The Strength of Solid and Hollow Brick.

Experiments have lately been made in England to test the relative strength of the above named kinds of brick, by Messrs. Horner & Molesworth, Civil Engineers, and the results of these experiments have been published in the *Journal of the Society of Arts*.

The experiments were made with a 9-inch hydraulic press; the plunger by which the pressure was applied was 1 inch in diameter, and the weight was suspended to a lever, which multiplied the power 15 times. In applying the transverse strains, however, a shorter lever, which only multiplied the power by 5 was used. The bricks subjected to a crushing force were faced, so as to remove all inequalities; they were then bedded on a sheet of thin lead, and another sheet placed upon them.

The pressure was communicated by a cast-iron plate, so arranged as to adjust itself to the brick, and distribute the pressure uniformly over the whole surface. The weights were carefully applied, and allowed to come to a full bearing before more were added.

In exposing the bricks to a transverse strain, the supports were placed two inches apart, and the weight gradually applied to the center by means of a spring balance.

The solid brick made by machinery were the strongest. A solid brick of 8 lbs. weight, made by a machine, withstood a crushing weight of 117 tuns, while a hollow brick weighing 6 lbs. only withstood a crushing weight of 47 tuns. A solid brick made by hand, weighing 5 3-4 lbs. withstood only a crushing weight of 13 tuns.

When exposed to a transverse strain, hollow bricks weighing 6 lbs. only withstood a breaking weight of 3 tuns, while solid brick weighing 8 3-4 lbs. required 9 tuns weight to break them. Solid bricks made by hand, weighing 9 1-2 lbs. were broken by a weight of 4 1-2 tuns.

In these experiments one fact appears remarkable, namely the great strength of machine-made brick in comparison with those made by hand, according to their weight.—Thus a machine-made solid brick weighing 8 3-4 lbs. withstood a transverse strain up to 9 tuns 17 cwt., while a hand made solid brick of 9 1-2 lbs. was broken with 4 tuns 8 cwt. Hollow and perforated machine-made brick were much stronger than the solid hand made brick, although weaker than solid machine brick. In molding brick by machinery the pressure exercised on the clay is much greater than can be by hand; the particles of the clay and sand are, therefore, brought into closer contact, and their cohesive powers thereby greatly increased by the intimate connection of all the particles.

These experiments are of great value, and afford evidence of some of the benefits conferred upon the arts by machinery, in comparison with hand labor. Brick machines do away with one of the most laborious human drudgeries, and at the same time produce a superior manufacture.

The New Steam Frigates.

The Secretary of the Navy has the following in his Report, respecting the five new steam frigates :—

"In my last annual report I informed you that three of the steam frigates ordered by Congress were afloat. It now affords me pleasure to state that they are all afloat. The machinery for each will be complete and ready for trial in a few days. The *Merrimac* and *Wabash* are now in commission. Thus far the most sanguine expectations of the Department have been fully realized.

The performance of the *Merrimac* has impressed favorably the severest architectural critics. The machinery and boilers have exhibited remarkable evidence of power; the material and workmanship were superintended and approved by the engineers of the government, although built, of necessity, in private establishments. The speed is greater than usual in auxiliary steamers, in which steam is by no means the chief motive power, but the great desideratum is attained of preserving unimpaired all the essential elements and capacity of the sailing vessel.

Five of these frigates were modeled by the Chief of the Bureau of Construction, &c., and will each carry a battery of 8-inch. guns on the spar deck, 9-inch. on the gun deck, with a 10-inch. pivot gun bow and stern.

The *Niagara*, built in New York, was modeled and completed in the Navy Yard by the late George Steers, whose genius and great capacity for shipbuilding were so highly commended that he was appointed temporary Naval Constructor for that purpose. She will carry the novel armament of 12 11-inch guns, each throwing a shell of 135 pounds.

The introduction of these magnificent vessels constitute an era in the history of the United States Navy, and while they may well stimulate the energy and valor of its officers, they will also excite emotions of a just national pride in the bosom of every American beholder."

[The opinion of the Secretary of the Navy respecting the *Merrimac* must be taken with a wide margin. The Editor of the *United States Nautical Magazine* in this city has criticized it with severity, and its performance has been the very reverse of impressing him favorably.

The boilers have not operated satisfactorily, or else one of them would not have had a hundred tubes taken out while in this port, before leaving for England—her speed is also rated low. On the whole, however, she is a noble vessel, and has astonished Uncle John Bull, across the water.

