



## B. T. M. (Terry) Willis (1927–2018)

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## B. T. M. (Terry) Willis (1927–2018)

Terry Willis left us on January 18, 2018 after a long and active life. Terry obtained an honors degree from Cambridge in 1948, and a PhD from Royal Holloway, University of London in 1951 with John Bernal and Samuel Tolansky as his supervisors. After working with X-rays for 3 years at the GE Research Laboratories, he was recruited by George Bacon to come to Harwell, where he arrived in 1954. Within 2 years, the new reactors DIDO and PLUTO were operating, and Terry set about building a 4-circle diffractometer to measure single crystals. With the help of Ulrich Arndt (then at the Royal Institution), they persuaded Ferranti to construct such a machine and it was operating with punched paper tape by 1960. In 1966, Terry and Arndt published a book, *Single Crystal Diffractometry*, which was released as a paperback in 2009.

Exploiting the ability of neutrons to detect light atoms in the presence of heavy ones, Terry fastened on to the idea of using neutrons to examine uranium dioxide, which had by then become the nuclear fuel of choice, and single crystals were available at Harwell. This led to a number of pioneering experiments, including the first publication (in *Nature*, 1963) of the structural changes when  $\text{UO}_2$  takes up additional oxygen. Terry continued his love affair with the many forms of uranium oxides for the rest of his life, working more recently with the high-resolution powder diffractometers at ISIS. He proposed the so-called “Willis clusters”, and these are still the subject of research today [1].

Terry, together with Peter Egelstaff (1925–2015), became the



primary exponents of opening the Harwell neutron scattering facilities to university researchers. They introduced many to Harwell who went on to become leaders in the field. Probably the most famous were Dorothy Hodgkin (1910–1994), who won the Nobel Prize for X-ray work on vitamin  $\text{B}_{12}$ , and Maurice Wilkins, who shared the 1962 Nobel for the structure of DNA. Terry encouraged many of Hodgkin’s students and co-workers to come to Harwell and use neutrons. A number of important publications resulted, but Terry’s role was to stimulate the use of neutrons and act as an enabler, rather than trying to convert himself from a crystallographer into a biologist.

Terry’s ongoing research from the 1960s on a variety of systems led to another book *Thermal Vibrations in Crystallography*, with Arthur Pryor that was published in 1975. Many scientists visited Terry at Harwell. Hugo Rietveld (Petten) was a frequent summer visitor and Terry and he discussed the profile fitting method. Alberto Albinati came from Milan, and Noriaki Kato from Japan.

Terry himself was a visitor to Denmark, India, Switzerland, Pakistan and Japan.

In 1965, Harwell decided that, with its many external users, the time was ripe for a Summer School in neutron scattering, and Mick Lomer (1926–2013), then head of the Materials Physics Division, asked Terry to organize this. The world’s first “Summer School on Neutron Scattering” took place at Harwell in 1966 with Gordon Squires giving the theory lectures, which he later turned into one of the best texts on the introduction to neutron scattering. 50 years later these schools, now moved to Oxford, still take place every 2<sup>nd</sup> year [2]. In restarting the schools at Oxford in 1979, Terry joined forces with Colin Carlile and they produced yet another important book, *Experimental Neutron Scattering*. From the many school photographs, we estimate that the schools have instructed almost 1,000 students. Reference [1] gives details of the celebration of the school in 2009, and the special poem written by Alan Leadbetter to honor Terry.

Terry left Harwell in 1984 and became a Professor in Chemical Crystallography in the Chemistry Department at Oxford University, where he continued neutron experiments right up to and beyond his retirement in 1997.

Terry’s first wife, Nanette, died early, but with his second wife Margaret, Terry was always in attendance at the schools and together they entertained the students with “Tea and Croquet” on Saturday afternoons at their home on the river in Oxford. They were certainly memorable events for all concerned, and

many students were introduced to the unfathomable complexity of croquet and punting for the first time!

Terry's enthusiasm never left him; all neutrons were good neutrons. He was a good friend and mentor in his personal life and a rigorous and talented scientist in all

his professional dealings. We shall greatly miss him.

## References

1. See "Willis – A tribute" under the Harwell header at <http://neutronsources.org/about/history/literature.html>
2. <http://www.oxfordneutronschool.org/history.htm>

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