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“The Institution of Engineers in Scotland”

by Andrew H. Wilson

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THE INSTITUTION OF ENGINEERS IN SCOTLAND

by Andrew H. Wilson

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Abstract

'Learned' institutions, institutes and societies began to appear within the engineering profession in the Western World in the 19th century - for example, the Institution of Civil Engineers in London, England, in 1818, plus the Institution of Mechanical Engineers in Birmingham, England, in 1847, the American Society of Civil Engineers in Reston, Virginia, in 1857, the American Society of Mechanical Engineers in New York, in 1880, and the Canadian Society of Civil (non-Military) Engineers in Montreal in 1887 (In 1918, to become the Engineering Institute of Canada). Their main purpose was the discussion, dissemination and distribution of technical and other appropriate information to the profession and others, plus social occasions for the profession.

The inaugural meeting of the multi-disciplinary Institution of Engineers in Scotland (IES) took place in Glasgow on 1 May 1857, its establishment having been promoted by W.J. Macquorn Rankine, a well-known engineer and Regius (Crown-appointed) Professor of Civil Engineering and Mechanics at the University of Glasgow. (This Glasgow Chair was the first British Regius Professorship to be named in Engineering, in 1840.) The advent of the IES also reflected the changing industrial 'geography' along Clydeside.

This paper will discuss this Institution's history, the history of its 'offshoot' - the Scottish Engineering Hall of Fame, and present short biographies of two of Scotland's leading early engineers: Macquorn Rankine and Lord Kelvin.

About the Series

Principally, the Cedargrove Series is intended to preserve some of the research, writings and oral presentations that the author has completed over the past half-century or so, but has not yet published.

About the Author

He is a graduate in mechanical engineering (1949) and the liberal arts (1954) and has held technical and administrative positions in industry in the United Kingdom and technical, administrative, research and management positions in the Public Service of Canada, from which he retired over 30 years ago. He became actively interested in the history of engineering on his appointment (in 1975) to chair the first History Committee of the Canadian Society for Mechanical Engineering (CSME). He was later president of CSME and of the Engineering Institute of Canada (EIC), and chaired the Canadian Engineering Manpower Council (CEMC) and the Canadian Association for the Club of Rome (CACOR).

To begin with...

Officially, the Institution of Engineers and Shipbuilders in Scotland is a multi-disciplinary professional body and learned society, founded in Scotland, for professional engineers in all disciplines and for those associated with or taking an interest in their work. Its main activities are an annual series of evening talks on engineering, open to all, and a range of school events aimed at encouraging young people to consider engineering careers.

The longer history of the Institution goes like this:

When the formal establishment of 'learned' bodies of engineers began in the 19th century for professional reasons, in English-speaking countries they were usually called 'institutions' in Britain, and 'institutes' or 'societies' in North America. Their functions were the same: the discussion, dissemination and duplication of technical and other information relevant to the different disciplines/branches of engineering. They included, dominantly, the British, American and Canadian learned societies. Scotland, however, was not to be left behind. Apart from the distance to be travelled by Scottish engineers to technical meetings in London, engineering in Scotland, and especially the marine and locomotive-building varieties along Clydeside, was flourishing. As well, the English Mechanical Institution paid an official visit to Glasgow in 1856. So it was no real surprise that an Institution of Engineers was formed, "to encourage and advance engineering science and practice" with headquarters in Glasgow in May 1857, on the initiative of the well-known engineering professor, William J. M. Rankine, and a Glasgow locomotive-building colleague, Walter M. Neilson.

But the job was not finished! Shipbuilding partnered marine engineering along Clydeside. A Scottish Shipbuilders' Association was formed in October 1860, which, in October 1865, amalgamated with the Institution of Engineers. and adopted a new name, The Institution of Engineers and Shipbuilders in Scotland (IESiS), in 1870. The Institution was incorporated by Charter in 1871. In 1873, the Association of Engineers in Glasgow, founded in 1860, merged with the Institution.

In 2020, following the serious reduction in shipbuilding and other engineering activity, and the closure of many Clyde yards, the Institution changed its name back to the Institution of Engineers in Scotland (IES). It remains the multi-disciplinary, 'learned' engineering institution it started out to be!

