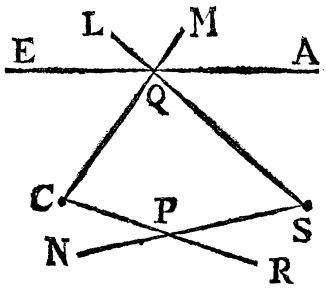
V. *Nova Methodus Universalis Curvas Omnes cujuscunque Ordinis Mechanicæ describendi sola datorum Angulorum & Rectarum Ope.* Per Colin Maclaurin *in Collegio Novo* Abredonensi *Matheseos Professore.*

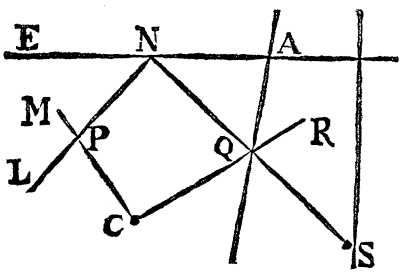
INter innumera sublimiaque Magni *Newtoni* inventa, quibus Geometria amplissime ditata in immensam excrevit luculentissimæ Cognitionis molem, Constructionem exhibuit Curvarum Mechanicam, post Enumerationem Linearum Tertii Ordinis, ad finem *Opticæ* editam, arduo summi Viri ingenio dignam; qua simpliciorem & simul adeo Universalem aliam exhibuit Nemo. Methodum vero suam ad Curvas Tertii Ordinis puncto duplice carentes, aut eas altiores Ordinis puncto multiplice destitutas, non extendit; earumque descriptionem Problematibus Geometriæ difficilioribus annumerandam pronuntiat. Atque hinc in spem venio Methodum sequentem, qua Curvæ Geometricæ cujuscunque Ordinis, licet puncto duplice aut multiplice quovis destitutæ, construuntur, non fore Geometris ingratam.

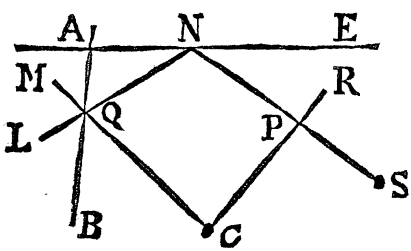
I. Lineæ primi Ordinis ipsæ sunt Rectæ; quæ in uno solo puncto sibi mutuo occurrere possunt. Lineæ secundi Ordinis sunt Sectiones Conicæ, quæ in pluribus punctis quam duobus à rectâ quavis secari non possunt. Fæ vero omnes secundum Lemma 21. Lib. I. *Princip.* D. *Newtoni* sic construi possunt. Circa data duo puncta



C & S moveantur Anguli dati M C R, L S N; ita ut Crurum C M S L concurſus ſemper ducatur per rectam indefinitam poſitione datam A E; tunc crurum aliorum C R & S N concurſus in P deſcribet Lineam ſecundi Ordinis ſeu Sectionem Conicam.

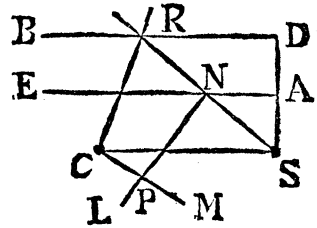
II. Moveatur ut prius Angulus M C R (*v. Fig.* 2.) circa datum punctum C; Angulus vero datus L N Q ſemper percurrat Angulari ſuo puncto N rectam datam A E, ita ut crus N Q ſemper tranſeat per datum punctum S. 1. Si concurſus crurum C R & S N, tum punctum Q ducatur per rectam infinitam A B, concurſus crurum C M & N L deſcribet Curvam lineam Tertii Ordinis punctum duplex habentem in C. 2. Reliquis manentibus, ſi crurum C M & N L concurſus (*vide Fig.* 3.) ducatur per rectam indefinitam A B: concurſus crurum C R & S N in P deſcribet Curvam Tertii Ordinis punctum duplex habentem in S.



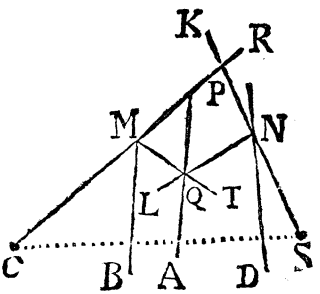


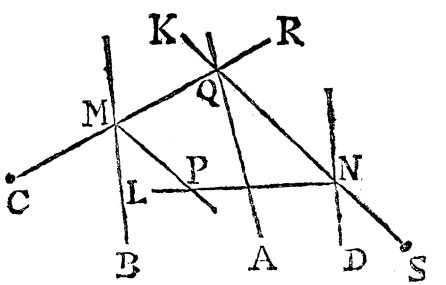
Exem-

Exemplum Caſus 1. Sint anguli MCR. LNS recti, (*vide Fig.* 4) & AE, DB, CS parallelæ; ſint quoque SA & SD normales reſpective in rectas AE & DB; ſitque SD = 2SA. Hiſce poſitis, ſi SD ſit minor recta CS, Curva ſecundum regulam Caſus primi deſcripta, erit Parabola Nodata cum Ovali, Speciei 68*væ* Curvarum D. *Neutoni*; Quod ſi SD = CS, Ovalis evaneſcit & nodus evadit Cuſpis, atque Curva deſcripta erit Parabola *Neiliana* ſeu ſemicubica; Si vero ſit SD major quam CS, erit Curva Parabola punctata Campaniformis Speciei 69*na*.



