



Famous Statisticians and Mathematicians

Carol Devore
Brian Gardiner

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Table of Contents

Chapter 1 - Arthur Lyon Bowley and R. C. Bose

Chapter 2 - Harry Campion and Alexander Alexandrovich Chuprov

Chapter 3 - Colin Clark and George Dantzig

Chapter 4 - W. Edwards Deming and Karen Dunnell

Chapter 5 - Ronald Fisher and Stefano Franscini

Chapter 6 - Milton Friedman and Michel Gauquelin

Chapter 7 - Charles Roy Henderson and Joseph Hilbe

Chapter 8 - Leonhard Euler

Chapter 9 - Augustin–Louis Cauchy

Chapter 10 - John Von Neumann

Chapter 11 - David Hilbert

Chapter 12 - Stefan Banach

Chapter 1

Arthur Lyon Bowley and R. C. Bose

Arthur Lyon Bowley

Sir Arthur Lyon Bowley (Bristol, England 6 November 1869 - 21 January 1957) was an English statistician and economist who worked on economic statistics and pioneered the use of sampling techniques in social surveys.

Bowley's father, James William Lyon Bowley, was a minister in the Church of England. He died in 1870 when Arthur was under two, leaving Arthur's mother as mother or stepmother to seven children. Arthur was educated at a well-known school, Christ's Hospital. After a successful career there he won a major scholarship to Trinity College, Cambridge to study mathematics. He graduated as Tenth Wrangler.

At Cambridge Bowley had a short course of study with the economist Alfred Marshall who had also been a Cambridge wrangler. Under Marshall's influence Bowley became an economic statistician. His *Account of England's Foreign Trade* won the Cobden Essay Prize and was published as a book. Marshall watched over Bowley's career, recommending him for jobs and offering him advice. Most notoriously Marshall told him the *Elements of Statistics* contained "too much mathematics."

After leaving Cambridge Bowley taught mathematics at St John's School in Leatherhead from 1893 to 1899. Meanwhile he was publishing in economic statistics; his first article for the journal of the Royal Statistical Society) appeared in 1895. In that year the London School of Economics opened. Bowley was appointed as a part-time lecturer and he would be connected with the School until he retired in 1936. He can be considered one of the School's intellectual fathers. However, he continued to teach elsewhere; for more than a decade he taught at University College, Reading (now the University of Reading). He was the Newmarch lecturer at University College, London (1897–98 and 1927–28). At the LSE he became Reader in 1908, and Professor in 1915. In 1919 he was appointed to a newly established Chair of Statistics, probably the first of its kind in Britain. In Bowley's time, however, the LSE statistics group was very small: E. C. Rhodes arrived in 1924 and R. G. D. Allen in 1928

Bowley produced a stream of studies of British economic statistics, beginning in the 1890s with work on trade and on wages and income, and proceeding to studies of

national income in the 1920s and –30s. Specially noteworthy was his collaboration with Josiah Stamp on a comparison of the UK national income in 1911 and 1924. (Official national income statistics date only from the Second World War.) From around 1910 Bowley worked on social statistics as well. In aim, the work was a continuation of such surveys of social conditions as Charles Booth's "Life and Labour of the People in London" (1889–1903) and Seebohm Rowntree's "Poverty, A Study of Town Life" (1901). The methodological innovation was the use of sampling techniques. Bowley gave a detailed exposition of his approach to sampling in a 62 page paper published in 1926. The culmination of Bowley's work on social surveys was the monumental New Survey of London Life and Labour. Even in the 1930s his research could take a new direction, as when he collaborated with his junior colleague R. G. D. Allen on an econometric study of family expenditure.

