Sagital Suture, crofs'd from one Parietal-Bone to the other, as far as the Coronal Suture on that fide oppofite to the Wound; another had gone crofs the Coronal Bone; and the third was on the Parietal Bone on the fide of the Wound, pretty near the *Sutura Squamofa*; but what is moft fingular, is that none of thefe Fiffures did reach that, upon which the Trepan had been applyed. An *Empyema* was found in the *Thorax*, and a confiderable Impofthume in the Liver.

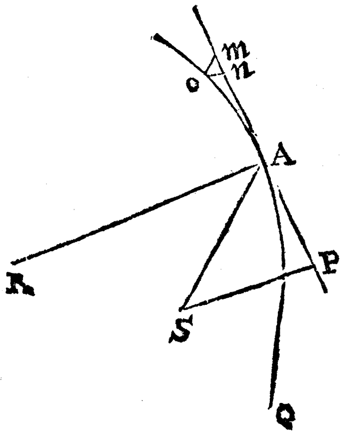
II. *Jo. Keill ex Æde Chrifti Oxonienfis, A. M. Epiftola ad Clariffimum Virum Edmundum Halleium Geometriæ Profefforem Savilianum, de Legibus Virium Centripetarum.*

HAUD oblitus es, uti arbitror, Vir Clariffime, te cum nuper effes Oxonii, Theorema, quo Lex vis centripetæ, *Quantitatibus finitis* exhiberi poffit, mecum communicaffe: Quod Theorema tibi monftravit Egregius Mathematicus D. Abrahamus De Moivre, Dixitque Dominum Ifaacum Newtonum, Theorema huic fimile prius Inveniffe. Cum autem ejus demonftratio perfacilis fit, Eam, itemque alia de eadem re cogitata, non poffum tibi non impertire. Etfi minime dubitem, quin, fi idem argumentum pertractare libuiffet, tu acerrimo quo polles ingenij acumine, rem omnem penitus exhaurire potuiffes.

THEO-

THEOREMA.

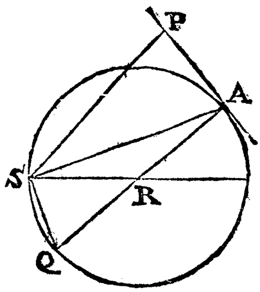
Si corpus Urgente vi Centripetà in curva aliqua moveatur; Erit vis illa in quovis curvæ puncto, in ratione composita ex directâ ratione distintiæ corporis à centro virium, & reciprocâ ratione Cubi perpendicularis à Centro in rectam in eodem puncto Curvam Tangentem demissæ, ducti in Radium Curvaturæ quem ibi obtinet curva.



Sit Q A O Curva quælibet à mobili urgente vi centripeta ad punctum S tendente descripta. Sitque A O arcus in minimo quovis tempore percursus, P *m* ejus tangens, A R Radius circuli æquicurvi, hoc est cujus Peripheriæ pars minima cum Arcu A O coincidat. Et sit S P recta a puncto S in tangentem perpendiculariter demissa; Ducantur O *m* ad S A & O *n* ad S P Parallelæ. Et exponat O *m* vim qua mobile in A urgetur versus S. Vis qua perpendiculariter à tangente recedit corpus, erit ut O *n*, id est vis tendens versus R & faciens ut mobile, eadem qua prius velocitate latum, describet circulum æquicurvum arcui A O erit ad vim tendentem versus S, qua corpus in curva A O movetur, ut O *n* ad O *m*, vel ob æquiangula triangula ut S P ad S A. Sed corporum in circulis latorum vires centripetæ sunt ut quadrata velocitatum applicata ad Radios; per Corol. Theorem. 4. Princip. Newtoni.

