

Books

The Galactic Novae. By Cecilia Payne-Gaposchkin. 336 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1957. \$8.50. *Reviewed by C. C. Kiess, National Bureau of Standards.*

The term New Star, or Nova in its Latin form, no longer carries with it its original meaning of a star newly created where none had previously existed. The only quality of newness it has is our acquaintance with it. It is now generally accepted by astronomers that Novae are really old stars, very old physiologically, which for some unknown reason have been rejuvenated, and after a brief splurge of glory, reckoned by days and not in cosmic time, settle down to a quiescent state, or, like old soldiers, fade away. The numbers of these stars, including the Supernovae also, are surprisingly small for a stellar population consisting of hundreds of millions of members. But enough factual knowledge about them has been uncovered during the past five or six decades to justify bringing it together and systematizing it for analysis and indicating the direction of further research. This is the goal set by the author of the book under review and she has attained it in admirable fashion.

The first three chapters give the important statistical details about dates and positions in the sky of the stellar outbursts and the variations in intensity and spectral composition of the radiated energy. The next three chapters give for individual stars the intimate details of their photometric and spectroscopic behavior during the period in which they were observed. Each of these chapters segregates the stars according to the amount of data available for them. In chapters 7 and 8 are discussed variable stars that resemble Novae qualitatively but with outbursts that recur at short, irregular intervals reckoned in days rather than in centuries or millennia. Chapter 9 deals with the Supernovae. As the name implies, these stars are Novae on a grander scale photometrically, their outpouring of energy during an outburst being 5 to 10 times greater than that of Novae. Spectroscopically they are difficult to interpret because they exhibit no characteristic emission or absorption features that can be identified with certainty. Their spectra are continuous but with distinctive distributions of energy that permit grouping them in two classes. In Chapter 10 the spectral changes that have occurred during the outbursts of several Novae are intercompared. These events are explosions on a large scale, the radiation of enormous amounts of energy being accompanied by the ejection of successive shells of stellar material that may eventually spread out into a diffuse nebula

surrounding the stellar remnant. In some respects they resemble the planetary nebulae. In the final chapter is given a "superficial survey" of the theories that have been advanced to explain the phenomena of Novae. In their efforts to find sources of energy responsible for these stellar explosions all of these theories have encountered objections difficult to overcome. Those making use of nuclear reactions and shock-wave phenomena offer the greatest promise of success.

This book is written for the specialist in astrophysics rather than for the general reader. Yet the latter may read parts of it with rewarding interest. If the specialist cannot find the information he wants in the book itself then he must look for it in the original papers that are listed in the extensive bibliographies appended to each chapter. In addition to these, indexes of subjects, of stars, and of authors cited in the text complete the book.

Now a few words about the mechanics of the book itself. It is the first in the new *Series in Astrophysics*, and its format and make-up presumably will be followed in succeeding volumes. The size and weight are commendable and make the book light enough to hold comfortably while it is being read. But the use of light-faced type on semiglossy paper imparts a lack of contrast to the printed page that makes for difficult reading in artificial illumination. A further hindrance to easy reading is the practice, now regrettably being adopted in various publications, of printing in parentheses and in type of the same size as that of the text, the dates of the bibliographical citations. When as many as eight such dates appear in a line it makes reading a hop-skip-and-jump performance that soon becomes fatiguing for one accustomed to take in several words at a glance. It is hoped that in future volumes of the series the editors will use numerical superscripts above the names of authors cited in the bibliographies.

Conference on the Physics of Cosmic Rays. Vol. 19, No. 5, 1955, of The Bulletin of the Academy of Sciences of the USSR—Physical Series. 109 pp. Translated by Columbia Technical Translations, White Plains, N. Y., 1956. Paperbound. Annual Subscription \$110; single issue \$20.00. *Reviewed by R. D. Sard and H. Primakoff, Washington University.*

This translation of an issue of the *Izvestiia Akademii Nauk* of the USSR contains part of the proceedings of the "Third All-Union Conference in the Physics of Cosmic Rays" held in Moscow, December 15–23, 1954, under the chairmanship of S. N. Vernov. One gathers from Vernov's opening address that it was at this conference that Soviet work with accelerators (680-Mev synchrocyclotron under Mescheryakov and 300-Mev synchrotron under Veksler) was first revealed to the scientific public—as a result the conference proceedings not only contain much still valuable data but are of considerable historical interest. The issue is divided into two sections, the first devoted to experimental cosmic-ray work, at mountain altitudes and higher, the second devoted to a description of the synchrocyclotron experi-