

disappearance can hardly be conceived.

The editor for this sixth edition of the volume on thermodynamics is A. Kastler, professor at the University of Paris. This latest updating unites the qualities of the classical text by Bruhat and the completeness of a really modern treatise. It ranks among the most comprehensive thermodynamics texts available to students. It carries along a well balanced blend of basic principles and their experimental and historical justification, theoretical arguments and applications to engineering and to advanced contemporary physics. As is frequent in French books, the mathematical exposition is systematic and rigorous, but it is by no means overwhelming and the book remains primarily a physics book. It is a good clear treatise but does not have problems for students to solve. The exposition is above average regarding clarity.

The first 100 pages are devoted to a detailed analysis of the principles of thermodynamics and their formulation. The mathematical relationships are then developed, and direct application of the principles is made to important cases such as: perfect and real gases, real fluids, changes of state and Nernst-Planck postulate. This is followed by the application of thermodynamics to several physical phenomena (surface energy, electrostatics, thermoelectricity, voltaic cell and magnetism), and the general features of chemical thermodynamics. An elaborate presentation of statistical thermodynamics and its applications covers 250 pages. Moreover, a new chapter by J. Chanu gives a substantial introduction to the thermodynamics of irreversible processes.

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Plasma Diagnostics

W. Lochte-Holtgreven, ed.
928 pp. Interscience, New York, 1968.
\$38.50

"This book provides an up-to-date account of the major theoretical and practical aspects of the diagnostics of high-temperature plasmas with special emphasis on quantitative spectroscopic methods. The different chapters were written by specialists actively engaged in research in these fields."

So starts the jacket blurb, and I could not have said it any better. W. Lochte-Holtgreven, of the University of Kiel, has gathered together a dozen men (including himself) and has produced 15 chapters on diagnostics of hot plasmas.

The first six chapters concentrate more or less on various spectrographic methods. X rays, microwaves, lasers and mass-spectrographic methods each rate a chapter, and electric (Langmuir) probes occupy two chapters. The second of these covers the special conditions usually arising from hypersonic velocity and an ungrounded system, met with in space-vehicle mounting of these probes. A chapter is devoted to measurement of magnetic fields in pulsed-plasma systems (in dc systems, the magnetic fields are too uniform to give much information, says Böttcher, who wrote this chapter). This section also describes various probes, Zeeman methods and the Faraday effect. A chapter on collisions and transport cross-section measurements and one on transport properties end the book.

As befits a 928-page book, it says almost everything worth saying on the subject. After working in plasma physics for over ten years, I found a number of techniques in this book new to me, but I could not think of one, offhand, that was not at least mentioned and referenced.

From the depth of treatment of material, I would judge that the book was intended to teach a worker in the field about methods he may not know, and to teach him enough that he can intelligently choose a particular method to apply to his problem. But then I would suggest that the worker still go to the references given (there are 1695 of them) to learn enough details to apply the method. This is a reasonable way to organize such a book. To have added the contents of all those references would have put the book's covers too far apart.

For a multiauthored book, the chapters are relatively uniform in depth and treatment. References up to 1966 are cited by some authors, 1967 references are cited by others. Perhaps amusingly, Robert L. F. Boyd, writing on Langmuir probes on spacecraft, (probably the most avant-garde chapter), quotes references only to 1965. This could be, of course, because there was no 1966 references that Boyd found of interest; in many cases, years were completely

skipped by all of the 12 authors.

Why, in a book so beautifully organized, so admirably useful to nearly every working plasma physicist, so thoroughly referenced, (and so expensive), did Lochte-Holtgreven get tired at the end and put in a skimpy subject index? Was he trying to prove that nothing, not even his book, was perfect?

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Variational Principles In Dynamics and Quantum Theory

By Wolfgang Yourgrau,
Stanley Mandelstam
201 pp. Saunders, Philadelphia, 1968.
\$6.50

This is the third edition of a little volume, first published in 1952, that traces the uses of the variational principle in physical science all the way from Hero of Alexandria to Schwinger of Massachusetts. The occasion for the new edition is the addition of an essay by Laurence Mittag, Michael Stephen, and Wolfgang Yourgrau on the hydrodynamics of normal and superfluids, emphasizing variational formulations.

The book, however, is worth commenting on as a whole, for it has languished for 17 years in an undeserved obscurity. It offers concise and elegant formulations of the great variational principles of optics, mechanics, electrodynamics, quantum theory (old and new), and now, hydrodynamics. Although each topic is skillfully presented in analytic terms congenial to the modern reader, the historical background is almost always preserved. This is a luxury almost universally abandoned by authors of scientific books, and though the reasons for this are obvious, the loss is quite possibly greater than many of us think. It is not just that the subject is thereby dehumanized; the accompanying loss of perspective on our own efforts, both as physicists and as people, is equally to be regretted. A trivial example is the discussion of Hamilton-Jacobi theory (the concise presentation of which, by the way, is the best I have seen this side of Landau and Lifshitz) which treats us to the spectacle of Jacobi, unable to resist the needle, in pre-