essentially on molecular distribution functions, such as have been in general successful in describing the properties of gases.

Lattice theories of the liquid state start from the assumption that there exists in a liquid some kind of order or structure reminiscent of that which characterizes the crystalline solid, though it is recognized that the structure must necessarily be much looser, changeable at any place with time, and decisive in producing the observed properties of the liquid only through the average values calculated from it. The methods discussed by the author are the "cell" theories, in which a regular lattice structure is postulated with all sites occupied, the "hole" theories, in which some of the lattice sites are unoccupied, the "tunnel" type of theory, in which a tunnel, through which a whole line of molecules can move, replaces the single cell, and the "Monte Carlo" theory, which assumes that the volume available for molecular motion is divided up into *large* cells, each containing many molecules. The last-named method essentially involves averaging over ensembles of molecular configurations.

The author discusses these various methods in turn, devoting indeed most of his attention to the "cell" theories. It is assumed that the reader is acquainted with the basic principles of statistical mechanics. Armed with this equipment he will find the book a useful summary of present knowledge. The shortcomings of the available theories of liquids are candidly set forth, and the challenge which this difficult state of matter still presents to the theorist is clearly presented.

Radio Exploration of the Planetary System. By Alex G. Smith and T. D. Carr. 148 pp. Van Nostrand, Princeton, N. J., 1964. Paper $1.50.
Reviewed by H. J. Hagger, Albiswerk Zürich, Switzerland.

It is astonishing that most radio astronomers are interested in radio emission from sources in deep space and from interstellar matter, but only a few scientists are eager to learn more about the members of the solar family by using radio telescopes. A. G. Smith and T. D. Carr, two radio astronomers from Florida Radio Observatory, have undertaken the task of writing a booklet on the radio exploration of our solar system for students and other people having an understanding of physics and an interest in the subject. The first two chapters deal with a historical survey of radio astronomy and with the tools and techniques a planetary radio astronomer uses. In very simple but concise language the basic experimental and theoretical features of the subject are described. In chapter three the authors start with some general remarks on thermal radiation and its relationship to temperature, later on they discuss the temperature measurements taken from planets at different wavelengths. The discrepancies of Venusian temperature measurements are explained from the point of view of transparency of the planet's atmosphere to frequency. In chapter four the most interesting planet of our system, Jupiter, is investigated both with regard to its thermal radiation and to the nonthermal microwave emission which a radiation belt is considered responsible for. In chapter five the authors deal with the sources of planetary radio signals, discussing plasma dynamic explanations for nonthermal radiation, and again Jupiter as a radio source is of topmost interest. At the end of the chapter the question remains open whether or not Jupiter is actually the only planet showing radio emission of nonthermal origin. Radar astronomy, the subject of the next chapter, is mostly used for meteor investigations, but conclusions about the nature of the surface of planets may be drawn from radar echo measurements. The last chapter relates radio astronomy to man's exploration of space and gives an outlook into future projects which may try to answer the question of the existence of intelligent life in other planetary systems.

This booklet may be considered to a certain extent a supplement to Steinberg and Lequeux's book *Radio Astronomy* reviewed previously (*Physics Today*, June 1964, p. 58), but considered separately this booklet stimulates the wish to take part in planetary exploration by radio. The authors have solved the problem of explaining the radio mysteries of our solar system in a nice and concise manner. The graphs shown are easy to read and to understand, the selected photographs of instruments and objects under investigation are welcome, and the references given and the index are very helpful. Thus I can highly recommend this book to everyone interested in radio astronomy and in our solar system in particular. Even a reader with a non-specialized physics background may easily understand and enjoy the book.

Functions of a Complex Variable and some of their Applications. By B. A. Fuchs and B. V. Shabat. 389 pp. Hindustan Publishing Corporation, Delhi, 1962. Rs 35.00.
Reviewed by J. Gillis, Weizmann Institute of Science, Israel.

It is clear from the material in this book that the Russian original must be excellent. After all it is not easy to say anything terribly new in the classical theory of functions of a complex variable at the level of the advanced undergraduate and early graduate student. Such textbooks can really differ very little from one another except as to titbits of useful explanation and the choice of examples, and in these respects the book under review definitely scores. There is a careful exposition of fundamentals and these are abundantly illustrated by interesting applications, including some to electrostatics and classical hydrodynamics. And one must praise the selection of real integrals evaluated by means of residues. For once we have a book with examples different from those which have appeared with dismal regularity in every previous textbook known to the reviewer.

Unfortunately the standard of the translation is low. The English style is worse than poor, and theorems are stated in such a slipshod manner that the book is more liable to harm students than help them. Thus Liouville's theorem is extended to the proposition, "If the function $w = (z)$ be regular in the whole open plane and does not take up values corresponding to a certain curve in

the w-plane, then it is a constant." Apart from the obvious typographical error, we have to ask what kind of certain curve is meant? A simple closed curve? Any arc? A continuous curve? The student who knows the answer will not be misled, but then he has little need of the book in any case.

