

### Timber Piles and the 'Teredo'—A New Invention Wanted.

The chief engineer of the San Francisco harbor commission has recently made a report on the experiments ordered to be carried out with piles prepared by various methods, with the view of determining the best way of competing with the *Teredo navalis*. In June, 1882, in pursuance of the orders of the board, ninety-nine piles were driven in Mission Street pier 1, then being constructed. During the past month, after an exposure of five years and four months, one or more of the piles of each method, and four unprepared, or naturally bark-protected piles, were removed for examination. When deemed best, a sample of these piles was preserved for future examination. The various methods were given the names of the inventor or experimenter to identify them, and proper records were made to distinguish them. All of the prepared piles were barked for a distance of 40 feet, which was the length treated.

A. W. Von Schmidt, of San Francisco, prepared two piles by jacketing the driven pile with sewer pipe, and filling the space between the pile and pipe with concrete or grout composed of sand, gravel, and Portland cement. The cost of this covering, exclusive of the cost of furnishing and driving the pile, was 75 cents per linear foot, or 30 dollars per pile—a total of 60 dollars for the two. One of these piles was removed. It was found that the teredo had not attacked it, but near the upper part one or two sections of the sewer pipe had been broken and the limnoria had weakened the pile about one-fourth or one-fifth of its original strength.

Frank Shay, of San Francisco, prepared twenty-three piles at 25 cents per linear foot, or 10 dollars per pile. His method was a modification of the Culver process, or a covering of asphaltum and burlap. The modification consisted of a substitution of wire cloth for the burlap. The pile was given a coat of hot asphaltum, then wrapped in the wire cloth and given a second coat of asphaltum, dusted over with sulphate of lime. Two of these piles were removed, and found so badly injured as to break in drawing them from under the cap. Only traces of the covering were left.

James McKeon & Co., of Oakland, prepared ten piles, at 16½ cents per linear foot, or 6 dollars 50 cents per pile. The protecting coat consisted of so-called "marine cement," applied, whitewash fashion, in four coats. The composition of this marine cement was kept secret, except that it contained an "extremely poisonous substance of great efficacy." This coating did not adhere well in driving the pile. Two of the piles thus prepared have been removed, and both had been practically destroyed by the teredo.

W. H. Raye, of Oakland, prepared twenty piles, at 16½ cents per linear foot or 6 dollars and 45 cents per pile. His method of protection was similar to the one just described, and the material used was a wash of Portland cement and other secret ingredients. The two Raye piles removed were practically destroyed by the teredo. Pearce & Beardsley, of Oakland, prepared forty-four piles at 34 cents per foot and 13 dollars and 55 cents per pile. Their covering was another modification of the Culver process of burlap and asphaltum, and was a covering of burlap, saturated with "Pearce's compound," a mixture of naphtha and carbon bisulphide, with a small proportion of limestone, kaolin, sawdust, and sulphur. Of the piles thus prepared, two were removed. One had been practically destroyed, and the other seriously attacked.

There were driven at the same time, and in the westerly part of the pier, eleven cedar piles. Two of these were removed and found very slightly attacked—practically as sound as ever, although the bark fell off in removal. It is to be regretted that these piles were not subjected to a more severe test, and unless otherwise ordered, they will be redriven in that part of the water front most infested by the teredo, so as to further test their resistance powers.

In August, 1882, two eucalyptus piles, furnished by Mr. William T. Coleman, were bolted under the same pier. In October, 1886, one of these was removed, and found very seriously injured by the teredo, and the sap wood above water had rotted to a depth of 1½ inches. Four yellow fir piles driven at the time of construction were also removed for comparison. All had been very slightly attacked, but not one of the four so seriously as to in any way impair its strength. Many of the fender piles, however, had been entirely cut off, and the mooring and cluster piles destroyed.

