

# DUTCH PENDULUM OBSERVATIONS IN THE ATLANTIC, THE PACIFIC AND THE INDIAN OCEANS \*

(From "Nature" — London — December 25, 1926 and December 17, 1927).

The Dutch submarine "XIII", 800 tons, left Holland via the Panama Canal bound for Surabaya, and performed the voyage of 20,600 miles in 200 days, 112 of which were sailing days.

During the voyage, 113 measurements of gravity were made by Dr VENING MEINESZ with free hanging apparatus; 15 observations were made at harbours of call. Later 26 measurements were made in four profiles perpendicular to the Java Deep.

A list of the provisional results of Dr MEINESZ' observations in the Atlantic and Pacific is published in the Proceedings of the Amsterdam Academy of Sciences.

The conclusions are principally the following:

1. In the Atlantic and Pacific there are excesses of gravity extending over large areas. As has been explained by Dr W. BOWIE and C. H. SWICK, both of the U. S. Coast and Geodetic Survey, these may be caused partially by a depression of the geoid with regard to the spheroid. The final computations will show in how far this circumstance may account for the excesses.

2. It is unlikely that the longitude terms introduced by HELMERT and by HEISKANEN in the formulae will agree with the values of gravity obtained in the oceans.

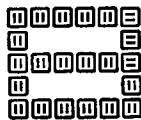
3. In the Pacific there exists a remarkable parallelism between the variations of the anomalies and of the sea-depths.

4. The observations made above the four deeps all show a remarkable defect of gravity in the middle of the deep. The excesses on the borders do not make the impression that they may be ascribed to an excess of mass below the deeps, required for isostatic compensation, but give rise to the supposition of tangential pressure in the earth's crust.

5. The observations at the foot of the continental slopes give greater values of the gravity than should be the case according to the current theory.

6. The results obtained in the Banda Sea, especially near the double range of islands, show a large excess at the inside, that gradually changes into a very noticeable defect at the outside, where the tangential pressures which are probable in this part of the archipelago should make an excess probable. The great anomalies are in accordance with the general view that in this part of the world the earth-crust was recently, or is still at present, weak.

7. In general, the results obtained at sea give the impression of greater regularity than those obtained on land. This agrees with what was expected. The outer layer of water immediately below the observer is homogeneous and the disturbing masses in the solid crust are farther away. Moreover, the deformation caused by erosion is absent.



\* Detailed information is given in the *Geographical Journal*, February 1928, p. 144.