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EDINBURGH  
& DALKEITH  
RAILWAY:  
GLENESK BRIDGE,  
DALKEITH.

The case for an  
1829-31  
date of origin.

Roland A. Paxton,  
M.Sc., C.Eng., F.I.C.E.

Senior Research Fellow,  
Heriot-Watt University

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THE RAILWAY  
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Dedicated to  
**CHARLES E. PETERSON,**  
F.A.I.A.,  
of Philadelphia,

**Architectural Historian, Restorationist and Planner,  
who examined this fine example of conservation  
with the author in August 1993 and who  
encouraged him in this investigation.**



Fig. 1. James Jardine (1776-1858), F.R.S.E.  
Engineer to the Edinburgh & Dalkeith Railway, 1826-45. [1]

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INTRODUCTION

The statutory list of buildings of architectural or historic interest compiled by Historic Scotland and other post-war publications [2,3,4,5] mistakenly give the date of construction of Glenesk Bridge as 1847 and its Engineer as John Miller (1805-1883). One account even states that the present bridge replaced an earlier timber structure. The recently-made plate on the bridge also gives the construction date as 1847. On the basis of this understanding the bridge is currently listed as category B. The author is convinced that there never was an earlier timber railway bridge at this site and that the present stone structure below deck level is nearly two decades earlier and of much greater historical significance than is generally realised.

The object of this publication is to demonstrate that Glenesk Bridge with its fine ashlar masonry, archivolt, tapering pilasters and extensive curved wing-walls [Fig. 2] is a masterly, late-Georgian creation of the eminent civil engineer, and close associate of Telford, James Jardine (1776-1858), F.R.S.E., Engineer to the Edinburgh & Dalkeith Railway. The bridge, which beyond a reasonable doubt was erected between 1829 and 1831, bears an elevation which is reminiscent of some of Telford's Highland road bridges and contrasts markedly with the ubiquitous standardised railway arch bridges and viaducts of the mid-19th century, for example those on the former North British Railway [Figs 3 & 4]. Because of its true provenance, scale, quality and character, Glenesk Bridge is of national significance in historical engineering and heritage terms and can be considered as Scotland's finest pre-Victorian railway bridge.

As part of his lecture tonight to the Dalkeith History Society and the Institution of Civil Engineers on the subject of the Edinburgh & Dalkeith Railway, 1826-45, the author hopes to lay the ghost of a timber bridge and an 1847 dating to rest, to enhance public appreciation of Glenesk Bridge in the year of its tasteful conservation, an achievement which reflects great credit on all concerned, and to persuade Historic Scotland to upgrade its listing to A, which ought to ensure its future preservation.

#### FINDINGS

The statements of an 1847 dating for Glenesk Bridge and that there was an earlier timber bridge at this site, are not supported by any contemporary evidence that has come to the author's notice after an extensive search of publications and records. Conversely, a convincing case in support of an 1829-31 dating for the bridge has emerged based, in the absence to date of the specification and contract, on overwhelming circumstantial evidence:

1. As already mentioned, the design of Glenesk Bridge is characteristic of the best of early 19th century road bridge design practice and not the developed railway structures of the mid-1840s.
2. The bridge was originally designed at the width required for a *single track, 4 ft. 6 in. gauge, railway* in order to minimise its considerable capital cost. Jardine, prudently, as it has transpired, and happily for posterity, avoided earlier proposals for timber and iron bridges by Grieve [7] and Chapman [8], preferring the stability and greater longevity of masonry. Thomas [9] is, uncharacteristically, not quite correct in indicating that from 1831 the main line was double throughout. It was double from Edinburgh to the north end of the bridge, where it merged into a single track to cross, and continued single for about 1½ miles to the South Esk terminus at Dalhousie Mill. What can be taken as a reliable measurement of the *clear width* between parapets of the bridge in August 1838, has been stated at *14 ft. 10 in.* [10] by the Railway Company's ingenious Manager David Rankine, and who was father of Professor W. J. MacQuorn Rankine (1820-

