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Iron Lighthouses.

So long as wood is cheaper than iron in our country, it will be used in preference to it for the sake of economy in the first cost. Every year, however, tends to increase the scarcity and price of timber, and iron is every day extending in use, and it will yet be as common to see iron houses of all kinds as it now is to see those of wood. We shall not live to see this result, but we can see it *afar off*. In our city, iron pillars are universally taking the place of those made of wood and stone, and in Britain, five iron ships are now built for one of wood. The employment of iron in marine structures forms an important era in respect to its use for lighthouses. The great expense and difficulty heretofore experienced in forming foundations of stone for lighthouses in sand banks, and in yielding soft places, have been overcome by Mitchell's iron screw piles, and Potts' iron cylinders, and then raising the superstructure on these. We have a letter before us from Mr. C. Pontez, stating that he is progressing with his foundations of iron cylinders for a lighthouse in the course of erection fifteen miles below Baltimore. A number of these cylinders are now sunk, and when all completed, they will form two concentric circles, the outer one twenty-three feet in diameter, composed of cylinders 26 inches in diameter each, and one inch thick; the inner circle will be seventeen feet in diameter with cylinders of 17 inch diameter. These cylinders will be filled with concrete, capped with iron plates, and all the caps connected together by wrought-iron ties, thus forming a continuous circuit. Around and within, the circles will be filled with large masses of granite to the level of low water, and on the top of the iron circuits the regular courses of masonry will be laid. The site is two miles from the shore, in water 10 feet deep, and thus a strong and permanent lighthouse will be built by the employment of iron foundations at an expense of less than one-half of what a stone foundation could be laid; indeed, the employment of iron, enables our marine engineers to build lighthouses in situations where it would be utterly impossible to build stone towers.

At the exhibition of the Franklin Institute now open in Philadelphia, there is the model of an iron lighthouse by Merrick & Son, to be built on screw auger piles bored 12 feet into the coral reef, at Sand Key, Florida, it has a base of 50 square feet will be 132 feet high, and weigh four hundred and fifty tons.—The lighthouse on Carysfort Reef, Florida, completed by the Topographical Bureau this year, is a wonderful iron structure, and was made by Merrick & Towne, of Philadelphia. It is built on piles arranged upon the angles and centre of an octagon; the heads of these piles are united by iron ties, and on this arise courses of iron pillars and a strong central column from the centre foundation to a level with the top of the upper series of pillars—from this central column, there radiate, at proper levels, iron girders of great strength, which, added to the horizontal ties extending from one pillar to another, form a combination so compact and stiff that no force of the wind, it is supposed, will ever disturb it. For the residence of the keepers of the light, a cast-iron dwelling of a circular and conical form is fitted to the above described frame-work of pillars, ties, &c., at a point 35 feet above the level of the reef, and 20 feet above the highest tides.

This dwelling consists of two stories. The lower one being about 8 feet in height, and 40 feet in diameter, is designed for the deposit of stores, the kitchen, etc. It is fitted with 8 windows and 16 bull's eyes—the former for air, the latter for light. It contains six iron tanks for water and oil. The upper story is divided into six rooms, with a hall in the centre to allow a free ventilation in all the apartments. There is a door at each end of the hall, and a large window in each room. Surrounding this story is a gallery, exterior to the house, 5 feet in width, where the keepers may exercise.

From the centre of the hall rises a spiral

staircase to the top of the structure. This staircase is enclosed by an iron cylinder, the whole weight of which rests upon the roof of the dwelling house. On the top of the structure is placed the watch room, and lantern, or light room, fitted to contain a Fresnel apparatus of the largest size, that will produce a light of the highest power. The diameter of the structure at the base is 50 feet, and 20 feet at the level of the watch-room floor. The height of the entire work above the surface of the reef is 127 feet, and the height of the centre of the light 115 feet.

