Scientific American

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Civilization, Inventors, Invention and the Arts.

REPORT OF THE COMMISSIONER OF PATENTS.—Part of this Report has been issued in a very neat form, by J. S. Redfield, of Clinton Hall, this city. It consists of 100 pages of closely printed matter, and is illustrated with a number of good wood cuts relating to the Art of Propulsion. It is our intention to present the principal part of these in our history of Navigation, and we therefore will not say anything upon that subject at present, but there are so many new subjects touched upon, —so many rare facts brought forth in the other parts of the Report, that we think it will be of interest to every one of our subscribers to read a few of these which we have selected.

In the introduction, differing from "Douglas on the Advancement of Society," he says in reference to the *Advent of the Arts*, "Man has everywhere made his debut in the character of an Orson. The annals of all the people of old began with their condition as savages—those of the Jews form no exception." This is a singular chapter, but we pass over it to another part. "The Earth," he says, "is a laboratory, in which, as a chemist, man has hardly begun to operate. When every force, latent and manifest is brought into service, and made the most of,—when man has spread his influence over every foot of the earths surface, and brought the stores beneath it within his reach—when mundane matter in whatever form appearing, is made to contribute to its ends, and when this planet is wholly changed from its natural wildness, into a fit theatre for cultivated intelligences, it will be time enough to speak of human advancement as culminating, and the arts as having reached the limits of perfection. Till these things come to pass, instead of looking for no more discoveries we should be prepared for a constant succession of them." So we think. On the dignity of Mechanical pursuits, he says, "this world is one of God's Workshops, and the universe a collection of his inventions, and in HIM the squeamishness of half-formed philosophers and of high bred fashionables respecting manual and mechanical pursuits, finds no sympathy, but terrible rebuke. His works proclaim his preference for the useful to the merely imaginative, and in truth it is in such, that the truly beautiful or sublime is to be found. A steamer is a mightier epic than the Illiad,—and Whitney, Jacquard and Blanchard might laugh even Virgil, Milton and Tasso to scorn."

In regard to what inventors have done, he says, "The idea is common that *savans* discover and inventors apply. It is not always so. Nearly every marked advance in civilization, began with and is due to the latter. The invention of printing, spinning frames, power looms, the steam engine, gas lights, steamboats, lithography, telegraphs and railroads, honorably distinguish *our* times" and mark the rapid advance of civilization. The chapter on this subject is very interesting. There is a capital chapter on the oppressions of the industrious classes during the dark ages, by the most unrighteous patents or monopolies, whereby workmen and manufacturers suffered the most unjust persecutions and exactions. No one should fail to read to this chapter, it would enlighten those calumniators of the present age, who feast with riotous pleasure upon the "good old days." He believes that Prime Motors are the Chief Levers of Civilization—such as the Water Wheel, Steam Engine, &c. He says, "there is no hazard in asserting that none of the ordinary modes of employing water as a Motor, are perfected.—The re-acting water wheel, until a recent period was little else than a toy in the lecture room, while, as exemplified in the *turbine*, the same principle has yielded eighty per cent. of the power employed. This strongly admonishes us, certainly, to investigate every source of mechanical force, with a view to economise it. Prime movers are too precious gifts to be only half used up. The turbine elucidates a truth, which inventors, above all other men, should cherish." In reference to Electric Motors he says: "At the present cost of metalic fuel (zinc), electro magnetism cannot become commercially valuable, nor can it compete with steam in any of its ordinary applications—for there is more virtue in a pound of coal than five of zinc. He believes that a new power is now wanted and looked for, and that there is a vast field of enterprise open for its introduction.

Nature, he believes, has yet her hidden mysteries, which the genius of man must extort from her. The water-spout can be observed in its workings, lifting water from the bosom of the ocean, but no one has yet been able satisfactorily to explain the causes of such a phenomenon.

We have but gleaned a few kernels from this Report; it may furnish us with texts and matter for one or more future reviews. In all likelihood it will not be published by government for some months, and this suggests to us the propriety of some inventor introducing an improvement in the mode of doing government business, so as to get the printing executed better and faster than has been done during the past two years. No one can get this Report by writing to Washington—it is a private enterprise, engaged in by the sensation created for the whole of the Report, from the extracts of it which were published in the Tribune of this city. See advertisement.

