

SCIENTISTS & ENGINEERS

with exceptional abilities are invited to investigate opportunities with the
Research Laboratories of Brown Engineering Company, Inc.

As the prime research support contractor for NASA-Marshall Space Flight Center, Brown's Research Laboratories have a major role in America's most advanced space project: Apollo Extension Systems.

Staff positions are open in many disciplines, with urgent requirements in • geo-astronautics • space instrumentation • mission analysis • electronic systems.

Openings normally require advanced training (25% of the staff hold PhD degrees) but inquiries are invited from capable personnel at all education and experience levels. Submit your resume in confidence to Raymond C. Watson, Jr., Director of Research.

BROWN

ENGINEERING COMPANY, INC.

300 Sparkman Drive, N.W.
Huntsville, Alabama 35805

An Equal Opportunity Employer

presented the established and inferred normal electron configurations (and spectral terms) of 14 neutral lanthanum atoms and their first three stages of ionization; likewise of 14 neutral actinon atoms and four stages of ionization—125 spectra in all. Here is a challenge to several generations of experimental spectroscopists who must either confirm or correct these predictions!

Science in Progress, 14th Series. Wallace R. Brode, ed. 286 pp. Yale University Press, New Haven, 1964. \$8.50.

Reviewed by R. B. Lindsay, Brown University.

The National Lectureships sponsored annually by the Society of the Sigma Xi and the Scientific Research Society of America are well known and justly admired. For many years it has been customary to publish the lectures in collected form, and the book under review constitutes the 14th series. It contains nine articles with an editorial preface by Wallace Brode. It is their purpose to present in general review form latest developments in certain aspects of science, both physical and biological. Physics is represented by material on magnetogasdynamics, engineering by an essay on space propulsion engines, chemistry by articles on structural reorganization through ligand interchange and the properties of solid carbon. In the biological sciences there are papers on the relation between nutrition and human behavior, the uniqueness of plants, and social anthropology. Finally, there are two articles devoted to what may be called, in the broad sense, the philosophy and sociology of science. As might be expected, the last two are the easiest for the general reader to handle.

All the articles are authoritative, are written with care, and are amply illustrated. On the other hand, they make a variety of demands on the reader's background. The physics article, for example, will not convey too much to the person who is not already familiar with electromagnetic theory, thermodynamics, and plasma physics. Similarly, the paper on ligand interchange implies a thorough grasp of modern theories of chemical reactions. It is true that an examination of

this material may stimulate the general reader's interest sufficiently so that he will want to go and inform himself further on these matters. But inevitably the interesting question arises: for what audience are these lectures really intended? If they are directed to the scientific specialist who wants to know more about some specialty other than his own but in his own branch of science, the articles in the present volume succeed admirably, but one wonders why they should be collected in a single volume. If on the other hand, they are intended for the scientist who wants to know what is going on in quite another branch of science than his own, this reviewer feels that the success of the present volume must be considered as only moderate. If the latter aim is the intended one, it would seem that the authors have not fully met the obligation to present their results in more general and descriptive terms with less emphasis on analysis and more stress on the relation with science as a whole. This is of course by no means an easy thing to do, but is being accomplished with considerable success in most of the articles in such magazines as *Scientific American* and especially in the *New Scientist*.

The volume is beautifully produced. Each article is accompanied by a brief bibliography, and there is an adequate index.

Plasma Diagnostics with Microwaves. By M. A. Heald and C. B. Wharton. 452 pp. John Wiley, New York, 1965. \$13.50.

Reviewed by Harold P. Furth, Lawrence Radiation Laboratory.

A precondition for the development of experimental plasma physics has been the availability of accurate non-destructive diagnostics. An important diagnostic tool of this type is a weak beam of electromagnetic radiation: by sampling the plasma dielectric constant along its trajectory, it can provide information about plasma density, temperature, and degree of quiescence, as well as about the interior magnetic field strength.

