

terior of the globe, at a period when the earth's crust was still furrowed and rent, and only in a state of semi-solidification; and a primordial condition is thus revealed to us, in which the temperature of the atmosphere, and climates generally, were owing rather to a liberation of caloric and of different gaseous emanations (that is to say, rather to the energetic reaction of the interior on the exterior) than to the position of the earth with respect to the central body, the sun.

The cold regions of the earth contain, deposited in sedimentary strata, the products of tropical climates; thus, in the coal formations, we find the trunks of palms standing upright amid coniferæ, tree ferns, goniatites, and fishes having rhomboidal osseous scales;\* in the Jura limestone, colossal skeletons of crocodiles, plesiosaurs, planulites, and stems of the cycadeæ; in the chalk formations, small polythalamia and bryozoa, whose species still exist in our seas; in tripoli, or polishing slate, in the semi-opal and the farina-like opal or mountain meal, agglomerations of siliceous infusoria, which have been brought to light by the powerful microscope of Ehrenberg;† and, lastly, in transported soils, and in certain caves, the bones of elephants, hyenas, and lions. An intimate acquaintance with the physical phenomena of the universe leads us to regard the products of warm latitudes that are thus found in a fossil condition in northern regions not merely as incentives to barren curiosity, but as subjects awakening deep reflection, and opening new sources of study.

The number and the variety of the objects I have alluded to give rise to the question whether general considerations of physical phenomena can be made sufficiently clear to persons who have not acquired a detailed and special knowledge of

\* See the classical work on the fishes of the Old World by Agassiz, *Rech. sur les Poissons Fossiles*, 1834, vol. i., p. 38; vol. ii., p. 3, 28, 34, App., p. 6. The whole genus of *Amblypterus*, Ag., nearly allied to *Palæoniscus* (called also *Palæothrissum*), lies buried beneath the Jura formations in the old carboniferous strata. Scales which, in some fishes, as in the family of *Lepidoides* (order of *Ganoides*), are formed like teeth, and covered in certain parts with enamel, belong, after the *Placoides*, to the oldest forms of fossil fishes; their living representatives are still found in two genera, the *Bichir* of the Nile and Senegal, and the *Lepidosteus* of the Ohio.

† [The *polishing slate* of Bilin is stated by M. Ehrenberg to form a series of strata fourteen feet in thickness, entirely made up of the siliceous shells of *Gaillonellæ*, of such extreme minuteness that a cubic inch of the stone contains forty-one thousand millions! The *Bergmehl* (*mountain meal* or *fossil farina*) of San Fiora, in Tuscany, is one mass of animalcules. See the interesting work of G. A. Mantell, *On the Medals of Creation*, vol. i., p. 223.]—*Tr.*