the chemical potential of volatile species are dealt with in some detail (although I was surprised to find no reference to the work either of Burnham, Holloway and Davis or of Presnall on the *PVT* of water and hydrogen respectively). On the other hand, the treatment of one, two, and three component systems in chapter 2 is very cryptic; for example, the free energy of binary solutions receives less than one page and will surely convince most non-initiate readers that there is a large element of magic in thermodynamics.

But this book's great merit is that it does what it sets out to do and at £5.75 represents a worthwhile investment to anyone about to embark on research in the field of experimental petrology.

S. W. Richardson

Life on Moon and Mars

Origins of Life: Planetary Astronomy. Edited by Lynn Margulis. (Proceedings of the 3rd Interdisciplinary Communications Program Conference.) Pp. xi+268. (Springer-Verlag: Berlin and New York, 1973.) DM46,70; $16.50.

This is a verbatim report of the third of four conferences on the origins of life. The style of the volume follows that of its predecessors (see *Nature*, **235**, 404; 1972; and **239**, 175; 1972). The publisher, however, has changed, and the price has come down by over 40%. The conference, too, was organised differently. On this occasion the purpose was to explore the effect of space exploration on ideas about the origins of life. For the purpose, eight planetary astronomers, who were personally involved in space programmes then current, were assembled to meet ten practitioners interested in the origins of life (three exobiologists, two microbiologists, four chemical prebiologists and one palaeontologist). A fair proportion of the biologists had attended at least one of the previous conferences, but most of the astronomers were there for the first time. The conference was held in February 1970.

There was not the same 'free for all' that characterised the earlier conferences. On the contrary, there was a rigid division into two halves, the first devoted to the Moon, the second to Mars. In each division, certain of the astronomers were asked to discourse on aspects of their topic that they thought might interest the biologists. The biologists were encouraged to interrupt, and to ask questions. During the first division, Shoemaker, Wasserburg, Kaplan and Singer discoursed on the Moon; then Oró went into considerable detail on the chemical search for carbon compounds in lunar material, and Young went into the methods adopted in the search for microbiological activity. In the second half, Murray, Owen and Leovy spoke about Mars. Some biological interest was aroused in the part that nitrogen might or might not play in life on the planet.

But the book, if not the conference, seems to have failed in its objectives. The timing was unfortunate. Knowledge of Mars has changed dramatically with the new data collected by Mariner 9 in the following year, and the review of the Moon (which, in any case, is of less biological interest than Mars) was based on data emanating from nothing later than Apollo 11. There has been a three-year delay in publication, and the field is just moving too fast for such a leisurely programme. The conference lacked the enthusiasm of its predecessors. The book is not only out of date; it is dull. Better accounts of both the astronomy and geology can be found elsewhere. It is especially to be regretted that no attempt was made to reproduce the illustrations of lunar and Martian topography which, from all accounts, formed a major feature of the conference.

P. C. Sylvester-Bradley

Well digested Protozoa

The Biology of Protozoa. By M. Sleigh. Pp. viii+315 (Arnold: London, October 1973.) £7.50 boards; £3.75 paper.

Recent spectacular increases in knowledge of the genetics, biochemistry and ultrastructure of the Protozoa have greatly increased the difficulty of writing a satisfactory book of modest size on this group. Dr Sleigh has attempted to produce in 300 pages, at about degree level, a general biology of the Protozoa, for the most part successfully.

After a brief introduction on evolutionary relationships and cellularity, three chapters are concerned with structure, metabolism and reproduction. Of the remaining seven chapters, six are devoted to taxonomic groups. It seems to me regrettable that the general treatment with which the book begins (and ends: chapter 11, "Ecology of Protozoa") was not carried through completely. But repetition, which is liable to occur in combining a systematic with a subject approach, is largely avoided by numerous cross references. Complex ascriptions in the text are minimised by the numerical reference system; hence the presentation is one of digested rather than of quoted information. Occasionally one could wish for more references to the sources of information, as in Table 5.1 of "Features of Various Flagellate Groups".

The illustrations are of diverse kinds, light and electron micrographs, drawings and diagrams and are generally fresh and apposite although some of the drawings of whole animals made them look, to me, more solid and opaque than protozoa usually do in the microscope.

This is altogether a valuable and timely book of the right size for use in undergraduate courses.

G. Chapman

Mediterranean collection

The Mediterranean Sea: A Natural Sedimentation Laboratory. By D. J. Stanley. Pp. xvi+765. (Dowden, Hutchinson and Ross: Pennsylvania; Wiley: Chichester, September 1973.) £22.50.

This volume is a collection of forty-seven papers brought together out of the feeling that the Mediterranean Sea is an ideal environment for the study of marine sedimentation, and in the belief that sedimentological work in this area, cutting across linguistic and national boundaries, should be summarised in order to speed future investigations. The papers are divided between twelve sections touching on many different aspects of the Mediterranean, its bathymetry and hydrography, the geological setting up to and including the Quaternary, clastic and non-clastic sedimentation on shelves and in coastal areas, deep-water sedimentation, and geochemistry. There is a paper on pollution of the Mediterranean and another sketching which topics should be given priority in research in the next decade.

Although a commendably high editorial standard is apparent, the content and relevance of the papers are uneven and not wholly representative of recent work in the Mediterranean. Some papers are regional or subregional in scope, whereas many deal with what could be purely local problems, and a few simply use the Mediterranean as the setting for the study of a general topic. Among these personal original endeavours, I sorely missed attempts at regional syntheses specific to the Mediterranean, which would aim to show in detail what was known and what remained to be studied. It is easy from this book to discover fairly completely who is doing what and how—it is excellent as a compilation transcending national differences in scientific outlook—but I am less confident that a critical light has been focussed on the major research problems of the Mediterranean and its hinterlands. A different blend of original papers and critical reviews might perhaps have led to a book greater than the sum of its parts.

J. R. L. Allen