Abstract set theory. By A. A. Fraenkel. Amsterdam, North-Holland, 1953. 12+479 pp. $10.00.

This book is essentially a translated, revised, and expanded edition of the first three chapters of the author's well-known German treatise (*Einleitung in die Mengenlehre*, Berlin, 1st ed. 1919, 3d ed. 1928). In the preface the author mentions that he is preparing another book (*Foundations of set theory*). The list of topics to be discussed in that book ("antinomies of the transfinite, axiomatic methods of basing set theory, logistic attitudes from *Principia Mathematica* to the present day, intuitionism and neo-intuitionism, axiomatics in general and metamathematics") indicates that *Foundations* will bear the same relation to the last two chapters of *Einleitung* as does the present book to the first three.

Reviewing the first edition of *Einleitung*, G. A. Pfeiffer (Bull. Amer. Math. Soc. vol. 27 (1921) pp. 333–334) registered a mild complaint against the author's prolixity. In his review of the third edition, T. C. Benton (Bull. Amer. Math. Soc. vol. 36 (1930) pp. 27–28) chides the author for relegating the discussion of the axioms of set theory to the end of the book (i.e., to the part not contained in the version under review now).

If *Einleitung* is prolix, the present book is much more so. The introduction and first three chapters of *Einleitung* cover 209 pages; the same material now covers 331. In every discussion the author's aim is completeness; he mentions all the examples, all the philosophical interpretations and misinterpretations, and all the references that could conceivably be called relevant. While this might decrease the usefulness of the book as a text, it can only add to its value as a reference.

The treatment is intentionally non-axiomatic; the author wants to steer a course between naive carelessness and axiomatic formalism. He chooses to do this by the formulation of certain "principles." The principles are, in fact, highly informal statements of well-known set-theoretic axioms. There are seven of them: extension, subset, pairing, union, infinity, power, and choice. The principle of subsets, for instance, reads as follows: "given a set S and a property π meaningful for the elements of S, there exists the set containing those elements of S, and only those, which possess the property π."

In most respects there is no significant difference between the third edition of *Einleitung* and the present book. The subject matter, the style, the terminology, and the notation are all the same. (Sometimes this rigidity is mildly regrettable. Thus, for instance, union and intersection are still denoted by Σ and Π, and the power set of a set S is