It is shown that by transformations the consideration of one form for purposes of distribution may be replaced by that of one or more other forms, and that it is possible to reduce all the forms until they possess the same number of members. On account of such transformation it is sufficient to keep s fixed in $G(s)$ in treating the problem of distribution.

While the notation is rather complicated, the analytic expression for the frequency of the forms in draw groups seems to be a result fundamental in the theory of "collective quantity" (Kollektivgegenstand) in general, and for problems of statistics in particular, as drawings z_h are representative of any events back of which lies that mode of origination that belongs to problems of chance. The work appears to the reviewer to be of considerable importance for the mathematics of statistics.

H. L. RIETZ.

Elementary Treatise on the Differential Calculus. By W. W. JOHNSON. New York, John Wiley and Sons, 1908. x + 191 pp.

IF phrases current in the present political situation be allowed in reviewing a text in the calculus, the best possible way to describe the impressions made on the reviewer by the present volume would be to say that it is very plainly written from the viewpoint of the "stand-patter" who refuses to be convinced of the value for purposes of instruction in the calculus of the methods of limits and function theory as promulgated by the "progressives," or of the "insurgent," methods of modern disciples of the Perry movement. And the analogy goes further than the stand-pat attitude taken on the method of rates; for it applies throughout to the contents of the 7 chapters of the volume of 191 pages.

The new text is in great part an abridgment of the author's larger treatise on the differential calculus. The contents are very similar to the old, but seemingly compounded in a more digestible form for beginners. The attitude on rates having been taken, the author naturally makes a maximum use of the student's geometric intuition in explaining the fundamental notions of the differential calculus, a point of view sometimes lost sight of by those who, regardless, hold fast to rigor of demonstration.

The derivative, or differential coefficient, is defined as the relative rate of increase of the function as compared with the

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independent variable; the absolute rate is obtained when t is taken as the independent variable; and finite values having the rates for their ratio are next assigned to dx and dy; I quote here in part from the preface.

The following chapter headings with the number of pages given to each show the emphasis placed on the several subjects: Functions, derivatives, and differentials, 43; Successive derivatives, 15; Maxima and minima, 17; Evaluation of indeterminate forms, 18; Development of functions in series, 29; Application to plane curves, 52; Functions of two or more variables, 14. From this it will be plainly seen that the evaluation of indeterminate forms and the applications to plane curves certainly receive more attention than is warranted; especially in view of the fact that indeterminate forms to be evaluated by calculus methods arise but rarely in practice and are more or less "cooked up" to suit the occasion. It is doubtful, too, if an elementary calculus is the proper place for a detailed study of the derivation of the equations and properties of the exhaustive list of higher plane curves here studied, even though these have become household words among geometers.

In the abridgment space might well have been saved by omitting entirely the brief references to pedal curves and intrinsic equations. In its place it would be possible to treat more fully such a subject as the radius of curvature, which latter seems almost lost to view.

The problems, with answers, following the several sections are of a type suitable for an elementary text in that they do not seem to be of the kind where the principles of the calculus are lost sight of in the maze of reductions involved in arriving at the answers. If any criticism were to be made, it would surely be to the effect that the answers too often "come out easy" instead of "correct to so many decimal places," a point to be considered since actual problems in the application of the calculus naturally come out in decimals.

ERNEST W. PONZER.

Hyperbolic Functions. Smithsonian mathematical tables. By GEORGE F. BECKER and C. E. VAN ORSTRAND. Washington, Smithsonian Institution, 1909. 8vo. li + 321 pp. $4.50.

THIS volume constitutes the fourth in the set of tables for scientific investigation published by the Smithsonian Institu-

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