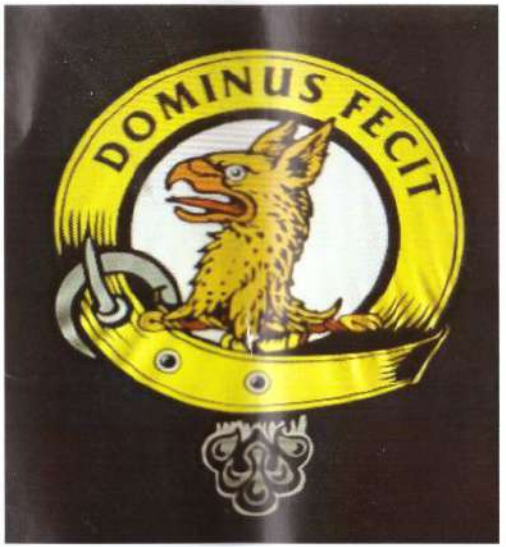
PHEW

PANEL OF HISTORIC ENGINEERING WORKS

Thanks to Sandra Purves, Mark Watson, Jenny Bruce, Isaac Baird, Claire McWilliam and John Yellowlees for their insight relating to aspects of engineering heritage in Scotland especially in the 19th century.



BAIRD FAMILY

Connections in Engineering

Unveiling of two memorial plaques celebrating the construction of Union Canal and the Slateford Aqueduct, Edinburgh.

MONDAY 7TH AUGUST 2023.

WATER OF LEITH VISITOR CENTRE, SLATEFORD, EDINBURGH.

SOME PROMINENT BAIRD ENGINEERS

NICOL BAIRD 1728-1806

CHARLES BAIRD 1766-1843

HUGH BAIRD 1770-1827

NICOL HUGH BAIRD 1796-1849

WILLIAM BAIRD of GARTSHERRIE 1796-1864

JAMES BAIRD of GARTSHERRIE 1802-1876

William Baird and Co.

ARCHIBALD BAIRD & SON of GLASGOW

Company established 1870.

HUGH BAIRD 1770-1827

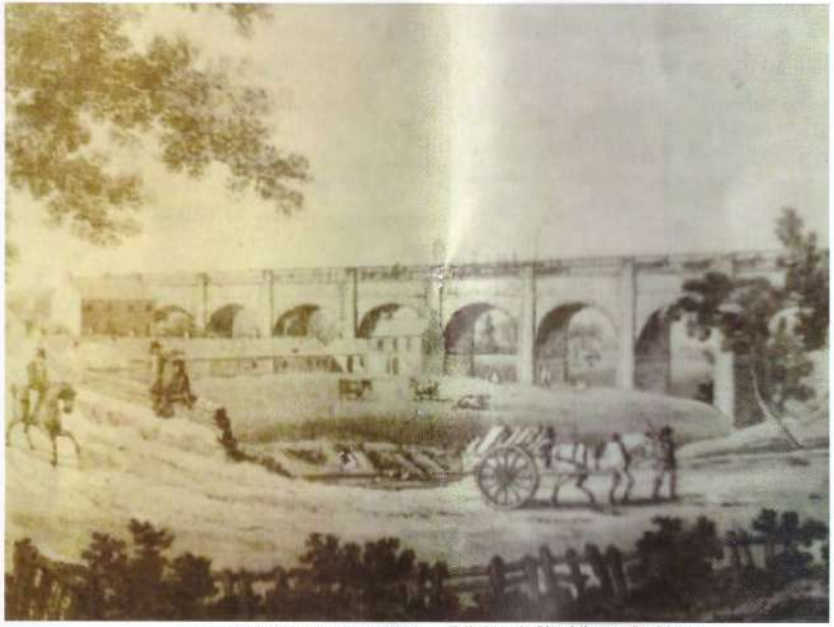
Hugh and his younger brother Robert owned an engineering & iron foundry business, H & R Baird engineers at Hamilton Hill, Old Canal Bason, Glasgow. The firm was recorded in 1800 and again in 1807 as erecting a new crane at the Broomielaw in Glasgow.

In 1795 Hugh took over from Pinkerton & Murray, as Contractor for the Ulverston Canal in Westmoreland which opened in 1796. He is noted as having inspected two sites for reservoirs for the Forth & Clyde Canal in 1796 and by 1799 he was Burgess of Glasgow.

In 1807 he succeeded his father Nicol Baird as Surveyor of the Forth & Clyde Canal. Five years later he was appointed Resident Engineer of the Forth & Clyde Canal. He submitted plans in 1810 for extending the harbour at the Port of Grangemouth & in 1814 for a new wet dock entered from the River Forth. However, neither of these proposals were acted on.