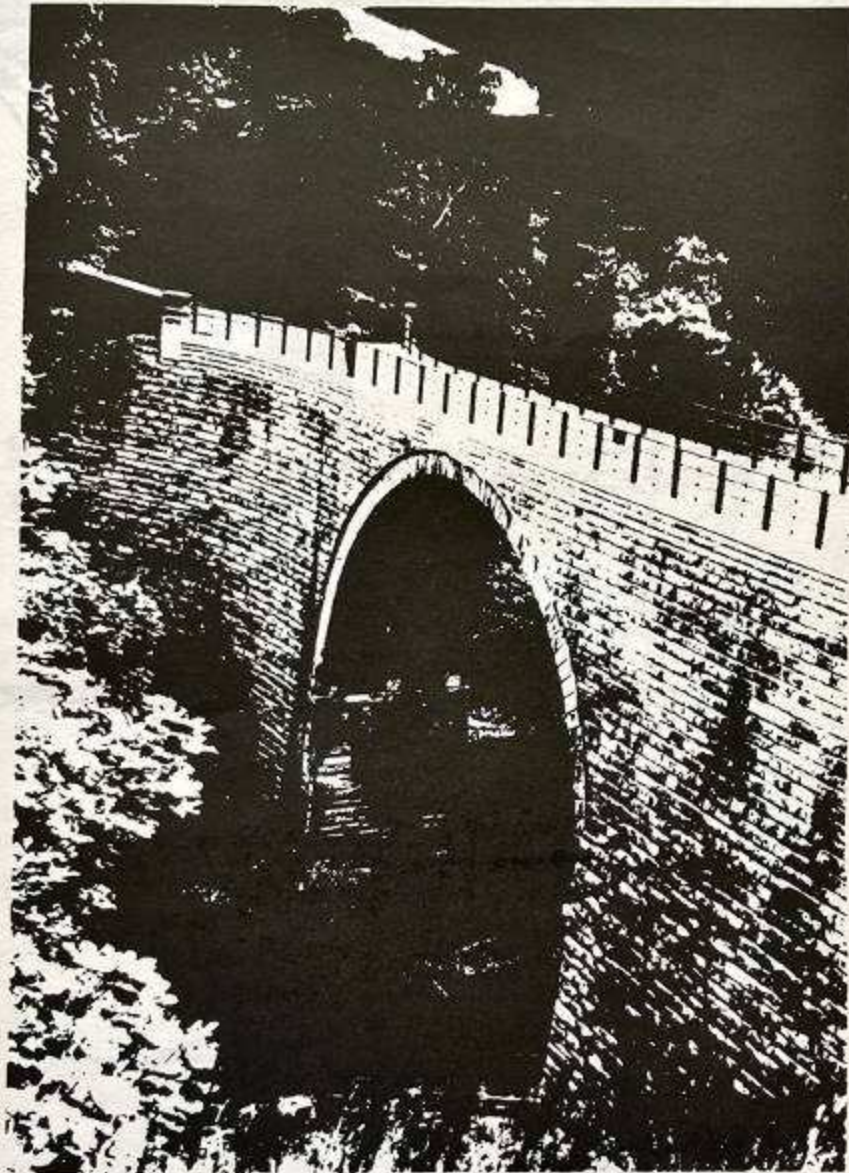
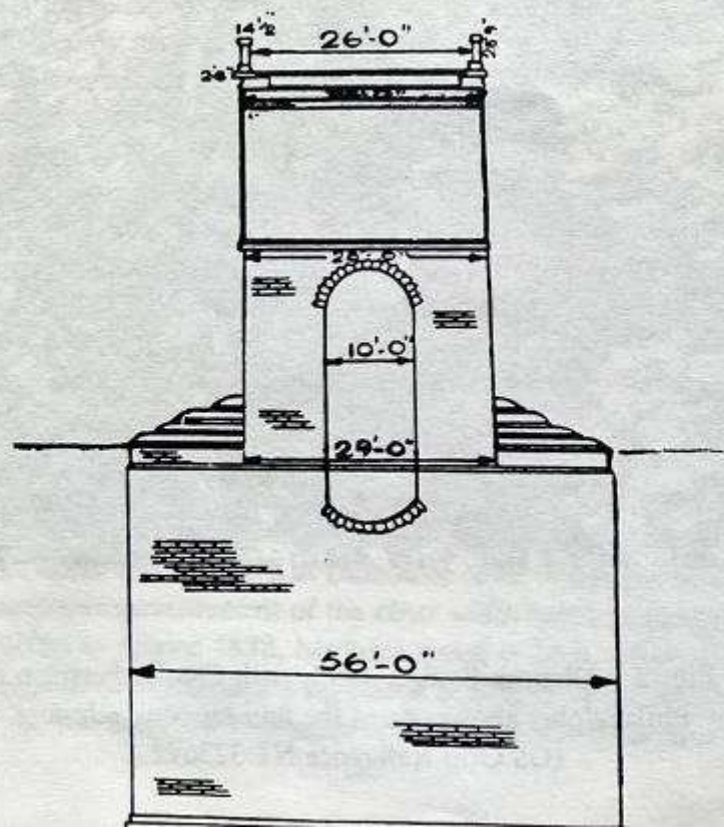
