THE SECOND EDITION OF THE HURWITZ-COURANT FUNKTIONENTHEORIE

Vorlesungen über allgemeine Funktionentheorie und elliptische Funktionen von Adolf Hurwitz, herausgegeben und ergänzt durch einen Abschnitt über geometrische Funktionentheorie von R. Courant. Zweite vollständig umgearbeitete und vermehrte Auflage. Berlin, Julius Springer, 1925. xii+496 pp. Vol. III of the series Die Grundlagen der Mathematischen Wissenschaften in Einzeldarstellungen.

The first edition* of this book consisting of 1500 copies, was exhausted in two years. In spite of general economic conditions which greatly inflated book sales in Germany, this fact is evidence of a very favorable reception.

As is indicated in the title, the book consists of three parts, Part I dealing with the general theory of analytic functions, mainly from the point of view of Weierstrass, Part II, with elliptic functions, and Part III, with the theory of functions from the geometric point of view. The first two parts are based upon a manuscript and upon lecture notes of Hurwitz, and from the start have left little to be desired in arrangement and clarity. Accordingly, it was found that in the new edition but little change was desirable. Such alterations as have been made consist of improvements of typography, in the figures, in a reduction of a somewhat superfluous use of italics and numbers for formulas, and in occasional changes in the form of presentation. All of these bear witness to a detailed revision, and, in general, render the work still more readable. Two additions of several pages each have been made, namely, a treatment of the Gamma function, and some examples of the Lagrange series for a function of an implicitly given function. Both because of their inherent interest, and their helpfulness in the comprehension of the theories they illustrate, these additions will be welcome.

Part III, the geometric theory of functions, is consistently faithful to the Riemann point of view. It carries the reader from the discussion of conformality and the elementary functions to such questions as abelian integrals and the existence of algebraic functions corresponding to a given algebraic Riemann surface, the existence of automorphic functions with given fundamental region, the mapping of multiply connected regions, and the problems of uniformization. The keynote of the whole treatment is the use of the Dirichlet integral which appears in the basic existence theorems.

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* The following reviews appeared: W. Wirtinger, MONATSHEFTE, vol. 33 (1923), p. 13; Rolin Wavre, ENSEIGNEMENT, vol. 23 (1923), p. 118; O. D. Kellogg, this BULLETIN, vol. 29 (1923), pp. 415-417; L. Bieberbach, JAHRESBERICHT DER VEREINIGUNG, vol. 32 (1924), pp. 54-55; H. Kneser, GÖTTINGISCHE ANZEIGEN, vol. 187 (1925), pp. 87-88.