

was practicable to formulate the desired rule, and that displacement or its equivalent should be incorporated as a factor in the rule of measurement adopted. As a result of the discussion thus opened up, it developed that there was a practical agreement on the three elements of length, sail area, and displacement as those which should enter into the question of measurement, and the rule as finally adopted by the Club is as follows:

$$\text{Rating measurement} = \frac{L \times \sqrt{S. A.}}{5 \sqrt[3]{D}}$$

or the length

multiplied by the square root of the sail area, and divided by five times the cube root of the displacement.

Now the development of the racing yacht under the old rule, in which the length of the waterline was added to the square root of the sail area, and the result divided by 2, had led to the production of an extremely undesirable type of boat, it having been found that the very fastest type of craft built under this rule was an unballasted scow—a broad, shallow, box-like structure with its under-body slightly curved longitudinally, so that when measured it would float on an extremely short water line, and when heeled to a breeze would lengthen out to something like double that waterline, using the windward portion of the hull with the crew crowded on the windward rail as ballast to enable the craft to carry its abnormally large sail spread. The most outrageous instance of this development is an extraordinary freak known as "Outlook," which was built for the defense of the Quincy cup. This craft, which is called a 21-footer, is 52 feet 7 inches in length on deck, 16 feet in extreme beam, has a draft of hull of only 8 inches, and yet has a sail spread of 1,800 square feet. This boat (sic) proves what may be done under a faulty rule, that is a rule that is not sufficiently compre-

portions and the tendency to run to the freak type had not made itself felt in what was known as the knockabout class. She is a moderate boat, with easy sailing lines, a good-sized displacement, and a snug sail plan. The other 21-footer, "Don," built in 1901, shows the rapid development toward the extreme type which had taken place in the brief period of three years. She was designed by Mr. Mower, and in the season's racing she had a brilliant career, proving to be practically invincible and winning by very large margins. It will be seen at once that though she is nominally a 21-footer and to that extent in the same class as "Arbeeka," she is actually a very much larger and more powerful craft. When she is heeled to a breeze her sailing waterline is from 28 to 30 feet in length, and with her 600 pounds of live ballast in the shape of the crew strewn along the weather rail, she is well able to carry her 811 square feet of sail even in a pretty fresh breeze. The abnormal sailing length is due to the great length and fullness of the ends. We have traced the designs of the two boats, one over the other, so as to show graphically how the New York Yacht Club's rule of measurement, if it were applied to them both, would give to the more wholesome type of boat a handicap so liberal that the faster boat could never cut it down.

In the new rule the length is no longer measured on the middle vertical plane of the vessel, but on a vertical longitudinal plane taken at one-quarter of the greatest beam at the load waterline, and it is obtained by measuring the length in this plane at the waterline and on deck, adding these together, and dividing by 2, which gives the mean length on the quarter breadth. By looking at the plan of the two yachts, it will be seen how greatly the full waterlines of "Don" and her long overhangs contribute to her

lutely prohibitive figure as shown above. The weak point in the rule, if it has one, is the very large displacement divisor, and we think it will probably be found, after one or two seasons' racing, that it will be advisable to take say three times the cube root of the displacement, instead of five times, as the divisor.

It is interesting to note the effect which the new rule will have on existing yachts: Thus "Columbia," whose rating under the old rule was 102, under the new rule becomes 131. The 70-footers "Mineola" and class, which are more extreme in model than "Columbia," have increased in measurement from 76.34 to 90. The most interesting comparison is that between last year's extreme racing yacht, "Neola," which measures 51 feet on the waterline, and the Fife boat "Isolde," which measures 59.7 feet on the waterline. The "Neola" is the most extreme, and for her size the fastest, large cutter that has been built to date. The "Isolde" is a large-displacement, deep-bodied, easy-lined craft of moderate sail plan, and is practically the type which the New York Yacht Club rule is expected to produce. The 51-foot "Neola," whose rating measurement is 60 under the old New York Yacht Club rule, measures 73 feet under the new rule; whereas the 60-foot "Isolde," which measured 60.5 feet under the old rule, measures practically the same, or 61 feet under the new rule. Or in other words, the 51-foot yacht under the new rule has a measurement 12 points higher than that of the 60-footer. It will thus be seen that the new rule, even in the larger classes, bears very heavily upon the extreme craft that have been turned out during the past two or three years.