The Elements of Statistics is generally regarded as the first English-language statistics text-book. It described the techniques of descriptive statistics that would be useful for economists and social sciences, and in the early editions contained rather little statistical theory. That changed in the enlarged 4th edition of 1920. In statistical theory Bowley was no innovator but drew on the writings of Karl Pearson, Udny Yule and, most importantly, F. Y. Edgeworth. Bowley paid tribute to the master by trying to make his contributions accessible but his 1928 book is possibly more impenetrable than the original. In the 1930s Bowley played the reactionary, informing Fisher that "Professor Edgeworth had written a great deal on a kindred subject" and slapping Neyman down with "I am not at all sure that the 'confidence' [in confidence interval] is not a 'confidence trick.'"

Bowley's teaching presaged several of the EDA ideas later popularised by John Tukey, including stemplots, decile boxplots, the seven-figure summary and trimean.

Bowley's Mathematical Groundwork of Economics was a notable attempt to provide the practising economist (rather than the beginner) with the main ideas and techniques of mathematical economics; it was the first book in English of its kind. One of its successes was to bring the Edgeworth box to the attention of economists generally. Bowley was so successful that this is often referred to as the "Edgeworth-Bowley box".

Bowley received many honours. In 1922 he became Fellow of the British Academy and in 1950 he was knighted. He served on the council of the Royal Economic Society and was president of the Econometric Society 1938-9. The Royal Statistical Society awarded him its Guy Medal in Gold in 1935 and he served as its president 1938-40 .

According to Allen and George, "In personality Bowley was somewhat shy and retiring. He did not readily make friends and his close friendship with Edwin Cannan over many years was an almost unique experience." They recall an anecdote about an occasion when Bowley and Cannan were cycling with Edgeworth. When Edgeworth wanted to discuss a mathematical question Cannan said, "Bowley, let us go a little faster, Edgeworth cannot talk mathematics at more than eight miles an hour."

His daughter Marian Bowley also made an academic career in economics.

Bowley's law

Bowley formulated Bowley's law, which says that the proportion of GNP from labor is constant.

Main publications of A. L. Bowley

(1345)

- A Short Account of England's Foreign Trade in the Nineteenth Century, 1893.
- Wages and Income in the United Kingdom Since 1860, 1900.
- Elements of Statistics, 1901. (4th edition in 1920)
- An Elementary Manual of Statistics, 1909.
- Livelihood and Poverty: a study in the economic conditions of working-class households, with A.R. Bennett-Hurst, 1915.
- The Division of the Product of Industry, 1919
- The Mathematical Groundwork of Economics, 1924.
- Has Poverty Diminished? with M.Hogg, 1925.
- Measurement of Precision attained in Sampling, Bulletin de l'Institut International de Statistique,(1926) 22, Suppl. to Book 1, 1-62. Gallica (after p. 451)
- The National Income 1924 with J. Stamp, 1927.
- Bilateral Monopoly, 1928, Economic Journal.
- F. Y. Edgeworth's Contributions to Mathematical Statistics, 1928.
- New Survey of London Life and Labour, 1930-35.
- Family Expenditure with R.G.D. Allen, 1935.
- Three Studies in National Income, 1939.

There is an extensive bibliography in Allen and George (1957).

Discussions

- Allen, R.D.G. and George R. F. (1957) Obituary of Professor Sir Arthur Bowley. Journal of the Royal Statistical Society, A, 102, 236-241.
- W F Maunder Sir Arthur Lyon Bowley (1869–1957) in Studies in the History of Statistics Probability, (ed. E S Pearson and M G Kendall) 1970. London: Griffin.
- Darnell, A. (1981) A.L. Bowley, 1969-1957, pp. 140–174 in Pioneers of Modern Economics in Britain, (ed. D.P. O'Brien and J.R. Presley) 1981. London: Macmillan.
- Bowley, Arthur Lyon, pp. 277–9 in Leading Personalities in Statistical Sciences from the Seventeenth Century to the Present, (ed. N. L. Johnson and S. Kotz) 1997. New York: Wiley. Originally published in Encyclopedia of Statistical Science.

