

Stevenson, Thomas (1818-1887), civil engineer and meteorologist, born in Edinburgh on 22 July 1818, was the youngest surviving son of Robert Stevenson (1772-1850), and his wife, Jane (c.1779-1846), daughter of Thomas Smith (*bap.* 1752, *d.* 1815), engineer to the Northern Lighthouse Board. He was the brother of Alan Stevenson and David Stevenson. He was educated in Edinburgh at Alexander Brown's Preparatory School and at the high school, where his performance was unremarkable, except for acquiring a grounding in Latin, which he cultivated and enjoyed in later years. Brown's contagious enthusiasm for English literature found in Stevenson a receptive mind, but the severe discipline which accompanied it initiated his lifelong contempt for formal education. On leaving school he provisionally entered the printing firm of his father's friend Patrick Neill, but he did not pursue a typographical career. Youthful interests included collecting books, writing, and printing some of his essays on his own working model of a 'Columbian' press.

At the age of seventeen Stevenson entered the family engineering firm and during a rigorous apprenticeship to his father in 1836-9 he gained experience in harbour, river improvement, and lighthouse work and attended several classes at Edinburgh University. He still found time to write fiction, amounting to a 'drawer full', but when this was discovered by his father he was urged by letter to 'give up such nonsense and mind your business' (Mair, 143). By 1841 Stevenson's book collection is known to have embraced Aesop's Fables with Bewick woodcuts, Boece's *Cronicles of Scotland* (1527), and engineering-related works, including Sinclair's *Hydrostaticks* (1672) with skilful pen and ink restoration of missing plates, presumably carried out by its young owner.

From 1839 until 1841 Stevenson combined his talent for writing with engineering in the columns of *The Civil Engineer and Architect's Journal*. His annotated copies attest to communications advocating the removal of ruinous buildings by blasting, and restoration rather than replacement of ruinous historic buildings; on the form of river bank profiles; the repair of breaches; and on an improved levelling staff and 'quick-set' level, made to his design. In 1845 he furnished the *Journal* with an abstract of his paper to the Royal Society of Edinburgh on forces exerted by sea-waves, the first significant work on this subject. These contributions, together with the first of numerous articles in the *Edinburgh New Philosophical Journal* in 1842-3 on defects in rain gauges and the geology of Little Ross Island, were the earliest of more than sixty publications during his lifetime. Many of these demonstrate Stevenson's innate faculty for the quantitative investigation of natural phenomena and artificial constructions which enabled him to advance contemporary knowledge and practice by means of observation and experiment.

On his father's retirement in 1846 Stevenson became the junior partner in the firm, which after a short period as Messrs Stevenson soon became known as D. and T. Stevenson. In this capacity, he was able for many years to engage effectively in research and development and became a leading authority on lighthouse illumination and harbour engineering. Abroad, the firm's advice extended to lighthouses in India, China, and Newfoundland and to the lighting of the whole coasts of Japan and New Zealand. In Scotland in 1855-84 Stevenson acted jointly with his brother David as engineer to the Northern Lighthouse Board; they designed and executed some twenty-eight beacons and thirty lighthouses, including Dhu Heartach completed in 1872 and Chicken Rock (Isle of Man) completed in 1875, on isolated rocks, which were works of particular difficulty. He then acted as sole engineer to the board for nine months and as joint engineer with his nephew David Alan in 1885-7 until his death.

From 1851 for several decades the firm acted as engineers to the British Fisheries Society and fishery board working at Lybster, Wick, Peterhead, and other harbours. Stevenson continued his practical investigations into the generation and force of waves. By 1852 he had formulated a tentative empirical relationship between their height and fetch which was commonly used by engineers for more than a century afterwards as a first approximation. Other experiments led to formulae which enabled the effect of harbours and breakwaters in reducing the height of waves to be calculated. Stevenson's valuable work became widely known through his *Encyclopaedia Britannica* article 'Harbour' (1857) separately published as *The Design and Construction of Harbours* (1864; 2nd edn, 1874; 3rd edn, 1886). The firm's harbour work was almost invariably successful, except for

Wick breakwater which, as its construction progressed, proved unable to resist the effect of 40 feet waves in 1872–3 and was eventually abandoned as a costly, but nevertheless most instructive, failure.

