Topic Page: Leibniz, Gottfried (1646 - 1716)

Definition: **Leibniz** from *Merriam-Webster's Collegiate(R) Dictionary*

pronunciation

Gottfried Wilhelm Leibniz 1646–1716 Ger. philos. & math.

Leib•niz•ian \līb-■■nit-sē-ən, līp-

pronunciation

\ *adj*

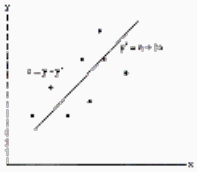

Image from: **least-squares regression** in *Dictionary of Economics, Wiley*

Summary Article: **Leibniz, Gottfried Wilhelm (1646-1716)**
From *The Hutchinson Dictionary of Scientific Biography*

Place: Germany

Subject: biography, maths and statistics

German philosopher and mathematician who was one of the founders of the differential calculus and symbolic logic.

Leibniz was born on 1 July 1646 in Leipzig, where his father was professor of moral philosophy at the university. Although he attended the Nicolai School at Leipzig, most of his early education came from his own reading, especially in the classics and the early Christian writers, in his father's library. At the age of 15 he entered the University of Leipzig, where his formal training was chiefly in jurisprudence and philosophy. Privately, he read all the important scientific texts - of Francis Bacon, Galileo, Johannes Kepler, René Descartes, and others. In 1663 he went to the University of Jena, where he was taught Euclidean geometry by Erhard Weigel (1625-1699). He then returned to Leipzig and after three years more study of law applied for the degree of Doctor of Law in 1666. It was refused on the ground that he was too young. He therefore went to Altdorf, where his thesis ‘De casibus per plexis in jure’ was accepted and the doctorate awarded.

Leibniz turned down the offer of a professorship at Altdorf and decided to travel about Europe. At the end of 1666 he entered the service of the elector and archbishop of Mainz; he was employed chiefly in foreign affairs, his special task being to devise plans to preserve the peace of Europe, just then emerging from the Thirty Years' War. He was invited to France by Louis XIV, to present to him his plan for a French invasion of Egypt (and so transfer war from European to African soil) and although, in the event, he never met the king, he remained in Paris for about three years. It was in Paris that his serious work in mathematics began. He met leading scientists, including Christiaan Huygens, made a thorough study of Cartesianism, and began work on his calculating machine. The machine was completed in about 1672 and was a marked improvement on Blaise Pascal's machine, in that it was able to multiply, divide, and extract roots.

The death of the elector of Mainz in 1673 left Leibniz without an official position. He was offered the post of librarian to the Duke of Brunswick at Hannover, but went instead to London. The visit marked a Turning point in his mathematical life, for it was in London in 1673 that he became acquainted with the work of Isaac Newton and Isaac Barrow and began to work on problems that led to his independent

discovery of differential and integral calculus.

In 1676 Leibniz at last took up the appointment as librarian to the house of Brunswick. He remained in that service for the rest of his life and much of his time was spent in conducting research into the genealogy and history of the Brunswick line.

He also continued to be charged with diplomatic missions and on one of his visits to Berlin he succeeded in persuading the local elector to establish an academy of science. It was founded in 1700 and Leibniz was appointed president for life. From 1712 to 1714 he was an imperial privy councillor at Vienna. In 1714 the elector of Hanover, Georg Ludwig, duke of Brunswick, acceded to the English throne as George I. Leibniz asked to be allowed to accompany him to London, but the request was denied. He therefore spent the last two years of his life engaged in genealogical work, embittered by the dispute with Newton over the invention of the calculus and suffering from gout. He died a neglected man - neither the Royal Society nor the Berlin Academy took any notice of the event - on 14 November 1716 in Hannover.

Just as much of his service to princes consisted in the search for a balance of power and international cooperation in Europe, and as he sought to reconcile in much of his philosophical writing Protestantism and Roman Catholicism, so did Leibniz dream of an international community of scholars, served by academies like that of Berlin, freely sharing their discoveries and continually exchanging their ideas. To this end he worked intermittently throughout his life at devising what he called a Universal Characteristic, a universal language accessible to everyone. It is therefore a matter of some sorrow that he became embroiled in a long and acrimonious dispute about the authorship of the calculus, a dispute that darkened the last 15 years of his life. In 1699 the Swiss mathematician and fellow of the Royal Society, Fatio de Duillier, accused Leibniz of stealing the idea from Newton, a charge that the Royal Society formally upheld in 1711. Leibniz himself never sought to conceal that it was after his 1673 visit to London, by which time Newton had worked out his calculus of fluxions, that he began his investigations into tangents and quadratures, the research that eventually led to his discovery of the calculus. But Newton's discovery, probably made in 1665, was not published for many years and there is no doubt that Leibniz arrived at his calculus independently. As he put it, he, Newton, and Barrow were ‘contemporaries in these discoveries’. Leibniz always communicated his findings to fellow mathematicians; most mathematicians of the time were working on the same problems and they all knew the work that had been done on infinitesimal quantities. At any rate, to Leibniz is due the credit for first using the infinitesimals as differences. To him also is due the credit for working out, like Newton, a complete algorithm and for devising a notation so much more convenient than Newton's that it remains in standard use today.

The idea of the calculus was in the mathematical air. It was Leibniz who expressed its fundamental notions in the most effective manner. That should not be surprising, for Leibniz will always be remembered chiefly as the founder of symbolic logic. Centuries later, it has become clear that his logic, free from all concepts of space and number and hence in his lifetime not recognized as mathematical at all, was the prototype of future abstract mathematics.

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Leibniz, Gottfried Wilhelm (1646-1716). (2018). In Helicon (Ed.), *The Hutchinson dictionary of scientific biography*. Abington, UK: Helicon. Retrieved from https://search.credoreference.com/content/topic/leibniz_gottfried_1646_1716

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