Relativistic electrodynamics, including the classical theory of radiation interaction, represents the concluding portion of Synge's book. It is perhaps here that one misses most some discussion of recent work in quantum theory. It is precisely because of the lucidity of the discussion that one would like to see it extended further. Altogether the book deserves high praise.

PETER G. BERGMANN
Department of Physics,
Syracuse University

Electronic Transformers and Circuits. Reuben Lee. Wiley, New York; Chapman and Hall, London, ed. 2, 1955. xvi + 360 pp. Illus. $7.50.

The stated objective of Lee's book is to provide a reference book on the design of transformers for electronic apparatus and to furnish electronic equipment engineers with an understanding of the effects of transformer characteristics on electronic circuits. To this end, chapters are included on transformer construction, rectifier performance, audio transformers and circuits, higher frequency transformers, control transformers, magnetic amplifiers, and pulse and video transformers and circuits. A quite complete bibliography is included, and the book is well indexed.

As stated in the preface, in a book of general coverage there is room for only a brief treatment of any phase of the subject. In general those phases dealing with low-frequency transformer design are quite adequately covered; however, the reader will find comparatively little in this book to aid him in the design of high-frequency transformers. Probably the most thorough portions of the book are those dealing with comparatively low-power transformers of conventional design—for example, filament transformers, anode transformers, combination filament and anode transformers, and reactors; with audio transformers; and with pulse and video transformers. The material on magnetic amplifiers forms a very good summary of this extremely important field, and sufficient theory is presented to give the reader an adequate background.

The text is well interspersed with charts, graphs, and design guides, and there are numerous examples to illustrate the design procedures. Despite this, however, the reader will still find it necessary to call on the benefits of experience to indicate, for example, allowable values of core induction, wire current density, estimated losses, regulation, and so forth. Useful formulas and graphs are provided from which such design parameters as open-circuit and leakage inductances and interwinding and total capacitances may be calculated. Thus the treatment of audio transformer design is well handled in the amount of space that is provided, and it should provide the reader with the essential details for the design of conventional audio amplifiers.

The approximate treatment of the transient response in pulse and video transformers should also provide good reference material. The treatment of radar pulsers and charging reactors is adequate. Sweep circuit operation is covered in some detail, although there is comparatively little on transformer design for this application. Ferrites, which find particular application in this and in high-frequency transformer design, are given very little mention. There is a brief mention of this extremely important class of materials on page 33, and there are two pages on high-frequency uses on pages 217–219, and only passing references elsewhere.

High-frequency transformers—for example, those used in intermediate-frequency amplifiers, are treated rather lightly on pages 224–232, and this treatment deals exclusively with the calculation of inductances, there being no information on the coil Q. Readers will find this information useful only as background material; it is insufficient for the design of such transformers.

Another omission, and a rather serious one, is the lack of adequate treatment of audio transformers for use with transistors. This important field of application is mentioned briefly on one page, and comparisons are drawn with conventional tube circuits that are misleading, if not downright incorrect. Various factors—that the impedance levels of transistors are radically different from those of electron tubes, that direct current usually flows in both windings, that small size is even more necessary here than with tubes, and that transistors are bilateral devices—would make a more detailed treatment of the subject desirable.

This book has valuable reference material for the design of low-frequency transformers and reactors. The high-frequency treatment is useful for background but inadequate for design purposes.

RICHARD F. SHEA
General Electric Company

Principles and Problems in Energetics. J. N. Brønsted. Translated by R. P. Bell. Interscience, New York, 1955. vii + 119 pp. Illus. $3.50.

The student of thermodynamics quickly recognizes that the subject is complete and exact. If he accepts the laws of thermodynamics, elaboration of the subject is accomplished by relatively trivial mathematical manipulations. The final results thus require no proof, either theoretically or experimentally, and the difficulties that arise for the thoughtful student of thermodynamics are concerned almost entirely with the first and second laws.

J. N. Brønsted, about 20 years ago, became disturbed over the classical formulation of the laws of thermodynamics. Over the next 10 years he developed what he preferred to call a system of energetics. He believed that it was simpler than traditional thermodynamics, and he hoped that it could be used for irreversible processes. The methods that he devised for these purposes cannot be described briefly. It can be said, however, that the first law of thermodynamics becomes a work principle, which applies to reversible processes, and that the second law is broadened to a heat and equivalence principle, which includes irreversible processes. It can also be said that Brønsted never loses the reader in mathematical complexities and that he always emphasizes the physical concepts.

The results of his deliberations appeared usually in Danish journals; this collected account of them was first published in Danish in 1946. Since English-speaking scientists are usually poor linguists, we should be grateful for an opportunity to learn about energetics in a readable translation by R. P. Bell. An interesting foreword has been added by V. K. La Mer, who has enthusiastically introduced the subject to his own students. Anyone who is seriously interested in thermodynamics should read this book.

GEORGE M. MURPHY
Department of Chemistry,
New York University

Mesons and Fields. vol. I, *Fields.* Silvan S. Schweber, Hans A. Bethe, and Frederic De Hoffmann. Row, Peterson, Evanston, Ill., 1955. 449 pp. Illus.

This is logically the first part, if chronologically the second part, of a two-volume work under the above title. Volume II, *Mesons,* by Bethe and De Hoffmann, has already appeared; the present volume is primarily the work of Silvan S. Schweber. It provides an excellent introduction to present-day field theory and the associated covariant perturbation formalism. The background required is approximately a standard course in quantum mechanics, making the volume well suited for use as the basis of a graduate physics course, which, in fact, was its origin.

The book first develops the equations and formal properties of relativistic particles with spins 0 to ½, and then pre-