

BOOK REVIEWS

Funktionentheorie. By Hellmuth Kneser. Göttingen, Vandenhoeck and Ruprecht, 1958. 422 pp., DM 34.

The author has devoted this work on functions of complex variables to those parts of this extensive field which he considers of use to the reader, giving preference to results which can be established by functiontheoretic methods. The treatment of the elementary parts of the subject, complex numbers in Chapter 1 and basic properties of analytic functions in Chapter 2, is somewhat brief but essentially complete. A novel feature is the inclusion of results on analytic functions of several complex variables, many but not all of which are analogous to the results for one variable. Early in Chapter 2, page 42, we find analyticity for several variables defined in terms of total differentiability. And near the end of Chapter 2, page 124, we find a discussion of the preparation theorem of Weierstrass and the structure of implicit functions of several variables in a neighborhood.

Chapter 3 begins with some results on singularities of power series. But it is mainly concerned with entire and meromorphic functions. It then discusses the Mittag-Leffler partial fraction and the Weierstrass product expansion theorems, order and growth of entire functions, and certain special functions such as the gamma function, elliptic functions, elliptic modular functions, and the Riemann zeta function. A proof of the Cauchy integral theorem for functions of several complex variables, and its application to the extension of the Mittag-Leffler expansion theorem for such functions, is given in the appendix.

Chapter 4 deals with analytic configurations. Some traditional synonyms occasionally appear. Thus we find "multiple-valued functions" used as a chapter heading. And the term "analytic functions" is mentioned, with the explanation that these are not "functions," i.e. having unique values. Riemann surfaces for algebraic functions are described, as well as Abelian integrals thereon. The analytic nature and singularities of certain solutions of differential equations, in particular the hypergeometric functions, are treated. The fifth and final chapter is concerned with conformal mapping. It includes the Riemann mapping theorem for simply-connected regions, its application to the Schwarz-Christoffel formula for a polygon, and the mapping of doubly-connected regions.

A few references are given at the ends of the last three chapters, and some others appear in footnotes. There are very few exercises,