Progress of American Manufactures.

The following extract from the Report of the Secretary of the Treasury will show the rapid progress made, and the extent of our manufactures at present :—

"In 1790 but little manufacturing was done in the country, as a distinct business. Nearly all that was done was in private families for domestic use. Now manufacturing is a separate pursuit, and immense capital is employed in its various branches. In 1840, the value of our manufactures was returned in the census of that year, at $483,278,215, and in 1850 they were returned in the census of that year at $1,055,595,899. The ratio of increase makes our manufactures for 1855 $1,391,031,293. In this result we recognize the fact that we have become a great manufacturing people, and the tables accompanying this report prove we are likewise a great agricultural and commercial people. An impulse, in accordance with the national sentiment, was given to manufacturing, by the imposition of duties on imports in our first revenue laws, and the impulse was increased from time to time by the imposition of additional duties. At first we manufactured the coarser and more bulky articles required by our population; gradually we have extended our operations to a great variety of articles, and to some requiring much skill in the execution, and now our manufactures are in possession of our home market in a great variety of articles. In 1790, our planters raised no cotton for exportation; now it is the great crop of our planting states, and they furnish it as a raw material to the manufacturing states, as well as to foreign nations, and now we manufacture the coarser cotton goods for the consumption of our entire population, and export near $7,000,000 annually to foreign countries. Our manufacture of cotton in 1840, was $46,360,453, in 1850, $61,869,184, and the same ratio of increase in 1855 would give $70,961,712."

Minerals of Connecticut.

The Rochester (N. Y.) *Democrat* says :—"Our townsman, Mr. John Alling, has just returned from a visit to Middletown, Conn. He brings with him specimens of the ore taken from the lead mines at that place, discovered and opened a few years since by a French gentleman. The quartz bears a large per centage of lead, mingled with silver and copper. Some portions are quite rich with silver; one small lump, weighing two pounds and nine ounces, which Mr. Alling brings, is said to be half silver ore. This mine is within a few rods of the Connecticut river, and the shaft extends 280 feet below the surface, and 160 below the bed of the river. It is stated that the yield is about 2300 tuns of crushed or separated ore per month. It is sent to Philadelphia for smelting. Near this mine is an old one, worked years ago, and now again opened. New England is full of mineral treasures which an agricultural and manufacturing population have but indifferently developed."

[The quantity of ore said to be obtained from this mine must be a mistake, as it amounts to 27,600 tuns per annum. There is not a copper or lead mine in our country which produces this amount of *separated* ore annually.

Manufacturing Ice.

A few weeks since we called for information from E. T. Sterling, respecting the cost of manufacturing ice, as practiced at the Cuyahoga Works, Cleveland, Ohio, stating at the same that if it could be produced at a cost not exceeding five dollars per tun it would be hailed as a useful invention by those residing in our Southern States, and in other warm regions. The following is information furnished us on the subject :—

"The machine in its present state, is arranged for making a tun of ice at an operation. A square cistern with a double wall has the space between the two walls, about one foot, filled with pulverized charcoal; inside of the inner wall are six rows, each row containing twelve cast-iron freezers, each capable of holding as much water as will make 30 pounds of ice; each freezer has a depth of twelve inches and the length is the same as the depth, and the width is six inches. A flange or rim of half an inch extends around the four sides of the freezer, and upon this the freezer is suspended by restives or bars running at right angles. The flanges thus arrayed, separate the freezers, forming a channel between each of one inch width. A passage of equal width extends under the bottom.

A steam engine works an air pump connected with a vessel containing ether, and as soon as a perfect vacuum is produced the ether is pumped from this vessel around the cistern containing the water, and returned into the vacuum vessel, and the heat extracted, and thus the operation is continued until the water is frozen into ice. This is the whole process of refrigeration.

The machinery is peculiar to save the ether from wasting in the exhausted air. The items of expense are the steam power; it takes two cords of wood to run a ten tun machine, one engineer to attend it, and two firemen.

2 cords of wood at $5	$10·00,
1 engineer, per day,	3·00,
2 firemen, $1·50 per day,	3·00.
	$16·00.

By allowing $10 for contingent expenses, the whole working expense amounts to $26 per day in producing ten tuns of ice ready to be carted away. As to the ability of the machinery producing this amount I think there is no difficulty, and it is no more liable to get out of order than a common steam engine.

