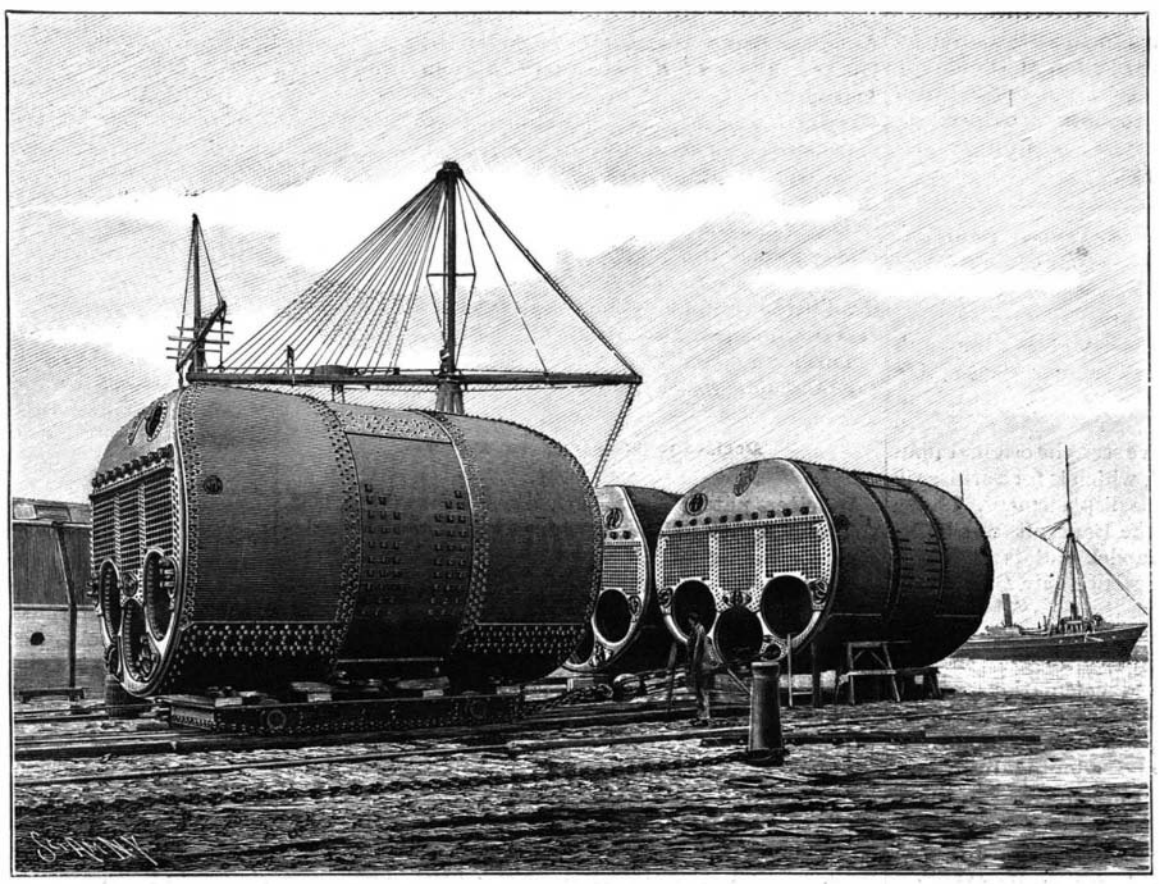
BOILERS FOR THE NEW CRUISER CINCINNATI.