W.J.M. Rankine, served as the Institution's main promoter and founding president, and served again later. Among its other presidents were: locomotive manufacturer Walter M. Neilson; Robert Napier (whom some credit with being the first to use the phrase 'Clyde-built' to describe the River's engineering and shipbuilding products, as a mark of quality; Sir Archibald and William Denny, Dumbarton shipbuilders; Alex C. Kirk, a pioneer of steam propulsion; John Inglis, engineer and shipbuilder; Sir William Arrol, the bridge-builder; Robert Caird, the Greenock shipbuilder, Sir Harold Yarrow, engineer and shipbuilder; Alexander M. Stephen, shipbuilder; Karen Dinardo, a civil engineer in

private practice and the first woman president (2016-18); plus University of Glasgow Professors of Engineering and Naval Architecture in addition to Rankine: John Dewar Cormack; Percy Hillhouse; Gilbert Cook; A.M. Robb; James Small; Douglas Faulkner; and Strathclyde University Engineering Professors: A.S.T. Thompson; and Iain MacLeod. It would seem that IESIS never lacked a distinguished leader! At the end of its first year, 1857, the Institution had 127 members.

Over the years, the Institution has had a variety of headquarters/meeting locations in central Glasgow.

By 1908, the Institution had around 1600 members. From its earliest years, it has given priority to having a good library and to inter-Library exchanges. A Memorial Plaque was erected in memory of the Glasgow members who perished with the *Titanic* in April 1912. Among its 'treasures' is a copy of a letter signed by James Watt and a copy of the contract between Cunard and Napier which started the Cunard Steamship Line. In the end, the IES Library was given to Glasgow University.

One of the Institution's regular events has been an Annual Dinner, the first of which was held in March 1882. However, as early as 1845, the Foremen Engineers of Glasgow had held a dinner to celebrate the birthday of James Watt. In 1887, the Foremen agreed to hold their dinner annually with the Institution and the Philosophical Society of Glasgow and it was re-named the James Watt Anniversary Dinner, for which the Institution took complete responsibility from 1895.

From the late 19th century, there was a liberal attitude towards younger members, who were encouraged to develop their own programs and to have their own officers and functions and employment registers. In 1881 a series of lectures was begun on naval architecture, endowed by the widow of shipbuilder John Elder, as well as a Chair in the subject at Glasgow University.

In 1920, the Institution launched an appeal marking the centenary of the death of James Watt. Support was raised for what became, in the 1940s, two Glasgow University Chairs, in mechanical and electrical engineering. The Institution has also acted with other local bodies and the University in the solution of marine technical problems. It has also arranged regular technical meetings on specific topics in other cities in Scotland and, in 1901, an International Technical Congress in Glasgow, under the chairmanship of a member, Lord Kelvin. The Congress in 1938 coincided with the Empire Exhibition in Glasgow and attracted 1000 delegates. The Institution's Centenary Congress held in 1957 attracted 500 delegates. The Institution has had 13 Secretaries during its lifetime, three of whom cover the years from 1871 to 1967. The third (1930-1967) was the legendary P.W. Thomas.

The Institution's current street address is: 105 West George Street, Glasgow, Scotland G2 1QL

(Incidentally, the British Institution of Marine Engineers was not founded until February 1888. The first marine engineer in history was, apparently, Archimedes.)

IESIS launched the Scottish Engineering Hall of Fame in 2011...

...to perpetuate the Scottish traditions in engineering and shipbuilding and to provide role models for the younger generations in these professions. The list grows longer at each annual James Watt Dinner. Not all of the inductees have been Scottish-born, nor have they all made their professional engineering reputations only in Scotland. They can be grouped in several ways:

Well-known names:

Sir William Arrol

John Logie Baird

Alexander Graham Bell

David Elder

John Elder

Sir William Fairbairn

The Lord Kelvin (Sir William Thomson)

Alexander C. Kirk

James Clerk Maxwell

Elijah McCoy

Andrew Meikle

William Murdoch

Robert Napier

Percy Pilcher

William J .M. Rankine

John Rennie (Senior)

John Scott Russell

Robert (Lighthouse) Stevenson

Not so well-known names:

Douglas Anderson

George Balfour

James Blyth

Thomas Graham Brown

Sir George Bruce

William K. Burton

Craig Clark

Henry Dyer

George Forbes

Hugh Gill

James Goodfellow

Graeme Haldane

Naeem Hussain

Sir Duncan Michael

Gordon McConnell

Sir Donald Miller

James Newlands

Stephen Salter

Robert Stirling

Robert Thompson

Thomas Telford

W.D. Weir (Viscount Weir)

James Watt

James Young

Sir Robert Watson-Watt

Ladies:

Victoria Drummond (first woman marine engineer in the U.K.)

