The following is a detailed account of the cost of construction:—

DETAILED STATEMENT of the Cost of the Dinting Vale Viaduct, on the Line of the Sheffield and Manchester Railway.

Quantity.	Description.	Price.	Amount.
			£. s. d.
7,881	cubic yards, excavating foundations	7d.	229 17 3
2,000	concrete	3s. 6d.	350 0 0
342,155	cubic feet of ashlar in the abutments and piers	1s. 1d.	18,532 7 11
44,024	cubic feet of tooled ashlar	1s. 3d.	2,761 10 0
829	cornice	1s. 6d.	62 3 6
8,212	parapet walls	1s. 1d.	444 16 4
6,875	flagging over spandrils	10d.	286 9 2
2,574	cubic yards of coursed rubble, in the small piers	10s.	1,287 0 0
	puddling the small arches	..	37 13 0
2,641	cubic yards of brickwork in the arches	15s.	1,980 15 0
40,476½	cubic feet of Memel timber	3s.	6,071 9 6
18,285	super. feet of planking in the roadway centering	8d.	609 11 8
		..	600 0 0
Tons. Cwt. Qrs.	wrought iron.	£21	676 5 3.
32 4 1	cast iron.	£8	252 0 0
31 2 0	super. feet of brown paper and tar	½d.	152 4 0
73,060	super. yds. of concrete on the roadway	1s. 6d.	152 6 0
2,031	Patent felt.	..	3 15 0
	Laying the permanent road	..	408 6 6
	Diverting the mill goit	..	110 16 8
	Interest and maintenance for 12 months	..	240 19 8
	Total Cost		£35,250 6 5

The paper is illustrated by three drawings (Nos. 3802 to 3804, Plates 7 to 10), showing the general construction and details of the works.

Mr. JEE explained, that the principle of the bent timber arches and the trussing, was identical with that so successfully employed by Messrs. J. and B. Green, of Newcastle, in the viaducts on the Newcastle and North Shields railway, and other places. He then drew attention particularly to the lightness of the centering used for turning the arches (Plate 10); this reduction of weight had been rendered practicable by each layer of bent timbers forming, in fact, a centre for the superincumbent layer to be placed upon, the strength thus increasing as the weight was imposed.

The flooring of lime and sand had been adopted, because it was

found, that the asphalte, with which some of the other bridges were covered, had been injured by the hot ashes from the locomotives.

Major-General PASLEY had seen the viaduct, and was much pleased with the design and the solidity of its construction. He had observed, in the course of his journeys of inspection, that whenever accidents occurred to bridges, they generally arose, not so much from any defects in the designs of the engineer, as from carelessness, or want of forethought in those who were appointed to superintend the execution of the work,—or from the use of improper materials, undue haste, and building in bad weather. He thought, that engineers should make an invariable rule of using good cement instead of mortar, for brick arches of any considerable span, or for arches built of small or thin stones; the increase of expense would be very slight, and the risk of failure would be greatly diminished.

Mr. WALKER agreed with the propriety of using cement for brick arches, but for stone arches good hydraulic lime was preferable.

No. 399. "On the Arched Timber Viaducts on the Newcastle and North Shields Railway, erected by Messrs. John and Benjamin Green, of Newcastle-upon-Tyne; and the further application of the System to Skew and other Bridges, as well as to the Roofs of Railway Stations and other large buildings." By Benjamin Green.*

In the formation of the numerous railways which have been completed within the last few years, perhaps that which has demanded the greatest exertion of skill, judgment, and varied ingenuity, is the construction of the bridges and viaducts, whether of stone, brick, iron, or timber. The excavation of a quantity of earth, or cutting through a hill to fill up an adjacent hollow to the required level, is in most cases a work of little more than manual labour, unless some unforeseen extraordinary difficulties occur in the strata, which may require energy and promptitude in adopting such measures as

* This paper was read March 9th, 1841, and would have been published in the third volume of the transactions of the Institution, if the series had not been discontinued. It is now published in connection with a similar subject; and such a selection has been made from the drawings, as are necessary to illustrate the paper.