

equation (14) and unroll the cone which projects this curve from the origin, on the xz -plane, the curve into which (c) goes will satisfy (10) and hence will rotate into a surface of constant positive curvature. Hence *the curves of 4-space which rotate by (7) into surfaces of constant positive curvature are obtained by tracing on the xz -plane curves (c) which rotate by (7) into surfaces of constant positive curvature, and then rolling the xz -plane into a cone with vertex at the origin. The curves into which the curves (c) go are those sought.* Of course to obtain curves which cut the path curves orthogonally the above cones must be such that each of their tangent planes cuts a pair of completely perpendicular planes in lines. Curves which generate surfaces of constant negative curvature are obtained in a similar manner.

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SHORTER NOTICES.

The Mystery of Space. A study of the hyperspace movement in the light of the evolution of new psychic faculties, and an inquiry into the genesis and essential nature of space. By ROBERT T. BROWNE. New York, E. P. Dutton and Company, 1919. 8vo. 395 pp. \$4.00.

THIS book is a mixture of cosmogony, psychology, and geometry; heralded in a recent flyer as "an epoch-making work."

With the cosmogony and psychology we can have little to do. Anyone obviously has a perfect right to philosophize about the universe and the true nature of space as much as he pleases and to dress his philosophy in Greek nomenclature to give it a scientific aspect if he chooses. But the reader may be pardoned if he is tempted to compare the periodic wanderings of Mr. Browne's "monopyknon," from chaos through seven stages of "pyknosis" before emerging into physical being, and thence through sentient, mental, and spiritual stages back to chaos again, with Goethe's story of the Homunculus; and to assert that the one is as mediaeval in character as the other was intended to be. Nor can one deny to the author the right to hold and to defend, if he can, the theory that humanity will one day develop to the point where,