

to understand nature". Berman and Evans stress the how of astronomy as opposed to the other authors who spend too long simply describing the what.

Valerie Illingworth has edited *The Macmillan Dictionary of Astronomy* from contributions commissioned from a host of British professional astronomers. Dictionaries can be easily judged by asking two questions. The first is "Is it in?"

Ignorance forces you to open the dictionary and the dictionary is only useful if it has an entry on the subject you are looking up. Secondly, "Does this entry tell you what you want to know?". The answer to the first question was "yes". The Macmillan dictionary nearly always had it in. Butler matrix, Bw stars, ylem, YY Orioris stars were all there. I only caught it out by straying into planetary geological

features (grabens, horsts, and so on) and I should not have been looking these up in an astronomy dictionary anyway. I answered the second question in the affirmative too. So the conclusion is simple, if you want a good astronomy dictionary get this one. □

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## Aerospace environment

T.B. Jones

*The Upper Atmosphere and Solar-Terrestrial Relations.* By J.K. Hargreaves. Pp.298. (Van Nostrand, Reinhold: Wokingham, UK, 1979.) £7.25.

THE launch of the first satellites in the late 1950s stimulated the study of space physics which has expanded rapidly since that time. The Earth's outer environment, or 'near space', is a particularly important and interesting region from both scientific and engineering viewpoints. It is the region where strong interactions with solar radiations and particles occur and where ionised particles can greatly influence man's activities.

Dr Hargreaves' book provides an excellent introduction to the aerospace environment. It is intended primarily for

undergraduate use and in this respect it fills an important need, as there are relatively few books available on the subject at this level. The present volume provides a broad picture of the Earth's environment, beginning at the base of the ionosphere and extending outwards to the magnetospheric boundary. The structure and behaviour of the ionosphere and magnetosphere are discussed in detail and these topics form the major part of the book. The interaction of the Sun's emissions with the Earth's environment is of fundamental importance in understanding the behaviour of both the ionosphere and the magnetosphere and full coverage of this subject is included. In particular, a detailed account is given of solar disturbance phenomena and their spectacular consequences in the aerospace environment. Mathematical formulation has been kept to a minimum and is only introduced where essential to the understanding of a particular section. Chapters have been included on experimental techniques and on the engineering significance of the various regions described.

The material is well illustrated throughout and many cross-references have been included. In several cases numerical estimates of the magnitude of various parameters (for example, electric currents and fields) are included which help the reader relate them to his everyday laboratory experience. Copious references to more advanced literature are included at the end of each chapter.

The author has succeeded in presenting an integrated account of the wide range of phenomena which occur in the Earth's outer environment. He has done this in a clear and concise style which makes the book particularly attractive for undergraduate use. The work will also appeal to the more specialised reader who will find it helpful to have the wide range of topics, together with many references to source material, contained in one compact volume. □

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## Solar energy

D.O. Hall

*The Sun.* By D.K. McDaniels. Pp.271. (Wiley: New York and Chichester, UK, 1979.) Paperback £6.50.

THIS is a good book and certainly can be recommended as an introductory text for a course on solar energy, but . . . Why is it that so many books, articles, and so forth, on solar energy ignore the most important use of solar energy today, that is, the energy from biomass which daily provides the equivalent of 20 million barrels of oil (equal to USA oil consumption) — probably because such solar energy use mostly occurs in developing countries where it is of crucial importance. But it is not recognised that currently, for example, the USA obtains about 2% and Sweden about 10% of their total energy

from biomass. Enough said!

The first three chapters discuss the overall energy problem, although it is heavily biased to the US situation. There are excellent chapters on the Sun and Universe and on solar radiation, and there are also discussions on economics.

The second half of the book describes solar energy applications for heating, cooling and electric power generation. The presentation of principles of operation, and the examples given, are very well thought out and clearly written with good diagrams and figures. The index and references are useful; the problems at the end of each chapter will also be helpful in teaching.

In short, a book to be recommended, as much experience in repeated teaching of a solar energy course to beginners is evident in the presentation. "The emphasis is entirely upon developing a qualitative approach of the subject" — this has been achieved. □

*D.O. Hall is Professor of Biology of King's College, London, and Chairman of the UK Section of the International Solar Energy Society.*

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