cept. It dogmatically closes a subject, while the whole advantage of theory is to open up new possibilities of finding facts—physically measurable quantities —never to expostulate a supernatural entity. Infinity or finitude of a universe may be equally useful—nay, equally true—concepts as rules of extrapolation to new measurable facts. It is the set of rules, blended with physical theory, represented by mathematics (multidimensional or not), used as an extrapolation tool, and not a metaphysical "thing-in-itself," which constitutes the "universe" of cosmology.

T. S. JACOBSEN
*Department of Astronomy,*
*University of Washington*

**Handbuch der Physik.** vol. 50, *Astrophysics,* I. S. Flügge, Ed. Springer, Berlin, 1958. vii + 458 pp. Illus. DM. 98.

It was an excellent idea on the part of the editor of the new *Handbuch* to include volumes on such borderline fields as geophysics and astrophysics. Indeed, a good astrophysicist is a much more complete physicist nowadays than most of his much-too-much-specialized physicist colleagues. An astrophysicist has to know quantum mechanics and electromagnetic theory to understand stellar spectra; nuclear physics to understand the energy production in stars; diffusion theory, thermodynamics, and statistical mechanics to understand the equilibrium in stellar atmospheres; ordinary and magnetohydrodynamics to understand many of the processes in interstellar space; Hamiltonian mechanics to understand celestial mechanics; and so on. Part of this many-sidedness of modern astrophysics can be gleaned from the first astrophysics volume of the new *Handbuch.* One can also see the truly international character of the subject from the fact that, of the ten contributions from four different countries, two are in German, three are in French, and five are in English.

It is clearly impossible in the restricted confines of a review to do justice to a volume such as the present one, and one must limit oneself to a brief summary of the contents of the various contributions. The emphasis in this volume has been predominantly observational, although the longest paper deals with the theory of stellar atmospheres.

The first contribution is by Fehrenbach (Marseilles), who gives a comprehensive survey of spectral classification of stars, comparing the different possible classifications. Keenan (Delaware, Ohio) discusses briefly metallic line stars, F-, G-, and K-type high-velocity stars, and stars with carbon features, while Swings (Liège) gives a survey of molecular bands in stellar spectra. Wurm (Hamburg) contributes two papers, the first one dealing with the observational data and the second one, with the theoretical interpretation of the spectra of planetary nebulae. Greenstein (Pasadena, Calif.) discusses white dwarfs, and van de Kamp (Swarthmore, Pa.), visual binaries. Gaposchkin (Cambridge, Mass.) deals with eclipsing, and Struve and Huang (Berkeley, Calif.), with spectroscopic binaries. The last contribution includes a discussion of several peculiar systems and of the evolution and origin of binaries. Finally, Barbier (Paris) treats the theory of stellar atmospheres in ample detail.

As one has come to expect from the *Handbuch,* the standard is high throughout, and the publishers have produced a book which is a pleasure to handle. As a consequence of its subject matter, it contains a large number of half-tones, well reproduced.

D. TER HAAR
*Clarendon Laboratory,*
*Oxford, England*

**Shell Theory of the Nucleus.** Eugene Feenberg. Princeton University Press, Princeton, 1955. xi + 211 pp. $4.

The shell theory of the nucleus in its initial stages of development was rejected because of the apparent conflict with the strong, short-range character of nuclear forces. It is now a challenge to the more fundamental approaches to nuclear structure to explain the shell model's unexpected success. Feenberg, a leader in the development of shell model ideas, has written a valuable description of the model's interpretation of low-energy nuclear phenomena.

The book begins with a brief historical introduction describing the experimental information that led early workers to hypothesize the shell structure of nuclei. A quantitative presentation of the independent particle approach is then given and used in the following chapters to interpret a variety of nuclear phenomena in terms of the shell model. Magnetic dipole and electric quadrupole moments are treated. Shell model predictions of the character and location of isomeric transitions are correlated with experimental data. The classification of beta decay according to shell model states is given, along with an analysis of favored beta decay. Of particular value is the analysis of j-j coupled configurations in which the isobaric spin formalism is used. Several beta decay matrix elements and magnetic moments are calculated explicitly as examples. One chapter is devoted to collective motion and its connection with shell structure. The final chapter is an introduction to what Feenberg terms the third stage of development—namely, the attempt to relate our knowledge of the nucleon-nucleon force to the problems of nuclear structure.

In total, the book provides a remarkably fine introduction to the shell model approach and has already proved very useful to students of nuclear physics.

R. W. KING
*Department of Physics,*
*Purdue University*

**Textile Chemicals and Auxiliaries.** With special reference to surfacants and finishes. Henry C. Speel and E. W. K. Schwarz. Reinhold, New York; Chapman & Hall, London, ed. 2, 1957. vi + 545 pp. $13.50.

This second edition differs from the first edition published in 1952 in containing market data on textile chemicals and a chapter on "Felts and non-woven fabrics." It also contains information on newer developments in flameproofing and other types of finishing, new trademarked products, and new fibers, but the total amount of new material is small.

Although the type is clear, numerous obvious errors detract from the book. These include errors in chemical formulas and spelling, replacement of words with words of somewhat similar appearance but different meaning, and scrambled sentences and paragraphs.

FLORENCE H. FORZIATI
*Textiles Section,*
*National Bureau of Standards*

**Advances in Cancer Research.** vol. V. Jesse P. Greenstein and Alexander Haddow, Eds. Academic Press, New York, 1958. ix + 463 pp. Illus. $10.80.

The fifth volume of this series maintains the high standard for informative, scholarly reviews set by the preceding four volumes. The *Advances* is now a standard reference, and any cancer research laboratory or clinic is quite incomplete without it.

The first chapter, on "Tumor-host relationships," by R. W. Begg, sets the main theme of the volume. There is certainly no doubt that neoplasms produce biochemical and morphological changes in tissues distant to, and free of, the tumor, but exploitation of these effects except in a few small specific instances still remains for the future. Three additional chapters deal with aspects that may be related to this topic. "Anemia