

ation of its light-process, may account for far greater and more fearful results for our own planet than any required for the explanation of all geognostic relations and ancient telluric revolutions. William Herschel and Laplace were the first to agitate these views. If I have dwelt upon them somewhat at length, it is not because I would seek exclusively in these the solution of the great problem of the changes of temperature in our earth. The primitive high temperature of this planet at its formation, and the solidification of conglomerating matter; the radiation of heat from the deeper strata of the earth through open fissures and through unfilled veins; the greater power of electric currents; a very different distribution of sea and land, *may* also, in the earliest epochs of the earth's existence, have rendered the diffusion of heat independent of latitude; that is to say, of position relatively to a central body. Cosmical considerations must not be limited merely to astrognostic relations.

V.

PROPER MOTION OF THE FIXED STARS.—PROBLEMATICAL EXISTENCE OF DARK COSMICAL BODIES.—PARALLAX.—MEASURED DISTANCES OF SOME OF THE FIXED STARS.—DOUBTS AS TO THE ASSUMPTION OF A CENTRAL BODY FOR THE WHOLE SIDEREAL HEAVENS.

THE heaven of the fixed stars, in contradiction to its very name, exhibits not only changes in the intensity of light, but also further variation from the perpetual motion of the individual stars. Allusion has already been made to the fact that, without disturbing the equilibrium of the star-systems, no fixed point is to be found in the whole heavens, and that of all the bright stars observed by the earliest of the Greek astronomers, not one has kept its place unchanged. In the case of Arcturus, of μ Cassiopeiæ, and of a double star in Cygnus, this change of position has, by the accumulation of their annual proper motion during 2000 years, amounted respectively to $2\frac{1}{2}$, $3\frac{1}{2}$, and 6 moon's diameters. In the course of 3000 years about twenty fixed stars will have changed their places by 1° and upward.* Since the proper motions of the fixed stars rise from $\frac{1}{20}$ th of a second to 7.7 seconds (and

* Encke, *Betrachtungen über die Anordnung des Stern-systems*, s. 12. *Vide supra*, p. 27. Mädler, *Astr.*, s. 445.