It was for this lighthouse that the Fresnel Light was intended, which was sold in the New York Custom House for old iron and glass, when in charge of the Topographical Engineers, and not under that of the Light-house Board, as we have since been informed. The benefit of iron in marine structures, such as lighthouses, was first displayed by A. Gordon, C. E., of London, who, in 1841, erected one on Morant point, in the Island of Jamaica, on a position difficult of access, and where, from the frequency of earthquakes, no stone lighthouses above two stories high could stand. This lighthouse is made of cast-iron, and has stood several severe shocks of earthquake. A cast-iron lighthouse was erected by the same engineer on the Island of Bermuda, in 1845; it is 105 feet high, and is provided with a Fresnel light, which can be seen at 30 miles distance. Owing to the great expense, or total inability of erecting stone structures in many exposed situations, we cannot but feel grateful that iron meets and surmounts all such difficulties. The iron lighthouse in Bermuda has been the means of greatly reforming the habits of a large number of the inhabitants who formerly gained their livelihood as wreckers, an occupation not very favorable to the development of the best qualities of humanity. The iron lighthouses on the dangerous Florida Reefs will also be the means of doing a vast amount of good in this respect. Within view of a first-class light on Carysfort Reef, there was wrecked in three years and four months, property to the amount of \$1,147,500. The wrecking fleet on the Florida Reefs amounts to 47 vessels with a tonnage of 1,200 tons, and crews amounting to 350 men. At Key West, Florida, the amount of salvage decreed to the wreckers, in 1848, amounted to \$199,140, and the wrecked vessels and cargoes amounted to \$1,282,000. The iron lighthouses on the coast of Florida, if they do not prevent all this great amount of wreckage, will no doubt prevent nearly the whole of it; success then, we say, to our Iron Lighthouses.

Firemen on Steamships.

A very important case has recently been tried before the U. S. Courts in this city, which we cannot pass over in silence. On the late voyage of the steamship Franklin, one of the firemen, when he left New York, was intoxicated, and when heated at his labor became stupid, disobeyed the command of the assistant engineer, fell off the stairs, became insensible, and in that state the said engineer poured some pails of cold water over him, after which, in a very short time, he was a corpse. The engineer was brought before the court on a charge of manslaughter, but the evidence, to our view, did not exhibit any intention to injure the deceased man. The evidence, however, developed a most heartless system, and brought to light the life of a steamship fireman, in comparison with which that of the meanest serf is blessedness itself. It was stated that the firemen were generally intemperate, that they drank a great deal of spirits, and no wonder. The fire-room is below the water line of the ship, and is often at 80°, 90°, and 100° of temperature. The men have to work in this atmosphere, and sometimes they can scarcely breathe. Frequently they sink down exhausted, and by pouring water upon them, revive; this was applied to the deceased fireman, but he will wake no more till the last trump shall sound. The temperature of the human body is 99° 5', and although it has been proven by many experiments, that the body maintains the same heat in the man who lives in the cold regions of 30° below zero, and him who lives in the tropical regions of 90° above it, yet reason, common sense, and experience tell us that there must be a certain temperature of the atmosphere most in

harmony with the temperature of the body.

Men have stood and may stand to live in an atmosphere of 100°, (and we have entered into an atmosphere above 200°) yet they can only do this for a short period. The difficulty of breathing (the fiery choking sensation) tells us that such an atmosphere cannot be breathed with impunity. For example, an atmosphere of 99° 5'—the same temperature as that of the human body—must be in equilibrium with it; now, as the action of the lungs is to promote slow combustion in the body, the atmosphere, to be perfectly healthy for a man, should always be colder than the carbonic acid gas and moisture from the lungs. Unless this is the case, the atmosphere, as it should, cannot act as a good condenser to the heat of the lungs, therefore, a highly heated atmosphere must be injurious to health; it cannot be otherwise. We have observed that those men and women whose lot was that of working in warm rooms for dressing fine muslins, in factories, in printworks, firemen of steamships, &c., presented a bleached and consumptive appearance, and it we had statistics of their health and longevity, we have no doubt but the bill of mortality and sickness would be appalling. The evidence presented by the engineers and firemen of the Franklin conclusively proves this, and something more is demanded in the inspection of steamships than an examination of the hull and boilers for the safety of crew and passengers. The safety of the lives of firemen working away down in their minor pandemonium, demands the attention of all philanthropic men, and we hope that this case may lead to a better ventilation of boiler rooms on board steamships.

The best temperature of atmosphere conducive to health ranges from 42° to 75°; we have no statistics to prove this assertion, we only conclude that these atmospheric temperatures are the best, from a knowledge of their influence upon fermentation, and the robust forms and general health of the natives of those countries, the temperature of which averages about 50° throughout the year, and never rises 30° above nor 30° below that standard, excepting upon rare occasions. The natives of very cold climates are stunted specimens of the human family, and if some of the natives of Africa are tall and muscular, it is owing to a physical constitution of an entirely different character from that of the Caucasian race.—They would no doubt make excellent firemen in our present steamships, (only they would have to be more strictly watched than men of our own race,) but we believe that the temperature of the boiler room can be maintained at 65° or 70° without any loss of heat to the boilers, and the firemen thereby be enabled to work with safety and comfort.

Artificial Hydraulic or Portland Cement.