R. C. Bose

Raja Chandra Bose

Born	June 19, 1901 Calcutta, India
Died	31 October 1987 (aged 86) Fort Collins, Colorado
Fields	Design of experiments (Statistics) Combinatorial design (Combinatorics) Finite geometry
Institutions	Colorado State University, USA, University of North Carolina at Chapel Hill
Alma mater	Calcutta University, India
Known for	Association scheme Bose-Mesner algebra Euler's conjecture on Latin squares

Raj Chandra Bose (June 19, 1901 – October 31, 1987) Indian mathematician and statistician best known for his work in design theory and the theory of error-correcting codes in which the class of BCH codes is partly named after him. He was notable for his work along with S. S. Shrikhande and E. T. Parker in their disproof of the famous conjecture made by Leonhard Euler dated 1782 that there do not exist two mutually orthogonal Latin squares of order $4n + 2$ for every n .

Early life

Raj was born in Hoshangabad, India; he was the first of five children. His father was a physician and life was good until 1918 when his mother died in the influenza pandemic. His father died of a stroke the following year. In very difficult circumstances Bose continued to study coming in first in the M.A. examinations in pure mathematics at the University of Calcutta. He did research under the supervision of the geometer Professor Shyamadas Mukherjee from Calcutta. Bose found a job as a lecturer at Asutosh College, Calcutta. He managed to publish some work on the differential geometry of convex curves.

Academic life

Bose's course changed in December 1932 when P. C. Mahalanobis, director of the new (1931) Indian Statistical Institute, offered Bose a part-time job. Mahalanobis had seen Bose's geometrical work and wanted him to work in statistics. The day after Bose moved

in, the secretary brought him all the volumes of *Biometrika* with a list of 50 papers to read and also Fisher's *Statistical Methods for Research Workers*. Mahalanobis told him, "You were saying that you do not know much statistics. You master the 50 papers ... and Fisher's book. This will suffice for your statistical education for the present." With S. N. Roy, who joined the ISI a little later, Bose was the chief mathematician at the Institute.

He first worked in multivariate analysis where he collaborated with Mahalanobis and Roy. In 1938–9 Fisher visited India and talked about the design of experiments. Roy had the idea of using the theory of finite fields and finite geometry to solve problems in design. The development of a mathematical theory of design would be Bose's main preoccupation until the mid 1950s.

The ISI workers had a joke about Mahalanobis and Bose and their different priorities. The professor wanted Bose to visit the paddy fields and advise him on sampling problems for the estimation of yield of paddy. Bose did not very much like the idea, and he used to spend most of the time at home working on combinatorial problems using Galois fields. Whenever Professor Mahalanobis asked about Bose, his secretary would say that Bose is working in fields, which kept the Professor happy.

In 1935 Bose had become full-time at the Institute. In 1940 joined the University of Calcutta where C. R. Rao was in the first group of students he taught. In 1945 Bose became Head of the Department of Statistics. The university authorities told him he had to have a doctorate. So he submitted his published papers on multivariate analysis and the design of experiments and was awarded a D.Litt. in 1947.

In 1947 Bose went to the United States as a visiting professor at Columbia University and the University of North Carolina at Chapel Hill. He received offers from American universities and he was also offered positions in India. The Indian jobs involved very heavy administration, which he saw as the end of his research work and in March 1949 he joined the University of North Carolina at Chapel Hill as Professor of Statistics.

In the years at Chapel Hill Bose made important discoveries on coding theory (with D.K. Ray-Chaudhuri) and constructed (with S. S. Shrikhande and E. T. Parker) a Graeco-Latin square of size 10, a counterexample to Euler's conjecture that no Graeco-Latin square of size $4k + 2$ exists. In 1971 he retired aged 70. He then accepted a chair at Colorado State University of Fort Collins from which he retired in 1980. His final doctoral student finished after this second retirement.

Bose died in Colorado, aged 86, in 1987. He is survived by two daughters. The elder, Purabi Schur, is retired from the Library of Congress and the younger, Sipra Bose Johnson, is retired as a professor of anthropology from the State University of New York at New Paltz.

