

## SCIENTIFIC MUSEUM.

## Model for a Fast Steamboat.

The Washington correspondent of the Atlas says:—

"There is a drawing in the Navy Department, of a new steamboat which is about to be built in New York, for the Hudson River, and which is to make the trip from New York to Albany in five hours. She is intended to compete with the New York and Albany Railroad. By the kindness of Commodore Skinner, we obtained her proportions, which are as follows:—Length of keel 500 feet; length of deck, 350 feet. She looks like a sword-fish. There is 75 feet of keel at each end, extending out from the deck, which shows itself above water, and which is sharp and pointed like the sword of a sword-fish. Both ends of the boat are alike, and her engines are to work both ways. She is not intended to turn round, but to work like a ferry-boat. She is to be called the George Washington, and to have accommodations for three thousand passengers. She will make the passage of 150 miles in five hours. She has been designed and modeled by Mr. Davidson, of New York.

## Fire Alarm Telegraph.

The people of Boston are constructing a fire-alarm telegraph. Forty-nine miles of wire have been stretched over the city, diving under the arm of the sea which separates the main portion from South and East Boston. The first of the forty cast iron signal boxes has been placed on the Reservoir in Hancock street. These will be so distributed that every house in the city will be within fifty rods of one. Whenever a fire occurs, resort will be had to the nearest box, where, by turning a crank, instantaneous communication will be made to the central office, and from that—which stands related to the whole fire department of the city like the brain to the nervous system—instant knowledge will be communicated to the seven districts into which the city is divided, by so striking the alarm bells simultaneously that the locality of the fire will be known exactly to all. This system, the perfect success of which is now certain, will stand forth as one of the finest achievements of scientific skill, and a source of just pride to Boston.

(For the Scientific American.)

## Pile Foundations.

The empirical rule given in your 12th number, for the weight which can be safely trusted on a pile, though from a very respectable authority, does seem to me very far from established and practiced rules. The action produced by percussion cannot be compared to the action by pressure, as in the quoted example; the power by pressure is valued only by the number of pounds per square inch.

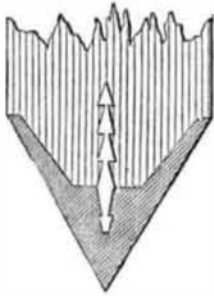
After a great number of very accurate experiments made by Rondelet and Gauthey, eminent French engineers, the pressure sufficient to crush a cubic block of wood, is, for oak, 6,056 lbs. per square inch; for pine, 7,100 lbs. per square inch.

But it has also been ascertained—1st. That the resistance does not decrease as long as the height of the block does not exceed 7 or 8 times the base. 2nd. A post will bend when its height is more than 10 times the base. 3rd. When the height is 16 times the base, the post is no more safe to bear any weight. From these, the following progression has been established:—For a cube of which the height is 1 ft., resistance is 1, or 24-24; for a post 12 ft., resistance, 5-6 or 20-24; post 24 feet, resistance 1-2 or 12-24; post 36 feet, resistance 1-3 or 8-24; post 48 feet, resistance 1-6 or 4-24; post 60 ft., resistance 1-12 or 2-24; post 72 feet, resistance 1-24.

The weight which can safely be trusted on the head of a pile driven in the ground, is practically valued at 50 kilogrammes per square centimetre, or 712 pounds per square inch, of the average section of the pile, (1 square inch equals 645 square centimetres). A pile of 5 or 6 yards long should be 10 or 12 inches diameter, measured in the middle of its length: suppose it to be 12, the surface of the section will be 113 square inches:  $113 \times 721 = 80,456$  pounds for each pile, and as they are generally placed 3 feet apart, the average weight for each of them is greatly reduced.

