

### THE NEW FRENCH BATTLESHIP "SUFFREN" AND HER PREDECESSOR.

"The Bailiff de Suffren was one of the most dangerous enemies that the English fleets have ever met, and, without exception, the most illustrious officer that has ever held command in the French navy." So writes Prof. Laughton in his interesting "Studies in Naval History," and it is an eulogy which the famous French admiral who gave our naval commanders so much trouble in East Indian waters well merits. This being the case, it is but natural that our cross-channel neighbors should keep his name alive in that of one of their battleships. A fine new armor-clad bearing this distinguished name was launched at Brest on July 25 last, and is a successor to an older ironclad of the same name now no longer effective. The latter was one of those wooden-hulled armor-plated ships that for some years handicapped the advance of the French navy, and dates from 1870, the year of the great "débâcle." She was of 7,600 tons displacement, plated with 6 to 8 inches of iron and had a speed of about 14 knots. Her new namesake is a far more formidable vessel.

To begin with she is nearly twice as big, as she will, when complete, displace 12,728 tons of water, and the French are congratulating themselves on the record she has made in rapidity of construction, as at the time of her launch she had only been 200 days in hand from the date of laying her first keel-plate. She was built from the designs of M. Thibaudier, and as she took the water received a blessing from Monsgr. Oury, the Archbishop of Algiers, in honor of whom, at the banquet which followed, Admiral Barrera proposed the following toast: "Let us drink to the French episcopate, to the army and to the navy, the three forces on whose absolute devotion France can reckon."

As will be seen from the sketch the "Suffren" will, when complete, be an imposing fighting unit, and her armor and armament will render her an ugly antagonist. Her main battery consists of four 12-inch guns placed in pairs in heavily armored turrets, placed fore and aft on the center line of the ship, while her secondary armament comprises ten 6.4-inch quick-firing cannon. Four of these are in a central casemate, with recessed ports, so that they can be fired either on the broadside or ahead and astern. The remaining six are placed each in a single armored turret, three on either beam. The central one in each case is much further out from the central line of the ship than the others, so that four of these guns can be fired ahead and the same number astern. Besides these the "Suffren" carries, or rather will carry when completely equipped, eight 3.9-inch rapid-firers, a score of lighter weapons, and four torpedo tubes. Of these two are placed in a submerged position below the water line. In order to protect her vitals from an enemy's fire she is fitted with a complete belt of Harvey-ized steel armor 11 inches in thickness and a steel deck nearly 2 inches thick, which curves upward from the lower edges of the belt. Above the belt proper the "Suffren" is protected by another band of 3-inch armor which extends from the bow to the aftermost turret, and above this again is the central battery

covered with 5½-inch armor. The smaller turrets have an equally thick protection while the larger ones are plated with armor 11 inches in thickness, while the barbette is just about an inch thinner. The "Suffren" will have three propellers, Niclausse boilers, and is estimated to steam 18 knots at full speed. C. FIELD.

### THE NEW BRAZILIAN ARMORCLAD "MARSHAL DEODORO."

Within the last few weeks the Brazilian navy has received a new recruit in the little ironclad "Marshal

formidable little vessel, and the only wonder is how, on a displacement of only 3,200 tons, so much armor and armament can be carried. She is provided with a complete belt at the water line of more than 11 inches in thickness, an armored deck about 2 inches thick, 8-inch plating on her two turrets, while her casemates have about 3 inches of protective armor. There is also an armored conning-tower nearly 4 inches in thickness for the use of the captain when in action. Her armament consists of two long 9.4-inch cannon, one in either turret; four 4.7-inch quick-firers in the casemates at the corners of the superstructure; and a couple of 5.9-inch mortars or howitzers. The latter are not usually to be found on board a war vessel of the present day, though in the early part of the century mortars were sometimes carried by French line of battleships. In addition to the weapons already enumerated, the "Marshal Deodoro" carries about a dozen small rapid-fire guns and a couple of torpedo tubes. These are placed below the water line, the only safe place for them, if we are to be taught by the occurrences of the battles of the Yalu and of Santiago.

