this startling achievement, his discussion of the origin of the theorem relating to the volume of a pyramid would have been somewhat different. His discussion of the critique of Pythagorean concepts of points due to Parmenides and Zeno of Elea is excellent, as is also his account of the development of the infinitesimal analysis of Democritus and Archimedes, and his comparison of it with modern views. There is another historical point to which it may be worth while to direct attention. Bertrand Russell and A. N. Whitehead refer to Weierstrass as the first to banish the fixed infinitesimal from the differential and integral calculus. Enriques mentions Weierstrass, but also Cauchy and Dini. We wish to remind the reader of the historical fact that the fixed infinitesimal was banished, in the works of Benjamin Robins in 1735, of Colin Maclaurin in 1742, and of Simon Lhuilier in 1786, though, of course, these men had not reached the arithmetization of the theory of limits of the time of Weierstrass.

FLORIAN CAJORI

Invariants of Quadratic Differential Forms. By O. Veblen. (Cambridge Tracts in Mathematics and Mathematical Physics, No. 24.) Cambridge University Press, 1927. viii+102 pp.

This book has been prepared to replace Tract No. 9 of the same series, *Invariants of Quadratic Differential Forms*, by J. E. Wright, which has been out of print for a number of years.

As pointed out in the preface, the presentation is formal in character as the space would permit of only the simplest applications. In Chapter I certain preliminaries are taken up such as the notation, the Kronecker deltas and then application to theorems on determinants. Chapter II is entitled *Differential Invariants.* Here the author considers such concepts as *n-dimensional space, coordinate system, invariant, tensor,* in a manner which commends the highest praise. Nowhere else have I seen these ideas so carefully presented. Chapter III considers quadratic differential forms and the theory of covariant differentiation and the curvature tensor. Chapter IV is devoted to euclidean geometry. The development is carried through largely for an n-dimensional space and in terms of a coordinate system not assumed to be Cartesian. In this fashion the expressions for a number of the metrical invariants of Riemannian geometry are introduced. Chapter V is given to a study of the problem of Christoffel concerning the equivalence of two quadratic differential forms. Chapter VI deals principally with the geometry of paths through the powerful method of "normal coordinates." A short historical section appears at the end of each chapter which serves to point out the chief sources of material.

In the opinion of the reviewer this book is exceedingly well done. The careful formulation of the underlying concepts and the meticulous phrasing of the definitions make this little book an invaluable one to a beginner in the subject, and for the same reason, it seems to me it must afford the adept a high degree of aesthetic enjoyment.

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