 Est

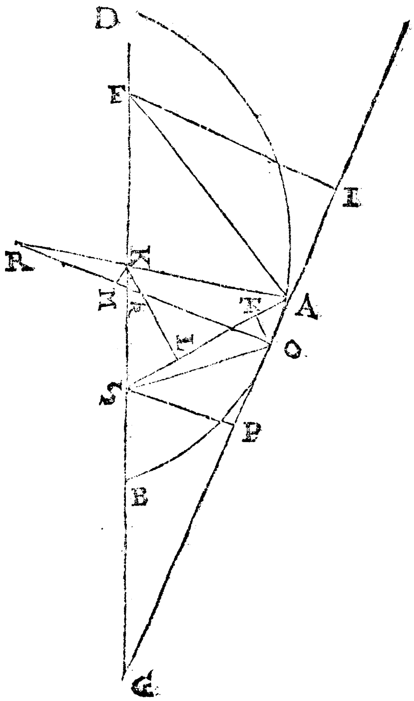
Eft vero velocitas reciproce ut S P, five directe ut $\frac{1}{SP}$ adeoq;quadratum velocitat. erit ut $\frac{1}{SP^2}$: vis igitur ut O *n*, five vis qua in circulo æquicurvo moveri poteft corpus, erit ut $\frac{1}{SP^2 \times AR}$: Oftenfum autem eft, effe S P ad S A ut vis tendens verfus R, qua corpus in circulo æquicurvo moveri poteft, ad vim tendentem verfus S: fed eft vis tendens verfus R ut $\frac{1}{SP^2 \times AR}$, adeoque cum fit $SP : SA :: \frac{1}{SP^2 \times AR} : \frac{SA}{SP^3 \times AR}$ erit vis tendens verfus S, ut $\frac{SA}{SP^3 \times AR}$. *Q. E. D.*



Cor Si curva Q A O fit circulus, erit vis centripeta tendens verfus S, ut $\frac{SA}{SP^3}$. Adeoque fi vis centripeta tendat ad S punctum in circumferentia fitum, erit [per 32 tertii] ang. P A S = ang. A Q S; adeoque ob fimilia triangula A S P, A S Q, erit A Q : A S :: A S : S P: unde $SP = \frac{AS^2}{AQ}$ & $SP^3 = \frac{AS^6}{AQ^3}$ unde $\frac{SA}{SP^3} = \frac{SA \times AQ^3}{AS^6} = \frac{AQ^3}{AS^5}$, hoc eft, ob datum A Q, erit vis reciproce ut AS^5.

Sit

Sit D A B, Ellipsis cujus Axis D B, foci F & S, A R, O R duæ perpendiculares in curvam sibi proximæ: ducantur KL, O T in S A, & K M in O R perpendiculares. Quia S A : S K : : (a) F A + S A : F S, hoc est data ratione, erunt rectarum S A, S K Fluxiones A T, K k ipsis S A, SK proportionales; & est AL = (b) $\frac{1}{2}$ lateris Recti = $\frac{1}{2}$ L. Porro ob K A ad S P parallelam, est angulus A S P = K A L = T O A ob ang. T A O utriusque complementum ad rectum: quare K A : A L : : S A : S P, unde $S P = \frac{L}{2} \times \frac{S A}{KA}$ &



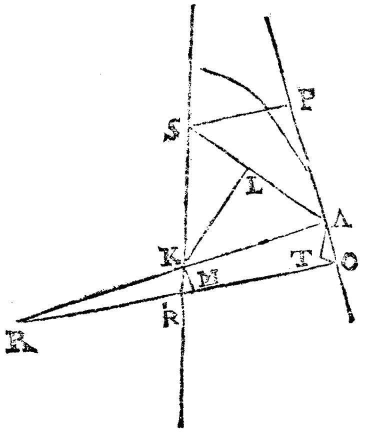
$K A = \frac{L \times S A}{2 S P}$. Porro ob æquiangula triang. K M k, G P S & O T A, S P A.

Est K M : K k : : G P : G S : : A P : S K.
Item K k : A T : : S K : S A
Item A T : A O : : A P : S A

Erit K M : A O : : $A P^2 : S A^2 : : S A^2 - S P^2 : S A^2$ $: : S A^2 - \frac{L^2 \times S A^2}{4 A K^2} : S A^2 : : 4 A K^2 - L^2 : 4 A K^2$, unde $L^2 : 4 A K^2$: : (A O — K M : A O : :) A K : A R.

