

THE CROTON AQUEDUCT.—After some delay we are enabled to find room for another article on this subject.

Without pretending to any opinion of our own in this matter, which we have not had time to examine, it seems obvious to remark that on so important a question, where so vast an expenditure is involved, and where there is a difference of opinion, it would be the part of wisdom and sound policy to consult the ablest engineers of the country, such men for instance as Col. Totten and Col. Thayer, and have the benefit of their judgment in arriving at a conclusion.

CROTON AQUEDUCT.

To the Editor of the New York American:

In an article in your paper of the 9th instant, an attempt was made to draw the attention of the public to the important work, now in progress, for the introduction of pure and wholesome water into this city. This communication has since been noticed in several of the daily newspapers, but as there was nothing adduced to contravene the main positions, as to the superiority of a continuous Aqueduct over the mode of crossing the Harlem River by inverted syphons, whether we have reference to the certainty of attaining the proposed end, the durability of the work, or the incidental benefits to be derived from a high bridge—as there was no denial of the fact, that propositions for a viaduct were set forth in the only Reports of Engineers, (Major Douglass and Mr. Martineau's,) submitted to the people, at the time that they were called on to vote respecting the Water Works—and as the importance and necessity of preserving the navigation of the Harlem River, at all hazards, is now generally admitted—the writer did not feel himself authorized to occupy the columns of the American for the purpose of meeting objections elsewhere made.

As, however, another correspondent has appeared to controvert, in your paper, some of the views expressed in the article above referred to, the author of the first communication induced again to trespass on your indulgence. The main objection to the continuous Aqueduct, besides the difficulty of constructing coffer dams, is the supposed augmentation of expense. Before alluding to that subject, it may be well to notice, as bringing into view one of the most important points at issue—viz. the feasibility of the new plan—a verbal criticism in the Journal of Commerce of the 12th instant. We had stated, in connection with the fact, that it was known to the ancients that water would rise to its level, that “the principle of the syphon, however theoretically true, will not answer for large masses of water.” We are sneeringly told that “the Commissioners do not recommend a syphon, they recommend iron pipes in the form or position of a syphon inverted.” The force of the criticism is not perceived. We thought, and still think, that a syphon, although it should be inverted, is still a syphon. We believe that the word has a general as well as a technical meaning, and our object in using it was to distinguish the structure advocated by the Commissioners from the high bridge, and in so doing we are not aware that we committed any error. We repeat our assertion, that the plan proposed will not answer for large masses of water, or, in other words, is not applicable upon a large scale. This is not because the water will not run, but because the nature of the materials and the principle of construction impose a limit upon the structure, which no practical man will pass. The statement is equally true of every other elementary principle in mechanics. The principle of the lever and the arch, though theoretically true, cannot, in practice, be indefinitely extended. Indeed, this view of the case is admitted by our opponents themselves, when they assign as a reason for the ancients not adopting the principle of the syphon, that they knew nothing of cast iron pipes, which will bear a pressure that lead will not. Now, even as to the strength of iron pipes, there is a limit.

Let us look at the facts. Each pipe, to be substantial, ought to contain at least 400 tons of iron: it will then hold upwards of 300 tons of water; besides which, all the lower part will be acted upon by an aggregate hydrostatic pressure of more than 300 tons to each joint of pipe. Nor is this all. The 300 tons of water are to be in motion, at the rate of 180 feet per minute, and must operate percussively therefore, and with appalling force, upon every irregularity of the joints, and other parts of the structure calculated to impede their motion. A continual and powerful tremor will ensue. The closing of the stop cock, while the water is in motion, will produce a violent action, and any greater stoppage would be attended with consequences which those only can appreciate who have witnessed the accidental collision of heavy masses. It is to be remembered, also, that the weights and pressure referred to are, according to the Commissioners' project, to be sustained by an embankment constructed haphazard, in a depth of 20 feet, more or less, of mud and soft clay, resting on an uneven bottom, and of course subject to unequal settlements, to cracks, ruptures, and dislocations. Would any one in his senses think of building the Astor House upon such a preparation? It might be so built with greater safety than the inverted syphon proposed. The aqueduct of Lyons, it is true, was constructed with syphons, but that was a case of necessity. Two ravines of two and three hundred feet deep, and some thousands of feet in width, had been crossed by a continuous aqueduct; but the depth of the valley of the Garonne, obliged recourse to the syphon. In adopting it, however, the deviation from the approved method was as slight as possible. The bridge on which the pipes were placed across the bottom of the valley, was still, an arcade of 70 or 80 feet high. It may be here added, that the syphon estimated by Major Douglass was also founded on a complete bridge of arch work. To the particular mode of construction adopted in the *Pont à Syphon*, at Genoa, alluded to in the article of the 12th, we have not at hand any means of referring. According, however, to the statement in question, the discharge of water in 24 hours is only a little more than a quarter of that expected from the Harlem syphon; and while it may be admitted that pipes may be obtained adequate to bear the pressure in the one case, it does not follow that they can be procured for the other. With regard to the water-works at Glasgow, whose authority has also been cited in favor of the new scheme, we see it stated in the Evening Post, of Saturday, that they have burst from the water freezing in them. But, whatever may be the means resorted to in order to avoid this difficulty, we do not see how the inconvenience from the contraction and expansion of the iron is to be got over. A difference of fifteen degrees in the temperature will make a change of an inch in the length of one of the pipes. This quality of the iron has indeed been considered a most serious objection to its use in bridges. These considerations, however they have been overlooked by the Commissioners, undoubtedly ought to induce us to pause, even if the estimated expense be less, and no regard be had to the other considerations to which we have alluded, before the city is induced to take a step from which there is no retreat.

