

5.
Kant's
nebular
theory.

of the earth, another philosopher of the highest rank took an important step in the direction of the study of the genesis of things natural, on the largest scale. It was Immanuel Kant, the philosopher of Königsberg, who, stimulated by the perusal of the cosmical theories of Thomas Wright of Durham,¹ applied the principles of the Newtonian philosophy in a first attempt to trace out the great stages in the formation of a planetary system.

¹ The work of Wright is not so rare as it is represented to be by foreign writers, as I picked up two copies from a second-hand catalogue several years ago. It is chiefly interesting as having induced Kant to venture on his genetic speculations, which appeared anonymously at Königsberg in 1855, and for a long time remained unknown. About the same time as Kant, the celebrated mathematician J. H. Lambert published his 'Cosmological Letters on the Structure of the Universe' (Augsburg, 1761), many ideas in which coincide with the later expositions of Herschel and Laplace, which were based on quite different considerations. The speculations of Wright, Lambert, and Herschel were what we may call morphological, whereas it is the merit of Kant and Laplace to have built upon the ideas as to the architecture of the universe a plausible theory of its genesis. A full account of Wright's suggestions, which were accompanied by very beautiful mezzotint engravings executed by himself, is given by Prof. R. A. Sampson of Durham in the 'Proceedings of the Society of Antiquaries' of Newcastle-upon-Tyne, vol. vii. p. 99.

Kant's theory has been dealt with by Helmholtz in his Königsberg address (1854), "Ueber die Wechselwirkung der Naturkräfte" ('Vorträge und Reden,' vol. i.), by Faye

('Sur l'Origine du Monde,' Paris, 1885, 2nd ed.), by C. Wolf ('Les Hypothèses Cosmogoniques,' Paris, 1886, which contains a translation of Kant's work), and by G. F. Becker (Amer. Journal of Science, 1898). It is, however, to be noted that recent writers on Astronomy are inclined to speak of the genetic theories of the universe very much in the same way as Humboldt treated them in his 'Kosmos,' which professedly excluded the historical aspect in favour of a purely descriptive treatment, recognising the many difficulties which stand in the way of a consistent elaboration of the "nebular hypothesis." See A. Berry's 'History of Astronomy' (1898), p. 409; R. Wolf, 'Handbuch der Astronomie' (vol. i., 1890), p. 594; G. H. Darwin, 'The Tides' (1898), p. 302; also J. Scheiner, 'Der Bau des Weltalls' (Leipzig, 1901). On the additional great support which has been given to a genetic conception in general in the second half of the nineteenth century by Thermodynamics and Spectrum Analysis I shall speak later on. The writings of M. Faye in France, and of Sir Norman Lockyer in this country, utilise to the fullest extent the arguments derivable from these sources, and mark a great contrast to the manner in which cosmological questions were treated by A. von Humboldt.