(a) *Prop.* 3. *El.* 6*ti*. (b) *Prop.* 6. *partis* 4*tæ Sect. Con. Milnij.*

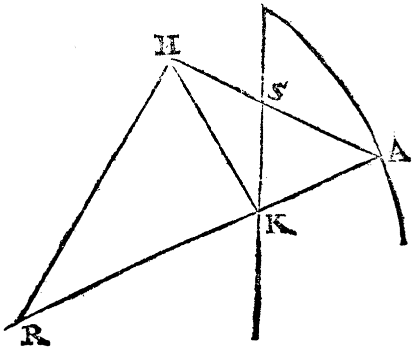
ac proinde $AR = \frac{4AK^3}{L^2}$. Eodem prorſus ratiocinio Invenietur Radius Curvaturæ in Hyperbola æqualis $\frac{4AK^3}{L^2} = \frac{L \times SA^3}{2SP^3}$.



In Parabola vero facilior eſt calculus. Nam ob datam ſubnormalem, eſt Kk ſemper $= AT =$ Fluxioni Axis; & triangula KkM, ATO, SPA, AKL, æquiangula, unde $KM : Kk :: AP, SA$, item eſt AT vel $Kk : AO :: AP : SA$, unde $KM : AO :: AP^2 : SA^2 :: SA^2 - SP^2 : SA^2 ::$ unde erit $SP^2 : SA^2 :: AO - KM : AO :: AK : AR$, ac proinde $AR = \frac{SA^2 \times AK}{SP^2}$; ſed eſt $AL = \frac{1}{2}$ lateris Recti $= \frac{1}{2}L$, & $AK : AL :: SA : SP$, quare erit $\frac{L}{2} \times \frac{SA}{AK} = SP$, & $SP^2 = \frac{L^2 \times SA^2}{4AK^2}$, quare erit $AR = \frac{4AK^3}{L^2}$, vel quoniam eſt, $AK = \frac{L \times SA}{2SP}$, erit $AR = \frac{L \times SA^3}{2SP^3}$.

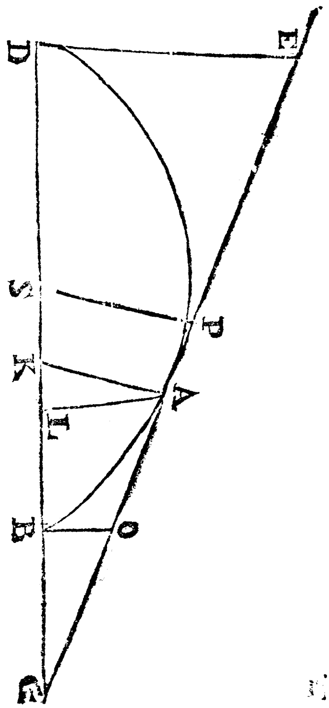
Atque ex his facillima oritur conſtructio, pro determinando Radio curvaturæ in quavis Sectione Conica. Sit enim A K perpendicularis in Sectionem occurrens Axi in K, ex K ſuper A K erigatur perpendicularis H K, cum A S producta concurrens in H. Ex H erigatur ſuper A H, perpendicularis H R, erit A R radius curvaturæ.

In



In Parabola paulo simplicior adhuc evadit constructio. Nam quoniam ex natura Parabolæ est S A = S K, & ang. A K H rectus, erit S centrum circuli per A K H transeuntis, unde invenitur Radius curvaturæ producendo S A in H, ut SH=SA, & in H erigendo perpendicularem H R; Et R erit centrum circuli osculantis Parabolam in A.

Vis Centripeta tendens ad focum Sectionis Conicæ in qua corpus movetur, est reciproce proportionalis quadrato distantiæ. Nam quoniam $AR = \frac{L \times SA^3}{2SP^3}$ erit $\frac{SA}{SP^3 \times AR} = \frac{SA \times 2SP^3}{SP^3 \times L \times SA^3} = \frac{2}{L \times SA^2}$ hoc est ob datam $\frac{2}{L}$ erit vis centripeta ut $\frac{1}{SA^2}$.



