gence of continued fractions with positive and with real elements (§11 and §12) are deleted, the statement of two theorems is improved in §14, and §15 has been completely rewritten to unify the presentation of the Van Vleck-Jensen theorems with recent extensions of these theorems. Chapter III has new sections on C-fractions (§21) and some other expansions of power series into continued fractions (§31), and on the relation to J-fractions of polynomials whose zeros have negative real parts. The discussion of periodic continued fractions (§22) has been modified to include C-fractions, and parametric representation of two continued fraction transformations has been added (§26). Chapter IV has a new section on complete convergence (§38) which permits the statement of a necessary and sufficient condition for a determinate Hamburger moment problem in §39. Several sufficient conditions for determinate Stieltjes and Hamburger moment problems are deleted from §39. Chapters V and VI have been reproduced without essential change.

The stated objective of the book is to give in an easily intelligible way the present state of knowledge of the subject. The author has been confronted with the difficult task of selecting and coordinating the material of major importance and not all readers will agree with his selections. Any defects of the book are those of omission. The reviewer regrets the omission of the methods and viewpoint of positive definite continued fractions and, in particular, positive definite J-fractions. However, the numerous virtues of the book, among which are clarity of presentation, systematic citing of origins of theorems, and the many examples and formulas, will make it a valuable reference for many years to come.

W. T. SCOTT

Combinatorial topology. Vol. 2. *The Betti groups*. By P. S. Aleksandrov. Trans. by Horace Komm. Rochester, Graylock Press, 1957. 11 +244 pp. $6.50.

The original Russian edition of Aleksandrov's *Kombinatornaya topologiya* (Moscow-Leningrad, OGIZ, 1947) is a single volume consisting of five parts. The English translation of the first two parts has been published as Vol. 1 (See the Review in this Bulletin, Vol. 62, 1956, pp. 629–630). The present Vol. 2 is the translation of Part III (Chaps. VII–XII), which is devoted to homology and cohomology groups of locally finite abstract cell complexes and homology groups of compact metric spaces. It deals mainly with the construction of these groups and the proof of their topological invariance.

The entire book is intended as an introduction to the classical homology theory. As such, this is an excellent textbook with many good features. Within the author's scope, the treatment is unusually thorough. The material is well organized, and presented with great detail at a leisurely pace. There is a constant emphasis on geometric content. Compared with the modern trend, the use of algebraic machinery is rather limited. The exposition is supported by ample illustrations, examples, and figures. This should be most helpful to the reader in understanding the various concepts and results.

The beginning (Chap. VII) of this Vol. 2 introduces the auxiliary algebraic apparatus (chains, boundary operator). The homology groups of locally finite abstract cell complexes are studied in Chap. VIII. Here as in the later chapters, the coefficient domains considered are non-topologized Abelian groups and fields. The cohomology groups for abstract cell complexes are introduced in Chap. IX, where one finds a careful study of canonical homology and cohomology bases. These are immediately used to derive the relations among homology and cohomology groups over different coefficient domains. The proof, using simplicial approximations, of the invariance of the homology groups of polyhedra is given in Chap. X. In Chap. XI, a homology theory for compact metric spaces is developed and is based on the notion of proper cycle, which is of Vietoris type. By using the topological invariance of the homology groups of a compact metric space, a second proof of the invariance of the homology groups of polyhedra is obtained. The last Chap. XII studies relative cycles and local homology groups, with application to homology dimension and pseudomanifolds with boundary. This Vol. 2 closes with an appendix containing the required basic facts on Abelian groups.

The translation is remarkably smooth. This reviewer sincerely hopes for early publication of the English translation of the remaining Parts IV and V, where one will find important topics and applications of classical homology theory (Alexander-Pontrjagin duality theorem, an introduction to the theory of intersection, mappings of polyhedra and Lefschetz-Hopf fixed-point formula). Without studying these, a student reading the present Vol. 2 would be unable to grasp the full significance of the theory. On the other hand, the beginning graduate student will find this Vol. 2 an excellent introduction to material treated from a more advanced and modern point of view in Eilenberg-Steenrod's *Foundations of algebraic topology*, Princeton, 1952.

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