

REVIEWS

SHORTER NOTICES

Mathematical Models in Applied Mechanics. By A. B. TAYLER. Clarendon Press, 1986. 280 pp. £25 (hardback) or £12.50 (paperback).

The book is based on the experience of the author and his colleagues in giving graduate M.Sc. courses where the problems used have arisen from Oxford Study Groups with Industry. Twenty-one of these problems are presented, each one preceded by half-a-dozen preliminary pages which give relevant background mathematics and physics. They cover a good range of methods of solving partial and ordinary differential equations and are grouped in chapters on wave motion, elliptic problems, diffusion and asymptotic methods for nonlinear problems. Many of the problems involve fluids. Previous acquaintance with partial differential equations and continuum mechanics is assumed. A number of exercises are given at the end of each chapter.

The Ocean Surface: Wave Breaking, Turbulent Mixing and Radio Probing. Edited by Y. TOBA and H. MITSUYASU. Reidel, 1985. 586 pp. Dfl. 210, US \$69, £58.25.

This proceedings of a conference at Sendori, Japan in July 1984 gives a wide coverage of the dynamics and measurement of the ocean surface. Naturally this largely concerns surface waves, both capillary waves, and gravity waves. There is an emphasis on wave breaking, the resultant turbulent mixing and remote sensing, as the title suggests, but a substantial number of papers fall outside these topics. The papers are arranged in groups with the headings: nonlinear wave dynamics; wave generation; wave dynamics, wave statistics and wave modelling; wave models; wave dynamics and microwave probing; radar, SAR, SCAR, scatterometry; scatterometry and altimetry case studies; remote sensor developments; drift current, wave breaking and turbulence; turbulence and Langmuir cells in the upper ocean; and mixed-layer models for climate study. An index is provided. This volume can be recommended since it brings together related work on topics which are not well covered by text books. Although the book is produced from typescript the reproduction is excellent.

Civil Engineering Hydraulics. By J. R. D. FRANCIS and P. MINTON. Arnold, 1984. 387 pp. £12.75 (paperback).

This is the fifth edition of the book *A Textbook of Fluid Mechanics* by J. R. D. Francis (reviewed in *J. Fluid Mech.* vol. 6, 1959, p. 316). The form and change of emphasis of this edition was agreed before Francis's death and the second author has carried out the revision. The major changes are a revision of the chapter on hydraulic machines, the addition of more marked examples and the omission of a chapter on compressible flow. The book attempts to cover at least the first two year's work of a three-year civil engineering degree. The level of mathematics may be judged by the absence of partial derivatives.

Hydraulics in Civil Engineering. By A. J. CHADWICK and J. C. MORFELT. Allen & Unwin, 1986. 492 pp. £35 (hardback) or £12.95 (paperback).

This text aims to provide a comprehensive coverage of hydraulics appropriate to a degree course in civil engineering and to be a guide and source of reference for practising civil engineers. It is divided into Part I, 335 pages on fundamental concepts, and Part II which gives design examples for a number of cases. As well as the usual topics in such texts, for example pipe and channel flow, there are chapters on compressible flow, sediment transport, flood routing and river and coastal engineering.

Solar System Magnetic Fields. Edited by E. R. PRIEST. Reidel, 1985. 290 pp. £29.95 (cloth) or £15.25 (paperback).

This 28th volume in the series of Geophysics and Astrophysics Monographs consists of papers given at a Summer School on Solar System Plasmas held at Imperial College in 1984, with the support of the Science and Engineering Research Council. The papers provide a clear and interesting introduction for research students and bring together studies of magnetospheres and solar physics. The chapters are: 1. Introduction to solar activity (E. R. Priest); 2. An introduction to magnetospheric MHD (D. J. Southwood); 3. Magnetohydrodynamic waves (B. Roberts); 4. MHD instabilities (A. W. Hood); 5. Magnetic reconnection (S. J. Cowley); 6. Magnetoconvection (N. O. Weiss); 7. Aspects of dynamo theory (H. K. Moffatt); 8. Solar wind and the Earth's bow shock (S. J. Schwartz); 9. Planetary magnetospheres (F. Bagnet); and 10. Comets (A. D. Johnstone).

Ernst-Becker-Gedachtnis-Kolloquium. Technische Hochschule Darmstadt, 1986. 231 pp.

Ernst Becker was Professor of Mechanics at the Technische Hochschule Darmstadt at the time of his death from cancer in November 1984 at the age of 55. His colleagues in the Institute of Mechanics organized a Colloquium in his memory in October 1985, and this little volume records in camera-ready-copy form the texts of the addresses and scientific lectures given at the Colloquium, most of them being in German. There is an opening address by the President of the Technische Hochschule, an appreciation of Becker's work as a teacher by W. Schnell, a description of his research contributions in boundary-layer theory, steady streaming, gas dynamics, chemically reacting flows, continuum thermodynamics and flow of non-Newtonian fluid by H. Buggisch, a list of Becker's publications, and then the texts of 13 lectures on a variety of topics, mostly in fluid mechanics. It is a pleasing tribute to a selfless man who earned the respect and friendship of all who came into contact with him.