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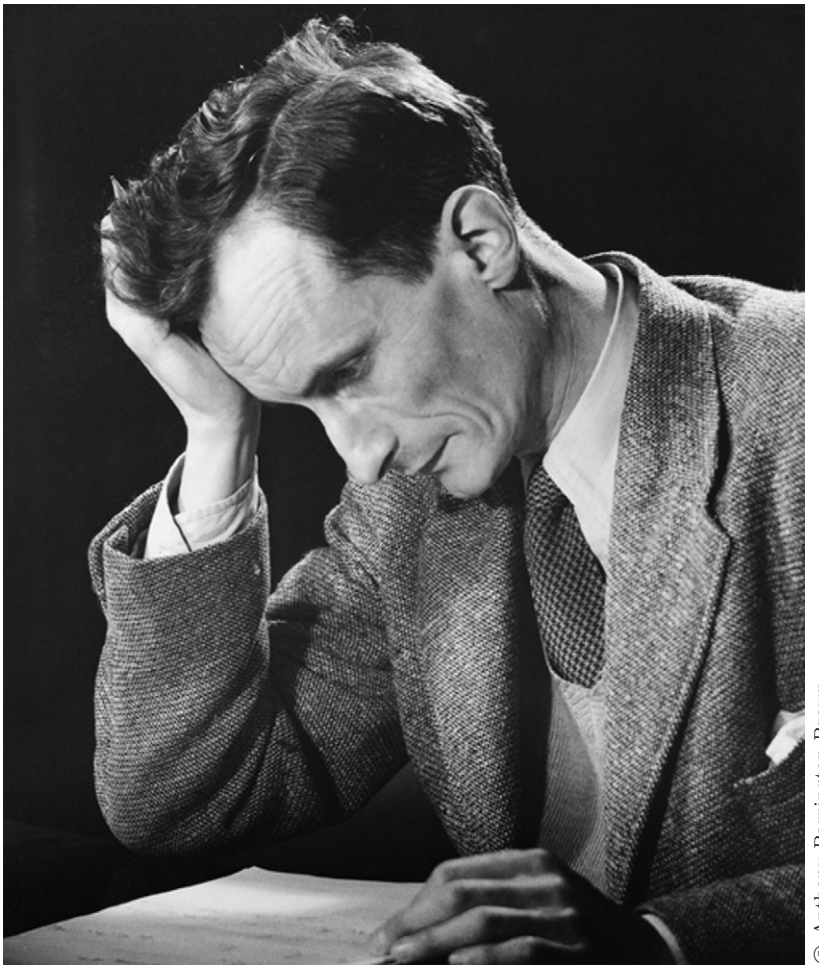
OBITUARY

Shaun Wylie, 1913–2009



Shaun Wylie, mathematician and Honorary Fellow of Trinity Hall, Cambridge, who was one of the leading members of the Bletchley Park code-breakers during World War II as well as one of its last survivors, died on 2 October 2009, aged 96. I was one of his research students in 1951.

Wylie was born in Oxford on 17 January 1913, the son of Sir Francis and Lady Kathleen Wylie; his father was the first Warden of the Rhodes Trust. He was educated at the Dragon School and Winchester College, from where he won a scholarship to New College, Oxford to read both classics and mathematics. In 1934, he went to Princeton University to study under Solomon Lefschetz (1884–1972). He and Max Newman were the first two British mathematicians to go to America in the 1930s to become topologists, and bring that subject back to England. Wylie took his PhD in 1937, and became a Fellow of Trinity Hall in 1938–1939.

While at Princeton, Wylie met the British mathematician Alan Turing (1912–1954). When war was declared in 1939 Turing joined the mathematical team of the Government Code and Cypher School (GCCS) at Bletchley Park, working on deciphering German military radio traffic. Meanwhile Wylie, after a research year at Aberdeen, was teaching at Wellington College, from where Turing recruited him in 1940 to join him at Bletchley. In February 1941, he joined Turing's team in Hut 8, to work on the Enigma machine used by the German Navy. In the words of Hugh Alexander, Turing's successor as head of Hut 8, 'except for Turing, no one made a bigger contribution to the success of Hut 8 than Wylie; he was easily the best all-rounder in the section, astonishingly quick and resourceful and contributed a great deal to theory and practice in a number of different directions'. In Autumn 1943, Wylie transferred to work on German teleprinter traffic, generated by the Lorenz machine, code-named Tunny. The electronic machine Colossus developed to decipher Tunny was a precursor of the modern computer; Wylie's work on Tunny continued even after VE Day in 1945.

While at Bletchley Park Wylie met and married Odette Murray, a Wren also working in his section.

Wylie returned to academic life after the war; he was a mathematics fellow at Trinity Hall until 1958. While not prolific in publishing research, he was a brilliant lecturer and an outstanding tutor at Trinity Hall. He was also a very successful doctoral supervisor. His first student, William Tutte (1917–2002), had also worked on Tunny at Bletchley Park. Tutte went on to become a Fellow of the Royal Society, as did two more of Wylie's other four PhD students: Frank Adams (1930–1989) and myself.

