

tions and it would have been most valuable to illustrate some of *their* system engineering problems. However, Goode and Machol have made a good start, and have produced an interesting book to boot. It is to be hoped that the books which will undoubtedly follow and extend their exposition will be able to maintain a similar degree of interest.

Physics in Meteorology. By A. C. Best. 159 pp. Pitman Publishing Corporation, New York, 1957. \$3.75. *Reviewed by S. F. Singer, University of Maryland.*

This little volume is written at a very simple level and serves as a fine introduction for physicists to meteorological problems. The author, who is Deputy Director of the British Meteorological Office, starts with a short discussion of meteorological instruments and then treats various special aspects of meteorology: the microphysics of clouds; radiation problems within the atmosphere, between the ground and the atmosphere, and into space; and the general question of the heat balance of the earth. A descriptive approach is given on the subject of atmospheric electricity, the production of thunderstorms and lightning. Dynamical meteorology as such is not discussed, but there is a brief treatment of large-scale winds and of the turbulence in the atmosphere, again on quite a descriptive level. Meteorological optics and acoustics and radiometeorology complete the treatment of physical problems. The latter chapter is quite detailed; it takes up propagation of radio waves and the effects of fog and precipitation. Finally, there is a brief account of the present state of work on weather control. The reviewer notes a lack of references to recent papers, or even to recent books, such as the *Compendium of Meteorology*, or to texts on physical meteorology.

Nuclear Reactor Physics. By Raymond L. Murray. 317 pp. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1957. \$7.50. *Reviewed by R. Hobart Ellis, Jr., New York City.*

In the rapidly developing field of reactor physics there are remarkably few books. Designers are basing calculations on journal articles, class notes, AEC documents, and personal communications. Students study the classic Glasstone and Edlund and engineering texts like Richard Stevenson's *Introduction to Nuclear Engineering*. In Professor Murray's new book they will now have their second-course text—a presentation of the more subtle aspects of reactor behavior previously to be learned only from original sources.

The author introduces his subject briefly in his first two chapters. Basic equations are stated with little or no derivation. Then come computations of critical masses, transient analysis, temperature effects, and one-, two-, and multigroup computations of neutron behavior.

The novice will find the book difficult and will do well to understand his basic concepts well before attempting this text. When average logarithmic energy decrement is

derived, for example, the uninitiated may not notice that it is independent of energy and may miss the significance of this important fact. He is not told about it. It will be difficult for him to get much feel for diffusion length when he suddenly comes upon a definition of its square in terms of other parameters with no discussion of its physical significance.

Even the better informed reader may object to a poor job on the part of the editor. He has not contributed to the ease of reading and understanding as he should have. The distinction between "may" and "can", for example, has disappeared. Hyphens do not connect the parts of compound modifiers in order to make quickly recognizable such distinctions as that between "fast reactor control" and "fast-reactor control". His hyphens stand instead where they don't belong as in "slowly-varying". But these are quibbles to most physicists, who will not mind re-reading many of the sentences in a short book to see just what they mean.

Let us differ, then, with the man who wrote the jacket blurb and thinks that this is "a logical and straightforward presentation of theory". It is rather an adventure into the presentation of material that is newer and more advanced than is to be found in most of the existing texts. It is concise rather than logical. Explanations and derivations have been omitted or abbreviated to make room for a wealth of material. The man who is designing reactors, however, will find at his fingertips the numbers, formulas, and concepts of his business in a compact package.

Proceedings of Symp. on Astronomical Optics and Related Subjects (U. of Manchester, Apr. 1955). Edited by Zdeněk Kopal. 428 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1956. \$12.50. *Reviewed by V. Twersky, Sylvania Electronic Defense Laboratory.*

The forty-six papers of this volume and the historical introduction by the editor are essentially the proceedings of a symposium held at the University of Manchester, April 19–22, 1955.

The first chapter consists of five papers on information theory and optics. These include general extensions of the theory to spatially extended "messages", as well as specific problems. For example, Gabor's work indicates that broadening the diffraction pattern of a double star improves the accuracy of measuring the separation at the expense of position: "spoiling the instrument" is an aid in collecting additional information on partially known objects.

The ten papers on optical images and diffraction of Chapter 2 range from Linfoot's paper on optical image assessment to Spencer's survey of radio antennas. Wolf's survey of partially coherent fields is the first of the four papers on interferometry and coherence problems of the following chapter. Chapter 4 contains seven papers dealing primarily with photo-electronic devices for obtaining pictures of star fields and for recording very faint spectra; these devices may lead to increased sensitivity (so

SENIOR RESEARCH PHYSICIST SENIOR ELECTRONICS ENGINEER

The new Central Research Laboratory of Continental Can Company has several opportunities for versatile scientists and engineers with advanced degrees and industrial experience to pioneer in the application of acoustics, optics, mathematical physics, electronics, rheology, solid state physics, and other fundamental fields to long-range industrial problems in such areas as energy conversion, automatic controls, instrumentation, and communications.

