to arithmetical relations, it will follow, as I have already observed,* that a stratum of granite would be in a state of fusion at a depth of nearly twenty-one geographical miles, or between four and five times the elevation of the highest summit of the Himalaya.

We must distinguish in our globe three different modes for the transmission of heat. The first is periodic, and affects the temperature of the terrestrial strata according as the heat penetrates from above downward or from below upward, being influenced by the different positions of the Sun and the seasons of the year. The second is likewise an effect of the Sun, although extremely slow: a portion of the heat that has penetrated into the equatorial regions moves in the interior of the globe toward the poles, where it escapes into the atmosphere and the remoter regions of space. The third mode of transmission is the slowest of all, and is derived from the secular cooling of the globe, and from the small portion of the primitive heat which is still being disengaged from the surface.

* See the Introduction. This increase of temperature has been found in the Puits de Grenelle, at Paris, at 58·3 feet; in the boring at the new salt-works at Minden, almost 53·6; at Pregny, near Geneva, according to Auguste de la Rive and Marcet, notwithstanding that the mouth of the boring is 1609 feet above the level of the sea, it is also 53·6 feet. This coincidence between the results of a method first proposed by Arago in the year 1821 (*Annuaire du Bureau des Longitudes*, 1835, p. 234), for three different mines, of the absolute depths of 1794, 2231, and 725 feet respectively, is remarkable. The two points on the Earth, lying at a small vertical distance from each other, whose annual mean temperatures are most accurately known, are probably at the spot on which the Paris Observatory stands, and the Caves de l'Observatoire beneath it: the mean temperature of the former is 51°·5, and of the latter 53°·3, the difference being 1°·8 for 92 feet, or 1° for 51·77 feet. (Poisson, *Théorie Math. de la Chaleur*, p. 415 and 462.) In the course of the last seventeen years, from causes not yet perfectly understood, but probably not connected with the actual temperature of the caves, the thermometer standing there has risen very nearly 0°·4. Although in Artesian wells there are sometimes slight errors from the lateral permeation of water, these errors are less injurious to the accuracy of conclusions than those resulting from currents of cold air, which are almost always present in mines. The general result of Reich's great work on the temperature of the mines in the Saxony mining districts gives a somewhat slower increase of the terrestrial heat, or 1° to 76·3 feet. (Reich, *Beob. über die Temperatur des Gesteins in verschieden en Tiefen*, 1834, s. 134.) Phillips, however, found (Pogg., *Annalen*, bd. xxxiv., s. 191), in a shaft of the coal-mine of Monk-wearmouth, near Newcastle, in which, as I have already remarked, excavations are going on at a depth of about 1500 feet below the level of the sea, an increase of 1° to 59·06 feet, a result almost identical with that found by Arago in the Puits de Grenell.