Atwood, George | Encyclopedia.com

(*b*. England, 1745; *d*. London, England, July 1807)

mathematics, physics.

Atwood attended Westminster School and was awarded a scholarship to Trinity College, Cambridge, at the age of nineteen. He graduated with a B.A. in 1769, received his M.A. in 1772, then became a fellow and tutor at his college. His lectures were well attended and well received because of their delivery and their experimental demonstrations. These experiments, published in 1776, the year he was elected a fellow of the Royal Society, consisted of simple demonstrations to illustrate electricity, optics, and mechanics.

Among his admirers was William Pitt, who in 1784 gave Atwood an office in the treasury, at £500 a year, so that, according to an obituary in the *Gentleman's Magazine*, he could "devote a large portion of his time to financial calculation" in which he was apparently employed "to the great advantage of revenue." His only published work in this connection was *A Review of the Statutes*... (1801), in which he analyzed the cost of bread. The price that the baker could charge for a loaf of bread was governed by statute and was determined by the cost of grain plus an allowance for profit. Central to the problem was how much grain was required to make a loaf of bread. Atwood's work, an attempt to rationalize the standards, was based on computation as well as on the results of experiments carried out by Sir George Young in 1773.

The work for which Atwood is best known and which bears his name—Atwood's machine—is described in *A Treatise on the Rectilinear Motion*... (1784), which is essentially a textbook on Newtonian mechanics. Atwood's machine was designed to demonstrate the laws of uniformly accelerated motion due to gravity and was constructed with pulleys, so that a weight suspended from one of the pulleys descends more slowly than a body falling freely in air but still accelerates uniformly.

Most of Atwood's other published work consisted of the mathematical analysis of practical problems. In "A General Theory for the Mensuration..." (1781), he derived equations for use in connection with Hadley's quadrant; and in "The Construction and Analysis..." (1796) and "A Disquisition on the Stability of Ships" (1798), he extended the theories of Euler, Bougier, and others to account for the stability of floating bodies with large angles of roll. For "The Construction and Analysis..." he was awarded the Copley Medal of the Royal Society. His work on arches, *A Dissertation on the Construction and Properties of Arches* (1801), based on the assumption that the material of an arch is perfectly hard and rigid and that the only critical forces are those relating to the wedging action of the individual arch units, is now totally superseded. It was published with a supplement containing Atwood's questions about the proposed new London Bridge over the Thames, which was to be of iron.

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Atwood's works are *A Description of the Experiments Intended to Illustrate a Course of Lectures on the Principles of Natural Philosophy* (London, 1776); "A General Theory for the Mensuration of the Angle Subtended by Two Objects, of Which One Is Observed by Rays After Two Reflections From Plane Surfaces, and the Other by Rays Coming Directly to the Spectator's Eye," in *Philosophical Transactions of the Royal Society*, **71** , part 2 (1781), 395–434; *An Analysis of a Course of Lectures on the Principles of Natural Philosophy* (Cambridge, 1784), a revised version *of A Description of the Experiments...; A Treatise on the Rectilinear Motion and Rotation of Bodies With a Description of Original Experiments Relative to the Subject* (Cambridge, 1784); "Investigations Founded on the Theory of Motion for Determining the Times of Vibration of Watch Balances," in *Philosophical Transactions*, **84** (1794), 119–168; "The Construction and Analysis of Geometrical Propositions Determining the Positions Assumed by Homogeneal Bodies Which Float Freely, and at Rest, on the Fluid's Surface; Also Determining the Stability of Ships and of Other Floating Bodies," *ibid*., **86** (1796), 46–130; "A Disquisition on the Stability of Ships," *ibid*., **88** (1798), 201–310; *A Dissertation on the Construction and Properties of Arches* (London, 1801); and *Review of the Statutes and Ordinances of Assize Which Have Been Established in England From the Fourth Year of King John, 1202 to the Thirty-seventh of His Present Majesty* (London, 1801).

Eric M. Cole