

THE STRUCTURE OF TURBULENT SHEAR FLOW

By Dr A. A. Townsend

The first systematic and comprehensive discussion of all kinds of turbulent motion, and the first to provide a reliable analysis of the processes which occur. This book will be needed by all those concerned with the theory or application of fluid dynamics, especially graduates in the university departments of mathematics, engineering and physics, and the staffs of many research establishments and laboratories.

\$7.50, at your technical bookstore

CAMBRIDGE
UNIVERSITY PRESS

32 East 57th Street
New York 22, N. Y.



X-RAY DIFFRACTION AND FLUORESCENCE

Opening for responsible individual to take charge of new, well equipped X-ray laboratory in Midwest. Experience and interest required in metallurgical, corrosion, general diffraction problems and fluorescence applications. Submit resume and salary requirements. Send replies to Box 556A, Physics Today, 57 E. 55 St., N. Y. 22, N. Y.

readable discussion of the special relativity of continuous media than the reviewer has found elsewhere. The stress-energy tensor is introduced, its principal axes are found, the equations of motion of the medium are set up and the meaning of pressure and incompressibility is discussed. One who has mastered this chapter should have no particular difficulty in understanding recent theories of cosmology.

The last two chapters deal with classical electromagnetic theory in its relativistic form. Here again the treatment is axiomatic and geometrical, as contrasted with the analytic and inductive approach of Panofsky and Phillips. The field tensors and the energy tensors are set up, the principal axes of the energy tensor are determined and the Poynting vector and the potentials are derived. A short discussion of various types of fields and of the field around a moving charge completes the main part of the text. There are appendices on the radiation from an accelerated charge, on retarded potentials, a list of references, and a quite adequate index. There are no exercises.

The Foreseeable Future. By Sir George Thomson. 166 pp. Cambridge U. Press, New York, 1955. \$2.50. Reviewed by P. Morrison, Cornell University.

The physicist is a kind of specialist in innovation. Change in means and in concept is his daily expectation. But he is very well aware that the world is far from haphazard, that the more things change, the more they must remain the same. It was Edward Condon who told the congressman that even the most radically inclined of skeptics in physics held fast to some notions now two thousand years old, and never called them into question. His example was Archimedes' Principle! It is his understanding of the firm framework of the world, matched with the willingness to let the façade and the furnishings change freely, that makes a reflective physicist a good architect for planning any technical future.

Sir George has been willing to let us in on his own sketches for the shape of things to come in the next hundred years. In a chatty, unpretentious, and concise way, he has here produced a kind of operational research into the probable state of the world, chiefly of course its technical state, projected a century ahead. The arguments are made carefully, but in a most elementary style, explaining the invariant principles upon which they are founded in a wholly nontechnical but still roughly quantitative way. The result is a short book which is both a highly plausible prophecy and a model of the order-of-magnitude reasoning of the imaginative physicist at work. It is a book of wide general interest for what it says, and of special value to the young student of physics for how and why it says it.

In a neat statement of what he considers the fundamentals of our knowledge of the world (the First and Second Laws, the replicated atomicity of all matter, and so on) Sir George lays down a nice extrapolation in fields as diverse as fuel and materials, communications and food, medicine and learning theory. The book is so

small and so worth reading that it would be wrong to catalogue the conclusions, but a few may be quoted as samples to tempt the reader. Knowledge of the role of defects in crystals will lead, he believes, to new materials of high yield strength, though with rigidities not different from our own. Architecture will then become more and more concerned with tension members, designed to allow deformation, and relatively less burdened by the stresses of structure weight itself. "The world of the future may be expected to look . . . more like fairyland" and the buildings may "be a little like the masts and rigging of a sailing ship . . ." he says. Nuclear-driven submarines of big size, capable of seventy-mile speeds submerged, free from power loss by radiation into surface waves, may take over fast goods carrying. The space platform may serve as dock for a low-acceleration vacuum-plying rocket, but it is too vulnerable to be anything but absurd as an engine of war. Climate control both by trigger schemes like the dry ice rain-making, and by biological-engineering projects of great scope, appeal to him. No chronic world famine looms before him, nor does he foresee the ultimate hydrogen catastrophe. Rather he looks to a reasonable effort at solution of our problems, and even to an England with lowing herds of machine-fed cattle and deer roaming the grassy parks, her farms replaced by factories, algal and yeast tanks, at least in part, and the meat won by bow and arrow, "supplying the engineers who made the fodder with a spice of adventure."