The wide variety of materials manufactured or fabricated at high speeds by Continental includes metals, glass, plastics, paper, fiber and combinations of these, and provides opportunities for an advancing knowledge in many new fields. Research facilities of the Company's new Chicago laboratories are believed second to none, and are located so as to allow staff members to live in some of the finest western and southern suburbs of the city. Proximity to the John Crerar Library, Armour Research Foundation, the University of Chicago, Argonne National Laboratory, and many leading manufacturers of scientific and technical equipment enhances professional development and expedites accomplishment in chosen fields.

Staff members will be granted the full degree of individual recognition attainable in a total staff of 100 covering the fields of chemistry, metallurgy, engineering and physics, and will have the opportunity to work closely with scientists and engineers in the other fields. Salaries and other benefits meet the highest industrial standards.

Please write, giving a brief resume of qualifications, to:

**Director Physics Research
Central Research and Engineering Division
CONTINENTAL CAN CO.
7622 S. Racine Avenue, Chicago 20, Illinois**

Pressures to 30,000 atmospheres

in a chamber $\frac{1}{2}$ " diameter by 10" high are available with the Nucor Parabar.

This new, standard research tool provides an environment in which to determine the electrical resistance, reduction in area at tensile fracture, and other physical properties of solids at pressures to 30,000 kg./cm.² (approximately 450,000 p.s.i.)—and selected properties of liquids in the same pressure range. It's compact, easy to use, and available on early delivery.

Illustrated bulletin gives details. May we send you a copy?

NUCOR RESEARCH, INC.

Subsidiary of Nuclear Corporation of America
2421 WOLCOTT — FERNDAL 20, MICHIGAN

UNUSUAL OPTICAL BUYS



AMERICAN MADE . . . OVER 50% SAVING
STEREO-MICROSCOPE

Only \$99.50
fob

Up to 3" Working Distance
Wide 3 Dimensional Field

Used in production, in research, or at home; for inspections, examinations, counting, checking, assembling, dissecting, speeding up and improving quality control. 2 sets of objectives on rotating turret. Standard pair of wide field 10X Kellner Eyepieces give you 23 power and 40 power clear, sharp, erect image. Helical rack and pinion focusing. Interpupillary distance adjustable. Storage Chest included. WE WILL SHIP ON 10-DAY FREE TRIAL. Order Stock No. 85,039-K . . . full price, \$99.50 f.o.b., Barrington, N. J. Order by Stock No. Send Check or M.O.

INFRARED SNIPESCOPE TELESCOPE & PARTS

See in the dark—without being observed. War surplus Sniperscope M-2. Gov't. cost about \$1200. Instrument complete, ready to use. Includes Power Pack, infrared light source. Will operate from 6 V auto battery. Battery or transformer available.

Stock No. 85,053-K . . . \$150.00 f.o.b.

Save still more money! Build your own Sniperscope! We will furnish instructions—parts, including: Power Packs, 1P25A image tubes, light units, filters, etc. For details—request FREE Bulletin A-26-K.



SILICONE POLISHING AND CLEANING CLOTHS

New! Saving industry thousands of dollars. Combines the miracle of Silicones with a non-woven, all rayon cloth. Used over and over (washable) to dust, polish, protect, anti-fog; mirrors, reflectors, lenses, coated optics, crystal glass, lucite, other plastics. Won't scratch. Lintless, non-oily. Try sample package. Cloth size 18" x 18".

Stock No. 60,059-K—Sample Package, 3 cloths . . . \$1.00 Postpaid

Stock No. 70,137-K—Package of 100 cloths . . . 26.50 Postpaid

Lower prices on larger quantities

FREE! Giant CATALOG of OPTICAL BUYS!

OVER 1,000 OPTICAL ITEMS . . . Many on-the-job helps . . . quality control aids! 72 pages—hundreds of illustrations. Many war surplus bargains! Imported instruments! Lenses, Prisms, Magnifiers, Telescopes, Microscopes, Binoculars, etc. Optics for industry, research labs, experimenters, hobbyists. No obligation. Write for FREE Catalog K.



