

# INSTITUTION FORUM

EAST OF SCOTLAND

## Civils firsts in Tayside's past 1750-1850

Tayside was once rich with development proposals said Rowland Paxton in Dundee when he talked about civil engineering in the area between 1750 and 1850.

For instance, John Rennie produced a scheme to link the Tay with Loch Earn by a shallow draft canal, and in 1817 Robert Stevenson designed a canal from Arbroath to Strathmore. Not surprisingly none of these schemes went ahead as they were not

considered economically viable.

However, a few years later some of the earliest railways in the country were built north of the Firth of Tay, Paxton told the Dundee branch of the East of Scotland local association.

The first was Charles Landale's

Dundee and Newtyle railway in 1831 which included three steep inclines equipped with stationary steam engines and haulage ropes to surmount the Sidlaw Hills. However, the inclines proved cumbersome and inefficient to operate and were eventually bypassed by loops with gentle gradients so that locomotives could use the whole route.

In 1838 came the 5'6" gauge Dundee and Arbroath railway and by 1845 railways were rapidly spreading throughout the region.

Prior to Thomas Telford's report to the Government in 1802 on communications in Scotland, inland routes even in Tayside were little more than tracks.

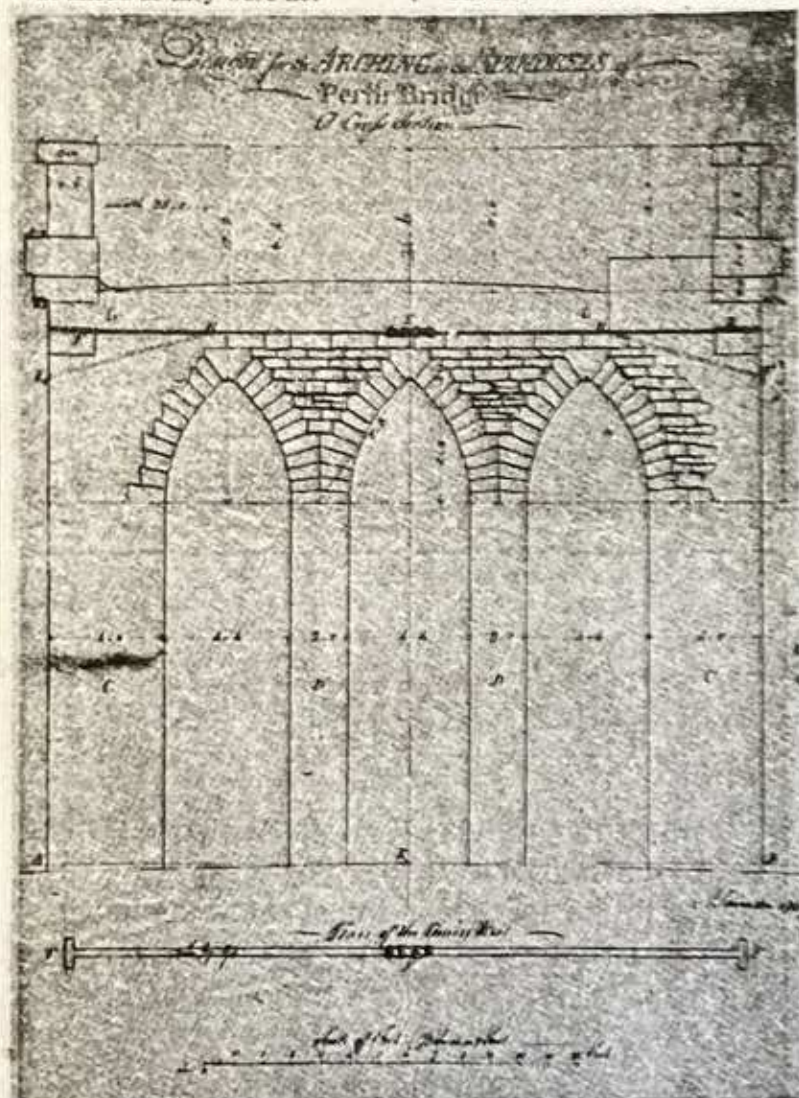
General Wade's military roads, constructed of gravel and not maintained during the winter, were unsuitable for commercial traffic. Paxton said that Wade's grand bridge across the river Tay at Aberfeldy, designed by William Adam, used up more than half his total Highland budget.

John Smeaton's bridge over the Tay at Perth completed in 1772, was the first bridge in Britain to be constructed with hollow spandrels to reduce the load on the foundations. Upstream Telford's 1801 bridge at Dunkeld, to replace the ferry, also had hollow spandrels. The chains of Brown's suspension bridge at Monroese, stressed to over 15.7kg/mm<sup>2</sup>, snapped during a storm in 1838.

Smeaton added extra sluices at Dundee harbour in an attempt to wash out the mud and silt which accumulated in the tidal basin. Later Telford also carried out improvements, and he in turn was followed by James Leslie, one of Britain's first civil engineers to have a degree, that of natural philosophy at Edinburgh University.

The Bell Rock lighthouse by Robert Stevenson is the most dramatic piece of Tayside civil engineering of the period. Constructed on a submerged reef some 22.5km off Arbroath between 1807 and 1811, it is one of the finest examples of a wavewashed lighthouse in the world.

Paxton described not just the complexity and brilliance of its construction, but also the uneasy and difficult relationship between Stevenson and John Rennie. ■



Drawing by John Smeaton in the Royal Society collection of section through Perth bridge showing hollow spandrels.