

reshoff type it varies greatly in construction, the tubes being arranged horizontally in sets immediately over the fire—each set being at right angles to those just above it. Exhaust steam is led to a surface condenser. An ordinary pump takes the water from the condenser, forces it into the upper set of boiler tubes, through the boiler to a separator located in front of the boiler, and to which the steam pipe is connected. The boiler will work safely with 160 pounds of steam, but in the race with the Mary Powell it was only found necessary to use from 120 to 125 pounds. The fire box is 6 1/4 feet square.

The screw is four-bladed, 4 feet in diameter, and 6 1/2 feet pitch. At the stern the boat draws 4 1/2 feet and at the bow 3 feet. We may notice that there are now building at the yards of Yarrow & Co., England, two torpedo boats which are expected to run, when light, at the rate of 24 knots an hour, or nearly 28 miles. The Stiletto must do better than 25 miles an hour before she can claim the broad title of the fastest boat in the world. In our issue of next week we will illustrate and describe in detail the construction of the boiler and engine and the method of forcing the circulation.

THE ENGLISH CUTTER GENESTA.

The greatest sporting event on the water this year will be the international yacht race for the America's cup, held under the auspices of the New York Yacht Club. Great interest is being manifested by the yachtsmen and others throughout the whole country in the coming contest, while the patriotic pride of many wealthy men in the race has been aroused to such a pitch that they have ordered several new and costly yachts to be built for the protection of the cup. Even General Butler has dropped politics (and law) long enough to say that he wants to enter the ancient America in the race. England will send two very fast yachts, with the hope that one of them will walk away with the prize. These are the cutters Genesta and Galatea. The former is the favorite, and seems to be most feared by the Yankee yachtsmen.

It is understood that the match is to be three races, best two to win—one a triangle 40 miles, one over the New York Club course, and the third, if necessary, 20 miles and return, starting from Sandy Hook.

The Genesta was built by Messrs. Henderson Bros., at Patrick-on-the-Clyde. She is 90 feet over all, 81 feet on the water line, 15 feet beam, 11 1/4 feet depth of hold, and 13 1/2 feet draught. Although originally she had only 60 tons of lead outside, she now carries 70 tons of lead on her keel. She has also been recently coppered and fitted with new and heavier spars. Keelson stringers, frames, and strengthening plates are all of steel, while the planking is teak and elm.

With great accommodations beneath, the cutter's fittings are plain but substantial. The deck fittings present several novelties. The bowsprit comes over the steamhead in the center of the yacht, with more than the usual difficulties in reefing it. To obviate this difficulty, one of the checks of the steel bits is hinged. This device permits of the bowsprit heel being swung round clear of the scuttle and the capstan, and run aft alongside the mast. The fore scuttle, oval in form, is a steel tube, round which the wire-fall of the bobstay tackle is coiled in easier turns than it would be belayed in the ordinary way. Just before the mast is a second scuttle, which accommodates the steward, and also the crew, on racing days. Behind the mast is a third scuttle, down which canvas can be lowered into the sailroom under the cabin sole.

The Genesta will be without any provisions for screening the weather spray, besides a racing cabin. The Genesta has a fine saloon fitted up lightly and elegantly, a ladies' cabin aft, and spacious accommodations for the crew, steward, and captain. The whole length of the yacht has been utilized, and the space obtained is remarkable. The Genesta is to be in charge of C. Carter, who is well known on the Clyde as a clever yachtsman. She is owned by Sir Richard Sutton. Our first page engraving is taken from an instantaneous photograph, representing the Genesta plowing through the water at full speed; it clearly shows the wave line, and indicates the ease with which she parts the water. All through the yachting season last year this boat met the best of the British fleets, and although not always a winner, she proved herself to be without doubt the best "all around" boat in the kingdom.

A New Military Shield.

Some interesting experiments have been carried out at Ryde, Eng., with a new arm of defense. The implement is simply a steel shield to be fixed on the muzzle of a rifle as a bayonet is fixed. It covers one superficial foot, weighs three pounds, can be easily slung under the arm, and does not appear to be unwieldy. On skirmishing duty the infantry soldier would take his "cover" with him, place the point in the earth, lie behind it, and pick off his men with ease, the shield forming a rest for the rifle. The shield, which is claimed to be bullet proof, has been submitted to the War Office, and the military authorities are said to view it with some favor.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

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NEW YORK, SATURDAY, JUNE 20, 1885.

