ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

109. J. H. Blau: *A characterization of algebraic fields of prime characteristic.*

A field F is said to be properly generated if it has a proper subring whose quotient field is F. It is proved that a field fails to be properly generated if and only if it is a finite field or an algebraic extension of a finite field. The general proof makes use of the well-ordering theorem, and hence does not furnish examples of such subrings in particular instances, such as the field of real numbers. (Received January 27, 1939.)

110. S. S. Cairns: *Planes transversal to polyhedral manifolds.*

A polyhedral manifold P^r is a finite complex of euclidean simplexes in E^n, each point of which has an r-cell for a neighborhood on P^r. It is a Brouwer manifold if every star of simplexes has a piecewise linear homeomorph in E^r. Every P^r with $r \leqq 3$ is a Brouwer manifold. This is not known to be true for $r > 3$. The writer investigates conditions under which one can define, through every point p on P^r, a continuously varying transversal $(n-r)$-plane, $\pi^{n-r}(p)$. Such a plane is analogous to the normal plane to a differentiable manifold and is characterized by the existence of a neighborhood of p no secant of which is parallel to $\pi^{n-r}(p)$. A necessary condition that $\pi^{n-r}(p)$ exist is that P^r be a Brouwer manifold. A sufficient condition, assuming the vertices of P^r independent in E^n, is as follows. Let $\Pi(S^k)$ be the space whose elements are the $(\nu-k)$-planes transversal to a star S^k of simplexes on a Brouwer k-manifold $(k<r)$ with the vertices independent in E^ν. Then every $(r-1-k)$-sphere in any $\Pi(S^k)$, $(k=1, \cdots, r-1)$, must bound a singular $(r-k)$-cell in that $\Pi(S^k)$. This sufficient condition is satisfied for $r \leqq 3$. For $r=4$, it also holds on the basis of a theorem stated by Tietze but apparently not proved in the literature. (Received January 27, 1939.)

111. J. E. Eaton: *Associative multiplicative systems.*

This paper is concerned with an algebraic system in which an associate operation is so defined that the product of two non-void subsets is a non-void subset. Conditions on subsets are obtained which insure that they have properties analogous to those of subgroups of groups. Of particular interest are the subsets for which a coset decomposition is possible, and study is made of the homomorphisms so generated. A class of subsets is defined which forms a Dedekind structure. Hence for this class the usual decomposition theorems are valid. All the conditions imposed on subsets in this paper are conditions on the subsets as a whole, rather than on individual members of the subsets. Application is made to the theory of multigroups and also to the theory of ordinary groups. In particular, if the multiplicative system is considered as a multi-