

To Mr. Pickernell.

Dear Sir,

Aulthorpe, 6th June 1782.

All our honours are now in the dust! It cannot now be said, that in the course of thirty years practice, and engaged in some of the most difficult enterprizes, not one of Smeaton's works has failed: Hexham Bridge is a melancholy witness to the contrary; yet, after all, I feel much less for honour and credit than I do for the actual loss sustained by Mr. Errington: it would give me much satisfaction if that matter were settled between him and the county. I have heard that his appearance there at the Easter sessions much inclined the magistrates to see the matter in a favourable light; but the difficulty was, how far it was in their power.

I saw Mr. Donkin in town, who acquainted me, that he was looking at it when it first appeared to give way; his son being but just returned from the fourth side, to see that the small arches there were safe, which was the only part that they had any doubt about. He was wondering at the possibility that any structure could withstand such extreme violence, yet not at all expecting that any thing would hurt it; and remarked that before any thing appeared to give way, the water was up to the top of the doom-ing of the piers up stream when it scarcely touched the bottom of the impost down stream, which makes a fall of five feet, and it was not above a couple of minutes between first perceiving the mortar dropping out of the joints of the soffit and the fall of the arch, and six more were down in half an hour, so that it was so equally guarded that in a manner it all went together. Could I have known beforehand that there was a possibility of a flood to come down so *suddenly* as to have made a fall through all those extensive openings of five feet, I should certainly never have attempted the building a bridge in that situation, as that fall would necessarily create a velocity to the water in its passage of 1100 feet per minute: a velocity that it would require the strongest sluice-floor and aprons to withstand. I am therefore clear that it has forced away the very bed of the river and all before it. The occasion of this extreme suddenness in the waters coming down, which in that respect was far greater, according to all accounts, than in the great inundation of 1771, though the total height not so great, was, doubtless, owing to this circumstance, that the afternoon before a very great downfall of snow happened, so deep as to cover the ground at an average two feet. This was immediately succeeded by a vast downfall of rain, none of which would run off, till the whole body of snow was saturated like a sponge, and then, like the bursting of a snow-ball in the fire, it would come down all at once, and that so suddenly, that the lower reaches of the river not having *time* to be filled from the upper they would be comparatively empty; and as the velocity of water depends upon its fall, or *difference* of level at any given place, and not upon its total height, the difference will depend

depend upon the suddenness of its coming down ; and this being further hurried down by a violent gale of wind at north-west, the very direction that, upon the whole, would tend to bring it down the quickest from both the Tynes, it would seem as if all the powers of nature were collected to humble my pride and yours. The news came to me like a thunderbolt ; as it was a stroke I least expected, and even yet can scarcely form a practical belief of its reality. A flood that could mount up to the top of the doomings of the piers was, however, not a small, or even middling flood, in point of height ; and as every object that entangled it would moderate its rapidity, it is not improbable but that the downfall of Hexham Bridge might be the saving of Corbridge ; and by the spreading gradually over the wide haughs in many places below, was not more than a moderately large flood at Newcastle. There is, however, one consolation that attends this great misfortune, and that is, that I cannot see that any body is really to blame, or that any body is blamed : we all did our best, according to what appeared ; and all the experience I have gained is, not to attempt a bridge upon a gravel bottom in a river subject to such violent rapidity.

I remain, your most humble servant,

J. SMEATON.

P. S. I cannot suppose any failure arising from the greenness of the work, but wholly from the whole bed of the river giving way under it ; as nothing appeared to settle till it gave way in a manner at once, which is a proof of its being firmly bonded together.