tures that return no answering glance to the last fond look of surviving love are caught and indelibly preserved to its memory.

The Stevens Floating Battery in 1852.

In looking over the back volumes of this paper our attention has been attracted by the following article which appeared on page 285, Vol. VII. (old series) SCIENTIFIC AMERICAN (1852). Steam batteries being a theme which is exciting the interest of all nations at the present time, we think it desirable to refresh the public mind in regard to what was thought of the subject ten years ago :—

On the 11th instant (May, 1862), Senator Stockton addressed the Senate at length on the resolution authorizing the building of a war steamer for harbor defence, in pursuance of a law authorizing a contract for that purpose with Robert L. Stevens. He said he desired to impress upon the senate the necessity of providing a harbor defence, and to have justice done to one of his constituents who had been ungenerously treated by the former Secretary of the Navy. "It was his opinion that the present state of affairs in Europe rendered war probable, and in that event there was danger of us being brought into it. The harbor of New York is not now any better than it was during the war of 1812, and fleets now approached the United States uninterrupted by winds or tides. With a speed of 20 miles per hour, a steamer could pass beyond the range of a fort in five minutes. To obviate the attack of a foreign fleet, it was necessary that there should be a construction for harbor defence, combining the qualities of stone with the power of motion. This vessel being shot and bomb proof, could do more to resist the progress of hostile fleets than twenty forts. Mr. Stevens, the author of the design, is an accomplished and experienced gentleman, who is willing to hazard his character and reputation on the success of the undertaking." Thus, and a great deal more, senator Stockton spoke in reference to a steam floating battery.

A petition has also been presented to Congress by a person professing to be acquainted with steam navigation, who believes that he can construct an ocean craft which can neither be burnt or sunk (even if stove against icebergs or rocks), nor blown up by its boilers, and which will average, in a voyage across the Atlantic, fifteen miles an hour, and he will undertake to build the vessel providing the Government will remunerate him in case of success. He asks Congress to place in the Deficiency Bill a provision giving him and his associates, or their legal representatives, the sum of one million of dollars upon condition of his producing such a vessel within five years from the passage of the act, to be adjudged and reported on by a committee of five disinterested persons to be appointed by the President, on whose decision the Secretary of the Navy is to pay the money. The plan is, that the vessel is not to be less than four thousand tuns, forty rods long, and six wide; to draw only from five to six feet of water when laden. She is to have two sets of boilers and engines, and four pairs of water wheels; is to be of iron entirely, with zinc finishing; the keelsons, ribs, &c., are to be of plate iron corrugated where proper, and made air-tight, forming air chambers. The floors or decks will be double, having sectional air chambers throughout, as will also the portions of the ship, including those forming the state rooms, cabins, &c., thereby rendering it impossible for her to sink. She is also to be subdivided by water-tight partitions. Although five years are asked, the memorialist says he can accomplish the work in two; and although the condition of speed is fixed at the moderate rate of fifteen miles an hour, he has no doubt of accomplishing an average of from twenty to twenty-five miles per hour, besides having her shot proof.

Here, then, are two Richmonds in the field. The latter proposition, we believe, is the best. Mr. Stevens will no doubt accomplish anything he undertakes in the steamboat line, but a harbor floating fort would be a most useless appendage. Let us have a good steam fleet; let our sea defence be upon the mountain wave. In an emergency, sand bank barricades can be thrown up for the defence of our harbors, and these, with heavy guns and brave hearts, need fear no foreign floating batteries.

NITRIC ACID FUMES.—Two men, employed in a chemical manufactory at St. Denis, France, were lately found dead in the street soon after leaving their work. Their bodies were removed to the Morgue for examination. The medical opinion was that their death was due to the inhalation of the fumes of nitric acid.

THE MANUFACTURE OF LEATHER CLOTH.

The London *Mechanics' Magazine* gives an interesting description of the manufacture of enameled oil cloth which it calls "leather cloth" and states that it was introduced into England from America, having been commenced at Newark, New Jersey in 1849. The establishment of Messrs. Crockett in London, England, in which it is made, is very extensive, covering ten acres of ground, employing 200 operatives, and turning out 15,000 square yards daily. Respecting the processes by which it is produced, our cotemporary says :—

It will be evident that an article intended to resemble leather should be pliant, supple, and not liable to peel off or to crack. These excellences are to be attained by the peculiar ingredients of the composition with which the cloth is covered, and the method of applying it. On entering the factory our attention was first directed to the boiling room, in which there are twelve furnaces, with a large cauldron over each for boiling linseed oil. This process is attended with considerable danger from the liability of the boiling oil to generate gas and explode; hence, a man is stationed at each cauldron stirring gently the boiling mass and watching a thermometer inserted in it, and which at the time of our visit stood at 580°. The oil is supplied to the boiling house by pipes from an adjoining building, where there is a huge tank with nine compartments, containing 3,200 gallons each, or 28,800 altogether, amounting to 122 tuns of oil. The boiled oil being allowed to cool is conveyed on a tramway to the mixing house, where, in a puddling machine, it receives several other ingredients, the principal ones being lampblack and turpentine, which being mixed into a composition is ready for use.

