Sir Christopher Wren | Encyclopedia.com

(b. East Knoyle, Wiltshire, England, 20 October 1632 ; d. London, England, 25 February 1723)

mathematics, architecture.

Wren came from a family with strong ecclesiastical traditions. His father, for whom he was named, was rector of East Knoyle, chaplain to Charles I, and later (1634) dean of Windsor. His uncle, Matthew Wren, was successively bishop of Hereford, Norwich, and Ely. Wren was frail as a child, yet even in his earliest years he manifested an interest in the construction of mechanical instruments that included a rain gauge and a "pneumatic engine." He was educated at Westminster School, whence he proceeded in 1649 to Wadham College, Oxford. There he became closely associated with John Wilkins, who was later bishop of Chester and a member of that distinguished group whose activities led to the formation of the Royal Society. At Wadham College, Wren's talent for mathematical and scientific pursuits soon attracted attention. He graduated B.A. in 1651, and three years later received the M.A. He was elected a fellow of All Souls College, Oxford, in 1653 and remained in residence there until 1657.

Wren's interest in astronomy appears to have manifested itself about that time,and it led to his appointment, as professor of astronomy at Gresh–am College in 1657. In his inaugural lecture, after mentioning the relation of astronomy to mathematics,to theology in the interpretation of the Scrip–tures, to medicine, and above all tonavigation, he praised the new liberty in the study and observation of nature, and the rejection of the tyranny of ancient opinions. He retained this professorship until 1661, when he was appointed Savilian profesor of astronomy at Oxford, a post he occupied until 1673.

Wren is best remembered as an architect. His fame as the most distinguished architect England has produced probably has obscured his accomplishments in other branches of science. He was perhaps the most accomplished man of his day. While at Oxford he ranked high in his knowledge of anatomy; and his abilities as a demonstrator in that subject were acknowledged with praise by Thomas Willis in his *Cerebri anatome,* for which Wren made all the drawings. Wren also is said to have been the pioneer in the physiological experiments of injecting various liquids into the veins of living animals (Wels, *History,* I, 273).

Wren made important contributions to mathematics; and Newton, in the second edition of his *Principia* (1713), classed him with John Wallis and Christiaan Huygens as the leading geometers of the day ("Christopherus Wrennus, eques auratus, geometrarum facile proncipes," p. 19). Chief among his contributions was his rectification of the cycloid. This curve, because of its singularly beautiful properties, had long been a favorite of geometers since its discovery early in the sixteenth century. Many of its properties had been discovered by Pascal; its rectification, the finding of a straight line equal to an arc of the curve, was effected by Wren in 1658 and also by Fermat.

In 1668 Oldenburg asked Wren, along with Wallis and Huygens, to inform the Royal Society of his research into the laws of impact. In a terse paper read on 17 December 1668 and published on 11 January 1669 in the *Philosophical Transactions,* Wren offered a theoretical solution based on the model of a balance beam on which the impacting bodies are suspended at distances from the point of impact proportional to their initial speeds. Equilibrium in the model corresponds to an impact situation in which bodies approach one another at speeds inversely proportional to their sizes and, Wren postulated as a "Law of Nature," rebound at their initial speeds, which Wren termed their "proper speeds." In cases in which the center of gravity of the system, Wren postulated that impact shifts the center of motion to a point equidistant from the center of gravity on the opposite side. Employing the further postulate that the speed of approach equals the speed of separation, Wren set forth rules of calculation that yield the center of gravity from the known sizes and initial speeds of the bodies, and then use the speeds and the center of gravity to compute the final speeds. The close fit of these resutls with experiment seems to have been the basic source of Wren's confidence in his solution Wren also made a number of pendulum experiments, and Wilkins declared that he was the first to suggest the determination of standard measure of length by means of the oscillation of the pendulum(Weld, *History,* I,196).

Even as a boy Wren had shown that he had the capacity to become a draftsman of exceptional ability. He probably applied himself to the serious study of the subject when he was commissioned to submit plans for the building of the chapel of Pembroke College, Cambridge, which was completed in 1663. His next major achievement was the building of the Sheldonian Theatre. Oxford, a model of which was exhibited before the newly formed Royal Society in April 1663. It was completed in 1669, and in that year Charles II appointed Wren surveyor of the royal works, a post he retained for half a century.

Meanwhile, the Great Fire had given Wren a unique opportunity to display his skill as an architect. Much of the City of London had been destroyed in the conflagration, including the old St. Paul's. This building, ancient and ruinous, had long been

in urgent need of repairs; and just before the fire Wren had been invited by the dean to prepare plans for the building of a new cathedral. Wren's original plans were not approved, so he prepared a second scheme, having meanwhile obtained the concession that he might make such alterations as he deemed advisable. This second scheme was accepted, and a warrant for the building of the cathedral was issued in 1675. The first stone was laid on 21 June 1675, and after many delays the cathedral was finished in 1710.