For the sake of comparison, we have shown the allowance which "Don" would have to give "Arbeeka" under the Larchmont-Hyslop rule, which is used by

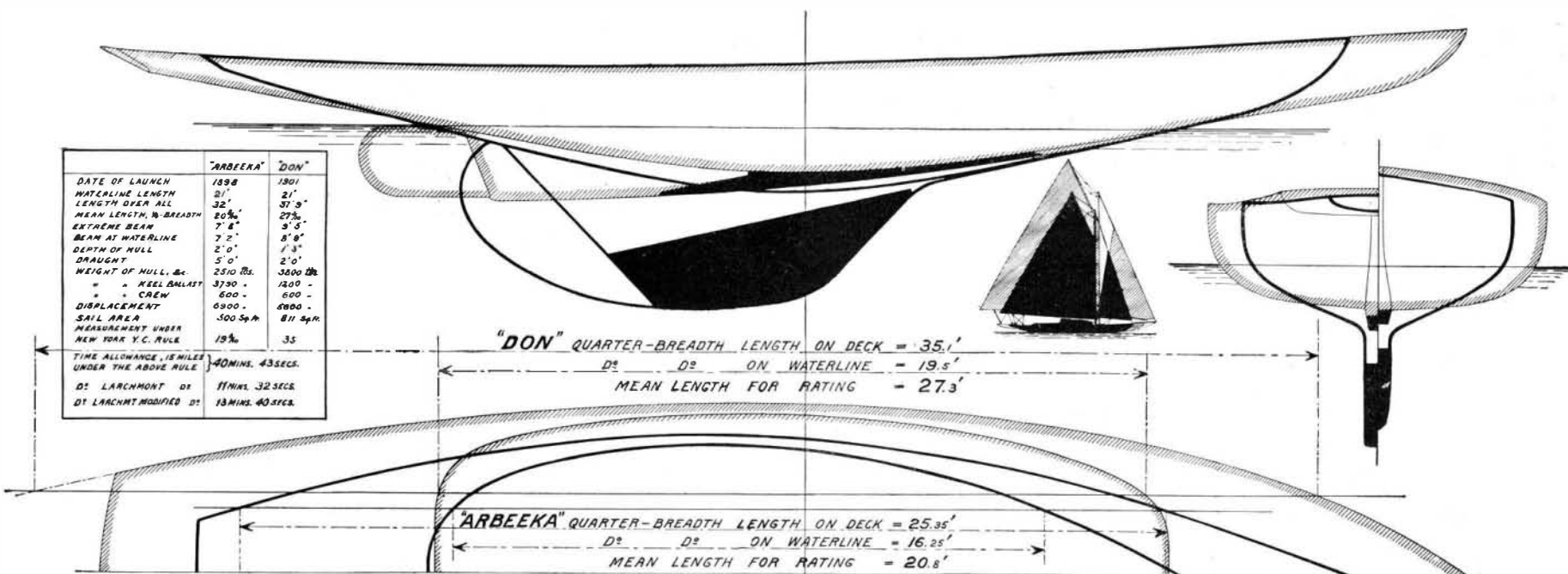


DIAGRAM SHOWING THE EXTENT TO WHICH THE N. Y. Y. C. NEW RULE OF MEASUREMENT TAXES THE EXAGGERATED PROPORTIONS OF A MODERN SCOW-TYPE RACING CRAFT.

hensive, when a clever designer sets out to build the most extreme boat possible under that rule by breaking the spirit without breaking the letter of it.

