and marked generosity of spirit. He listened patiently to all sides before speaking with a clarity and wisdom that usually presaged the final word on any given issue.

Padden was particularly kind and helpful to young people and to those facing important career decisions; his counsel was widely sought and generously given. In recognition of his caring attention to young scientists, the polymer physics division established the Frank J. Padden Jr Award in 1994, which annually recognizes a graduate student for excellence in polymer physics research.

A devout Christian, Padden was ordained as a deacon of his church in 1976. Not only did he participate significantly in the affairs and outreach programs of his parish, he and his wife regularly opened their home to countless people in need while they were helped to find their own way again. After his retirement, he devoted his life to comforting ill and dying people by serving as a hospital chaplain. His humanitarian qualities greatly exceeded in scope what was commonly known among his scientific colleagues.

Padden was a man of rare qualities. He will be greatly missed by all those who were fortunate enough to have known him, and especially by his many friends in the polymer physics community.

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William Walkinshaw

William "Bill" Walkinshaw, who was one of the many scientists whose careers were determined by the course of World War II, died from heart failure at his home in Abingdon, UK, on 20 November 2001.

Born on 16 February 1916 in Larbert, Scotland, Walkingshaw studied natural philosophy (as physics is called in Scotland) under Edmund Whittaker at Edinburgh University. In 1938, he graduated with an MA in mathematics. He also earned the university's Medal for General Analysis. Like many pre-World War II mathematics and science graduates, he became a schoolteacher, beginning work immediately after graduation.

The following year, on the outbreak of war, he was directed to join the Admiralty, to aid in the degaussing of submarines, an urgently required protection against magnetic mines. In 1940, he was sent to the code-named

WILLIAM WALKINSHAW

Telecommunications Research Establishment (TRE) to work on "radiolocation" (radar). There he joined the mathematics group, in which he worked on wave propagation problems and on the design of antennas, including periodic arrays.

After the war, Walkinshaw, like others who had worked at TRE, was recruited to work at the newly established UK Atomic Energy Research Establishment based in Harwell. His experience at TRE and his considerable mathematical skills ideally suited him to contribute to early pioneering work on linear accelerators. Walkinshaw joined the newly formed accelerator group, led by Donald Fry and located initially at TRE in Malvern, as a member of a small team responsible for building the world's first traveling wave accelerator. This accelerator was powered by a wartime magnetron and accelerated electrons to an energy of 600 keV.

As the field developed, Walkinshaw's interest broadened, and by 1949, he was in charge of a small team (which included the young John Bell) that looked at a wide range of theoretical problems, especially the linear acceleration of protons and the theory of synchrotrons. He was expert at making clear appraisals of new concepts, and had a realistic sense of what would be feasible.

The advent of the strong focusing principle from Brookhaven National Laboratory provided a solution to the troublesome focusing problem in high-energy proton linear accelerators, and, in 1953, design studies were begun for a 500-MeV machine for Harwell. Only the first section of this machine was built. This 50-MeV linac was completed in 1960 and used for studies in nuclear physics. However, the Harwell work provided the basic design procedure used for the linac injectors for the CERN and Brookhaven synchrotrons.

Walkinshaw's group also contributed to the understanding of other new concepts, such as the spiral ridge cyclotron, a variant of the fixed-field alternating gradient concept originating from Don Kerst's Midwestern Universities Research Association (MURA) group in the US. In 1957, Walkinshaw identified what is now known as the Walkinshaw resonance, which places constraints on practical design at higher energies.

The calculations for those more sophisticated machines posed increasing demands on computing power, which initially was not locally available. At the time, the Rutherford High-Energy Laboratory (later the Rutherford Appleton Laboratory) was just being established as a laboratory, separate from Harwell, to provide large-scale facilities for use by university groups. Walkinshaw quickly saw the need for adequate computing power and realized that problems of coordination would inevitably arise. He played an important part in developing computer policy at the laboratory, acquiring adequate capacity locally and pioneering a remote job entry scheme in which small computers were connected to the center via a phone line. The program was very successful; users kept data at the Rutherford Laboratory but worked from their home department. The program led to full networking, and the laboratory was established as a most reliable and productive computer center. By the time Walkinshaw retired in 1979, the UK Science Research Council had a network connecting its laboratories and most universities. This network subsequently evolved into an academic network that links all UK academic institutions.

Walkinshaw was known to have remarked that, on his retirement, he was greatly looking forward to doing nothing. This was, of course, far from the case. He continued his interest in music, playing the violin; in travel, especially in France, even camping on occasion; and in his garden. He was always sociable, friendly, and cheerful, even when ill in late life. And, naturally, he never lost his interest in physics and computing.

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