Kendall, David George

(1918–2007)

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Kendall, David George (1918–2007), mathematician and statistician, was born on 15 January 1918 at 11 Ure Bank, Ripon, Yorkshire, the only son of Fritz Ernest Kendall (1888–1970), a ladies' outfitter then serving as a mechanic in the Royal Naval Air Service, and his wife Emma, *née* Taylor (1892–1985). He had a younger sister, Muriel (Betty; *b*. 1921). Both sides of the family had lived in the North Riding of Yorkshire for many generations. In 1926 he entered Ripon grammar school, a famous and venerable foundation where, as he later said, the teachers were 'fantastic, dedicated scholars every one of them' (DGK: early days, Kendall papers). In particular George Viccars, the senior mathematics master, encouraged him to work on his own from the age of thirteen, lending him his Cambridge lecture notes and G. H. Hardy's *Pure Mathematics*.

Kendall's maternal grandfather George Taylor had been a merchant seaman, and had an interest in the stars that he transmitted to his grandson. A family friend lent Kendall a small telescope, but his more serious interest in astronomy was aroused by radio talks by Sir James Jeans on astrophysics. The school advised him that, if he wanted to be a professional astronomer, he should first take a degree in mathematics. He was entered for the scholarship examination at Gonville and Caius College in Cambridge, and was awarded an exhibition. But the family finances were such that he needed a full scholarship, and he had to refuse the Cambridge place. Fortunately Ripon was one of the schools whose pupils were eligible for the closed scholarships on the foundation of Lady Elizabeth Hastings at Queen's College in Oxford; Kendall was awarded one of these, and entered Queen's in 1936. In that year the college acquired a new tutorial fellow in Ughtred Haslam-Jones, a pupil of Hardy and an enthusiast for the sort of rigorous hard analysis that Hardy had introduced to Oxford before returning to Cambridge in 1931. This wind was not tempered to the shorn Yorkshire lamb, and indeed Haslam-Jones introduced him to the even more formidable E. C. Titchmarsh. But Kendall did not forget his astronomy, and had enough initiative to contact H. H. Plaskett and E. A. Milne. His first publication was a short note in *Zeitschrift für Astrophysik* in his second undergraduate year, and the next year he won the Skynner senior studentship at Balliol College, to enable him to undertake research in astronomy after his first degree. Many of his fellow students at Queen's were from Yorkshire, but he does not seem to have made friends easily, and for a time he fell prey to the Buchmanite Oxford Group. This phase passed, and he became more sociable, resolving his religious beliefs into a quietly devout Anglicanism, to which he remained loyal all his life.

Kendall graduated with first-class honours in mathematics in 1939, uncertain whether to devote himself to astronomy or pure mathematics. The outbreak of the Second World War swept aside his dilemma, and he was posted to the projectile development establishment at Aberporth, Cardiganshire. There he joined a group of mathematicians solving problems both about the trajectories of rockets and about ways of detecting the arrival of hostile projectiles.

Inevitably these were not purely deterministic, and statistical advice was given by Maurice Bartlett, later to be recognized as one of the greatest statisticians of the twentieth century. All went well until Bartlett was sent to London, and a volunteer was sought to replace his essential expertise. The lot fell to Kendall, who was allowed a week to learn the subject, which had not been part of the Oxford curriculum. Thus was Hitler responsible for introducing a classically trained analyst to real problems of random variation, which Kendall was to make his own. He stayed in contact with Bartlett throughout the war, and when it ended and he returned to Oxford he pursued Bartlett's interest in stochastic processes, phenomena evolving randomly in time, but with a degree of mathematical rigour and sophistication that Bartlett did not attempt.

Kendall's work at Aberporth had come to the attention of Sir Henry Tizard, who had been throughout the war a leader of Britain's scientific efforts, but then returned to Oxford as president of Magdalen College. In 1946 Tizard recruited Kendall as the tutorial fellow in mathematics, a post he was to occupy until 1962. He had to teach across the whole range of the (by then very old-fashioned) Oxford syllabus, but his own work was in the theory of probability and its applications. He discovered that in France and Russia, and later in the USA, this had been developed as an elegant and rigorous study, notably by the Moscow mathematician A. N. Kolmogorov. Gradually, so as not to frighten the horses, he introduced this theory into Oxford mathematics, and by his activities in the London Mathematical Society and the Royal Statistical Society to the wider UK community.

