7th International Geographic Conference held at Berlin in* 1899. *The Conference nominated a Committee of oceanographers, one of whom was the Prince of Monaco, for the purpose of arranging for the construction of a general chart of submarine relief, to decide as to the use of the terminology employed to designate the various forms of ocean bottom, and also, as to the choice of names for their indication.*

This Committee, presided by H. S. H. the Prince of Monaco, met at Wiesbaden on 15th and 16th April 1903, *and then adopted a proposal submitted by Professor Thoulet concerning the synonymy of terms employed to designate the various forms of ocean bottom in the principal languages, with the proviso that entire liberty should be allowed to inventors in the choice of the name, whether that of a man, of a ship, geographical, or any other, to be given to any special configuration of submarine soil, the right of each inventor to remain intact on condition that he be in reality the first discoverer.* (*See:* Bulletin du Musée Océanographique de Monaco, *N°* 21, *25th December*, 1904).

special sheet contains details of the North Atlantic taken from the most recent sources up to the year 1911. In this chart, Sir John MURRAY gives to the ocean Deeps the names of the persons or ships which had discovered them. The three above-mentioned soundings are shown on this chart within a vast enclosed area corresponding to the 3000 fathom depth contour line covering more than half of the *"North American Basin"*; it bears the name of: *Nares Deep* from the name of the commander of H.M.S. *Challenger*. The *"Ravin de Puerto Rico"* the name of which does not appear on Sir John MURRAY'S chart, is thus included in: *Nares Deep*. The following is the description of *Nares Deep* given in his book by Sir John MURRAY:

> *"Nares Deep* is the largest deep lying wholly in the Atlantic Ocean, and at the same time the deepest. Its outline is most irregular, extending from Lat. 18° N. to 34° N., and in the neighbourhood of the West Indies the floor of the Deep sinks to depths exceeding 4000 fathoms over a limited area, the maximum depth being 4662 fathoms, recorded by the U.S.S. *Dolphin* in 1902. This deep is estimated to cover an area of 697,000 square miles."

Thus the *"Ravin de Puerto Rico"* would be the deepest part of *Nares Deep*.

The bathymetric chart published in 1912 by Dr. Max GROLL of the Institut für Meereskunde, University of Berlin, accompanying his book: *Tiefenkarten der Ozeane*, is constructed in metric depths. On it, therefore, depths greater then 6000 metres are separated into two distinct zones.

The Second Edition of the General Bathymetric Chart of the Oceans, published in 1912 by the Prince of Monaco, so as to conform with the suggestions of Sir John MURRAY'S bathymetric chart published in 1911 re-established the name of *Nares Deep* for the zone of depths exceeding 6000 metres the centre of which lies approximately in Lat. 25° N., Long. 60° W. Thus delimited, *Nares Deep* is separated from the *"Fossé de Puerto Rico"* by a depth of 2,926 metres which, besides, is shown on Groll's chart, but which is an erroneous figure originating in a non-conversion from fathoms to metres and which is in reality a sounding of 5,960 metres.

The bathymetric chart of the Atlantic Ocean which accompanies Dr. SCHOTT'S publication: "Geographie des Atlantischen Ozeans", Hamburg, 1925, divides into two parts the depths of this area greater than 6000 metres.

The bathymetric chart of the Atlantic Ocean issued in 1934 by the Institut für Meereskunde of Berlin along with the Report of the German *Meteor* Expedition, 1925-27, separates these same depths *into four zones*, namely by a Ridge to which Drs. Theodor STOCKS and Georg WÜST in their booklet: *Tiefenverhältnisse des offenen Atlantischen Ozeans*, give the name of *Porto Rico Schwelle*.