Hugh Baird was commissioned to draw up a plan in 1813 for a canal to link Edinburgh to the Forth & Clyde Canal at Falkirk. There were many objectors to this plan, but Telford declared that it "would be the most perfect inland navigation between Edinburgh and Glasgow that the nature of the intermediate country could afford". The necessary Act of Parliament for this line was passed in 1817 with Baird appointed as the resident engineer for the Canal. The biggest engineering challenge was the construction of the three major aqueducts including this one over the Water of Leith. Baird after consultation with Telford decided on a masonry structure lined with a cast iron trough rather than puddled clay to contain the water for all three structures. The Union Canal was opened in May 1822 and is 31 miles in length from Falkirk to Fountainbridge, Edinburgh. The development of the railways particularly the Edinburgh and Glasgow Railway in 1842 contributed to the canal's decline and it was officially closed in 1965. A renewed interest in canals saw its revival and it was reopened and reconnected to the Forth and Clyde canal in 2002 via the Falkirk Wheel as part of the Millenium Link Project. Today the canal is

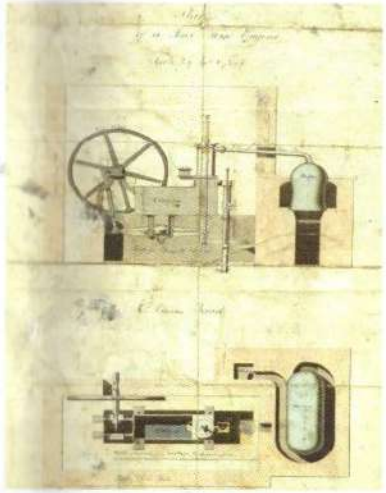
extremely popular for water leisure activities, and it is now having a new lease of life.



SLATEFORD AQUEDUCT 1824. Edinburgh City Library Archives

UNION CANAL ROUTE.

CHARLES BAIRD 1766-1843



(1) **CHARLES BAIRD 1766-1843.** Son of NICOL BAIRD 1728-1806

(2) Plan of a 4 HP engine by Charles Baird

Charles Baird founded the Baird Ironworks in St Petersburg and introduced steam technology to Russia. Apprenticed to the Carron Ironworks Company at Falkirk, Scotland in 1782, within three years he produced the carronade. (A short, smoothbore cast-iron cannon used by the Royal Navy.)

Aged twenty he accompanied Carron partner Charles Gascoigne to establish the Aleksandrovsk gun foundry at Petrozavodsk in 1786. Baird persevered as Gascoigne's assistant for three years. He had been sycophantically baptised Gascoigne Baird but changed his name in 1792 to emphasise a parting of ways. His new partnership in St Petersburg was cemented in 1794 by marrying his partner's daughter Sophia Morgan. Charles Gascoigne is heavily scored out from the partnership that created Baird Ironworks. "*Some Account of Myself*" written in 1832, describes relations with his patron: "the business was entirely conducted by me. Mr G – with all his abilities –

had no knowledge of the business... This man's ingratitude... his jealousy & ill treatment, although it imbittered some years of my early life – formed the character that has enabled me to get thro' life." Baird relates some of his engineering achievements ("the first Steamboat ever run on any waters on the continent of Europe – in 1815 ... before there was a Boat on the Thames"). See illustration below.

Baird kept updated on British steam technology, and supplied machines to the Imperial Arsenal, Mint, a glassworks, and a sugar refinery. He also supplied structural and architectural ironwork: the first cast-iron bridge in Russia (1805) and suspension bridges from the 1820s. Nephews Nicol Hugh Baird (qv), Andrew and William Handyside joined him, the latter leading on architectural ironwork for the Alexander Column and Saint Isaac's Cathedral dome. The serf workforce included skills in ornamental metalwork. Charles Baird's business and technical ability was recognised both in Britain and in Russia. Baird's son Francis carried the Baird Works forward after his father's death in 1843.

The "Elizaveta" Russia's first Steamship. designed by Charles Baird and launched in 1815

NICOL HUGH BAIRD 1796-1849

PORTRAIT OF NICOL HUGH BAIRD
http://collectionscanada.gc.ca/pam_archives//index.p.hp?

RIDEAU CANAL, OTTAWA,CANADA completed in 1832 a distance of 202 km with forty-seven locks.
Photograph J Bruce 2017.

The pioneer spirit that was evident during the early 1800s is a remarkable force in colonial development overseas. Connections

within connections helped make Canada into a prosperous nation, and Nicol Hugh Baird's skills in engineering and inventive creativity were to the forefront in early canal and road engineering especially in Lower and Upper Canada. Following his initial training in engineering practice with both his father Hugh Baird in Scotland and his Uncle Charles in St Petersburg, Russia, Hugh emigrated to Canada in 1828 after his father's death. Letters of recommendation from both Thomas Telford, Scottish Civil Engineer and the Duke of Montrose gave him an instant introduction to receive employment in surveying the Rideau Canal in Ottawa where fellow Scots such as Thomas Mackay and John Redpath were the main building contractors. Baird is also known for works on various canal and road construction such as the Welland and Trent Canals. Other projects which took his interest were Windsor (Whitby) harbour, improvements to Cobourg harbour and Presquile Lighthouse. In 1842 he devised and patented the "sweeping paddle wheel" which would provide greater speed and stability for steam vessels. His detailed historical records are a testament to the ingenuity of Scots engineering. The integrated network evident at this time illustrates shared professional ties, and a twenty-year legacy of integrity, determination and resilience towards the development of the Canadian nation.