Although he was a devoted and charismatic teacher, Kendall sometimes scared his students, by the high standards he demanded and by the way his warm and caring nature was to some hidden behind a mask of austerity. He came to be referred to by his initials DGK, and to be spoken of with awe as for a time the only man in Britain who really understood Kolmogorov. Yet in Oxford he found many congenial social activities, and he met, and on 9 August 1952 married, Diana Louise Fletcher (1924–2008), schoolteacher, and daughter of Donald Vernon Fletcher. They had a long and happy marriage, and brought up six children (two sons and four daughters) in their house on Cumnor Hill. Their elder son, Wilfrid, followed his father into probability theory, and became a professor of statistics at Warwick, while the eldest daughter, Bridget, gained acclaim as an intrepid foreign reporter for the BBC.

For the first decade after the war most of Kendall's papers were in what came to be called applied probability, using the calculus of probability to construct and analyse models of random phenomena. Of particular importance to his work were Markov processes, in which the state of a random system at any time is specified in sufficient detail that probability statements about the future depend only on the present state. Such processes are natural for instance in areas of biology, and Kendall applied the theory to models of population growth and cancer. In 1951 he published a seminal paper on queueing theory, a subject originating in the study of telephone traffic but later becoming one of the enabling techniques of operational research. He spent the academic year 1952–3 in the USA, mainly at Princeton. There he discovered that mathematicians were building on the work of Kolmogorov, and of Paul Lévy in Paris, to produce a general theory of Markov processes in which there were some very deep problems. On his return to England, he teamed up with the Durham mathematician Harry Reuter to solve some of these by applying new results in abstract analysis (essentially, calculus in infinite-dimensional spaces) to explore the surprising possibilities of the general theory. The series of papers by Kendall and Reuter, and later their student David Williams, proved to be an essential foundation for the modern theory of random processes.

While all this was happening beside the Cherwell, the shores of the Cam remained in blissful ignorance. At last Cambridge awoke to the need to teach modern statistics and probability and created a chair of mathematical statistics, to which Kendall was inevitably appointed (with a fellowship of Churchill College) in 1962. He rapidly earned the respect of his fellow mathematicians, who allowed him to turn the small statistical laboratory into a thriving centre for both probability and statistical data analysis. It soon became filled with research students and visitors from overseas universities, inspired by Kendall's unassuming leadership. Perhaps because of his wider remit covering statistics as well as probability, his own research changed direction. He had always shown a broad curiosity, and in Oxford had tried to reconstruct data of Flinders Petrie on predynastic graves in Upper Egypt. This proved to be the first of a series of diverse studies whose common feature was the analysis of data with special structure, such as alleged ley lines, prehistoric stone circles, towns on Otmoor, and even the flight of homing birds. These special studies led him to a general theory of random shape, which proved to be a fruitful area of mathematics combining probability and geometry.

By the time of his translation to Cambridge Kendall was in great demand across the world, but his particular concern was to visit countries whose scientists were not allowed to travel, in eastern Europe and later in China. He collaborated with mathematicians in Romania, Poland, Hungary, and China, and encouraged international bodies that exchanged ideas across national barriers. He was in 1975 the first president of the Bernoulli Society for Mathematical Statistics and Probability. In Britain he inspired a rapid development of pure and applied probability, and was properly honoured as its leader. He was elected to the Royal Society in 1964, and received its Sylvester medal in 1976. The Royal Statistical Society twice awarded him its Guy medal, in silver in 1955 and in gold in 1981. The London Mathematical Society, of which he was president (1972–4), gave him its Whitehead prize in 1980 and its highest honour, the De Morgan medal, in 1989.

Kendall retired in 1985, but continued to live in the family home in Barrow Road, Cambridge, and remained active mathematically for many years. He was co-author of what became the standard book on its subject, *Shape and Shape Theory* (1999). Although his mental powers faded after that, he was physically active, striding the streets of Cambridge, throughout his ninth decade. He died at Addenbrooke's Hospital of prostate cancer on 23 October 2007, and was survived by his wife, Diana, and their six children. He was accurately described at his memorial service as the father of British probability theory. He was a powerful and scholarly mathematician, equally adept at abstract theory and in diverse applications, and his influence was profound and lasting.

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Likenesses

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Wealth at Death

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- Kendall, Prof. David George, (15 Jan. 1918–23 Oct. 2007), Professor of Mathematical Statistics, University of Cambridge, 1962–85 and Fellow of Churchill College, since 1962 in Who Was Who

External resources

- National Archives
- The Royal Society