To sum up: The coatings applied by the various experimenters, depending upon their adhesion to the pile, utterly failed to afford even the protection given by the bark. This has been the history of such experiments in other places. Of the eight coated piles removed belonging to Shay, McKeon, Pearce & Beardsley, and Raye methods, but one retained sufficient strength to permit its removal, and this one was more severely attacked and damaged than any of the four "unprotected" piles pulled up or the cedar piles. These results are however not wasted, as they afford valuable

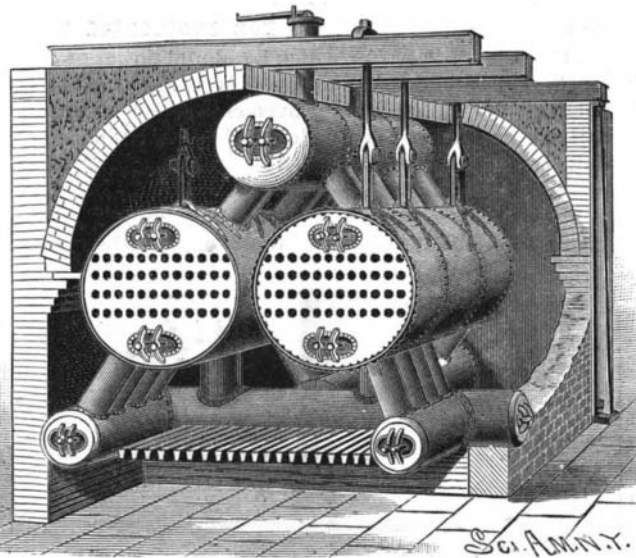
guides for the future to those unacquainted with the history of pile protection, and point out what lines of experiment may be avoided.

The Von Schmidt trial was not a new experiment, as this method has been tried elsewhere—notably at Galveston, Texas—and found too costly and liable to injury to compete with the old fashioned and efficient crosoting process. Considering the fact that about 45 per cent of the gross receipts of this board have been spent in wooden structures, and that about twice to twice and a half the cost of a pier is spent in repairing it before the entire renewal becomes necessary, this question of pile preserving is most important, and it is recommended that more extended and better directed experiments be made.

### AN IMPROVED STEAM BOILER.

A boiler which is designed to quickly generate steam with great economy of fuel, and in which the sediment in the water will not settle in the main boiler, is shown in the accompanying illustration, and has been patented by Mr. Joseph Leightham, of Lebanon, Pa. The grate bars are inclosed on two sides and at the rear by water tubes, from which branch pipes lead upward and connect with the front part of the water space in the main boilers, the latter being held suspended in the furnace by means of rods from beams extending across the top of the furnace, whereby expansion and contraction from variations of temperature is adequately allowed for.

From the steam spaces of the main boilers branch tubes lead upward, opening into and supporting a superheater, placed above and between the boilers, and from the rear part of the water spaces in the boilers



LEIGHTHAM'S STEAM BOILER.

branch pipes extend downward and open into the mud drum, which is supported partly by the pipes and partly by the end wall of the furnace, through which one end of the mud drum passes. The rear ends of the boilers are covered by an arch extending to the rear wall of the furnace. Besides the heating effect exercised upon the water tubes at the sides and rear of the grate bars, the products of combustion pass beneath and around the main boilers toward the rear wall of the furnace, then pass through the flues in the boilers to the front end of the furnace, and back again around the superheater to the chimney at the rear, part of the heat from the grate bars passing up directly between the boilers and around the superheater to the chimney. With this construction a good circulation is assured of the water in the boilers and tubes, and the sediment naturally settles in the mud drum, from which it can be conveniently removed through an opening in the outside of the furnace at the rear. The active circulation of the water in boilers so arranged of itself tends to partially prevent incrustation, but it will be observed that the flue tubes in the main boilers are here arranged directly over each other, so that all scale cleaned from them will fall to the bottom of the boiler, and not lodge on the lower tubes, thus facilitating the cleaning. The boiler here represented is also intended for connection with a blast furnace boiler which has three returns of gas, doing away with all extra firing.

For further particulars with reference to this invention address Messrs. D. & E. Kremp, of No. 228 North Tenth Street, Reading, Pa.

### El Canon Neumatico.

We have received from Havana a handsomely printed and illustrated monograph of 38 pages, in the Spanish language, entitled as above, "The Pneumatic Cannon," by Don Severo Gomez Nunez, captain of artillery. This officer spent some time here in watching the experiments of Zalinski. In this monograph, the author gives a concise and interesting history of the rise and progress of the new weapon, with details of the results obtained. The work, doubtless, will be of much value to all officers, naval and military, of the many Spanish-speaking countries.

