

a whole, although the author points out substantial unsolved questions. This comprehensive view is aided by the very readable exposition. The book is recommended to all readers interested in the subject.

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The world of mathematics. A small library of the literature of mathematics from A'h-mosé the Scribe to Albert Einstein, presented with commentaries and notes by James R. Newman. New York, Simon and Schuster, 1956. 18+2537 pp., 4 volumes. \$20.00.

While it is not customary to review popular books on mathematics in this Bulletin, this one so far exceeds the norm both in range and in sales that it demands notice. (It is undoubtedly the all-time best-seller among mathematics books other than textbooks.) A nonmathematician with an amateur's interest in the subject might well wonder at first why he should buy these volumes rather than one of the more compact (and less expensive) popular books, of which there are many excellent ones that have enjoyed a far smaller sale. However, most short popular books on mathematics cover only a limited selection of topics that are not too technical to discuss superficially and are conceded to possess universal appeal. Most of these topics are included here too, but so is much more, and the reader can make his own choice. The subtitle is in a sense misleading, since the contents are much more literature *about* mathematics than mathematics as such. This is of course inevitable in any popular book. A nonmathematician will not learn much mathematics from these volumes, although he is told a great deal about mathematics and about cognate subjects, such as mathematicians, physics, logic, and foreign politics; whether this will help him understand what mathematics is about and what mathematicians do is not for a professional mathematician to say. However, there is also a great deal here of value for the professional mathematician, collected from sources that are not on everyone's bookshelf. Some at least of this material will be helpful to teachers, and it would be hard to find any mathematician who will not be entertained by some of it, or who will not find something that is new to him.

The contents are highly varied. Some of the selections are actually from the mathematical literature in the strict sense, some are written specifically for the layman, and some are mathematics only by the editor's fiat. Some are extremely interesting, some are exasperating, and some are downright dull. It would be neither practical nor illuminating to list the contents in detail: the following remarks are indicative rather than exhaustive. There are numerous assorted dis-

cussions of the nature of mathematics and mathematical thinking, some old-fashioned and some up-to-date. They illustrate the principle that there are at least as many ways of thinking about mathematics as there are mathematicians. There are many biographical and historical selections. Since the chief interest of mathematicians, outside of mathematics, seems to be the personalities of other mathematicians, there is much here to interest the professionals. There are remarks on the general subject of "numbers," ranging from an enquiry into the question of whether birds can count to Dedekind's own account of irrational numbers. There is fascinating material on applied mathematics (my term, not the editor's), much of which seems to be more applications than mathematics: the discovery of Neptune, the problem of determining longitude, the periodic table of the elements, Haldane's famous essay *On being the right size*, Eddington on the constants of nature, Malthus on population. There is an assortment of essays on probability and statistics (it is a pity that room could not have been found for Feller's deflation of the St. Petersburg paradox, when so much of the traditional well-meant nonsense about it is included). There is a lucid exposition of Gödel's theorem by Nagel and Newman, and there is an essay that Lewis Carroll would have enjoyed (written especially for this anthology by Nagel) on *Symbolic notation, Haddock's Eyes, and the dog-walking ordinance*. There are particularly interesting essays on computing machines by von Neumann, Turing and Shannon. Apparently just to show how far one can attempt to go, there are selections from G. D. Birkhoff's writings on ethics and aesthetics. A real novelty is the inclusion of five selections from mathematics in fiction, ranging from *Gulliver's Travels* to *The New Yorker*.

All in all, this is an anthology with the faults of its genre and more virtues than most specimens of its kind, especially in the set of mathematical anthologies of which it is almost the only example. It has as legitimate a place in any mathematician's library as the *Oxford Book of English Verse* has in that of a specialist in English literature.

R. P. BOAS, JR.

Logic, semantics, metamathematics. Papers from 1923 to 1938. By Alfred Tarski; translated by J. H. Woodger. Oxford, Clarendon Press, 1956. 14+471 pp. 60 shillings.

Since most of the papers that make up this volume have become an essential part of the modern logician's equipment by now, it would be out of place to offer a review of their content at this time; what follows is a brief descriptive report.

Although Tarski has written extensively on several parts of mathe-