

disregard for the symmetry of pentagons and hexagons.

One substantial chapter is devoted to a description of the methods, principles, and arguments employed in the assignment of stereochemical configuration to the triterpenes. This chapter should be of general value to those working with natural products of steroid or terpenoid nature, and to all who aim at complete descriptions of the arrangement of atoms of complex molecules in three dimensions. Extensive use of conformational and optical rotatory analysis is made in arriving at the stereochemistry of the triterpenes, and the chapter in question provides many examples of the use of these powerful techniques.

The volume closes with an addendum to volume III of the series covering sesqui- and diterpenes. The hundred-odd pages so employed provide a welcome summary of recent work, including configurational analysis, with the smaller terpene molecules. In view of his outstanding contributions to the stereochemistry and conformational analysis of terpenes and steroids, it seems particularly appropriate that the elegant series of investigations of D. H. R. Barton and his coworkers on caryophyllene receives full treatment here.

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Wind and Solar Energy. Proceedings of the New Delhi Symposium. Arid Zone Research, vol. VII. UNESCO, Paris, 1956. 238 pp. \$8.

This attractive volume of some 240 pages combines articles presented at UNESCO's Arid Zone Research program symposium, held in October 1954 at the National Physical Laboratory of India in New Delhi. Wind and solar energy, both gifts of the skies, are regarded as important potential energy sources in the tropical zone, the home of nearly one-half of the world's population.

The list of experts who presented papers included representatives of many nations, East and West being neatly balanced. The subject of wind machines was aptly summarized by the Danish scientist J. Juul and the German U. Hütter. The broad aspects of solar-energy research were envisioned by Farrington Daniels, the sole participant from the United States. The results of extensive Russian work, presented by V. A. Baum, included an array of solar furnaces, water heaters, and an ice machine. French achievements with very high temperature furnaces give promise of industrial success, according to F. Trombe. Speculations on potential ap-

plications were visualized by the French and Indian group.

The requirements of the people living in the underdeveloped arid zones were stressed repeatedly. Indian and Russian scientists spoke of potential "important social repercussions, in raising the living standards of much of the world's population and reclaiming the desert." The task is a great and noble challenge to mankind.

The symposium, according to the late André Nizery, "would have abundantly justified itself if its only achievement were that of bringing together scientists working on arid zone problems."

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A Comprehensive Dictionary of Psychological and Psychoanalytical Terms. A guide to usage. Horace B. English and Ava C. English. Longmans, Green, New York, 1958. xiv + 594 pp. \$10.75.

A good dictionary must be complete in its coverage, accurate in its definitions, and comfortable to use; it is not required to be interesting. This is as nearly complete in its coverage as one could hope a psychological dictionary to be. In fact, it reminds us of a good many words (*adiadochokinesis*, *traumatophilic diathesis*, *nyctalopia*!) which one had hoped had achieved oblivion. The standard terms are defined with impeccable care and clarity, and terms which have not yet achieved a standard usage are supplied with carefully distinguished alternative meanings. The system of abbreviations, typographical aids, cross references, and so forth, can be easily mastered in a few minutes. As a dictionary this will prove invaluable to all students of psychology and related sciences.

What delights the reader, however, is that it is so much more than a dictionary; it is also interesting and absorbing. English loves the language that bears his name and loves the science that he is trying to rescue from confusion and ambiguity. He reminds us gently that *data* and *phenomena* are not singular; he waxes more than a little sarcastic when he deals with the artificially constricting meanings that have been thrust upon innocent everyday words, as in the case of the "information theory" jargon (not a "theory," he pauses to point out); and when a really confused term comes up, like *behavior*, or *learning*, or *operational*, or *phenomenology*, he is likely to launch into a carefully reasoned disquisition on the subject that is both fascinating and illuminating. One is reminded of experiences with Fowler's *Modern English Usage* when one has turned to the vol-

ume for a single item, only to find an hour later that one has been reading article after article for the sheer enjoyment of it. English may never achieve the eminence of *Fowler*, but he has certainly made a distinguished contribution to the clarification of psychological thinking.

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Asian Perspectives. The bulletin of the Far-Eastern Prehistory Association (American Branch), vol. 1, Nos. 1, 2. Wilhelm Solheim II, Ed. Far-Eastern Prehistory Association (University of Arizona, Tucson), 1957. 208 pp. \$1.

