

Despite these criticisms, the three volumes should be invaluable to engineers and scientists actively engaged on microwave measurement work. To those employed in the wider field of microwave engineering, the handbook should be of considerable interest. C. F. DAVIDSON

### The Materials Background to Space Technology

By Prof. A. J. Kennedy. (Newnes International Monographs on Astronautics and Astronomy.) Pp. viii + 206 + 4 plates. (London: George Newnes, Ltd., 1964.) 50s. net.

THE book is in two parts. The first gives a brief account of the main materials, metallic and non-metallic, used in aeronautics and space technology. The second is concerned with matters peculiar to space craft and their launchers.

The reader with a basic knowledge of metallurgy, chemistry and physics will find the book informative and stimulating. This is especially true of Part 2, which deals with vehicle and launcher structures, problems associated with re-entering the atmosphere, and the specialized requirements which apply to bearing and electrical materials under the vacuum and irradiation conditions of space.

Some minor blemishes were noted. For example (p. 103), the formula of silicon nitride is not SiN; the rate of impingement of molecules on a satellite surface given on p. 147 is (on the assumptions stated) about three decades too small. Again, the behaviour of bearings excepted, there is no justification known to me for the suggestion (on p. 5) that the behaviour of materials at  $10^{-12}$  torr is likely to be different from that under vacua more easily attainable in the laboratory.

However, the book is a courageous attempt to present a large amount of diverse information and should fulfil the hope, expressed by the author in his preface, that it will make a broad appeal to enquiring readers who are not specialists in the field. L. G. CARPENTER

### The Earth Sciences

Problems and Progress in Current Research. Edited by Thomas W. Donnelly. Pp. vii + 195. (London and New York: Published for William Marsh Rice University by the University of Chicago Press, 1963.) 6.00 dollars; 45s.

THE *Earth Sciences: Problems and Progress in Current Research* comprises six papers which formed the basis for lectures given in connexion with the celebration of the 'semicentenary' of the William Marsh Rice University. In addition to an introduction by Prof. T. W. Donnelly, the contributors and topics covered are as follows: Prof. S. P. Clark, on variation in density in the Earth and the melting curve in the mantle; Dr. J. A. O'Keefe, on the boundaries between geology and astronomy with particular reference to the Earth's gravitational field and the nature of the Moon; Prof. W. F. Fyfe, on experimental geochemistry and the problems of the origins of rocks; Prof. F. A. Donath, on the experimental approach to rock deformation; Prof. S. S. Wilks, on the applications of statistics to geology; and Prof. H. A. Lowenstam on the mineral and chemical composition of the skeletons of marine organisms.

This collection is on the whole a useful one, and several of the papers are particularly to be welcomed, in that their authors summarize and discuss the outstanding problems of wide and intricate, but rapidly growing, fields. An important note sounded repeatedly throughout the contributions is the dependence of progress in the Earth sciences on developments in the 'fundamental' sciences. Geology and other Earth sciences are seen as concerned with the consequences of physical, chemical and biological laws that operated within the framework of 'past' space and time. Prof. Fyfe, for example, writes: "If we are to proceed rapidly, it is becoming more and more important that the student of geology be exposed

to the maximum amount of physics and chemistry from physicists and chemists".

The book is well produced, as is to be expected from the University of Chicago Press, and the figures and plates are uniformly clear and well-made. Typographical errors are relatively few, although one contributor emerges with a longevity that not even Earth scientists would dare claim. J. R. L. ALLEN

### Progress in Organic Chemistry

Vol. 6. Edited by Sir James Cook and Dr. W. Carruthers. Pp. vii + 256. (London: Butterworth and Co. (Publishers), Ltd., 1964.) 57s. 6d.

ONE of the few conclusions to emerge from a conference recently called by the Chemical Society to consider "The Future of Chemical Publications" was the need for good review articles to maintain what in contemporary jargon has come to be known as 'current awareness'. It was, moreover, agreed that the writing of good reviews was time-consuming and yet had to be done by experts. *Progress in Organic Chemistry* occupies an individual place in the English review literature of organic chemistry. The editors have by their judicious selection of topics and authors contrived to establish the series as a kind of chemist's *Bedside Guardian*.

Once again there is a generous coverage of natural product topics, four of the six chapters falling within this province. Outstanding among them is Dr. J. D. Bu'Lock's lucid and lively chapter "Polyacetylenes and Related Compounds in Nature". Dr. Bu'Lock surveys the now very extensive field, gives the reader the benefit of his intimate knowledge of synthetic and degradative methods and for good measure adds an epilogue on taxonomy, physiology and biological activity. Dr. E. Haslam and Prof. R. D. Haworth contribute an account of the vegetable tannins which conveys the great difficulties inherent in this field of study and the conjectural state of knowledge, particularly regarding the flavonoid tannins. Dr. M. F. Grondon presents a selective and well-proportioned account of the *bis*-benzylisoquinoline alkaloids, while Dr. W. Schafer summarizes synthetic routes to the phenoxazones, a group of heterocycles which rose to prominence as components of the actinomycin antibiotics and surveys some of their salient chemical and spectroscopic properties.

The synthetic topic in this volume comes in the form of an excellent chapter on carbenes by Dr. W. Kirmse. Misgivings that this should have appeared concurrently with his book on the same subject are out of place, for this is an independently conceived and well-illustrated summary of highlights in this fascinating domain of organic chemistry. As has previously happened in this series with contributions on theoretical aspects of organic chemistry, Prof. S. F. Mason's "Molecular Orbital Studies of Organic Equilibria and Reaction Rates" will captivate the organic chemist inclined to approach it with a little more reserve than he brings to the other five chapters. K. H. OVERTON

### Progress in Boron Chemistry

Vol. 1. Edited by H. Steinberg and A. L. McCloskey. Pp. vii + 487. (London and New York: Pergamon Press, 1964.) 140s. net.

THIS book comprises a series of reviews dealing with aspects of boron chemistry, written by experts in the field.

Opinions will differ as to whether all the topics covered are equally significant within the framework of the amount of work published and current interest to boron specialists. This point would apply especially to the chapters on "Organoperoxyboranes" (A. G. Davies) and "The Reactions of Diazoalkanes with Boron Compounds" (C. E. H. Bawn and A. Ledwith). In two further chapters, there is