

## William Stanley Jevons

Victorian logician, economist and statistician **William Stanley Jevons** (September 1, 1835 – August 13, 1882) is regarded as one of the founding fathers of economics, and is widely recognized as making great contributions to basing political economy on a theoretical and empirical plane by introducing mathematical methods. In his *General Mathematical Theory of Political Economy*, published in 1866, he wrote:



“... the nature of a Theory of Economy ... will reduce the main problem of this science to a mathematical form. ... A True theory of economy can only be attained by going back to the great springs of human action – the feelings of pleasure and pain. ... Economy investigated

the relations of ordinary pleasures and pains ... Our choice of one course out of two or more proves that, ... this course promises the greatest balance of pleasure. ... Pleasure and pain, of course, are opposed as positive and negative quantities.”

Jevons was born in Liverpool, the ninth of eleven children of an extended family of intellectual and progressive individuals. As Unitarians, they based their religious beliefs on reasoning, an influence that was found in Jevons’s later writings. His father was an iron merchant with a flair for invention and a great curiosity. His mother was much interested in poetry, chemistry, logic, botany and political economy. She died when Stanley [as he preferred to be called] was ten years old and his elder sister Lucy became a substitute mother. As a Unitarian, Jevons was legally barred from attending Oxford or

Cambridge so at the age of fifteen he enrolled at Liverpool Institute High School. In 1851 he entered University College, a Benthamite institution that accepted non-conformists, where he specialized in biology, chemistry and metallurgy. This is not so unusual a curriculum for a future economist as one might think. These studies formed an important “metaphysical background” for Jevons’s scientific economic inquiries. Moreover as he noted, living in London and seeing major social problems firsthand - the squalid living conditions of the city’s poor, the appalling sanitary conditions, the outbreaks of cholera - turned his attention to the workings of society. In a fragment of his manuscript of *The Principles of Economics*, unfinished when he died (published in 1905), he wrote: “It was in 1851 that I first began, at the age of sixteen, to study the industrial mechanism of society.” While at University College he also was greatly influenced by Augustus De Morgan in the study of logic and probability.

The railway boom crisis of 1847 caused the bankruptcy of his father’s business. Because of his family’s financial difficulties, Jevons interrupted his education in 1852 to spend five years in Australia in a well-paying job as an assayer at the new Mint. While “down under” Jevons made good use of his leisure time by making scientific investigations in many different areas: railway policy, land policy, cloud formation, gunpowder and lightning, geology, meteorology, etc. A local dispute over railway funding led Jevons to read Dionysus Lardner’s book *Railway Economy* (1850) that contained a geometric treatment of supply and demand. This work inspired Jevons to begin investigating a “mathematical approach” to economics. In an article for the *The Sydney Morning Herald* (October 7, 1858) he claimed that the character of a city is connected with the character of the inhabitants. In particular he blamed the lack of sanitation of a dirty and unhealthy section of Sydney for the fact that its inhabitants were immoral and drunkards.

After the death of his father Jevons reevaluated the direction of his life, becoming more and more interested in economics, a subject in which he was entirely self-taught. Jevons found Adam Smith’s

*The Wealth of Nations* the driest account of the subject and came to believe that he had a potential for better understanding and explaining “the foundations and nature of the knowledge of man” than others. In a letter to his sister, Jevons claimed to be filled with a “mission to apply myself of such subjects, and it is my intention to do so. . . . to understand the principles of society appears to me now the most cogent business.” Returning to England to devote himself to economics and logic, he received a B.A. in 1860 and a Master’s degree in logic, philosophy and political economy in 1862. That same year Jevons submitted two papers to the British Association meetings at Oxford. The first contained his ideas for introducing mathematical methods and subjective utility into economics. The second was a study of seasonal fluctuations in prices. Jevons became recognized as a writer of the first rank on applied economics and statistics for his brilliant pamphlets, *A Serious Fall in the Value of Gold* (1863) and *The Coal Question* (1865). In the latter, he introduced the “Jevons Paradox,” which asserts that an improvement in the efficiency of resource-use leads to an increase, rather than a decrease, in the use of the resource. In 1866 Jevons was appointed to a chair of political economics at Manchester as well as to a professorship in logic and philosophy. Ten years later he moved to University College, but never comfortable lecturing or speaking in public, Jevons resigned in 1880 in order to concentrate on his writing.

Léon Walras in Switzerland and Carl Menger in Vienna and Jevons, working independently, simultaneously advanced the so-called “marginal revolution.” Each developed the theory of marginal utility to explain consumer behavior. Jevons’ version is contained in *Theory of Political Economy* (1871). The theory of utility holds that the value of each additional unit of a commodity, (the *marginal utility*), is less and less to the consumer. Jevons asserted that the degree of utility of a commodity is some continuous mathematical function of the quantity of the commodity available. His introduction of measurement strategies into economics, described in *The Principles of Science* (1874), was based on the assumption that mechanical laws governed both the natural and the social universe.

In his *Pure Logic* (1863), Jevons improved on the symbolic logic schema pioneered by George Boole and De Morgan, introducing his own system. He advanced the idea that logical problems can be resolved exactly like algebraic equations merely by representing the statements symbolically and then substituting elements with similar properties. In 1870 Jevons introduced his famous “logical piano,” so-called because it was about the size and shape of a small piano, at a Royal Society meeting. It was a primitive computer that could be used to make calculations in Boolean algebra by means of keys, pulleys and switches. It is currently on display at the Museum of Science in Oxford. His most important work in logic was *A Treatise on Logic and Scientific Method* (1874). His *Money and the Mechanism of Exchange* (1875) was written in a popular style for businessmen and students. In it, he states that money has four functions: “a medium of exchange,” “a common measure of value,” “a standard of value,” and “a store of value.” Jevons married Harriet Ann Taylor, one of the daughters of the founder of the *Manchester Guardian*, when he was 32. They had three children. Throughout his life he suffered a great deal from poor health. His life ended tragically on August 13, 1882, when on the last day of a family seaside holiday, he went swimming and drowned in a rough sea.

**Quotation of the Day:** “It is clear that Economics, if it is to be a science at all, must be a mathematical science.” – William Stanley Jevons