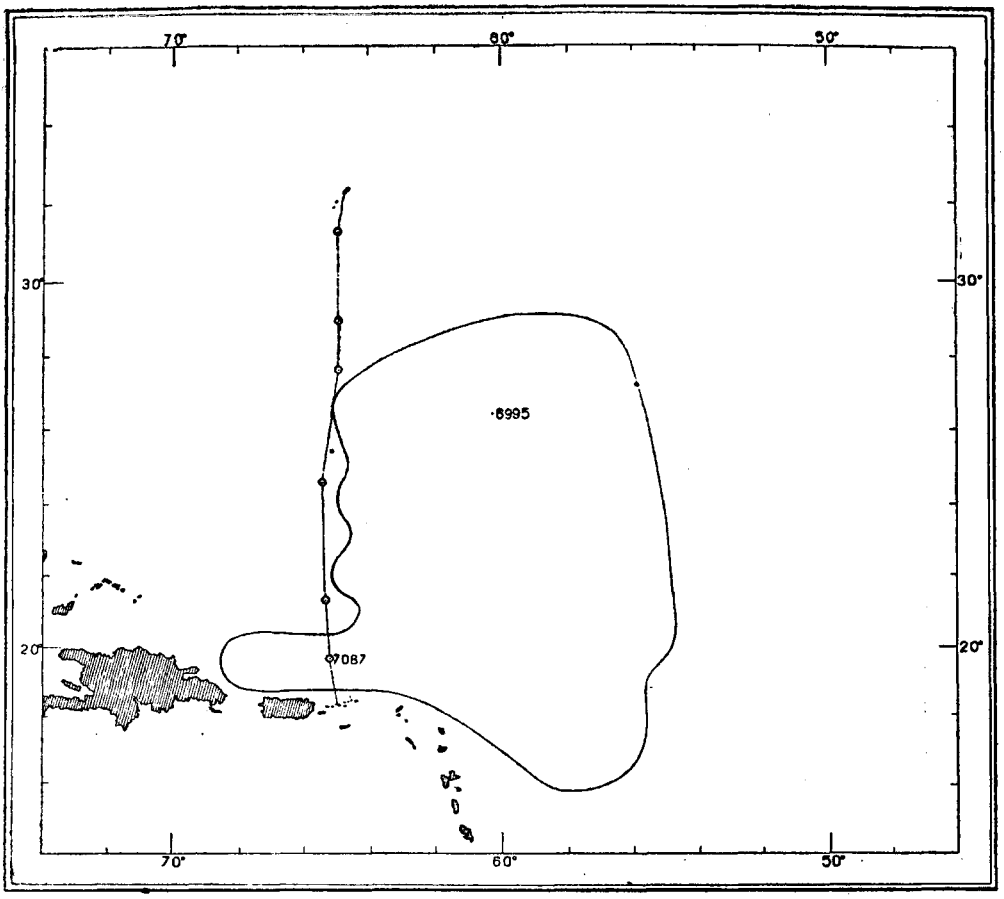
In May 1934, the U.S.A. Hydrographic Office published on the back of its Pilot Chart for Central American Waters a bathymetric chart of the Caribbean Sea. This chart shows the *"Fosse de Puerto Rico"* under the legend: *"Puerto Rico or Nares Deep"* delimited by the 3,500 fathom line.

Lastly, on the Third Edition of the General Bathymetric Chart of the Oceans published in April 1935 by the International Hydrographic Bureau, the area in which we are interested is shown *in three zones* of depths greater than 6000 m. The name of *Nares Deep* has been retained for the northern zone, the name of *Puerto Rico Deep* being reserved for the southern part.

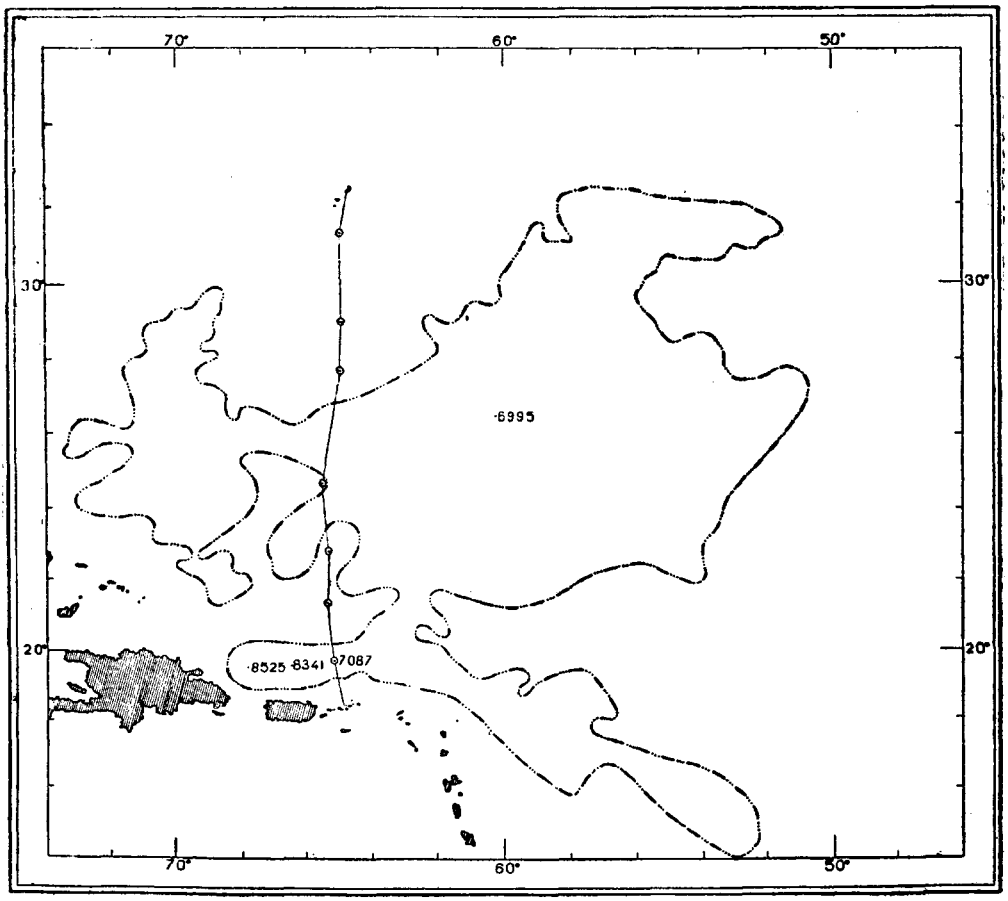
On this chart a decrease of the area of depths greater than 6000 metres may be noted; the cause of this decrease is the growing intervention of soundings less than 6000 metres which result from a constantly widening knowledge of these waters. We have in consequence an appreciable deformation in the outline of Deeps which had originally been shown as rather vast.

