BOOK REVIEWS

Logic for mathematicians. By J. B. Rosser, New York, McGraw-Hill, 1953. 14+540 pp. $10.00.

This book is undoubtedly a major addition to the literature of mathematical logic. Yet it is hardly the kind of addition which one would expect from its title, its preface, and the reputation of its author. The preface states that the book is intended as a textbook for mature mathematicians; that, as such, it aims to be relatively complete; and that matters of considerable logical importance which are not interesting for the mathematician are purposely omitted. The book turns out to be a detailed exposition, modeled on the *Principia Mathematica*, of a particular logistic system.

For the purposes of criticism the book will be divided into two parts. The first part, comprising the first eight chapters, develops what may be called the basic logic, i.e. logic through the restricted predicate calculus, including descriptions and equality. The second part deals with what may be called the higher logistic, which in this case means abstract set theory, including the more elementary portions of cardinal and ordinal arithmetic. It will be convenient to discuss what seems to be the main aspect of the second part first, and then to take up the first part along with the certain auxiliary aspects of the second.

The system developed in the second part is Quine's *New foundations*, which will be called NF. This is the system proposed by Quine at the winter meeting of 1936 and published in the American Mathematical Monthly in 1937. It followed a series of papers in which Quine, who was at first an advocate of the theory of types, made a study of axiomatic set theory. He showed in these that the axiom of subsets (Aussonderung), which guarantees the existence of the subset of those elements of a given set which have a certain property, is the essential axiom scheme of the theory. In NF he proposed that the restriction to subsets of a given set can be abandoned, provided that the property is required to be stratified, i.e. such that its variables (as they appear in that particular formula) can be classified so that the restrictions of the theory of types are satisfied. In the resulting system there is a single universal class, rather than a hierarchy of universal classes in the various types; also each class has a unique complement; and cardinal numbers exist as sets without typical ambiguity.

The consistency of the system was at first in doubt (cf. Zentral-