THE HARBOR OF NEW YORK.

[Continued from page 83.]

In order that we might not be amenable to the charge of attaching too much importance to this subject, we submit a few of the results of investigations held by the Tidal Harbors Commission, in England, together with the opinions of the necessity of maintenance of the tidal volume in *all maritime ports*, as furnished by Calver (in his very valuable work upon tidal rivers), whose *thesis* is that "the navigable condition of the outlet of a tidal river can only be maintained by tidal water, and that its extent as to sectional capacity, will be proportioned to the amount admitted."

We consider the magnitude of every tide harbor, both as to width and depth, is generally proportionate to the quantity of such flowing and reflowing water, and every subtraction from such quantity by embankment, tends to decrease the magnitude of the outlet to the harbor. —*Rennie & Jessop in Report on Rye Harbor;* 1801.

I am not aware that any remedy can be substituted for the deprivation of back-water.— *Rennie in Report on Southwold Harbor;* 1820.

It is not to be forgotten that as the sands and mud accumulate and marsh lands are formed in the upper part of the estuary, the power of scouring the lower portions (the entrance) is diminished.—*Telford in Report on River Dee;* 1821.

If there were no receptacle for tidal waters to pass in and out at every tide, the harbor would cease to exist. * * * * If with the same width between the piers, we reduce the quantity of water which has to pass in and out at the same time, we diminish at once the required velocity or power to remove obstructions, and a decrease of depth follows almost immediately. * * * * It is to be lamented that when the owners of estates were, perhaps, balancing in their minds whether the land they could reclaim would pay the expenses for reclaiming it, they were not advised of the injury they were about to do to the public and themselves by the reduction of the back-water upon which their harbor is dependent.—*Walker in Report on Southwold Harbor;* 1841.

Liverpool, Yarmouth, Montrose, and many of our great harbors, depend for their existence upon the tidal current, and therefore the receptacle for tidal water ought to be preserved with jealous care.—*Walker in Report on the River Tay;* 1845.

Question: Are the Commission to understand that inclosures stopping the flow of tidal water must gradually injure the bar of the harbor to which that formerly served as a scour?

Answer: Yes, it will do so. [*Cubitt in Evidence before Tidal Harbors Commission;* 1845.]

I think that any effect from a fresh at the bar is a mere bagatelle compared with the scouring of tidal water.—*Leslie in Evidence before Tidal Harbors Commission;* 1845.

Question: Are you of opinion that depths in rivers and their power of scouring are chiefly due to the volume of water brought down in freshes, or to the tidal waters?

Answer: I should say to the tidal waters. [*D. Stevenson in Evidence before the Tidal Harbors Commission;* 1845.]

Rye Harbor has been ruined by embankments; it appears in evidence that formerly a sixty-four-gun ship could use that harbor, which is now ruined.—*Rennie in Evidence before the Rochester Bridge Committee;* 1820.

Blackney and Clay, on the northeast of Norfolk, have a common entrance from the sea; within the memory of some of the present pilots one hundred and forty coasting vessels have taken refuge in this port during one tide, yet in the place where these vessels lay afloat, at low water, there is now only a depth of four or five feet, and the utility of the harbor has consequently been almost destroyed. It is stated that this evil has been caused by the inclosure, at different times, of more than one thousand two hundred acres of land, over which the tidal waters formerly flowed.—*Second Report of Tidal Harbors Commission;* 1846.

The area of the estuary of the Dee was formerly about 12,000 acres, covered at every spring tide; of this space, 8,000 acres have been inclosed, and the tidal water excluded. The act of Parliament that sanctioned this extensive encroachment required that a depth of fifteen feet, at ordinary spring tides, should be maintained up to Chester; but the river was in so bad a state in December, 1844, that a vessel drawing only eight and a half feet water could not go up to Chester on a spring tide. At Parksgate, twelve miles below Chester, which formerly was one or the principal mail packet stations between England and Ireland, a dry sand now extends almost across the estuary.—*Second Report of Tidal Harbors Commission;* 1846.

Mr. Walker, in evidence before the Tidal Harbors Commission, states that "the diminishing the reservoir for the tidal water in the Thames has had, in my opinion, the effect of increasing the shoal at its mouth."

Mr. Abernethy, in his report upon the Dee (the enormous obstructions from which river we have already noticed), remarks that "the lower portion of the navigation is gradually filling up;" thus proving the correctness of Telford's prediction.

The preceding testimony tends to dissipate the fatal error of a common and generally-conceded opinion, that the flow of water from the Hudson river, by freshets, is all-sufficient to keep the bar at Sandy Hook navigable.

In the Tay, the discharge, including that of the Earn, amounts, during freshets, to one million of cubic feet per minute, or two hundred and forty millions of cubic feet during four hours. The tidal water passing Dundee, in the same time, is above seven thousand millions, or thirty times that of the river water; and making the calculation at the bar, the tidal water is upward of forty times that of the river water. It is only when the quantities are reduced to figures, in this way, that the vast disparity is seen; and Mr. Leslie says that "any effect from a freshet at the bar is a mere *bagatelle* compared with the scouring of the tidal water." Now, if this text of a measurement of the proportionate flow of the tide and of the freshets was made in the Hudson or Delaware, or any of our tidal rivers of magnitude, a much greater disparity would be found to exist; for in this country, where the annual fall of rains is much below that of England, the volume of the river freshets would naturally be proportionally decreased, which freshets, when estimated in connection with the *datum* of those above-cited, would be conclusive as to the inefficiency of the scouring of a freshet in comparison with that of the flow of the tides.

As regards the effect of the presence of ice in a harbor, it must not be lost sight of that, although ice in suspension in the water does not reduce the tidal volume, other than by presenting a resistance to the surface current of the tidal flow, yet that when it is fixed, as when upon "flats" and shores, it reduces the tidal volume in direct proportion with its own.

