greatly economizing the reconstruction, as the old stone would work in well for this purpose, whilst the faces and main vaults were of new. The widening of the water-way, by the removal of the springings of the arches out of the water, would allow characteristic abutments to occupy the space now taken up by the two first arches of the series of thirteen, as well as the site of the two small land arches, without affecting the current, injuriously; and as the flat, pointed arch would give much more freedom to the navigation than the semi-circular arch affords, independently of the increased lateral space in every bay, the vertical head-way might be taken at an average of that now afforded by the central group. Moreover, the increased space at the approaches obtained by obliterating the useless land arches, would allow the accesses to the bridge from the low ground on either side to be greatly improved, and the ascent eased by dividing them to the right and left over the abutments, and so to distribute the rise over a longer space, and give the means of dividing the going and coming traffic."

These observations, continued Mr. Hosking, coincide in a very remarkable degree, with those upon the same bridge, in the report lately presented by Mr. Barry, to the Commission on the Fine Arts, in connexion with the House of Parliament. It was true that his suggestions stood alone in the particulars in which it was almost certain they would be peculiar; as it regards the introduction of the inner transverse arch groined to the main vaults; the increase of the span of the arches upon the same piers, (for he did not understand Mr. Barry's report to contemplate that) and in widening, winding and dividing the approaches for the double purpose of use and delight. It was quite clear, however, that as his remarks were written in September of last year, and—with the wood-cut illustration of the subject which appears with the text—printed in October, though not published until February of this year, he might claim some credit for having taken the same view of the subject that had already, he doubted not, presented itself to the mind of their eminent contemporary, whilst it might be held to strengthen, in some degree, the view they had both taken, that it had occurred to both Mr. Barry and himself, without communication or knowledge, indeed, of each other's doings, to support it by the same train of argument.

Civ. Eng. & Arch. Journ.

Gen. PASLEY on crossing Railways, by common roads at the same level.

Railway Department, Board of Trade, 17th March, 1843.

My Lord—In obedience to your Lordship's orders, that I should examine the projected Peterborough branch of the London and Birmingham Railway Company, and report whether the unusually numerous level crossings of turnpike, parish, and other roads intersecting it, as well as the single line of rails proposed, will be objectionable on the ground of public safety, in the event of this branch being carried

into effect; I proceeded, on the morning of the 14th instant, to Blisworth, this being the point where it is to commence; and from thence I carefully examined the whole of the line proposed as far as Peterborough, which occupied two days, because it was necessary for me to cross the Nene continually from one side to the other by a circuitous route, sometimes along the left, and sometimes along the right bank of that river.

Mr. Bidder, the second engineer of the proposed branch, in the absence of Mr. Robert Stephenson, having lent me an ordnance map on which he had traced the whole line in red, and having also supplied me with lithographed plans and sections of the same on a very large scale, that will be submitted to Parliament, I was enabled to trace it on the ground to great advantage; and I consider the line chosen between Blisworth and Peterborough to have been extremely judicious. It will descend the valley of the Nene, occasionally crossing that stream, and never receding from it more than about a mile and a quarter, to cut off the sinuosities of the river, which flows with a moderate descent through a valley varying in width, but nearly level; so that the proposed line will have the advantage of requiring few embankments and cuttings, and of very moderate height or depth, and only one tunnel, of 688 yards in length, in crossing the high ground to the south of Stibbington. Hence the level of the proposed railway will differ so little from that of the natural ground over which it is to pass, that it may be executed at much less expense than other railways in general, provided that the Company who is to form it be allowed to use level crossings for the roads that will be intersected by their line, which are so numerous, that if the bridges over all, or most, of those roads be made a *sine quâ non*, it will be a complete veto to the undertaking, because, one of those bridges might cost nearly 7,000*l.*, including not merely the principal arch itself, but the approach to it, whether consisting of earthen embankments or of brick arcades, especially in those parts where the railway may require to be raised five or six feet to guard against the inundations which occur from time to time in the valley of the river Nene.

