

THE INTERNATIONAL YACHT RACE.

racing has attracted so much attention as the trial for the championship between British and American yachts in the vicinity of New York during the week commencing Sept. 7. The arrangements for the contest were not made without a great deal of correspondence, extending through many months. The race was for the possession of the prize cup won by the yacht America, in a contest with a fleet of British Boston. Her dimensions are: 93 feet in length over 44 feet; bowsprit, outboard, 36 10 feet; spinaker boom, yachts off Cowes, England, in 1851; and its having remained on this side of the Atlantic for the thirtyfour succeeding years as a standing challenge for British yachtsmen, made the latter extremely cautious in their preparations for an effort to win back the cup this year. The New York Yacht. Club has held the cup under a deed of gift from the original owners of the America, under the condition of its remaining a perpetual challenge cup, not being the property of any boat winning a match in which it is the prize, but of the club to which such boat belongs, and subject to future competition for its possession. The New York Club, therefore, invited all regular organizations of American yachtsmen to unite with them in preliminary trials, with the view of selecting the best American yacht to defend the cup against the British yacht Genesta, which had been chosen to compete for it as the best representative "all-around" yacht of the different British yacht clubs.

When the challenges for this race were issued, it was

quickly concluded that there was no centerboard sloop ordered another, both being centerboard sloops. Of in yachting vernacular "skimming dishes." these two yachts, the Puritan, of the Eastern Yacht Club, was selected to sail against the Genesta.

made up to within a few days of the race, every pre-spars, and a small mainsail. caution being taken to have her in the best possible interests.

steel frame and elm and teak planking. She is 96 feet long over all, 81 feet on the water line, 15 feet extreme beam, 11 feet 9 inches depth of hold, and 13 feet 6 inches draught.

The great differences in width and draught of the Probably no former event in the history of yacht in this country of sufficient length to match against the two yachts at once mark the broad distinction be-Genesta, whereupon the flag officers of the New York, tween the two classes of vessels, the Genesta being Club ordered such a one built, and about the same of the cutter, or "knife-blade," style, while centertime some members of the Eastern Yacht Club also board sloops like the Puritan are sometimes styled

> The particulars of the Genesta's spars are given as follows: Mast from deck to hounds, 52 feet; topmast The Puritan is of wood, and was built at South from fid to sheave, 47 feet; extreme boom, 70 feet; gaff, all, 81 feet at the water line, 22 feet 7 inches extreme 64 feet; club of topsail, 42 feet. While the Genesta beam, and 8 feet draught. Mast, 78 feet long; topmast, has not always been successful heretofore, she is to be 44 feet long; and bowsprit, outboard, 38 feet; main credited with a long list of victories, under the most boom, 76 feet; gaff, 47 feet; and spinaker boom, 64 feet. diverse conditions, since her first race, at the regatta of All her spars are of Oregon pine. She was not selected the New Thames Yacht Club, in the spring of 1884. for the trial until after a contest with the Priscilla, Her passage across the Atlantic from Queenstown was built by the New York yachtsmen, and minor changes made in twenty-four days under jury rig, that is, a in her sails, ballast, and some other details were being mast and bowsprit two-thirds the length of her racing

> The cup won by the America in 1851, and which is condition to creditably represent American yachting the subject of the international contest, became the actual property of the owners of that schooner, as a The Genesta, which has come over here to race for prize won under the offer of the Royal Yacht Squadthe cup, is owned by Sir Richard Sutton, of the Royal ron of Great Britain, for which all nations were allowed Yacht Club; she was designed by J. Beavor-Webb, to compete. It is of solid silver, ewer-shaped, and and built on the Clyde, being of composite build, with elaborately ornamented, standing two feet high and weighing over 100 ounces. Around its broadest part are medallions variously inscribed, the first inscription being: "One hundred guinea cup, won August 22, 1851, at Cowes, England, by yacht America, at the Royal



THE INTERNATIONAL YACHT RACE.-VIEW OF THE AMERICAN CENTERBOARD YACHT PURITAN.