Pneumatic Pile Driving.

In our last number we gave a representation of a pier that was built upon Tubular Piles, sunk by the invention of Dr. Potts, who has just secured a patent for the United States.—In our description last week, we promised to give a fuller explanation of the process, and we will now proceed to do so.

Pile Driving is of great importance to the Hydraulic Engineer, and the means of expediting the old plans, have long engaged the attention of many eminent men. By the present plans, a great power is exerted by repeated blows to force down the piles—the soil has to be forced apart, to make room for the pile which if driven in like a wedge. The depth to which a pile can be driven is limited by the length of the pile of timber. The new process of Dr. Potts is entirely different from any heretofore employed. He employs a hollow pile, places it perpendicular on the spot where it is to be sunk, exhausts the air from it by an pump, the soil is drawn up through it from below, and the tube sinks as the soil is drawn up by the continued operation of the air pump. The pile is not driven down by the mere pressure of the atmosphere on the top of the pile, but by the continual undermining process going on at the bottom of the tube, and the pressure likewise—thus a driving and excavating process goes on at the same time. This is the distinction between this and the old plan of pile driving, and experience has satisfactorily proved that in proper situations this new process is by far the best. The tubes are made of cast iron, and can be constructed in such a manner that one can be tightly fitted on to the other, as it is sunk nearly to the surface of the water, and thus a pile of an hundred feet may be made up and sunk in sections. It will be observed that this process is only adapted for sinking piles in sand banks or bars, but at the same time it will sink a tube farther and easier in the most compact sands, than can be done by the old methods. These tubes have been sunk for a beacon on the celebrated Goodwin Sands, to a depth of 32 feet. Admiral Beaufort experimented on the same sands with a steel bar, and could drive it down only eight feet with a sledge hammer. It is a process which commends itself for carrying telegraph wires over many rivers, by sinking piles for posts at considerable distances from the shore. There are many places very favorable to carry out such an object. The practical operation of this discovery developes one fact, which would not readily be apprehended, viz., that gravel, clay, shingle and stones of considerable size are drawn up, and the stones, like the large sparks from a locomotive, are drawn up first—the heaviest bodies thus running up faster than the lighter particles. This is owing to the cohesion of the masses, for the pressure is equal on the whole surface, but it shows that these piles may be sunk in very refractory soils, if there is moisture to assist the adhesion of the soil in passing up through the tube, and what is essentially necessary at the same time, prevent the air from getting into the tube in any way. In a good operative model, we have seen masses of metal carried up through the tubes, with apparently greater facility than sand. The principle can be applied to a great number of purposes—such as well sinking in many places, and also for excavating itself. One good application of it would be to make sea walls by sinking the tubes, forming them into groins, and filling them up with concrete, which in time would form a wall better than any other kind whatever, and certainly at far less expense. These are our opinions, formed from observation.

We could say a great deal upon this subject, but we trust that enough has been said by us to convince our Civil Engineers that if they do not pay particular attention to this invention, they will be blind to their own interests, and exhibit a want of scientific enterprise. For piers, embankments, &c., in quicksands, we know of no discovery equal to it. If it had been employed in the construction of the U. S. Dry Dock at Brooklyn, it would, we believe, have saved at least half a million of dollars.

For the Scientific American.

Explosion of Steam Boilers.

The recent and horrible effects arising from the explosion of steam boilers, induces me to do what I have long intended, viz., to make public my own experience in the management of them—owning and running a steam engine, as I did, for a long time in this city, the boiler of which was old, and running the engine, as I did, for a long time at from 100 to 150 lbs. pressure, as indicated by the weights on the safety valve (which was one of the best construction and kept perfectly clean, so as to indicate the pressure upon it), I can, with truth, testify to the following:—The boiler was 22 feet long and 30 inches in diameter. When I commenced business I had it examined by a careful and competent boiler maker, whose report was, that with care it might last for years, so far as he could judge by entering it at the "man-hole" and sounding it. He said, however, that he could not judge of the strength at the "fire line," except from its appearance, which was fair. At this line, you are aware, he could not judge by "sounding," the bricks being in contact with the boiler. I drove the said engine some three years without any repairs to the boiler, and at the pressure above stated, when I sold out; and the boiler was taken out to be repaired by my advice. On taking it to the boiler maker the workmen were astonished at its having been strong enough to withstand the pressure, they being aware of the work done in the establishment, being able, as I witnessed myself, to strike a small hand-pick, weighing from 3 to 4 pounds, the point from 1-4 to 3-8 in diameter through the boiler, every blow along the fire line, and the bottom sheets which had been exposed to the fire.

