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THOMSON, JAMES (1822–1892), professor of engineering, eldest son of James Thomson (1786–1849) [q. v.], was born in Belfast, where his father was then a professor, on 16 Feb. 1822. His father superintended his early education and that of his brother William (now Lord Kelvin), and he was never at school, save for a short time at the writing-school of the Belfast Academical Institution. In 1832, when only ten years of age, he commenced attending the university of Glasgow, and in 1834 matriculated and gained a class prize. In 1839 he graduated M.A., with honours in mathematics and natural philosophy. In 1840 he entered the office of John (afterwards Sir John) MacNeill [q. v.] in Dublin, but, his health giving way, he was obliged in a short time to return to Glasgow. Recovering, he next year spent six months in the engineering department of the Lancefield Spinning Mill, Glasgow, and afterwards became a pupil successively in the Horsley Ironworks at Tipton, Staffordshire, and in Messrs Fairbairn & Co.'s works. But ill-health again drove him home. In 1851 he settled as a civil engineer in Belfast, where in November 1853 he became resident engineer to the water commissioners, and in 1857 he was appointed by the crown professor of civil engineering in Queen's College. He held that post till 1873, when he was elected successor to William John Macquorn Rankine [q. v.] in the similar chair in Glasgow University.

Thomson's inventive genius showed itself early. When only sixteen or seventeen he constructed a clever mechanism for feathering the floats of the paddles of steamers. A little later he devised a curious river-boat, which by means not only of paddles, but of legs reaching to the bottom, could propel itself against a current. In the winter of 1842–3 he gained the Glasgow University silver medal for an essay on ‘The comparative Advantages of the Methods employed to heat Dwelling-houses and Public Buildings.’ About this time he began devising improvements in water-wheels. He constructed a horizontal wheel which he named a ‘Danaide,’ and somewhat later another which he patented on 3 July 1850 (No. 13156) and named the ‘Vortex Water-wheel.’ This came into extensive use. At Belfast he occupied himself for several years with investigations as to the properties of whirling fluids, which led to his devising valuable improvements in the action of blowing fans, to the invention of a centrifugal pump, and to important improvements in turbines. A jet-pump which he designed has done important work in draining low-lying lands.

In 1848 he began his many contributions to the scientific journals. In a remarkable paper on ‘The Effect of Pressure in lowering the Freezing-point of Water,’ communicated to the Royal Society of Edinburgh in January 1849 (printed in its ‘Transactions,’ vol. xvi. pp. 541 seq., and republished in the ‘Cambridge and Dublin Mathematical Journal’ in November 1850), he expounded the principles which in 1857 he used as the foundation of his explanation of the plasticity of ice, a subject which continued to engage his attention for years. The results of his researches appeared from time to time in the ‘Proceedings’ of the Royal Society, the most important dealing with ‘crystallisation and liquefaction as influenced by stresses tending to change of form in the crystals’ (December 1861). Many other subjects occupied his active mind. He extended to an important degree the discoveries of his Belfast colleague, Dr. Thomas Andrews, on the continuity of the gaseous and liquid states of matter, made valuable researches on the grand currents of atmospheric circulation, investigated the jointed prismatic structure seen at the Giant's Causeway and elsewhere, and the flow of water in rivers. Papers from his pen on these subjects and others will be found in the ‘Proceedings’ of the Royal Society.

Thomson received the honorary degree of LL.D. from Glasgow in 1870, that of D.Sc. in 1875 from the Queen's University in Ireland, and that of LL.D. from the university of Dublin in 1878. He was elected F.R.S. in 1877.

A practical failure of eyesight obliged him to resign his chair at Glasgow in 1889, and on 8 May 1892 he died, and was followed to the grave within a few days by his second daughter and by his wife. He married, in 1853, Elizabeth, daughter of William John Hancock, Lurgan, co. Armagh, and sister of Dr. Neilson Hancock, professor of jurisprudence and political economy in Queen's College, Belfast. He had one son and two daughters.

[Memoir by J. T. Bottomley, F.R.S., in Proceedings of the Philosophical Society of Glasgow, 1892–3; obituary notice in Proceedings of the Royal Society, vol. liii.; information kindly supplied by his son and daughter, Mr. James Thomson and Miss Thomson, Newcastle-on-Tyne; Addison's Glasgow University Graduates, 1898.]

T. H.
