ganization, cultural beliefs, or values of the village, let alone case material to illustrate how lives are led there. The missing data are presumably in Theodore Schwartz's "large manuscript, so far unpublished," which is said to contain "a wealth of observations" (p. xi), but they are needed to provide the contextual background for interpreting the quantitative results of the present volume. Without them, the villagers appear normless, responding only to past and present economic pressures without any shared standards of conduct. The authors state, "[We] must have in mind the important fact . . . that the village is a cultural and spiritual desert" (p. 134). In this context it comes as a surprise, on looking back at the foreword, to read that "Dr. Lola Schwartz wrote her doctoral thesis on the villagers' concepts of morality" (p. xi), for there is no other indication in the book that they have moral concepts!

Fromm's theoretical approach, stated in *Man for Himself* (Rinehart, 1947) and summarized in the present volume, is based on a simplified version of the Freudian concept of character (the more visibly stabilized aspect of personality) in which the defensive and adaptive functions of character are viewed as coinciding in response to socioeconomic pressures. Fromm aims less at exploring the functions of character within the personality system than at generating typologies of character orientations (receptive, exploitative, hoarding, and productive) and "interpersonal relatedness" (symbiotic, withdrawal-destructiveness, narcissism, love) that vary in frequency across societies and historical periods according to socioeconomic conditions.

These typologies guided the design of the interview schedule used in the village and provided the coding categories in terms of which Maccoby singlehandedly analyzed the interviews and projective test responses, using a global procedure that deviates from academic operationism without the intensity and lengthiness of clinical psychoanalysis. Fromm's typologies and the categories derived from them are highly evaluative and, in this context, ethnocentric. Assertions like the following accompany the statistical data: "We found only one exploitative individual with a loving trait. Most of these men have destructive effects on their children, wives and others in the village" (p. 104). Eschewing the perspectives of cultural anthropology and clinical psychoanalysis alike, the authors are satisfied to categorize and judge the villagers by external standards rather than seek to understand the subjective standards, cultural and individual, by which the villagers categorize their own behavior and judge themselves and each other. Students of culture and personality can hope that there will be future publications from the investigation described above. In this book, however, the unknown villagers in their anonymous village appear as prisoners, not only of their past and present economic situations, but also of the abstractions that Fromm and Maccoby have imposed upon them.

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Concerted Reactions

The Conservation of Orbital Symmetry. R. B. WOODWARD and R. HOFFMANN. Verlag Chemie, Weinheim, and Academic Press, New York, 1970. vi, 178 pp., illus. Cloth, $5; paper, $3.50.

Reaction mechanisms in chemistry have been so extensively and successfully studied in recent years that in 1965 it seemed impossible that any revolutionary advance could occur in this field. Yet this is just what happened as a result of the publication of a series of papers by R. B. Woodward and R. Hoffmann. These papers dealt with the importance of orbital symmetry effects during the course of concerted (one-step) chemical reactions. The amount of new work inspired by this concept has indeed been phenomenal.

What Woodward and Hoffmann did was really quite simple—they correlated the molecular orbitals of the reactants with those of the products by selecting a certain reaction path in which one or more elements of symmetry were maintained. These symmetry elements allowed the necessary correlations to be made, using well-known principles from physical chemistry. The general rule was then proposed that if a reaction path correlated the ground state electron configuration of the reactants with the ground state of the products, the reaction is symmetry-allowed. That is, it can occur with a modest activation energy. If the correlation was to an excited state of the products, the reaction is symmetry-forbidden and could occur only with an excessive activation energy. Analogous rules exist for photochemically excited states of the reactants.

Earlier workers, particularly M. J. S. Dewar in England and K. Fukui in Japan, had used molecular orbital theory to discuss chemical reactions in a way that foreshadowed the work of Woodward and Hoffmann. The earlier workers did not, however, stress the dominant rule of orbital symmetry. By orbital symmetry we mean simply the changes in sign (plus or minus) that characterize the orbital wave function in different parts of the molecule.

The title of the book refers to the statement, made as a guiding principle by Woodward and Hoffmann, that orbital symmetry is conserved in concerted reactions. Actually this statement is somewhat ambiguous, since it can be regarded as something that has been known for a long time. The novelty consists in the application of the principle to actual examples.

The book is actually a reprint of a long article that appeared in *Angewandte Chemie* (International Edition in English) in 1969. I am sure the great demand for reprints of this article well justifies bringing it out in the present form. On the other hand, there are some disadvantages. The book is quite short and deals with a limited range of material. Only a few classes of reactions are discussed, and much recent work by other authors on symmetry rules using quite different approaches has been omitted. This omission is understandable because the field is so new and is growing so rapidly.

The reactions dealt with in detail are those which the authors discussed in their earliest papers, and for which they invented not only the rules but a useful nomenclature and systematization. These are electrocyclic reactions, cycloaddition reactions, and sigmatropic reactions. There is also some discussion of group transfers and eliminations and chelotropic reactions. One feels that inclusion of other reactions, even briefly, might have been useful. In particular, a discussion of some of the simplest reactions, those of two diatomic molecules with each other, would show most clearly how symmetry rules operate. Such examples would also show what most chemists still do not realize: that most diatomic molecules do not react with each other just because of orbital symmetry restrictions. Nevertheless, the examples the authors have chosen are so important, particularly in organic synthesis, and the stereochemical consequences of the symmetry rules so profound, that one really cannot criticize their selection. We can safely assume that other books taking up omitted topics will soon be available.

