in arousing one's interest in a topic, but having such a wide field can only deal with it briefly.

In the second chapter F. N. Spiess discusses the oceanic environment as it relates to information gathering and transmission interpreted rather broadly. About two-thirds of the chapter is devoted to acoustics, which is in proportion to its importance, but there are useful sections on electromagnetic systems (including light and infrared), gravitational variations and background radioactivity. This is another well written and informative chapter and it has a good bibliography.

R. L. Wiegel's chapter on ocean dynamics is a great disappointment in that it would be more appropriate to a research review than to a book on marine technology. For example, twenty-five pages are devoted to a scholarly review of the processes of wave generation, but only eighteen lines to the wave climate, which is possibly the most important aspect of ocean dynamics in relation to marine engineering.

The chapter on underwater navigation, by F. A. Andrews, devotes most of its space to acoustic position fixing, but has good descriptions of other navigational aids such as electromagnetic logs, inertia navigation systems and doppler-acoustic navigators.

Dealing with marine vehicles and structures, O. H. Oakley discusses the design of research and survey vessels, floating platforms and submersibles. This is a considerable part of the field of naval architecture, and in sixty-four pages means that the treatment is bound to be somewhat superficial. However, it is generally a good introduction to the subject with an adequate bibliography. An important omission is the absence of any discussion of the various modes of failure of pressure hulls.

The subject matter of sea systems by J. P. Craven and P. R. Stang largely duplicates that of other parts of the book, and in particular the previous chapter. One rather feels that "systems" is a popular word at present and that a chapter with this title had to be included even though the editors had no clear idea of what they meant by it. It is written in a pretentious style and adds little to the value of the book.

I am afraid that I have to admit to finding articles on policy generally a bore, particularly when they deal with the principles of planning. It is therefore possibly not H. E. Sheets' fault that I find his chapter on policy planning unreadable.

To sum up, the value of the good chapters in the book is such that they should be read by all students of marine technology, and it is a pity that the high price will stop most individuals from buying it.

M. J. TUCKER

Particulate Systems

The Dynamics of Aerocolloidal Systems. By G. M. Hidy and J. R. Brock. (International Reviews in Aerosol Physics and Chemistry, Vol. 1.) Pp. xv+379. (Pergamon: Oxford and New York, January 1971.) £10; $27.

THIS book is intended to provide a broad introduction to a new series of reviews in aerosol physics and chemistry, and to be an up to date monograph on the subject of aerosol dynamics. Aerosol scientists who have worked in a field practically devoid of specialist literature until the advent of Fuchs and of Green and Lane (Fuchs, N. A., *Mechanics of Aerosols*; Pergamon, Oxford, 1964; Green, H., and Lane, W., *Particulate Clouds, Dusts and Smokes*; Spon, London, 1964) may find themselves overcome by the amount of literature now appearing, and the prospect of the regular appearance of further books in this series may seem rather daunting.

The chapter titles promise a comprehensive coverage of the subject, but more detailed reading gives the impression that while some topics are dealt with exhaustively, others get only cursory treatment. The scope and limitations of the book are honestly set out in the introduction, where the aim is given "to explore the dynamical behaviour of idealized aerosol particles in the light of modern developments in classical mechanics". Thus there is no reference to the effect of particle shape on aerosol behaviour and no mention of the important recent work of Stöber and others on this subject. This is a pity, for however intellectually satisfying it may be to provide theoretical treatments for the behaviour of spherical particles, they bear little relation to most real life aerosols.

Again, according to the introduction, the effects of electrostatic charging on the particles are taken into account, at least in an elementary fashion. But there is no mention of the charging mechanism or charge distributions or the now classical work of Bricard.

It is inevitable, although perhaps unfair, that this book will be compared with Fuchs and Green and Lane. It adopts a very much more theoretical viewpoint than either of the other two, and although experimental work is very frequently referred to, it is generally quoted quite uncritically and sometimes rather uninformatively.

It will therefore appeal to the theoretician rather than to the experimental physicist. This is perfectly acceptable, and no doubt the series as a whole will give a balanced view of the entire subject.

The errors I found were entirely in the indexing, for example, references to Green, H. and Grad, H. are mixed up. This is unimportant, but there is little excuse for the misspelling of a particular author's name everywhere it occurs.

W. J. MEGAW

Discrete Astronomy

Relativity and the Question of Discretization. By D. G. B. Edelen and A. G. Wilson. (Springer Tracts in Natural Philosophy, Vol. 20.) Pp. xii+186. (Springer–Verlag: Berlin and New York, 1970.) 38DM; $10.50.

THE possibility that objects of astronomical interest have a discrete structure has not been seriously considered by many workers in this field, presumably because there is no great body of evidence to support this view. The authors of this book, however—one a mathematician and the other an astronomer—take the minority view and argue for the possibility that the sizes of galaxies form a discrete sequence similar to that found for angular momentum in quantum theory. This they attempt from two different viewpoints, one theoretical and the other observational.

As the title indicates, general relativity provides the framework for the development of the theory in the first section. Consideration is restricted to EO galaxies since a definition of the idea of "size" for these presents fewer problems than for the non-spherical cases, though rather than use the radius to a surface where some physical parameter is specified the authors introduce the concept of a "jump discontinuity". This is physically identified with the surface where galactic space structure gives way to free space. A length scale is derived using this concept, and on the assumption that a parameter appearing in the derivation does not vary from galaxy to galaxy a sequence of possible sizes is obtained. The assumption seems to have no physical basis and to have been made for no reason other than that a discrete set may result, so one is doubtful of the conclusions drawn.

The second part of the book deals with what observational evidence there is to support their view, and starts by examining a sample of thirty-one galaxies for evidence of discretization. It is surprising and disturbing to find that of the two slightly different methods used to obtain linear diameters using redshifts as a distance indicator, one yields significantly discrete diameters and the other does not. Also a surprise is the apparent dependence of the minimum possible diameter on redshift, and an extension of the method indicates discretization of redshifts without being convincing.

The style of writing makes this book difficult to read and tends to obscure rather than clarify the issues. This is not a volume that I feel I should recommend.

R. F. CARSWELL