Sit Ellipsis BAD quam tangit in A recta G E. Sintque S P per centrum Ellipsis & K A per contactum, transeuntes, perpendiculares in tangentem. Erit S P × K A = quartæ parti figuræ Axis seu = quadrato semiaxis minovis = B O × D E. Nam ob æquiangula triang. G B O, G L A, G A K, G P S & G D E,

$$S P : S G :: B O : G O$$
$$S G : D G :: B G : L G :: G O : G A$$
$$D G : D E :: G A : A K,$$

unde S P : D E :: B O : A K; & $S P \times A K = D E \times B O = \frac{1}{2} L \times S B$.

Hinc si Mobile moveatur in Ellipsi, vi centripeta tendente ad centrum Ellipsis, erit vis illa directe ut distantia; Nam est $\frac{SP^3 \times 4 AK^3}{L^2}$ = dati quantitati. Quia est $SP \times AK$ quantitas data. Vis igitur, ut $\frac{SA}{SP^3 \times AR}$, erit ut S A distantia.

In figura tertia Demissa ab altero umbilico F: in Tangentem Perpendiculari F I. Ob æquiangula Triangula S A P, F A I, erit $SA : SP :: FA : FI = \frac{SP \times FA}{SA}$, unde erit $SP \times FI = \frac{SP^2 \times FA}{SA}$ = quadrato semiaxis minoris: unde si Axis major vocetur b, minor autem $2d$, erit $SP^2 = \frac{d^2 SA}{b - SA}$ & $SP = \frac{d\,SA^{\frac{1}{2}}}{\sqrt{b - SA}}$.

In Hyperbola autem est $SP = \frac{d\,SA^{\frac{1}{2}}}{\sqrt{b + SA}}$.

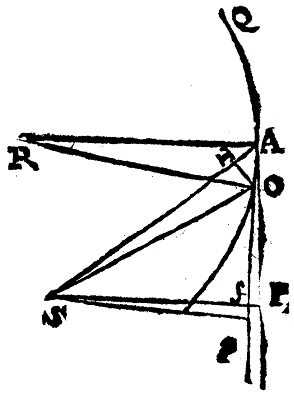
In Parabola est $SP = \sqrt{d\,SA}$, posito ejus latere recto $= 4d$.

Quoniam est $TA^2 : TO^2 :: AP^2 : SP^2 :: SA^2 - SP^2 : SP^2 :: SA^2 - \frac{d^2 SA}{b - SA} : \frac{d^2 SA}{b - SA} :: SA - \frac{d^2}{b - SA} : \frac{d^2}{b - SA} :: bSA - SA^2 - d^2 : d^2$, erit $\sqrt{bSA - SA^2 - d^2}$

$: d$

$: d :: TA : TO$ cumque sit $TA = S\dot{A}$, erit $TO = \frac{d\,S\dot{A}}{\sqrt{bSA - SA^2 - d^2}}.$

Sit jam Q A O. Quælibet curva, cujus arcus minimus sit A O, tangentes in punctis A & O, A P, O p. Radius Curvaturæ A R, Perpendiculares in tangentes sint S P, S p, erit $\frac{SA \times TA}{fP} = AR$. Nam ob equiangula triangula est

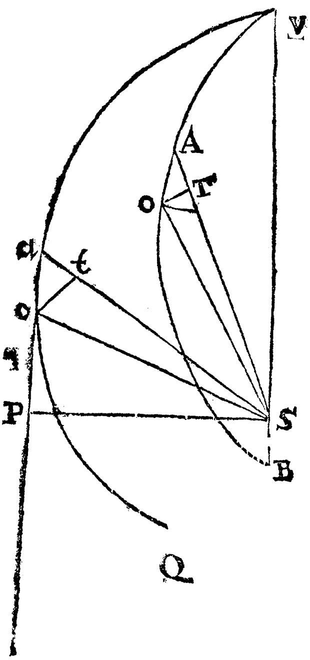


$fP : AO :: PA : RA$
& $AO : TA :: SA : PA$;
unde ex æquo erit $fP : TA$ vel $S\dot{A} :: SA : RA$, est vero $fP = S\dot{P}$, quare erit $RA = \frac{SA \times S\dot{A}}{S\dot{P}}$.