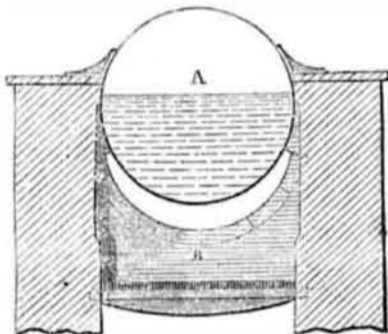
The weight of brick walls is about 3,150 lbs. per cubic yard; then the pile above would bear 25 cubic yards, which would give a wall 75 yards high, supposing it to be 1 foot thick, or 25 yards high supposing it to be 1 yard thick.

## CAST-IRON SHOE.



A pile is found sufficiently driven when, after a volley of thirty successive strokes of a ram weighing 900 lbs., the pile has not gone down more than 1-8th of an inch. The steam hammer is used successfully for the purpose in foundations of bridges where piles are very numerous. The piles are furnished with an iron shoe, often set at the largest end of the pile, so as to reduce the friction of the pile against the ground; the best shoe is made of cast-iron. It is found superior to wrought-iron, and a great deal cheaper, the cast-iron one amounting to only one-fifth of the cost of the other; it is conical, and its vertical section is an equilateral triangle. E. BONNET. New York, 1851.

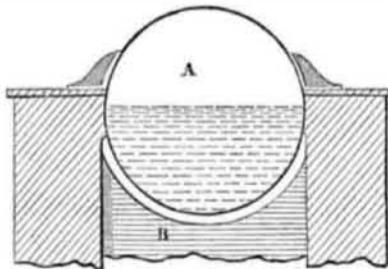
On Boilers.—No. 5.  
FIG. 10.



**FIRE AND FLAME BRIDGES.**—It is very important that all boilers of any considerable length, and particularly when erected on the direct-draft plan, should be provided with several flame bridges under them, commonly called "check bridges," but perhaps improperly so, from the supposition that their proper office was only to check or impede the too rapid current of hot air and flame in their passage to the chimney, and consequently to retain the heated gases longer under the boiler, which they certainly do quite as effectually as causing the smoke to travel through long, narrow, tortuous flues. This, however, is the least important purpose they subserve.

The above, fig. 10, is a transverse section of one of a number of boilers which were erected, says Armstrong, by a firm in Manchester several years ago, all of which are yet in work, showing how the boiler is hung upon cast-

FIG. 11.



iron brackets, rivetted to the boiler, A, a little above its centre, and resting by broad flanges on the top of the side walls.

This boiler was purposely chosen of this simple plan, and put up in the cheapest and simplest manner with a direct draft, so that any alterations or improvements that might have been found expedient to make, either in the setting or construction of the boiler, might be in the shape of additions merely, and therefore being separately proved, both as to first cost and actual worth; and also that observations might be made upon it for a sufficient length of time, without the liability of error either from complication of construction or from interruptions owing to the necessity of

stopping to clean out the flues or otherwise. It was thus made to answer the purpose of a trial boiler, in order to guide the firm to which it belonged in their choice of the kind of boilers to adopt in the erection of some new works.

One of the flame bridges is shown in elevation in fig. 10. It is an inverted arch, 5 inches from the boiler bottom, and equally distant all round. Too much attention cannot be paid to the proper construction of these bridges; for neglect in this matter has always been the cause of any great waste of fuel that has ensued on putting up a direct-draft boiler. If too great a space is left above them, it is almost as bad as if the bridges were left out altogether; for then the flame is apt to divide itself into two currents, one on each side of the boiler, and thus run off to the chimney without taking much effect upon the boiler bottom.

Their proper office is principally for the purpose of spreading the flame and heated air around the convex heating surface, so as to completely envelope the lower half of the boiler in a stratum of flame of comparatively equal thickness or uniformity.

Similar observations may be made with regard to the fire bridge, B, represented in fig. 11. It is too frequently built by bricklayers in the form of a horizontal wall of very little elevation at the end of the fire grate, in evident ignorance of what the proper functions of a boiler bridge consist, and as is also evidenced by the name of "stop," or "fire stop," that is commonly given to this bridge, from the supposition that its only use could be to prevent the stoker from pushing the coals over the end of the fire grate. Its most important object, however, is, like that of the flame bridge, to act as a dam for the current of flame and gas to flow over.

