ing for the most accomplished professionals. It is also for their wives and lady friends and for the more curious of their humanist colleagues —here's an authoritative and intellectually honest account of the challenge and excitement of good science, told from within, with charm and style. There are passages of almost poetic beauty (see, for example, the very last two paragraphs of Volume II). And this "Richard's Almanac" is also for senior directors of research, laboratory vice presidents, scientist-politicians, and others in need of anecdotes, historical snippets, snatches of authoritative scientific philosophy, and other ingredients for public communication about science.

The Feynman lectures are a sheer delight. And just think, they are educational too!

Thermodynamics. A Macroscopic-Microscopic Treatment. By Joachim E. Lay. 814 pp. Merrill, Columbus, Ohio, 1963. $11.25.
Reviewed by R. B. Lindsay, Brown University.

Thermodynamics is one of the most remarkable theories ever created by the mind of man. The fact that it is now subject to a certain amount of neglect by physicists and by many of them considered more properly the province of engineers and chemists should not blind us to the glorious chapter its evolution forms in the history of physics. The key role which the concepts of energy and entropy play in practically all aspects of human experience suggests a receptive look at every new attempt to present the basic principles and applications of thermodynamics.

The book under review constitutes such an attempt, written by a mechanical engineer primarily for engineering students. It differs from the general run of engineering texts in this field by the inclusion of a substantial amount of material on kinetic theory and statistical mechanics. This is the meaning of the term "macroscopic-microscopic" in the title. The author decided against the plan of basing the whole of thermodynamics on the statistical approach, and develops the classical macroscopic point of view and the probability-statistical method separately. There is a certain amount of integration of the two approaches, though the full power of the statistical method is not revealed. Thus, while the statistical interpretation of entropy is adequately discussed, the statistical derivation of the first law and the associated definition of heat are not presented.

The treatment of classical thermodynamics is clear and persuasive. The basic mathematics is adequate, though the reviewer believes the reader will find somewhat misleading the use of the same differential notation for both state variables and those quantities, like work and heat, which are not state variables. The text is illustrated with excellent diagrams and the author has provided a wealth of problems, some of which are worked out in detail. No reasonable pedagogical device has been overlooked.

Among special topics of interest that are treated, the reader will find the thermodynamic interpretation of information theory, an extensive presentation of flow problems, including shock waves, reactive mixtures, power cycles involving the solid states, and the thermodynamics of elastic, electric, magnetic, and radiating systems. The appendices contain useful tabular material. The modern analytical engineer should find this a useful book.

Lectures on the Many-Electron Problem. By R. Brout and P. Carruthers. 204 pp. Interscience, New York, 1963. $9.50.
Reviewed by B. W. Shore, Harvard College Observatory.

In recent years, workers in statistical mechanics have been strongly influenced by the techniques of quantum field theory. This is particularly true of those studying the properties of metals which can be derived by treating the metallic electrons as a gas. The prevalent designation "many-body problem" for the statistical mechanics of interacting particles expresses this current theoretical viewpoint. In the present monograph, the authors apply these techniques in some detail to three aspects of the interacting electron gas: cluster expansions, correlation energy, and generalized dielectric constant.

Cluster expansions are treated both classically and with the machinery of second quantization. Classically, the cluster expansion expresses the partition function for interacting particles as a power series in density. The coefficients in the expansion involve integrals over the positions of particles interacting by a two-body potential. In the quantum field theory approach, operator expansions are represented by a series of diagrams or graphs. The authors go into some detail on the use of such graphical aids when performing the summation.

The correlation energy (the difference between the actual energy per particle and the energy given by the Hartree-Fock approximation) is treated in several approximations, both in a separate chapter and at relevant points throughout the exposition.

The generalized dielectric constant used here is a "longitudinal" quantity describing density fluctuations induced by a test particle, rather than a response to electromagnetic waves. It links the microscopic interaction to macroscopic properties. (There is an unnecessary confusion of symbols here, with epsilon used for the dielectric constant, a single-particle energy, and an infinitesimal quantity. The two type fonts are not always used consistently.)

This book is primarily an exposition for the specialist. It provides a useful supplement to recent journal articles for readers familiar with the subject. The student will do well (as the authors suggest) to study first the more general monograph by Thouless and the reprint collection edited by Pines.

Radiation Hazards and Protection. By D. E. Barnes and Denis Taylor. 221 pp. Pitman Publishing, New York, 1963. $8.50.
Reviewed by H. J. Hagger, Albiswerk, Zurich, Switzerland.

Today nonspecialized people are working with radioactive substances, and so the danger of possible radiation hazards is increasing. Many articles on how to handle these substances and what precautions have to be observed in laboratories have been published in specialists' journals,