

(20.) The causes of uncertainty which tell with such very appreciable effect on the local determination of the force of gravity by the pendulum, have little or no influence on the local curvature of the surface of equilibrium, and absolutely none on the measures of large arcs of the meridian. Suppose, for example, a sea of four miles in depth, and of great extent, to cover one part of the earth's surface. Its surface water will gravitate less by one 1800th part of its proper weight, owing to the deficiency of attracting matter below it; and, the diminution of gravity growing less and less in descending (being proportional to the height of a particle above the bottom), the whole weight of the column of water vertically above a given spot will be diminished by one 3600th part, so that to maintain the equilibrium, one 3600th part of four miles, or one 900th of a mile, *i.e.*, about six feet of additional water, must be heaped on: a mere infinitesimal of the radius of curvature of its surface, which is that of the earth itself.

(21.) Let us now see how far the French metre, as it stands, fulfils the requirements of scientific and ideal perfection. It professes to be the 10,000,000th part of the quadrant of the meridian passing through France from Dunkirk to Formentera, and is therefore, scientifically speaking, a local and national, and not a universal measure. The earth's equator is not a perfect circle, but slightly elliptic; and the meridians of places differing in longitude are therefore not all of the same length. The difference, however, is so trifling (the ellipticity of its equator being not more than a thirtieth part of that