

cisions will be made, and it delineates an optimal decision process and the conditions conducive to producing it. "Vigilance," the optimal coping state, comes from the recognition of information that is discrepant with one's present course of action, and it is characterized by an unbiased, active search for and appraisal of information regarding all possible new courses of action. When the conditions for vigilance are satisfied, decisions result in the least possible regret and once made are firmly adhered to.

There have been previous theories about decision-making, and some of them, like the present theory, have been concerned with decisions of great emotional impact. What is new in the work of Janis and Mann is the comprehensiveness of their theory. For unlike previous theories, which have addressed only one or another aspect of the decisional process, the present work attempts to account for a variety of predecisional and postdecisional processes and to relate them to phenomena that range from coping with stress to response to therapeutic intervention. To accomplish this wide coverage, Janis and Mann have drawn on their extensive observations of decision-making in situations that range from laboratory experiments to intervention clinics intended to help people stop smoking or lose weight.

The theory is descriptive in that it lays out and relates types of predecisional conditions (such as insufficient time for the search for and appraisal of further alternatives), coping patterns of decision-making (such as ignoring negative information about a current course of action), and stages of decision-making (such as deliberation about the consequences of making a commitment to a particular course of action). The description is clear and well illustrated with case and anecdotal material. And, although one can always quibble about the interpretation of such material, the authors properly caution the reader that the material is to be taken as further definition of the theory rather than as evidential support.

The descriptive nature of the theory will be disappointing to theorists. The theory does not provide a unified view of the decision process, but juxtaposes a complex array of processes that are involved in making a decision. Though it fails to give a new, more basic, understanding of the decision process, it does address a number of phenomena and problems that are not well understood or researched, and by doing so it should generate theoretical controversy and needed research.

Because the authors are good observers of behavior and have had a great deal of experience observing the process of decision-making, the descriptive aspects of their theory are sound and will be useful to those who wish to improve their understanding of decision-making or the quality of their own decisions. Practitioners who counsel others about important decisions (marriage, divorce, occupation, investment, public policy, and the like) will find this volume helpful not only because of its conceptualization of the decision-making process but also because of the considerable practical advice and tools it gives for improving the quality of decisions.

JACK BREHM

*Department of Psychology,
University of Kansas,
Lawrence 66045*

Surface Phenomena

The Chemical Physics of Surfaces. S. ROY MORRISON. Plenum, New York, 1977. xviii, 416 pp., illus. \$39.50.

Catalysis is the process most employed in the chemical industry, and the properties of the interface are sufficiently different from those of the bulk that interfaces warrant consideration as almost a fourth state of matter. There are therefore excellent practical and intrinsic reasons for investigations of the nature of surface structures and processes, and physics, chemistry, materials science, and engineering are all vitally concerned with surfaces. Morrison points out that with improved surface preparation techniques and a host of new spectroscopies (given exotic acronyms such as ELS, RHEED, SIMS, and XPS), tremendous progress has been made recently in the characterization and understanding of clean metal and semiconductor surfaces, simple adsorbed species, and to a lesser extent reactions on clean, single-crystal surfaces. At the same time, solid-liquid interface processes, which were more susceptible to study by older methods, remain the subject of active research, with new phenomena (enhanced Raman scattering) and new explanations being produced rapidly. All these experimental results permit closer investigation of the microscopic mechanisms that underlie observed surface reactions.

Morrison has produced a broad overview of the conceptual and experimental situation in surface science in 1976. In this relatively short book, he considers solid-liquid, solid-vapor, and solid-vacu-

um interfaces. The ten chapters include ones on space charge, free surfaces, bonding of adspecies, photoeffects, and heterogeneous catalysis. Most of the relevant mathematical expressions are derived rather completely, and the discussions of band bending, polaron broadening of levels, double layer effects, space charges, and the like are helped greatly by the liberal use of potential energy diagrams. The book has some fine features, such as thumbnail sketches of the new surface spectroscopies, discussions of specialized chemical terms ("dangling bond," "Helmholtz plane," "Brønsted site,"), and an attempt to compare the solid-liquid and solid-gas interfaces.

There are numerous sins of omission (no reference to the work of Kuhn on monolayers, to that of Gault on tracers in exchange reactions, to neutron scattering studies of adsorbates, to semiconducting electrodes, to symmetry arguments in bonding, to transition metal complexes as models for metal surfaces) and of commission (the confusing and nonstandard use of "Franck-Condon splitting" to describe nuclear geometry changes after electronic transfer or excitation, the implication that all surface cluster studies employ the multiple scattering [MS] X_α techniques, the implication that electrons must be unpaired for covalent bonding, the incorrect differentiation of Marcus and Levich-Dogonadze descriptions of electron transfer, the incorrect description of the pseudopotential method).

Because the book is a broad survey, many important details, such as the limits of applicability of some of the spectroscopic methods and the nature of the parametrization in the Green's function methods for clean surfaces, must be omitted. This is frustrating, but unavoidable. Extensive references to the current literature are provided; more references to the review literature would be helpful. The text is largely free from typographical error (but the equation defining the Brønsted equilibrium constant is incorrect).

The book is timely and useful. It fills the need for a modern overview of surface phenomena and suggests the need for more detailed books on such topics as single-crystal surface reactions and modern approaches to electrode processes. It is a clear treatment that, despite the high price, will be worthwhile for the large community interested in surfaces.

MARK A. RATNER

*Department of Chemistry,
Northwestern University,
Evanston, Illinois 60201*