The new cruiser Cincinnati is now lying at the Brooklyn navy yard docks, receiving her machinery, which is the production in its entirety by the machine and boiler shops of the Brooklyn yard. The keel of the Cincinnati was laid in January, 1890. Built of steel. Length, 300 feet; beam, 42 feet; depth, 23¾ feet. Displacement, 3,183 tons. To have a main battery of ten 5 inch rifles, one 6 inch rifle. Secondary battery, eight 6 pounders, four 1 pounders, 2 Gatling guns, and a ram. Twin screws of bronze sectionalized and movable for variable pitch. Triple expansion engines in separate compartments, aggregating 10,000 horse power, designed to give the ship a speed of 19 knots per hour. The boilers, three of which we illustrate as they lay upon the dock ready to be swung aboard by the great navy yard derrick, are representative of the best quality of material and workmanship that can be produced. They were designed by the engineering department of the navy and constructed of the toughest American steel under the supervision of Chief Engineer James H. Chasmer, U. S. N. They have been tested at 250 pounds hydrostatic pressure and are to carry 160 pounds pressure. The boiler plant consists of four main double end boilers of 14 feet 4 inches and 13 feet 4 inches diameter respectively by 20 feet 3½ inches in length, with six corrugated furnaces in each boiler, 3 feet 6 inches diameter. Boiler shells of 1 15-64 inch steel plate.

Two auxiliary boilers 11 feet 4 inches diameter, 9 feet 10¼ inches long, single end with two corrugated furnaces each; boiler shells 1 inch steel plate. The aggregate grate surface of the boiler plant is 518 square feet, heating surface 18,179 square feet, number of tubes 3,992, 7 feet 4 inches long by 2¼ inches diameter; ratio of grate surface to calorimeter 7 to 1. Ratio of grate surface to heating surface 1 to 33. Pounds of coal burned per square foot of grate surface, 40 under full pressure and speed.

The corrugated furnace shells were welded and rolled at the Continental Iron Works, Greenpoint.

We are indebted to Chief Draughtsman L. E. Bartlett, of the machine department of the Brooklyn navy yard, for details.

