

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.