Hermann Flaschka of the Georgia Institute of Technology, with later revisions by the authors.

The blend of Schwarzenbach's theory, Flaschka's practicality and Irving's updating of terminology and his crisp concise English makes this quite an outstanding book. It gives an authoritative view of every broad area of complexometry and an insight into almost every nook and cranny. The theory of complexation of metal ions in solution is treated according to the mass action law by Bjerrum's method in an admirably precise way and a good account is given of metallochromic indicator action. Instrumental indication of the end-point is also dealt with in a separate chapter, though one cannot but be surprised to find coulometric titration listed with the others as if it were an end-point detection procedure instead of a completely different method of carrying out a titration without even using a burette or standard solution. Electrochemists may also be slightly unhappy about the symbols used for standard electrode potentials and the like in Nernstian equations and the use of concentrations instead of activities. The two chapters on typification of titrations and selectivity are particularly valuable. The second part of the book is devoted to a monographic treatment of the determination of cations and anions by direct and indirect methods and is a most valuable guide. Selection of methods has been made, and generally the selected method is undoubtedly the best. This section is critically comprehensive rather than general and encyclopaedic. As such, it is most welcome.

This second translation could have ridden easily and comfortably on the shoulders of the extremely successful first English edition, but it is a completely new book and a much better one. It is recommended without reserve.

Photometric Methods of Analysis covers a very wide area of atomic and molecular spectroscopy in the areas which are most familiar to the analytical scientist. It is well written in a clear didactic manner and because of this and its comprehensive nature it should be of very great use to all students and practitioners of these branches of science. It may not be without coincidence that the author's initials are A. B. C. because this is what this text gives the readers. The ABC of the selected techniques is spelled out clearly in a most praiseworthy manner. The author has stressed this aspect very strongly throughout—perhaps to the slight detriment of being up to date with some of the more recent developments or at least in condensing them into relatively small volume in relation to their current interest for trace analysis. It must be accepted, however, that there are now five or six comprehensive and special monographs on some of these specific areas, such as atomic absorption, atomic fluorescence, molecular spectrofluorimetry and the like, and these are currently available on most library shelves.

If, therefore, the reader does not place too much weight upon the relative balance of coverage of the newer areas in applied spectroscopy, he will find that he is being given an unusually well thought out introduction and grounding in the basic principles of those topics both with regard to their theory and instrumentation. The author has presented a well integrated, carefully designed course of study of the techniques of absorption of electromagnetic radiation by molecular structures in the UV-visible-IR region of the spectrum and of the (thermal) emission of atoms in electrical discharges between electrodes and in flames. The reader is introduced briefly to atomic absorption and molecular fluorescence phenomena, and although one could have wished that these topics could have been given more expanded assessment it is appreciated that these newer topics are adequately catered for elsewhere in more ephemeral texts than this.

It is probably safe to predict that this text will achieve a steady long-lasting use and appreciation by several generations of students and teachers of applied spectroscopy, and, while many of the "glossier" publications on the newer techniques will age rapidly and pass into limbo,

this book will continue to be thumbed over regularly.

The author is to be congratulated on a sound, worthwhile text which can easily stand level with "Edisbury", "Lothian" and "Candler" in the same series from this publisher.

T. S. WEST

HEAT AND WORK

Understanding Chemical Thermodynamics

By George C. Pimentel and Richard D. Spratley. Pp. 219. (Holden-Day: San Francisco and London, 1969.) n.p.

EVERY lecturer on chemical thermodynamics has, or may have, a two-fold task. He must give most of his students a basic understanding of the subject and the knowledge of how to carry out the standard calculations of the G. N. Lewis tradition. Second, if he is concerned with specialist chemists, he must communicate to the cleverer ones sufficient enthusiasm and interest to enable them to struggle in later life with the austere and majestic writings of Willard Gibbs (and modern authors in the same vein). This knowledge is essential if they ever seriously want to break new ground. This book is concerned with the first task, and is particularly aimed at those whose knowledge of the calculus is minimal and who are undertaking a general introductory course.

The authors' method has been to intermingle macroscopic thermodynamic concepts with microscopic molecular interpretations, and this in my experience is the only possible course to take when there is only restricted lecture time or page space. Thus, potential-energy diagrams are used for specific reactions like that of hydrogen plus iodine, with the movement of a representative point to show the extent of reaction. There is also reference to much older illustrations, of pistons compressing gases in cylinders, with sketch diagrams to illustrate the relative amounts of heat and work involved. As we all know, the soporific effect of a board full of differential equations can often be counteracted by a well timed joke or anecdote. In similar fashion, the sketch diagrams of the text are enlivened by the occasional humorous touch.

This book is much to be recommended, and even honours chemists will find it useful as secondary reading to a primary text such as that of Walter Moore or Denbigh. While these last two texts take the fundamental road to the first law through Born's theory of heat, however, this book follows the well-worn track through the water-calorie. There should, however, be no confusion for specialist chemists and the approach is the only palatable one for biologists and geologists at present. The occasional small blemish may be found, such as the omission of a superscript zero from ΔG° in one or two instances. In a useful short section on bioenergetics, the authors should have pointed out that the free energy of hydrolysis of ATP referred to a pH of 7—this section in fact failed to bring out the importance of pH. For use in Europe, the authors should have added a page of conversion factors to SI units, because these are not mentioned in the text. Perhaps a gummed page might be added for attachment to the inside cover.

D. D. ELEY

TRANSITION ELEMENTS

Halides of the First Row Transition Metals

By R. Colton and J. H. Canterford. (Halides of the Transition Elements.) Pp. xx+579. (Wiley (Interscience): London and New York, September 1969.) 180s.

Halides of the Second and Third Row Transition Metals

By J. H. Canterford and R. Colton. Pp. xx+409. (Wiley (Interscience): London and New York, 1968.) 120s.

THESE two volumes, together with Brown's *Halides of the Lanthanides and Actinides*, form a trilogy dealing with