variations in density at any given depth in the real earth must then be removed by taking out or rejecting enough material in each part to make the density conform accurately to the mean density in the real earth at that point. In this ideal earth the density will increase with increase of depth in the same manner as it does upon an average in the real earth, but in the ideal earth all masses lying at the same depth will have the same density, whereas in the real earth such masses have densities which are known to differ slightly from one another.

Using Helmert's formula $\gamma_o = 978{\cdot}030\ (1 + 0{\cdot}005302 \sin^2 \varphi - 0{\cdot}000007 \sin^2 2\varphi)$, where γ_o = required gravity at a station on the ideal earth above described in the latitude φ. On such an ideal earth the value of gravity at the surface would be a function of the latitude only. The numerical value of γ_o is both the acceleration in centimetres per second per second, and the attraction in dynes on a unit mass (1 gram) at the station expressed in the centimetre-gram-second system.

The formula is thus fixed by theory. The three constants 978·030, 0·005302 and 0·000007 were derived from a great number of observations scattered over the surface of the earth. New and better values of these constants will no doubt be obtained from more observations. Up to the present time there have only been the few observations for gravity already referred to taken in Canada, and so the observed value of gravity at many stations scattered over the northern half of this continent should give information that will be of great value in determining the correct equation for gravity.

In computing the intensity of gravity in the United States, Helmert's formula was used; and from the observations there a small correction to the constant 978·030 was made. It became 978·038.

CORRECTIONS FOR ELEVATION, TOPOGRAPHY, AND ISOSTATIC COMPENSATION.

Elevation.—The correction for elevation was computed by the formula $-0{\cdot}0003086\,H$, in which H is the elevation of the station above sea-level in metres. This correction of the attraction upon a unit mass (1 gram)