time for there are extensive areas in both Canada and the United States where isostatic gravity anomalies of 20 milligals or even more prevail, representing unbalanced loads of rock of 500 feet or more in thickness.

At a considerable number of pendulum stations in the glaciated regions of the Canadian Shield the isostatic anomalies are negative, suggesting, possibly, that the crust of the earth depressed by the ice may not have regained its pre-glacial elevation.

Investigations of Geophysical Methods of Prospecting.—An exceedingly sensitive gravity apparatus is the Eötvös torsion balance. This instrument, unlike the pendulum or the gravimeter, does not measure, directly, either gravity or gravity differences. It does measure the rate of change of gravity or gradient of gravity in the level or horizontal surface and also the differential curvature of the level surface with extraordinary accuracy. Differences of gravity may be obtained by setting up at two or more points. Gravity gradients can be measured to an accuracy of one Eötvös unit corresponding to a rate of change of gravity which, over a distance of one mile, would represent a variation of gravity of one-sixth of a milligal. The instrument has been displaced but not entirely supplanted, by the gravimeter.

For several years the Observatory carried on investigations and tests in collaboration with the Geological Survey of Canada and other institutions, with torsion balances and magnetometers over certain geological structures and ore deposits with quite favourable results in several cases. Reports on the work appear in publications of the Dominion Observatory and elsewhere.

Investigations with Gravimeters.—With the development of the modern gravimeter and particularly with the development of these instruments in the United States during the latest decade, extraordinary progress has been made in the investigation of the earth's crust by the gravity method. Many thousand determinations have been made in the United States and Canada in the search for oil and other minerals. Gravimeters are in principle exceedingly delicate weighing machines capable of measuring gravity differences to one-hundredth of a milligal which is one one-hundred millionth part of gravity, although the instrument, like the invariable pendulum, does not really measure gravity itself. Up to 100 determinations can be made in a restricted area with the gravimeter in a day. Deposits or formations of light or heavy rock can, therefore, be rapidly outlined with them.

In the summer of 1944, the Humble Oil and Refining Company of Houston, Texas, through the courtesy of the American Geophysical Union, placed a gravimeter at the disposal of the Dominion Observatory. In collaboration with the Geological Survey of Canada and the Department of Lands and Mines of the Province of New Brunswick during that season several hundred observations were made with this gravimeter in Eastern Canada and particularly over the carboniferous basin of central New Brunswick where indication of the location of buried pre-carboniferous ridges was sought. Evidence of these ridges was discovered at several places. Further observations, in 1945, by the Dominion Observatory, brought the number of observations with the instrument up to over 1,000 and showed that granite batholiths in the Maritimes are definitely associated with negative anomalies and that the Caledonia Mountain region of New Brunswick and the Cobequid Mountains of Nova Scotia, in which igneous rocks and altered sediments of Precambrian and Palæozoic age are prevalent, are both areas of positive gravity anomaly.