The few errors in the book are serious—for example, the statement that "energy is given off when elements of high atomic number are broken down into their nucleons." In the example of a two-component decay curve, the short-lived species is incorrectly resolved. The discovery of element 102 is confused with that of mendelevium, and the diagrams of energy level in which positron emission goes "uphill" are annoying.

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Metallurgy

Electronic Structure and Alloy Chemistry of the Transition Elements. Paul A. Beck, Ed. Interscience (Wiley), New York, 1963, 261 pp. Illus. $12.

This book, which is based on papers presented at a symposium sponsored by the Metallurgical Society and the American Institute of Mining, Metallurgical, and Petroleum Engineers, contains eight chapters, each written by a specialist in the field.

Harvey Brooks discusses theoretical models for transition metals and their alloys and gives a very complete summary, from the theoretical viewpoint, of our present knowledge of bonding in transition metals. He provides an extensive list of references. The most important developments leading to future progress in the field are, according to Brooks, the study of localized magnetic states in dilute alloys, studies of the hyperfine field at the nucleus in ferromagnetic materials, and the influences of many-body effects on properties of, and at, the Fermi surface. F. E. Hoare reviews what specific heat measurements can contribute to the study of the electronic band structure of transition elements and their alloys. For the second and third transition series, the results can be reasonably well explained on a simple rigid-band model. For elements of the first transition series, additional knowledge is needed of the magnetic behavior of some of these alloys, particularly at low temperature. J. Crangle discusses the ferromagnetic properties of alloys of the first transition series as well as those of dilute solutions of ferromagnetic elements in palladium and platinum.

C. G. Shull presents a short but complete summary of the magnetic electron configuration in iron, which can be deduced from magnetic scattering amplitudes when the polarized neutron technique is used. Shull also discusses the magnetic electron configuration in Fe_3Al. In his usual informal style W. Hume-Rothery discusses the problem of the transition metals. The occurrence of specific phases is proposed as a basis for an alloy chemistry analysis based on group numbers or electron concentrations. After expressing the opinion that "mathematicians" will not be of much help to the metallurgists in the near future (although he agrees that "Mathematical work must, of course, continue") Hume-Rothery reviews some of the most promising experimental techniques, including soft x-ray spectroscopy, which, perhaps unfortunately, has not received much attention during the last 20 years.

The last three chapters are concerned with alloy chemisty. M. V. Nevitt provides a most complete description and classification of alloy phases of transition metals (including the rare earths) in terms of their composition and crystal structure. Hans Nowotny places special emphasis on alloys of the transition metals with boron, carbon, nitrogen, aluminum, and silicon. These two chapters, with their extensive lists of references, constitute a very complete and up-to-date summary of the crystal structure of alloys that involve transition elements. In the last chapter Leo Brewer states that "Although in principle all the properties of metals should be deducible from the solution of the Schrödinger equation, in practice there is no hope in the foreseeable future that one will be able to deduce properties of a wide variety of metallic systems from first principles alone. Because of the impractibility of the exact quantum treatment of metals one must resort to various simplified models to aid in the correlation of the properties of metals." Brewer then develops his ideas about the application of Pauling's valence bond theory to metals. Brewer stresses N. Engel's contributions to this field and reminds us that Engel's original work was published in Danish (in 1949) because the three most important metallurgical journals published in America—*Transactions of the American Institute of Mining and Metallurgical Engineers, Transactions of the American Society for Metals*, and *Acta Metallurgica*—considered his manuscripts too original and novel and for that reason rejected them.

This book will constitute a very valuable addition to the libraries of students and advanced research workers in the field of alloys.

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Atmospheric Processes

Exploring the Atmosphere. G. M. B. Dobson. Oxford University Press, New York, 1963. 200 pp. Illus. $3.40.

This little book presents a fascinating account of atmospheric properties and processes as they are seen by a scientist whose investigations over four decades have contributed greatly to our understanding of the upper atmosphere. Dobson's objective is quite limited, and it is on this basis that his work should be evaluated. The book consists of a nontechnical account of ten more or less independent atmospheric problems. The topics chosen are, of course, those of particular interest to the author; and this leads to the neglect of large areas of great interest and importance. The book is, nevertheless, self-contained and coherent to a remarkable degree. The organization revealed by the table of contents suggests a hodge-podge, but the author makes a generally successful effort to weave a logical fabric. Dobson has illustrated the fact that what is important in a book or a lecture aimed at a wide audience is the communication of the author's way of thinking about his subject. In this case, the thinking is sound, the emphasis appropriate, the expression lucid, and the link between author and reader strong. An effort to compile a similar book from papers by a number of authors probably would have been a disaster.

The topics discussed are a general picture of the atmosphere; temperature and humidity of the troposphere and stratosphere; temperature and density at great heights; clouds, hail, and rain; thunderstorms; ozone; the sun, sunspots, and solar activity; the ionosphere; the aurora, airglow, and Van Allen Belts; and the geomagnetic field. These complex problems are presented with refreshing clarity and simplicity. It is inevitable in a nonmathematical account that much has been omitted, but con-