Trusting that the results furnished, and the many and important views herein given, will meet with the hearty approbation of the readers of the SCIENTIFIC AMERICAN and a concurrence in the opinion as to the importance of the subject, we conclude by submitting the following query:—"If the merchants of Boston and other tidal ports are alarmed regarding *their* harbors, 'possessing, through the great rise and fall of tide, great tidal volume, the essential element of preservation of depth,' what excuse can be offered by the merchants of New York for their total and reckless neglect of all action having in view the preservation of *their* harbor—one of the most magnificent in the world—and the maintenance of the requisite depth of water on the bar at Sandy Hook?" We pause for an answer.

[Concluded.]

COMPENSATING PENDULUMS.

MESSRS. EDITORS:—On page 36 of the present volume of the SCIENTIFIC AMERICAN, Mr. Henry Giles gave a description of a compensating pendulum, which, at first glance, appears to be perfect; but I think it can be satisfactorily shown that it is not as good as a simple wooden rod, straight-grained, well-seasoned, and varnished to protect it from moisture. In the one he describes, the brass rod in the back of the case rests at the bottom on a support fixed firmly to the wooden case, and the brass piece through which the pendulum spring passes at the top is also fixed to the same board. Now, it is evident that the real vibrating length of the pendulum is regulated by the distance between these two pieces, since whatever expansion the pendulum rod may have is carried above the upper one by a corresponding expansion of the rod in the back of the case, and *vice versa*. The distance between these points is subject to all the variations of the board to which they are fixed, and this board may be cross-grained, and is seldom, if ever, protected by varnish or otherwise from the moisture of the atmosphere. Would it not be much easier to find and prepare a wooden rod which would be perfectly straight-grained, &c., than to find these qualities in a board wide enough and thick enough for the back of a clock case? In regard to a wooden rod, although it is much better than an ordinary metallic one, yet we have the testimony of the most eminent artists in that line, that it will not answer where a complete compensation is required. If I am wrong in my ideas, I wish to be enlightened, as I am practically interested in the subject. O. D. BEMAN.

Harpersville, N. Y., July 24, 1860.

SILVER'S "MARINE GOVERNOR" CONTROVERSY.

Silver's "marine governor"—illustrated on page 356, Vol. XI (old series), SCIENTIFIC AMERICAN—consists of a pair of rotating pendulums, each suspended by its center of gravity from a common axis to which are attached springs that exert a tendency to keep them parallel. When the pendulums are made to rotate, they diverge from the axis until the centrifugal force balances the statical one exerted by the springs. As its action is independent of the direction of its axis and of the force of gravity, it is eminently adapted for steam engines on ships, which are subject to violent motions.

There has been quite a controversy maintained in several of the London periodicals, lately, about the above-mentioned governor, and another one for which a patent had been solicited by Mr. J. Meriton. Those interested in Mr. Silver's British patent resisted the issuing of one to Mr. Meriton, on the ground that it was a modified form of the same invention. The Commissioners of Patents refused the issue of the new patent, hence the controversy in the newspapers on the subject. This is our understanding of the case, as derived from our exchanges. One side contends that Meriton's improvement is different from Silver's invention, and that a patent was unjustly refused for it; the other side contends that Meriton's claimed improvement is similar to making the hammer of a musket strike upward instead of downward, and calling that a different invention and improvement. This discussion has, however, drawn out a fact before unknown to us, namely, that the great Brunel invented a marine (spring) governor, with double balls and crossed arms, several years ago, but it never came into general use. The reason is not stated, although the device appears to have been capable of doing good service.

PRACTICAL TEST OF A GOOD VALVE.

MESSRS. EDITORS:—In your issue of July 21st, I notice a communication from "C. R.," on the working of steam engines, which leads me to give my experience. I agree with him in regard to cutting-off, but think that end best practically obtained on ordinary high-pressure engines by the link motion or its equivalent. He speaks of the openings for the admission and escape of steam being too small, and of the friction, owing to the enormous pressure when the openings are of sufficient size. I agree exactly with him and must give him my experience with an engine having a valve overcoming all these objections to the ordinary slide valve, known as "Michener's balanced valve." It is a circular valve having a hollow stem extending through the steam-chest cap, and an arm on that stem to oscillate it. The steam passes into the steam chest and out through this hollow stem. The engine on which I have used it is $7\frac{1}{2}$ inches bore and 15 inches stroke; and this valve gives an induction opening of $\frac{3}{8}$ by 15 inches long, and an escape opening $\frac{3}{4}$ by 15 inches. The throw of the valve is about $2\frac{1}{4}$ inches. The engine was started in March, 1858, and for eight months after it was started I engineered it without the least trouble. Up to this date the valves (one on each end of the cylinder) have never been removed nor the packing yarn in the stuffing box renewed. The pressure on the valve is so slight that, when sawing, I can take hold of the driving arm on the valve and raise it up off its seat.

The engine is attached to the saw shaft and runs at the same speed as the saw, averaging about 350 revolutions per minute. I have seen it attain a speed of 700 revolutions per minute. Three ordinary hands sawed 28,000 feet of poplar in 5 days (of 10 hours), using nothing, for fuel, but sawdust as it was made from the logs. The average pressure of steam in the boiler did not exceed 50 lbs. I am confident that the same engine, attached to a circular mill, will double the amount with the same pressure of steam. Is not that better than can be done with an unbalanced-valve engine of the same size? A. D.

New York, Aug. 6, 1860.

CANADIAN INDUSTRIAL EXHIBITION.—The next annual agricultural exhibition in Canada will be held at Hamilton, C. W., commencing in the early part of next month. About $15,000 in value will be awarded in prizes. The Prince of Wales is to be present.

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