Hinc si distantia S A, in suam Fluxionem ducatur, & dividatur per Fluxionem perpendicularis, habebitur radius Curvaturæ; Quo Theoremate facile determinatur Curvatura in Radialibus curvis. Exempli Gratia. Sit A Q, Spiralis Nautica; quoniam angulus S A P datur, ratio quoque S A ad S P dabitur; sit illa ratio a ad b, erit $SP = \frac{bSA}{a}$ & $S\dot{P} = \frac{bS\dot{A}}{a}$ & $AR = \frac{SAS\dot{A}}{S\dot{P}} = \frac{aSA}{b}$, unde facile constabit, Spiralis Nauticæ Evolutam esse eandem Spiralem, in alia positione.

Quoniam $AR = \frac{SAS\dot{A}}{S\dot{P}}$, erit $\frac{SA}{SP^3 \times AR} = \frac{S\dot{P}}{SP^3 \times S\dot{A}}$ Atque hinc rursus, ex data relatione S A ad S P, facile invenietur lex vis centripetæ.

 Exem-



Exemplum. Sit V A B Ellipsis cujus focus S, Axis major V B = b, Axis minor = 2 d, latus Rectum = 2 R. Sitque V a Q alia curva, ita ad hanc relata, ut sit perpetuo angulus V S A angulo V S a proportionalis, & sit S a = S A. Quæritur lex vis centripetæ tendentis ad S, qua corpus in curva V a Q moveri potest.

Quoniam ang. V S A est ad V S a, in data ratione; horum angulorum incrementa erunt in eadem ratione, sitque ea ratio m ad n; unde erit $ot = \frac{n \times OT}{m}$.

Est autem $OT = \frac{d S\dot{A}}{\sqrt{\overline{bSA - SA^2 - d^2}}}$

unde erit $ot = \frac{n d S\dot{A}}{m \sqrt{\overline{bSA - SA^2 - d^2}}}$.

Quoniam autem est $SA^2 + SP^2 : SP^2 :: ta^2 + ot^2 : ot^2$

$:: S\dot{A}^2 + \frac{n^2 d^2 S\dot{A}^2}{m^2 \, \overline{bSA - SA^2 - d^2}} : \frac{n^2 d^2 S^2}{m^2 \, \overline{bSA - SA^2 - d^2}}$

$:: 1 + \frac{n^2 d^2}{m^2 \times \overline{bSA - SA - d^2}} : \frac{n^2 d^2}{m^2 \times \overline{bSA - SA^2 - d^2}} ::$

$m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2 : n^2 d^2$, unde erit

$\sqrt{\overline{m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2}} : nd :: SA :$

SP, & $SP = \frac{ndSA}{\sqrt{\overline{m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2}}}$.