If an endeavour were made to trace on the chart the 5,486 metre = 3000 fathom contour line, it would be seen that it is, notwithstanding, possible to reunite all the depths in this area greater than 3000 fathoms, including the *Puerto Rico Deep*, in a single enclosed area.

It will be noted in conclusion that the maximum sounding coming within *Nares Deep* as it appears on the Third Edition of the General Bathymetric Chart of the Oceans is a sounding of 6,995 metres = 3,825 fathoms, lying in Lat. 26°32' N., Long. 60°06' W., and that this sounding seems, in reality, to have been obtained in 1852 by the U.S. Brig *Dolphin*, Commander S.P. LEE.



A.



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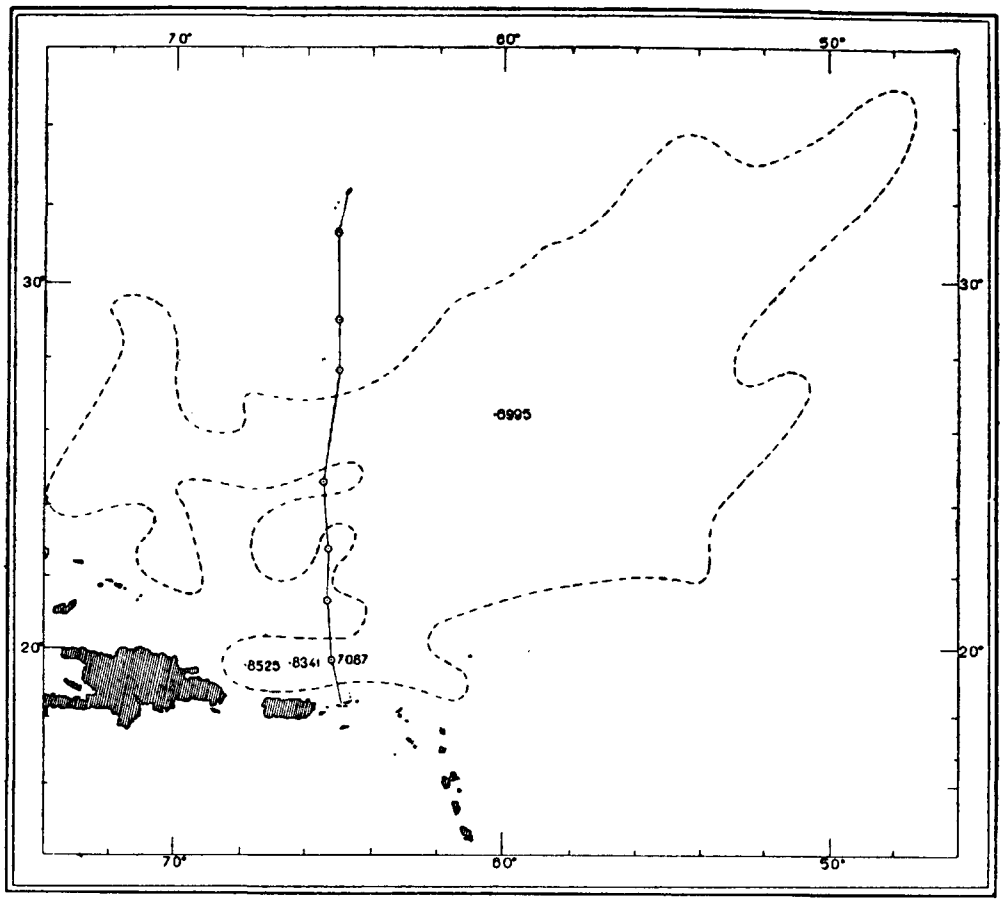
70°
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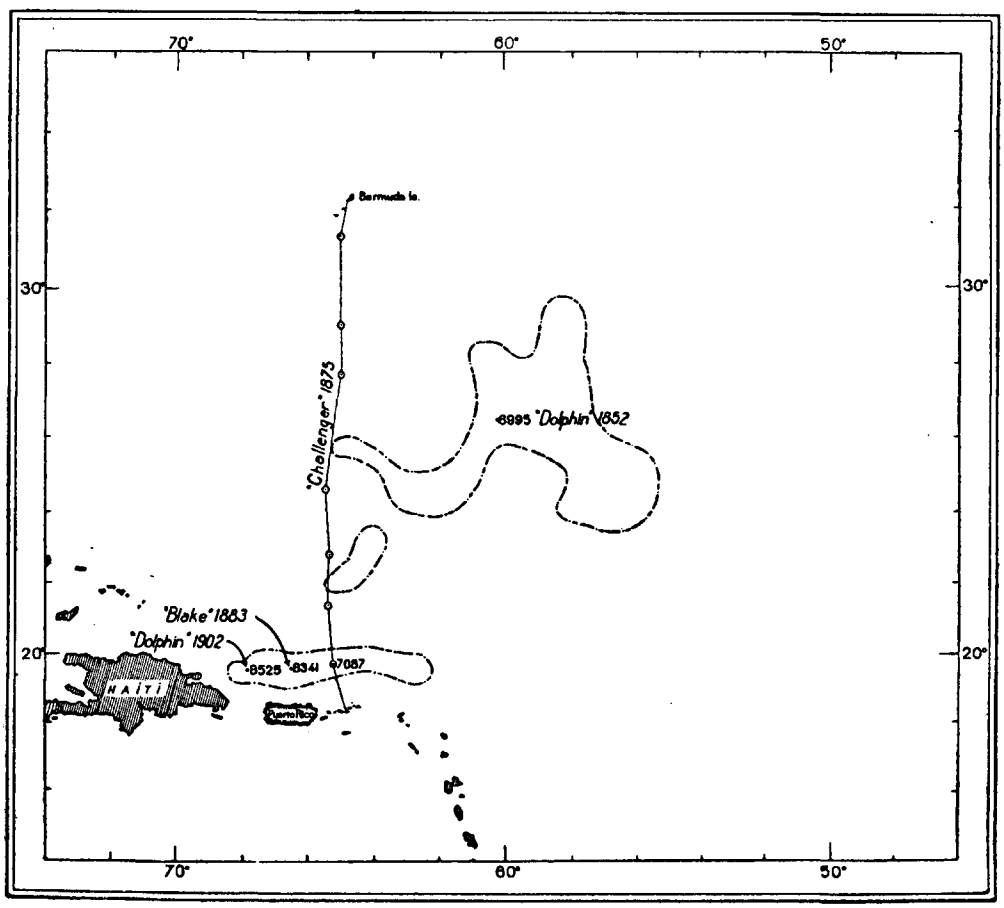
70°
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Bermuda Is.
"Challenger" 1875
8995 "Dolphin" 1852
"Blake" 1883
"Dolphin" 1902
8525
8341
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HAITI

D.

The principal sources of the other soundings greater than 6000 metres lying within the Deep are: 1895, H.M.S. *Rambler* (Commander G.E. RICHARDS); 1988, H.M.S. *Rambler* (Commander H. E. PUREY-CUST); 1903, H.M.S. *Goldfinch* (Commander F. C. LEARMONTH).

In order to illustrate the preceding and to show the very varied interpretations obtained of the outline which an ocean deep may take depending upon the choice of the depth contour selected and whether in fathoms or metres; the accompanying sketch has been compiled to show:

A. The 3000 fathom outline of this Deep taken from the chart of the *Challenger* 1885 Expedition.

B. The outline of *Nares Deep* by Sir John MURRAY in 1912.

C. The outline which this Deep would have to-day limited to 3000 fathom depths.

D. The outline at present given to it in the last edition (1935) of the General Bathymetric Chart of the Oceans, the Deep here being limited to 6000 metre depths.

Bearing the preceding in mind, it may be seen from the sketch that Sir John MURRAY, in choosing the 3,000 fathom depth-line for the delimitation of the Deep, thus brought the Puerto Rico Trench within the same contour as the *Nares Deep*. On the other hand, the 1935 New Edition of the General Bathymetric Chart of the Oceans, by the choice of the 6,000 metre contour line, cuts the Deep into three different parts, the name of *Nares Deep* having been allotted to the northern, i. e. to the largest part.

Attention is however directed to the fact that the track of the *Challenger* from St. Thomas to the Bermudas actually passes altogether outside and to the West of the northern part of the 6000 metre depth area.

H. B.