

tended over the space within σ lies between two constants greater than 0. All the usual results with respect to the series follow immediately. But uniformity and rigor have been sacrificed, for it is explicitly stated that the question of the proof of the above theorem is left open. In Poincaré's work it is derived on the basis of certain "Poincaré transformations," without appeal to Dirichlet's principle, and E. R. Neumann's work deserves credit for crystallizing the difficulty of the situation in this one theorem, particularly in view of the fact that for a large class of surfaces it has been proven (Korn: *Lehrbuch der Potentialtheorie*, I, pages 241 and 245), and further generalization is probably possible.

The results desired by the Jablonowski Gesellschaft have on the other hand since been attained in a more far reaching manner through Fredholm's work, especially in its application by J. Plemelj (*Monatshefte für Mathematik und Physik*, volume 15, 1904). The matter of convergence is completely settled and interest in the work of the more immediate followers of Poincaré becomes historical in its nature, with the important exception of certain studies of the behavior with respect to continuity of surface distributions and their derivatives, upon which the Fredholm method for the potential problems also depends. The present work is of value in both respects and is moreover to be commended for its style and arrangement.

O. D. KELLOGG.

Vorlesungen über mathematische Näherungsmethoden. By Dr. OTTO BIERMANN. Braunschweig, Friedrich Vieweg und Sohn, 1905. 227 pp.

"In recent years much has been done to meet the requirements of those who find it necessary to make use of mathematical methods, and it is therefore surprising that as yet no book exists which treats of methods of approximation in mathematics in clear and concise form and so as not to require much preliminary mathematical knowledge." This, the first sentence of the preface, indicates clearly the object with which the book under review was written. We may say at once that it fulfills this object admirably.

The book is divided into six parts treating respectively of: I, calculation with exact and approximate numbers; II, numerical computation in higher analysis; III, the approximate