All men-of-war designs are in the nature of a compromise between armor, armament, speed, and coal capacity, and the "Marshal Deodoro" having so much displacement devoted to the two former, naturally suffers in the latter. Her speed is not more than 16 knots, a very slow rate of progression for a modern battleship. Her bunker space, too, in all probability, is limited. She is provided with two screws, and is equipped with two light masts,

each of which carries a single open military top. Though, of course, unable to contend with a battleship of the ordinary size, yet the "Marshal Deodoro" would prove a formidable opponent to any armorclad of an approximating displacement and also to a cruiser much more numerously gunned. C. FIELD.

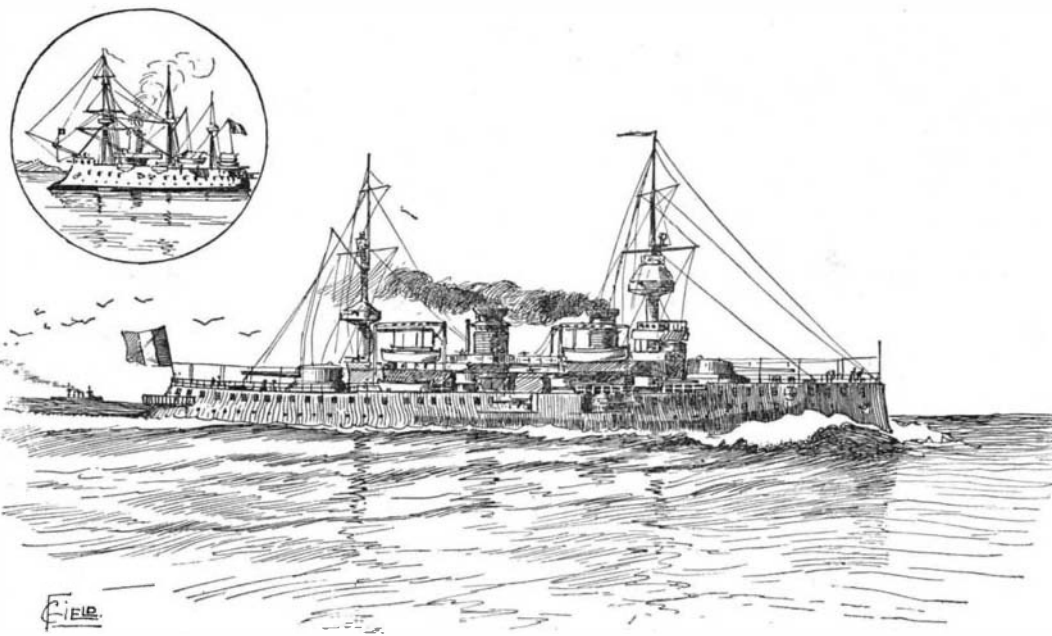
### The Jesup North Pacific Expedition.

Dr. Berthold Lanfer, of the American Museum of Natural History, has just returned from two years of exploration in Northern Asia, as the representative of the Jesup North Pacific Expedition. He has lived during this time in Manchuria in the Island of Saghalin. He brings back with him a choice collection of clothing, utensils, works of art, etc., which gave an idea of the manners, customs and culture of these strange peoples.

The general plan of the Jesup expedition is to investigate first all the isolated tribes of Eastern Asia except those belonging to the Ural-Altaic stock. Russian influences are rapidly doing away with primitive languages and culture and with them all traces of man's early history in Asia which would be a severe loss to science. The tribes in question include the Tschuktschis on the extreme tip of Asia which are divided into two tribes, and reindeer people and fisher folk. Down to the left of these

but northeast of Kamtschatka are the Koryaks, while on the northern coast of Asia along the Siberian (Arctic) Sea are the tribe of Yukaghees.