The engineer and fireman first employed by me were content with keeping the water above the lower guage cock, but certain that there was no necessity for so large a space as steam chamber; and finding that the lapse of but a few minutes after a trial of the guage, showing water at that point, that nothing but steam issued, I gradually increased the amount of water in the boiler, noting the effect, and was agreeably surprised to find that keeping the boiler almost full of water had one good effect. We were not as liable to fall short of steam (the fire being the same) and by obliging the fireman to keep the water at the upper guage, it increased his attention to it, inasmuch as a little too much would cause an overflowing of water into the steam cylinder, which gave him trouble.

I have frequently, since I was engaged in the business alluded to, reflected on the apparent danger we encountered, but have long since come to the conclusion that we would probably have escaped injury for the reasons I will now attempt to describe, and would be much gratified if you would besides giving your own opinion on the subject, submit it to your readers. What I am anxious to have is the opinion of scientific as well as practical men.

It is simply this, that water, being almost incompressible, and steam compressible to an extent limited only as it would seem by the strength of the vessel containing it, that no safe guard is needed to do away with all danger arising from explosions further than *fill your Boilers with water*, constructing them, so far as the steam chamber or reservoir goes, somewhat in the form of locomotive boilers.

No one would contend that there is any necessity for keeping a supply of steam in your boilers, further than is wanted for a few revolutions of your engine, and the amount of heat being the same, as necessary to keep up the supply with the water at the fire line, will certainly give the requisite amount. In fact I found by experience that with the greater quantity of water, less attention was needed.

Compare for an instant, the number of locomotive engines in our country with those of all other kinds: I presume there are many more of the first. Compare the size of their boilers and the power they furnish: are not explosions very rare among them compared with all others? I think so, and believe it to arise from the fact that the engineers are obliged to be at their post and to keep their pump in motion a great part of the time, owing to the flues being near the top of the boiler, and the steam chamber being so small.

I have heard it asserted by scientific men, in whose judgment I feel great reliance, that in case of an explosion of a boiler, "nearly filled," as I have described, that the effects would, in their opinion, be as disastrous as in the case where the water was kept as customary at the fire line; and in the hope that your insertion of this will draw out something valuable from yourselves or others, I submit it to you.

That ten or twenty cubic feet, packed with steam, could do the same damage or exert as much power as one hundred, I cannot believe yet. I saw a boiler some years since which had "burst" a few days previous: it had been nearly full of water, and further than a rent across a sheet exposed to the fire, through which the water escaped and put it out, no damage was done.

To conclude: if, as I firmly believe, all steam boilers could be constructed advantageously, as described, and a United States law was passed, that all steam engines of ten horse power and upwards, used on board steamboats or in manufactories, should have connected with them an apparatus which would ring a bell at stated intervals; say every 20 minutes, or a certain number of revolutions of the engine, on which signal some one having charge of the boilers would be required to try the guage cocks, a heavy penalty being imposed on the captain or owners for every omission—putting on water if necessary, I firmly believe we could and would travel by steamboat in perfect security. Yours truly,

Phila. ENQUIRER.

[We will make some remarks on this most important subject next week. We would merely state here (as this is a question of importance every moment), that there are truths in the above letter which cannot be set aside by any sophistry whatever.—ED.

Building in New York.

In the last year 1495 new buildings have been erected, making an increase of upwards of 300 over the preceding year, and nearly double the number erected in 1838. Within the last fifteen years 20,000 structures have been built in this city.

In publishing the list of gold medals, granted by the American Institute, at the late Fair, we omitted to notice that one was granted to Mr. McCormick for his Patent Virginia Reaper. He would esteem it a favor if those Editors who omitted this notice would take the opportunity to insert it.

Erratum.

In our correspondent's letter from Washington, last week where it refers to the articles deposited in the National Institute it mentions "and the *other* fruit," it should read "and the *osher* fruit.