onomy and the interior of Saturn? If not, why put them in one book? Perhaps the reader should take advantage of Annual Reviews' reprint service rather than spend his money at an efficiency of 1/14 or 2/14. (In fairness, the price of the collection *is* attractive, and the book is a vast improvement over most conference proceedings.)

The reminiscence by Jeffreys, one of the fathers of the field, is stimulating, though one might prefer that such personal reminiscences be collected from a dozen of the eminent fathers of planetary science into one separate volume where attitudes and accounts could be compared (but perhaps such a volume would have a short half-life against spontaneous explosion).

I was struck by the range of problems that we *ought* to be working on, but often can't for lack of adequate funding. Vonnegut, for example, tells us that unintentional artificial weather modifications are going on right now and that we haven't adequately evaluated them! With respect to the subject of my own recent work, Mars, a number of problems were suggested by these papers—for example, red bed formation, possible analogies between isostatic, nonrebound uplifts on Earth and the Tharsis and Elysium volcanic domes on Mars, and the reptile-to-mammal transition (was it due to the same solar-induced climatic shift suggested from Mariner 9 data to have occurred several hundred million years ago on Mars?). Yet while thinking about these matters I learned of the complete inadequacy of the funding available through NASA to follow up the Mariner 9 discoveries. Well, let us hope there is material for volumes 2, 3. . . .

WILLIAM K. HARTMANN
Planetary Science Institute, Tucson, Arizona

Atmospheric Processes

Turbulent Diffusion in the Environment. G. T. CSANADY. Reidel, Boston, 1973. x, 248 pp., illus. Paper, $13. Geophysics and Astrophysics Monographs, vol. 3.

The dispersal of pollutants in the environment by turbulent atmospheric or oceanic flow is a matter of great public concern and practical importance; at the same time the theory of turbulent dispersion in even idealized situations is a difficult problem in statistical mechanics. This book steers a middle course between the cookbook approaches that may not be reliable even to within an order of magnitude or two and the more rigorous mathematical approaches that may not be able to give any "answer" at all. The main concern of the book is to develop the simple properties of a dispersing cloud or plume to situations in which a mean shear is present and where buoyancy effects are significant. These, together with questions of relative diffusion and the fluctuation problem, are described in such a manner as to be accessible to a beginning graduate student who knows some fluid mechanics and differential equations; the successes and shortcomings of the theory are illustrated by frequent reference to laboratory and field data.

Not a book for one who wants a quick and easy answer or for one who wishes to understand the latest statistical mechanical analysis, it will, with proper caution, enable the meteorologist or oceanographer to know at least what must be measured and what to do with it in order to estimate dispersion rates in the many and varied situations that he is being called upon to examine.

O. M. PHILLIPS
Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, Maryland

Systems under Pressure

Electronic Transitions and the High Pressure Chemistry and Physics of Solids. H. G. DRICKAMER and C. W. FRANK. Chapman and Hall, London, and Halsted (Wiley), New York, 1973. x, 220 pp., illus. $16.50. Studies in Chemical Physics.

Electronic transitions under pressure are a topic of much current interest and include metal-nonmetal transitions of all kinds and transitions involving spin state, valence state, and charge transfer state. Drickamer and his colleagues at the University of Illinois have carried out pioneering studies in recent years in the latter field, using mainly Mössbauer and optical spectroscopy under pressure, and have published a wealth of data on shifts in energy level with pressure and their consequence in a large number of organic and inorganic systems of varying complexity. They developed techniques necessary for extension of such studies to very high pressures, and have established the occurrence of a change of spin state and oxidation state of Fe under pressure in a number of materials. From their results certain generalizations seem apparent, namely: that under pressure a new electronic ground state is established; that, depending on the position of the crystal-field-split levels of the metal ion relative to the ligand levels of the organic molecule, electrons can flow from the former to the latter, or vice versa, causing reversal in the spin or oxidation state; that the equilibrium between these states follows the laws of equilibrium familiar in chemistry; and that the chemical reactivity can be strikingly altered in the new ground state. The book under review is a research monograph embodying mainly this work.

The presentation is slanted toward a chemical physics audience. The theoretical ideas used in the interpretation of the results are dealt with in the first four chapters, which include a brief discussion of the molecular orbital theory, configuration coordinate state diagrams, and the energy of thermal versus optical transitions, as well as a description of continuous electronic transitions modeled on regular solution theory. The experimental techniques are dealt with briefly in chapter 5. The six remaining chapters cover the experimental data and their interpretation. Chapter 7 is a brief discussion of electronic transitions in metals and metal-insulator transitions.

The book should be of interest to both chemists and physicists engaged in theoretical as well as experimental research.

A. JAYARAMAN
Bell Telephone Laboratories, Murray Hill, New Jersey

Drawings and Ideas

An Illustrated History of Brain Function. EDWIN CLARKE and KENNETH DEWHURST. University of California Press, Berkeley, 1973. xiv, 154 pp., illus. $14.

The history of medical illustration is a field that one expects to cut across disciplinary boundaries. Intersecting the history of art and of culture, as well as that of medicine, it should open up resources for interpretation and expansion beyond the traditional view of medical development as a self-contained, progressive accumulation of knowledge. With an acknowledgment of the influence of Robert Herrlinger's masterly work on the history of medical illustration, Clarke and Dewhurst also subscribe to this thesis.