discouraged research student, who will take heart from the story of how the mathematical world was made to sit up and take notice by the young van der Waerden, Mann, and Linnik.

It should be recorded that, since Chapter II was first written in 1945, it has been partly superseded by the work of van der Corput, Martin Kneser, and others.

A. M. MACBEATH

APOSTOL, T. M., *Mathematical Analysis* (Addison-Wesley, Reading, Mass., 1957), 553 pp., 76s.

This book aims to fulfil the long-felt want of a textbook which will deal rigorously with the part of the subject now known as " advanced calculus ". The author proves very carefully, with a proper statement of conditions, theorems like Green's theorem, which are unsatisfactorily dealt with in most textbooks.

Inevitably, the book suffers slightly from the complication which so rigorous treatment must at first involve. Some of this is a result of the intrinsic difficulty of the material, but there are places at which simplification would be possible. For instance, the statement of the Mean Value Theorem of the Differential Calculus is needlessly complicated by allowing the function to have, at the endpoints, two jump discontinuities which cancel one another out.

The following features are particularly welcome :

(i) use of vector notation and the treatment of functions mapping one Euclidean space into another,

(ii) the use of set theory and simple topological terms and ideas,

(iii) a satisfactory treatment of Gauss's, Stokes's and Green's theorems.

The book also includes chapters on Riemann-Stieltjes integration, on Fourier analysis, and on Cauchy's theorem and calculus of residues. It seems a pity that the Stieltjes integral $\int f(x)dg(x)$ is treated without first dealing with the special case $\int f(x)dx$. One also regrets the absence of a definition of real numbers, either using Dedekind section or Cauchy sequences. And one would have liked to see a treatment from first principles of the exponential and trigonometric functions.

There would appear to be a misprint in the statement of the inverse function theorem on p. 144. Surely condition (ii) ought to be not $X = f^{-1}(Y)$, but $X \subset f^{-1}(Y)$. Incidentally the proof given of the inverse function theorem is unusual and rather interesting.

By and large, the book succeeds in its aim. Teachers of analysis should not be without it, though for students it is at times a little severe. A. M. MACBEATH

SPRINGER, G., *Introduction to Riemann Surfaces* (Addison-Wesley, Reading, Mass., 1958), pp. viii + 305, 76s.

This is a modern presentation of the classical theory of Riemann surfaces. The author assumes that his reader has a knowledge of elementary complex variable theory and a little algebra and real variable theory, but gives a sufficient introduction to topology and Hilbert space for his purpose. The material is clearly and carefully explained and frequently illustrated by figures. The book is not intended to be an account of modern work in the subject but would be a useful introductory text for advanced undergraduate reading. E. M. WRIGHT

HAYMAN, W. K., *Multivalent Functions* (Cambridge University Press, 1958), 168 pp., 27s. 6d.

The object of this tract is to study the growth of univalent and multivalent functions $f(z)$ which are regular in the unit circle, and, in particular, to obtain bounds for the absolute values and coefficients of such functions.

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