"The London Journal of Arts and Sciences" contains an article on testing the brick-beam erected at the Great Exhibition last year with Portland cement. In England no artificial hydraulic cement was discovered until the experiments of Mr. Frost, who was the real discoverer of the Portland cement. This hydraulic cement has superior qualities to any other; it is capable of setting very fast in water, and it can also be used as a mortar. The Portland cement is made of clay mixed in certain proportions with chalk, then ground in water and afterwards burned. It is submitted to a high heat, and has been called over-burned lime. It is now used extensively in England for docks in harbors, for stucco work, the construction of cisterns, &c. The discoverer of this cement conferred a great boon upon England; he came to this country a number of years ago, and resided for a long time in the city of Brooklyn, in which place he breathed his last at a good old age, the early part of this summer. His experiments with steam, and his pamphlet on *stame* (steam heated apart from water) which he termed "a substance with new qualities," are well known to the public. He was a man of a very gentlemanly appearance, he possessed great ingenuity and engineering skill, was an excellent practical electrotypist as mentioned by Dr. Lardner in his lectures in 1841, and had a very extensive knowledge of chemistry. There were few, if any, men in our country possessed of more general information connect-

ed with engineering than Mr. Frost. At one time he was possessed of considerable wealth, but his latter days were spent, though not in want, in comparative poverty. He was an inventor, and the last days of his life were like those of too many of that benefit-conferring class; he benefited others to the injury of himself.

The Fair of the American Institute.

It was decided by our State Courts that "The Art Union" of New York was a lottery. The American Institute at its present Fair, has flung the gauntlet of contempt at such a legal imputation upon such an Institution as an "Art Union." At the East end of the machine room there is suspended a picture resembling the scene of "The Money Changers" in the Temple at Jerusalem. Connected with it is the flaming sign, "Art Union," for the relief of Broadway, by steam carriages. At the desk beneath, a subscription list has been opened, and subscribers solicited. The object of this Art Union is the formation of a company for the relief of Broadway, by the substitution of steam carriages in place of horse omnibuses. We shall say nothing about the impracticability of such notions being carried out; but we do say, that no company has received, nor can receive, the privilege of running steam carriages in Broadway, and to form a joint-stock company for this purpose is a most extraordinary proceeding. And how does the conduct of the American Institute comport with true ideas of right and honor? It certainly appeared as an abettor of this scheme, or why did the managers allow part of the Fair to be turned into a subscription box? The Fair, in this respect, is an infliction upon visitors and a disgrace to our city: it has become a vender of spurious titles; for it is not an exhibition of American Industry only, but a dealer in baseless projects. Any person or persons have a perfect right to form all kinds of legal joint-stock companies for testing any scheme, practicable or impracticable, but the Fair of the Institute is not the place for selling stocks for such projects.

Hydraulic Rams.

We have received a communication from J. D. Rice, No. 397 Market street, Phila., which states that the information which we received about the hydraulic ram from the "Report of the Committee of Science and Art" of the Franklin Institute, Philadelphia, is full of error. The communication states that the ram said to have been put up in the town of Naples, N. Y., (as mentioned on page 13, this Vol., Scientific American) to supply it with water, has never distributed a single drop.—The Town Clerk of that village furnishes this information. The hydraulic ram of Birkenbine, which was put in to supply the Girard College, it is also stated, has been taken up, and that institution is now supplied with water from a pump operated by a steam engine. This is a question of facts in respect to certain statements; who has done wrong in propagating errors? This is to be answered by our Pennsylvania friends.

Portrait of Washington.

Sold by Williams, Stevens & Williams, Broadway; Wm. Terry, 113 Nassau street, sole agent.—An engraving from Stuart's superb picture of the Father of his country has been handed over to us for inspection, with which we are highly delighted. It is engraved upon steel by T. B. Welch, of Philadelphia, from the original painting in the Athenæum at Boston, and reflects the highest credit upon the artist. As a specimen of American skill, it is one that does infinite credit to our country, and we sincerely hope that the spirited publisher will receive all the patronage that he so justly deserves. It would be useless to enter into any critique upon the painting, which is too well known to require description, and it will be found that the engraving is a true copy of the original. Every feature is as accurately represented by the lines of the engraver as by the pencil of the artist. It is a national work and therefore deserves national patronage. We doubt not that the sale will be immense.

DANIEL WEBSTER, Secretary of State, died at his residence in Marshfield, Mass., at 3 A. M., on the 24th inst.: thus have recently passed away our three greatest statesmen—Calhoun, Clay, Webster.