

London and the early history of economics and statistics

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Before the foundation of UCL in 1826, the benefits of a university education in England were available only to men and only to those who were members of the Church of England. UCL, the first university established in England after Oxford and Cambridge, was founded to provide academic opportunities to non-Anglicans and placed no restrictions on race, class or religion of its students. In 1878, it also became the first British university to admit women on equal terms to men. Its academic programme was also innovative in its recognition of new disciplines, including many of the social sciences.

The Chair of Political Economy at UCL was created in 1827 in memory of David Ricardo, establishing the first Department of Economics in England. The modern department has an outstanding international reputation in key areas of current research including applied theory, microeconometrics, game theory, labour economics, development economics, macroeconomics, industrial economics and environmental economics.

London has been associated with many pioneers in economics and statistics. Many of these have associations with University College, either as students or teachers there. Below we summarise the place of London in the history of economics, statistics and related sciences until the mid twentieth century.

One of the earliest contributors was the London merchant and mercantilist, *Thomas Mun*¹ (1571-1641) whose emphasis on the importance of the balance of trade in economic prosperity deeply influenced subsequent economic thought. *William Petty*² (1623-1687) was an advocate of data collection and quantitative enquiry in economics and other issues of state whose own exercises in 'political arithmetic' included an attempt to estimate national income and can be seen as early examples of applied econometrics. *John Locke*³ (1632-1704), best known for his contributions to epistemology and political philosophy, wrote also on economics and provided, for example, an early statement of the Quantity Theory of Money.

In 1776 probably the most influential book in the history of economics, *The Wealth of Nations*, was published in London. Its author, the Scotsman *Adam Smith*⁴ (1723-1790) spent most of the previous three years in London debating the book's chapters with friends and refining it for publication. At times also in London was Smith's greatest friend, fellow Scottish philosopher *David Hume*⁵ (1711-1776) who also wrote on economics, arguing, for example, against mercantilism and introducing specie-flow arguments into analysis of international trade.

The late eighteenth century saw London at the centre of intellectual advance in economics. *Jeremy Bentham*⁶ (1748-1832) introduced the notion of 'utility' and developed the utilitarian framework still

¹ Mun was baptized at St Andrew Hubbard in East London – the church was destroyed in the Great Fire of 1666 and was in the current Eastcheap. He lived in the parish of St Helen Bishopsgate and his body is interred in the chancel of the church.

² Petty's will refers to a house in Tokenhouse Yard, Lothbury, now in the City of London, largely destroyed in the Great Fire of 1666. He died in his house in Piccadilly in central London opposite to the church of St James in that street.

³ Locke moved to London in 1667 where he remained until 1674 as physician and political adviser to Lord Ashley (the later Earl of Shaftesbury), living at his residence in Exeter House, located at the current site of the Lyceum Theatre in Exeter Street, central London. He later spent part of the four years from 1679 onwards with Shaftesbury at Thanet House, Aldersgate St (now on the site of Shaftesbury Place). Returning to London after six years of political exile in Holland after the Glorious revolution of 1688, he resided for a short time in Warwick Lane in East London before moving to Dorset Court, Channel Row (now Canon Row, behind Westminster tube station).

⁴ Smith stayed during this time mainly at 27 Suffolk Street, off Pall Mall East. He is known to have frequented the British Coffee-house in Cockspur St, and to have been a member (along with figures such as Samuel Johnson, Charles James Fox, Edmund Burke and Edward Gibbon) of The Club which met at the Turk's Head in Gerrard Street.

⁵ Hume lodged always at the Misses Elliott's boarding house for Scottish gentlemen in first, Lisle St, near Leicester Square, and later, Brewer St, near Golden Square.

⁶ Bentham was born in Houndsditch in the City of London, near to the corner of Creechurch Lane and Duke's Place. His adult life was lived in Westminster in a house at Queen Square Place, the site of which is now occupied by the

underpinning much applied policy evaluation, besides writing occasionally on explicitly economic issues. Living most of his life in London, his ideas influenced the founders of UCL and, according to the terms of his will, his dressed skeleton can still be seen in a glass cabinet in the college's cloisters. Reverend *Thomas Robert Malthus*⁷ (1766-1834) is believed to have worked on his controversial but influential ideas on population and economy while living in London. Among his ideas was that of diminishing returns in production, an idea discovered at the same time by two other London-born thinkers, *Edward West*⁸ (1782-1828) and David Ricardo and by another political economist who came eventually to settle in London, Colonel *Robert Torrens*⁹ (1780-1864).

