THE CLAIM OF LEIBNITZ
TO THE INVENTION OF THE
DIFFERENTIAL CALCULUS

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DR. H. SLOMAN

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DIFFERENTIAL CALCULUS,

by

DR. H. SLOMAN.

TRANSLATED FROM THE GERMAN WITH CONSIDERABLE
ALTERATIONS AND NEW ADDENDA BY THE AUTHOR.

To

SIR DAVID BREWSTER.

THE

BIOGRAPHER OF NEWTON,

AND THE

REV. J. EDLESTON,

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IS RESPECTFULLY DEDICATED

BY

THE AUTHOR.

GERHARDT: "So it is Leibnitz —— "to whom we owe this. The Chapter "in which the question respecting the "first discoverer of the higher Analysis "has till now been agitated, now disap- "pears from the history of the mathe- "matical sciences. The battle of more "then one hundred years, about the first "discoverer of the Differential Calculus, "is now at its end." *Gerhardt* II. page 82.

GERHARDT: "So ist es Leibnitz — "— — dem wir dies verdanken. Das "Capitel, in welchem die Frage über "den ersten Entdecker der höheren Ana- "lysis bisher erörtert wurde, verschwindet "fortan aus der Geschichte der mathema- "tischen Wissenschaften. Der mehr als "hundert jährige Streit über den ersten "Entdecker der Differenzialrechnung ist "zu Ende." *Gerh. Abh.* II. S. 62.

EDLESTON: Synoptical view of Newton's life:

1666 Octob. Small tract on fluxions and fluents with their applications to a variety of problems on tangents, curvatures, areas, lengths, and centres of gravity of curves.

1666 November. Small tract similar to the preceding but apparently more comprehensive. (Notation by points in first and second fluxions, Basis of his larger tract of 1671.) *Edleston* in his Correspondence of Sir I. Newton, 1850, page 21.

LEIBNITZ: Cum Parisiis apulissem anno Christi 1672 eram ergo — — in pene dixerim superba Matheseos ignorantia. *Leibnitz* in Gerhardt's Pamphlet, I, page 29 et 30, line 2.

CHAPTER I.

BARROW AND THE METHOD OF TANGENTS.

From about the year 1650, the vigorous mathematical life, in which England had never been deficient, is seen to receive there an extraordinary impulse, and attain to such a degree of development, that that country became the centre of all the mathematical activity of the period, while in France, after the death of Descartes, there are no important men to name in mathematics.[*]

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[*] Perhaps even Descartes was much indebted to the English Harriot. For not only does the upright Wallis, who would never knowingly have uttered an untruth, affirm this with zealous warmth in many passages of his *Tractatus Algebrae historicus et practicus*, but it was also believed by contemporaries, and at the same time countrymen of Descartes's, who are spoken of in Baillet's *Vita Cartesii*, and by Roberval, *qui s'entretenant un jour avec Milord Cavendish, lui témoignant être inquiet, d'où était venu à Descartes l'idée, d'égaler tous les termes d'une équation à zéro, Milord Cavendish lui dit, qu'il n'ignorait cela que parcequ'il était Français, et lui offrit de lui montrer le livre auquel Descartes devait cette invention. En effet il le mena chez lui, et lui montra l'endroit de Harriot, où l'on voit la même chose; sur quoi Roberval, transporté de joie, s'écria, "il l'a vu, il l'a vu!" et il le publia de toute part.* We quote this out of Montuclat. II., p. 144. When Colbert in 1666 was looking about him for men, out of whom to form an *Académie des Sciences*, he found no geometers or astronomers in France, except the following: viz., Auzout, Buot, Carcavi, Couplet, Frenicle, Niquet, Picart, Richer, Roberval and De la Voye—none of them, with the exception of Roberval, who died soon after, persons of any great eminence. It was on them and their immediate successors that Leibnitz and Bernouilli, who were both their colleagues, pronounced the following judgment: (See Gerhardt's edition of the Math. Works of Leibnitz, p. 814: the earlier editions

Two problems occupied at that time the attention of geometers, namely the problem of Tangents and that of Quadratures, in which Barrow and Wallis, in England, had achieved the most advanced positions.

The two problems had as yet no mutual connexion; for the object contemplated was measure in one of them, and direction in the other. It will be readily understood, that Barrow's method of tangents cannot be left unnoticed in an enquiry like ours; and so indeed a great deal is said respecting him, by the most modern writers in France and Germany—as Biot in the "Journal des Savants," and Gerhardt in his various writings—who have aroused in the present day a lively interest in the question, was Leibnitz the discoverer of the Differential Calculus, and to what extent?

We need not on this point speak at much length. Barrow says,[*] *Nulla est magnitudo, quæ non innumeris modis intelligi producta possit,*

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of the Correspondence do not contain this passage) *Verissimum est, quod de nonnullis Academicis notas—et sane quæ a se habent plerumque sunt mediocria, ne dicam ridicula—et si quid boni edunt, dubitare non licet, quin ab aliis furati sint.*

[*] Compare p. 15 of his principal work, and the one which made the greatest noise at that time, entitled, *Lectiones Geometricæ in quibus præsertim generalia curvarum symptomata declarantur.* Of this work the date is not without importance: it was published in 1670, (and not in 1674, as Gerhardt says in his tract of 1848, p. 15—nor yet in 1672, as he supposes in his tract of 1855, p. 45). That Leibnitz before his discovery of the Differential Calculus either in 1676 or in 1675 or in 1674, should not have read this work, (as Gerhardt affirms in the place quoted,) is inconceivable. Books were not so abundant in those times. Indeed evidences to the contrary are contained in the documents, which Gerhardt himself produces. In App. 1, to Gerhardt's tract of 1848, p. 32, Leibnitz says expressly, that he had seen from Barrow's Lectiones "cum prodirent"—what they contained. This proves that Leibnitz possessed Barrow's book not long after its first appearance, 1670. Gerhardt gives another document, (Tract of 1855, p. 129,) from which the same conclusion may be drawn. This document is, as Gerhardt affirms, dated in Leibnitz' hand-writing 1 Nov., 1675, and therein we have again Leibnitz' own words: *Pleraque theoremata Geometriæ indivisibilium, quæ apud Cavallerium, Vincentium, Gregorium, Barrovium, extant, etc.*