

The book is essentially a text for the astrophysics student with a good background in mathematics and atomic physics. It starts off without preliminaries. On page 2 we meet the Stromgren sphere and on page 3 we find the basic formula for its radius. The presentation continues apace and, reading at random, one finds hardly a page unworthy of one's attention. I, for one, have learned a lot by reviewing the book.

The first three sections—Interstellar Hydrogen, The Physical State of the Interstellar Gas, and Interstellar Dust—are the basic ones; they occupy about half the book. In the chapters under these headings radio and optical astronomy are properly blended. These chapters are good ones, but the reader should be warned that they are not up to date. As far as I can judge, the text is essentially complete to 1963, and there are selected references included to 1966 and 1967, but the new results and developments of the past four or five years are not represented here. For them one must turn to the published summaries of the Crimean Symposium of the International Astronomical Union, held in September 1969 at Pikelner's home base, with him as one of the principal organizers. The Crimean Symposium volume is or soon will be available in book form. There will be other summarizing volumes to consult—such as the volume based on the Steward Observatory symposium on dark nebulae, globules, and protostars held in Tucson in March 1970, also soon to be in print, or the presentations at the Brighton General Assembly of the International Astronomical Union (August 1970). For the reading of all these, sections 1, 2, and 3 of Kaplan and Pikelner provide ideal background material.

Section 4 deals with Interstellar Magnetic Fields and Nonthermal Radio Emission. This is a research subject in which the authors are preeminent, and it is good indeed to have their introductory material made generally available to English-speaking readers. The unified treatment includes naturally several aspects of the study of cosmic rays, which represent a very important part of the interstellar plasma. The chapter ends with some illuminating discussions of the Crab Nebula, Cassiopeia A, the Cygnus Loop Nebula, and the galactic spur. Again, one notes with some regret that the discussions of these objects include references only to 1966; pul-

sars, radio and optical, are discussed only very briefly in an addendum on pages 402 to 405, and the references to observational data on galactic magnetic fields are out of date. It will be most interesting to read the next edition of the book, in which the authors should express their views on pulsars, neutron stars, and the helical components of the galactic magnetic field.

The book ends with a monumental section (100 pages) on Interstellar Gas Dynamics and the Evolution of the Interstellar Medium. It is a beautiful introduction to the volume based on the Crimean Symposium. The chapter opens with two fine sections, one on shock fronts, the other on ionization fronts. Kaplan and Pikelner write on these topics as true experts—and our anonymous translator has done well in presenting the difficult material in English. The first half of the chapter ends with a good discussion of motions in the interstellar gas, including an analysis of basic observational material on interstellar turbulence.

The concluding chapters, section 5, deal with problems of the evolution of the interstellar medium. This is a subject on which Pikelner has made major contributions, which have not generally received in the West the attention that they deserve. The sections on the gravitational collapse of interstellar clouds, large and small, should be read with care by students and professionals alike. I have personally been much intrigued by Pikelner's work on barred spirals and the role they may play in the evolution of galaxies. It is a pity that there is so little on this subject in the present book and that the treatment of galaxy problems is so brief. We are all looking forward to more books like the present one by these authors.

The printing and binding of the book are up to the standards one expects from the Harvard University Press. The price is high, but, believe me, the book is well worth having. The reproductions of photographs are not quite what they should be, and in my reading I came across several printing and spelling (names!) errors. But basically this is an excellent book. There is much to praise and there are few criticisms to be made. Thank you, Dr. Kaplan, thank you, Dr. Pikelner, and thank you, anonymous translator.

BART J. BOK

*Steward Observatory,
University of Arizona,
Tucson*

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