

photons." And so on. One can sympathize with the author who uses the usual "T" to represent absolute temperature, rather than the "K" given in the list. The reader should be warned, if previous experience has not already warned him, that the list is far from inclusive.

For the most part, this book will appeal to engineers and applied scientists. Few will be interested in all the papers; however, the variety of topics dealt with will provide almost everyone with something of interest.

I. LEONARD EISNER
Barnes Engineering Company,
Stamford, Connecticut

Botany

Principles of Angiosperm Taxonomy.

P. H. Davis and V. H. Heywood.
Van Nostrand, Princeton, N.J., 1963.
xx + 556 pp. Illus. \$15.

Davis (University of Edinburgh) and Heywood (University of Liverpool), both working taxonomists who are especially familiar with the Mediterranean flora, have written a new textbook on plant taxonomy, a subject on which new books are not a frequent occurrence. Most American colleges use Lawrence's *Taxonomy of Vascular Plants* (1951) and very recently Benson's *Plant Taxonomy: Methods and Principles* (1962). More than half of Lawrence's useful volume is devoted to treatments of particular families, and the book is primarily concerned with traditional methods, treated rather briefly. Benson's text is more theoretical, but it contains extensive discussions of specific examples, many drawn from the genera *Quercus* and *Ranunculus*.

The new work is entirely theoretical and therefore especially welcome. It is also comparable to but much more comprehensive than Simpson's *Principles of Animal Taxonomy* (1961). It delves especially into the theory of characters, both macroscopic and microscopic, and its application to classification and goes fully into taxonomic evidence from plant morphology, anatomy, palynology, embryology, cytology, and genetics. An admirable exposition is given of the "new systematics," including intensive treatments of evolutionary and phylogenetic theories, and especially of population theory (by Turesson and others), breeding behavior, and the newest fields of phytochemis-

try and machine methods in taxonomy (necessarily limited to the few published papers, chiefly by Sokol and Sneath). The stimulating contributions to the taxonomic treatments made by such relatively new concepts as ecotypes, polyploids, apomicts, clines, introgressants, and species aggregates is especially full and welcome in that there are no uniformly accepted methods at present. The book does not entirely neglect herbarium methods in taxonomy. (Heywood is the chairman of the editorial committee for the monumental *Flora Europaea*, the first volume of which is expected momentarily, and is thus entirely familiar with traditional methods.) However, since this book deals only with taxonomy, restricted to the principles of classification, and not with systematic botany in general, the authors do not discuss any particular systems of classification in detail, for such information can be readily obtained elsewhere—in Lawrence's text or Benson's *Plant Classification*.

It is inevitable that a British text should draw chiefly on the European literature and that Benson and Lawrence should draw most of their references from American publications. The new work is therefore even more valuable in that it covers and synthesizes a large body of information from European sources, including the Soviet Union, which are not otherwise readily available to teachers and students. This new text, being the only one to bring together and integrate the vast body of present-day knowledge bearing on taxonomy, should and undoubtedly will be used as a text in many college courses in systematic botany, and all working taxonomists will need to have it close at hand. Zoologists too will find it necessary, since the taxonomic principles involved are the same essentially in plants and in animals.

C. V. MORTON
Smithsonian Institution,
Washington, D.C.

On Science Popularization

A History of Communications. Maurice Fabre. Hawthorn, New York, 1964. vii + 105 pp. Illus. \$5.95.

This book is the ninth in a series of 12 volumes, *The New Illustrated Library of Science and Invention*, which purport to "chronicle mankind's major

scientific and technological achievements." Although written in a lively style by a French popularizer and handsomely printed in Switzerland, this volume fails to live up to its promise; many significant communication advances are omitted, or treated only superficially, and the author frequently forgets that the book's focus is supposedly scientific and technological.

