

them by unremitting creative activity, nature will not be able to invent new obstacles. All that is uncertain is how long the process will last.

This is not so much an oracle as an expression of official Soviet policy. Inquiries of Soviet scientists in the field have always received more or less the same reply: the Soviet Union is aiming at excellence in high-temperature plasma physics and is content to let the physics show what time scale is natural to the harvesting of economic benefits.

Course 28: Star Evolution (Proceedings of the International School of Physics "Enrico Fermi," Varenna, Italy). L. Gratton, ed. 488 pp. Academic Press, New York, 1963. \$18.50.

Reviewed by J. Allen Hynek, Dearborn Observatory.

Stellar evolution is a broad domain into which virtually all phases of astrophysics and observational astronomy enter, and to which they all contribute, in greater or lesser degree. No one volume, or a series for that matter, can essay to cover the field adequately. The rapid evolution our ideas of stellar evolution themselves have undergone, even in the time since the volume under review was in preparation, emphasizes this point. Quasistellar sources and recent advances in our knowledge of radio galaxies and in relativistic astrophysics were not yet a part of the working data of the contributors when they met on the shores of Lake Como in Varenna, Italy, to deliver Course 28 in the International School of Physics "Enrico Fermi", on the subject of star evolution. Thus, even though sixteen specialists presented eighteen excellent and thorough lectures on specific problems in stellar evolution, this volume, edited competently by L. Gratton, himself one of the contributors, is not a comprehensive survey of the field of stellar evolution. Rather, many contributors dealt with those ideas which were frontier aspects of the field when the symposium was held in 1962.

Despite these limitations, an understandable price of progress, the volume contains much fundamental material basic to an understanding of the central ideas of stellar evolution.

There are areas in the field which are well established even though progress has been rapid, and many of the contributors have given an excellent résumé of these.

For this reason the book can be fully recommended to serious readers wishing an authoritative discussion of integral aspects of the problem of stellar evolution. These cover a wide spectrum, ranging from the observational approach to stellar evolution, to nuclear astrophysics and the construction of stellar models. Schatzman treats the early stages of stellar evolution in one chapter, and in another he deals with the very late stages of stellar evolution in his discussion of white dwarfs and Type I supernovae. Gratton follows this with a discussion of stellar association and very young clusters, while much older stars, Cepheids, white dwarfs, and stars with helium-rich cores are treated by Baker and Schatzman. Ledoux contributes a fine chapter on stellar stability and stellar evolution. The Burbidges give a comprehensive treatment of nuclear astrophysics and nucleosynthesis, covering in detail the synthesis of elements and the related topic of supernova explosion; then following this, they discuss the observed chemical composition of the stars. G. Burbidge includes a very excellent bibliography.

No detailed chapter-by-chapter discussion can be given in this review, but the survey of the observational approach to stellar evolution given by Sandage and Gratton should be especially noted as it will appeal to a much wider audience than some of the more specialized chapters. Following a résumé of the theory of the Hertzsprung-Russell diagram and the closely related color-magnitude diagrams, they present the observational evidences for stellar evolution as shown particularly by diagrams for open and globular star clusters, interpreted as envelopes of stellar evolutionary tracks.

The mathematics of stellar structure cannot be encompassed in a few chapters, and Wrubel devotes his chapter on construction of stellar models to a few selected aspects, particularly calculation of opacities for use in model integrations. Another

special aspect, "stellar evolution as a problem for an electronic computer", will be found timely.

The closing chapter of the symposium by M. Hack deals with the evolution of close binary systems. This is one of the most exciting and potentially productive phases of the problem of stellar evolution. When the components of a close binary (separation of the order of diameter of the stars) are not of equal mass, the more massive will evolve from the main sequence first, expanding in size and transferring part of its mass to the companion through the first Lagrangian point of the system. This, in turn, upsets the normal course of stellar evolution, leading to a variety of consequences.

The task of editing a symposium in so rapidly evolving a field is a harassing one, and Gratton has handled this well although an excessive number of typographical errors have been left unattended.

The Equilibrium Theory of Classical Fluids. A Lecture Note and Reprint Volume. By Harry L. Frisch and Joel L. Lebowitz. 3 Chapters. Benjamin, New York, 1964. Cloth \$10.00; paper \$5.95. *Reviewed by Stuart A. Rice, University of Chicago.*

The Equilibrium Theory of Classical Fluids is a reprint volume which departs somewhat from the pattern established in the past. In addition to useful comments in a number of places provided by both editors and authors, there are several good new articles with the nature of critical reviews. The purpose of these articles is to provide new and clearer derivations of well-known results and, hopefully, thereby new insights. Thus, instead of making a compendium of reprints, the editors have constructed something intermediate between an original monograph and a collection, and should be commended for this. I believe the book to be useful to all interested in statistical mechanics and the classical many-body problem.

As minor demurrers, let me remark that in my copy pages II-258 and II-259 are identical. I also believe that it would have been better to cut open the journals before photographing the articles, since the