Any prophet not only portrays a future, but reveals himself. The good spirit and human decency which lie behind this book leave their mark nearly everywhere in it, and the love of the chase and the woodland, no less than of the lab and zoological garden, is fitting and honorable in the Master of a Cambridge College. One would not want, however, to accept as real a few of the problems which the life and views of an English gentleman here project. The wish for scientific study of racial capacities, and other matters of race, concerning which Sir George feels facts are much needed, is only the unpleasant reminder of the insularity of a past generation and a narrower world, when physics knew the Cavendish and Berlin, but not Kyoto, Bombay, or even Nashville.

Two main worries emerge, and with them one important omission became clear to this reader. He is concerned with the need for adventure in a rational, mapped, and organized planet; and he fears for the idleness of the "definitely stupid man" or even "the man of barely average intelligence" when the routine tasks of farm, factory, and file have been taken over by servo and flip-flop. These are real problems, but part of the answer lies in what he has left out. That is the impact of science, not simply on the technology of making a living for mankind, but on man himself, and on the ideas and values by which he lives. It is hard to see how adventure can be lacking in a world and a century in which space will be occupied, life made anew in the laboratory from unliving substance, the elementary particles related one to the other, and the history of the

OUTSTANDING McGRAW-HILL BOOKS

● MODERN PHYSICS

By JOHN C. SLATER, *Massachusetts Institute of Technology*. 330 pages, \$5.50

An elementary survey of modern physics including its development from 1900 to the present. It follows the development of the ideas of modern physics, in particular the quantum theory, and its application to the structure of atoms, molecules, solids, and the atomic nucleus, keynoting the logical historical development of 20th Century physics.

● INTRODUCTION TO MODERN PHYSICS

By F. K. RICHTMYER; E. H. KENNARD, *National Research Laboratory, Bethesda, Maryland*; and T. LAURITSEN, *California Institute of Technology*. *International Series in Pure and Applied Physics*. Fifth Edition. 666 pages, \$8.50

A sound revision of a popular text substantially improved by the inclusion of extensive material covering significant advances in the field, and by rewriting, rearrangement, and abbreviation of older material where necessary or desirable, to reflect further change in perspective on the physical scene. Added new material is contained in the discussion of nuclear energy, cosmic rays, and spectroscopy.

● NUCLEAR PHYSICS

By ALEX E. S. GREEN, *Florida State University*. *International Series in Pure and Applied Physics*. 556 pages, \$9.00

A comprehensive presentation of the essentials of nuclear physics . . . systematically treated and including all major recent advances. Five major topical groups comprise the text: (1) background, (2) instruments and methods, (3) experimental results and their interpretation, (4) systematic and semiempirical theory, and (5) theory. The systematics of nuclei as revealed by experimental evidence are presented. Included are areas of nuclear physics in which greater research is essential.

● THE ATOMIC NUCLEUS

By ROBLEY D. EVANS, *Massachusetts Institute of Technology*. *International Series in Pure and Applied Physics*. 972 pages, \$14.50

A standard text and reference book for professional workers in all fields bordering on nuclear physics characterized by an unusually broad coverage involving both "intra-nuclear" and "extra-nuclear" fields. Discussion of each topic begins at the introductory level, then carries through intermediate levels of difficulty into advanced areas of most recent research. Combines the experimental and theoretical approach.

● ATOMIC PHYSICS

By GAYLORD P. HARNWELL, and WILLIAM E. STEPHENS, *University of Pennsylvania*. *International Series in Pure and Applied Physics*. 412 pages, \$8.00

Presents the essential ideas upon which the current atomic theory of matter rests with emphasis on the extension of the basic classical concepts of physics into the realm of atomic phenomena, and on the evolution of those particularly central concepts and elemental quantum concepts, having no classical counterpart, which uniquely characterize the physics of atomic particles.

