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

in cancer," reviewed by V. E. Price and R. E. Greenfield, as one of the complex end results of the neoplastic process, may well be related to the "Specific tumor antigens" which L. A. Zilber describes, as an autoimmunization effect, or to the catalase-reducing, heat-stable proteose with which W. Nakahara and F. Fukuoka deal in their "Newer concept of cancer toxin."

P. N. Campbell describes "Protein synthesis with special reference to growth processes both normal and abnormal." The Weisburgers give a full account of the "Chemistry, carcinogenesis and metabolism of 2-fluorenamine and related compounds"; these intriguing chemical "polycarcinogens," unlike the aromatic hydrocarbons, fortunately seem to maintain the fruitful interest of biochemists. P. R. Peacock presents a timely chapter on "Chemically induced tumors of fowls." The role of viruses is not any clearer in these neoplasms than in other species, despite the present popularity of this concept.

C. Berman condenses his long-term interest in "Primary carcinoma of the liver" into a short, clinically oriented chapter. Despite the fact that only relative frequency figures are available as an index of its occurrence, it is clear that liver cancer is an environmental neoplasm of epidemic proportions in South Africa, India, and the Far East. It is one of the neoplastic afflictions of mankind (along with carcinoma of the bladder associated with infestation by *Schistosoma haematobium,* and epidermoid carcinoma of the lung induced by cigarette smoke and other air pollutants) in which research and public health can join hands in an international effort, with the victory of substantial prevention being an assured, achievable goal.

MICHAEL B. SHIMKIN
National Cancer Institute,
National Institutes of Health

Land of the Tollund Man. The prehistory and archaeology of Denmark. Palle Lauring. Translated by Reginald Spink. Macmillan, New York, 1958. 160 pp. Illus. $6.

If it is not correct to call the *Land of the Tollund Man* a book for professional archeologists, neither is it fair to call it merely a popular book on the archeology of Denmark. A judiciously limited amount of straight archeological fact is clothed in cultural dress based on stimulating data from other fields and trimmed with theories and speculations which are always carefully distinguished from the facts.

In the first chapter, Lauring's description of the changes in land and climate, based on the latest views of glacial geology and geography, clarify the limited picture of man's first appearance in Denmark. As the archeological story progresses, the chapters abound with a variety of subjects: modern experimentation in flint-flaking, including rather bloody attempts by the author himself; religious ideas that may have underlain the practice of constructing megalithic monuments; a comparison of the economics of farming in Neolithic and modern times; accidentally preserved costumes of the Bronze Age; the necessity of postulating a powerful organization in Bronze Age Denmark which exported local products, largely amber, on a large scale and which demanded and made use of expensive bronze and gold objects in return; the construction of Iron Age boats; and the importance of the sea in Denmark's economy in all periods.

Among the most interesting finds are the treasures and well-preserved human bodies found in bogs. The condition of the body, with face bashed in, throat cut, or with a noose around the neck, gives Lauring the opportunity to recreate the scene of sacrifice in vivid, melodramatic prose. One of these sacrifices, the Tollund Man, supplies the title to the book.

The final chapter carries the story down through the Germanic Iron Age, in which the foundation for the Viking period was laid.

The book is illustrated with 77 photographs of exceptionally high artistic and technical quality.

DONALD FREEMAN BROWN
Peabody Museum, Harvard University

Communicable Diseases. A bibliography of internal medicine. Arthur L. Bloomfield. University of Chicago Press, Chicago, 1958. viii + 560 pp. $10.

In the preface Bloomfield states that "The surge of new knowledge in medicine has created a tremendous problem both for the student and for the practitioner . . . . In current medical writing what is referred to as the 'older literature' often turns out to be that of the previous decade . . . . In brief, there is a real danger that we shall become completely cut off from our medical past and relapse into a sort of modern Dark Age."

With this situation in mind, Bloomfield, professor emeritus of medicine at Stanford University School of Medicine, has compiled this bibliography of communicable diseases. Thirty diseases are included: typhoid fever, cholera, bacillary dysentery, plague, brucella infection, pneumococcal pneumonia, scarlet fever, erysipelas, rheumatic fever, meningococcal infection, gonorrhea and gonococcal infection, tuberculosis, leprosy, diphtheria, tetanus, typhus, syphilis, malaria, amebic dysentery, influenza, poliomyelitis, the common cold, measles, smallpox, vaccinia, rabies, yellow fever, herpes zoster, mumps, and whooping cough.

References cover the period from about 1800 to the present. An author index is included.

Bridges and Their Builders. David B. Steinman and Sara Ruth Watson. Dover, New York, rev. ed., 1957. xvi + 401 pp. Illus. Paper, $1.95.

The first book devoted solely to bridges did not appear until 1714, but this lack of specialized information has been fully remedied in more recent times. There is today a legion of technical publications available to the modern bridge engineer which would fill a major size library. These many works reveal the fascinating story of the bridgebuilder's ever-increasing competence and ingenuity in more effectively and economically meeting man's continually expanding needs for such basic transportation facilities. Unfortunately, however, this story is both largely unavailable to the layman and obscured by technical terms and details. As a result, the few popular books on bridges which have been issued are largely pictorial in character and seldom attempt to explain either the simpler problems of bridgebuilding or the many factors, from the availability of materials and the economics of construction to the compelling forces of need and cost, that condition the labors of the bridgebuilder. Such works thus offer little to enlighten the layman and little of value to the engineer.

The authors of this book, a revised and enlarged edition of a work first published in 1941, have attempted to follow a middle course. They have selected a group of notable bridges, especially more recent works, and have told the story of these bridges and of their builders with clarity and in some detail. Steinman is a well-known bridge engineer, and, while some of his interpretations of the reasons which led to the adoption of earlier bridge forms may be questioned, both the layman and the engineer will find much of interest in this effort to reveal "man's conception and creation of bridges."

As the authors note, engineering and architecture went hand in hand through earlier ages, and it was not until the 18th century that the design of bridges broke away from the overpowering artistic architectural interests of the Renaissance and a truly modern era of rationalized bridge design began to emerge. This movement was initiated in France, espe-