The cloth to which this composition is applied is known by the name of "greys," or unbleached cotton. It is of a peculiar manufacture, and made expressly for the company. The store room is a spacious building, and will contain an immense stock; at present it has 25,000 pieces, or 300,000 yards. Here the cloth is calendered, and cut into lengths of twelve yards. The two ends of each length are sewn together to make it endless; two sewing machines are in constant operation at this work. The pieces are then removed to the "milling" rooms, so called because they contain the mills on which the cloth receives the composition. These mills are rough-looking wooden structures, having a drum at one end and a roller at the other, over which the cloth is passed, and then tightened by a crank and wheel at one end. A large frame knife or scraper is then dropped down close to the cloth, a measured quantity of composition being laid on the cloth along the edge of the knife, the mill revolves, and the cloth receives as much of the composition as can pass under the edge of the knife. The piece is then carried to the heating room adjoining, and hung up on the rack to dry till next morning.

There are on the premises six milling rooms, with three mills in each, and having three men attendant upon each mill. The adjoining rooms for drying are heated by three rows of pipes laid along the wall. These pipes, during the day, are at a temperature of about 130°. The temperature is increased toward the evening, and during the night to 160°, and it is the duty of the watchman to open the doors for ventilation and cooling preparatory to the men resuming their work for the next coating.

Of course, in a building so greatly heated, and having so much inflammable material within it, the danger of fire is imminent, but every precaution has been taken which prudence could dictate. The building is fire proof, the doors are of metallic lava, and the roof, which is flat, is of the same material. A large pipe runs up the outside wall by the partition which divides the drying rooms, into each of which runs a branch pipe with a valve, which can be worked from the outside. A deluge of steam can by these means be poured into the rooms in a few minutes by day or night. There are fourteen fire plugs around the buildings, on the main of the East London Waterworks, with hose and turncock at hand, so that ample means of extinguishing fire exist on the premises.

But to return to the manufacture. The coating being thoroughly dry, the cloth is then taken to the "rubbers," whose business it is to remove all inequalities from the surface and make it perfectly smooth. This is done by the "rubbing machine" (an ingenious contrivance of Mr. Eagles, the manager), by which the cloth is made to pass under two rollers revolving in opposite directions. These rollers are covered with pumice stone, and do the work completely and expeditiously, which, till lately, was done by hand at great expense of labor. The "coating" and the "rubbing" being repeated four, and in the case of heavy goods, five times, the cloth is ready for the "painters." The "painting rooms" contain machines similar to the "mills;" but instead of the drum they have a roller at each end, over which the cloth passes slowly, and a man at each side applies the paint, "meeting each other half way." Dependent partly on the colors, and partly on the article to be produced, is the number of coats of paint to be applied. Sometimes two will be sufficient, at other times four are necessary. The last coat receives several applications of a peculiar elastic enamel, composed chiefly of copal varnish, to protect it from the action of the atmosphere.

At this stage of the process the edges of the cloth are rough and have to be trimmed, and the seam by which the ends are sewn together has to be cut. This is done by a machine called the "Guillotine," and we now follow the cloth to the "grainer." This latter, and, to the ordinary leather cloth, finishing process, is done by a remarkably beautiful iron machine, having two rollers, the upper one being of polished iron grooved obliquely on the surface, the under one of paper. Between these two rollers the cloth passes twice and receives its external resemblance to morocco leather. There are six machines used for this finishing process, and others for embossing from the small diamond to the large mediæval pattern. The latter consumes much more time in passing through the machines. The cloth is now stamped with the trade mark, labeled, and rolled up ready for transmission to the warehouse in Cannon street West.

On looking at the pieces when finished, one is struck by the extreme cleanness of the inner side after passing through so many soiling operations; this is owing to the practical skill with which the men handle the cloth, and to the agility with which they remove it from the several machines, and carry it to the drying rooms. While watching the process we thought that, in many respects, it was similar to the tanning with sumac, from the leaves and stalks of the *Rhus coriaria*, by means of which skins are made into morocco leather. As the leather cloth can be made permanently soft and elastic by the oily matter combining with the texture of the cloth, as it does with the fibres of the skin, the imitation is complete and successful.

There is another room in this establishment, specially interesting to the artist, where the cloth i printed in gold and colors, in designs which are reall chaste and beautiful, and which, when used for th furniture and hangings, adorn rooms with somethig of oriental splendor. Here, too, there are tale covers with floral borders, rich in color and choicin grouping, with center pieces which, as specimen of decorative art, are very effective.

The French have been acquainted with the at of making oil cloth of this kind for a long time an we think they were the first who commenced its manufacture. A description of French oil cloth is given on page 105, Vol. V., 1849 (old series), SCIENTIFIC AMERICAN, with a more minute account of the ingredients used. There is also a description of G. DeBruns' French patent for the manufacture of oil cloth on page 265, Vol. XIV., 1859 (old series), SCIENTIFIC AMERICAN. Sulphuric acid and the sulphate of zinc, also the oxide of lead are boiled and mixed with linseed oil to render it quick drying for the manufacture of this kind of cloth.

IN 1851 the value of machinery exported from England was £1,168,611 sterling ($5,843,055), last year it amounted to £4,250,000 sterling.