Broadly speaking, the adoption of a rule which took cognizance merely of length and sail area, was based upon sound scientific principles; for length is the chief determining factor of the resistance of the vessel, and sail area of her power. Other things being equal, the longer vessel will be faster than the shorter one, and the vessel with the larger sail area will have the greater driving power. Building under this rule it was soon found that of two vessels of equal waterline length, the beamy boat of shoal draft with a hull of small displacement was faster under the average weather conditions than a boat with moderate beam, greater draft, and larger displacement. Moreover, if a shallow hull was adopted, it became possible to carry out the overhangs of the boat to an excessive length, and by maintaining the hard turn of the bilges in the sections as they ran out into the overhangs, it became possible to greatly lengthen the waterline as the vessel heeled down to a breeze. Consequently a 21-footer, like the "Outlook" mentioned above, became, to all intents and purposes, when she was heeled, a 40-footer, the great stability due to her extreme beam and lengthened waterline enabling her to carry the rig that would ordinarily appear on a 40-foot yacht.

Although the New York Yacht Club rule is not likely to be applied to any boats under 30 feet in length on the waterline, we have chosen for comparison the two 21-footers, shown in the accompanying diagram, for the reason that the full data regarding these boats was accessible. The "Arbeeka" is a 21-foot knockabout, designed in 1898 by Mr. Crowninshield, at a time when the craze for extreme pro-

high rating of 35, while the sharper waterlines and moderate overhangs of "Arbeeka" assist to reduce her rating to less than 20.

It should be explained that the rule states that in case the width of the stern on deck exceeds one-half the greatest beam at the load waterline, the measurement for the length on deck shall be taken to a point aft of the stern where the continuance of the fair line of the top edge of the plank-sheer would intersect the quarter-beam line. This tends to keep down the broad overhanging sterns that are so much in vogue, and causes "Don" to add several feet more to her deck length. Not only is the extreme boat penalized for length, but also for sail area and displacement. Of sail area it is not necessary to say anything here; but regarding displacement it may be mentioned that it is in this respect that the extreme craft is subjected to one of her heaviest penalties. A shoal, broad boat is of relatively light displacement compared with a boat of deeper body, and since the deep-bodied and large-displacement craft is a better sea boat, has better accommodations, and gives greater comfort generally, displacement has been brought into the rule by making it a divisor of the results obtained in measurement of the length and sail area. In the case of such a yacht as "Don" the penalty is simply enormous and quite prohibitive—her measurement working out as 35 against 19.6 for "Arbeeka," with the result that she would have to allow "Arbeeka" about 2 3/4 minutes per mile—something which even such a flier as "Don" could not do with any possible chance of winning.

The new rule, as we have said, will probably not be applied to boats under 30 feet in length, and in the case of the larger yachts of extreme form, the penalties, though very heavy, will not work out at such an abso-

lute the Larchmont and Seawanhaka clubs, and under what is known as the modified Larchmont rule, which has been adopted by the Long Island Sound Yacht Racing Association. Under the Larchmont rule, measurement is made of the waterline length; the sail area; the breadth taken at the greatest breadth and at an eighth of the distance from the forward and after points of waterline measurement; the depth; and the midship section—the difference between the two rules being that in the Larchmont rule 3 1/3 of the midship section is taken, and in the modified Larchmont rule 3.85 of the midship section. Both rules are favored by those designers who have done most of the work in the development of racing craft in the smaller classes, and they claim that the modified Larchmont rule would promote a type of vessel that conforms more closely to the typical American model than would the New York Yacht Club rule, which, because of the big displacement factor, will tend to produce a big-bodied vessel with moderate overhangs, and excessive displacement, conforming more to the typical British cutter.

THE HOME OF THE NEW YORK YACHT CLUB.

The famous yacht club, of whose beautiful home on 44th Street, in this city, we present a series of photographs, is perhaps best known both here and abroad because of the remarkable series of contests, extending over a period of more than half a century, which have been carried on under its auspices for the possession of the "America" Cup—undoubtedly the most famous yachting trophy in the history of sport upon the sea.