Unpretentious in format, the first official publication of the Far-Eastern Prehistory Association (an offshoot of the Pacific Science Association) has as its avowed purpose the creation of interest in Far-Eastern prehistory. It plans to serve archeologists, physical and cultural anthropologists, historians, Sinologists, art historians, and others. Covering the Eastern Hemisphere east of India, the *Bulletin* deals with 20 regional areas of interest, ranging from broad geographical zones to separate states. Responsibility for each area is delegated to a regional editor. The fact that these areas include nations quite new politically as well as troubled older countries contributes to a state of unrest that is not entirely conducive to unhindered scientific research.

Following each of the regional résumés of recent events in the field is a bibliography of newer publications. Care is taken not to overlap too much with the publications of the Council for Old World Archaeology. This is a worthwhile little bulletin, and I wish it success.

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Introduction to Riemann Surfaces. George Springer. Addison-Wesley, Reading, Mass., 1957. viii + 307 pp. \$9.50.

The theory of Riemann surfaces has its origin in the need to create a suitable domain of definition for a function w of a complex variable z that satisfies a given relation. A preview of some of the difficulties that actually arise can be obtained by considering the simple example $w^2 = z$; a value of z does not determine w uniquely, and if z varies continuously along a simple closed curve in the complex plane, a given root w that varies continuously need not return to its

original value. Such a state of affairs is at least as intolerable for the physicist and engineer as for the mathematician; if a scientist is ever tempted to question the value of mathematical abstraction, he should find in this book some measure of proof of the thesis that it is out of such abstractions that the solutions to very practical problems are created.

The theory of Riemann surfaces requires for its comprehension a great deal of modern mathematics. The author assumes no such knowledge on the part of the reader; four of the ten chapters (2, 4, 5, and 7), entitled "General topology," "Covering manifolds," "Combinatorial topology," and "The Hilbert space of differentials," introduce the reader to basic ideas in modern mathematics. These chapters are not surveys of the respective subjects but rather carefully developed treatments, with selection of material judiciously made in terms of the over-all aim of the book.

Chapter 1 is largely intuitive in its mathematical approach; it seeks to familiarize the reader with fundamental questions at issue, drawing on problems from both mathematics and physics. Chapter 3 is more formal; it proceeds from the abstract definition of Riemann surfaces (given in Chapter 2) and power series to build the concept of the complete analytic configuration of the analytic function. But it is in the remaining four chapters—"Differentials and integrals," "Existence of harmonic and analytic differentials," "Uniformization," and "Compact Riemann surfaces"—that fundamentals of the theory are developed.

The author has done an excellent job on a difficult assignment. His book will be of great value to the mathematician and should prove equally valuable to many scientists.

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How to Estimate the Building Needs of a College or University. A demonstration of methods developed at the University of Minnesota. William T. Middlebrook. University of Minnesota Press, Minneapolis, 1958. 169 pp. Illus. \$15.

This study of plant needs at the University of Minnesota up to the year 1970 originated in a commission set up by the state legislature in 1955 to study state building requirements. The staff assembled to undertake this long-range forecast at the state university rejected the customary procedure of calculating future requirements on a per-student square-foot basis. So general a measure

was inadequate for the varied educational and research tasks of a great state university. Instead, the university undertook an elaborate inventory of existing facilities and space utilization as well as a careful projection for the future. The methods employed and the results realized are reported in this volume, by the well-known vice president for business administration of the university.

There is little in the analysis which is new to those who have been studying enrollment trends, space utilization, and plant requirements. What is impressive is the careful amassing of data for the various instructional programs and the realistic use of simple analytic tools to project future needs. For example, employing as its basic unit of measurement square footage per student station, the study envisages an improvement in space utilization as enrollments increase. With a 135 percent increase in students on the Minneapolis campus projected for the period 1954 to 1970, the report indicates a need for a 93 percent increase in laboratory space, a 44 percent increase in classroom space, a 92 percent increase in library space, a 132 percent increase in faculty offices, a 75 percent increase in research facilities, a 51 percent increase in administration space, and a 64 percent increase in plant operation facilities. The result is an expressed need for over 128 million dollars' worth of building and land expansion and rehabilitation between 1957 and 1969. One wonders how the state of Minnesota will meet this staggering, but undoubtedly worth-while burden.

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New Books

Satellites, Rockets and Outer Space. Willy Ley. New American Library, New York 22, 1958. 128 pp. Paper, \$0.35.

Gestation. Transactions of the fourth conference, 5-7 Mar. 1957, Princeton, N.J. Claude A. Villee, Ed. Josiah Macy, Jr. Foundation, New York, 1958. 216 pp. \$4.50.