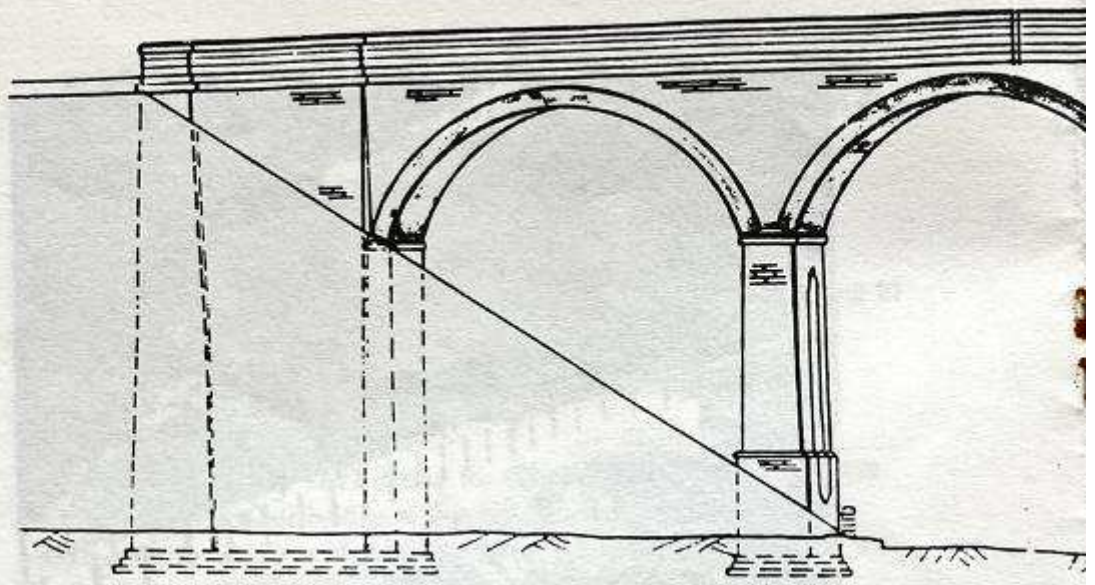


