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NOTE ON THE CONSTRUCTION OF CARTESIANS.

[From the *Quarterly Journal of Pure and Applied Mathematics*, vol. XV. (1878), p. 34.]

IF $\rho = a + b\cos\theta$, and $r = \frac{1}{2}\{\rho \pm \sqrt{(\rho^2 - c^2)}\}$, then obviously $r^2 - r\rho + \frac{1}{4}c^2 = 0$, that is,

$$r^2 - r(a + b\cos\theta) + \tfrac{1}{4}c^2 = 0,$$

which is the equation of a Cartesian. Here $\rho = a + b\cos\theta$ is the equation of a limaçon or nodal Cartesian, having the origin for the node; and for any given value of θ, deducing from the radius vector of the limaçon the new radius vector r by the above formula $r = \frac{1}{2}\{\rho \pm \sqrt{(\rho^2 - c^2)}\}$, we obtain a Cartesian, or by giving different values to c, a series of Cartesians having the origin for a common focus. The construction is a very convenient one.