John Rennie’s improvement of Scotland’s infrastructure 1779-1821

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Funeral arrangements at St. Paul Cathedral extremely well devised. The funeral coaches and private carriages formed a line nearly a mile long. The coffin which was a gigantic proportions, covered with black velvet and ornamented with gold, was carried by eight bearers. The cortege consisting of a hearse with six horses, 16 mourning coaches and 19 private carriages moved slowly from Rennie’s house at Stamford St. A few minutes before one o’clock the body was carried into St. Paul’s followed by 60 mourners. Among the vast number of distinguished persons who followed Mr. Rennie to the grave we noticed Sir Joseph Yorke, Sir Humphrey Davy, Sir J. Seppings, Sir George Cockburn, Mr Hamilton Under Secretary of State, Mr. Chantry R.A., &c. &c. Mr G. Rennie, eldest son was chief mourner. Some confusion arose from the efforts of the crowd to force themselves with the procession into the church, but no serious accident occurred.
Here lie the mortal remains of
JOHN RENNIE
CIVIL ENGINEER
F.R.S.  F.A.S.
Born at Phantassie in East Lothian
7th July 1761
Deceased in London 4th Ocr. 1821
THIS STONE
is dedicated to his private virtue
and records
the affection and the respect of
his family and his friends
but
the many splendid and useful works
by which
under his superintending genius
England, Scotland and Ireland
have been adorned and improved
are
THE TRUE MONUMENTS
OF
HIS PUBLIC MERIT
Waterloo—Southwark—Bridges
Plymouth Breakwater
Sheerness Docks &c. &c. &c.

Rennie bust and grave inscription in St Paul’s Cathedral
His date of birth was actually 7 June 1761
Rennie’s birthplace, Fantacie (Phantassie), East Linton – note Knowes Mill which reputedly he worked on c.1779
Houston Mill, East Linton - home of Andrew Meikle Millwright, from whom Rennie learnt his trade from c.1773
Rennie’s birthplace, Phantassie, East Linton
Knowes Mill 1779 – undershot wheel
[reputed to be the first mill on which Rennie worked]
man of the name of Rannie. He was intended for a mill-wright, and was breeding to that business under the famous Mr Mackell at Linton, East Lothian. He had not then attended Mr Gibson for the Mathematics, &c. much more than six months; but on his examination, he discovered such amazing powers of genius, that one would have imagined him a second Newton. No problem was too hard for him to demonstrate. With a clear head, a decent address, and a distinct delivery, his master could not propose a question either in natural or experimental philosophy, to which he gave not a clear and ready solution, and also the reasons of the connection between causes and effects, the power of gravitation, &c. in a masterly and convincing manner; so that every person present admired such an uncommon stock of knowledge amassed at his time of life. If this young man is spared, and continues to prosecute his studies, he will do great honour to his country.

David Loch’s school examiner’s report on Rennie at Dunbar High School in 1778. Rennie was at Edinburgh University 1780-83 – studied part-time under Professors Robison and Black
Rennie’s Scottish Projects 1779 – 1821

His early work included mills, canals, and harbours
Rennie letter to Shuttleworth re. Rochdale Canal in July 1792. Note his busy life – Crinan Canal survey – Inverary, Tobermory, Ullapool, Wick and Inverness Harbours
Aberdeenshire Canal 1796-1805. GNSRailway in 1854
Crinan Canal
1793 – 1801
Refurbished
1815-17
9-mile long Crinan Canal at Crinan
Edinburgh to Glasgow Canal – Rennie’s involvement 1797-1816. He favoured a line in this 1815 report 40 ft higher than Union Canal.
Edinburgh and Glasgow Canal project – Rennie’s line (brown) connecting Leith harbour. Baird’s line (green) begun 1817
Edinburgh to Glasgow Union Canal project – Rennie’s line (brown)
Rennie worked on Wick harbour and mills in 1790s but Telford’s harbours (above) were executed.
Rennie’s Queensferry Improvements 1808-17
Note Hawes and Longcraig piers
Ferry patronage at Queensferry in 1811 from Rennie’s report

Great as the importance of this communication has always been reckoned, the ideas entertained of it have fallen very short of the reality. It appears from an account kept by the superintendent, that during the year ending 15th May 1811 there crossed at the Queen’s-ferry Two Hundred and Twenty-Eight persons every day throughout the year. And on some days so many as Four Hundred and Forty-Seven were ferried over. There passed during the same year

| Carriages | -   | -   | -   | 1515 |
| Carts     | -   | -   | -   | 4254 |
| Horses    | -   | -   | -   | 13154|
| Cattle    | -   | -   | -   | 18057|
| Sheep     | -   | -   | -   | 25151|
| Barrell Bulk | -   | -   | -   | 5520 |
| Dogs      | -   | -   | -   | 2615 |

by far the greater part of which travelled along the Great North Road. The value of the goods
Hawes Pier Queensferry in 2008
Queen Margaret ferry-boat at Hawes Pier Queensferry in 1963
Plan of the
RIVER CLYDE
At the City of Glasgow
WITH THE PROPOSED DOCKS ON THE
BROOMIELAW.
by the late M. Rennie.

Fig. 1.

