

diminish it in a corresponding measure elsewhere. The return of the ice into the state of water would produce an opposite effect. The attractive influence of the ice-sheets of the Glacial Period upon the sea-level over the northern hemisphere has been discussed by various mathematicians, especially by Croll, Pratt, Heath, and Lord Kelvin. Considerable differences appear in their results, according to the conditions which they postulate, but they agree that a decided elevation of the sea-level must be attributed to the accumulation of thick masses of snow and ice. The rise of the sea-level along the border of an ice-cap of 38° angular radius and 10,000 feet thick in the centre is estimated at from 139 to 573 feet.¹⁹⁷ (4) A still further conceivable source of geographical disturbance is to be found in the fact that, as a consequence of the diminution of centrifugal force owing to the retardation of the earth's rotation caused by the tidal wave, the sea-level must have a tendency to subside at the equator and rise at the poles.¹⁹⁸ A larger amount of land, however, need not ultimately be laid bare at the equator, for the change of level resulting from this cause would be so slow that, as Dr. Croll has pointed out,

¹⁹⁷ See Croll, "Climate and Time," chaps. xxiii., xxiv. *Geol. Mag.*, 1874. Pratt, "Figure of the Earth," *D. D. Heath, Phil. Mag.* xxxi. (1866), pp. 201, 323, xxxii. (1866), p. 34. Thomson (Lord Kelvin), *op. cit.* xxxi. p. 305. A. Penck, *Jahrb. Geograph. Gesel. Munich*, vii. De Lapparent, *Bull. Soc. Geol. France*, xiv. 1886, p. 368, *Revue Generale des Sciences*, May, 1890. R. S. Woodward, *Bull. U. S. Geol. Survey*, No. 48. Von Drygalski, "Bewegungen der Kontinente zur Eiszeit," Berlin, 1889. Prof. Suess believes that the limits of the dry land depend upon certain large indeterminate oscillations of the static figure of the oceanic envelope; that not only are "raised beaches" to be thus explained, but that there are absolutely no vertical movements of the crust save such as may form part of the plication arising from secular contraction; and that the doctrine of secular fluctuations in the level of the continents is merely a remnant of the old "Erhebungstheorie," destined to speedy extinction. "Anf- litz der Erde," Leipzig, 1883. Pfaff defends the general opinion against these views in *Zeitsch. Deutsch. Geol. Ges.* 1884.

¹⁹⁸ Croll, *Phil. Mag.* 1868, p. 382. Thomson, *Trans. Geol. Soc. Glasgow*, iii. p. 223.