In brief, Fabre is more concerned with the sociocultural and economic relations of communications than with its scientific and technological development. For example, in the chapter "Books, paper, and printing," only three sentences are devoted to technical advances in printing after Gutenberg, but several pages are given to the rise of publishing as a business and the growth of public libraries. The chapter entitled "The rise of the press" allows only two paragraphs to technical matters, such as the linotype and rotary press, and is devoted almost entirely to the history of the freedom of the press. In his final chapter, the author confesses that communications theory "is too complex and too technical for a book of this nature" (!), mentions the name of Claude Shannon in passing, and hurriedly moves on to lengthy—and frequently shallow—discussions of the role of advertising and the effects of radio and television on mass culture.

The illustrations (many in full color) are beautiful examples of the arts of the photographer and engraver. Unfortunately, most of them are as irrelevant to the text as the text is irrelevant to the scientific and technological history of communications.

MELVIN KRANZBERG
Department of Humanities and Social
Studies, Case Institute of Technology

Mathematics

Lectures on Boolean Algebras. Paul R. Halmos. Van Nostrand, Princeton, N.J., 1963. vi + 147 pp. Illus. Paper, \$2.95.

Although it was composed at about the same time, this book is a younger, more spritely cousin of Sikorski's *Boolean Algebras* (Berlin, 1960). Except for some exercises and a few sections, the material is an explication and modernization of Stone's contributions, but it is clear that much has been done about Boolean algebras since

Stone's paper was published in the *American Journal of Mathematics* some 30 years ago. The necessary background for a rapid reading and understanding include basic information and considerable facility with elementary set-theoretic topology, ring theory, measure theory (including Haar measure), and logic. For a slower reading, with omission of many of the exercises, delete "considerable facility" and all reference to the fields following "set-theoretic topology" in the preceding sentence, these latter appearing essentially as models and examples. As to the mathematical style, there are diagrams, injective and projective Boolean algebras, and the use of "pairing" in presenting the duality theorems. The volume is not entirely contemporary since the treatment is not "categorized" and the author prefers "Boolean homomorphism" to "morphisms." In the oral version there were no doubt comments about how and why Boolean algebras got into analysis, more direct reference as to connections with other fields (for example, does pairing stop here or is it used elsewhere?), and extensions and ramifications (for example, the p -algebras).

The literary style is a mature version of the author's earlier presentations, and there is a trace of current Gallic hauteur as well as some Bourbakian pontification. (In my opinion Laurence Sterne's aphorism is now mathematically invalid.) But this is an entirely minor and subjective opinion, and the book is most highly recommended as a generally elegant and perceptive introduction to the basic facts concerning Boolean algebras, available to the very well-trained senior and to the average second-year graduate student. The only reference to the literature is that to Sikorski's book.

A. D. WALLACE

*Department of Mathematics,
University of Florida, Gainesville*

Notes

Information Retrieval

Electronic Information-Logic Machines [Interscience (Wiley), New York, 1963. 180 pp. \$8], by L. I. Gutenmacher, was translated from the Russian edition by Rosalind Kent and edited by Allen Kent. The book combines an in-

troduction to digital circuitry with an advanced and somewhat obscure discussion of the use of various memory addressing schemes for information retrieval, translation, and document indexing. There are many interesting notions, but I cannot determine which are proposals and which are already realized in hardware and thus available. In one case the ambiguity, perhaps attributable to the translation, is resolved by a photograph of a completed read-only capacitor memory device.

The outlook is quite broad and ambitious, suggesting many practical applications of information retrieval systems. The discussion of the technical aspects of indexing and its problems seems somewhat superficial—for example, there is no discussion of the problem of finding a *best* match to a retrieval prescription, if a perfect match is not found in an associative memory. The translation editor did not see fit to mention the original date and place of publication of this book itself, thus impairing its value for assessing Soviet technology in this area.

MARVIN MINSKY

*Department of Electrical Engineering,
Massachusetts Institute of Technology*

New Books

Mathematics, Physical Sciences, and Engineering

Advances in Catalysis and Related Subjects. vol. 14. D. D. Eley, Herman Pines, and Paul B. Weisz, Eds. Academic Press, New York, 1963. 534 pp. Illus. \$16. Six papers: "Quantum conversion in chloroplasts," by Melvin Calvin; "The catalytic decomposition of formic acid," by P. Mars, J. J. F. Scholten, and P. Swietering; "Application of spectrophotometry to the study of catalytic systems," by H. P. Leftin and M. C. Hobson, Jr.; "Hydrogenation of pyridines and quinolines," by Morris Freifelder; "Modern methods in surface kinetics: Flash desorption, field emission, microscopy, and ultrahigh vacuum techniques," by Gert Ehrlich; "Catalytic oxidation of hydrocarbons," by L. Y. Margolis.

