MATHEMATICIAN J. B. MCLEOD FRS, FRSE, DIES AT 84

When J. Bryce McLeod was ten years old, his home city of Aberdeen was under threat of German bombs. As a result, his schooling was partially interrupted, and so his parents sent him to his grandfather, former Head of Mathematics at Aberdeen Grammar School, for instruction. Apparently, this gentleman had lost track of what maths a ten year old would have been exposed to, and he began the first lesson with algebra, completing linear equations in around 15 minutes and then delving into the quadratic equation. Young Bryce, having seen nothing beyond arithmetic before, had (he reported much later) no idea what these x's and y's were about, but was too in awe of his grandfather to admit this. He went home with an assignment, and agonized for hours trying to determine what was going on. But when he returned the next day he was able to solve every quadratic equation his grandfather gave him.

Unfortunately, his grandfather did not live to see the results of his efforts, which led to a distinguished undergraduate career at Aberdeen University and Oxford, an Oxford D. Phil. directed by the renowned E. C. Titchmarsh, and a position as perhaps the leading British researcher of the 60's and 70's in what is now termed "applied analysis", a subject primarily devoted to the rigorous mathematical study of differential equations arising in the sciences and engineering.

In the 40's and 50's, major figures in this area in the UK included Titchmarsh, M. L. Cartwright, and J. E. Littlewood, but then the subject fell in stature as compared to more abstract and "pure" types of mathematics, such as ("modern") algebra and topology. McLeod became a Fellow at Wadham College, Oxford, in 1960, and University Lecturer a few years later, but his work at that time was being recognized more in the US than at home. In fact, after Titchmarsh no specialist in differential equations held a Chair at Oxford until John Ball was appointed Sedleian Professor in 1996. By that time McLeod had decamped to the University of Pittsburgh, becoming a University Professor. In addition to the lack of enthusiasm for his subject in Britain, he was motivated by the mandatory retirement he saw looming . He stayed in Pittsburgh for 20 productive years, though he and his wife Eunice kept their home in Abingdon and returned there in the summers. During this period, ironically, he received an inquiry from a senior mathematician at Cambridge inviting him to apply for a Chair there. He had to reply that he was beyond the mandatory retirement age, something the writer had apparently overlooked.

McLeod's influence did much to resuscitate applied analysis in the UK. One indication of this was his FRS, awarded in 1992. Others around Britain, including John Ball, were encouraged in their interest in differential equations by his work. His Oxford graduate students gained Professorships at Exeter (later Canterbury), EPFL Lausanne, Heriot-Watt, Michigan, and North Carolina State. These students particularly appreciated his optimistic approach to mathematical research. During a meeting held upon his retirement from Pittsburgh in 2007, each of his Oxford students in attendance expressed the same view: working with Bryce was a pleasure, especially compared with the ordeal they saw many of their fellow students enduring in that period.

McLeod's most cited paper, written with the distinguished American mathematician Paul Fife, explains mathematically the development of nerve impulses in an axon. Another important insight led to major theoretical advances in "inverse scattering'', which plays a pivotal role in

wave propagation, whether in water or other media. He collaborated widely, working with at least 40 coauthors from the US, UK, continental Europe, and Asia. His paper on wave propagation in a neural network, written with leading mathematical biologist and Pittsburgh colleague G. Bard Ermentrout, has been widely influential.

One cannot hope to summarize all of McLeod's more than 150 published research papers, on a wide variety of topics, but his landmark study in 1962 of the principal mathematical model of coagulation should also be mentioned. This paper is still of active interest, and a large number of publications in the intervening years have cited either it or its "offspring".

McLeod did not attempt to develop the sorts of elaborate theoretical structures that fascinate more abstract mathematicians. Instead he was a problem solver of genius. His collaborations usually developed when another mathematician had a problem from an applied area which he could not solve, and brought it to McLeod's attention. Very often the result would be a simple way of looking at the problem which led to an ingenious solution.

Those mathematicians who were stumped were not run-of-the-mill. One of the most eminent was Tosio Kato, Professor of Mathematics at the University of California at Berkeley. The problem he and McLeod worked on was about "wave motion in the overhead supply line to an electrified railway system''. When Kato, having returned from Oxford to Berkeley, received McLeod's solution he wrote back: How ever did you think of that? Many of his collaborators over the years had the same question.

It is symbolic of the revival of applied analysis in the UK in the last 30 years that the 2011 Naylor Prize and Lectureship of the London Mathematical Society was awarded to J. B. McLeod, "in recognition of his important and versatile achievements in the analysis of nonlinear equations arising in applications to mechanics, physics, and biology. "

J. Bryce McLeod was born on December 23 , 1929 and died on August 20, 2014. He was elected FRSE in 1974 and FRS in 1992. He received the Whittaker Prize of the Edinburgh Mathematical Society in 1965, the Keith Medal and Prize of the Royal Society of Edinburgh in 1987, and the Naylor Prize of the London Mathematical Society in 2011. He married Eunice Martin Third in 1956. He is survived by his wife, four children and three grandchildren.