BOOK REVIEWS

Introduction to Riemann surfaces. By George Springer. Reading, Addison-Wesley, 1957. 8+307 pp. $9.50.

Of all requests for bibliographical information made to the reviewer none have come as frequently as that for "a good modern introduction to Riemann surfaces" from those not specialists in Function Theory. This request has been difficult to answer, for while recent books of Nevanlinna, Schiffer-Spencer and Pfluger contain introductory material to a greater or lesser extent what has been needed is a book which is avowedly a textbook on the subject. This is the need which the present book by Springer aims to fill.

The subject in hand is without doubt one of the hardest in which to write an effective text. The reason for this is the fact that, just as from the study of Riemann surfaces has developed a large part of modern Mathematical endeavour, so now in order to present the theory in its proper context it is necessary to call on many branches of Mathematics. The writer is faced at every step with difficult choices as to what to assume and what to develop from first principles. Let it be said at once that on the whole the author has done an excellent job. In a subject as well developed as the present it would indeed be hard to display much originality in the actual content of the proofs and those familiar with the sources will recognize many of those given here. Nevertheless the author has built up the logical structure carefully, blended the proofs skillfully to provide good unity of style and for the most part has smoothed the passage from one concept to another with carefully thought out motivation.

We will now describe the actual contents of the book.

Chapter 1 consists of an introduction, for the most part heuristic, to the theory. Starting with the simplest notions of algebraic functions and their integrals and the associated Riemann surfaces, the author discusses some geometric-topological aspects of the latter. He then passes on to a discussion of fluid flows and potentials, first in the plane, then on differential-geometric surfaces. He exhibits the nature of the simplest singularities and connects them with meromorphic functions. Finally he goes into somewhat more detail in the case of the torus.

Chapter 2 contains an introduction to the simplest concepts of point set topology. There follows a discussion of (two-dimensional) manifolds, including Prüfer's example of such not possessing a countable base. The chapter concludes with the introduction of the