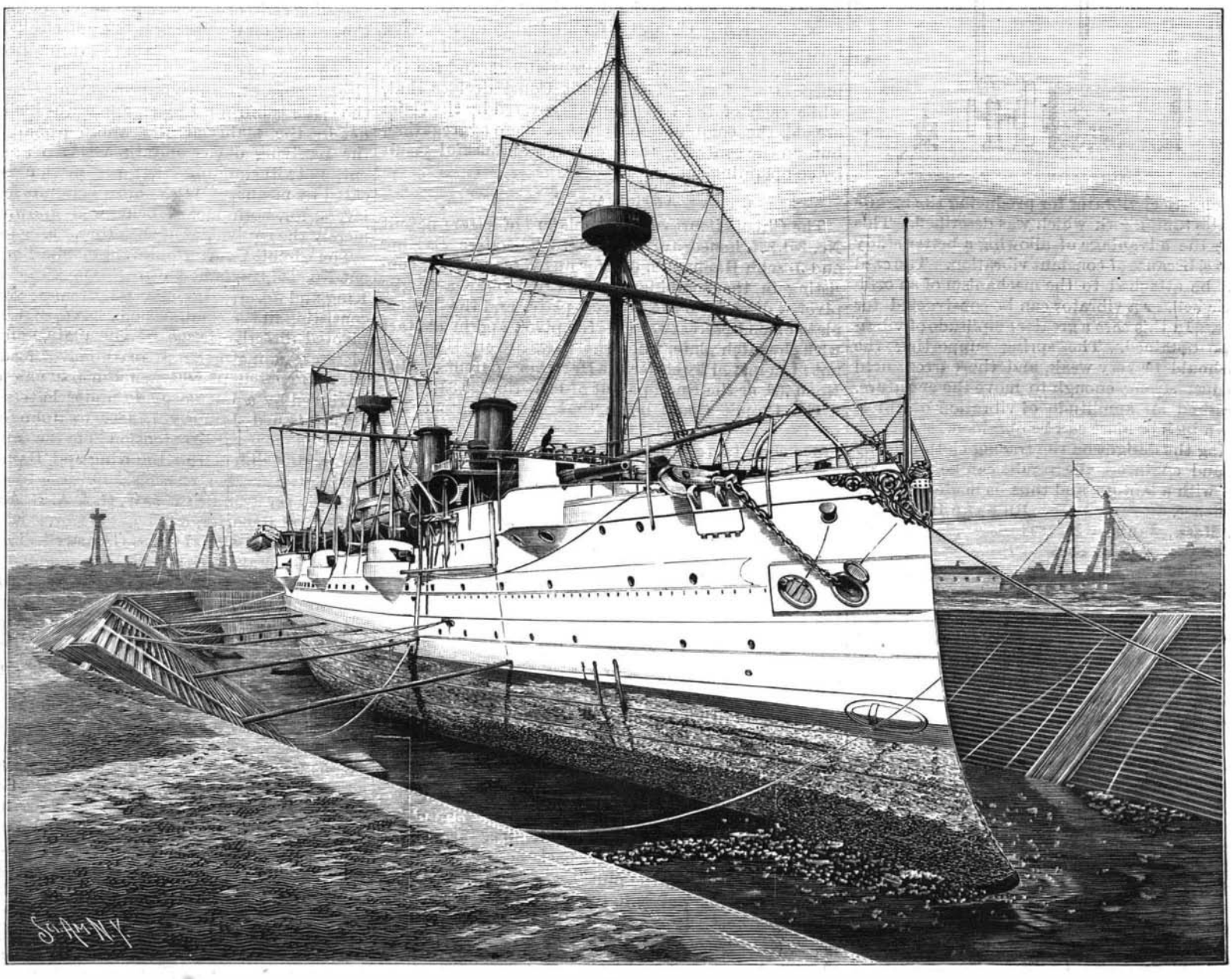


BOILERS FOR THE U. S. CRUISER CINCINNATI.

THE CRUISER BALTIMORE IN DRY DOCK.

It is about two and a half years since the cruiser Baltimore sailed out of New York harbor on the voyage to Sweden, with Captain Ericsson's body on board. Since that time she has done 48,000 miles of cruising, visiting various European ports, remaining considerable time in the Mediterranean, and finally getting around to the Pacific, where she appeared in time to represent the United States at some of the Chilean ports during the temporary misunderstanding our government had with that power. She has come home now to take part in the great Columbian naval parade and review, but as a preliminary thereto it was highly essential that she should have her bottom cleaned and painted, for which purpose she was placed in the dry dock at the Brooklyn navy yard. Our engraving is from a photograph, and therefore faithfully represents, without any exaggeration, how completely the entire bottom of the vessel below the water line is covered by barnacles, accumulated during her long cruise. Such an abundant deposit of these crustaceans as had fastened themselves on the hull of the vessel had the effect of materially lowering the speed of the vessel, as always happens in such cases, and for this reason officers of the navy claim that a vessel cruising in southern waters should have her bottom cleaned as often as twice a year. The Baltimore was some twenty days in the dry dock, but after the naval review she will probably receive more extensive repairs.

The Baltimore was completed in 1889, and developed on her trial trip over twenty knots an hour. She has two horizontal direct-acting triple-expansion engines, with two high pressure cylinders, each 43 inches diameter, two intermediates 60 inches diameter, and two low pressure 94 inches, the piston stroke being 42 inches. She is 335 feet



THE U S. CRUISER BALTIMORE IN DRY DOCK, TO REMOVE BARNACLES FROM HER BOTTOM

length over all, 48 feet 6 inches moulded breadth, 19 feet 6 inches draught, and has a displacement of 4,400 tons. Her armament consists of four 8-inch breech-loading rifled guns, six 6-inch breech-loaders, eight 6-pounder rapid-firing guns, and she has two steel masts with tops, in which Gatling guns are mounted. She is also fitted with five torpedo tubes.

A Yucatan Exhibit at the Fair.

