

BOOK REVIEWS

Mathematik als Wissenschaft, Kunst und Macht. By Helmut Hasse. Wiesbaden, Verlag für Angewandte Wissenschaften, 1952, 34 pp. 4.80 DM.

This little book, by a distinguished mathematician, is based on lectures delivered to the mathematical-natural sciences faculty of Hamburg University and to the "Amerikahaus" in Hamburg. It is, therefore, addressed to a general audience, with the object of setting forth the "true nature" of mathematics. The author frankly points out, however, that he speaks only for himself, limiting himself to those aspects of mathematics that first attracted him as a student and subsequently held his loyalty through the years. Written in a lucid and relaxed style, essentially as originally delivered, it is easy to read and most entertaining.

In conformity with its title, the book is divided into three main parts, preceded by a general introduction. Mathematics as "*Wissenschaft*" emphasizes the "spiritual" or intellectual character of mathematics. Here the opportunity is seized to point out that the layman, who considers mathematics as calculation and measurement, misses its true nature entirely. As an intellectual discipline, mathematics (for the author) fulfills the "instinct for knowledge of the truth" in a way not to be found in philosophy or any of the other branches of learning. Apparently it was this that first attracted the author to mathematics.

However, his sustained devotion to mathematics was due more to its nature as an *art*. To the reviewer, this part of the book (to which is devoted 14 pages, in contrast to the combined total of 10 pages for "*Wissenschaft*" and "*Macht*"), is by far the most interesting. Due to his predilection for music, the author stresses the analogies between this art and mathematics, in each of their creative, aesthetic, structural and communicative aspects.¹ Not only is this most certainly deserving of reading by the mathematician as well as the layman, but the former will find much to stimulate discussion.

For example, the striving for extreme formalism is, in the view of the author, one of the "tragedies" to which the modern mathematician is prone. The author decries the process whereby the intuitively conceived mathematical construct passes through various

¹ The mathematician who has done creative work should enjoy the discussion of musical composition given by Paul Hindemith in *How music happens*, Saturday Review of Literature, Dec. 29, 1951, pp. 29-32.

stages of polishing and refinement until it becomes the bloodless, dead form of "Definition, theorem, proof" in manifold repetition. Originally to be found in Euclid's *Elements*, this striving for formalism has been revived in modern times—"chiefly in North America," but, partly as a consequence of Hilbert's work and partly because of the impact of American tastes, also influencing mathematical work in Europe. Whether one agrees with this or not, one cannot but feel that the author has a point in regard to that excessive formalizing and abbreviation whose only justification is to comply with demands for brevity due to high printing costs.

By mathematics as "*power*," the author is careful to make clear that he means not material power or power over one's fellow men, but the feeling that comes, for instance, with the creation of a mathematical tool that enables one to solve a whole class of problems as special cases of a general theory.

Although there is plenty of room for disagreement with some of the author's principal assertions (as well as with some minor ones such as the mention of Leibniz as, by implication, the sole creator of the calculus), this little book is to be highly recommended as general reading for the professional mathematician and as "must" reading for the layman whose notions of mathematics are embodied in the query, "Won't you please add up my bridge score; you're a mathematician, aren't you?"

R. L. WILDER

An introduction to homotopy theory. By P. J. Hilton. Cambridge University Press, 1953. 8+142 pp. \$3.00.

This is the first book to appear on homotopy theory. There has long been a need for collecting results from diverse sources, and this book seems to meet a large part of that need. Of course, a book of this size cannot be comprehensive and other books will be required. It is surprising, however, how much the author manages to get into the small number of pages. This seems to have been accomplished by careful planning and abetted by the author's ability to explain what is happening without becoming verbose. Another factor is the restriction to homology theory of complexes with integer coefficients, although one might argue that the introduction of singular theory would pay for itself in simplified proofs (and more general theorems) in some cases.

The book seems well suited for a textbook even though it does not contain exercises. The most important factor is that it can be read by a student. Then there is what should turn out to be a good pedagogic