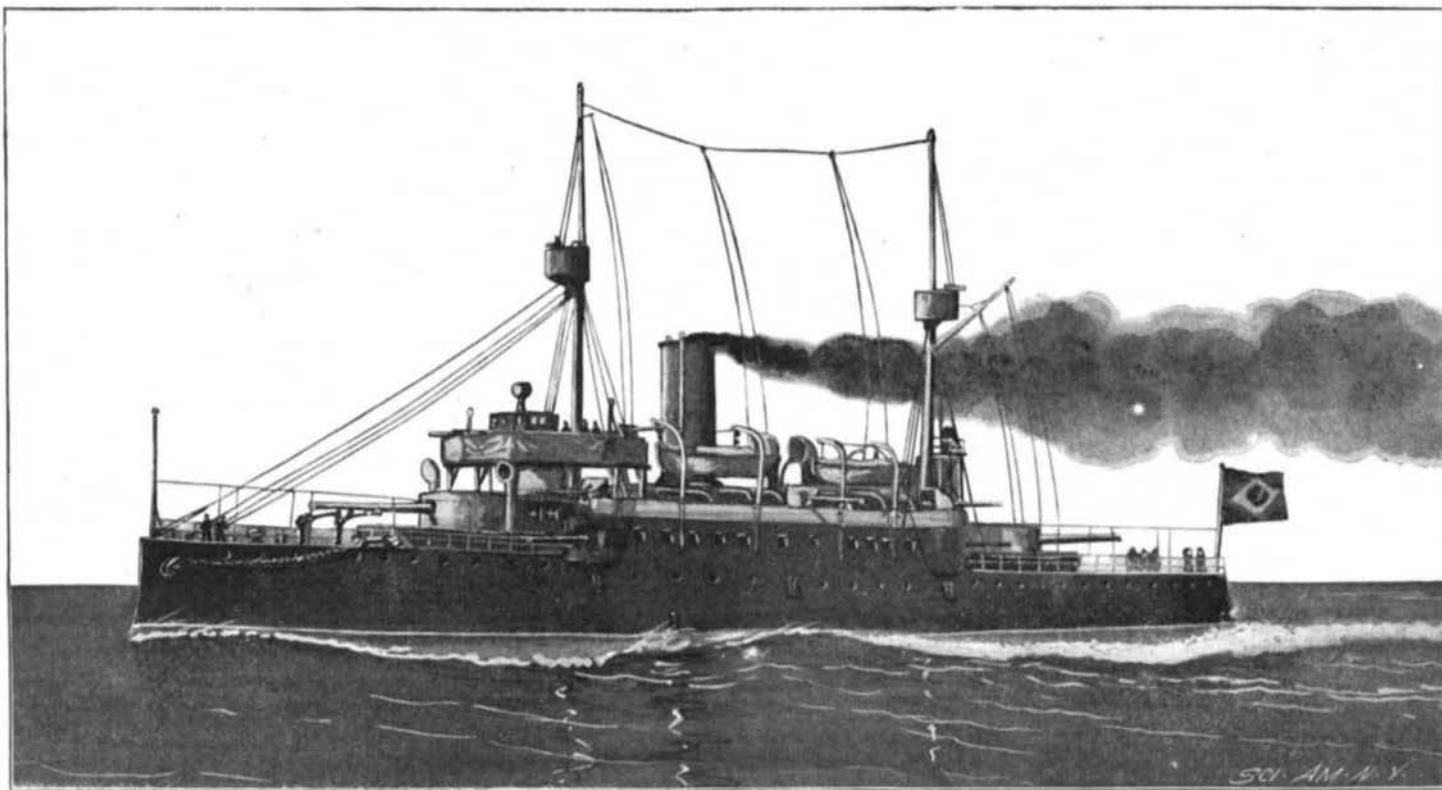
The government of the Congo Free State has decided to adopt wireless telegraphy for the transmission of official dispatches in the Upper Congo region.



FIRST-CLASS FRENCH BATTLESHIP "SUFFREN."

Displacement, 12,728 tons. Speed, 18 knots. Maximum Coal Supply, 1,100 tons. Armor: Belt, 11 inches; upper belt, 3 inches; deck, 2 inches; main turrets, 11 inches; secondary turrets, 5½ inches; central battery, 5½ inches. Armament: Four 12-inch B. L. R., ten 6.4-inch R. F., eight 3.9-inch R. F., twenty 1.8-inch R. F. Torpedo Tubes, four (two submerged). Complement, 650. Date, 1900.

Deodoro," which has been built at the celebrated "La Seyne" yard at Toulon. Some little interest attaches to this vessel, as it is thought that she, when anchored at Las Palmas on the way out, was suspected by the British cruisers of being a privateer fitted out in the interest of the Boer government to attack their transports on their way to South Africa. Whether she was not at that time properly in commission or had not been handed over formally to the Brazilian government, and so did not fly the ordinary colors of a warship belonging to Brazil has not been stated, but the precaution of steaming for one or two nights when in that latitude with all lights masked, was carried out by one or two of the troopers at the suggestion of the officers commanding the British cruiser which at that time lay off Las Palmas. The newness of the



BRAZILIAN BATTLESHIP "MARSHAL DEODORO."

