

yet we certainly know nothing definite regarding its actual material dimensions; its augmentation* by emanations from the tails of myriads of comets that come within the Sun's vicinity; the singular changes affecting its expansion, since it sometimes does not appear to extend beyond our Earth's orbit; or, lastly, regarding its conjectural intimate connection with the more condensed cosmical vapor in the vicinity of the Sun. The nebulous particles composing this ring, and revolving round the Sun in accordance with planetary laws, may either be self-luminous or receive light from that luminary. Even in the case of a terrestrial mist (and this fact is very remarkable), which occurred at the time of the new moon at midnight in 1743, the phosphorescence was so intense that objects could be distinctly recognized at a distance of more than 600 feet.

I have occasionally been astonished, in the tropical climates of South America, to observe the variable intensity of the zodiacal light. As I passed the nights, during many months, in the open air, on the shores of rivers and on llanos, I enjoyed ample opportunities of carefully examining this phenomenon. When the zodiacal light had been most intense, I have observed that it would be perceptibly weakened for a few minutes, until it again suddenly shone forth in full brilliancy. In some few instances I have thought that I could perceive—not exactly a reddish coloration, nor the lower portion darkened in an arc-like form, nor even a scintillation, as Mairan affirms he has observed—but a kind of flickering and wavering of the light.† Must we suppose that changes are actually in progress in the nebulous ring? or is it not more probable that, although I could not, by my meteorological instruments, detect any change of heat or moisture near the ground, and small stars of the fifth and sixth magnitudes appeared to shine with equally undiminished intensity of light, processes of condensation may be going on in the uppermost strata of the air, by means of which the transparency, or, rather, the reflection of light, may be modified in some peculiar and unknown man-

* Sir John Herschel, *Astron.*, § 487.

† Arago, in the *Annuaire*, 1832, p. 246. Several physical facts appear to indicate that, in a mechanical separation of matter into its smallest particles, if the mass be very small in relation to the surface, the electrical tension may increase sufficiently for the production of light and heat. Experiments with a large concave mirror have not hitherto given any positive evidence of the presence of radiant heat in the zodiacal light. (Lettre de M. Matthiessen à M. Arago, in the *Comptes Rendus*, t. xvi., 1843, Avril, p. 687.)