

currences, it is evident that nebulæ themselves are in a general way determined by other antecedent conditions and phenomena, which turn out to be collisions between stars. Thus arises the suspicion that cosmic evolution may be in truth a cyclic process which had no beginning and can have no end.¹

An alternative hypothesis regards the pres-

¹Such a view, until quite recently, was universally rejected because it appeared to conflict with the second law of thermodynamics, — that of the degradation of energy. But lately it has been put forth by no less an authority than Arrhenius, who has advanced a theory to explain away the difficulty of the second law.

“The recognition of the indestructibility of energy seemed to accentuate the difficulties of the cosmogonic problems. The theses of Mayer and of Helmholtz, on the manner in which the Sun replenished its losses of heat, have had to be abandoned. My explanation is based upon chemical reactions in the interior of the Sun in accordance with the second law of thermodynamics. The theory of the ‘degradation’ of energy appeared to introduce a still greater difficulty. That theory seems to lead to the inevitable conclusion that the Universe is tending towards the state which Clausius has designated as ‘Wärme Tod’ (heat death), when all the energy of the Universe will be uniformly distributed through space in the shape of movements of the smallest particles. That would imply an absolutely inconceivable end of the development of the Universe. The way out of this difficulty which I propose comes to this: the energy is ‘degraded’ in bodies which are in the solar state, and the energy is ‘elevated,’ raised to a higher level, in bodies which are in the nebular state.” — ARRHENIUS, “Worlds in the Making,” translated by Borns. New York and London, 1908, p. xiii.