SEND FOR COPIES ON APPROVAL

McGRAW-HILL BOOK COMPANY, Inc.

330 West 42nd Street

New York 36, N. Y.

PHYSICISTS, MATHEMATICIANS

Honeywell's Aeronautical Division is conducting advanced research projects in the areas of inertial guidance, stabilized platforms, inlet geometry control, air data computers and operational digital computers.

■ Several unusual positions are open in our Aeronautical Research Department for physicists and mathematicians with a Master's Degree or higher. Experience or interest is desirable in digital and analog computing, inertial guidance—both from a physical equipment and mathematical analysis standpoint—supersonic aerophysics and numerical analysis.

■ These are permanent positions in both basic and applied research in a group reporting directly to division management. You will take professional responsibility for your project and its translation into the desired goals.

CONSIDER THESE ADVANTAGES

■ Minneapolis, the city of lakes and parks, offers you metropolitan living in a suburban atmosphere. No commuting.

■ Your travel and family moving expenses paid.

■ Salaries, insurance-pension programs, plant and technical facilities are all first-rate.

WRITE TO US

If you are interested in a career with a company whose sound growth is based on research, call collect or send your resume to Hugo Schuck, Dept. PY-7-97, Director of Research, Aeronautical Division, 2604 Ridgway Road, Minneapolis 13.

Honeywell *First in Controls*

PHYSICISTS ENGINEERS

SEMICONDUCTOR DEVELOPMENT

Responsible positions are now available with one of the leading and fastest growing manufacturers of semiconductors. These are outstanding opportunities in research, development or applications of advanced silicon and germanium transistors.

You'll be located in pleasant, suburban Boston where cultural and educational advantages are found for you and your family. And you're only an hour's drive from New England's vacationland.

Send resume or call

Transitron electronic corporation
407 MAIN STREET, MELROSE, MASS. MELrose 4-9600

stars charted in detail. It is this effect of science, the setting of new values and new victories, which he gives too scanty a treatment, but which may help solve the problems of boredom, over-leisure. Here is the path to a solution, and here is one more, and indeed a more worthy reason, why science training needs to be brought to wider and wider circles, not to an elite of future missile experts alone. Sir George Thomson's book is far from a bad place to begin a layman's introduction into the uses and beauties of physics.

Report of the Committee on the Measurement of Geologic Time, 1953-1954. NAS-NRC Publication 333. John Putnam Marble, Chairman. 193 pp. National Academy of Sciences—National Research Council, Washington, D. C., 1955. Paperbound \$1.75. *Reviewed by S. F. Singer, University of Maryland.*

This is probably the last publication of Dr. John Putnam Marble, Chairman of the Committee on the Measurement of Geologic Time. His death last June is a great loss, both professionally and personally, to his colleagues. He and eleven other distinguished geophysicists and geologists have put together this report which lists all of the work in this field published during 1953-54, summarizes it and gives complete references to the literature. The report of the Chairman constitutes a general summary of the work during the past two years and bears his delightful touches. Among other recent developments the report deals with new data on the lead isotope method of measuring geologic time, natural variations in stable isotopes, methods for measuring the C-14 content of materials, and the general chemistry of radioactive elements. It also discusses the tritium method, the argon-potassium method, deep-sea cores, and the recent researches on the age and origin of meteorites.

Modern Physics: A Textbook for Engineers. By Robert L. Sproull. 491 pp. John Wiley & Sons, Inc., New York, 1956. \$7.75. *Reviewed by Arthur Beiser, New York University.*

There is no shortage of texts whose purpose is to reveal modern physics to engineers, but Sproull's new book differs considerably from the norm. After introducing particles, nuclei, and atoms, and describing some of their properties, a careful discussion of the wave-particle duality is presented. Then the Schrödinger equation is stated and applied to square wells, the harmonic oscillator, radiation and absorption, and in some detail to atomic and molecular structure and spectra. Next, four chapters on the solid state, followed by material on physical electronics and nuclear physics (the former occupying more space than the latter). The striking difference in emphasis between solid-state and nuclear physics is certainly no accident here, but one may question whether in correcting the usual inequity the author