Much of the City having been destroyed, Wren was invited to submit plans for the rebuilding of some fifty churches consumed in the flames. (These are described in *plarentalia,* 309–318.) At Oxford he built, in addition to the Sheldonian Theatre, the Tom Tower of Christ Church and Queen's College Chapel. At Cambridge, besides the chapel at Pembroke College, he built the library of Trinity College.

Wren received many honors. The University of Oxford conferred upon him the degree of doctor of Civil Laws; Cambridge awarded him the LL.D. In 1673 he was knighted. Wren also represented many constituencies in Parliament at different periods. In 1669 he married Faith Coghill, of Blechingdon, Oxford, by whom he had two sons, oneof whom survived him. On the death of Lady wren he married Jane Fitzwilliam, by whom he had a son had a daughter.

Wren played a prominent part in the formation of the Royal Society of London, which arose out of the informal gatherings of the votaries of experimental science that took place about the middle of the seventeenth century. These gatherings doubtless were inspired by the growing desire for learning that had been stimulated by the writings doubtless were inspired by the growing desire for learning that had been stimulated by the writings of Francis Bacon, notably the *Norrum Organism;* but they also owed much to the institution founded under the will of Sir Thomas Gresham, according to which seven professors were employed to lecture on successive days of the week on divinity, astronomy, geometry, physic, law, rhetoric, and music. Of those whose enthusiasm prompted them to associate themselves with the new venture, the best-known, besides Wren, were Robert Boyle, John Wilkins, John Wallis, John Evelyn, Robert Hooke, and William Petty. The meetings, held at Gresham College, were suspended during the troubled times that followed the Civil War. On the return of Charles II in May 1660. they were revived and the need for a more formal organization was at once recognized. Accordingly, on 28 November 1660 the following memorandum was drawn up: "These persons following . . . mett together at Gresham College to heare Mr. Wren's lecture." At the end of Wren's lecture it was proposed that the meetings should continue weekly. A list was drawn up of those interested; and at a meeting held on 19 December 1660, it was ordered that subsequent meetings should be held at Gresham College.

The charter of incorporation passed the great seal on 15 July 1662(which thus is the date of the formation of the Royal Society); Wren is said to have prepared is preamble A Council was formed, with Wren as one of the members. He was the society's third president, serving from 30 November 1680 to 30 November 1682. *The Record Book of the Royal Society of London* (1940, 18) pays tribute to Wren's Zeal and encouragement despite the difficulties facing the young organization: "To him the Royal Society owes a deep debt of gratitude for the constant and loyal service which he rendered to it in its early days."

Wren also studied meteorology long before it had become an exact science through the work of Mariotte, Boyle. and Hooke. He was one of the earliest naturalists to investigate, by means of the microscope, the structure of insects; and his remarkable skill as a draftsman enabled him to make accurate drawings of what he saw.

Wren was largely instrumental in arranging for the (unauthorized) publication of Flamsteed's *His toria coelestis Britannica* (1712),which had been financed by Prince George, Queen Anne's consort, but had ceased with his death in 1708. When at length printing was resumed, many obstacles were placed in Flamsteedx's way. Wren had been appointed a member of the committee to oversee the printing of the work; and despite much opposition, he gave Flamsteed great encouragement. Nevertheless, Flamsteed's wishes met with little response; and after the work eventually appeared under Halley's editorship, Flamsteed managed to secure three hundred of the four hundred copies printed and at once consigned them to the flames.

In 1718 Wren was superseded as surveyor of the royal works, after more than fifty years of active and laborious service to the crown and the public. He then retired to Hampton Court, where he spent the last five years of his life. He is buried in St. Paul's Cathedral, where a tablet to his memory has been erected.

BIBLIOGRAPHY

I. Original Works. Among Wren's papers that appeared in *Philosophical Transactions of the Royal Society* are "Lex collisionis corporum" (Mar. 1669); "De scription of an Instrument Invented Divers Years Ago scription of an Instrument Invented Divers Years Ago for Drawing the Out-line of Any Objective in Perspective" (1669); "The Generation of an Hyperbolical Cylindroid Demonsstrated, and the Application Thereof to the Grinding of Hyperbolical Glasses" (June 1669); "A Description of Dr. Christopher Wren's Engin Designed for Grinding Hyperbolical Glasses" (Nov. 1669); and "On Finding a Straight Line Equal to That of a Cycloid and to the Parts Thereof" (Nov. 1673)

II. Secondary Literature. See Sir Harold Hartley, ed., *The Royal society: Its Origins and Founders* (London, 1960); *Parentalia, or Memoirs of the Family of Wrens* (London, 1750), compiled by his son Christopher and published by his grandson Stephen; *Record Book of the Royal Society of London*(1940); and C. R. Weld, *History of the Royal Society, 2 vols*. (London, 1848).

For Wren's work on impact, see A. R. Hall and M. B. Hall, eds., *The Correspondence of Henry Oldenburg*, V (Madison, Wis., 1968), 117–118, 125, 134–135, 193, 263, 265, and in particular 319–320 (Wren's paper in the original Latin) and 320–321 (an English translation).

J. F. Scott