

are very unequally distant from the earth, it is not possible, according to the laws of the velocity and transmission of light, that we should be able, in so short a period of time, to perceive any actual changes in a cosmical body of such vast extent. These considerations in no way exclude the reality of the changes that have been observed in the emanations from the more condensed envelopes around the nucleus of a comet, nor that of the sudden irradiation of the zodiacal light from internal molecular motion, nor of the increased or diminished reflection of light in the cosmical vapor of the luminous ring, but should simply be the means of drawing our attention to the differences existing between that which appertains to the air of heaven (the realms of universal space) and that which belongs to the strata of our terrestrial atmosphere. It is not possible, as well-attested facts prove, perfectly to explain the operations at work in the much-contested upper boundaries of our atmosphere. The extraordinary lightness of whole nights in the year 1831, during which small print might be read at midnight in the latitudes of Italy and the north of Germany, is a fact directly at variance with all that we know, according to the most recent and acute researches on the crepuscular theory, and of the height of the atmosphere.\* The phenomena of light depend upon conditions still less understood, and their variability at twilight, as well as in the zodiacal light, excite our astonishment.

We have hitherto considered that which belongs to our solar system—that world of material forms governed by the Sun—which includes the primary and secondary planets, comets of short and long periods of revolution, meteoric asteroids, which move thronged together in streams, either sporadically or in closed rings, and finally a luminous nebulous ring, that revolves round the Sun in the vicinity of the Earth, and for which, owing to its position, we may retain the name of zodiacal light. Every where the law of periodicity governs the motions of these bodies, however different may be the amount of tangential velocity, or the quantity of their agglomerated material parts; the meteoric asteroids which enter our atmosphere from the external regions of universal space are alone arrested in the course of their planetary revolution, and retained within the sphere of a larger planet. In the solar system, whose boundaries determine the attractive force of the central body, comets are made to revolve in their elliptical

\* Biot, *Traité d'Astron. Physique*, 3ème éd., 1841, t. i., p. 171, 238, and 312.