Advances in Electronics and Electron Physics. vol. 19. L. Marton and Claire Marton, Eds. Academic Press, New York, 1964. 333 pp. Illus. \$12. Four papers: "Electronic instrumentation for oceanography," by Allen H. Schooley; "Radio wave scattering in the ionosphere," by K. L. Bowles; "Properties, measurement, and bioclimatic action of 'small' multi-molecular atmospheric ions," by M. Knoll, J. Eichmeier, and R. W. Schön; and "Endfire antennae," by G. Broussaud and J. C. Simon.

Advances in Machine Tool Design and Research. Proceedings of the third international conference (University of Birmingham), September 1962. S. A. Tobias and F. Koenigsberger, Eds. Pergamon, London; Macmillan, New York, 1963. 503 pp. Illus. \$22.50 (34 papers).

Advances in Physical Organic Chemistry. vol. 2. V. Gold, Ed. Academic Press, New York, 1964. 300 pp. Illus. \$10. Four papers: "Isotopes and organic reaction mechanisms," by Clair J. Collins; "Uses of volumes of activation for determining reaction mechanisms," by E. Whalley; "Hydrogen isotope effects in aromatic substitution reactions," by H. Zollinger; "The reactions of energetic tritium and carbon atoms with organic compounds," by Alfred P. Wolf.

Advances in Space Science and Technology. vol. 5. Frederick I. Ordway, III, Ed. Academic Press, New York, 1963. 352 pp. Illus. \$13. Contents: "Astronautical investigations of the sun," by R. Grant Athay; "Advances in communication relay satellite techniques," by R. P. Haviland; "Solid propellant rocket technology," by H. W. Ritchey and J. M. McDermott; "Environmental control of manned space vehicles," by Robert E. Smith; "Terrestrial, lunar, and planetary applications of navigation and geodetic satellites," by John D. Nicolaides, Mark M. Macomber, and William M. Kaula; and "Orbital operations," by Krafft A. Ehrliche.

American Vacuum Society, Transactions. Tenth national vacuum symposium (Boston, Mass.), October 1963. George H. Bancroft, Ed. Macmillan, New York, 1964. 532 pp. Illus. \$23.

Analysis and Computation of Electric and Magnetic Field Problems. K. J. Binns and P. J. Lawrenson. Pergamon, London; Macmillan, New York, 1963. 347 pp. Illus. \$12.50.

Application of Computers in Valve Gear Design. Prepared under the auspices of the Society of Automotive Engineers, Powerplant Activity Committee. Pergamon, London; Macmillan, New York, 1964. 96 pp. Illus. \$5.60.

The Application of Computing Technique to Automatic Control Systems in Metallurgical Plant. A. B. Chelyustkin. Translated from the Russian edition (Moscow, 1960) by D. P. Barrett. D. K. Ghosh, Ed. Pergamon, London; Macmillan, New York, 1964. 235 pp. Illus. \$10.

Asynchronized Synchronous Machines. M. M. Botvinnik. Translated from the Russian edition (Moscow, 1960) by L. A. Thompson. D. Westwood, Ed. Pergamon, London; Macmillan, New York, 1964. 91 pp. Illus. \$5.

Ballistic Missile and Space Technology, Transactions. Eighth symposium, (San Diego, Calif.), October 1963. vol. 1. Air Force Systems Command and Aerospace Corporation, Los Angeles, Calif., 1964. 401 pp. Illus. Paper.

Boron-Nitrogen Chemistry. A symposium (Durham, N.C.), April 1963. Kurt Niedenzu, Ed. American Chemical Soc., Washington, D.C., 1964. 340 pp. Illus. \$7.50.