Yacht Squadron regatta, open to all nations, beating," after which follow the names of all the vessels which started in the race. On the next medallion is engraved, "Schooner America, 170 tons, Commodore John C. Stevens; built by George Steers, New York, 1851." On the other spaces are inscriptions recording the results of the races with the schooners Cambria, Livonia, 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 careis 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 referevery 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 can, with its splendid engravings and valuable information; (2.) Comgirder 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. ** 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 culation in all commercial places throughout the world. Address MUNN the main channel. This is 525 feet, and is, we believe, the longest single girder in the world. It is 1031/2 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 bridge at Cincinnati, built several years ago, has a clear span of 515 feet, and was at the time of building the longest railway girder known. Next in length came the Kinlenburg Bridge in Holland, with a span of 492 feet. It is not probable that the Henderson Bridge will long enjoy its distinction, for the limits in this direction have already increased so surprisingly that spans of 800 feet, such as the central span of the contemplated bridge over the Hudson at Poughkeepsie, N. Y., are not considered impracticable; but 525 feet has not yet, we believe, been exceeded, except on paper.

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 other 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 II Professor Leyden confirmed the fact, that death by lightning is occasionally accompanied by rupture of internal organs, as the brain and liver.

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 v 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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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, 11/4 inches in diameter, and is 33,100 feet long, or about 6½ 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 $6\frac{1}{4}$ and 10 lamps respectively were therefore maintained by each horse power.

A considerable speed is claimed for the new road. The round trip of 6¼ 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 for the heaviest armed and armored ship affoat to lie at anchor or attempt to maneuver in its vicinity; for it must deal with an unseen enemy which guns cannot reach nor armed men overpower. Should this vessel 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 co 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