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and Countess of Dufferin, and the sloop Atalanta. The programme for the races was as follows: Sept. 7, outside Sandy Hook, twenty miles to windward and return; Sept. 9, over the regular New York Club course, when, if a third race should become necessary to decide the contest, it was to be sailed over a forty mile triangular course outside Sandy Hook.

----A Good Suggestion.

In giving estimates, says one of our contemporaries, do not make your calculations on loose scraps of paper and then throw them away, keeping only a memorandum of the amount. You may want to look over your figures some day, and verify the operations that gave them to you. Have a blankbook, and arrange an index for it; then make as many divisions or departments as the different classes of your work require, and be care- is issued weekly. Every number contains 16 octavo pages, uniform in size ful to observe the arrangement in your use of the book. with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, Make all your calculations in this, compactly, make a all newsdealers throughout the country. note of number of the page in the index for easy reference, and the book will become more valuable to you will be sent for one year, postage free, on receipt of seven dollars. Both every day.

The Longest Single Span Girder.

The new railroad bridge over the Ohio between Evansville, Ind., and Henderson, Ky., which was formally opened for traffic in the early part of August, enjoys the distinction of having the longest single span girder of any bridge yet constructed. It is built on the Terms for Export Edition, \$5.00 a year, sent prepaid to any part of the triangular truss plan, and is very symmetrical and word. Single copies, 50 cents. [37] Manufacturers and others who desire pleasing in appearance. The structure has a length to secure foreign trade may have large and handsomely displayed an-nouncements published in this edition at a very moderate cost. of 3,200 feet, and rests on sixteen piers, each span being 250 feet long, with the exception of the one over the main channel. This is 525 feet, and is, we believe, the longest single girder in the world. It is 103½ feet above low water, and 57 feet above high water mark. The bridge, with the lines connecting the railroad system centering at Evansville with the Louisville and Nashville system at Henderson, has a length of ten miles, three miles of the approach on the Indiana side being over a wooden trestle.

**** The Effects of Lightning Stroke.

At a recent meeting of the Berlin "Verein fur Innere Medicin," Dr. Liman described the changes present in the bodies of two men who had been killed by lightning when taking shelter under the trees of the Thiergarten. In the one subject the hair over the left temple was singed, and the skin from the left ear to the shoulder-blade was discolored a brownish-red, the chest and abdomen being covered with red and white streaks. Reference was made to the dendritic figures described in many cases, and attributed often to impressions of twigs, leaves, etc., and in this body there was a figure which could be compared to a palm leaf, but which was undoubtedly due to the contact of the folds of the shirt. The parts thus pressed upon remained white, the surrounding skin being reddened. The apex of the heart was the seat of an irregular cavity, which communicated with both ventricles; evidently the lightning stroke had caused rupture of the organ. In the II. ENGINEERING, ETC.-Superseding the Horse.-The best substiother case the skin and hair were similarly excoriated and singed, and numerous ecchymoses occurred beneath the serous layers of the pericardium and pleura; the lungs were much congested. Here death was evidently due to asphyxia. Dr. Liman mentioned, and $|_{III}$. Professor Leyden confirmed the fact, that death by lightning is occasionally accompanied by rupture of internal organs, as the brain and liver.



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NEW YORK CABLE ROAD.

New York is now about to have its experience with a surface cable road, and having been a little behind other cities in this respect, it starts out with the advantage of their blunders as a warning.

The Third Avenue Railroad Company has completed its cable line on Tenth Avenue from 125th to 186th Street, and formally opened it to the public on the 29th of August. The constructing engineer, Mr. D. J. Miller, was an assistant on the Chicago Cable Railway, and his experience there suggested several novel features for the New York road. The objection that has always been urged against cable roads in general is on the ground that should any accident happen the cable, the entire road would be disabled. The fear of such an event has induced a feeling that the system is not

More specific objections are due to the fact that often they work anything but satisfactorily, and are not always subject to that immediate control which should be an absolute requisite on any road passing through crowded thoroughfares. These, however, are objections which, though serious enough, as our experience in Philadelphia and Chicago has shown, are not essential to the system, and by a more perfect working out of the details are quite remediable.

