pages of text. The book is well produced and the diagrams and photographs are particularly attractive. The style is informal and non-mathematical.

As a first introduction to the subject, this book is likely to appeal much more to chemistry than to physics students. The manner in which the solid state is taught in physics departments implies the use of a book in which a more restricted range of topics is treated in greater detail, and in which use can be made of a basic knowledge of thermodynamics, statistical mechanics, and quantum mechanics, which the student will, one hopes, have acquired at an earlier stage.

R. E. MEADS

PHOTOCHEMISTRY CONFERENCE

Reactivity of the Photoexcited Organic Molecule

(Proceedings of the Thirteenth Conference on Chemistry at the University of Brussels, October 1965.) Pp. ix + 350. (London and New York: Interscience Publishers, a Division of John Wiley and Sons, 1967.) 126s.

It is a pity that this good book is a "conference proceedings". As such, despite the useful and valuable information it contains, the book will be neglected. It will be misplaced in the library, in that it will not be among the current literature; it will be difficult to refer to and it will be tedious to write out the references to the articles which it contains.

This seems to be the fate of all conference proceedings now, with the exception of those published in the normal literature such as *Discussions of the Faraday Society*. By being produced sometimes under the name of an editor and sometimes not, they inevitably seem to be filed in the wrong places. Quoting articles from them in papers or in reviews is always difficult: for anyone who does not agree, I suggest that they write out for themselves a short form reference of the article contained in this volume by G. Porter on page 79, working from the full reference to the book shown above. I suggest there will be as many versions as people attempting the problem and many of them will be ambiguous and lengthy. A further point is the price of this book, which is high; the publishers seem to know that it will not be seen by too many people.

One solution to the problem would be for the publishers to obtain contracts in the usual way, but to combine together perhaps with the aid of a learned society to produce series of conferences proceedings in, say, physical chemistry, organic chemistry, fluid dynamics, etc. These, while still being produced by various publishers, would be assigned a volume number by agreement so that for example "Conference Proceedings in Physical Chemistry" formed a sensible series. Then one might refer to the article mentioned above as say G. Porter, *Conf. Proc. Org. Chem.*, Volume 000 (1967), page 79. In this way our librarians would both wish to obtain them and know where to file them; they would be easy to reference. The greater circulation would allow the price to be lower and people would be encouraged to buy individual volumes on topics which interest them.

Once again, this is a good book. There are a series of reports by distinguished workers: Coulson, Daudel, Porter, Hammond, Yang, Dauben, Havinga and Schmidt. These range from the theoretical aspects of the subject through reactivity and energy transfer to reports on the organic photochemistry of selected fields including the solid state. Each forms a useful review and in some cases would make a good introduction to the subject for a new graduate student, or someone interested in seeing what organic photochemists are up to. Following each report there is a discussion: as is the custom of the Solvay conferences all the contributors are notable and the questions are to the point.

There are no real deficiencies in the book: it would have been interesting to read the paper by Schenck which is not

published but for which the discussion is printed. It is mildly frustrating to find that the French contributors still retain the language of diplomacy rather than using the language of science as everyone else does.

In short, this is a delicious mixture of primer and review, in which the flavour of the field can be tasted. For this reason I am anxious that it should not disappear from sight in the usual way of conference proceedings.

PETER BORRELL

CHEMISTRY OF OCEANS

Equilibrium Concepts in Natural Water Systems

(Advances in Chemistry Series, No. 67.) Pp. viii + 344. (Washington, D.C.: American Chemical Society, 1967.) \$8.50.

THIS book, containing the sixteen papers given at an interdisciplinary symposium on the geochemical development of the Earth's natural waters, illustrates clearly the difficulties both of geochemistry and of interdisciplinary symposia. It emerges with credit, but not distinction, from both encounters.

Studies of heterogeneous equilibria involving oxides, carbonates and silicates in aqueous media (of which several accounts are given here) are often impeded by the slowness with which equilibrium is approached. Moreover, an additional degree of freedom is available to colloidal systems in which surface energies contribute significantly to the total Gibbs free energy. In the organic field, the problems are no less severe: photosynthesis causes the accumulation of thermodynamically unstable carbon compounds which may persist for geological time-spans. Complications of a higher order are introduced by the possibilities of biological mediation in many other chemical processes.

It is therefore scarcely surprising (despite the title of the volume) that several authors should express careful reservations concerning the relevance of equilibrium thermodynamics to studies of natural water systems. It is hoped, however, that progress can be made by comparing natural systems with calculated equilibrium states of suitable models (or steady states if open-system models are used). This approach acquired much impetus from the pioneering work of L. G. Sillén, who contributes to this volume an account of a clarified method of representing complex equilibria, and illustrates impressively its value in an application of Gibbs' phase rule to a geochemical balance in an eight component ocean model. Other contributions are largely directed towards the provision of basic data for such studies, and outlining the difficulties besetting their interpretation. Two examples are given of successful comparisons between real systems and appropriate models.

Participants at interdisciplinary conferences are menaced by the danger of mutual unintelligibility. This has been admirably overcome in the present instance, for the contributors have evidently been encouraged to remain within a fairly narrow geochemical context. At the other extreme, such a limitation could detract from the value of interdisciplinary exchanges, transforming what should be exciting adventures in cross-fertilization into a kind of scientific incest. This danger has also been avoided, although more narrowly: one might have expected more scope for controversy to be evident in a developing subject of such complexity.

This book is clearly intended to stimulate further research: its success will be measured by the brevity of its life-span. Its value as an instantaneous picture of current research would have been enhanced by the incorporation of an editorial epilogue synthesizing the various views expressed.

There is an irritating abundance of minor typographical errors.

J. M. HAYNES