Stevenson's national reputation was based on his harbour work and more particularly on his devices, by which 'the great sea lights in every quarter of the world now shine more brightly' (R. L. Stevenson, *Familiar Studies*, v). These are fully described in his classic work *Lighthouse Illumination* (1859; 2nd edn, 1871), expanded into *Lighthouse Construction and Illumination* (1881). He developed the work of Augustin Fresnel and Alan Stevenson and installed at Peterhead North Harbour lighthouse in 1849 a catadioptric fixed holophote which was the first to combine the whole sphere of rays diverging from a light source into a single beam of parallel rays. Stevenson then further developed this system by introducing the first dioptric holophotal revolving light which was installed at Horsburgh Rock near Singapore in 1850. The holophotal system, which proved a great improvement in lighthouse illumination, was then adopted on a larger scale by the Northern Lighthouse Board at North Ronaldsay lighthouse in 1851 and afterwards came into universal use. Stevenson also developed the concept of creating an 'apparent' light on dangerous reefs by indirect illumination and reflection from a parent lighthouse and installed a 'beautiful and ingenious contrivance' ('Report ... Stevenson's paper on dipping and apparent lights', 291) at Stornoway in 1851. Stevenson's crowning achievement was his 'azimuthal condensing system', which reduced the available light in some sectors of azimuth and optimized it in others. It was introduced at Isle Oronsay lighthouse, Skye, in 1857 to service Sleat Sound. He was assisted in some of the calculations required for his inventions by his cousin and lifelong friend Professor W. Swan and also by Professor P. G. Tait.

Stevenson was elected a fellow of the Royal Society of Edinburgh in 1848, becoming its president in 1885. He was elected a member of the Institution of Civil Engineers in 1864, a fellow of the Geological Society in 1874, and was a founder member of the Scottish Meteorological Society in 1855, becoming its honorary secretary in 1871. Among the many and permanent contributions which he made to meteorology were the Stevenson screen for the protection of thermometers, designed in 1864 and now in universal use; the introduction in 1867 of the term 'barometric gradient'; and the means of ascertaining, by high and low level observations at Ben Nevis observatory and elsewhere, the vertical gradients for atmospheric pressure, temperature, and humidity.

Stevenson married Margaret Isabella (1829–1897), daughter of the Revd Lewis Balfour, minister of Colinton, on 8 August 1848. In her early and middle life she suffered from chest problems. They had one child, the writer Robert Louis Stevenson. A devoted member of the Church of Scotland, Thomas Stevenson wrote several religious pamphlets including *Christianity confirmed by Jewish and heathen testimony*, and the deductions from physical science (1877; 2nd edn, 1879). He became ill with an enlarged liver in 1885; eventually he developed jaundice and died at his house, 17 Heriot Row, Edinburgh, on 8 May 1887. He was buried in the new Calton cemetery, Edinburgh. He was survived by his wife who lived for a time in Samoa with her son.

Roland Paxton

## Sources

W. Swan, 'Thomas Stevenson', *Proceedings of the Royal Society of Edinburgh*, 20 (1892–5), lxi–lxxviii · *PICE*, 91 (1887–8), 424–6 · R. L. Stevenson, *Records of a family of engineers* (1912) · R. L. Stevenson, *Memories and portraits*, 8th edn (1898) · T. Stevenson, *Lighthouse construction and illumination* (1881) · T. Stevenson, *The design and construction of harbours*, 3rd edn (1886) · C. Mair, *A star for seamen: the Stevenson family of engineers* (1978) · J. M. Townson, 'Thomas Stevenson', *Shore and Beach*, 44/2 (1976), 3–12 · business records of Robert Stevenson & Sons, NL Scot., Acc. 10706 · private information (2004) · R. L. Stevenson, *Familiar studies of men and books* (1886), v · 'Report of the committee appointed by the Royal Scottish Society of Arts on Thomas

Stevenson's paper on dipping and apparent lights', *Transactions of the Royal Scottish Society of Arts*, 4 (1846–55), 291 · d. cert. · family grave, New Calton cemetery

## Archives

NL Scot., corresp. with Scottish Society of Arts · NL Scot., business records of Robert Stevenson & Sons, Acc. 10706

## Likenesses

G. Reid, oils, Scot. NPG · photograph (after G. Reid), Royal Society of Edinburgh · photograph, repro. in Mair, *Star for seamen*

## Wealth at death

£26,918 16s. 11d.: confirmation, 5 Aug 1887, *CCI*

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Roland Paxton, 'Stevenson, Thomas (1818-1887)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004 [accessed 7 Oct 2004: <http://www.oxforddnb.com/view/article/26440>]

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