involution is obtained by interchanging the variables in a bilinear relation and subtracting, instead of by squaring a matrix as on page 49, the fact that it suffices for *one* pair of distinct points to have the involutory property is proved simultaneously; the author has to give a separate proof on the following page. A slight modification of the argument on page 54 shows that *three* perpsectivities suffice to construct a projectivity on a line.

The book is clearly printed and contains a large number of examples, the most important of which are accompanied by solutions, thus augmenting the theory developed in the text.

D. MONK

KEENE, G. B., *Abstract Sets and Finite Ordinals* (Pergamon Press, 1961), 106 pp., 21s.

This book shows how the theory of finite sets and ordinals may be based on set theory. To avoid Russell's paradox (about the set of all sets which do not belong to themselves) set theory must be rather complicated. Here Bernays' version of set theory is used. Bernays distinguishes between *classes* and *sets*. Every set determines a class having the same members, but not vice versa. The only objects that can be members either of classes or sets are sets. There is an axiom that if x is a set and y is a set, there is a set whose only members are y and the members of x. Taking $x = y$, we have x', the set whose only members are x itself and the members of x (it is called the self-augment of x). Starting with the empty set O, we obtain O' which we denote by *1*, *1'* which we denote by *2*, and so on. Every class C determines a predicate or property, that of belonging to C; but not every predicate P defines a class, so we cannot necessarily speak of the class of all sets having property P. Writing capitals for classes, small letters for sets, the predicates defining classes include those of the forms $x \in y$, $x = y$, $x \in C$, and any predicate obtainable from such expressions by means of *and*, *not*, $\exists$. We cannot obtain Russell's paradox, but we can do ordinary mathematics.

The book requires no previous knowledge of logic or mathematics. It is intended for the general reader and for students of logic or mathematics. Most undergraduate students of mathematics would find it rather hard reading. It can be highly recommended to graduate students of mathematics.

D. G. PALMER

ROTH, K. F., *Rational Approximations to Irrational Numbers* (University College London Inaugural Lecture) (H. K. Lewis & Co. Ltd., 1962), 13 pp., 3s. 6d.

In this inaugural lecture Professor Roth surveys the field of Diophantine approximations, a subject to which a new lease of life has been given by his own work. A series of theorems are stated and explained, culminating in the Thue-Siegel-Roth theorem, and the lecture concludes with a brief discussion of simultaneous approximation and other unsolved problems.

R. A. RANKIN

SHKLARSKY, D. O., CHENTZOV, N. N., AND YAGLOM, I. M., *The USSR Olympiad Problem Book*; Revised and edited by IRVING SUSSMAN; Translated by JOHN MAYKOVICH (W. H. Freeman and Company, 1962), 452 pp., £3, 3s.

This book contains 320 unconventional problems in algebra, arithmetic, elementary number theory and trigonometry. Most of them first appeared in the competitive examinations sponsored by the School Mathematical Society of the Moscow State University and in the Mathematical Olympiads held in Moscow. The book is designed for Russian students between thirteen and sixteen years of age, and very bright they must be. As the authors say, there are few problems whose solutions require mere