The top of this bridge is described by a circle of the same radius as the boiler, A, at about 10 inches below the boiler bottom, as shown in figure 11, which is a vertical section of the furnace across the back end of the fire grate on a scale of  $\frac{1}{4}$ th of an inch to a foot. This fire bridge reclines backwards, with a batter of about 6 inches in the middle, diminishing to each side of the furnace, where the upper part of each wing of the bridge is vertical.

## The Power of Mind on the Untutored Savage.

The delegation of Indians from the West, says the Republic, now on a visit to Washington City, were taken, last week to the Navy Yard at that place, to see the operations there. Nothing struck them with so much surprise as the steam engine, which spoke to their minds in the deep humming of the rapid revolving wheels and the tremors of the ground upon which they stood. One of them remarked, "they were now certain that nothing was impossible to the white people, they were next in power to the Great Spirit." Surrounded as we are by such evidences of the work of mind, they fail to make more than a passing sensation, but to the untutored savage they conveyed a world of new ideas which filled him with wonder and delight.

## Tobacco for Snake Bites.

MR. EDITOR—As corroborative of your views of the efficacy of tobacco juice, in the cure of snake bites, I send the following:—Some years ago my father was bitten by a copper-head snake, he instantly applied the juice of strong tobacco, mingled with saliva from the mouth, and so perfect was the cure, that he did not lose a day from business on account of it. W.

## Cure for Toothache.

Two parts of brown sugar, two parts of tar, and one part of finely ground black pepper: mix them cold, and apply a portion to the affected part. Repeat this occasionally, for a day or two, and a perfect cure will be effected. I have tried it twice with entire success on my own teeth. My neighbors have found it equally efficacious. W. Cornersville, Tenn.

## Tea, Coffee, and Wool.

The importations of tea, coffee, and wool into the United States, during 1851, as shown by the statement accompanying the Report of the Secretary of the Treasury, were as follows: tea, \$4,798,004, whereof was re-exported

\$1,129,064, leaving for consumption in the United States \$3,668,141. Coffee imported, \$12,851,070; re-exported, \$336,000, leaving for consumption, in the United States \$12,515,070. Wool imported, \$3,883,160, re-exported, \$7,966, leaving for consumption in the United States \$3,825,194. The importation of wool in 1850, was valued at \$1,681,000, showing an increase in the value of the importation the last year of over two millions of dollars.

## LITERARY NOTICES.

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**THE GUARDIAN—A Family Magazine,** devoted to the cause of Female Education on Christian principles: edited at the Female Institute, Columbia, Tenn., by F. G. Smith and others: terms, \$1 per annum, monthly, and a very excellent publication. We thank the Editor for his favorable notice of our efforts to throw light upon the "Fire Annihilator."—Examining the prospectus of the above institution, we should think it well managed, and an ornament to the State.

**THE STUDENT—A Family Miscellany and Monthly School Reader,** devoted to the physical, moral, and intellectual improvement of youth: N. A. Calkins, Editor: Fowler & Wells, publishers, 131 Nassau st., New York, at \$1 per annum. We regard this work as a valuable accessory to every household. The subjects treated in its columns are well calculated to direct the minds of youth to high and honorable aims, and we wish it to attain a position corresponding to its importance, as a work for youth. Its columns are not supplied with vagaries, but with wholesome truths and practical suggestions.

**THE EXCELLENT WOMEN—A book of Essays,** by W. B. Sprague, D. D., upon the 31st chapter of Proverbs. Each chapter is beautifully embellished with an engraving, and the writings of Dr. Sprague are a sufficient recommendation to the work. The book is tastefully got up, and is in every respect a suitable holiday gift. Published by Gould & Lincoln, Boston, and for sale in this city by E. H. Fletcher, 141 Nassau st.

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