Chapter 2

Harry Champion and Alexander Alexandrovich Chuprov

Harry Champion

Sir Harry Champion, KCB, CBE (20 May 1905 - 24 May 1996) was a British statistician and the first director of what was the Central Statistical Office of the United Kingdom. He was also first director of the United Nations Statistical Office. He played a leading role in the development of official statistics, nationally and internationally, after the Second World War.

Background and early career

Harry Champion (later Sir Harry Champion) was born in Worsley, Lancashire, and was educated at Farnworth Grammar School and Manchester University. After leaving university, Champion joined the newly formed Cotton Trade Statistical Bureau, which collected data on output and sales of the cotton industry in the UK and also data on cotton industries of other countries and principal export markets and where he took part in the preparation of a regular digest of statistics. He spent 1932 in the United States, having been awarded a Rockefeller Foundation scholarship, then returned to Manchester University where he became Robert Otley Reader in Statistics from 1933 to 1939 and set up an Economic Research Section carrying out applied research. While at Manchester he published research on the distribution of national capital using estate duty data and a book on public and private property. In 1939, Mr Champion joined the Central Economic Intelligence Service (CEIS), part of the War Cabinet Office, whose purpose was to provide economic and statistical material for a continuous survey of financial and economic plans and where Champion's role was to organise the statistics needed.

Career at the Central Statistical Office

In January 1941, the Central Statistical Office was established to co-ordinate all statistics brought before the War Cabinet and soon after, Champion became its first director. The CSO became established as a permanent feature of government focusing on the development of national income accounts. After the war, Champion was seconded to the United Nations for a year to organise the creation of the United Nations Statistical Office.

Following this secondment, Campion returned to the CSO until his retirement in March 1967.

Some of the statistical products which first saw the light of day in the Harry Campion era are:

- Monthly Digest of Statistics, first published in 1946.
- Statistics of Trade Act 1947.
- Standard Industrial Classification, completed in 1947 and introduced in 1948.
- Annual Abstract, first post-war publication at beginning of 1948.
- Index of Industrial Production, first published in February 1948.
- Economic Trends, appeared in November 1953.
- Development of the National Accounts including:
 - Employment Policy White Paper, first published in 1946.
 - National Income and Expenditure Blue Book, first produced in September 1952.
 - Sources and Methods, first edition published in 1956.
 - quarterly estimates of national expenditure, first published in 1957.
 - constant price estimates, appeared in 1959.
 - seasonally adjusted estimates, appeared in 1960.
 - quarterly balance of payments estimates and the Balance of Payments Pink Book, first published in 1960.
- Financial Statistics, first appeared in 1962.

United Nations

After the Second World War, the United Nations Economic and Social Council (ECOSOC) invited a number of prominent national statisticians, including Harry Campion, to form a 'Nuclear' Statistical Commission, which met from 1–14 May 1946 and made recommendations for the composition and terms of a permanent commission on statistics; the organisation of a statistical organisation; the disposition of existing statistical activities conducted by the League of Nations; the relationship between the statistical activities of the UN and specialized agencies; and the relationship between the statistical activities of the UN and other non-governmental organisations. Shortly afterward, Campion was seconded, at the request of the first Secretary General of the United Nations, Mr Trygve Lie, to the UN for a year to organise the creation of the United Nations Statistical Office .

Death and bequests

Sir Harry Campion died in 1996 aged 91.

On his death, Sir Harry Campion bequeathed half the residue of his estate to the Royal Statistical Society, who decided to commemorate him and the prominent part he played

in the development of official statistics through a Fellowship. The Campion Fellowship is awarded every two years with the maximum sum of money available on any occasion being £10,000, to Fellows of the Society to promote a specific piece of work or project that would make a significant contribution to the development, use or exposition of statistics on the economic or social well being of the population.

The Manchester Statistical Society was also a beneficiary of the estate of Sir Harry Campion and similarly the bequest was placed into a trust fund to provide occasional modest grants to support research consistent with the Society's objective and history .

