which the oscillation is not less than a given positive number form a closed set; the Du Bois-Reymond theorems on integration; the Sierpinski theorem; and others. The new concept lends itself readily to broad generalizations, and its simplicity suggests the possibility of advantageous use even in the usual theory.

10. Let a_{ik} be the general element of the infinite determinant D and assume the convergence of $\Sigma|a_{ik}|$. By comparison with an infinite product Professor Brenke obtains the following results, of which (*d*) is a well-known theorem, from which also (*a*) might be derived: (*a*) D converges absolutely to the value 0; (*b*) if the elements of any number of rows or columns of D are replaced by quantities less in absolute value than a positive constant, the new determinant converges absolutely to 0; (*c*) if all the elements a_{ik}, $i > k$, are replaced by quantities less in absolute value than 1, the new determinant converges absolutely; (*d*) von Koch's "normal determinant" converges absolutely; (*e*) a normal determinant remains absolutely convergent if elements a_{ik} are replaced as in (*c*).

11. Professor Davis shows that if the difference between two complex vectors in space is $\delta_1 + \sqrt{-1}\delta_2$ and if k is $UV\delta_1\delta_2$, then the square of the distance between the complex vectors is $e^{\sqrt{-1}\theta}T(\delta_1 + k\delta_2)T(\delta_1 - k\delta_2)$ where θ is the angle between $\delta_1 + k\delta_2$ and $\delta_1 - k\delta_2$. This is an extension to space of a formula of Laguerre.

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NOTE ON THE POTENTIAL AND THE ANTI-POTENTIAL GROUP OF A GIVEN GROUP.

BY PROFESSOR G. A. MILLER.

(Read before the American Mathematical Society at Chicago, December 29, 1914.)

§ 1. *Introduction.*

WITH every regular substitution group there may be associated a conjugate substitution group on the same letters