I first went to Wylie's lectures on topology in 1950 when I was reading for Part 3 of the Tripos, in order to find out what the word meant. I was captured by his enthusiasm, and finished up becoming a topologist myself. I asked him if he would take me on as a research student, and he said yes, provided I found my own problems to work on; I think this was because he had not had the opportunity to do much research himself, and so did not have an armoury of unsolved problems to give out to his students. It turned out to be blessing in disguise, because I became used to finding problems, both hard and soft, that I was subsequently able to give to my own students. Shaun was assiduous in reading anything I gave him to read, and proved very encouraging. Eventually, I wrote my thesis on homology theory.

In 1960, Wylie published a book with Peter Hilton, *Homological Algebra: An Introduction to Algebraic Topology* [3]. I remember I spent a year thinking up problems to go as exercises into the book, which has gone on to become a classic. Through his book and his students, Wylie is recognized as one of the founders of the outstanding British school of algebraic topology. Wylie was fond of the words *vumula* and *kateka*, to describe the difference between continuous and discrete mathematics. For example, geometry and manifolds are vumula, whereas algebra and group theory are kateka. What fascinated him about algebraic topology was that it used kateka structures to classify vumula objects, for instance, the homology and homotopy groups of a manifold.

In 1958, Wylie became Chief Mathematician at GCHQ in Cheltenham, the successor to the GCCS of his war work. While his work there was secret, one publicly visible outcome was his involvement in the work of his GCHQ colleague James H. Ellis on public-key cryptography. At Shaun's invitation I used to go and spend a month there in the summer. I was intrigued to discover the real difference between code-breaking and mathematics, to understand why Shaun had moved there from the academic world of Cambridge. Code-breaking is a much more social activity: as soon as you get an idea, you tell everyone else, and so advances tend to be much more co-operative efforts. Whereas in mathematics you tend to struggle alone, and only tell the others when you have proved the theorem. The real difference lies in the content of the results: code-breaking tends to solve the particular problems of one code at a time and not to be of general use, whereas a mathematical theorem is a permanent contribution to knowledge. Mathematics is the more noble activity.

On retiring from GCHQ in 1973, Wylie ended his career as he began it, in school teaching. He taught mathematics and Greek at Cambridgeshire High School for Boys (later Hills Road Sixth Form College) in Cambridge till 1980. He was elected an Honorary Fellow of Trinity Hall on his retirement. When I started Mathematics Masterclasses for l3-year-olds in 1980, I invited him to give them one of their first series of lectures.

The Ultra Secret, the fact that Allied intelligence had successfully broken German military radio codes, was not only top secret during the war, but, as a result of a decision made by Churchill in his last months as Prime Minister, remained so for nearly 30 years afterwards. Everyone who had worked at Bletchley Park had signed the Official Secrets Act, which continued to bind them to secrecy. Partly as a result of the publication in 1974 of F. V. Winterbotham's book *The Ultra Secret*, old Bletchley hands eventually began to speak out, notably Turing's statistical assistant Jack (Professor I. J.) Good. Wylie wrote an account 'Breaking Tunny and the birth of Colossus', published in 2001. He also appeared in several television programmes, where his contributions were notable not only for their technical content and historical importance, but also for his strikingly warm and engaging personality and sense of humour. Bletchley Park, Station X, in wartime terminology, is now a museum; Shaun and Odette were among those interviewed for Station X material.

Wylie had many interests outside mathematics. In addition to chess and anagrams, he was an international hockey player, representing Scotland in 1938, and a keen long-distance walker. He composed crosswords for *The Listener* as 'Petti' (a play on his name: 'wyliecoat' is an old Scottish term for petticoat). He had a lifelong interest in amateur dramatics, and was president of the dramatic club at Bletchley Park. He was a founder member of the Social Democratic Party, and continued as an active supporter of the Liberal Democrats.

Shaun and Odette Wylie had three sons and a daughter. Odette predeceased him, as did their eldest son Keith, a barrister and croquet international. He is survived by his other three children Rowan, Malcolm and Bartow, and eight grandchildren and one great-grandson.

Wylie was a modest man of great human warmth. When asked whether he had any regrets, he replied 'I wish I'd been a better mathematician'.

My father died shortly after I was born, and I had always missed not having one, but Shaun filled that missing role. He taught me not only about mathematics but also about people, and how to become a serious academic. He was one of the finest people I have ever met, and I was honoured to model myself on him.

Publications of Shaun Wylie

1. 'Irregularity in complexes', *Ann. of Math.* (2) 39 (1938) 247–255.
2. 'Duality and intersection in general complexes', *Proc. London Math. Soc.* (2) 46 (1940) 174–198.
3. 'Intercept-finite cell complexes', *Algebraic geometry and topology. A symposium in honor of S. Lefschetz* (Princeton University Press, Princeton, NJ, 1957) 389–399.
4. (with P. J. Hilton) *Homology theory: an introduction to algebraic topology* (Cambridge University Press, New York, 1960).

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