### Fashionable Electric Lights.

The ball room of Mr. Ogden Mills' residence, 69th Street and 5th Avenue, was lighted by means of the New York Isolated Accumulator Company's storage batteries, on Monday night, 16th ult. The occasion was a ball and house warming, and a large assemblage of the leading members of New York society were present. The ball room was brilliantly illuminated by sixty 16 candle power lamps—the electricity being supplied from the batteries which had been charged on the previous Friday at the Electrical Accumulator Company's factory, Newark, N. J.; carted to Mr. Mills' residence on Saturday; placed in position in the cellar, and connected with the lamps on Monday, and used from 9:30 P. M. until 3:30 A. M. the following day, without a single interruption of any kind.

The effect of the lights was very beautiful, and many expressions of admiration were heard on all sides.

Mr. Cornelius Vanderbilt ordered sufficient storage batteries to illuminate his Fifth Avenue mansion on the occasion of his grand ball given on the 23d ult.

This is the first instance in which storage batteries have been used in America to furnish temporary light for special social occasions, and its success is likely to lead to a large business of this character in all prominent cities. This company uses the Faure battery, so says the *Electrical Review*.

### A Chance for American Inventors.

The *London Evening Standard* says: It is not often that the inventive genius of Englishmen fails to meet the requirements that are made upon it; but the reports of Sir Frederick Bramwell, Sir Digby Murray, and Mr. J. Thorneycroft, the judges named by the Royal National Life Boat Institution to examine the models and drawings sent in for competition for the gold and silver medals offered by the Institution, show that for once the problem presented has baffled our inventors. The Life Boat Institution were desirous, if possible, of substituting mechanical power for oars or sails, and invited plans for the best model of a mechanically propelled life boat, and for a propelling power best suited to the existing self-righting life boats of its own fleet. The judges have reported that, after carefully examining the plans and models submitted to them, they are of opinion that none of them is suited to the requirements of the Institution, and are therefore unable to award the medals. It is, indeed, a difficult problem for inventors to grapple with. Life boats are large craft, and require considerable power to drive them against a gale in their teeth; space is precious, for not only has the crew to be carried, but a freight of rescued people; the weight of the propelling machinery must not be great, or it will overcome the buoyancy of the air chambers, and the boat will no longer be a life boat; it must be placed so low down as not to interfere with the self-righting properties of the boat; it must be strong enough to withstand the roughest usage and the shocks and jars that are entailed by the violent pitching of the craft in a heavy sea. It is hardly a matter for surprise that this combination of difficulties has, so far, baffled inventors.

### Remarkable Rescues by St. Bernard Dogs.

It is only within the last few days that particulars have been published in the Swiss papers of a brave rescue effected on Mont St. Bernard on the night of the last Sunday in November. While a violent snow storm was in progress, Grand, the manager of the hospice, noticed that his own special dog that was alone with him in his room became very restless, and made signs to him to go out. He took the lantern and fog horn and went out on the mountain, the dog leading him. In a very short time he heard a call and groaning, and, helped by the dog, dug out of the snow an Italian, whom he carried on his back into the hospice. The rescued man stated that his father, two brothers, and another Italian, all journeying home with him over the pass, lay buried in the snow. He had pushed on to obtain help, but had been overpowered by the storm. Grand made ready and went out again. This second search was more tedious and led him further away, but at last the barking of the dog announced a discovery. It was the Italian stranger who was now saved and carried up to the hospice. A third time Grand and his dog sallied out into the tempest, and after a quarter of an hour's search found the others, near where the second man had been discovered. They were quite buried under the snow and almost insensible. He took the most feeble on his own shoulders, and with difficulty conducted the others to the hospice. It was now past midnight, and his toilsome task had occupied Grand over four hours, in a blinding snow storm.—*London Times*.

NEW YORK CITY educates about three hundred thousand children annually, in one hundred and thirty-four school buildings, covering an area of thirty-five acres. These buildings placed side by side would extend more than two miles. There are about four thousand teachers, and the annual expense of these schools is about four million dollars.