Posts held

- Director, Central Statistical Office, UK, 1941-1967.
- Member of the 'Nuclear' United Nations Statistics Commission, 1–15 May 1946.
- Director, United Nations Statistical Office, 1946–1947
- Chairman, United Nations Statistics Commission, 1951 & 1953.
- President, Royal Statistical Society, 1957-1959.
- President, International Statistical Institute, 1963-1967.
- Vice-President, Manchester Statistical Society.

Awards

- CBE (1945).
- CB (1949).
- RSS Guy Medal in Silver (1950).
- KCB (1957).
- Honorary LLB, Manchester (1967).

Alexander Alexandrovich Chuprov

Alexander Alexandrovich Chuprov (or Tschuprov) (Russian: Алекса́ндр Алекса́ндрович Чупро́в) (Mosal'sk, February 18, 1874 - Geneva, April 19, 1926) Russian statistician who worked on mathematical statistics, sample survey theory and demography.

Chuprov was born in Mosal'sk but grew up and was educated in Moscow where his father, Alexander Ivanovich (1842-1908), a distinguished economist and statistician, was a professor. Alexander Alexandrovich graduated from the physico-mathematical faculty of Moscow University in 1896 with a dissertation on "The theory of probability as the foundation of theoretical statistics." He spent the years 1897-1901 studying political economy in Germany, in Berlin and Strasbourg. His doctoral dissertation, supervised by Georg Friedrich Knapp (1842-1926) *Die Feldgemeinschaft, eine morphologische*

Untersuchung was published in 1902. The most important result of his stay in Germany was his friendship with the statistician Ladislaus Bortkiewicz. On his return to Russia and, in order to get a teaching position, Chuprov completed master's examinations at the University of Moscow, concentrating on theoretical economics and the application of mathematical methods. He started teaching at the St. Petersburg Polytechnical Institute and was in charge of the teaching of statistics until 1917.

Chuprov used to go abroad regularly to work in foreign libraries. In June 1917 he went to Stockholm to the Statistical Bureau. He was away from Russia when the Bolshevik Revolution occurred. He intended to return but first illness and then money problems prevented him. In January 1919 he became director of the statistical bureau of the Central Union in Stockholm and in charge of its publication Bulletin of World Economy. In the middle of 1920 he moved to Dresden where in complete seclusion he wrote furiously. In 1925 he took up an appointment with the Russian College in Prague. The following year he died.

Work and influence

Chuprov was influential both as a teacher and as a writer. The curriculum he designed for the St. Petersburg Polytechnic Institute was modern and his book on the theory of statistics was influential. He had some good students, the best known was Oskar Anderson. Chuprov's research was influenced by Bortkiewicz on the theoretical side and his father, A. I. Chuprov, on the empirical. Bortkiewicz was the leading exponent of the dispersion theory of Lexis and Chuprov contributed to this research. (There is a brief account of the history of this theory in Heyde & Seneta (1977.)) A. I. Chuprov was the leader of a movement to get statistical information on social conditions in Russia. By 1910 his son A. A. Chuprov was writing about the use of random sampling in such investigations. His work paralleled that of Bowley in England. Chuprov's first work on sampling was not mathematical but in the 1920s he developed the formula for optimal allocation in stratified sampling (to be rediscovered by Neyman in 1934 and usually associated with him). Chuprov also did demographic research.

Chuprov tried to bring together the approaches of Bortkiewicz and Lexis, of the Russian mathematicians and of the English biometricians. He watched developments in Britain and was sympathetic to the work of Karl Pearson, much more so than A. A. Markov with whom he corresponded on statistical matters. Both Chuprov and his student Oskar Anderson published in Pearson's journal *Biometrika*. Chuprov was not above telling the English off, "English scientific tradition rejects the concept of 'mathematical probability' ... and the method of mathematical expectation has naturally shared the fate of the concept ... on which it rests." For a brief period Chuprov was known in Britain. In John Maynard Keynes' *Treatise on Probability* (1921) he is put with Markov and Chebyshev as the three great Russian names in the theory of statistics. However, with the rise of Fisherian statistics, Chuprov was forgotten. In Scandinavia he had a more lasting influence, principally through the papers he published in the *Skandinavisk Aktuarietidskrift*.