It is admitted on all hands that the high bridge is practicable; and that there is really nothing so formidable in the construction of the coffer dams as the Commissioners apprehend, we would beg to refer them to the Market street bridge in Philadelphia, which was laid in 42 feet water. The bridges of Peronnet and others in France, though not often built in deeper water than the Harlem, were frequently more difficult to be formed. One of the piers of the new London bridge was built in water 56 feet deep at high tide, besides being in an impetuous current, immediately beside the openings of the old bridge; and yet the coffer dam was made so dry and perfect, that the use of pumps was hardly necessary.

As to avoiding the inconveniences of the frost, it is only necessary to make the work perfectly tight, which may indeed require more care than is usually bestowed on canal aqueducts. Indeed, the masonry on such works as the New York canals is wholly inapplicable to the present undertaking. One mode of effecting the object, as to the prevention of freezing, would be placing within the aqueduct, and between the water and the masonry, intermediate layers of earth, for which, if the bridge be a viaduct, ample space would be afforded. It may be well here to remark, that the character of the aqueduct at Con-

stantinople, is wholly mistaken by the writer in the Journal of Commerce. The structure spoken of was adopted for the sole purpose of purifying the water, which is collected in a marshy district, before it arrived at the city. For this purpose it is collected in a succession of basins, and allowed, as they describe it, to breathe at the top of successive pyramids, until it is rendered pure.

Whatever may be the mode of crossing the river, the span of the arches will never answer at 80 feet. They should, with a view to the conceded right of navigation, be made nearly if not quite that size. That this is practicable, the Commissioners, (if they can for a moment intermit the study of the elaborate works, on which we infer from the Journal of Commerce they are engaged,) will learn by referring to so common a book as the Penny Magazine. We are there told that the London bridge consists of five semi-elliptic arches. The centre arch is 152 feet span, with a rise above high water mark of 29 feet 6 inches; the two arches next the centre are 140 feet in span; the abutments are each 130 feet in span. The roadway is 53 feet wide between the parapets, the footways occupying 9 feet each. The length of the bridge from the extremities of the abutments is 928 feet, within the abutments 782 feet.

Bridges, indeed, from 120 to 150 feet span are to be found all over Europe, several of them above the latter dimension; and the beautiful bridge of Chester has recently been built with a span of 200 feet, in the form of a segment, which, if completed to a semi-circle, would be nearly three hundred feet. Among the designs for the new London bridge, to whose construction we have already referred, it was satisfactorily demonstrated that an arch of 240 feet might be built with perfect safety. We know, of course, that the centerings of such large arches cost more than those for small ones; but we know also that up to 120 feet, and even 150, when the arch is high, the centerings can be built without extra foundations, and at no more, therefore, than a proportionate increase of expense, for the question as to the centres is not between a single centre of 80 feet and one of 140, but between seven centres of 80 feet and four of 140, and the difference, if there should be any, against the latter, is to be balanced against the saving on four hydraulic foundations, which, in that case, would be rendered unnecessary.

