taining to its motion imply that the planet possessed essentially its present orbital characteristics. Huber correlates Venus's heliacal risings and settings with textual recordings of the lunar calendar in a long technical section to prove the latter point. For consistency, the lunar-planetary ephemeris is found to be in accord with pre-Babylonian historical chronology.

The overall organization, editing, and presentation of the text are commendable. This reviewer found no typographic errors and only a few incorrect references. The inclusion of identical graphs in two essays (pp. 83 and 163) seemed unnecessary.

What does all of this one-sided debating accomplish?

On the home field of the scientists there is no contest. Velikovsky is flatly and totally disproven. But few scientists ever gave credence to his ideas in the first place, and the book is not directed primarily toward members of the scientific community anyway. For the general reader the volume can be difficult in places. Undefined terms like "latent heat of fusion," "vapor pressure," "three-body problem," "bolometric albedo," and "Curie point" do not adorn the pages of *Newsweek*, though they might sneak into *Scientific American*. Notwithstanding, most educated lay readers will find the book stimulating and convincing.

Which brings us to the primal issue in any discussion of '70's pseudoscience. It is skirted in a statement tucked away on the next to last page of text: "It is difficult for anyone with training in the physical sciences to understand how Velikovsky's ideas, after such a consistent record of failure, can continue to attract wide public interest and generate ardent defenders." The solution is simple: Velikovsky proponents do not deal with his views on a scientific basis because they do not understand the ways of science. The truth about the workings of the natural world are demonstrably best arrived at by the reasoned approach of science we have so painstakingly cultivated. The scientific edifice, interlocking, interdependent, and self-cleansing, produces beautiful results. It is a pity so few who live outside understand what occurs within its walls. The scientist is partly to blame for failing to educate a wanting public, which can often become hostile and suspicious. This book, though it may not have the broad appeal of *Origins* or *The Dragons of Eden*, can be counted among the welcome pieces of responsible literature for the public finally beginning to emanate from the scientific community. As far as Velikovskianism is concerned it is dead and buried. The final nail has been driven. It is to be hoped that we can now move on to more exciting things.

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Mesophases

Liquid Crystals. S. CHANDRASEKHAR. Cambridge University Press, New York, 1977. x, 342 pp., illus. $38.50.

Joseph Needham, writing in *Biochemistry and Morphogenesis* (Cambridge University Press, 1942), argued that "the paracrystalline state seems the most suited to biological functions, as it combines the fluidity and diffusibility of liquids while preserving the possibilities of internal structure characteristic of crystalline solids." To a considerable extent Needham's adumbration remains unrealized although, to be sure, much more is known today concerning lyotropic liquid crystalline phases than might have been true had the subject of liquid crystals not undergone a substantial and somewhat unexpected growth since 1942.

Lyotropic mesophases (those associated with solvent systems) are not treated in detail by Chandrasekhar, but virtually everything else of current interest in liquid crystal physics is, and in an especially satisfactory manner for anyone who wishes to get a good first impression of the subject. In itself that is a valuable contribution, for the subject has needed a treatment that begins with the facts and works its way through the interpretations to the state of the art.

Readers familiar with liquid crystals may find the presentation deficient in this or that favorite aspect of the subject. For example: A central question in liquid crystal science concerns the proportions of attractive and repulsive forces that compel the various phase transitions and order the phases. That question, and its concomitants, are treated incompletely in this exposition, partly because valuable work has appeared since the book went to press and partly because the earlier work has not been treated in a sufficiently critical manner. As early as 1968 the view had begun to take root that an ordered, anisotropic, nematic mesophase resulted from excluded-volume effects between essentially hard, elongated rods in a fluid phase modulated by attractive forces that fixed the density and in some less significant manner assisted the ordering within the mesophase. Such a view can properly be called a "van der Waals model" of the nematic phase. Indeed, it was, and in several recent papers the analysis has been carried rather far forward. Yet over 30 years ago Frenkel suggested that such a circumstance doubtless prevails. After dismissing local dipolar fields as insufficient to account for the phenomenon of mutual orientation between molecules larger than a few atoms, he wrote in his remarkable book *Kinetic Theory of Liquids* (Oxford University Press, 1946): "In this case it is more expedient to treat the molecules as small rigid bodies of definite shape, with superficial fields of attractive forces tending to press them against each other as tightly as possible, so as to ensure a spatial distribution corresponding to the smallest possible volume of the whole system."

Cavils aside, this book is to be commended for what it does especially well. It has a splendid account of the continuum theory, a very strong association between the experimental situation and its interpretation, as carefully assembled a bibliography as any newly interested reader could possibly want, and a felicitous prose style that captures without pedantry the excitement and mystery of mesophases.

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Phytopathology

Plant Disease. An Advanced Treatise. Vol. 1, How Disease Is Managed. JAMES G. HORSFALL and ELLIS B. COWLING, Eds. Academic Press, New York, 1977. xxii, 466 pp. $29.

This volume, the first of five, is a synthesis of the specialties in plant pathology into an integrated approach to disease management. Subsequent volumes will be concerned with epidemiology, metabolic changes in diseased plants, mechanisms of pathogenesis, and mechanisms of disease resistance.

