

Books

Astrophysics. A Topical Symposium. Edited by J. A. Hynek. 703 pp. McGraw-Hill Book Company, Inc., New York, 1951. \$12.00.

The present volume is a compendium of fourteen separate monographs on various astrophysical topics, which are treated by well-known authorities in their respective fields. Included in the contents are an introduction by Bengt Stromgren, Classification of Stellar Spectra by P. C. Keenan and W. Morgan, Interpretation of Normal Stellar Spectra by L. H. Aller, Analysis of Peculiar Stellar Spectra by O. Struve, Molecular Spectra in Cosmic Sources by P. Swings, The Growth of Our Knowledge of the Physics of Stars by B. Stromgren, The Sun and Stellar Radiation by E. Pettit, Comets by N. T. Bobrovnikow, The Origin of the Solar System by G. P. Kuiper, Visual Binary Stars and Stellar Parallaxes by G. Van Biesbroeck, Spectroscopic Binaries by J. Hynek, Eclipsing Binaries by N. L. Pierce, Intrinsic Variable Stars by C. Payne-Gaposhkin, Interstellar Matter by J. Greenstein, and Structure and Sources of Energy of Stars by S. Chandrasekhar.

A symposium, or collection of monographs of this type, is chiefly of value as a reference book. It is not intended as a text, nor is it suitable as one; on the other hand it could well be assigned as collateral reading in courses on astrophysics. Each monograph is written as a summary of the present situation in that branch which is covered and presents the results of many workers in each respective field. While there is no general summing up, nor tables of data at the end, much useful data is contained in the individual articles.

As with all such compendia, the difficulties facing the editor are twofold. First, the various papers discuss particular subjects and omit others. Hence one can look in vain for many of the interesting phenomena of astrophysics, such as a detailed discussion of the observations of the number, characteristics, etc. of novae, and the various theories of such explosions. On the other hand the quantitative analysis of stellar atmospheres is treated twice. Two authors give a detailed account of the methods of measurement and interpretation of the widths of spectral lines. It is pleasing indeed to see that astrophysicists are well aware that the spectral lines of most elements in most stars show largely radiation damping intrinsic width profiles, in contrast to the belief held by many physicists (who certainly should know better) that the widths are primarily due to Doppler broadening. Both accounts, although approached from differing directions and dif-

fering in considerable detail in the forms presented, are competent and understanding accounts of the situation, and show a broad familiarity with the contributions of the various persons, such as Russell, Stewart, Unsold, Minnaert, and others, who have worked in this field.

This reviewer feels that the title "Astrophysics" should really read "Special Topics in Astrophysics". The shorter form is misleading, and we would guess was chosen by the publisher. Yet the book is a useful one, and many persons as well as libraries will welcome it on their shelves. The book permits much useful material to be quickly obtained which otherwise would require extensive searches in the original literature. The book is remarkably free from errors, the printing and paper are of good quality and the binding presents a pleasing appearance.

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Space-Time Structure. By Erwin Schrödinger. 119 pp. Cambridge University Press, New York, 1950. \$3.00.

In view of the history and direction of development of theoretical physics in the last 35 years, the appearance of any volume on a subject which is essentially relativity *per se* rather particularly engenders the question: Why?

To what extent are a more illuminating attitude and interpretation brought to the exposition of the subject by virtue of the author's special qualifications, researches, or particular ability of expression? To what extent is new and well-established material presented?

To anyone who has followed developments in this field, the answers to these questions must on all scores be obvious. The stated *leitmotiv* of the volume, at least for essentially the first ten chapters, is the investigation of the geometry of the 4-dimensional continuum through its logical evolutionary stages: (1) the unconnected manifold under general invariance only; (2) the affinely-connected manifold; and (3) the metrically-connected manifold. Particular notice is taken of those concepts which are peculiar to each stage and accessible at that stage, but which have no meaning at the previous stage. The grace notes, so to speak, are the last two chapters which deal briefly with the formal and physical aspects of "Conservation Laws and Variational Principles" and "Generalizations of Einstein's Theory".

Possibly at the risk of appearing tautological or emphasizing what is obvious to some readers, the first of these two chapters devolves on the issue that in an infinitesimal geometry it is not permissible to use comparisons-at-a-distance; that is, it is not possible to compare (Euclidian fashion) the lengths of two line elements at *different* points of space. Hence one finds respectively: (1) the concepts of tensor "at a point" and infinitesimal displacements "bound to a point", being characteristics which are engendered by the bare notion of "derivative"; (2) manifolds which are such that