Fig. 2. Glenesk Bridge, 1993, with Charles Peterson of Philadelphia above one of the four tapering pilasters. (OS Grid Reference NT 323672.)





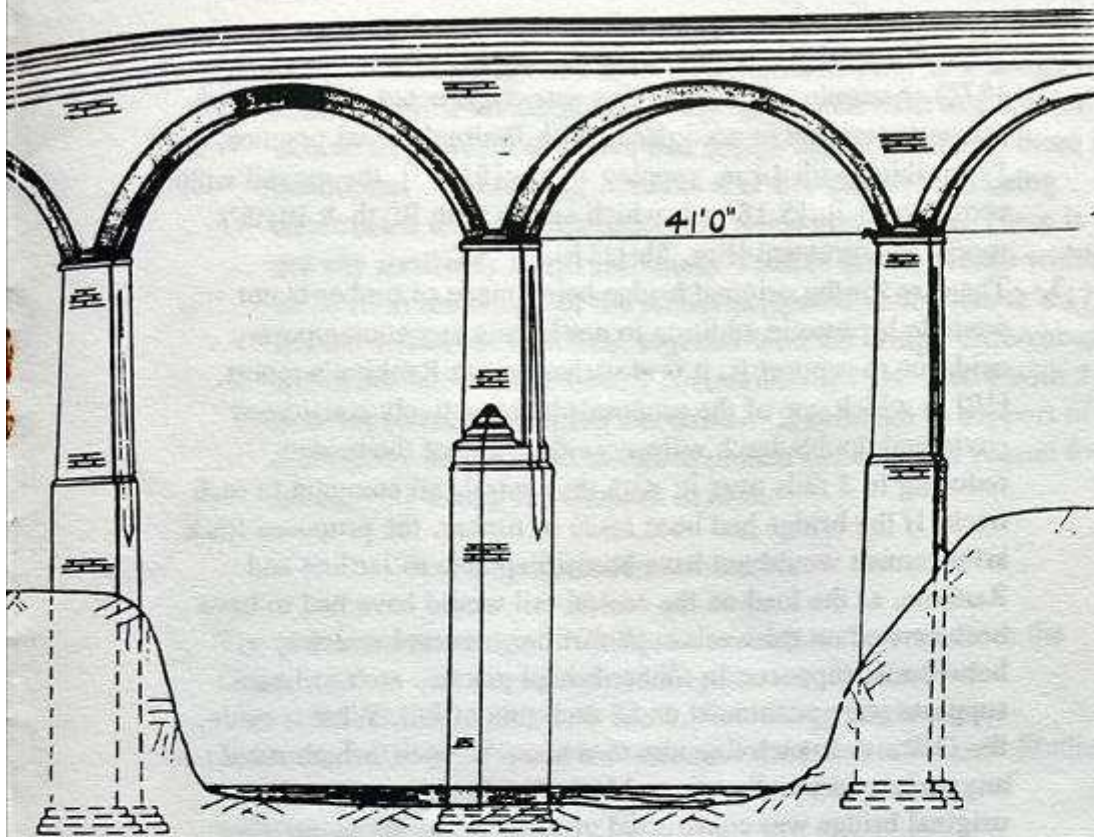


Fig. 3. Dalhousie Viaduct, Newbattle, over R. South Esk.  
Elevation of north west end.  
Drawing by courtesy of ScotRail.  
(OS Grid Reference NT 327648.)

Fig. 4. Dalhousie Viaduct, Newbattle, over R. South Esk.  
Side elevation of water pier.  
Drawing by courtesy of ScotRail.

1872). Assuming that the bridge was constructed of stone, with masonry parapets in accordance with Jardine's usual practice, say 12 in. thick with 14 in. capping stones [Fig. 5], the overall width comes to 17 ft. [5.18 m.], which agrees with Blyth & Blyth's recent measurement [Fig. 5]. [11]

3. The case for the original bridge being made of timber is not credible because in addition to not having any contemporary evidence to support it, it is at variance with Rankine's report, [10] in which one of the proposals being actively considered envisaged double track railways either side of the bridge reducing to 3 rails over it, with the central rail common to each track! If the bridge had been made of timber, the proposed track arrangement would not have been acceptable to Jardine and Rankine, as the load on the central rail would have had to have been carried on the weakest part of the structure mid-way between its supports. In timber bridge practice arch or beam supports were positioned under each line of rail. What is more, the Dalkeith Branch line was then about to open, which ruled out any major work at that time. More direct evidence that the original bridge was constructed of stone follows:
4. Francis Wishaw, C.E., in his compilation on railways stated, c. 1840, on the basis of information furnished by Rankine, that the main line was double track throughout and that 'The bridges are all of stone.' [12] This statement, whilst acceptable in respect of the main structures, is not completely accurate, as there were several small-span cast iron bridges, for example, Braid Burn of 17 ft. 6 in. span near Duddingston Road West. [13] This evidence suggests either that the deck of Glenesk Bridge had been widened by the year 1840 or, alternatively, that the 3-rail arrangement mentioned previously had been implemented. By 1847 the bridge must have had its deck widened by at least 50% by cantilevering out footways at each side, thus allowing the main structure to bear twin track loading. This work was probably carried out either under Jardine's direction if done before July 1845 or by Miller, which seems more likely, after that date, as the gauge was then increased to 4 ft. 8½ in.

