

Satellite technology

The Versatile Satellite. By Richard W. Porter. Pp. +173 (Oxford University: Oxford and London, 1977.) £4.95.

THE author sets himself the task of explaining "what a satellite is, how it is put into orbit (and why it does not promptly fall down again), what special considerations enter into its design, and especially what it is 'good for' and why". Since all of this is attempted in 173 pages, it is not surprising that the reviewer, an environmental scientist, found the treatment of environmental applications was rather superficial. Nevertheless, a great deal of technical information is conveyed in a clear and concise manner.

The book is well structured, beginning with the history of launching the satellites and their evolution from German and Russian rocketry. This is followed by a useful explanation of orbits and energy requirements for different types of satellite configurations. In a discussion of design requirements, emphasis is placed on the special circumstances of lack of atmosphere, absence of gravity, ionosphere, thermal environment, electromagnetic radiation, geomagnetic field, charged particle environment, and micro-meteoroids. The author praises the satellite designer for overcoming this unfriendly satellite environment within limitations of weight and cost. However, the cost-benefit aspects of the satellite programmes are not discussed in depth in this book.

The environmental scientist should have particular interest in those chapters explaining "what it is good for and why". These discuss applications in the fields of communications; weather forecasting and monitoring; navigation; surveying the oceans and land; monitoring flora, fauna and fish; and spaceborne laboratory experiments.

The impressive growth of satellite communications is well documented and the characteristics of Intelsat satellites are described in some detail. The technologist and engineer may revel in the details of stabilisation, antennas and electronic systems, but all readers will flinch in the face of space jargon — for example, SPADE — "a super-acronym for single channel per carrier pulse code modulation multiple access demand assignment equipment". Even Mr Porter is moved to comment that "the jargon gets worse and worse but really there is no way to avoid it". Although agreeing with this, one wishes a glossary of acronyms had been included so that one does not have to hunt through pages to find the explanation of a particular term.

The section of the book dealing with the surveying of the oceans and the

land gives a good technical description of the "Earth's Resources Technology Satellites. Some of the illustrations used to demonstrate different spectral responses are disappointing, especially Fig. 7.6. Also one notes that the concept of the spectral signature, first mentioned on p98, does not receive further explanation until p127. Likewise, problems affecting the spatial extension of supervised and unsupervised classifications of digital data are not discussed. As a result, the casual reader may be left with the false impression that recognition of crop types is a simple matter.

The informed reader will feel that the present capability of LANDSAT in respect of mapping soils and land use is somewhat overstated. One may note that recent pronouncements by NASA officials are more cautious. For example, J. Morrison, (*NASA Earth Resources Survey Program: Problems and Prospects*. European Space Agency Symposium on Remote Sensing of Earth from Space, Strasbourg, 1977) writes "I do not think we will be able to do this (that is, the Worldwide Crop Information System) successfully until about the 1984 period. The reason is that the present LANDSAT satellites simply do not have the resolution necessary for providing worldwide crop data, particularly in small field situations". Likewise, the assertion that plant disease can often be detected in satellite images before it is apparent to the casual observer on the ground was not borne out by the Corn Blight Watch Experiment (R. B. MacDonald *et al.*, *Results of the 1971 Corn Blight Watch Experiment*, Proc. 8th Int. Symp. Remote Sensing of the Environ-

ment, 1, 157, Ann Arbor, Michigan; 1973). It seems likely that such achievements must await the launch of LANDSAT-D and the Thematic Mapper.

Perhaps the most interesting part of this book is the chapter entitled "Laboratory for Science; An Observatory for Astronomy". This presents the case for space experiments and space observations in a succinct and effective manner. Subsequent sections dealing with the manned satellites and the Shuttle programme are also useful. One feels, however, that the role of the European Space Agency in the Spacelab programme could have been given greater prominence. In contrast to the space race between the US and the Soviet Union, the Spacelab programme provides a welcome example of international collaboration. Further discussion of Spacelab would also have revealed some of the initial limitations of the Shuttle in respect of mission duration and maximum inclination of orbit when launched from the Eastern Test Range.

In the last paragraph, Mr Porter notes that the future depends on the use that is made of satellite technology. It is increasingly apparent that there are considerable problems of technology transfer to be overcome before satellite information will be used to its full potential. This book provides an interesting glimpse of the technologist's world and will help the potential user to understand some of the engineering constraints on satellite systems.

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Parasitic Protozoa

Parasitic Protozoa. Vol. 4: *Babesia*, *Theileria*, Myxosporida, Microsporida, Bartonellaceae, Anaplasmatocae, Ehrlichia, and *Pneumocystis*. Edited by J. P. Krier. Pp. xv+386 (Academic: New York and London, 1977.) \$32.50; £23.05.

I HAVE already commented on the fact that the scope of this series encompasses more than the Protozoa (*Nature*, 268, 773; 1977); and favourably, as the treatment of parasitic Protozoa along with other parasitic organisms of similar basic behaviour, multiplying in the vertebrate host, is more likely to be conducive to exchange of fruitful concepts than the traditional association of Protozoa with the helminths, organisms of a basically different mode of life. The present volume is an illustration of this useful format, presenting ten chapters dealing respectively with *Babesia* in domestic animals and in man and other hosts; with *Theileria*, Myxosporida, Microsporida,

Bartonella with *Grahamella*, *Anaplasma*, *Aegyptianella*; with *Eperythrozoon* and *Haemobartonella*, Ehrlichiae and *Pneumocystis*. The volume deals with a range of organisms all of which are important in relation to disease in man or his domestic animals, interpreting the latter so as to include his cultivated fish and insects.

The reviews are excellent up-to-date summaries of their subjects, many of which are diffusely scattered in the literature. They will be popular as systematic first readings or as reference guides to the 'state of play' of their respective subjects. The book is well presented and indexed, with a few line diagrams and half-tones; the last do not receive special treatment as regards the paper on which they are printed and so are adequate rather than excellent.

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