The Tenth Avenue Road has therefore removed the essential fault of the system by providing for the contingency of a broken cable. Throughout its entire length, the road is constructed with a double cable. Both are contained in the same tube, so that in case of accident to one, it will be a matter of but a few minutes to put the other in operation, and so avoid any serious delays of travel. The road contains several heavy grades, and is a trifle over three miles in length. It is expected that the route will very shortly be extended across the city on 125th Street. The cable is of iron, 1¼ inches in diameter, and is 33,100 feet long, or about $6\frac{1}{4}$ miles. It weighed on the reel 46 tons.

The motive power plant is located at 128th Street and Tenth Avenue, where a handsome building of iron and moulded brick, 100 by 200 feet, has been erected, and furnishes ample and well arranged accommodation. The engines and cable gearing are placed in the basement. The two large engines, built by Mr. Wm. Wright, of Newburg, areeach of 350 horse power, and are capable of operating both cables, so that ordinarily but one will be in use, and the reserved power will be an additional safeguard against delay or accident. These are supplemented by two donkey engines of 75 horse power each, which would be able to keep the cables moving, but at a reduced rate of speed. The entire building is lighted by an installation of Edison lamps. A No. 8 dynamo, of 3,200 candle power, and making 1,400 revolutions per minute, furnishes the necessary current. As such extravagant claims are put forward by various electric companies for their respective systems, the statement of the contractor may not be uninteresting, that the system introduced was giving 100 candle power for every horse power consumed. The lamps in use were 16 and 10 candle power, and 61/4 and 10 lamps respectively were therefore maintained by each horse power.

A considerable speed is claimed for the new road. The round trip of $6\frac{1}{4}$ miles, it is stated, can be made in 40 minutes. This, of course, is making no allowance for stoppages, but a moderate estimate for these delays would still leave a fair speed for surface travel.

SUBMARINE WARFARE.

The probability that the not distant future will see the perfection of the submarine torpedo boat and ram furnishes still another argument against the construction of great forts for harbor defense. If the marine monster now being completed at Fort Lafayette will do the half that is claimed for it, it would not be safe PAGE for the heaviest armed and armored ship afloat to lie at anchor or attempt to maneuver in its vicinity; for it must deal with an unseen enemy which guns cannot 185 reach nor armed men overpower. Should this vessel 8073 prove a success, the art of defense may reasonably be looked upon as having outstripped the art of attack, and we can look back upon our dilatoriness in building harbor defenses with something like as plaisance. Nor should it be forgotten, if this submarine vessel proves successful, that the success is in great part due to electricity and to the recent improvements in the storage battery and the electric light. The Holland submarine vessel proved that compressed air is both dangerous and uncertain when used under the conditions present in a submarine construction. It may be used as an auxiliary, but is not suitable for a main dependence. The secondary battery or the primary battery is, on the other hand, of certain action, and may therefore safely be depended upon to supply not only power, but also light. The testimony of divers proves that the electric light will illumine great distances under water. In a fog it shows itself lacking in the red and yellow tints which make gas and oil so effective, but beneath the surface of salt water, it seems, the powerful white and blue rays serve admirably to pierce the dim and somber-hued depths. Few people are aware of how much power the se

----Decision in Regard to Patent Harrows.

Justice Stanley Matthews has decided in favor of the plaintiffs in the now celebrated case of D. C. and H. ∇ C. Reed and Co., patentees of the spring tooth harrow, vs. Chase, Taylor & Co. et al., for infringement of patent, which was tried in the United States Court at Grand Rapids, Mich. The case has been before the vi courts for several years, and involved the past fifteen years' business in spring tooth flat harrows. By this decision the patentees will enjoy a royalty from every farmer or concern making any kind of infringement. It is one of the most important cases ever decided in patent litigation.

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