wind". With a temperature of two million degrees, it generates radiations which the photosphere is unable to produce; yet its extreme tenuity prevents these radiations from reaching destructive levels.

A plasma of filamentary structure, betraying the rule of magnetic fields, it appears to be heated from below by shock waves into which subphotospheric turbulence degenerates upon reaching the tenuous upper strata. The source of its heating is one of the many mysteries of coronal physics and structure discussed in this volume by 47 expert authors from eleven different countries. The contributions range from brief abstracts to extensive memoirs; a Russian article alone contains 22 pages of a table of predicted short-wave spectral emission lines of atoms and ions. Theoretical treatises prevail, setting up more problems than solutions. As examples of observational highlights, the use of American rockets with pinhole cameras for x-ray pictures of the sun, and the French method of polarimetric registration of the corona in daylight could be mentioned.

The volume covers current problems of coronal theory and observation. With ample lists of literature, it is an important landmark, facilitating further study of the corona.

Electromagnetic Waves in Stratified Media. By James R. Wait. Vol. 3 of Internat'l. Series of Monographs on Electromagnetic Waves, edited by A. L. Cullen, V. A. Fock, J. R. Wait. 372 pp. Pergamon, London, 1962. Distr. in US by Macmillan, New York. $15.00.
Reviewed by H. J. Hagger, Albiswerk Zürich, Switzerland.

For studies in electromagnetic wave propagation in our terrestrial atmosphere, a model assuming a layer structure of the medium is very useful, especially for radio waves in the very low-frequency range (3 to 30 kc/s). J. R. Wait is a well-known research worker in this field, and the book reviewed is the outgrowth of courses in wave propagation given at the University of Colorado and the Technical University of Denmark.

Starting with some basic ideas and notation on Maxwell's theory, the author first considers the reflection of waves from horizontally stratified media, where solutions for the plane waves, and later on for cylindrical (line-source) and spherical waves (dipole), are developed. Some experimental data are also given. In Chapter 3 the variation of conductivity or dielectric constant is assumed to follow certain profiles, where solutions following an exponential or a power law can be found. In the next chapter, continuously stratified media are considered and various approximation procedures either for slowly varying profiles (WKB method) or for rapid variation (iteration process) are given. Propagation along a spherical surface (of both large and small curvatures) is treated, using Watson's method for large, and Bremmer's approach for small, radii (or very low frequency waves around the earth). In Chapter 6 the author gives the fundamentals of the mode theory of wave propagation over a flat earth with a sharply bounded ionospheric layer. Later in the chapter he discusses the influence of the curvature of the layers guiding the waves. At the end of this chapter a stratification of the ionospheric boundary layer is also considered. In Chapter 7 the mode theory is derived for the very low-frequency case with the aim of obtaining numerical results for attenuation, phase velocity, and dominant mode excitation. In the next chapter Wait deals with the very important case of stratified magnetoplasma media. He starts with the dielectric properties of a plasma, the reflection coefficient for a plane boundary between free space and plasma and then develops the theory for a stratified plasma and for an anisotropic ionosphere and makes some remarks on strongly ionized media and the energy dependence of the collision frequency. In Chapters 9 and 10, theoretical and experimental results on very low frequencies (3-30 kc/s) and extremely low frequencies (1-3000 c/s), respectively, are compared. In the next chapter the relationship between mode theory and ray theory is discussed. In the twelfth (and last) chapter Wait considers propagation in a stratified medium having a parabolic refractive index profile, a problem which is of great importance at ultrahigh frequencies.

The book is an excellent monograph on this subject, and a large number of references to each chapter and very helpful indices are given. It is a very theoretical treatise, but clearly written. It can be highly recommended as a reference book for all research workers in the field.

Physics and Chemistry of the Organic Solid State, Volume 1. David Fox, Mortimer M. Labes, Arnold Weissberger, eds. 823 pp. Interscience, New York, 1963. $25.00.
Reviewed by Stuart A. Rice, University of Chicago.

Following recent developments in molecular biology and solid-state physics, there has been a significant growth of interest in the study of the properties of organic crystals. The text under review consists of a series of articles by experienced investigators dealing with many aspects of the study of such crystals. No attempt has been made to collate in one volume articles which overlap and, for this, the editors are to be commended, since the volume has been published more rapidly than is typical of collections.

The articles vary considerably in quality. That by Craig and Walmsley on the visible and ultraviolet absorption spectra of molecular crystals is excellent and very readable. On the other hand, the article by Lions is disappointing.

The first article in the book, by Westrum and McCullough, deals with the thermodynamics of crystals. It gives a very good coverage of the field and cites approximately 800 pertinent references. There is some description of experimental techniques. In contrast to the thoroughness of this article, that by Sloan on the definition and attainment of purity in organic compounds is adequate but not detailed enough. Many different methods are discussed by Sloan, but too few examples are given to make the article truly useful. For example, tabular material on what substance A can be separated from what substance B and how much of substance A can be detected in substance B would have been very helpful.

Other articles deal with crystal growth, the structure of surfaces, plastic crystals, photochemistry, crystalli-

zation of long chain polymers, and the thermal reactions of solids. In general, the articles collected give an overall though spotty view of the current status of our knowledge of the properties of molecular crystals. I am confident that the second volume of this series will fill in the gaps, thereby making the set an indispensable aid to all those investigators interested in the properties of these substances.

Methods of Quantum Field Theory in Statistical Physics. By A. A. Abrikosov, L. P. Gorkov, and I. E. Dzyaloshinski. Revised English edition translated and edited by Richard A. Silverman. 352 pp. Prentice-Hall, Englewood Cliffs, N.J., 1963. $16.00.

Reviewed by George H. Weiss, Rockefeller Institute.

The technique of representing terms of a series by diagrams was first developed for the solution of problems in statistical mechanics. Although the most spectacular advances in the mathematical techniques were made by field theorists, events have come full circle and it is statistical mechanics that reaps the greatest benefit from those advances. The present book gives an account of the considerable contributions made by Russian workers in the systematic application of field theoretic techniques to problems in statistical mechanics.

To this reviewer the outstanding virtue of the book is its emphasis on the role of physical insight as an aid to the usual heavy mathematics. The first chapter, for example, introduces the reader to the concept of elementary excitations in liquids without any formalism. After some of the physical ideas are presented, the authors give an account of the mathematical techniques necessary to treat in detail, the problems suggested by the first chapter. Not surprisingly the authors emphasize the Green's-function approach of Migdal and Galitskii rather than methods more popular in Western research. Further, the book is concerned only with equilibrium problems rather than with any of the more vexing transport questions.

Aside from their presentation of the bare bones of the theory, the authors discuss several interesting applications which are not usually found in texts of this sort. Among these are the