Die Grundgleichungen der Mechanik, insbesondere starren Körper. Neuentwickelt mit Grassmanns Punktrechnung. By A. Lotze. Leipzig, B. G. Teubner, 1922. 50 pp.

A great many quantities which enter into mechanics are vectors and consequently the most natural way to treat mechanics is by vector methods and this has been done by a great many writers. There are, however, difficulties in treating forces which act at a given point, for vectors in general are only determined in magnitude and direction and hence to locate them on definite lines brings in other considerations.

The Grassmann point analysis gives us, however, a natural way out of this difficulty. He considered two elements, $A-B$ (where A and B are points) which represents a vector in the ordinary sense of the word, and AB which represents the segment of the line joining the points A and B. In cases, then, when we wish to localize a vector we can indicate it by AB.

In this little pamphlet Lotze writes up quite an extensive treatment of mechanics from the point of view of Grassmann's analysis. He assumes a knowledge of the point analysis including the notions of the Lückenausdruck and the fraction. No discussion of this is given and in places the argument is not easy to follow. The author has introduced some symbols of his own or at least not known to the reviewer, e.g., in addition to Grassmann's complement he uses $\llcorner\ \bar{v}$ to indicate the vector, in a plane, into which $\bar{v}$ rotates by a positive rotation through $\pi/2$; $\perp\ \bar{v}$ indicates (in space) the 2-vector perpendicular to $\bar{v}$ and of equal magnitude and so directed that $\bar{v} \perp \bar{v} = v^2$. Different symbols are used to represent the quantities of different order and this lessens the difficulty of reading.

This is a fairly complete text of the mechanics of rigid bodies. It is divided into three chapters: I. Kinematics of rigid bodies; II. General dynamics of material point systems; III. Dynamics of rigid bodies. The general properties of rigid motion are quite fully treated in the first chapter. The second chapter carries us as far as the derivation of d'Alembert's and Hamilton's principles and Lagrange's equations. The last chapter deals with work and energy and the various screws such as the impulse screw and the force screw.

The pamphlet is well worth reading; but it seems to the reviewer as if the reading could have been made much easier.

C. L. E. Moore

Précis d'Arithmétique. By J. Poirée. Paris, Gauthier-Villars et Cie., 1921. 62 pp.

C. Camichel has written a preface for this delightful little volume in which he says, "L'Arithmétique élémentaire est une excellente introduction à l'étude des Mathématiques. On y trouve sous une forme concrète des modèles de tous les modes de raisonnement depuis les plus simples jusqu'aux plus délicats de l'Analyse. Cependant cette partie des Mathématiques est en général négligée par les élèves." Poirée has presented a few topics from the theory of arithmetic and the theory of numbers in a way that will attract the neophyte and will be approved by the savant. The discussion commences with "Combien y a-t-il de billes?" and leads up to