Among the names that call for prominent mention in any reminiscences of the New York Yacht Club, none is more widely known than that of Commodore John C. Stevens, for it is



The Spacious Model Room; 96 Feet Long, 48 Feet Wide and 26 Feet in Height.



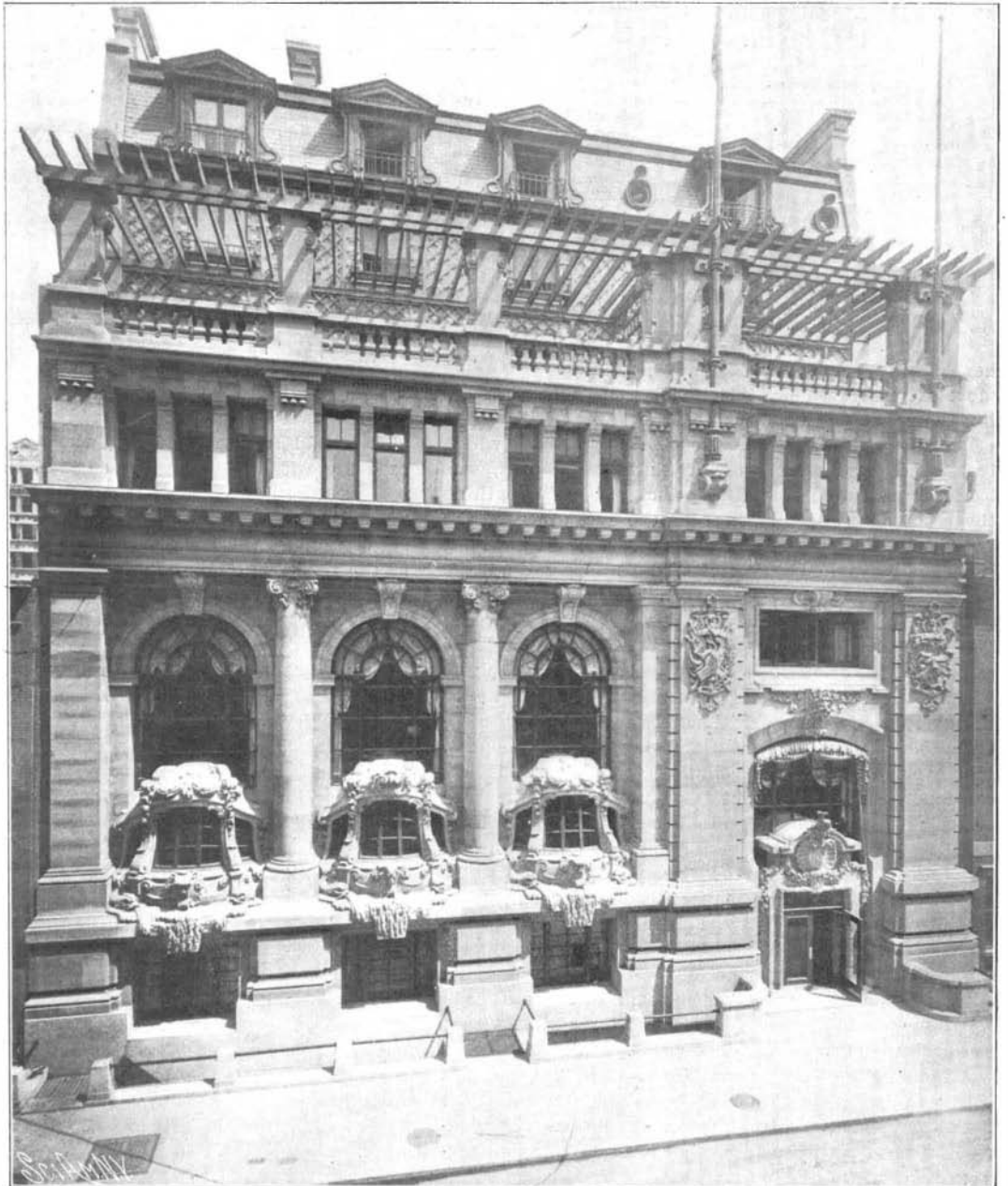
Ornate Fireplace and Mantel in the Model Room.



