ment, time, and material"; "Planar and linear structures and jointing"; "Faults"; "Folds"; "Tectonic analysis of folds"; "Cleavage"; "Major structures and tectonics"; "Igneous rocks"; "Structural petrology" (written by E. Den Tex); and "Geomorphology and morphotectonics." This organization of the subject matter is very effective.

The style of presentation detracts from the overall merit of the book. In the preface Hills states that "Particular attention has been paid to definitions . . . [and that readers will find this] far from being dry as dust material for rote learning. . . ." He succeeds in maintaining such a sharp focus on definitions that one often wonders whether the book is a textbook or an expanded, well-illustrated glossary. This lackluster effect is reinforced by the author's unwillingness to commit himself to any theory or groups of theories that would form a unified basis for the presentation of the material. The result is a disjointed presentation that is sure to defeat even the most concerted effort to keep one's mind on the subject. In the preface it is also stated that the reader will witness "as much discussion of pros and cons as is possible within the limit of a text book." Instead, references to genesis, comparative environment of formation, and other underlying principles are commonly restricted to a single clause or sentence immersed in a much larger volume of purely descriptive material; or such references are presented in separate sections so that they will not jeopardize the presentation of the descriptive material. The net result is a very antiseptic treatment of the material.

Owing to the slow progress in the field of structural geology during the last few decades, one would expect new textbooks in the field to be up to date, particularly with respect to any attempt to present a quantitative description of the genesis of structures. Yet such work is not covered to any degree in this text. The two notable omissions are (i) the buckling analyses that relate fold wave lengths to rock type and physical environment (by Biot; Curie, Patlode, and Trump; and Ramberg) and (ii) the thermodynamic studies on the crystallization of minerals in stressed environments, which are basic to a quantitative understanding of petrofabrics (by MacDonald; Verhoogen; Kennedy; and Kamb).

Regardless of these shortcomings, the scope and organization of the material presented and the abundance of illustrations and references should make this a good text around which to build an introductory course covering the traditional subject matter of structural geology.

RALPH O. KEHLE
Jersey Research Company, Tulsa, Oklahoma

Chemical Technology

Physical Chemistry of Petroleum Solvents. W. W. Reynolds. Reinhold, New York; Chapman and Hall, London, 1963. x + 211 pp. Illus. $10.

This handbook on the physical properties of petroleum hydrocarbons which characterize their solvent characteristics in practical systems such as resins, paint films, and printing inks resulted from a ten-year study carried out at Shell Oil Company's Wood River Research Laboratory under the supervision of the author, W. W. Reynolds. Few of us realize how, in recent years, advances in petroleum technology have provided a "spectrum of solvents and hydrocarbons extending from essentially pure isoparaffins to pure aromatics." Their use and adaptability in a variety of practical solvent systems has not been fully exploited, and this is essentially the message and purpose of this small volume.

Chapter 1, largely written by the author's colleague, G. W. Waters, contrasts the physicochemical properties of the three main categories of hydrocarbons—the paraffins, the naphthenes, and the aromatics—with practical properties or criteria of acceptable solvent behavior—solvency, viscosity, volatility, and odor. The data of the American Petroleum Institute's Research Project 44 on pure hydrocarbons are extensively quoted in this section. The second chapter very briefly reviews the thermodynamics of binary solutions, *a la* Hildebrand and Scott, together with the elementary Flory-Huggins approach to the thermodynamics of polymer solutions. The remaining seven chapters deal with more practical aspects of the nature of paint resin solutions, their flow properties, and the final characteristics of surface coatings. The treatment throughout is essentially thermodynamic in nature, and it is unfortunate that the author has not devoted some space to the importance of the kinetic aspects in this area.

The choice of solvents and compounding will remain an art until modern advances in theories of liquids and their mixtures can be reduced to a more useful semiempirical basis. This volume will be very useful to those who work in the area of solvent technology and should stimulate physical chemists to make a greater effort to understand the fundamentals of solvent behavior.

BRUNO J. ZWOLINSKI
Chemical Thermodynamic Properties Center, Texas Agricultural and Mechanical University

Astronomy

The Solar System. vol. 4, *The Moon, Meteorites, and Comets.* Barbara M. Middlehurst and Gerard P. Kuiper, Eds. University of Chicago Press, Chicago, 1963. xxii + 810 pp. $15.

In this fourth volume of a five-volume series on the solar system, 28 authors present 22 chapters that are up-to-date and authoritative. Twenty percent of the book is on the moon, 60 percent on meteors and meteorites, and 20 percent on comets. The book can be recommended without reservation to all who are interested, professional astronomers as well as amateurs. Its appearance is especially timely now that exploration of the solar system by means of rockets has begun in earnest. The final volume of the series, on planets and interplanetary material, should soon appear; it will also deal with such subjects as selenography, tektites, the origin of meteorites, and the primordial composition of the solar system.

Two remarks by the late F. G. Pease on lunar observations made with the 100-inch telescope at Mount Wilson are worth quoting: "The photos do not begin to show the exquisite detail that is seen visually when we have good seeing. They really do not tell the truth. The smoothed surface about Copernicus becomes a billion crater pits, each showing typical crater shadows at low sun; rifts become sharp and angular sometimes with acute angles; the light streaks appear to be but a series of very low mounds touched here and there with white. The dark streak in the rim of Aristillus is a veritable maze of fine threads." About the Mount