Send Check or Money Order

EDMUND SCIENTIFIC CO., Barrington, N. J.

that shorter exposures or smaller telescopes may be used), and may facilitate differentiating an object from the random fluctuations of its background. McGee points out that some of the advantages of photo-electronic techniques relative to photographic are their linearity, conversion efficiency, and increased bandwidth; they are more versatile in that electromagnetic deflection techniques can compensate for motions of the instrument, and that uniform background noise can be subtracted electronically. The fact that a photocell is practically linear, and that it can be calibrated and used repeatedly, introduces marked simplifications in data reduction; the disadvantage that it measures but one quantity at a time may be overcome by using television tubes and scanning techniques.

The next chapter contains nine papers on resolution problems and scintillation, and Chapter 6 consists of six papers dealing with wide-angle optical systems and aspheric surfaces. The five papers of the final chapter are on filter photography and thin films.

The papers are on the whole quite readable, and both the longer surveys and shorter summaries are well enough documented to enable the reader to follow up particular topics. The fact that much of the material would not have been regarded as "optics" even ten years ago, and the variety and scope of the papers, indicate the vitality of this field. The developments in photo-electronic techniques are particularly noteworthy; Kopal indicates that the 200-inch Hale telescope using one of McGee's image-storage tubes would extend the limits of observable space to those that could be reached by a 2000-inch telescope using existing photographic techniques.

The History of Mathematics. By Joseph E. Hofmann. Translated by F. Gaynor and H. O. Midonick. 132 pp. Philosophical Library, Inc., New York, 1957. \$4.75. Reviewed by Robert T. Beyer, Brown University.

In 1951, Oskar Becker and Joseph Hofmann wrote a *History of Mathematics (Geschichte der Mathematik)* in which Professor Becker treated the contributions of the Greeks and the Romans, while Professor Hofmann covered mathematical developments in the Near and Far East, and in medieval and modern Europe. In 1953, a slighter volume appeared, due to Hofmann alone, in which the principal emphasis was placed on the High Middle Ages and Early Baroque periods of Western history (1100-1600). It is this latter volume that has now been translated in the Philosophical Library series.

In a sense, the choice is somewhat unfortunate, since the Becker-Hofmann work is a more complete history. The Hofmann original, which appeared as a member of the *Sammlung Göschen* series of texts, bore a label of Volume I, and suggested a future completion of the work. No such label appears on the English translation so that the title of the book becomes misleading.

Two features of the German text have been omitted from the translation: references for further reading at the end of each chapter and a very detailed bibliog-

raphy of source material as part of the index. These features raised the German edition to the level of a valuable source reference for anyone interested in the field. Their omission in the translation alters the nature of the work to that of a popular and terminal presentation.

In this latter role, the book is handicapped by its precise and rather advanced mathematical style, difficulties that are not made any easier by occasional lapses into Germanic word order on the part of the translators, especially in the earlier portions of the work.

One cannot avoid comparing the book with the history written by Professor Dirk Struik. The Becker-Hofmann volume, or a Hofmann treatise extended into modern times through a second volume, would provide excellent competition for Struik's book. The actual English edition falls far short of such competition, especially in view of its relatively high price.

After having made so many critical remarks, the reviewer should point out that the coverage of the period 1100-1600 is an outstanding one, and that the book can serve as a useful reference for mathematics of this period.

Semiconductor Surface Physics: Proceedings of the Conf. on the Physics of Semiconductor Surfaces (Philadelphia, Pa., June 1956). Edited by R. H. Kingston. 413 pp. U. of Pennsylvania Press, Philadelphia, Pa., 1957. \$8.00. Reviewed by Joseph G. Hoffman, Roswell Park Memorial Institute.

Twenty-three technical papers, nine of which have accompanying discussions, present the work of forty-two contributors and new data about semiconductor surfaces. While germanium and lead sulfide are the semiconductors about which most of the experiments center, the results are suggestive and raise questions about surface phenomena in many other kinds of materials.

There are four main subdivisions of the subject in this book as follows: I, Clean Surfaces (2 papers); II, Real Surfaces (11 papers); III, Adsorption and Catalysis (4 papers); and IV, Oxidation (5 papers). The clean surfaces are on germanium. They are examined for their electrical properties, and are explored by electron diffraction with and without gas (oxygen and hydrogen) covering. Real surfaces are studied for field effect, photo effect, inversion layers, velocity of relaxation processes, and $1/f$ noise. Two of the papers on real surfaces deal with lead sulfide in the forms of photoconductive films and cleaved crystals. Adsorption and catalytic processes are examined where gas reactions occur and space charge boundary layers form on the surface, or, in another direction, where the photo effect plays a role in catalysis. Chemisorption is examined for the role it plays in long time changes in surface work function which can be induced by exposure to light or electrostatic fields. Oxidation of metals is discussed with emphasis on the nucleation theory.

While it is not possible to mention here all the contributors and their many experiments, it can be said