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(*b*. 1620; *d*. Westminster, London, England, 5 April 1684)

mathematics.

Brouncker's father was Sir William Brouncker, who was created viscount of Castle Lyons, Ireland, in September 1645; the father died the same November, and was succeeded by the son. The title passed to William's brother Henry in 1684, and since both were unmarried, became extinct when Henry died in 1687. William's mother was Winefrid, daughter of William Leigh of Newenham, Warwickshire.

Brouncker entered Oxford University at the age of sixteen and showed proficiency in mathematics, languages, and medicine. He received the degree of Doctor of Physick in 1647, and for the next few years devoted himself mainly to mathematics.

He held several offices of prominence: Member of Parliament for Westbury in 1660, president of Gresham College from 1664 to 1667, commissioner for the navy from 1664 to 1668, comptroller of the treasurer's accounts from 1668 to 1679, and master of St. Catherine's Hospital near the Tower from 1681 to 1684.

Brouncker was the king's nominee for president of the Royal Society, and he was appointed without opposition—at a time when there were many talented scientists. He was reappointed annually, and he guarded his position zealously, possibly holding on to it for too long. He resigned in 1677, in effect at the suggestion of an election, and was succeeded by Sir Joseph Williamson. He was an enthusiastic supporter of the society's bias toward experimentation and was very energetic in suggesting and assessing experimental work until Hooke took over that job. Sprat's history records two experiments performed by Brouncker, one on the increase of weight in metals due to burning and the other on the recoil of guns.

His major scientific work was undoubtedly in mathematics. Much of his work was done in correspondence with John Wallis and was published in the latter's books.

One of Wallis' major achievements was an expression for π in the form of an infinite product, recorded in his *Arithmetica infinitorum*. This book states that Brouncker was asked to give an alternative expression, which he did in terms of continued fractions, first used by Cataldi in 1613, as

from which he calculated π correct to ten decimal places.

In an exchange of letters between Fermat and Wallis, the French mathematician had proposed for general solution the Diophantine equation $ax^2 + 1 = y^2$. Brouncker was able to supply an answer equivalent to $x = 2r/r^2 - a$, $y = r^2 + a/r^2 - a$, where r is any integer, as well as another answer in terms of continued fractions.

A paper in the *Philosophical Transactions* (**3** [1668], 753–764) gives a solution by Brouncker of the quadrature of a rectangular hyperbola. He arrived at a result equivalent to

and found similar infinite series related to this problem. In order to calculate the sum, he discussed the convergence of the series and was able to compute it as 0.69314709, recognizing this number as proportional to log 2. By varying the problem slightly, he was able to show that 2.302585 was proportional to log 10.

Brouncker also improved Neile's method for rectifying the semicubical parabola $ay^2 = x^3$ and made at least three attempts to prove Huygen's assertion that the cycloidal pendulum was isochronous. A letter from Collins to James Gregory indicates that Brouncker knew how to "turn the square root into an infinite series," possibly an allusion to the binomial series.

Brouncker was a close associate of Samuel Pepys, socially and professionally, and is mentioned many times in the *Diary*. Pepys valued his friendship highly, but sometimes doubted his professional ability. Brouncker shared with Pepys an interest in music, and his only published book is a translation (1653) of Descartes's *Musicae compendium* with notes as long as the work itself, including a mathematical attempt to divide the diapason into seventeen equal semitones.

His fame as a mathematician rests largely on an ability to solve problems set by others. If he had devoted himself more fully to his own studies, he would undoubtedly have been one of the best mathematicians during a period in which talent abounded.

A portrait by Sir Peter Lely is in the possession of the Royal Society.

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John Dubbey