

Thomson, William

by Denis Weaire

Thomson, William (1824–1907), 1st Baron Kelvin of Largs, physicist, was born 26 June 1824 at College Square East, Belfast, son of James Thomson (qv), who taught in the RBAI, and Margaret Thomson (née Gardner). Together with his brother James Thomson (qv) he was tutored from an early age by his dedicated father, who was widowed in 1830. The Thomsons were of Scottish Covenanter stock, and had a farm in Co. Down until 1847. In 1831 James was appointed to the chair of mathematics at Glasgow University. By 1834 William had already matriculated in the university, where he and his brother excelled in a variety of subjects. Having reached the relative maturity of sixteen years, he left for Cambridge in 1841 without taking a degree. Already a devoted student of the French school of mathematics, and the author of several papers, he was clearly bound for great success in the mathematical tripos, yet somehow was placed only as second wrangler in 1845. He was consoled by first place in the Smith's prize competition. After a brief period as a fellow of Peterhouse and a sojourn in France, he returned to Glasgow as professor of natural philosophy in 1846. He remained in that position to the end, resisting temptations to move. These included the Cavendish chair at Cambridge, offered and declined three times. Despite his model career in Cambridge, which included athletic pursuits (single sculls, appropriately), he saw positive advantages in remaining remote from the energy-sapping centres of power and bureaucracy that lay to the south. He did not refuse responsibility (for example, as editor of *Philosophical Magazine*, and president of the Royal Society), but he preferred it at arm's length.

Thomson was elected FRS (1851), was awarded the Copley medal (1883), was knighted (1866), became Lord Kelvin (1892), and was one of the founding recipients of the Order of Merit (1902). To these honours were added a very long list of foreign academic awards and recognition by a splendid professorial jubilee celebration in 1896. At the end of this life of extraordinary fulfilment, he was still active, although bypassed by the new currents in physics. He died 17 December 1907 at home at Netherhall, Largs, and was buried near Isaac Newton in Westminster abbey.

Kelvin applied his prodigious energy and talents to a wide range of physical research, from fundamental speculation (vortex model of the atom, speculation on the ether . . .) to the commercialisation of many inventions. His mind was constantly on the move, as evidenced by his notebooks, now kept in the Cambridge University Library, and he was tenacious in working out fresh ideas in numerical calculations and mechanical models. In this he was self-reliant, but he collaborated with P. G. Tait on an important textbook, *Treatise on natural philosophy* (1867).

Optics, elasticity, electricity, magnetism, thermodynamics, hydrodynamics, navigation, geophysics, crystallography, metrology, and telegraphy by no means

exhaust the contents of his more than 650 papers. On the fundamental side, his name is enshrined in the Kelvin unit of temperature, effectively introduced by him in 1848 as the absolute thermometric scale. He contributed (together with Clausius and Camot) to the confused but ultimately fruitful debate on the emerging theory of thermodynamics, and shares credit for its key concept of entropy. Characteristically, his deep understanding of this subject led him to inventions such as air cooling by refrigeration, which was to be found among his many patents.

In commercial terms, Thomson's most successful work was in submarine telegraphy. Following the failure of the first transatlantic cable he successfully persuaded the promoters of a further attempt to adopt his ideas for improvement, which included the use of a sensitive mirror galvanometer of his own design. In approaching difficult technical problems such as this one, he was able to call on mathematical theory, practical skill, and a wide appreciation of the properties of materials. While less prominent in the conventional histories of science, his many investigations of materials formed one of the foundation stones of today's solid-state physics. It retains much of his terminology ('permeability', 'susceptibility', 'bulk modulus').

One of the few weaknesses of his authoritative view of physical science was a reluctance to accept fully Maxwell's electromagnetic theory of light (cf. G. F. Fitzgerald (qv)). He stubbornly refused to abandon the notion that light was a vibration of a material ether, which was 'a real thing'. Maxwell's abstract fields did not appeal to his realistic view of the physical world, in which the mechanics of matter took pride of place. This was a more serious shortcoming than his oft-cited mistaken estimate of the age of the Earth.

From his time in Cambridge, Kelvin maintained a close correspondence with G. G. Stokes (qv). Another Cambridge Irishman, Joseph Larmor (qv), edited his collected works. He readily acknowledged his Irish identity, and was a staunch supporter of the unionist cause.

Following the death (1870) of his first wife, Margaret Crum (m. 1852), he married (1874) Frances Anna, of the Blandy family of Madeira wine producers. There was no issue of either marriage. In his later years he lived at Netherhall, a substantial mansion that he had built on the Ayrshire coast, and cruised on his 126-ton yacht, the *Lalla Rookh*.

Lord Kelvin was a towering presence in the world of physics for more than half a century. He played a defining role in its emergence as a distinct subject and has often been called the last of the great classical physicists. There is a museum in Glasgow to house a selection of his many instruments and other memorabilia. Numerous biographies and a fascinating published collection of the Kelvin–Stokes correspondence document his long career. Various portraits exist in Cambridge and Glasgow, and a splendid statue looks out towards his birthplace from the Botanic Gardens of Belfast.

C. Smith and M. N. Wise, *Energy and empire: a biographical study of Lord Kelvin*
(1989)

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