each individual's contribution and to a restricted view of the vigor with which hypnosis research is proceeding. For example, Orne is portrayed as using only the real-simulating design and Hilgard as using primarily repeated measure designs, but the last real-simulating design study conducted in Orne's laboratory was conducted in 1966 (by Sheehan), and simulating subjects have been employed quite appropriately in Hilgard's recent research. The approach adopted by Sheehan and Perry fails to reveal the very richness of much research on hypnosis.

Another limitation of the book arises from the authors' emphasis on dealing with the problem of artifact by attempting to control and minimize its sources. An alternative, though conservative, strategy is to maximize the operation of factors contributing to artifactual results. To the extent that experimental manipulations produce results that exceed those due to artifact, as measured by appropriate control procedures, valid inferences are possible. This is the logic of the double-blind placebo control in pharmacology, of the real-simulating design, and particularly of the London-Fuhrer design and its subsequent modifications.

The book discusses in a compelling manner some of the most difficult areas of behavioral research. It deserves to be studied carefully by all students of human behavior.

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Chemical Dynamics

Dynamics of Molecular Collisions. WILLIAM H. MILLER, Ed. Plenum, New York, 1976. In two parts. Part A. xiv, 318 pp., illus. $39.40. Part B. xvi, 380 pp., illus. $39.50. Modern Theoretical Chemistry, vols. 1 and 2.

Although the study of modern molecular collision dynamics began, perhaps, with the work of Polanyi in the 1930's, it is only in the last 15 years that intense theoretical and experimental studies of the details of inelastic and reactive collision processes in the gas phase have been carried out for a variety of systems. The technological impetus for this work was strong, deriving from the need to understand the atmospheric effects of nuclear weapons and reentry vehicles, the possibility that chemical lasers could be developed, the recognition of the importance of inelastic collision processes in gas lasers, and, more recently, the need to deal with the problems of photochemical smog and pollution control in combustion. The scientific challenges and rewards in the study of molecular collision dynamics have been large, and such sophisticated experimental techniques as molecular beams and laser fluorescence detection now yield a wealth of detailed information on specific relaxation rates, energy distributions in reaction products, potential energy curves, and so forth.

The quantitative and semiquantitative theoretical approaches to collision dynamics are the subject of these welcome and timely volumes. Most of the theory has been developed or greatly improved in the last decade as a result both of significant theoretical advances and of the increasing use of large and fast computers. The fact that some contributions seem dated only 18 months after submission attests to the vigor of the field.

Work on the theory of chemical dynamics is difficult because, although chemists know the laws of interaction governing such processes, they do not have the power, despite large-scale computers, to solve exactly for any but the simplest systems. Thus each of the chapters in these volumes either deals with an approximate mathematical approach to chemical dynamics or describes a particular topic qualitatively. Of the 13 chapters five are good expositions of significant and recent results, four are primarily critical reviews of subjects in which recent activity has been less intense, and four are expositions of known results in subjects of narrower scope. As with any volume of contributions, the book's goal, to "be of use for beginning research students," is attained with varying degrees of success.

The chapter by Child on semiclassical methods is a concise and beautiful exposition covering not only primitive and uniform approximations but semiclassical transformation theory and mapping techniques. Rabitz, in his chapter on effective Hamiltonians, has tied together and critically reviewed the several recent approaches to the problem of controlling the dimensionality of the quantum coupled equations. He fails to mention, however, that the applicability of partitioning theory and optical potential is highly speculative. Pechukas, in his chapter on statistical theories of chemical reactions, presents the classical theory beautifully, but his delightful questioning style occasionally obscures what has been accomplished with semiclassical and quantum theory. Levine and Bernstein, on the other hand, provide a clear exposition of the information-theoretic, or thermodynamic, approach to kinetics. Although Micha assumes a high level of preparation and sophistication on the part of the reader, his chapter on optical potentials contains a fair fraction of the known material on the formal development and phenomenological applications of optical models.

The chapters by Siebrand, Wolken, Tully, and Hase on radiationless processes, gas-surface dynamics, nonadiabatic processes, and unimolecular processes, respectively, are good introductions and reviews. The chapters by Siebrand and Hase could well have been omitted, however, for excellent reviews of these topics already exist. The chapter by Lester on the N coupled-channel problem derives only the formal coupled differential equations for heavy particle scattering, neglecting other approaches such as integral equations and recent numerical methods. Porter and Raff give more detail on the classical trajectory methods, including Monte Carlo and other sampling techniques as well as appropriate numerical integration methods. Experimentalists, in particular, may find the qualitative chapter on the effects of potential energy surfaces on dynamics by Kuntz of interest and may glean some useful formula for vibrational energy transfer from the rather long chapter by Shin. Notable omissions from the volumes are the quantum theory of reactive processes, collision-induced dissociation, and photodissociation and chemi-ionization processes.

The goals of the book are laudable, the success is moderate, and the price is a disgrace.

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