

ground-breaking article “King of Siluria” in *Victorian Studies* 25 (1981–82) and his subsequent book *Controversy in Victorian Geology* (Princeton University Press, 1986), and Robert Stafford’s book *Scientist of Empire* (Cambridge University Press, 1990). Along with the work of Martin Rudwick, these studies provide the historical context lacking in Collie and Diemer’s introduction.

But it is by the text itself that such a book stands or falls. For making this important narrative available in such an attractive and (for its quality) inexpensive format, the editors are to be congratulated. ■

Ralph O'Connor is a fellow of St John's College, University of Cambridge, Cambridge CB2 1TP, UK. He is writing *The Greatest Show on Earth: Staging Prehistoric Worlds for the British Public, 1802–1856*.

Theatre

Playing dirty

Calculus

Written by Carl Djerassi
Performed at the New End Theatre, London,
until 28 August 2004

Philip Ball

We don't generally expect our geniuses to be genial, but few are as downright misanthropic as the version of Isaac Newton now in vogue in science histories. He is the villain in Lisa Jardine's *The Curious Life of Robert Hooke* (HarperCollins, 2003) who

tried to more or less erase the hapless Hooke from history. He is an elusive, forbidding presence in James Gleick's popular recent biography *Isaac Newton* (Pantheon, 2003). And Stephen Hawking, who now occupies Newton's chair at Cambridge, has accused him of being vindictive, arrogant and prone to petty arguments.

In Carl Djerassi's new play, *Calculus*, Newton appears just once — as a monster who browbeats Queen Anne's physician John Arbuthnot with furious silences. But this may not be the real Newton after all: his appearance features in a play within a play, written by architect John Vanbrugh and theatre manager Colley Cibber to reveal the 'truth' about Newton's dealings with the Royal Society in his dispute with Gottfried Wilhelm Leibniz.

Djerassi has used this device before in his play *Oxygen* (2001), which was also about priority disputes in the history of science. It is a useful way of dealing with the complexities of the issues. It allows Cibber to anticipate the audience's dismay (and indeed I sensed such a response) at having to hear about the calculus, the mathematical technique devised independently by Newton and Leibniz. It also lets Cibber and Vanbrugh impersonate the two protagonists as they argue over the details. The problem is that Arbuthnot's final revelation to Cibber about the source of his play's material forces us to doubt whether what we have just witnessed is any reflection of what really transpired when the Royal Society was called upon to adjudicate in the dispute.

Ultimately, however, *Calculus* struggles with the fact that there is just not quite enough at stake here to sustain the drama. The dialogue is crisp and the staging attractive, but the central event — Newton's manipulation of the Royal Society — is not inherently theatrical and does not generate sufficient tension. (I did, however, enjoy the portrayal of the eminent French mathematician Abraham De Moivre as a gluttonous reprobate.)

Newton called his version of the differential calculus 'fluxions'. He developed it in the 1660s, when he was in his twenties, but like so much of his work, he declined to publish it until it seeped out in the first version of the *Principia* in 1687. But when Leibniz visited London in 1673, it became clear to Henry Oldenburg, secretary of the Royal Society, that trouble lay ahead, for the German mathematician had devised a similar method. Newton was persuaded to write to Leibniz in 1676 to point out his prior work, and although the two men corresponded amicably enough for the next year, they reached no agreement. Leibniz published his own version of the calculus in 1684, but it was not until 1699 that the real arguments began. That was when Newton's friend Fatio de Duillier more or less accused Leibniz of plagiarism.

Djerassi wisely avoids trying to resolve this dispute. Rather, his play centres on the deliberations of a Royal Society committee appointed in 1712 to pronounce on the priority issue. Newton was the society's president at the time, so it was no surprise that most of the committee's 11 members were his supporters. But he took no chances, drafting the committee's report himself (it stated that “we reckon Mr Newton the first inventor” of the calculus) and simply presenting it to them for signing. They duly approved it, and Newton stepped in again to take care of the printing. Leibniz knew nothing of the process until the declaration was distributed to scholars all over Europe.

It was surely one of Newton's most deplorable acts. Djerassi looks at the ways that the committee members wrestled with their consciences, and at how considerations of nationalism, religion and personal politics coloured their behaviour. But in the end, the play's broader question is about scientific reputation: is it better to reveal science's shameful secrets or to preserve its appearance of authority? Djerassi says that he was himself accused of “washing dirty lab coats in public” after writing his earlier fictional books on scientific research. Mercifully we no longer seem compelled to sanitize the history and sociology of science in the way that David Brewster did with his 1831 hagiography of Newton, in which he meticulously excised all mention of the great man's interests in alchemy and astrology. ■

Philip Ball is a consultant editor for Nature.



A play within a play: Colley Cibber and John Vanbrugh make a point about Newton in *Calculus*.