One can only regret that a really good text should be marred by such poor treatment. Perhaps the brightest feature of the situation is the well-justified modesty of the translator who chose to remain anonymous.

High Pressure Physics and Chemistry. R. S. Bradley, ed. Vol. 1, 444 pp. $15.50; Vol. 2, 361 pp. $12.50. Academic Press, New York, 1963.
Reviewed by Stuart A. Rice, University of Chicago.

Amongst the flood of review volumes, there occasionally appears a comprehensive treatise that is both timely and welcome. In my opinion, *High Pressure Physics and Chemistry* falls into this elite category. Following the pioneering work of Bridgman, there has been an enormous expansion in the use of high-pressure techniques for a variety of studies. To discover what has and has not been done, what is the current state of the art, etc., would require a survey of a large number of journals scattered over a great variety of disciplines, except for the existence of review volumes. Of the several treatises written since 1949, this two-volume work is the most comprehensive; extensive bibliographies at the end of each chapter cover the literature up to early 1963. Despite the large number of contributors, there is relatively little overlap and repetition among articles.

Several chapters describe experimental techniques, but only Chapter 2 is devoted exclusively to a discussion of the production and measurement of high pressures. Aside from the historical material in Chapter 1, all of Volume 1 is devoted to the properties of matter in the gaseous, liquid, and solid states. The topics surveyed include: properties of compressed gases, compressibility and equation of state for liquids and solids, phase changes, transport and electrical properties of liquids and solids, and others. I have found the various articles almost uniformly good. In general, the exposition is clear, the references appropriate, and a fine balance is maintained between theory and experiment. Volume 2 contains material more directly of chemical interest. The contributions include surveys of high-pressure studies of geochemical interest, chemical equilibria and chemical kinetics, x-ray techniques, shock waves, and radio-frequency spectroscopy.

High Pressure Physics and Chemistry will be an indispensable reference tool for all investigators interested in the use of high-pressure techniques. As a bonus, the quality of the writing makes the text useful for beginning graduate students.

Atomes, Molécules, Noyaux. By Pierre Fleury and Jean-Paul Mathieu. Vol. 8 of Physique generale et expérimentale. 346 pp. Eyrolles, Paris, 1963. 68,05 NF.
Reviewed by Hans Bichsel, University of Southern California.

Some information about the whole series of which this is the last volume is contained in the last chapter "Remarques sur l'étude de la physique"; the material for a "first" study of physics is provided, presumably at the college level: "The arrangement is in the traditional sequence of topics, but indications of atomic and molecular structure are scattered throughout the series, while in contrast, nuclear physics and wave mechanics are taken up only in the last volume." The material in this last chapter should probably be read by the student at the beginning of his studies rather than at the end. Some of the remarks presented might be of interest to the teachers in the United States who are at present concerned with the reorganization of our physics curricula and books.

To get down to a discussion of Volume 8: In just about 300 pages of text (not counting the chapter mentioned above and miscellaneous tables and pages of glossy photographs) a profusion of material is offered. Not only the subjects indicated in the title are discussed but a description of the whole of modern physics is given. After a review of the properties of particles and waves and the basis of quantum mechanics, chapters on atoms and molecules follow. A discussion of the properties of condensed substances, including some solid-state theory, and quantum statistics closes the first half. The second part of the book (about 120 pages), dealing with nuclear transmutations and structure, includes the standard subjects of nuclear physics, and, in addition, sections on cosmic rays, accelerators, and reactors.

The whole approach is quite different from the presentation in the average American textbook. One has an impression of a great conciseness of expression. Just as an example: the very first paragraph in the text reads, "Matter cannot be divided indefinitely; numerous experimental facts show that any chemical element is composed of identical *atoms,* and that these atoms can be in different states (neutral, excited, ionized) which will be discussed later, and also that there are for many elements several isotopic varieties (see paragraph 1-5) differing slightly in their masses, but very little in their other properties." The development of concepts progresses at a fantastic pace. For example, the fundamentals of a mass spectrograph are derived on about half a page (including a schematic drawing), while the *focusing* conditions are derived on the rest of the same page. On the following page, another two types of spectro*graphs* are discussed, together with the mass spectro*meter.*

This same conciseness is also found in the extensive referrals to other sections of this volume and just as readily to all the rest of the series. There is hardly a page without one or several referrals to other volumes. Several original explanations, experiments, or illustrations have not come to my attention before; e.g., the idea of describing the creation of an electron and positron pair as the formation of a heap of sand from level ground—one has to dig a hole somewhere to produce the heap—can be worked out quantitatively; similarly, an experiment by Brumberg and Vavilov (no reference given) demonstrating unambiguously the quantum nature of light by visual observation sounds fascinating. It is interesting to