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(Illustrated articles are marked with an asterisk.)

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No. 494,

For the Week Ending June 20, 1885.

Price 10 cents. For sale by all newsdealers.

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THE NEW U. S. CRUISER DOLPHIN.

The fourth official trial of this new ship took place June 11, when by order of the Navy Department the vessel was sent out on the Jersey coast, near New York, for a six hours' continuous trial at sea. The requisition was that she should show herself capable of a speed of twelve knots an hour during the above period. The ship considerably exceeded this requirement, as she ran over fourteen knots per hour, and might have been driven to fifteen or sixteen knots.

On several of the preliminary trials of this vessel, when the machinery was new and stiff, the progress of the ship had to be stopped by reason of the heating of journals, a common occurrence with new steamers. These incidents were made the basis of certain letters and orders published over the name of the youthful Secretary of the Navy concerning the Dolphin; and some of the newspapers busied themselves by casting ridicule upon the ship and the contractor, Mr. John Roach, who executed the work.

It was made to appear that the Dolphin was little better than a worthless hulk; whereas in reality she is a noble specimen of naval architecture, fully equal in workmanship and speed to any boat of her class now afloat. The Dolphin was built in conformity with the drawings and specifications furnished by the Navy Department, and so far as can be ascertained, Mr. Roach, the builder, has faithfully carried out all the stipulations of his contract. The Dolphin is one of three ships of war for which the Department offered competitive plans for construction, and the bids of Mr. Roach were found to be nearly one million dollars less than those of any other builders. He has executed his work thus far in the most superior manner, and is entitled to the highest credit. We congratulate him upon the success of the Dolphin, and trust the other ships will show equally good work.

The governing condition in the design of the Dolphin has been high speed capable of being maintained for several days. It is intended for a dispatch boat for furnishing rapid communication from the seat of government to any point on the coast, or to act as fleet dispatch boat if a United States squadron should need its services. In designing it, all attempt at protection was abandoned, and machinery of the most durable and efficient type adopted.

The principal features of the Dolphin are:

Table listing features of the Dolphin such as 'Length between perpendiculars', 'Length, extreme', 'Breadth, moulded', etc., with corresponding measurements.

The contract price for the hull, machinery, and fittings of the Dolphin, exclusive of the masts, spars, rigging, sails, boats, etc., was \$315,000.

New Mode of Hardening Plaster.

Mr. Julhe, in a note presented to the Academie des Sciences, describes some experiments that he has performed with a view to rendering the use of plaster still more general.

Of all materials used in building, plaster is the only one which increases in bulk after its application, while mortars and cements, and even wood, undergo shrinkage and cracking through drying. When applied in sufficiently thick coats to resist breakage, it offers, then, a surface that time and atmospheric variations will not change, provided it be protected against water. But it is necessary to give this material two properties that it lacks—hardness and resistance to crushing. This is what Mr. Julhe proposes to effect by his process.

Six parts of plaster are mixed with one of finely sifted unslaked lime. This mixture is used like ordinary plaster for moulding any object whatever, and, when once dry, the object is soaked in a solution of a sulphate having a base precipitable by lime, and the precipitate of which is insoluble. There form sulphate and oxide of lime, both of them insoluble, which fill the pores of the object and render it hard and tough.

Sulphates of zinc and iron are the salts that answer the purpose best. With the first the object remains white, and with the second it gradually assumes the tint of sesquioxide of iron.—Chronique Industrielle.

English Channel Tunnel.

The projected scheme for building a tunnel under the channel to connect France with England has met with so decided a defeat in the House of Commons, that the question will probably not be brought up again for some time to come. The majority which rejected the project recently is larger than on any previous occasion when the subject has been discussed. Not a hundred members were found willing to allow even the experimental works at Dover to be continued, and two hundred and eighty-one votes were registered in opposition to the proposal.