amply indexed, it should also be of some interest to computer users.

Advances in Geophysics, Volume 9. H. E. Landsberg and J. Van Mieghem, eds. 374 pp. Academic Press Inc., New York, 1962. $14.50. *Reviewed by E. J. Öpik, University of Maryland.*

THE collection of monographic reviews of the *Advances* is assuming encyclopedic dimensions—if this term is applicable to the rapidly changing front line of modern research. The six contributions of the present volume represent among themselves a balanced entity, covering almost the entire spectrum of geophysics from the earth's deep interior to radiation belts.

The discussion by Stauder of the focal mechanism of earthquakes shows that strike-slip faulting (horizontal displacement) predominates over dip-slip, and that earthquakes with tensional and compressional motions on the fault are equally frequent. This is at variance with expectations based on existing theories of mountain building. A gigantic "thrust southward of the whole of Eurasia" is suspected.

The possibility of interchange of matter between the mantle and crust of the earth, with lateral inhomogeneities of density, is considered by K. L. Cook. Seismometric data on wave velocities in their relation to petrographic composition are lucidly presented. The mid-oceanic ridge system, a continuous world-encircling extension of the Mid-Atlantic Ridge, is apparently connected with strike-slip faults; there the "mantle-crust mix" may take place through upwelling of basaltic magma. The role of island arcs and continental rift systems is discussed, together with geothermic heat-flow data. The "mix" area is estimated to cover at least 10 percent of the earth's surface. The subject has far-reaching implications regarding the evolution of the earth and other planets.

A short essay by Sheppard considers the general circulation of the atmosphere "as a budgetary exercise" involving transfer processes of heat, momentum, and water vapor. Ingenious dimensional models are developed which, however, are failing in application and lead ultimately toward empiricism.

In another review of a more practical nature, J. P. Lodge describes laboratory methods for the determination of concentration, size distribution, and composition of aerosols; no results are quoted.

Charged particles of solar and cosmic-ray origin are trapped in the geomagnetic field, where they spiral along the magnetic lines of force, back and forth from one hemisphere to the other, being reflected from certain mirror points. This is an observational fact, apparent in the radiation belts, this newest addition to the geophysical domain. The trapping of protons originating from cosmic-ray albedo neutrons was first described by Singer. However, the more important mechanism of cooperative trapping of solar protons is not well understood; it is to be accepted as a fact. As a consequence of magnetic field gradients, the trapped particles drift in a longitudinal direction, creating a westward current. This, and other mutual interactions or perturbations between trapped particles and the geomagnetic field are the subject of a detailed cooperative study by Apel, Singer, and Wentworth. A model of the outer, or main radiation belt is proposed, and the theoretical predictions are compared with the experimental data. There is qualitative and also quantitative agreement. The physical and mathematical basis of the theory is given, so that the essay may serve as a first introduction into the theory of the magnetosphere.

The most extensive contribution, "Celestial Geodesy" by Kaula, is a little textbook covering everything, from the celestial mechanics of the motion of artificial satellites to methods of observation, including those of the moon, all with the purpose of obtaining precise geodetic coordinates. Final new results for the earth's radius, flattening, gravity, etc., are quoted.

Ample bibliographical lists add to the value of the volume which is a precious addition to any geophysical, astronomical, geological, physical, or geodetic library.

Thermodynamique (5th ed.). By A. Kastler and R. Vichniewsky. Cours de Physique Générale, edited by G. Bruhat. 822 pp. Masson, Paris, 1962. Paperbound 72 NF, clothbound 82 NF. *Reviewed by J. H. Van Vleck, Harvard University.*

IT would not be fair to say that this impressive volume of over 800 pages and almost 300 figures is simply a new edition of Bruhat's *Thermodynamique*. It is almost twice the size of the fourth edition, which was written in 1947 by Prof. Bruhat himself. The present volume is largely the work of Prof. Kastler, with the collaboration of R. Vichniewsky. Although some paragraphs are lifted verbatim from the earlier edition, by and large the treatment is different, and the scope is widened to include statistical mechanics and the quantum-mechanical foundations of thermodynamics.

The volume is written in the French tradition of lucidity and care. The writers have taken pains, especially in the early part of the book, to introduce the basic concepts gradually and thoroughly. As the author says in the preface, the thermodynamic scale of temperature is introduced without first introducing the concept of a perfect gas in order to avoid the impression too often given that such a gas is indispensable to the understanding of such a scale.

The first 150 pages are devoted to fundamental concepts and thermodynamic relations (in connection with which, incidentally, reference might have been made to the existence of Bridgman's very useful "A Condensed Collection of Thermodynamic Formulas"). Then come about 300 pages on "Applications des Principes". There is considerable stress placed on the Nernst heat theorem and chemical thermodynamics.

It is a well-known fact that modern courses in thermodynamics tend to draw more and more on interpretation of thermal behavior by means of statistical mechanics. Prof. Kastler has kept abreast of this tendency, as Part 5, comprising about 250 pages, is on statistical thermodynamics, a subject not treated in any detail in the earlier edition. Such subjects as the Einstein-Bose and Fermi-Dirac statistics are included.

Almost innumerable applications of thermodynamics are presented in the volume, with particular emphasis on the modern ones, including such subjects as adiabatic demagnetization and masers. It is natural that Prof. Kastler would include the modern developments, as he has made many notable contributions in the area that straddles thermodynamics and rf or microwave spectroscopy.

The final part of the book, written by R. Vichniewsky, is on industrial machines, and strikes a different note, taking one from the domain of the theoretical physicist to that of the engineer—internal-combustion engines, gas turbines, etc.

The volume is listed as the thermodynamical one of a course in general physics. It is described as the thermodynamic part of a "cours de physique générale à l'usage supérieur scientifique et technique". Students who have even begun to master the material in it can consider themselves well-rounded. It differs from our American textbooks in not having any problems. The volume is useful as a reference book (though perhaps not so intended) and would be even more so if references to the original periodical literature and perhaps an index had been included rather than just broad general references to other books and an extensive table of contents printed at the back in the French fashion. However, the labor of writing this book must have been immense, and the writers certainly cannot be criticized for not wanting to make it more extensive and encyclopedic.

Fundamentals of Acoustics (2nd ed.). By Lawrence E. Kinsler and Austin R. Frey. 524 pp. John Wiley, New York, 1962. $10.75. *Reviewed by Walter G. Mayer, Michigan State University.*

ALTHOUGH a number of good books dealing with advanced or specialized problems in physical acoustics are available, there are relatively few introductory texts. *Fundamentals of Acoustics* has been one of these elementary books for about a decade. The second edition cannot be called a newcomer because both scope and arrangement are essentially the same in both the old and the new edition. The first four chapters are concerned with the mechanics and the mathematics of oscillations, vibrations of strings, bars, and membranes. The straightforward treatment of these topics follows the standard lines of approach. In the next five chapters on plane and spherical acoustic waves, transmission phenomena, and sound absorption in fluids, the authors only cover the essential principles which would prepare the student for more sophisticated