Displacement, 3,200 tons. Speed, 16 knots. Normal Coal Supply, 236 tons. Armor: Belt, 11 inches; deck, 2 inches; turrets, 8 inches; casemates, 3 inches. Armament: Two long 9.4-inch B. L. R.; four 4.7-inch R. F.; two 5.9-inch howitzers; four 6-pounders; two 1-pounders. Torpedo Tubes, two (submerged). Complement, 200. Date, 1899.

"Marshal Deodoro" may have had something to do with the matter. She had only then quitted Toulon for the first time and so was probably not recognized.

The "Marshal Deodoro" is one of the small class of battleships which now-a-days are built only for second-rate naval powers, a large displacement being the rule in all important navies. Still for her size she is a

**Comparative Noise On Different Pavements.**

It is a favorite statement of those who are opposed to the use of asphalt for pavements, that the noise of the horses' hoofs upon them is intolerable. This statement having been made quite frequently of late, a gentleman in Philadelphia recently undertook to ascertain the facts in the case.

The method employed was to observe the noise from the hoofs as a horse passed from the asphalt to the granite, or the reverse. This was easily done at points where the asphalt ended and the granite began, especially if a car track passed along the street. It was also, at such points, easy to note the sound made by saddle horses as they went from one pavement to the other. In the case of horses attached to wagons, those only could be observed when the wheels were in the car tracks, and the noise from them was thus practically obliterated.

Observations carried on at intervals covering some three or four weeks developed the fact that the noise made by the hoofs of horses is practically the same on granite and asphalt. It is, if anything, a little sharper on the granite, the asphalt seeming to have a slightly subduing effect on the impact of the shoe.

It is found that on both granite and cobble stone pavements the noise of the wagon entirely drowns the noise of the horses' feet, a quick ear being required to detect the sound of the shoes. The sound of the wagon is, as nearly as one can guess, ninety per cent of all the noise coming from rough pavements. The state of the case then is about this: When we have taken away ninety per cent of the noise, what remains causes greater complaint than the whole. For the noise of the wheels and rattle of the wagon is actually extinguished on the asphalt, leaving only that of the hoofs.

It would appear self-evident to persons who were disinterested that this was the case. Yet arguments against asphalt are so difficult to obtain, that anything is seized upon for the purpose and urged to the utmost. One opponent of asphalt gravely wrote a few weeks since that cyclists were suffering from a dryness of the throat, caused entirely by riding over asphalt.

The arguments against asphalt on account of the noise which horses make upon it and the smoothness of it in wet weather, are arguments against the horse rather than against the pavement. It is quite within the mechanical possibilities of the age for us to give up using horses in our large cities and substitute traction engines and horseless vehicles for them. The smooth asphalt gives the mechanical carriage every advantage, and if our horsemen carry these arguments too far, they may find that they have proved too much, and people will say: If our pavements are not good enough for your horse, your horse must go. Strange things have happened within the last decade, and may be expected again.

**An International Exhibition at Canea.**

An International Exhibition under the auspices of Prince George, of Greece, will be held at Canea, on the Island of Crete, during the present year. The inhabitants of the island are exerting themselves to make the Exposition a complete success. Foreign consuls have recommended to their governments that everything be done to further this exhibition. Crete now affords an excellent market for many lines of goods. There will be an excellent passenger service to and from the island. The Exposition will be opened on April 11, and will be closed on May 7.

It is a curious fact that workers in vanilla factories are affected with headache, lassitude, muscular pains, skin diseases, etc. Some of the workers had to give up their employment.

**THE OLD AND NEW PUMPING ENGINES OF DRY DOCK No. 1, BROOKLYN NAVY YARD.**

The reconstruction of the pumping plant of Dry Dock No. 1, which will shortly take place at the Brooklyn Navy Yard, will afford a striking evidence of the advance which has been made during the past half

century in the construction and economy of operation of pumping machinery.

