

for the theory based on Σ_4 , and for the theory based on Σ_5 , implying $J\kappa = J\check{\kappa}$; and the property (PP_0) of being a definitely positive operation J is that $J\mu\mu$ is (P) a real non-negative number (P_0) vanishing only if $\mu = 0$.

We have specified the bases or terminologies and the postulates of the general theories F and H , and conclude this address on the foundations of the theory of linear integral equations with the expression of grateful appreciation of your so prolonged attention.

THE UNIVERSITY OF CHICAGO.

SHORTER NOTICES.

Lectures on Fundamental Concepts of Algebra and Geometry.

By J. W. YOUNG. Prepared for publication with the co-operation of W. W. DENTON, with a Note on the Growth of Algebraic Symbolism by U. G. MITCHELL. New York, The Macmillan Company, 1911. vii + 247 pp.

THE book contains twenty-one lectures on the logical foundations of algebra and geometry in substantially the same form as delivered at the University of Illinois during the summer of 1909, with an appended note on the growth of algebraic symbolism. "The points of view developed and the results reached are not directly of use in elementary teaching. They are extremely abstract, and will be of interest only to mature minds. They should serve to clarify the teacher's ideas and thus indirectly serve to clarify the pupil's." "The results nevertheless, have a direct bearing on some of the pedagogical problems confronting the teacher." "Let the teacher be vitally, enthusiastically interested in what he is teaching, and it will be a dull pupil who does not catch the infection. It is hoped these lectures may give a new impetus to the enthusiasm of those teachers who have not as yet considered the logical foundations of mathematics." Such is the purpose of the author.

The first five lectures, of 57 pages, form an introduction which makes clear the nature of the problems to be discussed and the point of view from which they are approached. Euclid's Elements, a non-euclidian geometry, the history of the parallel postulate, the logical significance of definitions,