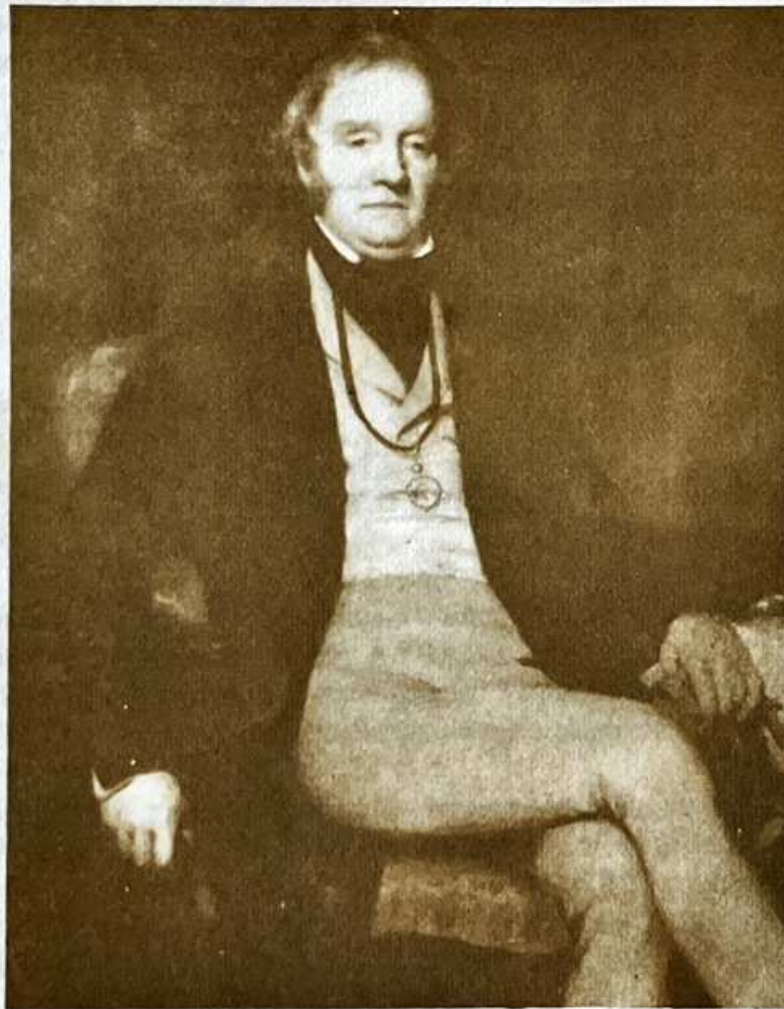


**THOMAS GRAINGER, C.E., F.R.S.E.  
1794-1852**

**EXHIBITION**

on the occasion of the unveiling of his portrait  
in the Civil Engineering Department, Heriot-Watt University by

**W. G. N. GEDDES, C.B.E., B.Sc., D.Sc., F.I.C.E., F.I.Struct.E., F.R.S.E.,**  
*Past President of the Institution of Civil Engineers*



by **Roland Paxton, M.Sc., C.Eng., M.I.C.E.**  
*Member of the Panel for Historical Engineering Works*

**THE INSTITUTION OF CIVIL ENGINEERS**  
**Edinburgh & East of Scotland Association**

Edinburgh : 1982

## INTRODUCTION

Thomas Grainger and his partner John Miller became outstanding civil engineers largely through initiating and successfully developing much of the Scottish railway system in the second quarter of the 19th century. Grainger was born at Gogar Green, lived much of his life in Ratho Parish, and was buried in Gogar Cemetery. These locations are all within three miles of Heriot-Watt University and the return of his portrait from Westminster to its new home in Scotland is particularly appropriate. This seems even more so when one finds Grainger in 1849, as President of the Royal Scottish Society of Arts, urging young engineers to contribute papers on engineering topics and stressing the need for discoveries to minimise production and transportation costs and to improve the quality of manufactured goods.

This exhibition represents a long overdue attempt at a modern appreciation of Grainger's work. It includes a selection of original material on display for the first time and aims to give an impression of his, and to some extent, Miller's engineering achievement and practice in the context of the technological limitations of their day.

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## ACKNOWLEDGMENTS

The Local Association wishes to thank the following for their interest and support:

The Council of the Institution of Civil Engineers for making the portrait by Sir John Watson Gordon available on permanent loan.

