wrote: "The war had brought on rapidly rising prices peculiarly hard to bear by the older people. It had dissipated to the four winds domestic servants of any kind. . . . Delicate and sensitive, Heaviside suffered, at first inconvenience, later real want. . . . He lived on alone. He saw reared on his work and genius an industrial and economic edifice of enormous proportions, and he had no share in the rewards and little in the fame. . . ."

When he was seventy-one, the Institution of Electrical Engineers held its jubilee. On the proposal of Sir Oliver Lodge, a special message was sent to Heaviside, and a little later he received the first Faraday Medal founded to mark the occasion of the jubilee of the Institution; this was personally conveyed to Heaviside by the president, the late Mr. J. S. Highfield.

SUBMARINE GRAVITY SURVEY

A BRITISH EXPEDITION IN THE EASTERN MEDITERRANEAN

THE figure of the earth is so nearly an ellipsoid of revolution that people are apt to think that the distance between two places can be calculated exactly, once their latitudes and longitudes are known. This is not so. The actual shape of the mean sea-level surface depends on the distribution of matter within the earth and is appreciably distorted in the vicinity of large masses. A good example is found on Cyprus. It is known from triangulation that Limmasol and Kalokhorio, which lie on the northern and southern shores of the island, are 57 km. apart. Yet the distance between them, as calculated from astronomical observations, is 1.8 km. greater, a difference of approximately 3 per cent. This discrepancy at once suggests that there is an abnormal concentration of high-density material between them. A gravity survey has confirmed this, for large positive anomalies are found almost everywhere on the island. At Agros, which is approximately half-way between Limasol and Kalokhorio, the free air anomaly is + 282 milligals, and after allowing for the attraction of topography, the Bouguer anomaly is found to be + 174 milligals. It is estimated, however, that even these large positive anomalies would only account for about half the observed difference in the deflexions of the vertical: presumably the rest is due to mass deficiencies below the sea farther to the north or south.

The example just given is abnormal, but it is a striking reminder that the fundamental problem of geodesy, the determination of the shape of the earth, is still far from solved. It has been shown by Stokes that the shape of the geoid can be calculated if gravity is known all over the earth. Unfortunately, this method can only be applied very approximately at present, owing to scarcity of data, especially over the oceans. At sea, except in shallow water, the only practical method of measuring gravity with sufficient accuracy is to make observations in a submerged submarine. Such experiments demand close collaboration between naval and scientific personnel. In Great Britain, the Defence Services Research Facilities Committee of the Royal Society provides the necessary liaison. Since the War, two expeditions have been made in the vicinity of the British Isles.

The results of the first, made in 1946, have recently been published, and technical details of the second are also available. A third expedition is now planned in the Eastern Mediterranean and is due to sail from Malta in the middle of May. The necessary funds are being provided by a special grant from the Royal Society, and the Royal Navy is giving wholehearted co-operation. The technical arrangements have been made by the Department of Geodesy and Geophysics in the University of Cambridge, with the generous assistance of the Danish Geodetic Institutes.

The Western Mediterranean has already been studied by the French and Italians, and so, when the British results are known, a fairly complete general picture of the gravitational field of the whole Mediterranean Basin will be available. Quite apart from the geodetic importance of these observations, it should be possible to draw some most interesting geological conclusions. The Mediterranean is generally supposed to be that portion of the Tethys Sea remaining after the great earth movements, which formed the Alps and other folded mountains in southern Europe and Asia Minor, had subsided. But even now the crust of the earth is not quiescent, for volcanic eruptions and earthquakes are still experienced. A study of the gravitational field may well throw light on the cause of these phenomena. Particular points will also be examined. Comparative surveys around Pantelleria and Malta may show whether or not the latter is of volcanic origin. The structural relationship between the islands of Crete and Cyprus and the Taurus Mountains on the Turkish mainland should be plainly revealed if the large anomalies mentioned earlier are found to extend out to sea. Measurements over the Nile Delta and among the Dodecanese Islands will show how nearly these regions are in isostatic equilibrium. In addition, it is hoped to connect up the results of earlier surveys by making special observations, both at sea and in harbours, and to carry out an extensive programme of echo sounding.

The survey itself will last about twelve weeks, during which about a hundred and twenty gravity determinations will be made; but it will be several months before all the records are finally measured and the results known. More accurate estimates of relative deflexions of the vertical can then be made and tentative geological conclusions drawn. These may require revision as further data become available; but the actual gravity measurements and soundings will be of permanent value. Geophysical methods are rapidly becoming of great assistance to geologists, and in areas such as the Eastern Mediterranean, where sediments obscure the underlying rocks, they may well prove of major importance. The results of the proposed British submarine gravity survey will therefore be awaited with great interest.

B. C. BROWNE

OBITUARIES

Prof. J. A. Crowther

By the death, on March 25, of James Arnold Crowther, we have lost another of the remaining living links with the Cavendish Laboratory of J. J. Thomson's time. It was in those days—which now seem both so recent and so distant—that Crowther, after a brilliant undergraduate career (1903–6) at Cambridge, made his first indelible mark on physics history with his important investigations into the