

than in the center. The last named of these distinguished physicists and astronomers expresses himself as follows, in reference to this question.* "Now, granting the existence of such an atmosphere, its form, in obedience to the laws of equilibrium, must be that of an oblate spheroid, the ellipticities of whose strata differ from each other and from that of the nucleus. Consequently, the equatorial portions of this

according to the ratio of the cosine of the angle; but in the same ratio, the greater number of the material points emit a feebler light, *in consequence of their obliquity*. The ratio of the angles is naturally the same for a gaseous sphere; but since the obliquity does not produce the same amount of diminution in gases as in solid bodies, the margin of the gaseous sphere would be more luminous than its center. That which we term the luminous disk of the Sun is the gaseous photosphere, as I have proved by the entire absence of every trace of polarization on the margin of the disk. To explain the *equality of intensity* indicated by the polariscope for the margin and the center, we must admit the existence of an outer envelope, which diminishes (extinguishes) less of the light which comes from the center than from the marginal rays having a longer way to traverse before they reach the eye. This outer envelope forms the whitish corona of light observed in total eclipses of the Sun. The light which emanates from solid and liquid incandescent bodies is partially polarized when the rays observed form an angle of a few degrees with the surface from whence they emerge; but there is no sensible evidence of polarization when incandescent gases are seen in the polariscope. This experiment proves, therefore, that solar light does not emanate from a solid mass or an incandescent liquid. Light is not engendered solely on the surface of bodies; but a portion originates within the substance itself, even when the experiment is made with platinum. Light, therefore, is not produced by the decomposition of the ambient oxygen. The emission of polarized light from liquid iron is an effect of refraction during its passage toward a medium of lesser density. Wherever there is refraction, a small amount of polarized light must be produced: gases do not emit polarized light, because their strata do not possess the requisite amount of density. When the Moon is followed through all its phases, it will be found to afford evidences of polarization, excepting at the full moon, and the days immediately preceding and following it. It is more especially during the first and last quarters that the unequal (mountainous) surface of our satellite presents suitable inclinations for the polarization of solar light by reflection."

* Sir John Herschel, *Astron. Observ. made at the Cape of Good Hope*, § 425, p. 434; *Outlines of Astr.*, § 395, p. 234. Compare Fizeau and Foucault, in the *Comptes Rendus de l'Acad. des Sciences*, t. xviii., 1844, p. 860. It is remarkable enough that Giordano Bruno, who was burned eight years before the invention of the telescope, and eleven years before the discovery of the spots of the Sun, should have believed in the rotation of the Sun upon its axis. He considered, on the other hand, that the center of the Sun was less luminous than the edges. Owing to an optical deception, he believed that he saw the disk turn round, and the whirling edges expand and contract. (Jordano Bruno, par Christian Bartholmess, tom. ii., 1847, p. 367.)