

the obstruction in front of the guard-lock will rather increase than diminish, is a certain result flowing from fundamental principles of hydraulics.

To have evaded all these difficulties, to have placed the streams in a situation to force their own way, and keep constantly open to the face of the lock a channel of ample depth for the occupancy and transit of boats, it was only necessary to watch nature herself, and pursue her indications.

The outline of the gravel at low water, marked the proper situation for the canal bank, and near the extreme point of the shoal, some two hundred feet in front of its present position, properly directed towards the pool, and with its upper mitre sill laid adjacent to deep water, the guard lock ought to have been located. The guard bank of the canal should have pursued the outer margin of the gravel bar, being armed externally with a heavy riprap of imperishable materials, and showing to both streams a slope of about $2\frac{1}{2}$ to 1. The shoal itself, under this arrangement, would have been comprised within the canal basin, materially and economically extending its capacity.

Thus, at but little more expense than has already been incurred, the basin would have been enlarged, the guard lock made available, and the use of the dredging machine avoided, by contracting the streams so as to restore their transporting power, and enable nature to do that work.

It is true that this plan would have caused an increased rise of water in freshets. Such in effect would have been its design; but as I have heretofore declared the formation of an ample levee to be *incident* to the "low level," and *indispensable* to the security of the town, a small additional rise in the streams would have been of no moment to a place thus shielded against floods.

It is indeed still possible to remedy, in a degree, the defective location of the guard lock, though not without considerable expense. The plan would be to close the present mouth of Wills' creek by a causeway elevated above the freshets; to embank the greater part of the gravel shoal to the same height; (affording a noble site for a warehouse;) to cut open a new channel for the creek, passing the face of the guard lock, and thus limiting both it and the North Branch to such a width of water way, as would guarantee a sufficient accession of velocity during freshets to keep their channels clear.

I will now state the reasons why, in my opinion, the town