The soundings are all taken in feet and inches at High Water mean tides the level of H. W. being 9 feet 3 inches below the top of granite coping on S. Quay Wall.
Leith - Rennie docks and warehouses executed 1804-17
Leith Docks 1806 - Entrance lock, swing-bridge, dry dock. Rennie’s drawing
Leith docks entrance lock 1806 as in 1980
Leith docks entrance lock as preserved in 2010
Leith docks in 1838 – note Rennie’s entrance lock and docks (left) and dry dock (right)
Fraserburgh Harbour 1806. Rennie’s work incorporated in North Pier.
Helmsdale Harbour
1814-19
Rennie Engineer
Proposed Break-water not built?
Portpatrick Harbour – Rennie 1818 – 2 piers and lighthouse – c. £170,000. Work began 1820 – ‘700-800 labourers digging, quarrying, trundling barrows and working by night and day in the light of blazing coals … din of ocean stilled by the clang of hammers, suction of pumps, hissing boilers and bellows roar. £14,000 storm damage in 1839. Above view c.1850
Rennie’s Berwick Pier and Lighthouse 1808-24. Pier about 30 ft wide and 2000 ft long. Cost £63,000 – still used
Bell Rock Lighthouse as erected 1807-11
John Rennie, Chief Engineer
Robert Stevenson, Resident Engineer
Slow progress until the beacon was built alongside, then completion of masonry in 13 months
Bell Rock layout with various features named by Stevenson - e.g. Port Rennie
Bellrock Lighthouse kitchen – note floor dovetailing
Plymouth Breakwater 1812-47
Edinburgh water supply
Crawley Spring
Glencorse Reservoir
1820-25

Glencorse dam
Glencorse Reservoir 1825 – Engineer James Jardine

John Rennie’s signature on original specification
Loch Leven proposed drainage in 1810 to reclaim 500+ acres and improve water supply to River Leven mills. Done 1830. Rennie’s drainage of English East & West Fens was on much larger scale.
Rennie bridges roads and railway (all shown red).
Stenhouse Bridge over Water of Leith, Edinburgh 1784 – Rennie’s role unconfirmed. Bridge replaced c.1925
Whiteadder Bridge, Berwickshire - Proposals 1800. Rennie changed his spandrel load transference mode from radial to vertical at Boston in 1804
A stone bridge at Kelso was built 1755-6, fell 1757, rebuilt c.1760, fell in 1797 when, according to Rennie, “during one great ice flood it had four of its six arches very much choked with ice and the current running between its narrow starlings and the other two arches, dug out the bottom and swept the whole away.”
Kelso Bridge 1801-04
72 ft spans (elliptical)
“When living in Kelso in 1803 I got employment at the New Bridge … a more chaste and beautiful structure with the exception of Waterloo and London Bridges does not exist [but]…to which I took a great dislike … I met with an accident which nearly crippled me for life … [when carrying a stone] beyond my strength I sank under the load and the stone fell on my right leg … near 3 months confinement … effectively barring a mason’s clerkship”
Rennie drawings of Musselburgh (46 ft max) and Newton Stewart (50ft max) Bridges
Musselburgh Bridge 1806-8 widened in 1925 on downstream side by Blyth & Blyth, Edinburgh
Musselburgh Bridge 1806-8 in 2010
Cree Bridge, Newton Stewart 1812-14 – cost £8234
Glasgow, R. Clyde, Hutcheson Bridge Proposal 1815
(120 ft – 140 ft- 120 ft spans: ribs 48-66 ins deep)
Ken Bridge, New Galloway (90ft. max) 1820-24. Extensive water-way as earlier bridges destroyed by floods in 1806 and 1815.
Rennie drawing of Bridge of Earn (72 ft spans) – built 1819. Widened in 1925 by F.A. Macdonald & Prtnrs
Rennie’s Bridge of Earn 1819 as widened with concrete in 1925 retaining the elliptical shape of the original arches visible under the bridge.
Rennie’s (8-arch) Cramond Bridge 1820-21 under demolition in 1963
Rennie proposal 1808-22 - not executed
Union Bridge, Paxton, 1819-20. Rennie advised Capt. Samuel Brown RN on the strengthening of the tower and abutment, of what is now the world’s oldest suspension bridge still carrying vehicular traffic.
Union Bridge abutment 1820 Wrought ironwork by Capt. Samuel Brown. Rennie advised
Southwark Bridge 1814-19. Weight c. 5400 tons. Cost £0.66m. Demolished 1920.
Rennie’s Waterloo Bridge London with centering
Waterloo Bridge 1811-17 – ‘the finest bridge in Europe’, cost £1M. Under demolition from 1934. Note balusters and Arrol’s temporary steel replacement bridges. Rennie also designed Southwark and London Bridges.
London Bridge opened 1831 cost £2.5m. Sold in 1968 for $2.5m. Façades now part of a re-build at Lake Havasu, Arizona, USA.
Rennie Memorial, East Linton, including Waterloo Bridge baluster (not seen) and James Rennie, at its relocation at Phantassie in 1981 (left). 1936 memorial on bypass (right)
Second Waterloo Bridge baluster in Phantassie grounds, with plaque from 1936 memorial at base. This was replaced by a larger plaque on its relocation at Phantassie in 1981.
Rennie as a bibliophile was a man after my own heart. When his fine library was sold at auction in July 1829, it comprised more than two thousand titles ranging from the 15\textsuperscript{th} to the 19\textsuperscript{th} century. It included early printing, history, topography and travel with such gems as Daniell’s \textit{Ornamental Scenery} (1795) and \textit{Voyages in Great Britain} (1814-25) and Hakluyt’s \textit{Navigations} (1805), works by Defoe, Euclid, Isaac Newton and Euler, and a first folio Shakespeare (1623)!