Chapter 3

Colin Clark and George Dantzig

Colin Clark

Colin Clark

Born	2 November 1905 London, England
Died	4 September 1989 (aged 83), Brisbane, Australia
Nationality	British and Australian
Fields	Economics
Institutions	Oxford University, Cambridge University, Monash University, University of Queensland
Alma mater	Oxford University
	Sir Richard Stone
Doctoral students	V.K.R.V. Rao Sir Alexander Cairncross Hans Singer

Colin Grant Clark (2 November 1905 - 4 September 1989) was a British and Australian economist and statistician who worked in both the United Kingdom and Australia. He pioneered the use of the gross national product ("GNP") as the basis for studying national economies.

Biography

Colin Clark was born in London in 1905 and was educated at the Dragon School in Oxford. He then studied at Winchester College, then at Brasenose College Oxford where he graduated in Chemistry in 1928. After graduation he worked as a research assistant with William Beveridge at the London School of Economics (1928–29) and then with Sir Alexander Carr-Saunders and Allyn Young at the University of Liverpool (1929–30). During this time he ran unsuccessful campaigns for the British Labour Party in the

parliamentary seat of North Dorset (1929), and later for Liverpool (1930) and Wavertree and South Norfolk (1935). In 1930 he was appointed a research assistant to the Economic Advisory Council newly convened by Prime Minister Ramsay MacDonald. He resigned shortly after his appointment, after being asked to write a background memorandum to make a case for protectionism. Despite this, he had sufficiently impressed one of the council members (John Maynard Keynes) to secure an appointment as a lecturer in statistics at Cambridge University.

He was a lecturer in Statistics in Cambridge from 1931 to 1938 where he completed three books: "The National Income 1924-31" (1932), "The Economic Position of Great Britain" (jointly with A.C Pigou) (1936) and "National Income and Outlay" (1937). His first book was sent to the publisher Daniel Macmillan with a recommendation from Keynes:

"[...] Clark is, I think, a bit of a genius: almost the only economic statistician I have ever met who seems to me quite first-class."

During a visit to Australia and New Zealand in 1937 and 1938 he accepted a position with the Queensland Government at the invitation of the premier William Forgan Smith, who was generally known as Forgan Smith . At the time he wrote to Keynes about his decision to stay in Australia. As he put it, the chance to advise the Queensland Premier on 'practically everything connected with economic matters' was 'too remarkable an opportunity to be missed for putting economics into practice'

On 6 May 1938, he was appointed Government Statistician, Director of the Bureau of Industry, and Financial Advisor to Queensland Treasury, and provided the State's first set of economic accounts in 1940. He also held the position of Deputy Director (Queensland) of the Commonwealth Department of War Organisation of Industry from 1942 to 1946. Clark resigned as Government Statistician on 28 February 1947 to become Under Secretary of the Queensland Department of Labour and Industry.

Unusually for a public servant he continued his academic work, publishing numerous articles in Economics and preparing his book "Conditions of Economic Progress" which was published in 1940.

In 1951 he took a secondment to the Food and Agriculture Organization in Rome (1951) and then to the University of Chicago (1952) before taking the Directorship of the Institute for Agricultural Economics at Oxford University (1952–69). He returned to Australia in 1969 as the Director of the Institute of Economic Progress at Monash University (1969–78) and finally as a Research Consultant to the Department of Economics at the University of Queensland until his death in 1989.

Richard Stone, in his Nobel Prize Lecture, paid tribute to Clark's influence on his work:

"[...] the restoration of the synthetic vision of the political arithmeticians came in the 1930's with the work of Colin Clark who in 1937, in his National Income and Outlay