Charles Roe, Chairman of the Museum Committee, Professor Arthur Bolton, David Haldane and others for their efforts in obtaining transport and hanging the portrait, and for making this exhibition possible.

Dr Walter Makey, City Archivist, Edinburgh District Council, for the loan of item 1.

P. J. W. Kilpatrick, a descendant of Grainger's sister and former Member of Court of Heriot-Watt University, for the use of his notes.

This edition has been limited to 300 copies.

## EARLY YEARS

1. **Plan of the East Side of Leith Walk.** Surveyed by Thos. Grainger. May 1819. Original coloured drawings (1700 x 280 mm). Signed by John Henderson, Lord Provost for the Leith Walk Trustees.  
*Grainger set up in business as a land surveyor in 1816. He trained under John Leslie from c.1811 and attended classes in Natural Philosophy at Edinburgh University in 1817-18.*



2. **Monkland & Kirkintilloch Railway Act 1824.** Title page.
3. **The Lanarkshire Railways.** Lithograph map. No imprint. c.1840. (705 x 545 mm).  
*From 1823-25 Grainger surveyed, designed and constructed the Monkland & Kirkintilloch Railway. Movable locomotive engines were envisaged in the Act. During the next decade Grainger & Miller engineered most of the Lanarkshire Railways including the Glasgow & Garnkirk. Miller worked for Grainger from 1823 and became a partner in 1825 when 20 years of age.*
4. **Report of a survey . . . best road from Glasgow to Ayrshire.** Edinburgh: 1829. 4to pp 46 folding plan. Holograph note by Grainger.  
*This project was one of a number of nationally strategic road improvements surveyed and reported on by the firm before the potential for a national network of locomotive powered railways was generally realised c.1830. Grainger was co-surveyor on the Edinburgh to Newcastle road improvement scheme for J. L. McAdam in 1828 (via Carter Bar).*

5. **Grainger's Record of Admission to Membership of the Institution of Civil Engineers.** 3 February 1829. Signed by Telford. Copy I.C.E. Library. *By 1828 the firm were practising as "Civil Engineers and Surveyors from 56 George Street, Edinburgh."*
6. a. **Opening of the Glasgow & Garnkirk Railway. View at St Rollox looking south-east.** Old sepia facsimile lithograph after the original by D. O. Hill in 1832. (358 x 278 mm).
  - b. *ibid.* **View of the Depot looking south.** (358 x 273 mm).
  - c. *ibid.* **View near Provan Mill Bridge looking west.** (358 x 276 mm).
  - d. *ibid.* **View of the Germiston Embankment looking west.** (358 x 276 mm).

*Grainger introduced steam locomotion on the Glasgow & Garnkirk Railway in 1831. The views give a good idea of the scope of his work and practice.*

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#### EDINBURGH & GLASGOW RAILWAY

7. **Observations on the formation of a Railway Communication between . . . Edinburgh & Glasgow . . .** Edinburgh: 1830. 4to. pp. 10, 4, folding plan, folding view of locomotive and train. *Grainger had travelled on the Liverpool & Manchester Railway on 15 September 1830, its opening day, at the then seemingly incredible speed of 20-25 m.p.h. and within a month the firm had prepared the above observations promoting the first Scottish inter-city railway.*
8. **Plan and Section of the proposed Edinburgh & Glasgow Railway.** Partly coloured lithograph c.1830. Initialled "G. & M.". (3760 x 596 mm). *A reduced version was published by the firm in a report of January 1831. This proposal shows at a scale of 4 in. to 1 mile a route from Haymarket via Bathgate to join with the Garnkirk & Glasgow Railway.*
9. **Edinburgh and Glasgow Railway. Reports by Mr George Stephenson . . . and Messrs Grainger & Miller . . .** Edinburgh: 1831. 4to. pp. 28, folding plan. *The firm with the backing of Stephenson and their operational experience of steam locomotion on the Lanarkshire Railways put up a strong case for the railway, but the opposition from the Canal Company and landowners proved so difficult to surmount that a decade was to pass before the railway was finally completed under Miller's superintendence.*
10. **Specification. Almond Valley Contract 1838.** MS. fo. page 20—Almond Viaduct.
11. **Almond Viaduct.** Modern photograph.

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10. **Specification. Almond Valley Contract 1838.** MS. fo. page 20—Almond Viaduct.
11. **Almond Viaduct.** Modern photograph.

