as belonging to one of a finite number of non-equivalent types. This meager knowledge depends partly on the empirical results of Tait and his contemporaries, partly on the known calculable knot invariants such as those discovered by Alexander, and partly on special results (some of which are still unpublished) concerning pairs of knots which are not distinguishable by their invariants. Thus the problem is still open and still fascinating—the more so since it is now apparent that even though the problem seems to be one of abstract groups, progress may depend on the results of the most unexpected domains of algebra. The complete and concise little work of Reidemeister will do much to encourage further attacks.

P. A. SMITH

MOORE ON POINT SETS

Foundations of Point Set Theory. By R. L. Moore. American Mathematical Society Colloquium Publications, Volume 13. New York, 1932. viii +486 pp.

We are told in the Preface that this volume is intended to be a self-contained treatment of the foundations of the point-set-theoretic branch of analysis situs. It is concerned chiefly with those topics which are the results of Professor Moore's own research. Hence the book does not mention certain topics—dimension theory, for instance—which are closely connected with the topics discussed, but with the development of which Professor Moore was not primarily concerned.

The present treatment of point set theory is based upon a system of axioms, the undefined notions being *point* and *region.* General logical concepts are assumed, including in particular those of the logic of classes and the fundamental propositions concerning integers. Of these concepts, the author states explicitly only the Zermelo Axiom, which is to be considered as included among his assumptions. In addition to these introductory statements, the Introduction (pp. 1–4) is concerned with definitions of various types of sequences.

Chapter 1 (pp. 5–85) contains the theorems which can be derived from Axioms 0 and 1. The author also shows that most of these theorems follow from Axioms 0 and 1_0, where 1_0 is a weaker form of Axiom 1. Since Axioms 1 and 1_0 each consist of several parts, it is not surprising that so many theorems can be proved from them. While certain theorems can be proved with still weaker hypotheses, the author makes no attempt to do so. But the group of examples on pages 24–28 shows that in the case of certain theorems at least, no unnecessary restrictions have been placed in the hypotheses to compensate for the weakness of the assumptions concerning the space containing the sets. It is shown by these examples that under weaker hypothese the conclusions of this group of theorems become false, even if we assume that the underlying space is the euclidean plane.

The topics discussed in Chapter 1 are concerned with the following ideas, arranged roughly in order: boundary point, sequential limit point, Bo el property, connectivity, irreducible continuum, limiting set, separation of two sets