Non-Euclidean Geometry, by Stefan Kulczycki. Translation by Stanislaw Knapowski. Pergamon, 1961. 208 pages. $5.00.

Since undergraduate courses dealing with non-Euclidean geometry are few, the average mathematics student and most high school mathematics teachers find the subject a mystery. This regrettable situation is aggravated by the fact that, while good books on the subject exist for the specialist, there is a need for books of sufficient simplicity that a non-specialist may digest them without aid. The present book goes a long way toward supplying this need.

A translation from a Polish book of 1956, the work is divided into three chapters. The first, a historical sketch, traces the development of geometrical thought from earliest times, particularly as it concerns questions of parallelism. The fascinating story of the discovery of hyperbolic geometry, and the struggle of its creators to achieve recognition, concludes the chapter.

Chapter II introduces and develops an entirely synthetic approach to hyperbolic geometry. The author reasons concisely and accurately, but does not sacrifice clarity for extraneous detail. The treatment is given a light touch by some delightful illustrations. For example, in the discussion of the properties of the equidistant curve (p. 102) the following paragraph appears:

"In non-Euclidean geometry, tram-lines could not be straight; if one of them were straight, the other would be an arc of an equidistant. Similarly, the sides of a drawer would have to be arcs of equidistants, for otherwise the drawer could not be smoothly pulled out."

In his presentation the author has purposely avoided stressing the concept of groups of transformations, although some of the work of Hjelmslev on this subject appears. In the reviewer's opinion, the only weak points of the book appear in this connection. The complaint is not with the slenderness of the treatment, but with the imprecision in definitions. The definition (on p. 61) of a symmetry (reflection in a line), for example, employs the word "symmetrical" and appeals to a diagram for clarification, whereas a short, accurate, and clear definition could easily have been furnished. The concept of a group (p. 102) is introduced so poorly, and used so little, that it would have been better to have omitted it.

In chapter III the author gives the main points of hyperbolic trigonometry. This is the only part of the book which requires more knowledge than high school synthetic geometry for its understanding. Even at this point, a rudimentary knowledge of trigonometry and logarithms will see one through.

The book contains a great many diagrams, which, along with the author's skill as a teacher, help one over the many difficult points of the subject. The index is adequate. Unfortunately there are several grammatical errors, due, no doubt, to the translator's unfamiliarity with certain fine points of English.

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Studies in Modern Analysis, Vol. 1 of MAA Studies in Mathematics, ed. R. C. Buck. Published by the Math. Association of America, distributed by Prentice Hall, Inc., 1962. ix + 182 pages. $4.00.

This book initiates an MAA series aimed at bridging the gap between the college and the research levels. There are four papers: 1) The theory of limits, by E. J. McShane (discussing the concepts of nets, directed systems and general convergence by means of a modified Moore-Smith limit), 2) The generalized Weierstrass approximation theorem, by M. H. Stone (giving a detailed lucid account of the subject, proofs of the theorems and several important applications, e.g., the Peter-Weyl theorem), 3) The spectral theorem, by E. R. Lorch (starting with the finite-dimensional case, enveloping the necessary prerequisites in Hilbert space theory, proceeding to the completely continuous case, then the bounded case and ending with an introduction to the unbounded case; there is a clear discussion of resolvents, and point, continuous and residual spectra), and 4) Preliminaries to functional analysis, by C. Goffman (a discussion of convergence, completeness and continuity in function spaces, orthogonal and orthonormal bases, spectral decomposition of operators, and introducing Banach algebra up to and including a proof of Wiener's theorem on the Fourier series of the reciprocal of a function).

The papers are expertly written and there are many illustrations by special cases. A few misprints were noted but these should cause no difficulty.

If the following volumes remain on a comparable level, the series promises to be a most useful one for those who want to learn, review, or design a course.

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