12. Autograph letter from Miller to John Gibb & Son (Contractor). 27 December 1839. 4to. pp. 2.

*Relating to an accident in which a man had been severely burned by firedamp during the construction of Winchburgh Tunnel and recommending measures for improving the ventilation.*

13. Mr Buchanan's ticket for the private opening of the railway on 18 February 1842.

*Depicting Haymarket Station and other scenes including the Almond Viaduct. Possibly the Edinburgh Civil Engineer, George Buchanan.*



#### OTHER WORK AND MORE SCOTTISH RAILWAYS

14. Glasgow Water Supply. Report of 1834 recommending reservoirs, conduit and pipes from the Water of Earn to the city. In "Report by the . . . Councillors of Glasgow . . . to conduct the opposition to the Bill . . . for the better supplying of the city . . . with water". Glasgow: 1835. 8vo. pp. 44, Folding plan.  
*Not executed.*

15. **Plan of the Intended Harbour, Docks, Piers . . . at Trinity, near Edinburgh.** 1834. Report from the Select Committee . . . Harbours of Leith and Newhaven. P.P., H. of C. 6 July 1835. Pl. 11. fo.  
*Not executed, but influenced the creation of Granton Harbour.*
  16. **Edinburgh Northern Railway Prospectus, 1844.** pp. 3 (267 x 427 mm).  
*Grainger's proposal to connect Edinburgh with Perth and Dundee involved an inclined plane into Central Edinburgh under Scotland Street powered by stationary steam engines and ferry crossings of the Forth and Tay. He originated the idea of floating trains across these rivers and the Tay train ferry at Broughty Ferry with its terminal harbours began operation in 1849.*
  17. **North Portal of Scotland Street Tunnel.** Modern photograph.
  18. **Scotland Street Tunnel.** Longitudinal section of strata. (Lithograph, undated).
  19. **Edinburgh, Perth & Dundee Station, Princes Street, Edinburgh, 1852.** From O.S. 5 ft. to 1 mile map. *Closed in 1868.*
  20. **Report to . . . Council of . . . Edinburgh relative to . . . eligibility for Manufacturing Establishments.** Edinburgh: 1835. 8vo. pp. 24, 4 plates. Printed wrapper.  
*Grainger was convener of a Committee recommending the establishment of cotton, flax and woollen mills utilising steam power.*
  21. **Edinburgh & Bathgate Railway.** (Parliamentary). **Plans and Sections of the proposed extension of the Barracks' Branch . . . from Whitburn to Benhar Coalfield and Shots' Iron Works . . . 1846.** Thomas Grainger, Engineer. Obl. la. fo. 7 sheets.  
*Grainger's partnership with Miller had ended in 1845 but between them they had been associated with most of the Scottish Railways in operation at that time.*
  22. **Map of Railways in Scotland . . . for Scottish Railway Gazette.** W. & A. K. Johnston. Edinburgh: October 1846. (534 x 645 mm).
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## LEEDS, DEWSBURY & MANCHESTER RAILWAY

23. **Leeds Viaduct.** East end showing cast iron arches of 70 ft. and 105 ft. spans over the Leeds & Liverpool Canal and r. Aire. Original drawing (2220 x 532 mm). 13 August 1847. Signed Thos. Grainger, Engineer.
24. **Plan of Foundations of South Abutment of the River Arch.** Signed Thos. Grainger, 24 August 1847. Original coloured drawing. (440 x 516 mm). *Shows 11 ft. long timber piles at 3 ft. centres.*
25. **Sketch Plan for a Central Station at Leeds.** October 1846. Partly coloured lithograph (1030 x 655 mm). *Extends to the crossing of the r. Aire.*
26. **Leeds Central Station.** Plan and front elevation. Dated from 16 Castle Street, Edinburgh. 18 February 1847. Original coloured drawing. (1320 x 543 mm).
27. **View of timber viaduct near Leeds on the Leeds & Dewsbury Railway taken from the Whitehall Road.** April 26th 1848. Original colourwash drawing. (430 x 315 mm). *A temporary timber approach viaduct and station were built pending finalisation of the permanent station design.*
28. **Churwell Contract. Details of Iron Work for Bridge.** Signed Thomas Grainger, Engineer, J. Henderson, Resident Engineer, Leeds, 24 July 1847. Cast iron girder bridge of 32 ft. 6 in. span. Original coloured drawing. (960 x 632 mm).