GARTSHERRIE IRONWORKS LANARK BY NIGHT by C. R. Stanley 1853
Summerlee Museum of Scottish Industrial Life. Coatbridge.

WILLIAM & JAMES BAIRD.

WILLIAM BAIRD & Co., Gartsherrie

Civil Engineering Marvels: The Rise of the Bairds of Gartsherrie.

Infrastructure creates empires. Developed by brilliant minds of Scottish engineering, a commercial empire rose to shape the United Kingdom and Scotland. This marriage of iron manufacturing and the civil engineering marvel of the Scottish canal system resulted in the rise of the William Baird & Company, Gartsherrie Iron works. By the mid-19th century, the family became the largest producer of pig iron in the world.

The Bairds of Gartsherrie sprung from the fertile soils in Old Monkland near Coatbridge. Originally farmers, they leveraged their land with discovery of coal nearby. Buoyed by rising coal prices, the family rose from obscure poverty to wealth quickly. The two elder sons, William and James, gained success by capitalising on infrastructure and engineering advances. In 1816, they began the first lease on coal mines near Airdrie. They soon expanded to Gartsherrie and in 1826, the Monkland Canal work initiated linking the Bairds to Glasgow and even more importantly to the Forth and Clyde Canal. The Monkland canal, where Hugh Baird served as the resident engineer, connected to the Union Canal. This canal system became so important for the movement of raw resources, that William Baird, the eldest son, became the director of the Forth and Clyde canal in the 1840s.[1] The results of the Union Canal were predicted in 1815 by Thomas Telford who specifically named the work of Hugh Baird when he wrote "...it will open inexhaustible coal fields to the inhabitants of Edinburgh, facilitate intercourse with the city of Glasgow, and the populous districts situated in the vallies [sic] of the Forth and Clyde."[2] Telford further pronounced that engineering issues resolved "...after many trials and mature deliberation, the engineer employed (Mr. Hugh

Baird) has, in my opinion, chosen with great judgement."[3] The canal delivered as the engineers designed.

With the advances in iron manufacturing by Stirlingshire Bairds and others, the Bairds of Gartsherrie rose to significant wealth and power. They leveraged this wealth and political power to donate to local communities, schools, churches, local communities. They expanded into farming with the goal of sustainable farming practices and engaged in diplomatic work in the Middle East and Australia.

It was the culmination and success of Scottish Engineering.

[1] Anton, P. (1893). Kilsyth: A Parish History. United Kingdom: John Smith.
[2] Telford, Thomas. The Scots Magazine and Edinburgh Literary Miscellany. (1815). United Kingdom: Archibald Constable & Company. Pg 336
[3] Ibid.

GARTSHERRIE IRONWORKS, early 1830s
www.culturenlmuseums.co.uk/SIModes/Detail/26545

ARCHIBALD BAIRD AND SON

There are many other Baird families involved with the industrial development of Scotland. One was Archibald Baird and Son of Glasgow and Hamilton, a company started in 1870 as the equivalent of builder's merchants for the mining industry. Gradually their business expanded to selling iron castings for machinery and refurbishing small railway engines for mines. Archibald and his son Matthew were extremely inventive and applied for many patents in all aspects of mine technology ranging from pressure measurement, lubrication of axles, mine ventilation and humidifiers, to specialist safety lighting for mining and miners.

Each family mentioned above have played a rich part in the development of the Scottish Enlightenment. Their contribution being characterized by their innate practicality and astute vision which, when combined with inventive engineering skills provided significant cultural influence reaching far beyond Scotland.

THE NATIONAL TRANSPORT TRUST

The National Transport Trust was formed in 1965 as the only national body which promotes and encourages the **preservation and restoration** of Britain's **transport heritage** in all its forms - road, rail, air, and water. One of the ways that it does this is to designate by means of Red Wheel plaques at sites of transport heritage, with QR codes that link the visitor to its database for more information. Across Britain there are now over 160 Red Wheel plaques, of which more than 30 are in Scotland. The Union Canal, Edinburgh is of particularly interest as it will today have three wheels. One at Leamington Lift Bridge at Fountain Bridge, the Linlithgow Canal basin and now one at Slateford which is one of the three graceful masonry arched structures supporting an iron trough of Hugh Baird's. The others being the Almond Aqueduct at Lin's Mill and the Avon Aqueduct at Muiravonside. Other examples of Red Wheel heritage plaques on canals are to be found at the Crinan Canal, the Caledonian Canal at Fort Augustus and the former Glasgow, Paisley, and Johnstone Canal.