SHORTER NOTICES

Cours d'Analyse Infinitésimale. By Ch. J. de la Vallée Poussin. Vol. I, 5th ed. Paris, Gauthier-Villars, 1923.

An earlier edition of this Cours was reviewed in this BULLETIN of 1915. This latest edition has been very largely recast and the first volume only deals with the classic topics treated in the standard French *Cours.* The matter printed in large type in the older editions constitutes the bulk of this volume and only Riemann integrals are considered. The material referring to point-set theory, measurable functions and Lebesgue integrals which was printed in small type in the old edition will find place in a subsequent volume.

This arrangement seems much better than the old one for it will permit of a homogeneous development more in harmony with the historical evolution of the ideas involved.

Even in following the conventional order of the French treatises, de la Vallée-Poussin displays his usual elegance and simplicity of presentation so that the most hackneyed matters acquire a new interest. Thus on page 39 will be found a neat and simple proof that the familiar functional equations

$$f(x+y) = f(x)+f(y), \qquad \Phi(x+y) = \Phi(x)\Phi(y)$$

have unique solutions of the form $f(x) = ax$ and $\Phi(x) = A^x$ provided f and Φ are *borné* in an arbitrarily small interval (O, e).

The treatment of indeterminate forms is the best the reviewer knows of and extremes of functions of one or more variables are carefully handled.

Chapter III on derivatives and differentials of functions of several variables is extremely well done and the conditions of Young and Schwarz for the inversion of the order of derivation are neatly and briefly established.

Even the usually arid subject of formal integration gains with his deft treatment an elegance and beauty rarely found in text books on the calculus. Multiple integrals, change of variable, the theorems of Green and Stokes are carefully treated and conventions of sign, so often loosely passed over, are fully gone into. Attention is called to the clever evaluation of the error in Simpson's rule.

The book ends with a chapter on series where the usual tests including Kummer's are set forth. In conclusion it may be said that this is one of the most valuable handbooks on modern analysis in any language and an English translation of it would be a welcome addition to our literature of the subject.

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