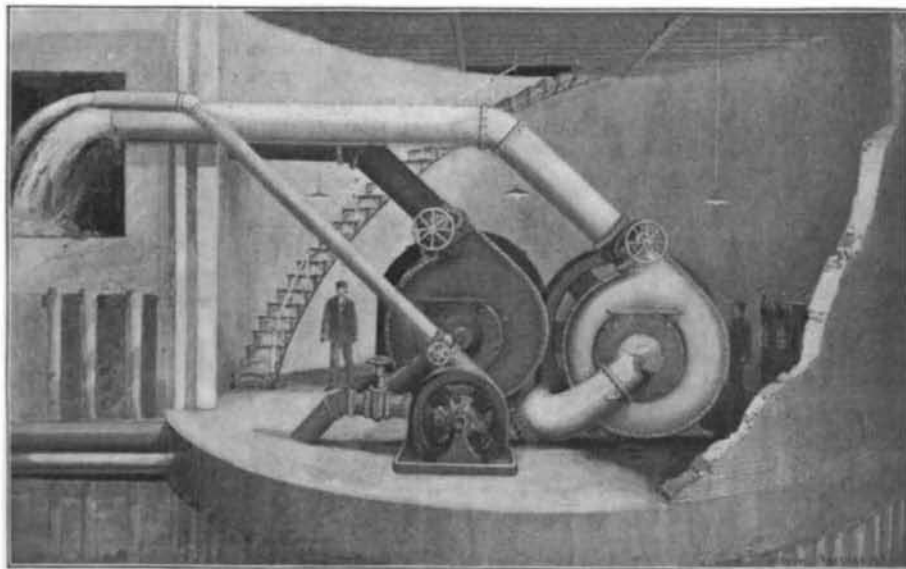
Our larger engraving is a side elevation of the original condensing, double-acting, beam engine and pumps, which were erected in 1851; while the smaller engraving, which is drawn to the same scale, represents the new electric pumping plant

which it is proposed to erect in its place. The drawings being made to the same scale, the contrast between the elaborate and cumbersome design of the old, walking-beam engine, and the compact arrangement of the electrically-driven centrifugal pumps, is evident at a glance, particularly when it is stated that the pumping capacity of the smaller is nearly three times as great as that of the larger plant.

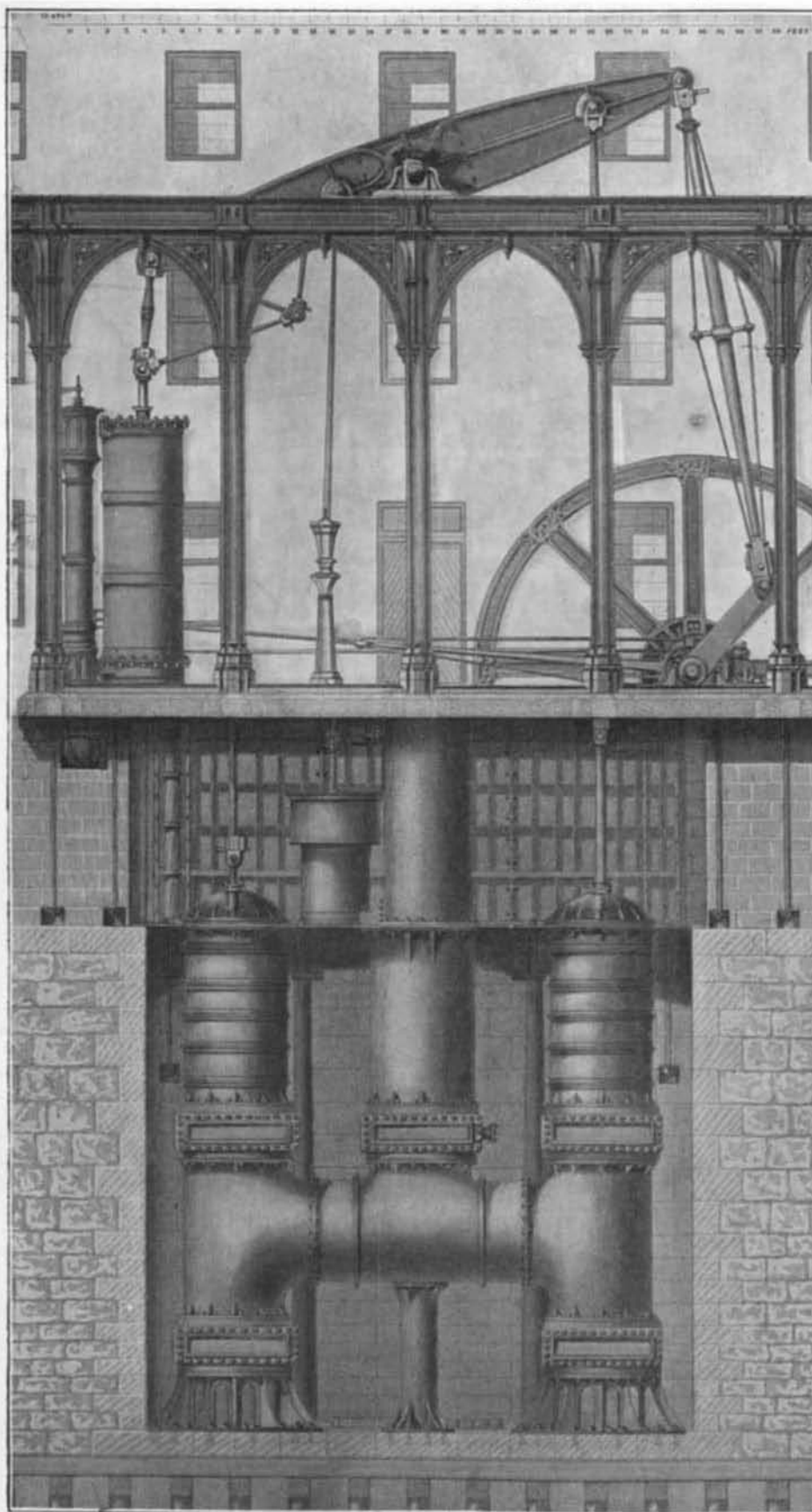
At the same time we must be careful, in our modern self-sufficiency, lest we claim more credit than is warranted by the enormous advantage accruing from over half a century's experience in the construction and handling of pumping machinery; and it is questionable in view of our end-of-the-century advantages, whether the magnificent old engine which may still be seen in its spacious engine house at the Navy Yard, is not even more creditable to its designers than its up-to-date successor. In the description of the plant written by Mr. Charles B. Stuart, Engineer-in-Chief of the United States Navy, it is stated that at the time the plans were matured and adopted it was deemed important by the engineer in charge, Mr. McAlpine "that the machinery for exhausting the water from the dock should be of the most perfect kind and of great power and capacity also." This gentleman put in plans and specifications which after discussion by a special board, were adopted with some modifications.