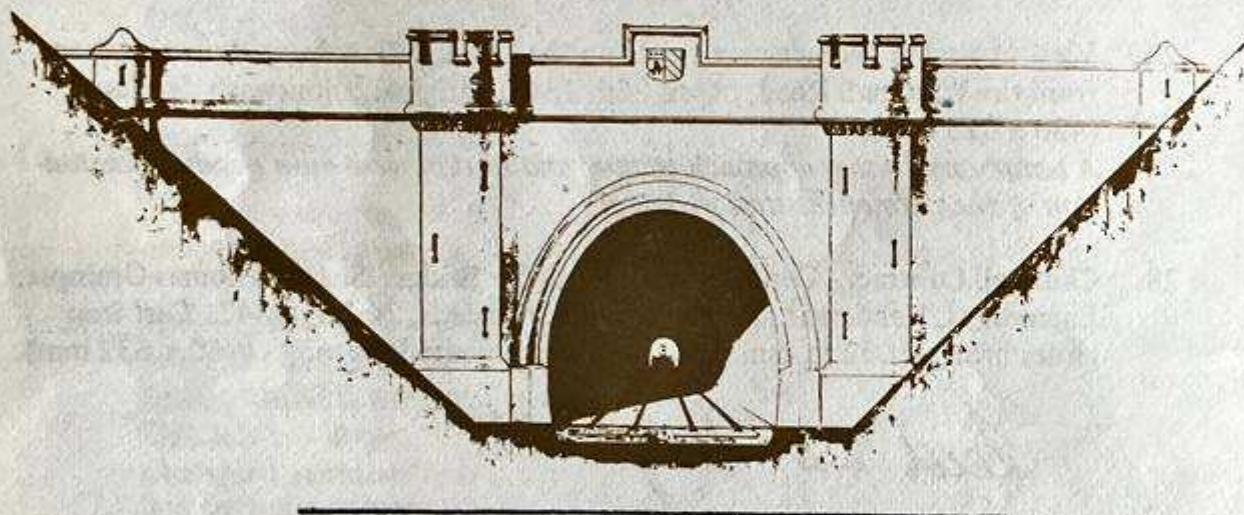
*Leeds 24 July 1847*

*Thomas Grainger  
Engineer  
J. Henderson  
Resident Engineer*

29. **Details of Ironwork on Roof of Engine Shed. Copley Hill.** Dated from 119 George Street, Edinburgh. Original coloured drawing. (980 x 640 mm). 17 June 1848.
30. **Details of Workshops. Copley Hill.** Dated from 119 George Street, Edinburgh. January 1848. Original coloured drawing. (940 x 580 mm).



31. **Dewsbury Contract (Ravenswharfe Viaduct). Drawing No. 4. Bridge No. 2. Over the River Calder.** 1846. Original partly coloured drawing (1800 x 750 mm). Cast iron arch skew bridge of 2 No. 100 ft. spans.  
*A model is displayed in upper gallery of the Royal Scottish Museum. The bridge is still in use.*
32. **Leeds & Dewsbury Railway—Plans and Sections.** c.1846. Signed J. Henderson. Lithograph. (6625 x 462 mm). With MS detail added.  
*Open at Morley Tunnel—3373 yards in length.*
33. **Morley Contract. Altered drawing for Tunnel Section.** 1846. Signed Compd. J. Allen Leeds, January 20th 1847. Original coloured drawing. (630 x 740 mm).
34. **Leeds, Dewsbury & Manchester Railway. Design for Tunnel Entrance—Morley Contract.** Dated from 119 George Street, Edinburgh. December 1847. Original coloured drawing. (635 x 450 mm).



#### POST SCRIPT

Grainger deserves to be remembered today not so much as an innovator, although his Tay train ferry was at the forefront of engineering practice, but mainly for his foresight in appreciating the benefits of railway communication at an early date and his energetic achievement of much of the basic railway infrastructure of Scotland and Yorkshire. The exhibition indicates the scale of some of his work on the Leeds, Dewsbury & Manchester Railway with his magnificent proposal for Leeds Central Station, its approach viaduct, Morley Tunnel and Ravenswharfe Viaduct, but he also engineered the East & West Yorkshire Junction and the Leeds Northern Railways.\* Amongst his many interests he was also an advocate of increased safety on railways, and it is ironic that it was a train collision on an extension of the latter railway near Stockton that resulted in his death on 25 July 1852.

\* Minutes of Proceedings, I.C.E., Vol. xii, p. 159. (*Obituary notice*)