Most of the 21 chapters in the volume under review present principles of disease management in combination with thoughtful projections about future directions of research. The chapters proceed logically from the sociology and history of plant pathology through the topics of disease diagnosis, assessment of crop losses, and the principles of disease management to the specifics of dis-

ease management by the use of chemicals (fungicides, nematocides, and antiviral agents) and by the manipulation of environment, associated microbiota, physical factors (heat and radiation), and host genes. The book stresses the need for a more holistic approach to crop protection. Several authors emphasize the importance of developing data on economic thresholds because of their significance in implementing strategies of disease management in our agroecosystems. The development of descriptive and predictive models of crop production, in which disease management is a part, is presented as one approach for obtaining maximum benefits for the producer, the consumer, and the public. A rare discussion of the involvement of international organizations in disease management is included. The final chapter is, appropriately, concerned with the education of future disease management practitioners.

A folksy treatment of the history and sociology of plant pathology is provided by the editors. They discuss the struggle between objectivity and the dogma of the time as they trace the historical development of the concept of plant disease. They also list the scientific genealogy of the 70 presidents of the American Phytopathological Society and report that H. A. deBary was the ancestral professor of all but three. Their compilation of a hall of fame of the 100 most distinguished plant pathologists (dead or retired) will stimulate considerable discussion.

Present-day societal constraints on disease management procedures are shown to have limited the alternatives for disease control and in some cases to have encouraged disease epidemics. Laws designed to protect us from risks inherent in the use of pesticides are inhibiting the development of chemicals potentially useful in disease control; but pesticides, properly used, must remain one choice in pest management.

It is unfortunate that the book neglects the subject of management of pathogen vectors, since many causal agents, such as mycoplasma-like organisms and most viruses, are transmitted by insects. Information about this subject is vital to the holistic approach to management of many diseases and would have been of greater value here than the chapter on the action of antiviral agents.

The book will be useful for plant pathologists, students of pest management, and all scientists interested in crop production.

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Steroids

Biochemistry of Steroids and Other Isopentenoids. WILLIAM R. NES and MARGARET LEE MCKEAN. University Park Press, Baltimore, 1977. xii, 690 pp., illus. $39.50.

Although there are a number of books and monographs that discuss one or more aspects of steroid chemistry and biology, this scholarly, comprehensive book provides a well-rounded presentation of both the theoretical and practical aspects of the subject. It tells, in fact, what you always wanted to know about steroids but couldn't find in any single place before. Nes has himself made numerous contributions to the field of steroid chemistry and biochemistry over the past quarter-century and has a keen sense of the historical development of the field. This is made evident in the first chapter, an interesting review of the major discoveries in the field, especially those that gained the discoverer a Nobel prize. The steroids have undergone a number of changes in nomenclature, some evolutionary and some revolutionary; this subject is discussed in a detailed, scholarly review of steroid structure and nomenclature in chapter 2. The following chapter provides an overview of the many types of analytic procedures used in steroid biochemistry, ranging from classical chemical and physical methods to newer ones utilizing chromatography and protein-steroid interactions such as radioimmunoassay and competitive protein binding.

Much of the book is devoted to a detailed review of the experimental basis of our present understanding of how steroids and other terpenoids are synthesized, by way of the formation and polymerization of isopentenoid units. The chapters of greatest interest to chemists are those concerned with the structure, nomenclature, analytic procedures, and biosynthesis of steroids (chapters 2 through 9). Of greatest interest to biologists, perhaps, will be chapter 10, on the occurrence, physiology, and ecology of the sterols. Here the authors discuss the various kinds of sterols synthesized and metabolized by a wide range of organisms ranging from bacteria and protozoans through fungi, green plants, and invertebrate and vertebrate animals. Of special interest to clinical endocrinologists is chapter 11, dealing with the functions of steroids. The chapter provides a detailed and up-to-date discussion not only of steroidal hormones but of bile acids and cholecalciferol as well. In addition, it contains a fine review of the roles of sterols in the structure and function of biological membranes.

Each chapter is well annotated, with an excellent bibliography, and the book has an index of authors cited as well as an index of subjects discussed. The historical approach is evident throughout the book and results in an interesting, easily understood presentation of the field. Many of the monographs published today are collections of chapters by many different authors, each writing primarily about his or her own contributions to the field. This book, written by two authors, is comprehensive without being concerned with minutiae, logically organized so that there is minimal duplication of subjects between chapters, and uniformly clearly written. The authors set out to write an up-to-date version of *Steroids* by Louis and Mary Fieser, and they have succeeded admirably in this endeavor.

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Advanced Mechanics of Materials. Hugh Ford. Horwood, Chichester, England, and Halsted (Wiley), New York, ed. 2, 1977. x, 672 pp., illus. $27.50.

Advances in Inorganic Chemistry and Radiochemistry. Vol. 20. H. J. Emeléus and A. G. Sharpe, Eds. Academic Press, New York, 1977. viii, 374 pp., illus. $38.

Aircraft Emissions. Potential Effects on Ozone and Climate. A Review and Progress Report. R. C. Oliver with E. Bauer, H. Hildalgo, K. A. Gardner, and W. Wasylkiwskyj. Federal Aviation Administration Office of Environmental Quality, Washington, D.C., 1977 (available from the National Technical Information Service, Springfield, Va.). Variously paged, illus. Paper, $11. Report No. FAA-EQ-77-3.

Alternatives to Psychiatric Hospitalization. Harry Gottesfeld. Gardner Press, New York, 1977 (distributor, Halsted [Wiley], New York). x, 132 pp. $11.95.

The Analysis of Contingency Tables. B. S. Everitt. Chapman and Hall, London, and Halsted (Wiley), New York, 1977. x, 128 pp. $8.50. Monographs on Applied Probability and Statistics.

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