

# Fragment of "An account of the Differential Method from the year 1677 inclusively"

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## An Account of the Differential Method from the y{e}ar 1677 inclusively<sup>[1]</sup>

② M<sup>r</sup> James Bernoulli in the Acta Eruditorum mensis Ianuarij 1691 pag. 14, gave an account of the Differential method in these words Quanquam, ut verum fatear, qui calculum Barrovianum (quem decennio ante [i.e. ante annum 1784] in Lectionum inibi contentarum farrago) intellexerit alterum a Dn. Leibnitio inventum ignorare vix poterit; utpote qui in priori illo fundatus est, & nisi forte in differentialum notatione & operationis aliquo compendio ab eo non differt.. ① And that very candid Gentleman the Marquis de L'Hospital in the Introduction to his Analysis, tells us that M<sup>r</sup> Fermat found a method of Tangents which Des Cartes allowed to be often better then his own. That D<sup>r</sup> Barrow made it more simple & adopted a proper calculation to it, but this was still wanting, viz to exclude fractions & radicals in using this method. In default of which the calculus of M<sup>r</sup> Leibnitz succeeded who began where D<sup>r</sup> Barrow left off.

These two Gentlemen knew nothing of what M<sup>r</sup> Leibnitz had received from England by the means of M<sup>r</sup> Oldenburg. M<sup>r</sup> Leibnitz never acknowledged to them any thing of that kind. In the Acta Eruditorum he never made any acknowledgment of any advantage which he had received either from D<sup>r</sup> Barrow or from M<sup>r</sup> Newton or from M<sup>r</sup> Gregory or from M<sup>r</sup> Collins or M<sup>r</sup> Oldenburg or any body else in England, unless where he could not avoid it. He never acknowledged any thing more of that kind then what was published by D<sup>r</sup> Wallis, & therefore it is but just that the world should know from other hands what he has further received from M<sup>r</sup> Oldenburgh

M<sup>r</sup> Newton in his Letter of 10 Decem. 1672 (a copy of which was sent to M<sup>r</sup> Leibnitz by M<sup>r</sup> Oldenburge amongst the Papers of M<sup>r</sup> Gregory in Iune 1676,) & in his Letters of 13 Iune & 24 Octob. 1676 gave notice to M<sup>r</sup> Leibnitz that he had a method whereof the method of Tangents of Slusius was but a branch or Corollary, & that this Method extended to the abstruser sorts of Problemes about the curvatures, lengths, areas, solid contents, centers of gravity &c of lines & figures & succeeded in mechanical curves as well as in others & proceeded without sticking at surds, & made the method of Series so universal as to reach to almost all Problemes except perhaps some numeral ones like those of Diophantus. And he gave examples of this Method in drawing of Tangents & squaring of Curves & the foundation of this method he comprehended in this sentence exprest enigmatically, Data æquatione quocunque fluentes quantitates involvente fluxiones invenire & vice versa. And a part of the inverse method he exprest enigmatically in this sentence Extrahere Fluentem quantitatem ex æquatione simulo involvente fluxionem ejus. In both which sentences the word fluxiones relates to the second third & following fluxions as well as to the first.

When M<sup>r</sup> Leibnitz received this information he could not at first believe M<sup>r</sup> Newtons Method was so general: for he wrote back in his Letter dated 27 Aug 1676 Quod dicere videmino plerasque difficultates (exceptis Problematis Diophantæis) ad Series infinitas reduci, id mihi non videtur. Sunt enim multa usque adeo mira et implexa ut neque ab æquationibus pendeat neque ex Quadraturis: qualia sunt (ex multis alijs) Problemata methodi tangentium inversæ; quæ etiam Cartesius in potestate non esse fossus est. And M<sup>r</sup> Newton in his Letter of 24 Octob. 1676 made answer: Vbi dixi omnia pene Problemata solubilia existere; volui de ijs præsertim intelligi circa quæ Mathematici se hactenus occuparunt vel saltem in quibus ratiocinia Mathematica locum aliquem obtinere possunt. Nam alia sane adeo perplexi conditionibus implicata excogitare liceat, ut non satis comprehendere valeamus; et multo minus tantarum computationum anus sustinere quod ista requirerent. Attamen ne nimium dixisse videar, inversa de Tangentibus Problemata sunt in potestate alioque illis difficiliora. Ad quæ solvenda usus sum duplici methodo; una concinniori altera generaliori. Vtramque visum est impræsentia literis transpositis consignare <145v> {ne} propter alios idem obtinentes, institutum in aliquibus mutare cogar [Una method{us} consistit in extractione fluentis quantitatis ex æquatione simul involvente fluxionem ejus: altera tantum in assumptione seriei pro quantitate qualibet {illeg} cognita ex qua cætera commodè derivari possunt, et in collatione terminorum homologorum æquationis resultantis ad eruendos terminos assumptæ seriei] By the words of M<sup>r</sup> Leibnitz Sunt enim multa usque adeo mira et implexe ut neque ab æquationibus pendeant neque ex quadraturis: qualia sunt (ex multis alijs) problemata methodi tangentium inversæ, its manifest that when he wrote his Letter of 27 Aug. 1676 he did not understand the differential method.

Ioachim professed that the father son & {h G.} were una essentia una substantia unaque natura, but said that this unity was collective as many men are collectively said to be one people. & that Peter Lombard made a quaternity three persons & one essence. The IV Lateran Council said that there was not a quaternity because each of the persons were that substance essence or divine nature ut sint distinctiones in personis et unitas in natura.

Peter Lombard who flourished about the middle of the 12<sup>th</sup> century wrote in his sentences that the divine essence wasquædam summa quæ est Pater est filius est spiritus sanctus & illa non est generari neque genita ne{que} procedens. And gives this reason for his op. Divina essentia Non genuit essentiam ne seipsan genuerit. . By these last words he seems to have taken the Divine essence not for an individual substance but for a species For because a substance generates a substance but a species does not generate a species & yet he spaks of this essence as a subsistence or being..

Ioachim the Abbot who placed the unity of the persons in the unity of will mind, & consent (as when many men are called one people & many faithful one Church,) of reprehended him as if he made a quaternity in the Deity instead of a Trinity, three persons & one summa res And sometime after the Lateran Council composed of 412 Bishops which met at Rome A.C. 1215. condemned the opinion of Ioachim & defined that there was a summa res which neither begot nor was begotten nor proceeded, & which was the substance essence or divine nature of the persons, not a fourth thing, but the very persons them selves joyntly & severally, ut distinctiones sint in personis et unitas, in natura which unity they call identitatis in natura unitati an unity consisting in the identity of nature, & say that the father in generating the son gave him his substance, not part thereof but the whole, so that the father & son have the same substance, meaning the same nature or essence. And Theodoret: Some of the Montanists deny the hypostases of the divinity as Sabellius, saying like noetus that the father the son & the H.G. are the same. They meane the Montanists K{antæ}

then

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[1] {Reply} {illeg} Bernoull{i} {illeg}