settled question of bonding in the metallic hydrides. The preparation and chemical properties are generalized nicely and the confusing details of isolated, specific cases have been eliminated. The short discussion of x-ray and neutron diffraction may not be necessary for all the readers, but it is an excellent review of the operational basis of structure information. The chapter of crystal structure shows the similarity of many of the hydride structures and dispels the myth that hydrides are solid solutions based on the parent metal lattice. The discussion of thermodynamic properties handles the problems of the application of thermodynamics to nonstoichiometric phases very well. The electrical and magnetic properties are related to structure and bonding in a tentative and critical way, in keeping with the uncertainty in the relationship at the present time.

This book is not a handbook of data on binary hydrides. Rather, it is a concise introduction and critical review which would prepare an engineer or physical scientist to understand the literature in this field and to undertake research in this area. In my opinion, it is an outstanding critical review of the subject as well as an advanced textbook.

David T. Peterson

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January 21, 1966

About the Reviewer: David T. Peterson received his PhD in physical chemistry from Iowa State University in 1950. Since that time, he has been associated with the Metallurgy Division of the Ames Laboratory of the Atomic Energy Commission and the Metallurgy Department at Iowa State University. His research interests have centered about the preparation of pure metals, metal-hydrogen systems, and thermodynamics of metal reactions.

Atomic and Ionic Impact Phenomena on Metal Surfaces. By Manfred Kamisky. Academic Press, New York (1964). 432 pp. $14.50

For its size, this book covers a truly remarkable range of subjects varying from thermal energy accommodation, adsorption, and surface ionization to high-energy ion reflection and sputtering. The connection between all of these phenomena is quite logical since, for example, it is necesto understand the criteria for surface cleanliness in order properly to evaluate the results of an experiment on secondary electron ejection by high-energy ions. Moreover this is the first time, to the reviewer's knowledge, that a book encompassing these diverse but intimately related fields has been attempted.

In the author's words, "The intention has been to give the reader a balanced view of the subject from both the experimental and theoretical standpoints and to emphasize the well established principles which emerge and the many peculiarities, obscurities, and uncertainties which still remain to be resolved." In this regard the author has succeeded rather well considering the length of the book. However, partially because of the difficulty of obtaining well-defined surface conditions, there are so many peculiarities, obscurities, and uncertainties in this field that it is impossible to cover them all in the allotted space with complete coherence. This has resulted in a certain amount of confusion in the handling of individual experimental results and in a rather severe curtailment of the necessary theoretical background. Although this latter fault will probably cause no difficulty for those intimately involved in the field, workers in other fields using this book as a reference might have some difficulties. There are, however, sufficient references to original source material. The summary of the experimental methods is good, and the extensive tabulation and correlation of experimental results will be particularly useful for quick reference to specific systems.

As is the case with any book dealing with current research topics, the time lag between completion and publication can render some portions of it obsolete. In general, however, this book is a comprehensive and concise review of the subject literature up to 1963.

Sheldon Datz

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January 26, 1966

About the Reviewer: Sheldon Datz is presently a group leader in the Chemistry Division at Oak Ridge National Laboratory and has worked in the fields of molecular beam scattering, surface ionization, and gas surface interaction. He was a guest scientist at the Laboratory for Mass Separation in Amsterdam, The Netherlands, in 1962-1963, where he worked on sputtering and ion-surface reflection phenomena.

Foundations of Plasma Dynamics. By E. H. Holt and R. E. Haskell, The Macmillan Company, New York (1965). 590 pp. $12.95.

This book is devoted more to background material than to plasma physics itself. It is offered as a senior and graduate text mainly for engineers, and as a reference work for practicing engineers and scientists. As background, there are chapters on tensor notation, electrodynamics, binary collisions, ion orbits, kinetic theory (not assuming prior knowledge of the Boltzmann equation), and gas and surface dynamics in discharges. This leaves, excluding still more interspersed supporting material, less than 150 pages on specific plasma subjects. These include mainly collisional effects, Langmuir oscillations and electromagnetic wave propagation in stable plasmas (notably the ionosphere), and a brief account of magneto-fluid dynamics.

A serious omission is a descriptive chapter on plasma instability. From this book, the student would get little inkling of the typical tendency of laboratory plasmas to be unstable or turbulent with attendant collective transport. There are occasional oblique references to the Langmuir paradox in the introduction, to anomalous diffusion (one paragraph), etc. But probably the student would not appreciate how often the many pages devoted to calculating collisional transport would be irrelevant in the laboratory because collective processes dominate.

While perhaps a useful collection of diverse reference material, as a basic plasma text this book is, in this reviewer's opinion, not wholly successful. As an introductory text, it tends to submerge the essence of the subject in details. As a reference work, many will find its use clumsy because of the notation. One may question whether the authors' extensive use of Cartesian tensor notation is worth the price of unconventionality. Their justification based on teaching experience perhaps misses the point. Namely, in the long run, neither the student nor the researcher will read this book alone. In this light, is the burden of translating familiar equations worth the occasional benefits of compact expression? Tensor notation could have been used only when truly useful, as is often done, for example, in switching from 3-space to 4-vectors in chapters on relativity within electromagnetic theory texts. Lastly, a trifle; in the review copy, Avogadro's number is misprinted on the inside cover.

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February 24, 1966

About the Reviewer: After receiving his PhD in physics from the University of Wisconsin in 1957, T. K. Fowler joined the Oak Ridge National Laboratory where, from 1961-1965, he directed theoretical work in fusion-oriented plasma physics. Now at General Atomic, he is engaged mainly in research on plasma turbulence. He serves on the editorial board of the Physics of Fluids.