III. Moveantur Anguli dati RMT, KNL, ita ut puncta M & N percurrant rectas indefinitas BM, DN reſpective; & crura RM, KN ſemper tranſeant per data puncta C & S. Si primo Crurum MT & NL concurſus Q ducatur per rectam indefinitam AQ; tunc concurſus crurum MR & NR in P deſcribet lineam Quarti Ordinis puncta duo duplicia habentem, alterum in C alterum vero in S. Sed ſecundo ſi crurum MR & NK (*vide Fig.* 6.) concurſus ducatur per rectam indefini-

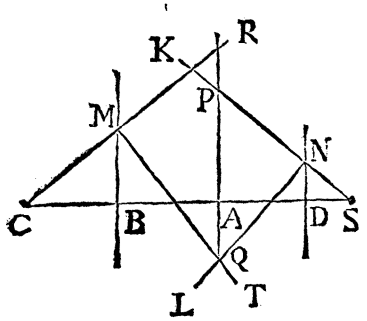




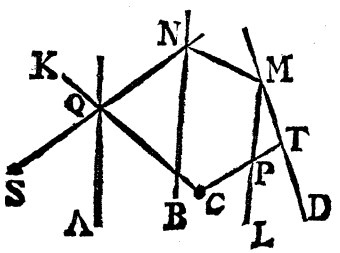
tam

tam A Q; tunc concurſus crurum M T & N L deſcribet Lineam Quarti Ordinis puncto duplice carentem.

IV. Quod ſi in primo caſu hujus Conſtructionis (*v. Fig.* 5.) rectæ C M R, S N K, una coincidant cum C S; tunc puncta C & S evadunt ſimplicia & Curva erit Tertii Ordinis abſque puncto duplice. Exemplum. Sint rectæ B M, A Q, D N, ſibi mutuo parallelæ atque omnes perpendiculares in C S. Sint quoque Anguli R M T, K N L recti, & ſi ſecundum regulam primi Caſus deſcribatur Curva, Crura C M R, S N K una coincident cum C S; & hac conſtructione deſcribi poſſunt Curvæ D. *Newtoni* 10, 11, 20, 21, 40, ſecundum varias poſitiones punctorum C & S reſpectu trium rectarum B M, A Q, D N; Omnes vero hæ Species puncto duplice carent.

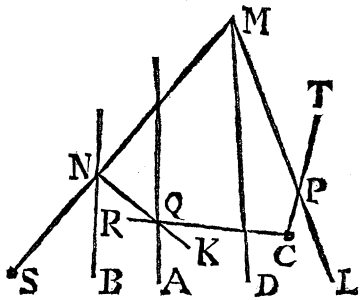


V. Lineæ vero Quarti Ordinis quæ punctum triplex habent ſic conſtrui poſſunt. Sint tres rectæ A Q, B N, D M poſitione datæ; ſint etiam Anguli Q C T, S N M & N M L dati & invariabiles; percurrant puncta N & M rectas B N & D M, ita ut crus N Q ſemper tranſeat per datum punctum S. Revolvatur Q C T circa C ita ut concurſus crurum C K, S N percurrat tertiam rectam A Q; tunc concurſus



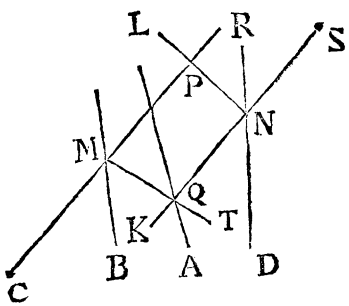
ſus crurum C T, M L deſcribet Lineam Quarti ordinis punctum triplex habentem in C.

VI. Oſtendi quo pacto Lineæ Quarti Ordinis deſcribi poſſunt, quæ punctum triplex habent aut duo duplicia; Aliæ quæ unicum habent punctum duplex ſic commode deſcribuntur.



