GRAVITY MEASURING CRUISE OF THE U. S. SUBMARINE "BARRACUDA". SOUNDING DATA

(Lecture delivered by Captain L.R. LEAHY, Hydrographer of the Navy, U.S.A., before the Fourth International Hydrographic Conference, Monaco, 20th April, 1937).

The following are a few notes on the Gravity Measuring Expedition carried out by the Submarine *Barracuda* during the months of December 1936 and January 1937.

The cruise of the *Barracuda* is the third expedition of its type undertaken by the U.S. Navy in the Caribbean area. The S-21 in 1928 took observations from Puerto Rico to the Gulf of Mexico, and in 1932 the S-48 surveyed the region surrounding Cuba, including the Bartlett Trough and Bahama Islands. The *Barracuda* this year completed a detailed investigation on a line from Coco Solo, Panama, to Trinidad and thence through the Lesser Antilles area at the eastern end of the Caribbean from Trinidad to St Thomas and out into the Atlantic Ocean.

The pendulum developed by the distinguished Dutch scientist F. A. VENING MEINESZ was used together with an electric timing device specially developed by the BELL Laboratories of New York for this expedition. This device made it possible to record the swing of the pendulum within 1/3000 of a second and it is believed will add greatly to the accuracy of the Meinesz pendulum in the determination of gravity at sea.

The calculations for the gravity determinations of the present cruise are not yet completed; therefore, no report on them can be made at this time. 51 stations were occupied.

The cruise began at Coco Solo, Panama, on November 30th 1936, and proceeded to Port of Spain, Trinidad. Two north-south traverses in mid-Caribbean were made during this leg. From Trinidad northward, six radial traverses across the Lesser Antilles were made each extending about 200 miles either side of the arc. Over 4000 supersonic soundings were obtained. The main features found as a result of these sounding observations are as follows :

1. — The *Brownson Trough* was found to curve southeastward following the island arc. A depth of 4300 fathoms was recorded north of the Anegada Passage. Southeastward the Trough shallows and ends rather abruptly at Lat. 15° 30', Long. 59° against a steep scarp 1000 fathoms high, evidently a fault plane. A narrow branch of the main trough lies closer to the islands (" Antigua Trough "). A ridge extending northward from Barbados separates the main trough from this " Antigua Trough ".

2. — The *Aves Ridge,* on which Aves Rock is the only projecting point, was found to extend for practically the whole width of the Caribbean paralleling the Lesser Antilles Arc, but located some 130 miles to the west of it. A number of shallow areas of less than 500 fathoms depth are found on it. The ridge has a rounded character and is surmounted on its west side by a row of sharp peaks probably volcanoes, of which Aves Rock is one.

3. — Within the Caribbean a number of flat bottomed basins were found. In fact, the whole sea appears to be a series of these basins separated by comparatively rugged ridges. The " Grenada Trough " has a very level bottom at a depth of a little more than 1600 fathoms. The Tanner Deep or Basin has a fairly flat bottom at 2600 to 2800 fathoms. It is suggested that the flat bottom of these basins is the result of sedimentary filling, possibly during a stage when relative sea level was considerably lower and each basin formed an isolated lake or sea .

4. — Two ridges extending eastward into Anegada Passage were noted. The northernmost of these, which trends a little south of east from Sombrero Island, comes within 25 fathoms of the surface in the middle of Anegada Passage.