The present book is very well written, using a deliberately nonmathematical approach. The illustrations are particularly well done and show the arguments and the conclusions quite clearly. The authors have presented in a convenient and attractive way their pioneering contributions to an important new area of chemistry.

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Actinide Element

The Chemistry of Plutonium. J. M. CLEVELAND. Gordon and Breach, New York, 1970. xxiv, 654 pp., illus. $19.50; to institutions, $39.50.

Some 30 years have passed since the discovery of plutonium. From less-than-microgram to many-ton amounts has been the history of production; the volume of literature has kept pace, and we find that the element is indeed well studied, certainly better than many other more common elements. Since plutonium has been and is of prime importance in weapons work and will most assuredly become extremely important for electrical generation in the next generation of nuclear breeder reactors, it is not surprising that a great deal of both basic and applied research has been carried out over this 30-year period.

The author has attempted to include all of the known chemistry of plutonium in one volume with the unfortunate, in my opinion, exception of the chemistry of the metal itself. I believe that the author has indeed collected essentially all the rest of the unclassified chemical knowledge of plutonium and has reported it in a comprehensive and lucid fashion. The book jacket states that the coverage of the many topics is so thorough that the original literature in most cases need not be consulted. To depend on this book rather than upon the original articles is, of course, a rather optimistic and probably foolhardy procedure. However, the discussions are sufficiently complete that the researcher can decide which articles to consult and can then find those of the 1100 references he desires conveniently listed.

The Chemistry of Plutonium is divided into four sections. The first is a very brief introductory discussion. The next section, on solution chemistry, is several hundred pages long and discusses topics such as oxidation states and reactions, hydrolysis, complex formation, ion exchange, solvent extraction, and nonaqueous solution chemistry. The third section is also long and discusses the compounds of plutonium in a comprehensive way, giving such physical properties as crystal structure, melting point, and vapor pressure, along with preparative methods. The final section, on chemical processing, is more engineering in nature and discusses reactor fuel treatment, conversion of other compounds to the tetrafluoride, metal preparation, and, finally, recovery and waste disposal.

Although there are few who can use all of the varied information given, almost anybody interested in actinide chemistry will find this book to be a very useful collection of the known facts on the element plutonium.

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The Distorted Wave Method

Direct Nuclear Reaction Theories. NORMAN AUSTERN. Wiley-Interscience, New York, 1970. x, 390 pp., illus. $19.95. Interscience Monographs and Texts in Physics and Astronomy, vol. 25.

Austern has written a textbook intended for advanced graduate students and research workers in the field of direct nuclear reactions. But he has achieved much more. Acting in the capacity of a super referee he has brought together over 600 articles for digestion, dissection, rejection, and reconstitution. The final product is presented to the reader as one of those marvelous multicolored candy balls known to English children as "gob stoppers." It delights the eye as well as the palate as it so easily dissolves in the mouth. The aftertaste is tart (some might say bitter); the overall effect is refreshing.

The main theme of the book is the distorted wave method and its application to nuclear processes. The discussion of this is preceded by introductory chapters on scattering theory. A wave packet approach is employed, but in a manner which is shown to be relevant rather than pedantic. This leads naturally into a discussion of delay times and the difference between a compound nucleus and direct reaction. Antisymmetrization is discussed in configuration space, not in a second quantized formulation. Students will undoubtedly find this easier, but it will not help them in reading outside this book.

Detailed and easily readable examples of the method are then given in a huge chapter on applications. Experimentalists especially will find this the most useful part of the book. The presentation is both complete and clear, and there can be few reactions that are not discussed in detail. The results are illustrated throughout by such an overwhelming number of accurate fits to experiment that one is convinced that all is solved and there is nothing more to learn. But we are only halfway through the book. There follow quieter chapters to which perhaps fewer readers will penetrate but which I found equally absorbing. Those finer points so essential to the real specialist, so important in dragging up that last vestige of information from the data, are worked over. Coupled channels, L-space models, recoil effects, and many other topics are included, with a last chapter on unified theories and dispersion theory.

All the time I was reading this book, though, a specter kept tugging at my mind. His name is Fadeev. I would really have been interested to hear what Austern has to say about non-Fredholm kernels, dangerous diagrams, and divergence of the Born series. Does Fadeev's work show that there is a tragic flaw in the whole fabric of our understanding of many-particle interactions, or is it just an irrelevant mathematical detail which in the final analysis affects nothing? If Austern knows the answer to this question he is not telling us here.

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Stereochemistry

Polymer Conformation and Configuration. FRANK A. BOVEY. Academic Press, New York, 1969. x, 182 pp., illus. $9.50. Current Chemical Concepts.

This volume is based on a series of lectures presented by the author at the Polytechnic Institute of Brooklyn. Bovey surveys areas of polymer stereochemistry, including the use of such