Molly Ferguson (first woman Fellow of the Civil Engineering Institution)

Dorothee Pullinger (leading automotive engineer)

Anne Gillespie Shaw (time & motion study consultant)

The Initial seven inductees:

Meikle

Thomson/Kelvin

Pilcher

Telford

Watt

Weir

Young

Finally, Two very well-known members...

...and perhaps, in retrospect, the two principal 'stars' of the Institution, Professor William John Macquorn Rankine and (Sir) William Thomson, the Lord Kelvin of Largs.

Perhaps Rankine's principal contribution to engineering theory was with Rudolf Clausius and Lord Kelvin and the laws of thermodynamics, although he also contributed to civil engineering, physics and mathematics. He developed the Rankine scale of temperature, the Rankine Cycle in heat engine theory and, in 1871, published the first edition of a 700-page Manual of Civil (as opposed to Military) Engineering. As a young man, he contributed to mathematics, music and number theory. He published hundreds of papers during his relatively short life.

Rankine was born in Edinburgh in 1820 into a military family with engineering connections. He attended several high schools and the University in Edinburgh, where he won several prizes, but left without a degree. He learned engineering from his father, but later apprenticed under civil engineer, Sir John Macneill. In 1850 he was elected a Fellow of the Royal Society of Edinburgh, the first of many honours. In 1855 he succeeded Lewis Gordon as the Second Regius (Crown-appointed) Professor of Civil Engineering and Mechanics at the University of Glasgow. He died in December 1872 at the early age of 52.

Three members of the Thomson Family moved from Belfast to Glasgow in 1833, father James to the Chair of Mathematics at the University, son James, ten at the time, and son William, eight at the time, were tutored by their father and educated also in London and on the Continent. In 1841 William was sent to Peterhouse, Cambridge to study physics, electricity and mathematics, and graduated in 1845. In 1846, at the age of 22, William was elected to the Chair of Natural Philosophy (physics) at the University of Glasgow. He was knighted in 1866, and ennobled as Lord Kelvin of Largs in 1892, the first British scientist to be so elevated. Kelvin never left Glasgow, and remained in his Chair until 1899, when he retired after 53 years' service. Meanwhile, his brother James was the Regius Chair of Civil Engineering and Mechanics at the University, from 1873 until 1889. In 1904 Kelvin was elected Chancellor of the University.

Kelvin's technical interests were legion and he made significant contributions to industrial research and development; for example, he joined the British-Kodak Company and participated in instrument-maker, Kelvin, Bottomley and Baird, in Thomson & White, and Kelvin & Hughes. These interests involved: submarine and trans-Atlantic cable-laying; depth-sounding; cable instrumentation; compasses; atmospheric electricity; electrometers; atomic theory; heat transfer; and dark matter. He is credited with influencing such colleagues as Rayleigh; Carnot; Clausius; Joule (for example, the Joule-Thomson Effect) and Davy. He received many honours: for example, he was among the first to be admitted to the Order of the Companions of Honour (CH), and among the first members of the Order of Merit (OM). He was president of the Royal Society from 1890 until 1895. Some of his scientific pronouncements were not in fact correct, but only some! He died in 1907, at age 83.

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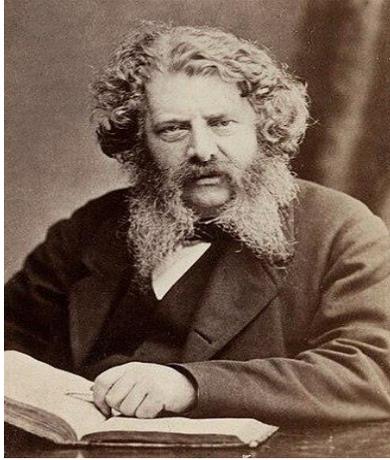
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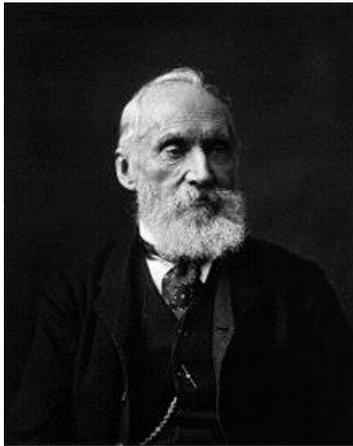
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William Rankine



Lord Kelvin