Norwegian glaciers on p. 77), but these are minor points and do not detract from the value of this book, which can be heartily recommended.

JOHN W. GLEN

WAVEGUIDES

Millimetre and Submillimetre Waves

Edited by F. A. Benson. Pp. 579. (Iliffe: London, February 1970.) 252*s*.

PROFESSOR BENSON is to be congratulated on having assembled a first-class team to undertake a review of millimetre and submillimetre waves. The book is most timely in its arrival, because the development of communication facilities in this decade will only be achieved by using this segment of the spectrum, albeit that a shift to optical frequencies may follow quickly. The work begins, very appropriately, with an introduction by Professor Cullen. In this he remarks that with the advent of the laser, the gap in the electromagnetic spectrum has now been closed. Because many lasers cannot be tuned or modulated easily, however, there is still a technological gap which inhibits the growth of applications in the submillimetre regime.

The editor has aimed to make the work comprehensive and in addition to the front runners there are also some outsiders. Readers will, however, quickly discern which of the techniques are of current practical significance. In the section on generation, several authors have provided a useful review of the fundamentals and, in particular, reveal those factors which cause generator efficiency to decline with increasing frequency. Solid state devices are included among the generators, and data are given which represent the state of the art in 1966. This, of course, highlights the difficulty of producing a book which attempts to provide an up to date review and, in a way, strengthens the case for review issues in the learned society journals, where a significant improvement in speed of publication can be achieved.

The section on transmission includes an important contribution by the editor on surface effects in waveguides, and an article which shows clearly the potential low attenuation capability of the H_{01} mode waveguide. Surface wave transmission and excitation are considered in some detail, but the comparison between rectangular waveguide and single wire transmission losses conveys an impression that the latter means is to be preferred to waveguides for transmission in the submillimetre band. As far as I know, the difficulty of supporting an actual single wire line presents a serious practical problem. Quantitative consideration of bending losses seems to be an omission from the surface-wave chapter.

In view of the many important contributions to the millimetre field made at the Royal Radar Esablishment, it is pleasing that the articles on components and detection come from authorities from that establishment. These articles include excellent line drawings of devices, which, coupled with twenty photographs, make the book attractive to the student and all those entering the field.

The final chapter on applications is marred by the brevity of its treatment of significant topics. But for a footnote (possibly inserted by the editor), one would conclude that the use of circular waveguides for millimetre wave communication was considered at the Bell Laboratories only in the 1940s and that optical techniques have now superseded the millimetre waveguide system. A prognosis to the effect "that further development is unlikely" reduces confidence in other predictions made in that chapter.

In total, however, this is an excellent book and one that in time will be found in nearly every laboratory where work in the millimetre and submillimetre field is in progress.

P. J. B. CLARRICOATS

WIND-SWEPT EARTH

Introduction to the Solar Wind

By J. C. Brandt. (Series of Books in Astronomy and Astrophysics.) Pp. xii + 199. (W. H. Freeman: New York and Folkestone, May 1970.) 94*s*.

THE Earth, together with all the planets, is being buffeted by a wind which steadily blows from the Sun. This solar wind is basically a proton-electron gas which streams past the Earth with a mean velocity between 400 and 500 km s^{-1}, a mean density of 5 particles cm^{-3}, a temperature of 5×10^5 K and a magnetic field of 6γ. The Sun is continually losing mass at the rate of $\sim 10^{-14}\,M_\odot\,yr^{-1}$ as parts of the outer corona escape into space. The steady wind must be contrasted with the gusts and bursts of energetic particles which cause magnetic storms and auroral activity. Evidence of the solar wind has been at hand for many years, but until the advent of interplanetary space probes such as Mariner 2 and 4 and Venus III, the wind has not been studied at close quarters. As a result of these satellite borne experiments and also E. N. Parker's theory explaining the hydrodynamic expansion of the solar corona, our knowledge of the solar wind has advanced greatly in the past decade.

John C. Brandt has summarized these advances in this monograph. His writing has a pithy style and the book is a good introduction to the subject, emphasizing basic principles, fundamental theories and observational data. It is aimed at a sophisticated scientific audience and will serve as an introduction for scientists in the fields of astronomy, astrophysics and space research.

The seven chapters deal with a historical introduction and a summary of modern observations; a review of solar physics, emphasizing the generation and transport phenomena believed responsible for the existence and heating of the corona and also the overall aspect of solar activity; the theoretical approach to the solar wind and the extent of the wind in space; ground based methods of observation, including the effects of the wind on ionic comet tails, radar reflexions from the solar corona, solar radio noise bursts, transmission of cosmic radio waves, geomagnetic observations and cosmic rays; space observations and the plasma probes and magnetometers used to measure the temporal variations of density, velocity, temperature, composition and magnetic field; the interaction of the wind with the solar system including the interesting colour changes it produces in the lunar surface; and finally the impact of the solar wind on astrophysics, stellar models and stellar rotation.

This is a timely and very useful book, well written with good tables and figures and excellent bibliographic notes.

DAVID W. HUGHES

SPACE PLASMA JOURNAL

Cosmic Electrodynamics

An International Journal devoted to Geophysical and Astrophysical Plasmas. Edited by C. P. Sonnet. Vol. 1, No. 1. Quarterly. (Reidel: Dordrecht, April 1970.) $35 per vol. (4 issues).

THE editorial board and publishers are to be congratulated on creating this new journal. Its first issue runs to 142 pages of excellent material, well in line with the editor's aims that the journal is to be devoted to geophysical and astrophysical plasmas and that critical papers, experimental as well as theoretical, are to be published.

"Hydromagnetic Aspects of Solar Wind Flow Past the Moon" is a superb account by Spreiter, Marsh and Summers of new problems of hydromagnetic flow past the Moon. The ingenious mathematical model used combines their ideas with those of others. The electrical conductivity of the Moon is taken to be so small that magnetic field lines