5. If the present bridge had been constructed in 1847 to a design by John Miller, it would undoubtedly have been built to a similar double track width and have had design details similar to those at Dalhousie, or Lothian Viaduct as it is also called, then being constructed under his direction 1½ miles to the south. There is not any similarity at all. Dalhousie Viaduct has an overall width of 28 ft. at the crown of the arches compared with Glenesk's 17 ft., the difference in which, together with the design differences which are self-evident from a comparison of Figs. 3 & 4 with 2 & 5, represent compelling circumstantial evidence in support of a completely independent design approach and a further reason for an 1829-31 dating for Glenesk Bridge.

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- [5] *Herald & Post*, Edinburgh, 2.12.1993.
- [6] *Act 10 Geo. IV. cap. 122*. Royal assent 4.6.1829. Refers to additional pontage rates and that 'For every article carried across the railway bridge to be erected over the North Esk River at Eskbank ... 4d per ton.'

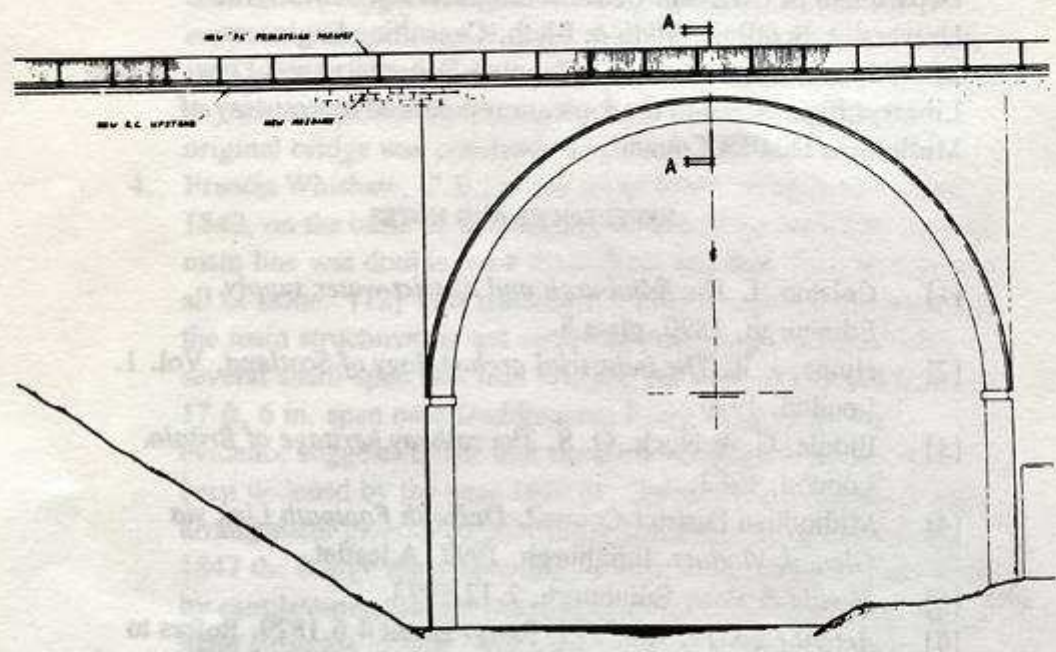
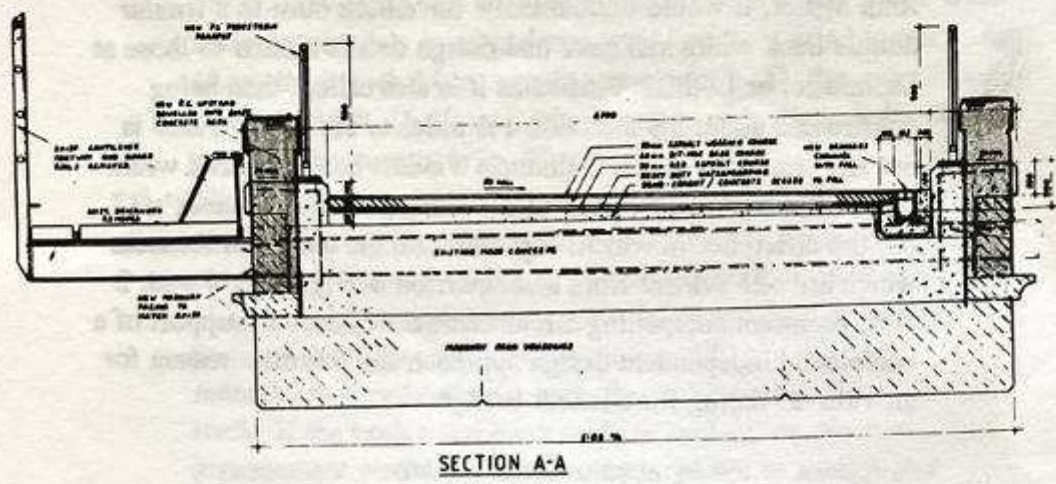
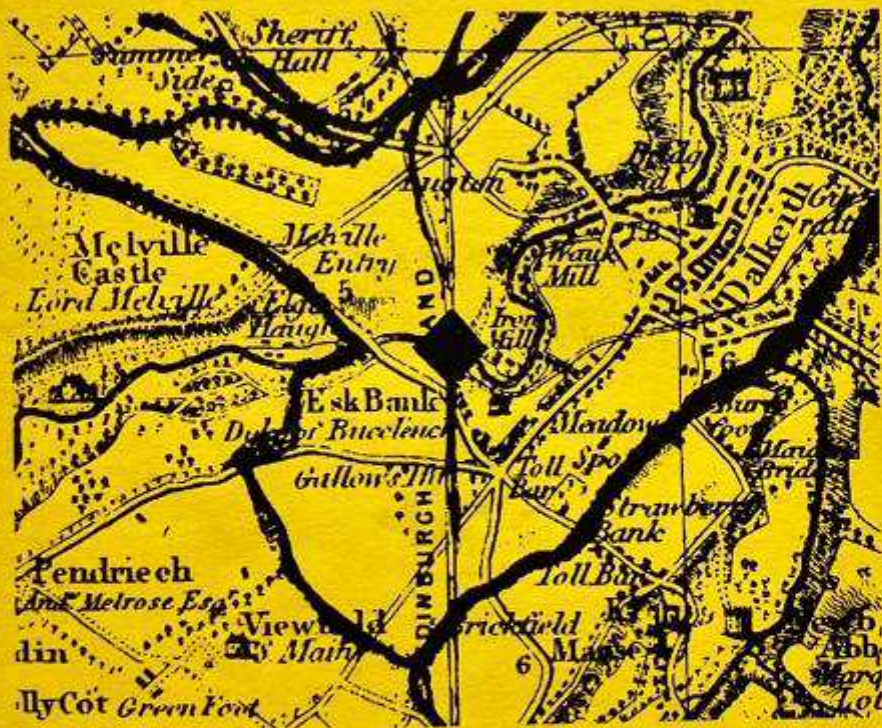


