him for linear difference equations. The papers by Poincaré in these fields went a long way toward providing a general theory of such linear equations. However, it is only very recently that a general theory of such equations has been developed.*

The last paper of the volume under review contains the second part of the unsuccessful Prize Essay referred to above, and was only published posthumously in the Acta Mathematica in 1923. Here we find a preliminary treatment of the problem as to when an ordinary linear differential equation of the second order with polynomial coefficients and only regular singular points is such that if we write $y_1(x)/y_2(x)=z$ when y_1 and y_2 are two linearly independent solutions, then x is a meromorphic function of z. This problem had been proposed and incompletely solved by Fuchs in 1880, and Poincaré's essay is mainly a critique of Fuchs's work. In this article is to be found the genesis of Poincaré's work in the theory of automorphic functions, which is contained in volume II of his Collected Works.

The reader of volume I will also be very grateful for the careful and highly competent revision which Professor Drach has provided.

G. D. BIRKHOFF

EISENHART ON CONTINUOUS GROUPS

Continuous Groups of Transformations. By L. P. Eisenhart. Princeton, Princeton University Press, and London, Oxford University Press, 1933. 10+299 pp.

This work is an up-to-date textbook on Lie's theory of continuous groups and on the recent developments of this theory. It is, in contrast to some introductions to the subject, not a book written for a beginner who knows only calculus. It will, however, be enjoyed by every student who knows some existence theorems on differential equations and is familiar with the elements of the tensor symbolism. He will not be bored through a considerable part of the book by the almost traditional detailed treatment of more or less trivial examples before reaching the first general theorem of Lie. In fact, in the present book many illustrations of the general theory are formulated only as exercises, so that Lie's three Fundamental Theorems can be developed fully in the very first chapter. Due to a similar attitude through the whole work, the present book, though of moderate extent, leads essentially farther and deeper than its predecessors, without, however, requiring too much from the reader.

The book starts out with some elementary facts regarding total and Jacobian differential systems and their generalizations. The necessary existence and uniqueness theorems of local character are used only under the restriction of analyticity. These preparatory paragraphs are followed by an explanation of the notion of a continuous transformation group and by a rather concise

* See a joint paper by myself and Trjitzinsky, *Analytic theory of linear difference equations*, Acta Mathematica, vol. 60 (1932), and a paper by Trjitzinsky entitled *Analytic theory of linear differential equations*, in vol. 62 of the same journal.