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(*b*. **Bath, England, 1707** ; *d*. Fort St. David, India, 29 July 1751) *mathematics, military engineering*.

Robins probably is best known as the inventor of the ballistic pendulum. Today the device is used to demonstrate conservation of momentum as well as for the purpose to which Robins put it: to determine the muzzle velocity of bullets. Robins needed experimental confirmation of his theoretical computations.

Born of Quaker parents, Robins never showed an inclination for pacifism. Trained as a teacher, lie soon left that profession for mathematics and for ballistics and fortifications. In 1727 he published an article in the *Philosophical Transactions of the Royal Society*, a demonstration of the eleventh proposition of Newton's *Treatise on Quadratures*. Although the *Dictionary of National Biography* asserts that he accomplished the work without help, it is doubtful that Newton missed passing on it. Robins became one of Newton's most adamant defenders, often to the point of indelicacy. Much of his writing was devoted to attacks on Newton's enemies—Leibniz, the Bernoullis, Berkeley, and James Jurin. Robins took part in the celebrated *vis viva* controversy, the subject of most of his polemics.

Robins' best-known work, *New Principles of Gunnery*, appeared in 1742. Euler translated it into German in 1745, adding his own commentary. It was also translated into French in 1751. It was there that Robins described the ballistic pendulum. His other work on ballistics was far from trivial, including studies of the resistance of fluid media to high-speed objects, pressures on projectiles inside a gun barrel, the rilling of barrel pieces, and the shape of actual, as opposed to ideal, trajectories. For his service he was awarded the Copley Medal in 1747. His last work consisted of investigations of rockets for the purpose of military signaling.

Robins never married. He died in India, where he had gone to assist the British East India Company in renovating fortifications.

BIBLIOGRAPHY

I. Original Works. Robins published only two articles in the *Philosophical Transactions of the Royal Society*: "Demonstration of the Eleventh Proposition of Sir I. Newton's Treatise of Quadratures," **34** (1727), 230–236; and "On the Height to Which Rockets Will Ascend," **46** (1749), 131–133; and participated in the research for John Ellicott, "An Account of Some Experiments … to Discover the Height to Which Rockets May Be Made to Ascend," **46** (1750), 78–584. His major work remains *New Principles of Gunnery* (London, 1742). The most valuable collection or his writings was published by a friend ten years after his death: *Mathematical Tracts of the Late Benjamin Robins*, James Wilson, ed., 2 vols. (London, 1761). This collection contains Robins" book on gunnery, the polemics on the *vis viva* controversy and other articles read to the Royal Society but until then unpublished, reprints of the published articles, and Wilson's personal comments on the life and character of his old friend.

II. Secondary Literature. There is almost nothing except occasional mention of Robins in general histories. There are accounts of his life in British biographical series, most notably the *Dictionary of National Biography*. No full biography has been published.

J. Morton Briggs, Jr.