

prove the existence of a mutual relation between the two, as in distinguishing between *physically* and merely *optically* double stars. Figures of double nebulae are given in the *Philos. Transact.* for the year 1833, figs. 68–71. Compare also Herschel, *Outlines of Astr.*, § 878; *Observ. at the Cape of Good Hope*, § 120.

Annular nebulae are of the rarest occurrence. According to Lord Rosse, we are acquainted with seven of these bodies in the northern hemisphere; the most celebrated of these is situated between β and γ Lyræ (No. 57, Messier; No. 3023 of Sir John Herschel's Catalogue), and was discovered in 1779 by Darquier at Toulouse, when Bode's Comet passed near it. Its apparent size is nearly equal to that of Jupiter's disk, and its form is an ellipse, whose greater and lesser axes are in the ratio of 5 to 4. The interior of the ring is not black, but somewhat illumined. Sir William Herschel discovered some stars in the ring, which has since been entirely resolved by Lord Rosse and Mr. Bond.* The splendid annular nebulae of the southern hemisphere, numbered 3680 and 3686, appear, on the contrary, perfectly black in the interior of the rings. The last-named of the two is not elliptical, but perfectly round;† all are probably annular clusters of stars. The increasing power of optical instruments appears, moreover, generally to render the contour of both elliptical and annular nebulae less defined; thus, for instance, Lord Rosse's colossal telescope exhibits the annular nebula of Lyra in the form of a simple ellipse, with remarkable divergent, thread-like nebulous appendages. The transformation effected in a nebulous spot—Lord Rosse's *Crab nebula*—which appears in instruments of inferior power to be a simple elliptical body, is particularly striking.

The so-called planetary nebulae, which were first observed by the elder Herschel, and which rank among the most remarkable phenomena of the heavens, although of less rare occurrence than annular nebulae, do not number, according to Sir John Herschel, more than 25, of which nearly three fourths lie within the southern hemisphere. These bodies present the most striking resemblance to planetary disks; the

* "*Annular Nebulae*."—*Observations at the Cape*, p. 53; *Outlines of Astr.*, p. 602. "*Nébuleuse perforée*."—Arago, in the *Annuaire* for 1842, p. 423; Bond, in Schum., *Astron. Nachr.*, No. 611.

† *Observations at the Cape*, p. 114, pl. vi., figs. 3 and 4. Compare also No. 2072 in the *Philos. Transact.* for 1833, p. 466. See Nichol, *Thoughts on the System of the World*, p. 21, pl. iv., and p. 22, pl. i. fig. 5.