The engine stands in a lofty room which is about 54 feet square. The frame consists of an entablature of cast iron, supported on double lines of Gothic columns and arches, which extend from end to end of the engine room. To modern eyes, the effect of the Gothic columns and arches, is exceedingly ecclesiastical and strongly suggestive of the nave of a cathedral. Howbeit these Gothic ornamentations, incongruous as they look to-day, were fashionable half a century ago, and they were characteristic of the stately steamboat engines, after the pattern of which we are told the engine is largely modeled. Our illustration is reproduced from a beautiful steel engraving in a volume by Chief Engineer Stuart, on the "Naval Dry Docks of the United States." The author draws attention to the fact that it "shows very beautifully the style of ornamentation that has been given to the whole work, care having been taken to have all the parts in keeping with each other."

Coming now to details, the cylinder is 50 inches in diameter by 12 feet stroke; the walking beam is of cast iron and measures 31 feet between the end centers and weighs over 15 tons. The piston rod is attached to the beam by the old parallel motion, first designed by the celebrated Watts. The main pump and the air pump rods are connected to the walking beam by double rods and links, while the air pump cross-head works in slides attached to the columns of the engine frame. The engine has a trussed connecting rod the tension rods of which are adjustable by screws and nuts. The cast iron balance wheel is 24 feet in diameter and the crank and shaft are of wrought iron. The engine is provided with an independent adjustable extension gear, which is so arranged that as the load upon the engine is increased by the lowering of the water in the dock, an increased amount of steam is admitted to the cylinder. This is effected by means of a cam wheel on the main shaft, against which a cam roller, connected with the expansion valve stems is made to revolve, and along which it can be made to travel at any speed desired. A curious feature of the construction



\*Proposed Electric Pumping Plant—Capacity, 60,000 Gallons per Minute.



Old Pumping Plant of Dry Dock No. 1, Brooklyn Navy Yard, Installed 1851—Capacity, 22,000 Gallons per Minute.

\* The two Drawings are reproduced on the same scale.

HALF A CENTURY'S DEVELOPMENT IN PUMPING MACHINERY.