

There are variations, it is true, which, in obedience to the laws of universal gravitation, affect the form of the earth's orbit and the inclination of the ecliptic, that is, the angle which the axis of the earth makes with the plane of its orbit; but these periodical variations are so slow, and are restricted within such narrow limits, that their thermic effects would hardly be appreciable by our instruments in many thousands of years. The astronomical causes of a refrigeration of our globe, and of the diminution of moisture at its surface, and the nature and frequency of certain epidemics—phenomena which are often discussed in the present day according to the benighted views of the Middle Ages—ought to be considered as beyond the range of our experience in physics and chemistry.

Physical astronomy presents us with other phenomena, which can not be fully comprehended in all their vastness without a previous acquirement of general views regarding the forces that govern the universe. Such, for instance, are the innumerable double stars, or rather suns, which revolve round one common center of gravity, and thus reveal in distant worlds the existence of the Newtonian law; the larger or smaller number of spots upon the sun, that is to say, the openings formed through the luminous and opaque atmosphere surrounding the solid nucleus; and the regular appearance, about the 13th of November and the 11th of August, of shooting stars, which probably form part of a belt of asteroids, intersecting the earth's orbit, and moving with planetary velocity.

Descending from the celestial regions to the earth, we would fain inquire into the relations that exist between the oscillations of the pendulum in air (the theory of which has been perfected by Bessel) and the density of our planet; and how the pendulum, acting the part of a plummet, can, to a certain extent, throw light upon the geological constitution of strata at great depths? By means of this instrument we are enabled to trace the striking analogy which exists between the formation of the granular rocks composing the lava currents ejected from active volcanoes, and those endogenous masses of granite, porphyry, and serpentine, which, issuing from the interior of the earth, have broken, as eruptive rocks, through the secondary strata, and modified them by contact, either in rendering them harder by the introduction of siliceous matter, or reducing them into dolomite, or, finally, by inducing within them the formation of crystals of the most varied composition. The elevation of sporadic islands, of