Though the allowance made in our former article for the difference in graduation, is reduced by the adoption of a fall less than that on which our calculation is based, we nowhere learn why the estimate of Major Douglass for the bridge is so greatly enhanced by the present engineer, as to make, with the additional sum charged for rendering it a viaduct, nearly three times the amount stated by his predecessor. The preserving throughout, the line indicated by Major Douglass, is the highest defence which his professional rival can afford to his scientific judgment. That, owing to an alteration in the mode of construction, an increase in the estimates on the route between the Croton and the Harlem may be justified, is very possible, but we cannot imagine how a bridge which Major Douglass could construct for \$415,650, (which is about Mr. Jarvis's estimate for the syphon,) can now be made to cost \$1,236,000. Equally extraordinary does it seem to us that official pique should be carried so far by any set of men, invested with an important trust, as to induce them to prefer a confessedly imperfect method, because brought forward by a favorite engineer, when the perfect plan of another Engineer at the same cost is repudiated. We refer to the question of cost, not as conceiving that that ought to be alone consulted in a decision of a matter of this nature. We, indeed, deem it most unfortunate that such a subject as the Water Works should be discussed at a period of great pecuniary embarrassment, and when, without reflecting that we are acting for posterity, on whom also the expense is to be imposed, we are induced to counsel the same economy which necessity compels us to submit to in our private concerns. Two years ago the attempt to spoil a magnificent plan by a pitiful parsimony would have been universally resisted; and if we can read aright our future destiny, when our city shall be renovated by the prosperity of two coming years, we shall regret what, if not now attended to, it may be too late to avert. The discrepancy in the Engineers' statements is of itself an adequate reason, before taking the irrecoverable step, for submitting the two projects to competent and disinterested scientific gentlemen. Where millions are to be spent, for the mode of crossing the Harlem River affects the whole plan, the expense and delay of such a reference can be of no importance. The Chief Engineer himself, if confident of his correctness, would rather solicit than oppose such an investigation, while, without it, the Common Council, before whom the subject is now pending, and who do not, from the nature of the case, possess the requisite knowledge for weighing the arguments in support of the respective plans, would be able to act understandingly, and with a full acquaintance with the expense which their accomplishment would demand. Such a course would put an end to cavil in every quarter, and whatever the decision, as it would satisfy them that the expenditure was to be an available one, would reconcile the citizens to the debt to be incurred. Certain it is, no work of equal importance was ever decided upon, on such *ex parte* information, as that given in the commissioner's report. We mean not unnecessarily to impugn their judgments on matters with which they can be supposed to be conversant, but we cannot see how they can be properly indoctrinated in so difficult and complicated a question as the one under consideration, and our distrust is not, in the smallest degree, mitigated by the sneers which their advocates are pleased to cast on “scientific knowledge.”

[From Fraser's Magazine.]

THE YELLOW PLUSH CORRESPONDENCE—MISS SHUM'S HUSBAND.

Dear Hollyver Y.—There was a pretty disturbance, as you may fancy, when your Magazine arrived in our hall, and was read by all the men and gals there assembled. First there was coachman: he takes his whig off when I comes into dinner, and b'ughing with a hair of mock gravity, drinks to “Mr. Charles the literary man.” Next, Shalott, my lady's maid (a French gal) says, “O Jew, Master Shaul, vous eight ung belispre.” “Will you have some bile mutton, Yellow plush,” cries cook; “it's the leading Harticle of our dinner today.” Never, in fact, was such chaffin heard, the jacks and rep'arces flashin about like lightning.

“I am,” says I, in a neat spitch, “I am a literary man—there's no shame in it in the present instins; though, in general, it's a blaggerd employment enough. But it ain't my trade—it isn't for the looker of gain that I sitt penn to payper—it is in the saycred caws of nollitch. (Hear, hear.) The exalted class which we have they honor to serve,” says I, “has been crooly misreparysented. Authors have profist to describe what they never see. Pepple in Russle Square, and that vulgar naybrood, bankers, slissitors, merchants' wives, and indeed snobs in general, are in their ideer of our manners and customs, misguided, deloded, HUMBUGGED—for I can find no more ellygant expression—by the accounts which they receive of us from them authors. Does BULWER,” says I, “for instins, know any thing of FASHNABLE life? (Sneers and haryorical cries of “Hookey,” “How's your mother?” &c.) “You jine with me in a pinion,” says I, “and loudly hauser No! Did SKELETON know any thing more? (Cries off “Hoff, Hoff,” from coachman, “Fee dong” from my lady's maid.) No, no more nor Bulwer. It is against these imposters that I harm myself, and you, my friends, will applaud my resolution.”

The drawing-room bell had been ringing all this time like mad, and I was here obliged to finish my spitch in a pint of porter to the health of the cumpny. On entering the room I only found miss smilin and readin a copy of your Magazine.

“Papa has been ringing this half hour, Chawls,” says she, “and desires you will wait till he returns from the libry.” And then Miss (Lucy her name is) simpered and stuttered, and looked down and looked up, and blushed, and seemed very odd—bewtiful she always is. “Chawls,” says she, a summonsing curridge, “is this—that is—that—I mean, is this article in Fraser's Magazine your composition?”

“It is, miss,” says I, looking at her most tenderly, “an insignificant triffl: from my pen.”

“It is the best Magazine in Eurup,” adds Miss Lucy.

“And no mistake.”

“Your article is—really—very—amusing,” says she, blushing as red as a piany.

“Do you, do you think so, miss?” says I: “miss, dear miss, if it gives you any pleasure, oh how amply it repays me!” I gev her, as I said this, one of my pecuniary look—I never knew them look fail with any woman at any hage. I was on my knees, as I said, quite appropo; for I had just been emptying coals from the skittle. I laid one of my hands in my left weakit, and said, “O Miss Lucy!” in a voice of such excruciating tenderness, that I saw at once it was all up with her. But “Hush!” cried she, all of a sudden, “get up, sir—here's papa.”

And papa it was, sure enough. Sir Jeames came into the room very stately, and holding a book in his hand. “Chawls,” says he, “we have been readin your article in Fraser's Magazine, and very much amused we was. High life was never so well described, or so authentically. “Pray, sir,” says he, “may I ask is this review also yours?” and he holds up to me the Quotly Review