REVIEWS

SHORTER NOTICES

Scaling Phenomena in Disordered Systems. Edited by R. PYNN and A. SKJELTORP.
  Plenum, 1985. 580 pp. $92.50.

This volume, produced from camera-ready copy, comprises the proceedings of a
NATO Advanced Study Institute held in Geilo, Norway in April 1985. It contains
50 papers, varying in length from two pages to 34, on a fascinating variety of complex
physical phenomena such as phase transitions (the classic Ising model of
ferromagnetism is used as an analogy to study other transitions), the growth of
crystals and other aggregates, percolation through and transport properties of rigid
porous media containing one or more fluid phases, the elasticity of aggregates, the
physical properties of polymer solutions and polymer melts, etc. There are many
theoretical papers including some on the complex behaviour that can arise out of
simple deterministic dynamical systems such as aggregates of cellular automata, but
there are also a substantial number concerned with the problems of testing the
theories experimentally. Percolating through the whole volume is the central
geometrical concept of fractals, suggesting as it does the basis of the scaling laws
which all the authors seek to derive and understand. Recommended browsing for
lateral thinkers.

Historic Writings on Hydraulics. Compiled by HUNTER ROUSE. Friends of the
  University of Iowa Libraries, 1984. 135 pp. $15.

This is a catalogue of the History of Hydraulics Collection in the University of Iowa
Libraries, a collection of over five hundred relatively rare volumes, mostly acquired
by Rouse using the income from the *History of Hydraulics*, written by himself and
S. Ince and published in 1957 (see the review by S. P. Hutton in *J. Fluid Mech.* vol. 4,
1958, p. 655. The catalogue covers most of the important works covered in that
History and in Rouse's *Hydraulics in the United States, 1776–1976*, published in 1976
(reviewed by A. M. Binnie in *J. Fluid Mech.* vol. 80, 1977, p. 203). It is arranged in
chronological order of author, beginning with Aristotle (in the form of a 1566
Venetian edition of St Thomas Aquinas's commentary) and Archimedes, and ending
with Rouse himself. The compiler has added very brief explanatory notes to some
entries, but the catalogue should really be regarded as a supplement to the two
volumes referred to above, and as a stimulus to the historically minded fluid
dynamicist to study the collection in Iowa.

Hydrodynamic Instabilities and the Transition to Turbulence. Topics in Applied
  Physics, vol. 45, 2nd Edition. Edited by H. L. SWINNEY and J. P. GOLLUB.
  Springer, 1985. 306 pp. £19.80 (paperback).

The second edition of this book (the first edition of which was reviewed in *J. Fluid
Mech.* vol. 119, 1982, pp. 533–535) comes at a time when much progress is being made
in understanding the routes to chaos in dynamical systems. A final chapter, Recent
Progress, by F. H. Busse, J. P. Gollub, S. A. Maslowe and H. L. Swinney, has been
added to the nine articles in the first edition. The new account contains a brief review
of experiments and theoretical developments since the original publication. A

comprehensive list of references is given. The decrease in the cost of this edition in paperback is welcome since, as the editors note, it should 'make the book accessible to many additional scientists and students'.

Theoretical and Applied Mechanics. Edited by F. I. NIORDSON and N. OLHOFF. North Holland, 1985. 435 pp. Dfl 225.00, $83.25.

This volume comprises the proceedings of the Sixteenth International Congress of Theoretical and Applied Mechanics, held in Lyngby, Denmark, in August 1984. It contains the full text of invited (general and sectional) lectures, and a list of titles of contributed papers. The authors and titles of the invited lectures are:

H. Alfvén and F. Čech. Space Research and the New Approach to the Mechanics of Fluid Media in Cosmos

J. B. Keller. Computers and Chaos in Mechanics

H. Aref. Chaos in the Dynamics of a Few Vortices – Fundamentals and Applications

V. V. Beletsky. Resonant Phenomena in Rotational Motions of Artificial and Natural Celestial Bodies

M. V. Berry. Quantum, Classical and Semiclassical Adiabaticity

L. Bjørnø. Aspects of Nonlinear Acoustics

O. M. Faltinsen. Hydrodynamic Loads on Marine Structures

E. J. Hinch. The Recovery of Oil from Underground Reservoirs

K. Hutter and T. Alts. Ice and Snow Mechanics, A Challenge to Theoretical and Applied Mechanics

K. Kirchgässner. Nonlinear Wave Motion and Homoclinic Bifurcation

A. Libchaber. From Periodicity to Chaos in Hydrodynamic Systems

J. J. McCoy. Continuum Formulations for Stochastic Multi-component Systems

H. Mitsuyasu. Recent Studies on Ocean Wave Spectra

D. W. Moore. Numerical and Analytical Aspects of Helmholtz Instability

J. R. Paulling. Hydrodynamic Synthesis of Marine Structures

P. Terndrup Pedersen. Structural Design of Marine Structures

W. G. Price and Y. Wu. Hydroelasticity of Marine Structures

D. Rogula. Non-Classical Material Continua

P. G. Saffman. Three Dimensional Stability and Bifurcation of Steady Water Waves

J. Salençon. Yield-Strength of Anisotropic Soils

W. O. Schiehlen. Vehicle System Dynamics

S. Taneda. Flow Field Visualization

Annual Review of Fluid Mechanics, Volume 18. Edited by M. VAN DYKE, J. V. WEHAUSEN and J. L. LUMLEY. Annual Reviews Inc., 1986. 522 pp. $32.00 ($35.00 outside USA).

The contents of the latest volume in this series, still the cheapest and easiest way of keeping up to date with most branches of fluid mechanics, are:

Keith Stewartson: His Life and Work, by J. T. Stuart

Strange Attractions in Fluids: Another View, by John Guckenheimer

Regular and Mach Reflection of Shock Waves, by Hans Hornung

Gravity Currents in Rotating Systems, by R. W. Griffiths

Eddies, Waves, Circulation, and Mixing: Statistical Geofluid Mechanics, by Greg Holloway

Wind-Wave Prediction, by Rodney J. Sobey

Three-Dimensional and Unsteady Boundary-Layer Computations, by J. Cousteix

Steady and Unsteady Boundary-Layer Separation, by F. T. Smith

Vortex Flows in Aerodynamics, by J. H. B. Smith

Flows Far From Equilibrium via Molecular Dynamics, by Denis J. Evans and William G. Hoover

The Continental-Shelf Bottom Boundary Layer, by William D. Grant and Ole S. Madsen

Interaction of Flows With the Crystal-Melt Interface, by M. E. Glicksman, S. R. Coriell and G. B. McFadden

Characteristic-Based Schemes for the Euler Equations, by P. L. Roe

Marine Propellers, by Justin E. Kerwin

Critical Layers in Shear Flows, by S. A. Maslowe

Vorticity Dynamics of the Oceanic General Circulation, by Peter B. Rhines