of the air. It is quite otherwise, however, with the solution of the great problem of the internal heat of the whole Earth. As we may judge of uniformity of temperature from the unaltered time of vibration of a pendulum, so we may also learn, from the unaltered rotatory velocity of the Earth, the amount of stability in the mean temperature of our globe. This insight into the relations between the *length of the day* and the *heat of the Earth* is the result of one of the most brilliant applications of the knowledge we had long possessed of the movement of the heavens to the thermic condition of our planet. The rotatory velocity of the Earth depends on its volume; and since, by the gradual cooling of the mass by radiation, the axis of rotation would become shorter, the rotatory velocity would necessarily increase, and the length of the day diminish, with a decrease of the temperature. From the comparison of the secular inequalities in the motions of the Moon with the eclipses observed in ancient times, it follows that, since the time of Hipparchus, that is, for full 2000 years, the length of the day has certainly not diminished by the hundredth part of a second. The decrease of the mean heat of the globe during a period of 2000 years has not, therefore, taking the extremest limits, diminished as much as $\frac{1}{360}$th of a degree of Fahrenheit.*

This invariability of form presupposes also a great invariability in the distribution of relations of density in the interior of the globe. The translatory movements, which occasion the eruptions of our present volcanoes and of ferruginous lava, and the filling up of previously empty fissures and cavities with dense masses of stone, are consequently only to be regarded as slight superficial phenomena affecting merely one portion of the Earth's crust, which, from their smallness when compared to the Earth's radius, become wholly insignificant.

I have described the internal heat of our planet, both with reference to its cause and distribution, almost solely from the results of Fourier's admirable investigations. Poisson doubts the fact of the uninterrupted increase of the Earth's heat

* Laplace, *Exp. du Syst. du Monde*, p. 229 and 263; *Mécanique Céleste*, t. v., p. 18 and 72. It should be remarked that the fraction $\frac{1}{360}$th of a degree of Fahrenheit of the mercurial thermometer, given in the text as the limit of the stability of the Earth's temperature since the days of Hipparchus, rests on the assumption that the dilatation of the substances of which the Earth is composed is equal to that of glass, that is to say, $\frac{1}{18.000}$th for 1°. Regarding this hypothesis, see Arago in the *Annuaire* for 1834, p. 177–190.