

send it to the ROYAL SOCIETY, with a Figure of the Infant, with the Parts in their proper *Site*. One thing I cannot pass in Silence, *viz.* how the Circulation could be carried on, the Heart being thus inverted; and yet the Child lived several Days after Birth. I observed the Heart from its Basis, whence the *Aorta* and pulmonary Artery spring, and where the *Cava* and pulmonary Vein enter it, to its Cone, surrounded loosely with several Windings of these Vessels, through which the Blood's Circulation must necessarily be performed. A wonderful Sagacity in Nature! but I shall reserve the rest for my Tract.

VIII. Johannes Castillioneus *D^{no}. de Montagny, V.D. Philosoph. Prof. in Acad. Lauzannesi, Reg. Soc. Lond. Soc. &c. de Curva Cardioide, de Figura sua sic dicta.*
S. P.

NON ignoro, V. C. novarum curvarum investigationem, tanquam nimis Analytici facilem, contemni: Cum tamen D. *Carré*, non mediocris Geometra Regiæ Scientiarum Academiæ, (28 Feb. 1705.) novam curvam, quamquam *vix summa sequens fastigia rerum*, proponere non dubitavit; cur tibi, viro in amicos benignissimo, nonnulla, quæ mihi ejusdem *Carré* dissertationem legenti venerunt in mentem, scribere non ausim? Sed proœmiis omissis, ad rem.

Semicirculi *BMA*, (Fig. 1. 2. 3. TAB. III.) diameter *BA*, ita, puncto *B* peripheriam radens, ut semper trans-

transeat per punctum A gignet curvam, de qua agitur.

Ex generatione patet,

1^o. Quod $DA\alpha$ normalis ad AB , æquat diametri duplum.

2^o. Quod hujus curvæ peripheria $ADNaNA$ finiet in A .

Curvam hanc a figura *Cardioïdem*, si placet, appellabimus.

Jam per a , & A ducantur aE , AQ normales ad aA , & ubi libet EN normalis ad aE : Ex genesi erit $AN = BA + AM$, & (per similitudinem triangulorum QAN , MBA) $AQ = BM + MP$, ac $NQ = MA + AP$.

Hæc est præcipua hujus curvæ proprietas, altera non injucunda est, quod recta NN semper æquat diametri duplum, & semper a circulo bifecatur in M .

Sit nunc $BA = a$, $aE = x$, $EN = y$, Erunt $QN = \mp y \pm 2a$, $AN = \sqrt{x^2 + y^2 - 4ay + 4a^2}$, & $MA = \mp a \pm \sqrt{x^2 + y^2 - 4ay + 4a^2}$; quæ quatuor lineæ per analogiam comparatæ, dant æquationem ad curvam.

$$y^4 - 6ay^3 + 2x^2y^2 - 6ax^2y + x^4 + 12a^2y^2 - 8a^3y + 3a^2x^2 \} = 0$$

$$\frac{2y^4 - 9ay^3 + 2x^2y^2 + 12a^2y^2 - 3ax^2y - 4ay^3}{6axy - 2xy^2 - 3a^2x - 2x^3} = \frac{x}{y}$$

Sed ex curvæ generatione facilius ducendæ tangentis ratio deduci potest. Veniat MAN in locum primo quamproximum mAn , sumantur $AR = AM$, & $Ar = AN$, & junctis MR , Nr , ducatur per A recta

AT iis parallela, & per Mm , Nn , rectæ MT , nt .
 Jam $nA : At :: nr$ (vel mR) : $rN :: mR \times MA :$
 $rN \times AM :: mR \times MA : MR \times AN :: MA \times$
 $Am : AN \times AT$, sed in ultima ratione $mA = MA$,
 & TA normalis ad MN , quare $nA : At ::$
 $\overline{MA}^2 : AN \times AT$; si nunc ex M ducatur per circuli
 centrum F , recta MF producenda, donec. rectæ TA
 item productæ occurrat in G , id est, usque ad circuli
 peripheriam, erit $\overline{MA}^2 = TA \times AG$; quapropter
 $nA : At :: AG : AN$; describatur igitur semicir-
 culus per G , & N , qui secabit rectam AT in t , ex
 quo ducta recta tN erit tangens ad curvam, ad quam
 insuper recta NG est normalis; hinc jungantur MO ,
 cui ex N ducatur parallela, quæ tanget curvam.

Hic obiter notandum puto hanc ducendarum tan-
 gentium methodum probe convenire pluribus curvis.

Sit AB , Fig. 2. Conchois Nicomedæ: Tunc
 (supposita superiori præparatione) $BP : Pt :: BR$,
 (vel cr) : $Rb :: cr \times CP : Rb \times CP$, (vel $rC \times$
 PR) : $\overline{CP}^2 : TP \times PR$, unde deducitur superior
 constructio.

Recta longitudinis datæ Fig. 3. CPB , extremitate
 C radens rectam CDT ad DA normalem, semper
 transeat per punctum P datum in ipsa DA , & ita
 curvam AB gignat.

Superiorem præparationem, & ratiocinium huic
 aptans habebis $BP : Pt :: bR$ (rc) : $RB :: cr \times$
 $CP : RB \times CP$ ($BP \times rC$) : $\overline{CP}^2 : BP \times PT$,
 ut supra. Piget plura referre.

Cæterum methodus de *maximis*, & *minimis* dat
 maximam ordinatam $= \frac{2a}{4}$, & ejus abscissam $= \frac{a}{4} \sqrt{3}$.
 Possset eodem pacto investigari abscissarum maxima;
 sed

sed longæ ambages, series sed longa laborum; quare sic eam quærito.

Quia EN , Fig. 1. est tangens ad curvam, recta MG ex puncto M per centrum F ducta determinat punctum G , ex quo ducta GN est normalis ad EN , ergo & ad Aa , ex hypothesi, sed $NQ = AV = MA + AP$; ergo $VP = MA$; atqui $BA : AM :: MA : AP$; ergo $BA : PV :: VP : PA$; sed $PF = FV = a - 2z$; & ideo $a : a - 2z :: a - 2z : z$. Unde facile deducitur $z = \frac{a}{4}$, $EN = \frac{7a}{4}$, $AQ = \frac{3a}{4}\sqrt{3}$. Ubi notandum quod idem punctum M , quod præbet in recta $NAMN$ punctum majoris ordinatæ, præbet etiam punctum majoris abscissæ.

Sed jam satis patientia tua abusus videor: quare finem faciam, nonnulla alia, quæ de hac curva commentatus sum, propediem missurus, si putes hæc & similia non indigna, quæ a te subcisivis horis legantur. Vale,

Vir, quo neque candidiorem
Terra tulit, neque cui me sit devinctior alter.
Viviaci, pridie Kalendas Apriles 1741.

IX. *Ad Eclipses Terræ repræsentandas, Machina J. And. Segneri, Med. Physic. & Mathem. Prof. Goetting, R. S. S.*

UT eclipsis aliqua terræ oculis exhibeatur spectanda, projectio arcuum & circulorum, qui in hemisphærio terræ illuminato concipiuntur, in planum, servire potest egregie: Sique in ejusmodi projectionem