Characterisation of Organic Compounds. F. Wild. Cambridge Univ. Press, New York, 1958. 306 pp. \$6.50.

Spot Tests in Inorganic Analysis. Fritz Feigl. Translated by Ralph E. Oesper. Elsevier, Amsterdam, rev. ed. 5, 1958 (order from Van Nostrand, Princeton, N.J.).

Tables of Light-Scattering Functions. Relative indices of less than unity, and infinity. R. H. Boll, J. A. Leacock, G. C. Clark, S. W. Churchill. Univ. of Michigan Press (for the Engineering Research Inst.), Ann Arbor, 1958. 368 pp. \$9.50.

The Vocabulary of Dentistry and Oral Science. A manual for the study of dental nomenclature. George B. Denton. American Dental Assoc., Chicago, 1958. 215 pp.

A Modern Approach to Organic Chem-

istry. J. Packer and J. Vaughan. Oxford Univ. Press, New York, 1958. 983 pp. \$13.45.

Existence. A new dimension in psychiatry and psychology. Rollo May, Ernest Angel, Henri F. Ellenberger, Eds. Basic Books, New York, 1958. 454 pp. \$7.50.

Isaac Newton's Papers and Letters on Natural Philosophy and Related Documents. I. Bernard Cohen, Ed., assisted by Robert E. Schofield. Harvard Univ. Press, Cambridge, Mass., 1958. 514 pp. \$12.50.

Einführung in die Physik. vol. II, *Elekttrizitätslehre, Wellenlehre, Akustik, Optik.* P. Frauenfelder and P. Huber. Reinhardt, Basel, Switzerland, 1957. 504 pp. F. 28.50.

American Agriculture: Geography, Resources, Conservation. Edward Higbee. Wiley, New York; Chapman & Hall, London, 1958. 409 pp. \$7.95.

The Gyroscope. Theory and applications. James B. Scarborough. Interscience, New York, 1958. 269 pp. \$6.50.

Fundamentals of High Polymers. O. A. Battista. Reinhold, New York; Chapman & Hall, London, 1958. 150 pp. \$5.50.

Current Trends in the Description and Analysis of Behavior. Nine lectures under the auspices of the department of psychology in the college of the University of Pittsburgh delivered during 11-12 March 1955 and 8-9 March 1956 in the Stephen Foster Memorial Auditorium. Robert Glaser *et al.* University of Pittsburgh Press, Pittsburgh, 1958. 242 pp. \$4.

Man and His Physical Universe. Frank Covert Jean, Ezra Clarence Harrah, Fred Louis Herman. Samuel Ralph Powers, editorial collaboration. Ginn, Boston, ed. 3, 1958. 666 pp. \$6.50.

The Tissues of the Body. An introduction to the study of anatomy. W. E. Le Gros Clark. Oxford Univ. Press, London, ed. 4, 1958. 427 pp. \$9.75.

Calculus of Finite Differences. George Boole. J. F. Moulton, Ed. Chelsea, New York, ed. 4, 1957. 348 pp. \$4.95.

Other Worlds in Space. Terry Maloney. Sterling, New York, 1958. 128 pp. \$2.95.

Principles of Genetics. Edmund W. Sinnott, L. C. Dunn, Theodosius Dobzhansky. McGraw-Hill, New York, 1958. 473 pp. \$6.75.

1001 Questions Answered about Astronomy. James S. Pickering. Dodd, Mead, New York, 1958. 431 pp. \$6.

Space Book for Young People. Homer E. Newell, Jr. Whittlesey House, New York, 1958. 114 pp. \$2.95.

Living Silver. Burns Singer. Houghton Mifflin, Boston; Riverside Press, Cambridge, Mass., 1958. 232 pp. \$3.75.

Principles of Modern Physics. A. P. French. Wiley, New York; Chapman & Hall, London, 1958. 364 pp. \$6.75.

How to Live with Diabetes. Henry Dolger and Bernard Seeman. Norton, New York, 1958. 192 pp. \$3.50.

Frontiers in Cytology. Sanford L. Palay. Yale Univ. Press, New Haven, Conn., 1958. 541 pp. \$9.75.

A Handbook of Lattice Spacings and Structures of Metals and Alloys. W. B. Pearson. Pergamon Press, New York and London, 1958. 1054 pp. \$38.

Enzymes. Malcolm Dixon and Edwin C. Webb. Academic Press, New York, 1958. 815 pp. \$16.