

*Problems of Cosmogony and Stellar Dynamics.* By J. H. Jeans. Adams Prize Essay for 1917. Cambridge, University Press, 1919. vii + 293 pp.

As a general cultural study, astronomy is comparable to poetry in its stimulation of the imagination. It appeals to the widest interests, the most diverse individuals. And of all astronomy the most fascinating is cosmogony—the origin, evolution, and destiny of our material universe. The arrangement pursued by Jeans in his Adams Prize Essay was apparently adopted with the aim of permitting an intelligent reader to carry the general drift of his theory without having to wade through deterring mathematical difficulties. Recondite mathematics there is in plenty, but always with a pleasant prelude and with an effective summary.

Briefly, Jeans's conception of stellar evolution follows Russell and his notion of the cosmos as a whole is the "island universe" theory. Our galactic system is comparable in mass with the largest spiral nebula. The spiral nebulae are not part of our galactic system, which is a star cluster larger than other star clusters as the Andromeda nebula is larger than other spirals. The development of the individual stars is from cold diffuse masses of cosmic dust up through the red to the white or even blue type, and then back to the dense dying reds. The theories of figures of equilibrium changing slowly toward a limiting unstable state with subsequent rapid cataclysmic development are marshalled in support of this general conception of the world. That some differ with the author even in the dynamical theory, to say nothing of the general conclusions, may be seen by reference to Macmillan's long analytical review in the *ASTROPHYSICAL JOURNAL*. For a discussion of the tenability of the island-universe theory, one may read the symposium of Curtis and Shapley before the National Academy in 1920, printed by the National Research Council.

As I am merely one of the many who have read avidly the writings of mathematical and physical astronomers since the time I could first read at all, I have but small right to any opinion on cosmogony, but may I venture a word in admiration of the courage of those who work in this difficult field where there are rare clues and, it sometimes seems, no proofs. There are only seven stars (of course, binaries) of which the masses are well determined, and these lie between 0.7 and 3.4 if the sun's mass be unity; yet it is generally stated that the masses of all the stars are of approximately the same magnitude. This is a courageous conclusion. May it not be that the eight (our sun included) are not a fair random sample of the billion and a half? And even if you have a random sample of eight out of a lot of a billion and a half what is the probable departure of the average of any particular physical property of the eight from that of the lot? Jeans is aware of such troubles; he is tentative, not dogmatic. (Since this review was first written, a discovery has been reported of a double star system of which the mass is many times that of the sun.)

The essay contains a review of earlier work by Roche, Darwin, Poincaré, expanded with many individual contributions which the author has been making in recent years in friendly competition with Eddington. Those who read the work will feel the thrill of Keats "On First Looking into Chapman's Homer."

E. B. WILSON.