One of the most interesting displays that will be seen at the Fair will be that made within the "Ruined Palace of Mitla" by the Department of Ethnology. Prof. Edward H. Thompson, who has been consul at Merida for eight years, has prepared papier-mache moulds of the ancient sculptures found in the deserted cities of Yucatan, and thirty cases of these moulds have already arrived at the Park. They will be installed as soon as the building is completed. The ruins of Uxmal will be reproduced on an extensive scale, and among them will be a perfect fac-simile of the temple and figure of the god "Kukulkan," or the great feathered serpent. The body of the serpent is wrought in the stonework all around the building, and this will be represented entire. The original materials were principally marble and coarser varieties of limestone, and the work shows that the ancient Yucatecos possessed great skill in mechanical workmanship, though their industrial arts were but poorly developed. One of the finest reproductions by Professor Thompson will be that of an arched gate of the ancient palace of Labra, which was literally chopped out of the jungle. —*Chicago Inter-Ocean.*

Borings in Broadway, New York.

Mr. William Barclay Parsons, M. Am. Soc. C. E., read a paper recently before the society on this subject. We make the following abstract from the *Transactions:* In order to ascertain the quality and nature of the material underlying Broadway, in the city of New York, the Rapid Transit Commission of this city undertook a system of borings in 1891 under the direction of Chief Engineer William E. Worthen, past president of this society, and under the immediate supervision of the writer as principal assistant engineer.

In general, the system followed was to put down a test hole at every street crossing from South Ferry along Whitehall Street to Broadway, and thence to Thirty-fourth Street, a distance of about three and one-half miles. These holes were sunk by the water-jet process and were carried down until rock was encountered. The method of proceeding was to select a spot where, as far as the inspector in charge could tell, the line of the hole would not encounter any pipe, subway, sewer or any other subsurface structure. One paving block would then be removed and a test would be made with a sounding rod for eight or nine feet, to determine whether the location was free from obstructions. If so, a two-inch pipe would be driven to serve as a casing. In order to drive this pipe a small portable pile-driver was used, the top of the pipe being covered with a protecting cap. The hammer, weighing 150 lb., was directed between four light metal guides and had a fall of about six feet, the whole arrangement being supported on a cast-iron stand. The hammer was raised by hand power.

After two or three lengths of casing had been driven, the protecting cap was removed and a tee screwed on in place, and down the pipe was inserted a three-quarter inch wash pipe with a chisel point, in the corners of which were two small holes. Water was then forced into this wash pipe, while two men worked the pipe down by hand. The water thus discharged, washing the sand away from the foot of the wash pipe, flowed upward between the wash pipe and casing, carrying the sand with it. This water and sand flowed out of the side opening of the tee at the top, and was caught in a bucket and sampled by the inspector in charge. Some of the results obtained were quite different from what had been expected; first, rock was at a much greater depth than had been believed, being over 163 feet down at Duane Street; secondly, the rock at Canal Street is not the deepest along the line; thirdly, the material underlying the surface at Canal Street is not muck and fine sand, but, on the contrary, consists largely of good coarse gravel, and presents an excellent material for foundations.

FOUNTAIN OF SAINT GEORGE AND THE DRAGON, VIENNA, BY ANTON DOMINIK RITTER VON FERNKORN.

Vienna has no abundance of public monuments, and it is therefore a pity that one of its choicest works of sculpture should be hidden in the courtyard of a palace where connoisseurs are the first to search for it. In fact, a great many Viennese have never seen the original group, Saint George and the Dragon, which ornaments the fountain at the palace of Prince Montenuovo, situated in Strauchstreet, Vienna. It has, however, become quite popular, as so many excellent copies of it have been made.

FOUNTAIN OF SAINT GEORGE AND THE DRAGON VIENNA, BY ANTON DOMINIK RITTER VON FERNKORN.

We present to our readers a successful print of this animated group from a photograph of the original, which reminds one of the great master, Anton Ritter von Fernkorn, who has ornamented Vienna with so many creations of his powerful genius. This group was his first great work, and his other monuments are the best in Vienna.

We are indebted to *Wiener Bauindustrie Zeitung* for our illustration, and also the foregoing remarks.

Australia Grows the Largest Trees in the World.

