John Michael Hammersley

Mathematician, born in Helensburgh on 21 March 1920, died in Oxford on 2 May 2004

John Hammersley was one of the outstanding problem-solvers of 20th century mathematics. He formulated many problems of significance for theoretical and applied science, and made remarkable progress towards their solutions. He is famous worldwide as the founder of the mathematical theory of percolation.

He was born of an international couple. His father, Guy Hammersley, was employed in the American steel trade mostly in London, and worked his way from office boy to European manager during the 1920s. His mother, Marguerite Whitehead, was born in Moscow in 1889, and was sent to boarding school in England in 1903. They married in 1914 and John was born in 1920. His first real mathematical experience was at Stratton Park, a preparatory school near Bletchley, where his teacher was Gerald Meister who had just arrived from Sedbergh School. John was sent to Sedbergh in 1934, and, finding himself bored by the traditional classical education on offer there, he migrated to science and mathematics. After a couple of attempts at the entrance examination, he was awarded a scholarship at Emmanuel College, Cambridge. The extra freedoms of Cambridge and the confusion at the start of war led to a very uncharacteristic Third Class in the first year examinations.

War intervened and, called up in 1940, Hammersley was commissioned in 1941 in the Royal Artillery. Posted to an anti-aircraft gun site near Worsham, he applied himself to the use of wireless and radar in gunnery, and introduced several improvements on current practice in gunnery calculations with immediate benefit to accuracy. Realising that there were greater errors elsewhere, he replaced the old seven figure trigonometric tables by four figure tables. Also, in a coup which would be difficult even today, he persuaded the Treasury to release a roomful of desk calculating machines. This was also his chance to learn some probability and statistics.

Cambridge was a different place on his return in 1946, and he was older, better motivated, and better supervised. He graduated in 1948 as a Wrangler ('First Class'). It was not then customary to do a PhD, and his first job was as a graduate assistant within the Oxford University group working in the Design and Analysis of Scientific Experiments, headed by David Finney. It was over Sunday lunch in Oxford that he met Gwen Bakewell, who became his wife in 1951. Their first home in Longwall Street was soon replaced by Willow Cottage, where their sons Julian and Hugo were born.

When Pat Moran, a luminary of Australian statistics, departed Oxford for Australia, Hammersley was appointed to take his place at Trinity College where he remained a Fellow until his death. He spent some years commuting to Harwell before returning in 1959 as a Senior Research Officer in the Institute of Economics and Statistics.

He was the only mathematics don at Trinity until Chris Prior joined in 1976, and he organised Trinity Maths in his own special way. If there were no sufficiently strong

candidates in any given year, he would admit none. He believed an Oxford Tutor should be capable of teaching every branch of his subject for the undergraduate degree, and that undergraduates should, in principle, be able to answer questions in all areas. If he was not acquainted with an area, he would work it out live within the tutorial. True to his beliefs, he volunteered classes on problem-solving, but his problems were rather difficult, and few students were able to meet his high standards. Those able to make some progress recognised him as a tremendous force for good in their mathematics education.

Hammersley was for a period equally at home in California and in Oxford. He was a regular contributor to the Berkeley Symposia on Mathematical Statistics and Probability, and was a close friend of the distinguished statistician Jerzy Neyman. He received many honours, including election to the Royal Society in 1976.

On retiring from his Oxford Readership in 1987, he enquired of the Heads of the Departments of Statistics and Mathematics whether they could find him a desk, but was apparently declined. He was instead welcomed at OCIAM (Oxford Centre for Industrial and Applied Mathematics). He once explained that he felt a duty to reciprocate this act of hospitality, and this he did by making his extensive mathematical experience available to all who asked. In more recent years, he was to be found at Willow Cottage, reading, doing the crossword, and working on Eden clusters.

John Hammersley was a pioneering mathematician of enormous intellectual power. He was passionately involved in creating mathematics for modelling and solving practical problems. His favourite activity was getting to grips with a good problem, and in this he gave inspiration to many. Despite his love of rigorous analysis, he did not hesitate to turn when necessary to calculators, and he was a master of the mechanical desk calculator and the early computer. He once boasted of holding the 1961 world record for keeping a computer (at Bell Labs) working without breakdown for 39 hours.

Hammersley preferred what he called 'implicated mathematics' over 'contemplative mathematics', that is, he found the solution of problems to be superior to abstract theory or 'high-rise mathematics'. He posed and solved some beautiful problems, among the best of which are self-avoiding walks and percolation. He was delighted to learn in retirement of the recognition accorded thereto by mathematicians and physicists, and of the enormous progress made since his own pioneering work. Ironically, recent progress has been made via a general theory rather than by the type of hands-on technique favoured by Hammersley.

An area which he made his own is that termed 'Monte Carlo simulation', this is a general technique first attributed to Stan Ulam in his work on the nuclear bomb at Los Alamos. With David Handscomb, Hammersley developed the basic theory and published the standard work. Their book *Monte Carlo Methods* (1964) remained for many years the only work available to practitioners, and the techniques therein are used currently in banks and elsewhere throughout the world.

During his lifetime, great changes were made in the teaching of mathematics at schools,

a matter on which he held strong and opposed, but by no means reactionary, views. He published widely and gave many lectures critical of soft theory at the expense of problem-solving and beauty in mathematics. His best known work, 'On the enfeeblement of mathematical skills by 'Modern Mathematics' and by similar soft intellectual trash in schools and universities' (published in the Bulletin of the Institute of Mathematics and its Applications, 1968), is now regarded as a force for good at a crossroads of mathematics education.

Hammersley sought through his uncompromising and combative style to provoke and to stir. He was often successful. At the conference held in Oxford in his honour in 1990, he spoke under the title 'Is algebra rubbish?', but uncharacteristically refrained from answering the question.

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