

This loss experienced by the central heat must have been very considerable in the earliest epochs of the Earth's revolutions, but within historical periods it has hardly been appreciable by our instruments. The surface of the Earth is therefore situated between the glowing heat of the inferior strata and the universal regions of space, whose temperature is probably below the freezing-point of mercury.

The periodic changes of temperature which have been occasioned on the Earth's surface by the Sun's position and by meteorological processes, are continued in its interior, although to a very inconsiderable depth. The slow conducting power of the ground diminishes this loss of heat in the winter, and is very favorable to deep-rooted trees. Points that lie at very different depths on the same vertical line attain the maximum and minimum of the imparted temperature at very different periods of time. The further they are removed from the surface, the smaller is this difference between the extremes. In the latitudes of our temperate zone (between  $48^{\circ}$  and  $52^{\circ}$ ), the stratum of invariable temperature is at a depth of from 59 to 64 feet, and at half that depth the oscillations of the thermometer, from the influence of the seasons, scarcely amount to half a degree. In tropical climates this invariable stratum is only one foot below the surface, and this fact has been ingeniously made use of by Boussingault to obtain a convenient, and, as he believes, certain determination of the mean temperature of the air of different places.\* This mean temperature of the air at a fixed point, or at a group of contiguous points on the surface, is to a certain degree the fundamental element of the climate and agricultural relations of a district; but the mean temperature of the whole surface is very different from that of the globe itself. The questions so often agitated, whether the mean temperature has experienced any considerable differences in the course of centuries, whether the climate of a country has deteriorated, and whether the winters have not become milder and the summers cooler, can only be answered by means of the thermometer; this instrument has, however, scarcely been invented more than two centuries and a half, and its scientific application hardly dates back 120 years. The nature and novelty of the means interpose, therefore, very narrow limits to our investigation regarding the temperature

\* Boussingault, *Sur la Profondeur à laquelle se trouve la Couche de Température invariable entre les Tropiques*, in the *Annales de Chimie et de Physique*, t. liii., 1833, p. 225-247.