

SHORT REVIEWS

International Symposium on Nonlinear Differential Equations and Nonlinear Mechanics

Edited by Joseph P. LaSalle and Solomon Lefschetz. Pp. xiv + 505. (New York and London: Academic Press, 1963.) 128s. 6d.

THIS volume covers the forty-nine papers delivered at the international symposium on "Nonlinear Differential Equations and Nonlinear Mechanics", which was held at the U.S. Air Force Academy, Colorado Springs, in August 1962, and which was sponsored by the Air Force Office of Scientific Research and the Research Institute for Advanced Study, Baltimore. A very large range of topics is covered, and particular emphasis was given to oscillations and asymptotic behaviour; applications of differential equations; control and stability; and qualitative theory. Some of the papers were very short, in fact little more than an abstract, with "details to be published later"; on the other hand, there were some much more extended papers, such as the one by Prof. Cesari on "Periodic Solutions of Hyperbolic Partial Differential Equations", in which purely mathematical aspects are emphasized.

The papers which definitely deal with applications cover various fields, such as servomechanisms, automation, space communication, and the flight of space vehicles. A typical paper is that by Beneš on "Ultimately Periodic Behaviour in a Class of Non-linear Servomechanisms". There are also a number of papers in various electrical fields including "The Nonlinear Effect, Arising from White Noise and the Flicker Effect in Nuclear Resonance Spectrometers of the 'Marginal Oscillator' Type", by Blaquièrre and Grivet.

The participants in the symposium came from many countries including the United States, the U.S.S.R., France, Germany, Japan and the Argentine. It is evident that research into differential equations and their applications is worldwide, and this field must be one of the most active research domains in mathematics. Every library concerned with mathematical research should have a copy of this book, and many individuals carrying out research in differential equations will also need a copy.

L. S. GODDARD

The Amateur Astronomer and his Telescope

By Günther D. Roth. Translated by Alex Helm. Pp. 152 + 23 plates. (London: Faber and Faber, Ltd., 1963.) 25s.

AMATEUR astronomy now enjoys a popularity greater than ever before. Whether the contributions of amateurs to astronomy are correspondingly great is debatable. Clubs, societies and associations may experience increases in membership, but in the great majority of cases serious practical work depends on a small nucleus of active observers. This, some would say, is what we should expect. Out of every hundred persons who profess a deep interest in astronomy, only one, if one, has sufficient time, patience, ability and aptitude to undertake regular and systematic observation. Yet the rapid growth of interest in the subject is an excellent thing in itself and promises well for practical activity in the future.

To-day, anyone wishing to take up active observation can draw on a fairly extensive literature. Günther D. Roth now adds a further book to the list. A prominent lunar and planetary observer, Roth has also had much to do with organizing astronomical societies in Germany. The first five of fifteen chapters deal with telescopes—with choice of instrument, type of mounting, eyepieces, telescope drives and optical performance. The last ten

chapters tell the beginner what to observe—sunspots (forms, numbers and positions), solar prominences, the bright rays on the Moon, lunar occultations, planets, variable stars and shooting stars—and how to set about observing them. Also included is a short chapter on stellar photography and one on building a sundial.

As an introduction to amateur astronomy, the book will certainly whet the beginner's appetite. On the other hand, it gives an overall impression of incompleteness, due largely to the fact that it attempts to cover too much in too few pages. Many beginners will want to know how to make a reflector or align the mirrors of a Newtonian telescope, reduce tube currents, protect mirrors, prevent dewing up of optical surfaces, make a simple observatory, obtain a heliographic grid (p. 79) . . . and much more. Roth is, however, fully aware of these shortcomings. He admits that he is offering only a few samples from a wide field of amateur activity and that the subjects he has chosen are not necessarily better than others which he has not mentioned.

Even so, the value of the book could have been enhanced had some of the material been more carefully chosen (for example, comets instead of sundials) and more references given to supply sources, books, articles and papers. Further, a work of this kind requires a good index: that provided is more frustrating than useful. Yet, apart from these shortcomings, the book contains a great deal of useful information and presents would-be observers with a good overall picture of the kind of work that can be done with small and medium-sized telescopes. H. C. KING

The Distribution and Motion of Interstellar Matter in Galaxies

Proceedings of a Conference held at the Institute for Advanced Study, Princeton, New Jersey, April 10–20, 1961. Edited by L. Woltjer. (Benjamin Books in the Planetary and Earth Sciences.) Pp. xiii + 330. (New York: W. A. Benjamin, Inc., 1962.) 11.75 dollars.

THE *Distribution and Motion of Interstellar Matter in Galaxies* testifies to the increasing interest in the problems of the interstellar matter in both our own and other galaxies; what was once regarded merely as a nuisance has become one of the most important objects of study in astrophysics. The conference covered the distribution and motion of interstellar matter in our Galaxy as revealed by both optical and radio methods; the distribution of gas in spiral, elliptical and irregular galaxies; large-scale and small-scale dynamical problems; and questions connected with interstellar magnetic fields and cosmic rays. Attendance at the conference was restricted to a small number of leading workers in the subject, and the papers printed have a much more authoritative tone than one finds in many of the papers presented to larger conferences. The very lively discussions should probably be attributed to the cosy atmosphere of the small conference. The book is well produced and is a 'must' for every library of astronomy. R. H. GARSTANG

An Introduction to Atmospheric Physics

By Robert G. Fleagle and Joost A. Businger. (International Geophysics Series, Vol. 5.) Pp. xi + 346. (New York and London: Academic Press, Inc., 1963.) 12.00 dollars.

AN *Introduction to Atmospheric Physics* is the fifth volume in an International Geophysics Series under the general editorship of J. Van Mieghem. It has formed the basis of a year's course for graduate students in the