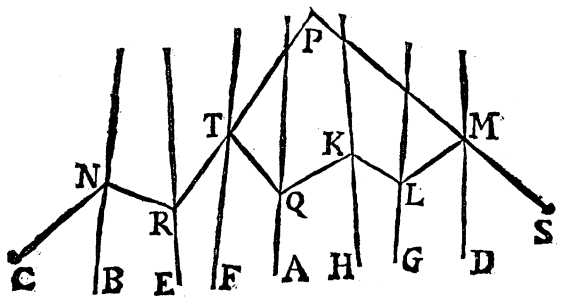
Sint tres rectæ ut prius poſitione datæ, A Q, B N, D M, dentur etiam Anguli S N K, S M L, R C T; ſint puncta N, M & S ſemper in eadem recta linea; Moveantur puncta N & M ut prius per rectas B N, D M; Si concurſus crurum C R, N K ducatur per rectam indefinitam A Q, tunc concurſus crurum C T, M L deſcribet Lineam Quarti Ordinis habentem punctum duplex unicum in C. Hæ vero duæ ultimæ Propoſitiones novas Methodus ſuppeditant lineas Tertii Ordinis deſcribendi, tum quæ puncta duplicia habent, tum quæ iis deſtituuntur; Eæ vero in brevi hoc Methodus Noſtræ ſpecimine ſunt omittendæ.

VII. Maneant Anguli atque rectæ ut in *Prop.* III. Concurſus vero nunc rectarum M T, N K ducatur per indefinitam rectam A Q; & Concurſus crurum M R & N L deſcribet Lineam Quinti Ordinis punctum quadruplex habentem in S. Habeo etiam alias Methodus curvas deſcribendi Quinti Ordinis, quæ punctum habent triplex, duplex, aut duo duplicia, vel nulla niſi puncta ſimplicia; ſed



hæc ſufficiant ad ſimplicitatem & univerſalitatem Methodus demonſtrandam. Notandum vero in ſpecialibus ſimplicioribus Angulorum & rectarum circumſtantiis, Lineam aliquando migrare in curvam ordinis inferioris quam in *Prop.* explicatur; Imo ſingulæ Propoſitiones Methodus ſuppeditant particulares, curvas aliquas ordinis cujuſcunque inferioris deſcribendi.

VIII. *Propoſitio Generalis.* Sumantur ad libitum Rectæ in eodem plano ubicunque poſitæ, quarum ſit numerus (*n*) ut B N, E R, F T. Sumantur etiam ad libitum aliæ rectæ ut D M, G L, & H K *&c.* quarum ſit numerus



(*m*). Sint Anguli C N R, N R T, R T Q *&c.* atque anguli S M L, M L K, L K Q *&c.* invariati, dum puncta angularia N, R, T, M, L, K, percurrant rectas indefinitas B N, E R, F T, D M, G L, H K; Ducatur concurſus crurum T Q & K Q per rectam indefinitam A Q; Invenire ordinem curvæ quam concurſus cruris S M cum aliqua rectarum C N, N R, R T, T Q *&c. ex. gr.* cum R T, perpetuo tanget.

In Serie rectarum C N, N R, R T, T Q *&c.* denotet *s* numerum rectæ R T, cujus concurſu cum S M Curva eſt deſcribenda, à C N incluſive; qui in hoc caſu eſt ternarius: erit Curva ordinis quem exprimit numerus

rus $s\,m + s + n + 1$: unde in caſu quem figura deſignat, cum $s = m = n = 3$ erit Curva ordinis 16^{ti}.

In his deſcriptionibus Rectas ſolummodo atque Angulos dari poſtulavimus; ſed facilius ſæpe ſimpliciorum Curvarum ope complexiores deſcribuntur; atque Propoſitiones his non minus Univerſales huc pertinentes inveſtigavi: Eas vero cum harum demonſtrationibus utpote prolixis impræſentiarum omitto; Eaſd poſtea publici juris facturus, ſi luce non videantur hæc Geometris indigna.

VI. *Extract of a Letter of the Reverend Mr.* William Rice, *Rector of* Caerleon *upon* Usk, *to* Charles Williams *Eſq; giving an account of an ancient* Roman *Inſcription lately found there. With ſome Conjectures thereon, by the Reverend Dr.* John Harris, *S. T. P.* and *R. S. S.*

Sir,

A Perſon laſt Week being at Plow in a Cloſe near the Bank of the River *Usk*, which the Ancients called *Iſca*, (which glides by us about a quarter of a Mile off and in ſight of this Town) came thwart a Stone, and finding Letters thereon, took it up whole; 'tis about a Yard in length, and about three Quarters broad. I went to the place, and took a true Copy thereof, which I here make bold to ſend you. There was underneath it ſome ſeeming Oblong Square Sepulcher of Stones, rude in order. A little further in that Cloſe, where that River wears out the Land, there was, ſome time before, a large Earthen Pot taken out of the Bank by the River-ſide, which had therein the Scull and Bones of ſome Perſon, by ſome thought to be a Child Murther'd; But I rather conjecture it a *Roman* Urn.

Caerleon, March 21. 1717.

Your humble Servant,
William Rice.