Arguably the greatest economist of his time, *David Ricardo*¹⁰ (1772-1823) corresponded with both Malthus and Bentham. Born into a Jewish family in east London, he made his fortune in the City's emerging financial quarters before working out his theories of political economy, developing, for instance, ideas of gains from trade and a theory of distribution of factor returns that remain influential. In his thorough application of comparative static ways of thinking to the analysis of economic equilibria he has been said to have "literally invented the technique of economics."

The Ricardian system dominated economic thought in the country for the next half century. The Chair of Political Economy founded in his name at UCL was occupied first by his follower *John Ramsay McCulloch*¹¹ (1789-1864). Also working in London was his adherent *Thomas de Quincey*¹² (1785-1859), now better known for literary memoirs recounting his time as an opium eater. Most influential among his followers however were the London father and son, *James Mill*¹³ (1773-1836) and *John Stuart Mill*¹⁴

Home Office at 50 Queen Anne's Gate, where a recently unveiled green plaque commemorates his memory. Bentham's 'auto-icon' – his preserved and dressed skeleton – can be seen in a glass cabinet in the South Cloisters of UCL. The college's main library has a mural representing Bentham's role in the foundation of the college. The Bentham Project, located in the Department of Laws at UCL (<http://www.ucl.ac.uk/Bentham-Project/>), maintains an extensive archive of Bentham-related material.

⁷ Malthus' letters around the turn of the century, sent from a correspondence address in Great Russell St, refer to his living in "a garret in Town" while working on the second edition of his *Essay on the Principle of Population*.

⁸ West was baptized and married in the parish of St Marylebone in north London.

⁹ Torrens, an Irish nationalist and military man, was drawn to London by political and publishing interests. He died in a house at 16 Craven Hill, Bayswater and is buried in Kensal Green cemetery.

¹⁰ Ricardo was born at 36 Broad Street Buildings, near to the current Liverpool St station – the site is at the south-east corner of the current UBS Investment Bank building at 100 Liverpool St. His family moved when he was very young to nearby 1 Bury St - the road still exists and the house was on the inner corner of the current bend (adjacent to the award-winning "gherkin" shaped Swiss Re headquarters). He would have worshipped at the nearby synagogue which can still be seen in Bevis Marks. His family later moved out to Old Ford, Bow Town, now part of East London. Temporarily estranged from his family as a consequence of marrying a Quaker and himself converting to Unitarianism, he moved to Lambeth, living at 2 Brooks Place, Kennington – the road no longer exists but the site is on the west side of the current Kennington Road roughly opposite the current junction with Windmill Mews. Their marriage was in the church of St Mary's Lambeth. He later moved a short distance to 7 and then 5 New Buildings, Kennington Place – on the site of the current Stannary St. He later moved to a house at New Grove, Mile End, again in East London, at a site now occupied by St Clement's Hospital. Later in life he occupied a larger property at 56 Upper Brook Street in Westminster. This house was demolished after sustaining bomb damage in the war and the site is now occupied by the US Embassy.

¹¹ McCulloch took residence at 4 Southampton St, Fitzroy Square – the site is that of the current Conway Street, within easy walking distance of UCL. He is buried in Brompton cemetery in west London.

¹² De Quincey lived for a time as a near destitute in 1802 in Greek St, Soho. He wrote *Confessions of an English Opium Eater* in 1821 at 4 York St (now 36 Tavistock Street), near Covent Garden, where a blue plaque commemorates the fact. The book is available from booksellers everywhere – many must have been the readers surprised by its passages on Ricardian political economy.

¹³ James Mill lived until 1810 at 12 Rodney St, Pentonville, where his son John Stuart was born, before moving to Newington Green in North London for the years to 1814. From then until 1831 he and his family lived in Queen Square, now Queen Anne's Gate, adjacent to the property owned by Bentham and described under his entry above. Ricardo was a frequent visitor at the address. Mill died in Church St, Kensington and is buried at St Mary Abbots, Kensington where there is a memorial to him.

¹⁴ John Stuart Mill lived with his father at the addresses listed under his entry until his father's death. The property later occupied at 18 Kensington Square, Kensington bears a blue plaque in commemoration. After marriage he moved to a property in Blackheath Park and then moved after his wife's death to a flat at 10 Albert Mansions, Victoria St. There is a statue to his memory on Victoria Embankment near Temple tube station.

