great difficulty in arranging an index which will measure with accuracy the extremely small space into which even a long column of air is compressed when the pressure becomes very great. It can scarcely be made available beyond 1,000 fathoms (200 atmospheres).

We have in Sir John Herschel's 'Physical Geography,'[1] and in Dr. Wallich's 'Atlantic Sea-bed,'[2] where it is given in the fullest detail, the doctrine of the distribution of deep-sea temperature as it seems to have been almost universally adopted up till the time of the cruise of the 'Lightning.' It was generally understood that while the surface temperature, which depended upon direct solar radiation, the direction of currents, the temperature of winds, and other temporary causes, might vary to any amount; at a certain depth the temperature was permanent at 4° C., the temperature of the greatest density of fresh water. It is singular that this belief should have met with so general acceptance, for so early as the year 1833 M. Depretz[3] determined that the temperature of the maximum density of sea-water, which contracts steadily till just above its freezing-point, is −3°·67 C.; and even before that time observations of sea-temperatures at great depths, which were certainly trustworthy within a few degrees, had indicated several degrees below the freezing-point of fresh water.

The question of the distribution of heat in the sea,

[1] Physical Geography; from the "Encyclopædia Britannica." By Sir John F. W. Herschel, Bart. K.H. &c. &c., p. 45. Edinburgh, 1861.

[2] Atlantic Sea-bed, p. 98.

[3] Recherches sur le Maximum de Densité des Dissolutions aqueuses. (Annales de Chimie, tome lxx. 1833, p. 54.)