The range of maximum usefulness of microwave diagnostics is determined by the condition that the beam frequency must exceed the plasma frequency if transmission is to take place



Examine Wiley & Interscience Books for High Quality
(based on authoritativeness, up-to-dateness, thoroughness, readability)

HIGH-STRENGTH MATERIALS

Proceedings of the Second Berkeley International Materials Conference: "High-Strength Materials—Present Status and Anticipated Developments"

VICTOR F. ZACKAY, Editor; *Lawrence Radiation Laboratory and the University of California, Berkeley.*

The papers and discussions in this book were presented at an international conference held at the University of California, Berkeley, June 15-18, 1964. The conference provided a forum for the presentation, discussion, and publication of important research problems and results by leading workers in the field. *A volume in the Inorganic Materials Research Series 1965.* 879 pages. \$22.00.

IMAGE FURNACE TECHNIQUES

By **TIBOR S. LASZLO**, *Avco Corporation.*

When should image furnace techniques be used? Which technique is best suited to the problem at hand? What new developments can be expected in the future? Here—in one handy reference—is all the information the reader needs in order to select . . . design . . . build . . . and operate an image furnace to satisfy any given work program. In preparing this book, the author contacted virtually every research organization involved in image furnace work. *An Interscience Book. Volume 5 in the Technique of Inorganic Chemistry series, edited by HANS B. JONASSEN and ARNOLD WEISSBERGER.* 1965. 195 pages. \$12.00.

TRANSFORMATIONS IN OPTICS

By **LAWRENCE MERTZ**, *Block Associates, Inc.*

A unique, comprehensive volume concerned primarily with the theoretical treatment and practical techniques for the implementation of Fourier transform spectrometry. The book also introduces the Fresnel transform from a pragmatic point of view and examines the interesting aspects of the wavefront folding interferometer. 1965. *In press.*

METHODS OF ORBIT DETERMINATION

By **PEDRO RAMON ESCOBAL**, *TRW/Space Technology Laboratories.*

Beginning with a complete introduction to astrodynamics and progressing to advanced material, *Methods of Orbit Determination* gives a step-by-step presentation of the techniques of analytical satellite mechanics, booster mechanics, orbit determination, and differential correction. The book is well illustrated, and end-of-chapter exercises and problems are provided. 1965. 463 pages. \$17.50.

JOHN WILEY & SONS, Inc.

RADIATIVE CONTRIBUTIONS TO ENERGY AND MOMENTUM TRANSPORT IN A GAS

By **DOUGLAS H. SAMPSON**, *Space Sciences Laboratory, General Electric Company.*

The radiative contributions to the macroscopic energy and momentum transport equations for a gas are derived for rather general conditions from the microscopic photon Boltzmann equation. The nature and validity of the usual approximations made in radiative transport theory are analyzed. *Volume 26 of Interscience Tracts on Physics and Astronomy, edited by R. E. MARSHAX.* 1965. Approx. 200 pages. Prob. \$9.50.

VISION AND VISUAL PERCEPTION

By **CLARENCE H. GRAHAM** (Editor), *Columbia University*; **NEIL R. BARTLETT**, *University of Arizona*; **JOHN LOTT BROWN**, *Kansas State University*; **YUN HSIA**, *Columbia University*; **CONRAD G. MUELLER**, *Columbia University*; and **LORRIN A. RIGGS**, *Brown University.*

Treats very nearly the entire spectrum of subjects concerned with vision and visual perception. 1965. Approx. 608 double-column pages. \$23.50.

ERROR IN DIGITAL COMPUTATION

Proceedings of An Advanced Seminar Conducted by the Mathematics Research Center, United States Army, at the University of Wisconsin, Madison.

Volume II—April 26-28, 1965

Edited by **L. B. RALL**, *Mathematics Research Center, United States Army, University of Wisconsin.*

This volume, along with Volume I, is THE basic book for anyone interested in the computational error problems from either a practical or theoretical standpoint. *Publications in the University of Wisconsin Mathematics Research Center Series. Volume II: 1965. In press. Volume I—October 5-7, 1964, edited by L. B. RALL: 1965. 324 pages. \$6.75.*

SPACE RESEARCH V

Proceedings of the Fifth International Space Science Symposium, Florence, May 12-16, 1964. Organized by COSPAR* and the Italian Space Research Committee. Edited by **D. G. KING-HELE**, **P. MULLER**, and **G. RIGHINI.**

The book contains those papers of the symposium dealing with: interaction of energetic particles with the atmosphere, and with latest results in space research by means of rockets or satellites. *A North-Holland (Interscience) Book.* 1965. 1248 pages. \$47.50. *Committee on Space Research of the International Council of Scientific Unions.

