BOOK REVIEWS

Transzendente Funktionen. By A. Kratzer and W. Franz. Akademische Verlagsgesellschaft, Leipzig, 1960. XIII+375 pp. DM 39.

The "transcendental functions" presented in this book are the hypergeometric and confluent hypergeometric functions and those special functions closely related to them. Thus, the material covered in the present book is roughly the same as that covered in the first half of "Part II. The Transcendental Functions" of Whittaker and Watson's classic, *Modern analysis.*

All the functions studied in the book are related to Gauss' hypergeometric series through special and limiting cases, and the presentation is further unified by basing all work, as far as possible, on contour integral representations of the functions concerned. There is much to be said in favour of such an organization, and it will certainly be welcomed by the student who wishes to work through the whole book. It must be admitted, though, that this plan of organization makes it virtually impossible to read the chapter on Bessel functions without having read the chapter on confluent hypergeometric functions, and in its turn the latter chapter is difficult to read without a knowledge of the basic chapter on the hypergeometric functions. Also, the emphasis on integral representations leads not only to the exclusion of functions which do not possess integral representations, but also to a concentration on integrals of the Euler-Laplace type. Contour integrals involving gamma functions (Mellin-Barnes integrals) do not find their natural place in the authors' scheme, and hypergeometric functions represented by such integrals (Mac-Robert's E-function, Meijer's G-function) are left on one side. Furthermore, those questions not particularly suited to the contour integral method are underplayed.

These features are mentioned here not so much in a spirit of criticism as in an attempt to define the scope of the book. It might be said that the book is a thorough study in the integration of the hypergeometric and confluent hypergeometric equations by contour integrals of Euler's and Laplace's type, and an investigation of the special functions arising in this work. The pace of the book is leisurely, motivation and proofs are given fully, and the authors make great, and successful, efforts to explain the tricky technique of contour integration on Riemann surfaces of integrands with branch points. Their aim appears to be to teach methods as much as to present results. A student having a firm grasp of advanced calculus and a