Cujus ut habeatur fluxio pro $m^2 bSA - m^2 SA^2 -$

m^2

$m^2 d^2 + n^2 d^2$. Scribatur x & erit $SP = \frac{n\,d\,SA}{\sqrt{x}}$, & $SP^3 = \frac{n^3 d^3 SA^3}{x^{\frac{3}{2}}}$; & eſt $\dot{x} = m^2 b\,S\dot{A} - 2\,m^2 SA\,S\dot{A}$, & $S\dot{P} = n\,d\,S\dot{A} \times x^{-\frac{1}{2}} - \frac{1}{2}\frac{n\,ASA\,\dot{x}}{x^{\frac{3}{2}}}$, & reducendo partes ad eundem denominatotem; erit $S\dot{P} = \frac{n\,d\,S\dot{A}\,x - \frac{1}{2}\,n\,d\,SA\,\dot{x}}{x^{\frac{3}{2}}}$. Et in numeratore loco, x & $\dot{x}$, ponendo ipſorum valores, & ordinando fit $SP = \frac{n\,d\,SA \times \frac{1}{2}\,m^2 b\,SA - m^2 d^2 + n^2 d^2}{x^{\frac{3}{2}}}$, unde erit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{\frac{1}{2}\,m^2 b\,SA - m^2 d^2 + n^2 d^2}{n^2 d^2 SA^3}$. Sed eſt $\frac{S\dot{P}}{SP^3 \times S\dot{A}}$, ut vis centripeta, quare erit vis, ut $\frac{\frac{1}{2}\,m^2 b\,SA - m^2 d^2 + n^2 d^2}{n^2 d^2 SA^3}$ vel ob datam $n^2 d^2$ in denominatore erit vis, ut $\frac{\frac{1}{2}\,m^2 b\,SA - m^2 d^2 + n^2 d^2}{SA^3}$, vel loco d^2 ponendo $\frac{bR}{2}$, erit vis ut $\frac{\frac{1}{2}\,m^2 b\,SA - \frac{1}{2}\,m^2 b\,R + \frac{1}{2}\,n^2 b\,R}{SA^3}$, ſeu ob datam $\frac{b}{2}$, ut $\frac{m^2 SA - Rm^2 + Rn^2}{SA^3} = \frac{m^2}{SA^2} + \frac{Rn^2 - Rm^2}{SA^3}$. Quæ omnia exacte coincidunt, cum iis quæ à Domino Newtono de vi centripeta corporis in eadem curva moti, traduntur, in *Prop.* 44. *Princip.*

Quoniam vis Centripeta tendens ad punctum S, qua urgente corpus in curva moveri poteſt, eſt ſemper ut $\frac{S\dot{P}}{SP^3 \times S\dot{A}}$; hinc ex data lege vis Centripetæ, Inveniri poteſt relatio S A ad S P, ac proinde per methodum Tangentium Inverſam, exhiberi poteſt Curva quæ data vi Centripeta deſcribi poſſit.

Sit verbi gratia Vis reciproce ut diſtantiæ Dignitas quælibet m, hoc eſt, ſit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{b}{a^2 SA^m}$, erit $\frac{S\dot{P}}{SP^3} = \frac{bS\dot{A}}{a^2 SA^m}$, & capiendo harum fluxionum fluentes; erit $\frac{1}{2}SP^{-2} = \frac{b\,SA^{1-m} \mp e}{m-1 \times a^2}$, unde erit $\frac{\frac{m-1}{2} \times a^2}{b\,SA^{1-m} \mp e} = SP^2$, & multiplicando tam numeratorem, quam denominatorem fractionis, per SA^{m-1}; & loco $\frac{m-1}{2}a^2$ ponendo d^2, fit $\frac{d^2 SA^{m-1}}{b \mp e SA^{m-1}} = SP^2$; quare erit $SP = \frac{d\sqrt{SA^{m-1}}}{\sqrt{b + eSA^{m-1}}}$.

Quod ſi quantitas conſtans e ſit nihilo æqualis erit $SP \frac{\sqrt{SA^{m-1}}}{\sqrt{b}}$.

Adeoque ſi vis reciproce ut diſtantiæ quadratum, poni poteſt $SP = \frac{\sqrt{d^2 SA}}{\sqrt{b}}$, & curva erit parabola cujus latus rectum eſt $\frac{4d^2}{b}$, vel poteſt eſſe $SP = d \times \frac{\sqrt{SA}}{\sqrt{b - SA}}$, & curva erit Ellipſis vel denique poteſt eſſe $SP = d \times \frac{\sqrt{SA}}{\sqrt{b \times SA}}$, & curva evadit Hyperbola.