(1806-1873) whose works expounded and developed both utilitarian ethics and classical economic theory. Living in London as a political exile, *Karl Marx*¹⁵ (1818-1883) was heavily though not uncritically influenced by Ricardo's theories as he developed his own economic theory working in the Reading Room of the nearby British Museum. *Nassau William Senior*¹⁶ (1790-1864) was an influential critic of Malthus' and Ricardo's assumptions and made important contributions to the theory of international trade. Now better known for his place in the history of computing, *Charles Babbage*¹⁷ (1791-1871), a lifelong Londoner, also contributed around this time to the economic theory of production.

The most eminent figure to hold a professorship of economics at UCL was *William Stanley Jevons*¹⁸ (1835-1882), also earlier a student of the college. Often seen as the main British contributor to the marginalist revolution in economic thought of the 1870s, he challenged Ricardian ideas, seeking for instance to replace theories of value based on labour input with theories based on utility. In his support for the use of mathematical analysis in economics and in his practical use of economic statistics, he can be seen as one of the first exponents of recognisably modern econometric methods. His ideas were influential on later London economists, including *Philip Wicksteed*¹⁹ (1844-1927), Edwin Cannan (1861-1935) and *Lionel Robbins*²⁰ (1898-1984). Among Jevons' friends was *Francis Ysidro Edgeworth*²¹ (1845-1926), later a professor at King's College London, whose own contributions included the idea of the indifference curve and important insights into economic equilibrium, whilst he also made contributions to the earliest developments in mathematical statistics.

In subsequent years economics in Britain was dominated by *Alfred Marshall*²² (1842-1924), who, though he later worked outside the city, was born and educated in London. His approach sought to reconcile classical and modern thought. Among his followers was Arthur Cecil Pigou (1877-1959) who began his career as a lecturer at Kings College London and who made important contributions to analysis of taxation.

¹⁵ Marx lived for a time after arriving in London in 1849 at 4 Anderson St, Chelsea, before moving briefly to a German hotel in Leicester St, off Leicester Square, and then to lodgings at 28 Dean Street, Soho, which are marked by a blue plaque. In 1856 the family moved on to 9 Grafton Terrace in Kentish Town, in 1864 to 1 Modena Villas, Maitland Park and then in 1875 to 41 Maitland Park Road, Hampstead where he later died. The Reading Room where he worked (at seat G7) can be found in the atrium of the British Museum, within walking distance of UCL. An impressive monument can be found at his gravesite in Highgate Cemetery.

¹⁶ Senior practiced law in London before entering academia, living from 1821 onwards at 32 Kensington Square. Amongst the posts held was a brief period as Professor at Kings' College London. He died in London at his house at 13 Hyde Park Gate, Kensington and is buried in Kensal Green cemetery.

¹⁷ Babbage was born at 44 Crosby Row in Newington, South London and a blue plaque marks the site near the junction of Larcom St and Walworth Rd. The family later moved to 10 George St, Adelphi. After marriage he resided for short periods at 31 Arundel St, off the Strand and at 46 Lucas St, Brunswick Square. From 1815 he settled at 5 Devonshire Street, off Portland Place in central London and then at 1 Dorset St, Manchester Square in Marylebone, where he died. His grave can be seen in Kensal Green Cemetery in northwest London. The left hemisphere of his brain is displayed in the Hunterian Museum of the Royal College of Surgeons, Lincoln's Inn Fields.

¹⁸ As a young student Jevons lived at 9 Oval Road and 13 Albert Street, both in Camden Town to the north of the college. Returning to the college later he lived at 8 Porteus Road, near the Little Venice area of Paddington. His final years were lived at 2 The Chestnuts, Branch Hill, Hampstead – the address still exists and oddly bears a blue plaque to one of its later residents, Paul Robeson. Jevons drowned while swimming when on holiday at Hastings and is buried in Hampstead cemetery in north London.

¹⁹ Wicksteed was a student at UCL and at Manchester New College, London. From 1874-1897 he was Unitarian minister at Little Portland St Chapel, a short distance west of the Bloomsbury area.

²⁰ Robbins lived at 10 Meadway Close, Hampstead Garden Suburb in north west London. He died in Highgate, north London.

²¹ Edgeworth and Jevons were known to take walks together on Hampstead Heath. Edgeworth lived in flats at 5 Mount Vernon in Hampstead.

²² Marshall was born in Charlotte Row, Bermondsey near to its unwholesome tannery area – the location, since redeveloped, was to the north side of Long Lane and east of Crosby Row. His family relocated for a time to the Bell Green area of Sydenham in southeast London before moving to the more prosperous area of Clapham. Though the house at 5 Russell Place, Larkhall Rise no longer exists the road is still there. He was schooled at Merchant Taylors School, then in Suffolk Lane in the City of London.

