Étude Géométrique des Transformations Birationnelles et des Courbes Planes. By Henri Malet. Paris, Gauthier-Villars et Cie., 1921. viii + 259 pp.

About half of this book is devoted to the study of plane curves and the linear transformation, the remainder to the quadratic and the general birational transformation. According to the preface it is the work of an engineer—the product of leisure hours at the front. The writer appears to be acquainted with the works of the older French geometers but entirely out of touch with modern developments. Only a score of references to some twelve mathematicians were noted. Of these Cremona is the most recent. The names of Cayley, Noether, Clebsch, Bertini, S. Kantor do not appear, nor is any present-day treatise mentioned.

The treatment, characterized as geometric, is based neither on a system of axioms nor on a set of theorems proved analytically. It is rather descriptive and intuitional. Though the book may be useful as collateral reading, it is not a safe guide for the novice. For example, the last two theorems (pp. 250, 255), which state that any two birationally related curves can be transformed the one into the other by a birational transformation of the plane (a Cremona transformation), are not correct.

ARTHUR B. COBLE

The Fourth Dimension. By E. H. Neville. Cambridge, University Press, 1921. 56 pp.

This little book is intended by the author to serve as an introduction for the general reader to the notions of four-dimensional space, this topic having become of interest to large numbers of laymen on account of the wide general interest in the work of Einstein and the theory of relativity.

The author presupposes the reader to be familiar only with elementary trigonometry and with the solution of simultaneous linear equations in algebra and, while literally his treatment justifies this supposition, a considerable knowledge of linear equations and of linear dependence is necessary as well as a considerable mathematical maturity. The treatment is purely analytic and constitutes indeed a construction of four-dimensional analytic space on the foundation of the real number system. The book is written in the spirit of mathematical foundations and is remarkable for its rigor and precision of statement. It is difficult for the reviewer to see how the book can be of interest to any large class of readers in this country. It is too abstract and presupposes too much mathematical maturity for the lay reader; on the other hand, individuals having sufficient mathematical training to appreciate the author's exposition are very likely not to need it. The book seems to the reviewer of interest primarily as giving the details necessary for constructing an abstract space on a purely analytic foundation. The introduction of the ideas of direction and measurement of angles in this connection is of special interest. As a popular introduction to the terms and notions used in the discussion of the theory of relativity, it can be of little use for the reasons already mentioned.

J. W. YOUNG