605 Third Avenue, New York, N. Y. 10016

National
Institute for
Research in
Nuclear Science

DARESBURY NUCLEAR PHYSICS LABORATORY

Opportunities for EXPERIMENTAL PHYSICISTS

The 4 GeV electron synchrotron NINA which is now under construction at Daresbury in Cheshire, England, will come into operation next year. The Laboratory will be used by research teams from Universities and other bodies; it is situated in pleasant rural surroundings in North Cheshire but within easy reach of many towns in South Lancashire and North Cheshire.

Posts are available for senior and junior physicists with postgraduate experience in nuclear or elementary particle physics and for physicists or engineers with special interest in fast electronics and logic. They will join in the planning and preparation of experiments on NINA, in co-operation with Universities.

Circulating beams of 10^{12} electrons per second will produce intense beams of electrons and photons for investigation of the electromagnetic interactions. Elastic and inelastic electron scattering and photo-production experiments will provide information on the properties of the mesons and baryons to verify theories and the classification schemes of elementary particles. Experiments will also test the predictions of quantum electrodynamics to very short distances.

Visual and filmless spark chambers will form a central part of most experiments requiring precise information and much effort will be involved in extracting this information in a form which can be easily handled by computers.

The posts will be for fixed terms of initially up to three years, and superannuation arrangements will be available. Salaries will be fixed according to age, qualifications and experience and generally in accord with those applied in the Scientific Civil Service.

There are generous leave arrangements. Assistance with housing accommodation may be available.

Please send postcard quoting reference number DL/66 for application form to:

Professor A. W. Merrison, Director

SCIENCE RESEARCH COUNCIL

Daresbury Nuclear Physics Laboratory

Daresbury, Nr. Warrington, Lancashire, England

PHYSICISTS

Openings are available at Xerox Corporation for Physicists interested in Applied Research. The work will appeal to those having a flair for creative approaches to solving technical problems and an interest in seeing practical results of their labors. The positions will involve cooperative efforts with engineers and chemists. Personnel with backgrounds in classical physics having a working knowledge of electrostatic phenomena, light, photoconductivity, thermodynamics and mechanisms should be especially interested in these openings.

These openings require a proven record and the potential to grow in responsibility. Salaries are commensurate with individual abilities, and a liberal, cost free benefit program is available to all employees.

These positions are in Rochester, New York. If interested, send resume to Mr. D. A. Zrebiec, Dept. PT-9A, Xerox Corporation, P.O. Box 1540, Rochester, New York 14603.

XEROX

An Equal Opportunity Employer

in the direction across magnetic field; sensitivity to density variations is highest just below this cut-off point. Wavelengths greater than 0.3 cm are cut off at particle densities above 10^{14} cm⁻³, and wavelengths smaller than 30 cm will not reach cut-off at 10^{10} cm⁻³.

The authors have been closely associated with the development of practical microwave plasma diagnostics during the past decade or so. The most striking feature of their book is its devotion to the interests of the utility-minded reader. The detailed and authoritative discussions of measurement technique and hardware, the many useful illustrations and graphs, the broad coverage of introductory theory (supplemented by extensive references) all combine to make this book a necessary—and to a large extent sufficient—guidebook for the plasma experimentalist.

The use of lasers has recently facilitated the extension of the electromagnetic probing technique into the infrared and optical ranges, with a corresponding rise in the accessible plasma-density range. This highly promising new technique furnishes the jacket photograph, and is discussed briefly in a chapter devoted to a general survey of plasma diagnostics.

Physical Acoustics. Principles and Methods. Vol. 2, Part A. Properties of Gases, Liquids, and Solutions. Warren P. Mason, ed. 476 pp. Academic, New York, 1965. \$17.00.

Reviewed by Walter G. Mayer, Georgetown University.

It is perhaps not immediately obvious from the subtitles that this book is actually concerned primarily with relaxation phenomena whose observation and evaluation make it possible to determine a great number of properties of gases, liquids, and solutions. Part A of the present volume treats the relationships between relaxation processes and molecular properties.

The first chapter (M. Greenspan) introduces the reader to the theory and some experimental techniques of sound propagation in gases at low pressure. Important parameters which will be found again later in the text are defined, explained, and discussed here with the emphasis on monatomic