At the turn of the century, the London School of Economics and Political Science was founded and played a major role in economic thought in the following years through figures such as Cannan and Robbins, already mentioned above, and others such as Arthur Bowley (1869-1957),

John Hicks (1904-1989), Abba Lerner (1903-1982), Roy Allen (1906-1983), Friedrich Hayek (1889-1992) and Bill Phillips (1914-1975) – of the Phillips-curve - who made various hydraulic models of the economy, one being on display in the Science Museum.

Perhaps the most influential and well known British economist of the twentieth century was *John Maynard Keynes*²³ (1883-1946). Although academically attached to Cambridge, he associated with a group of aesthetes and scholars known as the Bloomsbury Group named after the Bloomsbury area of London (particularly, Gordon Square) where they met and where the World Congress takes place.

Several of the above figures, such as Petty, Edgeworth and Bowley, also contributed to the history of statistics. Here also London, and especially UCL, has played an outstanding role.

*John Graunt*²⁴ (1620-1674), a friend and collaborator of Petty, studied London mortality statistics, projected population and created the first known life tables. *Abraham de Moivre*²⁵ (1667-1754), tutoring in London as a Huguenot emigré, made several fundamental contributions to the theory of probability including definitions of concepts such as independence and the first use of the normal distribution (which he linked to the binomial distribution in a precursor of the central limit theorem), besides working on problems of annuities. Not known for his contributions to economic theory, though one of the greatest scientists ever, was the Warden/Master of the Mint (from 1696 until his death) *Isaac Newton*²⁶ (1642-1727). Needless to say, his invention of differentiation was not just a milestone for physics, but proved to be indispensable for the development of (mathematical) economics too. It yielded numerous further tools, for instance Taylor's theorem, a creation of *Brook Taylor*²⁷ (1685-1731).

Reverend *Thomas Bayes*²⁸ (1702-1761), best known for the theorem bearing his name, ministered and is buried in London. His work was published after his death by *Richard Price*²⁹ (1723-1791), another dissenting cleric who made contributions of his own to the theory of probability and to many other areas, including actuarial science, social insurance and government finance. *Thomas Simpson*³⁰ (1710-1761), mathematician, also made important contributions to probability and annuities.

Through the nineteenth century, enquiry into public health led to developments in statistical practice. *William Farr*³¹ (1807-1883), an associate of McCulloch, modeled spread of epidemics. His collaboration

²³ Keynes lived for a time at 3 Gower Street, in the vicinity of UCL. A blue plaque at 46 Gordon Square, Bloomsbury, immediately adjacent to UCL, marks Keynes' residence in the area from 1916-1946.

²⁴ Graunt was born in Birchin Lane, east London and died at his later home in Bolt Court. He is buried in the church of St Dunstan-in-the-West at Fleet Street (the church was rebuilt and moved in 1830).

²⁵ De Moivre lived his later years in Westminster and is buried in the church of St Martins in the Fields. He supported himself as a mathematical consultant at Old Slaughter's Coffee-house in St. Martin's Lane.

²⁶ After his years in Trinity College (Cambridge) Newton lived at various London addresses, with a blue plaque at 87 Jermyn Street, Westminster. He is buried in Westminster Abbey, not far from the grave of another world famous scientist, viz. Charles Darwin (1809-1882), whose evolution theory inspired his cousin Francis Galton (see below) to study heredity which induced him to establish empirical bivariate statistical research methods, i.e. regression.

²⁷ Taylor was born in Edmonton, North London. He was buried in the churchyard of St. Anne's in Soho, of which, since the second world war, only the tower remains.

²⁸ Bayes ministered for a time as assistant to his father at the Presbyterian church in Leather Lane, Hatton Garden in central London. He is buried in a family vault in the nonconformist cemetery at Bunhill Fields, City Road, to the north of the City of London.

²⁹ Price studied at Tenter Alley, Moorfields before taking up a post as chaplain in Stoke Newington, north London. He ministered at Poor Jewry Lane (now Jewry St in east London), Newington Green in north London and in Hackney. He, like Bayes, is buried in Bunhill Fields.

³⁰ Simpson worked as a weaver in Spitalfields before gaining a post as mathematician with the Royal Military Academy in Woolwich in 1743.

