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part of this contribution do not belong more in a handbook of physical chemistry than in the *Encyclopedia of Physics*. The last two chapters, which are relatively short, contain matters of more physical interest. One is on absolute intensities of bands or of absorption rays in the infrared and, last but not least, dispersion in the infrared spectrum. All this criticism does not mean that the book's contents are not worth your attention. The volume is scholarly, put together by the best authorities in the field; particularly, Prof. Lecomte's authority in his own field is incontestable. It is merely a question of viewpoint which I am raising regarding the amount and type of material that should be concentrated in a volume of this kind. This in no way diminishes the value of this excellent book and full praise should be given both for the beautiful presentation and for excellent judgment shown in the choice of the contributors.

Metallurgical Thermochemistry (3rd Revised Edition). Vol. 1 of Internat'l Series of Monographs on Metal Physics & Physical Metallurgy. By O. Kubaschewski and E. Ll. Evans. 426 pp. Pergamon Press, London & New York, 1958. $10.00. *Reviewed by Cyril Stanley Smith, Institute for the Study of Metals, University of Chicago.*

This is the third edition of this important work, with small but significant changes from the first edition of 1951. (The increased bulk of the book is mostly a result of larger type and thicker paper.) Its most valuable feature is the extensive and up-to-date tabulation of thermodynamic constants for metals and simple inorganic compounds. It also provides a remarkably good summary of thermodynamic theory and experimental methods as applied to metallurgical problems, with specific examples. It is essential to a metallurgist and will be useful to many others who have problems in the field of chemical thermodynamics.

Tables of Modified Quotients of Bessel Functions of the First Kind for Real and Imaginary Arguments. By Morio Onoe. 338 pp. Columbia U. Press, New York, 1958. $12.50. *Reviewed by J. Gillis, The Weizmann Institute of Science.*

Given any sequence of cylinder functions $C_\nu(z)$, modified quotient functions of two types are defined by $zC_{\nu-1}/C_\nu$ and $zC_{\nu+1}/C_\nu$ respectively. In this book modified quotients of both types arising from Bessel functions of the first kind are tabulated. The range of orders is 1 (1) 16, and functions are listed for both purely real and purely imaginary arguments covering, in each case, the range 0(0.01)20.00.

It is difficult to imagine that the usefulness of these tables can ever be comparable with the work and expense which have evidently gone into their production. When such quotients are needed in a calculation on an automatic computing machine, it will nearly always be more efficient (and less costly in storage

space) to generate them as needed. This may cease to be true if the total number of arguments for which the quotients are needed is small, but in that case, one might just as well take the $J_n(z)$ themselves from any of the excellent tables which exist. For hand computation this will almost always be true.

Perhaps the most valuable section of the book is the introduction in which the reader will find a complete list of the relevant formulae, series expansions, and asymptotic estimates.

Nuclear Scattering. By K. B. Mather and P. Swan. 469 pp. Cambridge U. Press, New York, 1958. $14.50. *Reviewed by Kamal K. Seth, Duke University.*

Nuclear properties fall into two broad categories: the "external", e.g., mass, spin, magnetic moment, quadrupole moment, etc., and the "internal", e.g., the nature of nuclear forces, nuclear excitations, etc. The former properties, though extremely useful in any over-all nuclear theory, have caught the imagination of chemists and microwave physicists. The measurement of these properties and the experimental techniques used for the purpose are essentially "nonnuclear". It is the "internal" properties, however, that have become the exclusive concern of the professional nuclear physicist. Almost all information about nuclear structures and nuclear forces originates from some scattering measurement or another. Cross sections of every conceivable type are required and a great variety of projectiles are used. With the exception of high-energy electrons and gamma rays, these projectiles are necessarily nucleons, aggregates of nucleons, or subnuclear particles like mesons. The use of heavy ions (i.e., large aggregates like triply charged nitrogen) is relatively recent; mesons and hyperons are a separate story altogether. Neutrons, protons, deuterons, tritons, and alpha particles are the most commonly used particles. The monograph by Mather and Swan essentially confines itself to proton and neutron scattering—even deuteron reactions are treated rather sketchily. Other projectiles are mentioned in passing.

The monograph is actually two well-integrated books in one. The first half of the monograph is experimental. It is devoted to the description of particle production, acceleration, targets, detection techniques, and particle analysis. The discussions are necessarily brief, but to the point and present a bulk of useful information and suggest sources for more detailed reading on specialized aspects. This part of the book should be read by everyone who is starting his experimental nuclear-physics training. The student will find himself returning to this book from time to time even after he has advanced substantially in his knowledge of the subject.

The second part of the book is devoted to a study of the theoretical aspects of nuclear scattering. *n-p*, *p-p* scatterings at low energy are discussed in detail leading up to the study of light nuclei. The theoreti-

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* "Effects of neutron-induced gas formation on beryllium" by C. E. ELLS and E. C. W. PERRYMAN.

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