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-