³¹ Farr practised from 1833 at 8 Grafton St (now Grafton Way), Fitzroy Square. He later lived and died at 78 Portsdown Rd, Maida Vale and is buried at Bromley Common church.

with *John Snow*³² (1813-1858), a London medic, identifying the source of the 1854 cholera outbreak in Broad St to an infected water supply was a landmark in epidemiology. Farr worked closely with *Florence Nightingale*³³ (1820-1910), nurse and national heroine, who made important advances in collection of medical statistics. *William Guy*³⁴ (1810-1885), professor at Kings College London, also contributed to the development of medical statistics. In the late nineteenth century Charles Booth (1840-1916) initiated and oversaw an innovative fifteen year social survey of poverty in London.

In the same era the two early pioneers of matrix algebra were the friends *Arthur Cayley*³⁵ (1821-1895) and *James Joseph Sylvester*³⁶ (1814-1897). Ineligible, because Jewish, for university employment elsewhere in Britain, the latter was professor of Natural Philosophy at UCL from 1838 until 1840. Returning after a time in the US and now practising law, he met Cayley, who was trained as a mathematician too. Later both returned to chairs in mathematics.

The notions of correlation and regression were introduced in the work of the eugenicist, *Francis Galton*³⁷ (1822-1911). The Chair in Eugenics founded at UCL by Galton was first held by *Karl Pearson*³⁸ (1857-1936) who founded the college's Department of Applied Statistics. He continued to explore the ideas of regression and correlation with, for example, George Udny Yule (1871-1951) also then at UCL. Among Pearson's other contributions were both the introduction of the chi-squared test and the method of moments. Also briefly in the department at this time was *William Gosset*³⁹ (1876-1937), discoverer of the t test for a sample mean. Pearson's son, Egon Pearson (1895-1980) followed him into a post at UCL where he met Jerzy Neyman (1894-1981) with whom he developed the theory of hypothesis testing. Pearson's successor at UCL was *Ronald Aylmer Fisher*⁴⁰ (1890-1962) whose many contributions include the application of t and F tests to regression coefficients and proposing the method of maximum likelihood estimation. Meanwhile factor analysis was being developed by *Charles Spearman*⁴¹ (1863-1945) a professor of psychology at UCL. Other UCL statisticians of the early twentieth century included John Wishart (1898-1956), later of Imperial College, and Maurice Kendall (1907-1983), later at LSE and Maurice Bartlett (1910-2002), who succeeded Egon Pearson, but held other positions afterwards.

³² Snow lodged in 1836 at 11 Bateman Buildings, Soho Square (this was a road parallel to and between Frith St and Greek St) and from 1858 at 54 Frith St, Soho. He died at 18 Sackville St, Piccadilly and is buried in Brompton cemetery.

³³ Nightingale worked as a nurse in 1854 living at 47 Harley St in central London. After her time as army nurse in the Crimea she returned to London in 1856, living her later years at 10 South St, Mayfair in central London, where there is a blue plaque to her memory. The Florence Nightingale Museum can be found at 2 Lambeth Palace Road.

³⁴ Guy died at 12 Gordon St, Gordon Square, immediately adjacent to UCL.

³⁵ Cayley was born in Richmond and studied at King's College London. Known addresses are 59 Lee Road and 5 Montpelier Road.

³⁶ Sylvester was born in London and attended University College School. He also held appointments in the US and later in Oxford. He returned to London in 1892 and lived at 5 Hertford Street, Mayfair. He is buried in the Jewish cemetery at Kingsbury Road, Dalston.

³⁷ Galton lived for over fifty years at 42 Rutland Gate (Knightsbridge) where a blue plaque commemorates him. The UCL Department of Biology houses the Galton collection, part of which is on display online at <http://www.galton.museum.ucl.ac.uk/>

³⁸ Pearson was born at 10 Albion Rd (now renamed Furlong Road), off Holloway Road, Islington in north London. A blue plaque can be found on his house at 7 Well Road, Hampstead.

³⁹ Gosset stayed for two terms in 1906-7, living in Wimbledon, south London. He was employed as a chemist by the brewers, Arthur Guinness and Sons and later returned to London to work at the newly opened Guinness plant in Park Royal in west London.

⁴⁰ Fisher was born in Finchley, North London. In 1896 his family moved to Heath House, North End Way, Hampstead, near to Queen Mary's Hospital – the house, now renamed Inverforth House, bears a blue plaque to his memory. About ten years later the family moved to Streatham in south London. For a time after leaving college he worked in the City of London while lodging in Talgarth Road, West Kensington.

⁴¹ Spearman was born at 39 Upper Seymour St (now Seymour St) in Marylebone. In declining health, he took his own life by throwing himself from a fourth floor window of University College Hospital.

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