Fig. 5. Extracts from Blyth & Blyth Report showing detail of new decking and elevation of restored bridge. [11]  
 Author's conjectural parapets are shown by darker shade.



Fig. 6. Detail of the bridge prior to restoration showing the good condition of the masonry. The steel frame erected in 1968 to support the arch against possible effects of mining subsidence, and also the cantilevered footways, were removed as part of the restoration. The railway was closed to passenger traffic in 1969.

- [7] Grieve, J. & McLaren, J. *Report on the utility of a bar-iron railway from ... Edinburgh to Dalkeith*. Edinburgh, 1824. Grieve's estimate provided for 'a railway bridge of oak timber, supported on pillars of cast-iron, for crossing the River North Esk, with malleable iron chains, for stays of the bridge.'
- [8] Chapman, W. *Report of the projected railway to ... Edinburgh through the coal-field of Midlothian*. Edinburgh, 1825. Chapman proposed a wooden bridge of 324 ft. length, 73 ft. above the usual surface of the river, with stone piers and abutments, and estimated to cost £5,570 with its embankment.
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Part of Knox's County map of Edinburgh, 1845, showing the site of Glensk Bridge and the North British Railway's proposals for upgrading the alignment of the Edinburgh & Dalkeith line.



Part of Knox's County map of Edinburgh, 1847, showing the site  
of Glenesk Bridge and the North British Railway's proposal  
for opening the alignment of the Edinburgh & Dalkeith line.