It gives a compact and accurate statement of the modern status of the subject in hand, paying especial attention to the logical and historical foundations. It is recommended to those who want a brief treatment of this important branch of physics.

C. A. SHOOK

Collected Geometrical Papers, Part II. By Syamadas Mukhopadhyaya. Calcutta, University Press, 1931. 139–295 pp.

Part I of the Collected Papers was published in 1930, and reviewed in this Bulletin, vol. 36 (1931), p. 614. In Part II the pagination continues, and the make-up is the same as that of Part I. It contains two recent essays on plane topology which appeared in the Mathematische Zeitschrift in 1931 and the Tôhoku Mathematical Journal in 1931, respectively, and seven on parametric representation of curves in n-space, all but one of which (the Griffiths Memorial Prize Essay of 1910) were published in the Bulletin of the Calcutta Mathematical Society from 1909 to 1915. The argument and points of view of the papers on topology are similar to those in Part I. Only elementary methods are employed, but with striking originality and richness in new results. Most of these concern cyclic and sextactic points on continuous ovals.

The other essays are on the differential geometry of analytic curves in a euclidean n-space. Properties are expressed in terms of determinants of derivatives of various orders of the coordinates as to the parameter.

The first intrinsic parameter is the arc length. The second is the projection of the area of the triangle formed by three points which approach coincidence on the curve, summed over the interval of integration, etc. A curve in S_n has n such intrinsic parameters. They are independent of the coordinates chosen and of the parameter. Any $n-1$ independent equations connecting these parameters will determine a curve in S_n, intrinsically. The generalized idea of curvature, spheric of osculation, quadric of osculation etc. can now be expressed. The results in the case of plane curves are compared with those obtained by projective differential geometry. The same ideas are then extended to curves in S_n. At times the amount of machinery necessary seems a bit bewildering, but one is soon consoled by an unexpected general theorem evolving from the maze of formulas. The various kinds of singular points and the associated parametric representation in series are treated in great detail. The Papers contain a powerful weapon with which to attack metric problems on analytic curves of hyperspace.

VIRGIL SNYDER