In order to judge how far level crossings may be dangerous to the public safety, I have repeatedly passed along the Northern and Eastern Railway, from Stratford to Bishop Stortford, which may be considered as a prototype of the Blisworth and Peterborough branch, as it ascends, first, the valley of the river Lee, and then that of the river Stort, in the same manner that the latter will descend the valley of the river Nene; and, in consequence of this advantage, the Northern and Eastern Railway has been completed with very little labor of earth-work, but it abounds in level crossings, there being no less than 19 or 20 in the space of 28 miles, at all of which, except private or occupation roads, gates have been erected shutting across the road, and only opened for passengers when required, at which period they are shut across the railway. This is done by a gatekeeper living in a cottage on the spot. The trains of the Northern and Eastern Railway never slacken their speed in passing those points, unless the gates should be shut across the railway, which are sufficiently con-

spicuous by day, and rendered so by a red lamp at night, which is a signal to stop. This railway has been opened, though not to the whole of its present extent, for about two years and a half, and no accident has ever occurred at any of its numerous level crossings. The example of this line is, therefore, a sufficient proof that level crossings on a railway are perfectly safe, if steady gatekeepers be employed at all of those turnpike, or other public roads; and the management of the Birmingham Railway is so very perfect, and all the enginemen, policemen, and others in their employment, so competent and correct in the execution of their duty, that I see no danger whatever in allowing them to have as many level crossings as they please in the proposed line between Blisworth and Peterborough, which will not be more numerous in proportion, than on the Northern and Eastern Railway, for the number will be about 28 in 47 miles, of which the greater part are little frequented; whilst at the crossings of the most important public roads, it is proposed to have stations where the trains will stop; indeed, on a review of railway accidents by collisions, there have been much fewer at level crossings than on the regular lines of rails, and the worst of the former occurred when the custom of shutting gates across the railway prevailed as a general rule; the danger of which having become evident, it has since been abolished. In respect to accidents to foot passengers at level crossings, these have not occurred, nor can they ever occur, except through the extreme imprudence, recklessness, or intoxication of individuals.

Upon the whole, I feel it my duty to certify that the proposed level crossings on the Blisworth and Peterborough line are unobjectionable on the ground of public safety, provided that there is a proper gatekeeper stationed at all the crossings of turnpike, parish, or other public roads; and I can see no necessity for slackening the speed of the trains at every such crossing, except for a limited time after the first opening of the proposed branch, which is always prudent in new railways.

I before mentioned that it is proposed to lay down only one line of rails between Blisworth and Peterborough, but the intention is to make the permanent roadway wide enough to admit of a second line of rails hereafter if required. In very short lines, in which the trains may go from one end to the other, and return again without meeting or crossing each other, even if there be a considerable traffic, no chance of collision can occur; but I apprehend that the proposed Peterborough branch will be too long to be worked in this manner, unless the traffic were very small indeed, and, therefore, that the up and down trains will have to cross each other at some central station, where there must be a double line of rails for that purpose. This may be effected without the smallest risk of collision by good arrangements, for which the Directors and officers of the London and Birmingham Railway Company may be trusted, and which are so obvious, that I shall not enter into details. Indeed it appears to me that there is so little difficulty in this matter, that it might be accomplished with perfect safety to the public, even without the electric

telegraph, which, however, the Company proposes to lay down along the whole of this branch, and which will be still more satisfactory, because if any accident should occur to prevent one train from reaching the central or junction station in proper time, the circumstance may be made known at that station, to do away with all suspense; and, if such accident should entirely stop, instead of merely delaying, the train, it may be got into a siding, of which there will, no doubt, be several, and when this is made known by telegraph, the trains moving in the opposite direction may proceed without being stopped also.

After having finished my inspection of the proposed branch from Blisworth to Peterborough, I returned by way of Huntingdon, Cambridge, Chesterford, Newport, Bishop Stortford, in order to view the ground over which it is proposed that the extension of the Northern and Eastern Railway shall eventually pass: and one thing is certain, that, if this extension should ever take place, no passengers from Peterborough, or the vicinity of London, will go by the circuitous route of Blisworth; so that the branch which forms the subject of this letter, will be confined to the traffic of the valley of the Nene, along which it is to pass.

I have the honor, &c.,

(Signed)

C. W. PASLEY, *Major-General*,
Inspector General of Railways.

The Right Hon. the Earl of Ripon, &c. &c. &c.

Railway Magazine.

Preserving Timber.

Payne's Patent for preserving timber from the ravages of the dry rot, insects, &c., is now likely to be brought into extensive operation; the process consists of impregnating timber with a solution of the sulphate of iron, and forms an insoluble chemical preservative, and by the process adopted, impregnates the timber to the very centre; this is effected by placing the timber in large iron tanks with the solutions, and then first exhausting the air, and afterwards readmitting it, and then using a force-pump, with a pressure of 200 lbs. on the square inch, to force the solution into the heart of the wood, which it does very effectively. Iron, as a preservative to timber, has long been known, and it is now, through the ingenious process adopted by Mr. Payne, likely to become very extensively adopted. The Company is now preparing the timber to be used at Claremont, for the royal stables, by command of the government.

Civ. Eng. and Arch. Jour.