Si vis ſit reciproce ut diſtantiæ cubus ſupponi poteſt, ut S P ſit $= \frac{d\,SA}{b}$, & curva ſit ſpiralis Nautica, vel fieri poteſt ut ſit S P $= \frac{d\,SA}{\sqrt{b - e\,SA^{2}}}$, & Curva erit eadem cum eâ cujus conſtructionem à ſectore hyperbolæ petit Dominus Newtonus; vel poteſt eſſe S P $= \frac{d\,SA}{\sqrt{b + e\,SA^{2}}}$, & ejus Curvæ conſtructionem per Sectores Ellipticos tradit idem Newtonus, *Cor.* 3. *Prop.* 1. *lib.* 1. *Princip*

Si vis centripeta ſit reciproce ut diſtantia; relatio inter S A & S P, æquatione Algebraica definiri nequit, Curva tamen per Logarithmicam vel per quadraturam Hyperbolæ conſtruitur, ſit enim S P $= \frac{d}{\sqrt{b - L.SA}}$, ubi L. S A deſignat Logarithmum ipſius S A.

Hæc omnia ſequuntur ex celebratiſſimâ nunc dierum Fluxionum Arithmeticâ, quam ſine omni dubio Primus Invenit Dominus Newtonus, ut cui libet ejus Epiſtolas à Walliſio editas legenti, facile conſtabit, eadem tamen Arithmetica poſtea mutatis nomine & notationis modo; à Domino Leibnitio in Actis Eruditorum edita eſt.

Moveatur jam corpus in Curva Q A O, vide *fig.* 1. urgente vi centripeta tendente ad S; & Celeritas corporis in A dicatur C; celeritas autem qua corpus urgente eadem vi centripeta, in eadem diſtantia, in circulo moveri poteſt, dicatur *c*. Conſtat ex Theoremate primo, quod ſi S A exponat vim Centripetam tendentem ad S; vis Centripeta tendens ad R, qua urgente, corpus cum celeritate C, circulum cujus radius eſt A R deſcribet; per S P exponetur. Corporum autem circulos deſcribentium, vires Centripetæ ſunt ut velocitatum quadrata ad circulorum radios applicata, quare erit S P : S A : :

$\frac{C^2}{AR} : \frac{c^2}{SA}$, unde erit $SP \times AR : SA^2 :: C^2 : c^2$ & $C : c ::$ $\sqrt{SP \times AR} : SA$.

Si SP cum SA coincidat, ut fit in figurarum verticibus erit $C : c :: \sqrt{AR} : \sqrt{SA}$. Quod si curva sit Sectio Conica AR, radius curvaturæ in ejus vertice est æqualis dimidio lateris recti $= \frac{1}{2} L$, ac proinde erit velocitas corporis in vertice Sectionis, ad velocitatem corporis in eadem distantia circulum describentis, in dimidiata ratione lateris recti, ad distantiam illam duplicatam.

Quoniam est $AR = \frac{SA \times S\dot{A}}{S\dot{P}}$, erit $C^2 : c^2 ::$ $\frac{SP \times SA \times S\dot{A}}{S\dot{P}} : SA^2 :: \frac{SP \times S\dot{A}}{S\dot{P}} : SA :: SP \times S\dot{A}$ $: SA \times S\dot{P}$, adeoque ex data relatione SP ad SA, dabitur ratio C ad c, Exempli Gratia. Si vis sit reciproce ut distantiæ dignatas m, hoc est sit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{b}{a^2 SA^m}$; & erit $S\dot{P} = \frac{b SP^3 \times S\dot{A}}{a^2 SA^m}$, adeoque erit $C^2 : c^2 ::$ $SP \times S\dot{A} : \frac{b SP^3 \times SA \times S\dot{A}}{a^2 SA^m} :: a^2 SA^{m-1} : b SP^2$.

Unde si ponatur $SP^2 = \frac{d^2 SA^{m-1}}{b} = \frac{m-1}{2} \frac{a^2 SA^{m-1}}{b}$, erit $C^2 : c^2 :: a^2 SA^{m-1} : \frac{m-1}{2} a^2 SA^{m-1} :: m-1 : 2$ ac proinde erit $C : c :: \sqrt{2} : \sqrt{m-1}$.

