VOLUME I—ERGEBNISSE DER MATHEMATIK

Ergebnisse der Mathematik und ihrer Grenzgebiete, Band 1, 1932.

Knotentheorie. By K. Reidemeister, 74 pp., 114 figures.

Graphische Kinematik und Kinetostatik. By K. Federhofer. 112 pp., 27 figures.

Lamêsche-, Mathieusche- und verwandte Funktionen in Physik und Technik. By M. J. O. Strutt. 116 pp., 12 figures.

Die Methoden zur angenäherten Losung von Eigenwertproblemen in der Elastokinetik. By K. Hohenemser. 89 pp., 15 figures.

Fastperiodische Funktionen. By H. Bohr. 96 pp., 10 figures.

This series of reports forms a welcome addition to the work of abstracting published by the Zentralblatt für Mathematik and is being edited by the directors of this journal. The need of such reports is becoming more and more evident as scientific knowledge expands and it is particularly pleasing that this volume contains an astonishing amount of information in a compact form and presented in good style. The reports deal mainly with recent work and so supplement the articles in the Encyklopädie der Mathematischen Wissenschaften in which the history of each subject is given.

A reader who compares Reidemeister's modern account of the theory of knots with the early accounts given by Listing and Tait will realize that the subject has been greatly transformed by the use of groups, matrices, quadratic forms, and polynomials. A knot is regarded here primarily as a skew polygon. This plan simplifies the description of deformations and operations; it also facilitates the drawing of a regular projection of the knot, on a plane P. Such a projection divides P into regions which may be divided into black and white regions by a suitable method of coloring. Special names are used when there are only two or only three black regions.

The study of topological invariants, such as torsion numbers, forms an important part of the subject and it is interesting to note the substantial contributions which have been made by the American writers J. W. Alexander and G. B. Briggs. Reidemeister's report is well written and unlike many recent articles on topology does not make the subject look formidable.

Federhofer's report shows that pure geometry is still quite a live subject capable of interesting and useful applications in the study of driving mechanisms and linkages. The author has been particularly active in inventing new constructions for the elucidation of the motion of a plane system in a plane and the motion of a rigid system in space. He gives a fine account of the theory of kinematic chains and linkages, calling attention to the forgotten work of Grübler. The whole report is, indeed, furnished with very complete lists of references.

In kinetostatics the chief aim is to determine the guiding forces, linkage pressures and internal stresses, for arbitrary cross-sections, of the linked members of a chain of rigid bodies. The methods used are again geometrical but the masses of the members have to be taken into consideration. The analysis is