Book Reviews

Stellar Evolution: An Exploration from the Observatory. Otto Struve. Princeton, N. J.: Princeton Univ. Press, 1950. 266 pp. $4.00.

America's foremost observing astrophysicist here presents a most welcome book on his major field of activity over many years.

Presumably, the goal of astronomy is to understand the material universe well enough to describe its macroscopic state at any time in the past or future with a determined degree of uncertainty. Great progress toward this goal is being made by an increased understanding of the basic processes governing the evolution of stars. Some two decades ago, before the processes of nuclear transformations were delineated, many astronomers realized that certain extremely bright stars could not have persisted in their present condition for even the 3×10^9 years of the short time scale. The evolutionary sequence brilliantly suggested by H. N. Russell was beginning to show glaring weaknesses.

Otto Struve set himself the task of studying the particular stars that showed the greatest promise of clarifying the problem: the massive and intrinsically most brilliant O and B stars, many with extremely rapid rotation; stars with emission lines; stars whose light curves or spectra indicate binary systems with the two components nearly in contact; and stars whose light and spectral changes had presented baffling puzzles. To attain his objective, Struve planned and administered a new and well-equipped observatory, the W. J. McDonald Observatory of Texas, staffed by the University of Chicago through the Yerkes Observatory.

In *Stellar Evolution* the author presents his discoveries and his conclusions concerning the evolution of those types or groups of stars for which evolutionary trends can be deduced. He states that his "book is intended not so much for astronomers as for physicists, chemists and geologists." Since all astronomical knowledge and theory must be organized in such an attack, Struve gives a fundamental background for nonastronomers. The reviewer feels that because of the profuseness of detail few, other than astronomers, will read the book *in toto*; scientists in other fields, however, will find large sections of impelling interest. Any reader should be rewarded by an understanding of the subtlety of the problem, an appreciation of the judgment and ingenuity involved, and a realization of the need for more theoretical work, particularly in fields outside astronomy.

Struve's own direct contributions center around the measurements of rotations of stars, motions in their atmospheres, and the demonstration that moving shells of gas exist far from the "surfaces" of hot stars and close binaries. His indirect contributions, through guidance and suggestion to his colleagues and other astronomers, touch on most of modern astrophysics. His main thesis in *Stellar Evolution* concerns the loss of mass by the "shell" stars or binaries and the concomitant loss of angular momentum, so that the stars can evolve into less massive, fainter stars with slow rotation. He accepts the concept that stars are formed by concentration of the interstellar gas and dust, but is somewhat undecided as to whether the stars of small mass, including degenerate white-dwarf stars, were formed as they are or evolved from a more massive state.

The most serious criticism of *Stellar Evolution* concerns its lack of bibliography. There is no question but that the book will be read by every serious student of astronomy and will influence astronomical research of the next decade appreciably. The reviewer hopes that Struve can be induced to mimeograph a bibliography for limited circulation until a second edition can be prepared.

Probably a number of astronomers will criticize the author's hypothesis concerning the evolution of the W Ursae Majoris stars, sunlike binaries practically in contact. No quantitative evidence *proves* that these stars are losing material rapidly; perhaps they represent a much more stable configuration than Struve postulates. Even for the "shell" stars the quantitative losses of mass and angular momentum are poorly established.

Again, more space might well have been devoted to discussions of the two stellar families: one family concentrated to the galactic plane, representing an aggregate of new and old stars; the other family, typical of the globular clusters, representing early stellar formation. The golden key to stellar evolution may well lie in such studies.

No book, however, can be both finite and all-inclusive. *Stellar Evolution* is an important contribution—it must be read by all who wish to understand the known processes whereby stars can evolve.

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Electronic Mechanisms of Organic Reactions. Allan R. Day. New York: American Book Company, 1950. 314 pp. $3.50.

This book is one of several recent textbooks designed for introduction at the undergraduate level of some of the principles that have been successful in advancing theoretical organic chemistry over the past 25 years. The idea is an excellent one, although it would appear premature to believe that the theory has advanced sufficiently to justify Sir Robert Robinson's recent statement: "Gone are the days when organic chemistry could be stigmatized as memory work. . . ."

Unfortunately the present work follows a current trend toward overemphasis on *electronic* mechanisms. It is not made sufficiently clear in the book that there is an operational distinction between a reaction mechanism and