Quod si ponatur $SP^2 = \frac{d^2 SA^{m-1}}{b - e SA^{m-1}} = \frac{m-1}{2} \frac{a^2 SA^{m-1}}{b - e SA^{m-1}}$ fiet C^2 ad c^2, ut $a^2 SA^{m-1}$ ad $\frac{\frac{m-1}{2} a^2 b SA^{m-1}}{b - e SA^{m-1}}$, hoc est

ut

ut $b - e\,S\,A^{m-1}$ ad $\frac{m-1}{2}\,b$, ſed eſt ratio $b - e\,S\,A^{m-1}$, ad $\frac{m-1}{2} \times b$, minor ratione b ad $\frac{m-1}{2}\,b$, ſeu ratione 2 ad $m - 1$, unde erit C ad c in minore ratione quam eſt $\sqrt{2}$ ad $\sqrt{m-1}$.

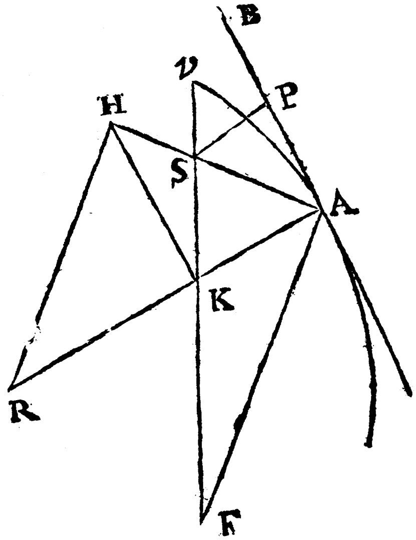
Similiter, ſi capiatur $S\,P = \frac{d_2\,S\,A^{m-1}}{b + e\,S\,A^{m-1}}$, invenietur eſſe C ad c in majore ratione quam eſt $\sqrt{2}$ ad $\sqrt{m-1}$.

Cor. Si corpus in Parabola moveatur, & vis Centripeta tendat ad focum S, erit velocitas corporis, ad velocitatem corporis in eâdem diſtantiâ, circulum deſcribentis ubique ut $\sqrt{2}$ ad 1, nam in eo caſu eſt $m = 2$ & $m - 1 = 1$. Velocitas corporis in Ellipſi eſt ad velocitatem corporis, in circulo ad eandem diſtantiam moti, in minore ratione quam $\sqrt{2}$ ad 1. Velocitas in Hyperbola eſt ad velocitatem in crculo in majore ratione, quam $\sqrt{2}$ ad 1.

Si Corpus in Spirali Nautica deferatur, eſt ejus velocitas ubique æqualis velocitati corporis in eadem diſtantia circulum deſcribentis nam in eo caſu eſt $m = 3$ & $m - 1 = 2$.

PROBLEMA.

Posito quod vis Centripeta (cujus quantitas absoluta nota est,) sit reciproce ut distantiæ quadratum & projiciatur corpus secundam datam rectam cum data velocitate. Invenire curvam in qua movetur corpus.



Projiciatur Corpus secundum datam rectam A B, cum data velocitate C. Et quoniam quantitas absoluta vis centripætæ nota est, dabitur inde velocitas qua corpus possit circulum ad distantiam S A describere urgente eadem vi; est enim æqualis ei quæ acquiritur, dum corpus vi illâ uniformiter applicata urgente, cadit per $\frac{1}{2}$ S A. Sit illa velocitas c. Ex A in A B, erigatur perpendicularis A K, & in ea Capiatur A R, quarta proportionalis ipsis c^2 C^2 & $\frac{SA^2}{SP}$ & erit A R, radius curvaturæ in A. Ex R in A S demittatur perpendicularis R H & ex H in A R perpendicularis H K, & ducta recta S K, dabit axis positionem; Fiat angulus F A K = angulo S A K. Et si F A sit ad S K Parallela figura in qua movetur corpus erit Parabola. Si autem Axi S K occurrat in F; & puncta S & F, cadant ad eandem partem puncti K, figura erit Hyperbola.; sin ad contrarias partes cadant puncta S & F, erit figura Ellipsis, unde focis S & F & Axe = S A + F A describetur sectio, in qua corpus movebitur.