The calculus: its Indian origins and transmission to Europe prior to Newton and Leibniz

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Abstract

The 'standard' story that the calculus was invented by Newton and Leibniz is placed in the context of the systematic manipulation of history as an instrument of Western religious politics. It is proposed to arrive at the truth by rejecting racist authority and forcing the use of a more rigorous and reliable standard of evidence. Newton and Leibniz themselves claimed credit for certain key series expansions known in India from some three centuries before them; and *this* prior Indian work has been publicly known to Western historians for the last two centuries. Nevertheless, a study of the possible transmission of the calculus to Europe was first taken up by this author only in 1995. We point out (1) the *prior line of development* for the calculus in India for at least a thousand years since Āraybhata (b. 476), in relation to precise trigonometric values required for the calendar/agriculture and navigation. This contrasts with the sudden appearance of the calculus, shortly after 1630, in a Europe unprepared to receive it. We also point out (2) the *opportunity* for transmission (through Jesuits and other missionaries in Cochin, since 1500), (3) their *motivation* (knowledge of local customs, Gregorian calendar reform of 1582, and precise trigonometric values needed for the European navigational problem 1498–1760), (4) the *documentary evidence* (from Jesuit letters and literature), and also (5) the *circumstantial evidence* (in the sudden spate of 'European' 'discoveries', after Vasco da Gama, of things long known earlier in India). Finally, there is (6) the *epistemological evidence*: the difficulties in the understanding of the calculus in Europe, for some two centuries after its alleged invention, indicate borrowing without proper understanding. Europeans had encountered strikingly similar difficulties earlier (1000–1600) in understanding the algorismus (elementary algorithms for addition, multiplication, division etc.) known to have been imported from India via Arabs.