A recent article in *Science* repeats the old idea, which has been frequently refuted, that the *Sequoia gigantea*, or Big Tree of California, is the largest tree known. It has been shown many times that these trees are surpassed in both height and girth by the gum trees of Australasia. A large number of species are known, and many of them are mentioned in Baron Von Mueller's "Extra Tropical Plants," recently reviewed in these columns. An extract from this book will be of interest, as giving the dimensions of some of these immense trees. Of *Eucalyptus amygdalina* it is said:

"In sheltered, springy, forest glens attaining exceptionally to a height of over 400 feet, there forming a smooth stem and broad leaves, producing also seedlings of a foliage different from the ordinary form of *E. amygdalina*, which occurs in more open country, and has small narrow leaves and a rough brownish bark. The former species or variety, which has been called *Eucalyptus regnans*, represents probably the loftiest tree on the globe. Mr. J. Rollo, of Yarragon, measured a tree which was 410 feet high. Another tree in the Cape Otway ranges was found to be 415 feet high and 15 feet in diameter where cut in felling, at a considerable height above the ground. Another tree measured 69 feet in circumference at the base of the stem; at 12 feet from the ground it had a diameter of 14 feet; at 78 feet a diameter of 9 feet; at 144 feet a diameter of 8 feet, and at 210 feet a diameter of 5 feet. [Thus, at a height in the air exceeding the height of almost every North American forest tree, this specimen had a diameter equal to most of our largest forest trees at the ground.] Other trees are known with a stem circumference of 66 feet at 5 feet from the ground. Prof. Wilson and Colonel Ellery obtained at Mount Sabine a measurement of 21 feet 8 inches in diameter of a stem, where cut, the length being 380 feet. Colonel Ellery had repeatedly reports of trees seven ax handles in diameter, and he met a tree on Mount Disappointment with a stem diameter of 33 feet at about 4 feet from the ground." Other species also attain enormous size. *Eucalyptus diversicolor* is known to grow 400 feet high, and trees have been measured 300 feet long without a branch! Boards 12 feet wide can frequently be obtained. *E. globulus* grows 300 feet high and furnishes ship keels 120 feet long. *E. obliqua* also attains 300 feet in height and 10 feet in diameter. A note in a recent number of *Garden and Forest* mentions a tree in Victoria 471 feet in height.

The colossal size of the trees of this genus is not the only peculiar feature they possess. Some are of exceedingly rapid growth, and are at the same time very durable. *Eucalyptus amygdalina*, for example, grew to a height of 50 feet in 8 years in the south of France. *E. citriodora* grew 20 feet high in 2 years in a district subject to protracted drought; and a trunk 40 feet long and 20 inches in diameter only broke after a flexion of 17 inches, under a pressure of 49 tons. *E. corymbosa* is very durable, fence posts that had been in the ground for 40 years showing hardly any decay. *E. globulus* grew 60 feet high in 11 years in California, and in Florida 40 feet in 4 years, with a stem a foot in diameter. The writer has seen trees in California, two years after planting the seed, 20 feet high; and the wood, although easily cut when green, becomes almost as hard as iron when dry. In Guatemala it grew 120 feet in 12 years and had a stem diameter of 9 feet. Railway sleepers made of *E. leucoxylon* were quite sound after being laid 24 years. Piles driven for a whaling jetty in 1834 were taken out in 1877 perfectly sound, although the water swarmed with teredo. This was *E. marginata.* Still more remarkable is the fact that some species withstand excessive heat and also a considerable cold. *E. microtheca*, for example, resists a temperature of 18° F. in France and 154° F. in central Australia. Besides serving as a timber tree, many species of *Eucalyptus* are used medicinally, producing a volatile oil very useful in treating various infectious diseases, like scarlet fever, especially when applied externally. Grown in malarious districts, they possess the power of purifying the air. Altogether, the genus may be classed as one of the most remarkable in the whole world.—*Joseph F. James, M.Sc., in Science.*

ALUMINUM is found combined with 195 other minerals, and, therefore, constitutes a large part of the crust of the earth, but until recently has been very expensive because of the difficulty of separating.