onal substitution, and has an orthogonal mth root for any index m. No orthogonal substitution of the second kind can be generated by the repetition of the same infinitesimal orthogonal substitution. Every orthogonal substitution of the second kind has an orthogonal root with any odd index; and no orthogonal substitution of this kind has an orthogonal root with even index. But, corresponding to any proper orthogonal substitution ϕ of the second kind, can always be found an orthogonal substitution ψ_ρ of the first kind whose coefficients are algebraic functions of a parameter ρ such that, by taking ρ sufficiently small, the $2m$th power of ψ_ρ can be made as nearly as we please equal to ϕ. Moreover, we have

$$\phi = L_{\rho=0}\psi_\rho{}^{2m},$$

but not

$$\phi = \left[L_{\rho=0}\psi_\rho \right]^{2m}.$$

[An exactly similar theory holds for the linear substitutions which automorphically transform a bilinear form with cogrediant variables.]

NOTES.

A REGULAR meeting of the NEW YORK MATHEMATICAL SOCIETY was held Saturday afternoon, June 2, at half-past three o'clock, the president, Dr. McClintock, in the chair. The following persons, having been duly nominated and being recommended by the council, were elected to membership: Mr. William Eimbeck, U. S. Coast and Geodetic Survey, Washington, D. C.; Professor Herman J. Gaertner, Indiana Normal College, Covington, Indiana; Mr. Henry Volkman Gummere, Swarthmore College, Swarthmore, Pa.; Mr. George Herbert Ling, Columbia College, New York. The by-laws were amended in accordance with the recommendations of the council, the amendments to go into effect July 1, 1894.

Dr. Henry Taber read a paper entitled "On orthogonal substitutions." This paper appears in the present number of the BULLETIN, see p. 251.

THE council of the Society, influenced by the high importance of most of the papers presented to the Mathematical Congress at Chicago in 1893, by the desirability of their publication collectively, prepared, as they were, to a large extent, for the purpose of giving a general survey of the present state of knowledge throughout almost the entire range of mathematics, and by a sense of the honor conferred upon America by the contributions of so many distinguished mathematicians resident abroad, has resolved to undertake the publication of

a volume containing the hitherto unpublished papers read at the Congress.

Macmillan & Co. have been consulted and have offered to co-operate with the Society on very generous terms. The funds immediately available for the purpose, however, are insufficient, and it will be necessary to raise the additional sum required by private subscriptions. The publication committee of the Society, or that of the Chicago Congress, will be glad to furnish detailed information upon application.

THE following graduate courses in mathematics will be given at Johns Hopkins University during the academic year 1894–95 :—Professor Craig: (1) Theory of functions (advanced course), three times weekly, first half-year; (2) Abelian functions, three times weekly, first half-year ; (3) Differential equations, three times weekly, second half-year ; (4) Elliptic functions, three times weekly, second half-year ; (5) Mathematical seminary, two hours weekly, through the year. Professor Franklin: (1) Theory of functions (elementary course), twice weekly, through the year ; (2) Theory of invariants, three times weekly, through the year. Dr. Chessin: (1) Theoretical dynamics, three times weekly, second half-year ; (2) Partial differential equations, three times weekly, first half-year. Dr. Hulburt: (1) Theory of plane curves, four times weekly, first half-year ; (2) Surfaces and twisted curves (metrical), twice weekly, second half-year.

The following graduate courses in astronomy will be given: Dr. Poor : (1) The theory and use of astronomical instruments, three times weekly, first half-year ; (2) Advanced theoretical astronomy, three times weekly, second half-year ; (3) General course in theoretical and practical astronomy, twice weekly, through the year ; (4) Astronomical seminary, weekly, through the year ; (5) Practical work with the instruments, daily, through the year. Dr. Chessin : (1) Celestial mechanics, three times weekly, through the year.   T. S. F.

AT the University of Chicago during the three quarters (a, w, s) of the academic year 1894–95, the following courses in advanced mathematics will be offered : by Professor Moore, Elliptic modular functions (a), Projective geometry (a), Configurations (s), Groups (s); by Professor Bolza, Theory of functions of a complex variable (a), Quaternions (a), Substitutions (w), Analytic geometry of three dimensions (w) ; by Assistant Professor Maschke, Higher plane curves (a), Advanced integral calculus (a-w), Weierstrass's theory of elliptic functions (w), Algebraic surfaces (s), Analytical mechanics (s); by Dr. Young, Theory of numbers (w), Theory of equations (w-s) ; by Dr. Boyd, Differential equations (s) ; by Mr. Hancock, Calculus of variations (w).   E. H. M.