Mr. Merriam, of Brooklyn, who saw the machine in operation, believes it would be applicable to produce entire cold in the holds of infected vessels, and thus destroy yellow fever virus. This can be done, and a current of air as cold as 24° below zero circulated through the hold of a vessel. E. T. Sterling.

Cleveland, Ohio, 1856.

A Railroad Joke.

The London (C. W.) *Free Press* gives currency to a joke which is said to be going the rounds of the railway circles, to the following effect :—

"A Michigan gentleman owned several shares in American railways, which he desired to sell in London, but was unable to find a purchaser. He finally offered them to the English Board of Directors of the Great Western Railroad Company, who agreed to take £80,000 of the stock, if the other party would accept in exchange the steamers *Canada* and *America*, which had already proved a dead loss of £20,000 to the Company. Michigan agreed to the trade, on condition that the steamboats should be delivered in Lake Erie. This was consented to, and a written contract made and signed. Now it happens that the steamboats thus transferred are too long to pass through the Welland Canal locks, and the question arises, how is the contract to be fulfilled? It is safe to conjecture that the Englishmen have been taken in."

Sounding the Ocean.

The following extracts from the Report of the Secretary of the Navy is the first official document issued respecting the survey of the Atlantic Ocean between Newfoundland and Ireland, by the *Arctic*, for the purpose of discovering a practicable route to lay a submarine cable. The account of the performance of the *Arctic* is brief but interesting.

Alluding to Lieut. Maury, it says :—

"He had been so bold as to insist that whenever a survey could be made of the bottom of the ocean, between Newfoundland and Ireland, it would be ascertained that such were the moderate depths—such the perfect repose there, and absence of abrading or disturbing currents, that telegraphic wires could be laid as safely and successfully as upon land."

"Lieutenant Brooke, of the Navy, had invented a most ingenious, yet simple contrivance, by which the moment it touched the bed of the ocean, it became detached, and carefully took up specimens of whatever it came in contact with, and brought them up safely to the operator.

There was an act passed, in 1849, giving authority to the Secretary of the Navy to use national vessels for 'testing new routes, and perfecting the discoveries made by Lieutenant Maury in the course of his investigations of the winds and currents of the ocean.' I confess I felt some pride in having the science and naval genius of our own country to continue foremost in these great ocean surveys, and in illustrating the practicability of so grand a conception as harnessing the lightning and making it obedient beneath the profound depths of the great sea, which Providence has placed between the old and the new world. Lieutenant Berryman, accompanied by Lieut. Strain, Passed Midshipmen Mitchell and Thomas, Midshipman Barnes, and a few men, left New York on the 18th of July, crossed the ocean, and returned on the 14th of October, bringing with him abundant supplies of curious and interesting specimens from the bed of the ocean, and at the same time beautiful charts, mapping out its various depths, at distances of thirty, forty, sixty, and one hundred miles. In order to make his soundings approximate accuracy, as nearly as possible, Lieut. Berryman returned in the same latitude and re-examined points where he had doubts The length of the route surved is about 1600 miles; the greatest depth found was 2,070 fathoms (about 2 1-2 miles,) the average, however, being much less. These charts and specimens have been turned over to the Naval Observatory. The Superintendent has already caused the specimens to be analyzed, and in the hands of a learned professor, whose report is before me, they are made to tell much of the character and mysteries of that ocean covered region. He thinks the appearance of the minerals 'indicate that they have been quietly deposited from gentle currents, and not subsequently disturbed.'

It is affirmed now that the developments of this survey corroborate the suggestions of scientific investigators, and establish the practicability of laying wires successfully on the bed of the sea."

The Compass on Iron Ships.

Dr. Scoresby, of England, celebrated for his scientific attainments, recently undertook a voyage to Australia, for the purpose of making experiments with compasses on iron vessels, in order, if possible, to discover some means of preventing local attraction. In writing from Australia after accomplishing his voyage out, he says : "The only way to keep the compasses from being influenced by the iron of the vessel is to elevate it above the reach of its influence on the mast." He also says : "If the return voyage shall prove as satisfactory as the one out, the principal risk in the navigation of iron ships may be considered overcome."

The St. Louis papers state that the steamer *Amazon*, belonging to that city, has been furnished with a steam organ, like that of the *Glen Cove*, running on the Hudson river.

Cement for Steam Pipes.

2 parts of litharge, 1 of sand, and one of lime, mixed with linseed oil, makes a cement or steam pipes.