The Grill Room, Built to Represent the 'Tween Decks of a Wooden Ship.



The Main Staircase.



The Facade of the N. Y. Y. Club House.

Photographs made especially for the SCIENTIFIC AMERICAN.

THE HOME OF THE NEW YORK YACHT CLUB.

to his initiative, and to the fact of his early association with Mr. George Steers, the designer of many successful pilot boats, that we owe the laying of the keel of the schooner yacht "America." It was after talking over the scheme with Hamilton Weeks, George L. Schuyler, James Hamilton, and J. B. Finlay, that the Commodore and his friends—prototypes of many a later "cup syndicate"—told Steers to go ahead and build a schooner that should make the transatlantic passage and try conclusions in their own waters with the British yachts. Commodore Stevens joined the yacht at Havre, and—well, not to repeat the details of an oft-told story—he brought back a curiously-wrought-and-fashioned silver flagon, that has since acquired a world-wide fame of which the gallant commodore and his friends little dreamed.

Commodore Stevens, who had held the position of chief flag officer from the year 1844, in which the club was organized, resigned in 1855, and he was succeeded by his brother, Edwin L. Stevens. The "America" Cup, which was won on August 22, 1851, was presented by the surviving owners, in 1857, to the New York Yacht Club as a perpetual international challenge cup. *Hinc illæ lachrymæ.*

But it is of the home of the club that the present article is to treat; and for the first club house we must go back to the year 1845, cross the Hudson River, and find the Elysian Fields, located north of Castle Point, Hoboken, where in a very modest way in a quiet little house the members met for the first time in their own club house.

At that time there were 122 members in the club, and only a dozen yachts were entered on its roll. Here the club remained for twenty-three years, or until June, 1868, when a move was made to Clifton, Staten Island, which remained the headquarters of the club for three years. In 1871, another transfer was made to the corner of Madison Avenue and 27th Street; and thirteen years later, on May 1, 1884, the club made another move, this time to 67 Madison Avenue, which it occupied for a period of eighteen years, or until it entered into possession of its present magnificent home.

The new club house is located on the north side of 44th Street midway between Fifth and Sixth Avenues. It stands upon a lot 100 feet deep and with 75 feet frontage, which was presented to the club by ex-Commodore J. Pierpont Morgan, one of the most enthusiastic members of the club and the present owner of the famous cup yacht "Columbia."

The building itself cost \$350,000, this sum not including any of the elaborate and expensive furnishings. As will be seen from the accompanying illustrations, which were taken specially by the SCIENTIFIC AMERICAN, through the courtesy of Mr. G. A. Cormack present secretary of the club, the club house was designed to harmonize, both in its architectural motive and in its accommodations, with the special uses to which it was to be put; and it will be generally agreed that in carrying out the work the architects, Messrs. Warren & Wetmore, have produced an extremely pleasing and satisfactory result. The facade on 44th Street has a total height of five stories, the three lower stories being carried up flush with the building line, and the front wall of the two upper stories being carried back to form a broad balcony which is roofed in with open rafters. These, in the summer season, are covered with trailing vines and afford a striking, but not unpleasing, skyline to the facade. The building as viewed from 44th Street, presents a dignified, and at the same time highly picturesque effect, the last feature being heightened by a very novel but effective treatment of the three main windows of the second floor, the lower third of which has been designed to reproduce the stern lights of an old Spanish galleon. And remarkably well does the device blend with the general architectural treatment.

The building is entered from the street level through a richly-carved doorway, that leads into a large and lofty hall. Immediately to the left is a small reception room, on the walls of which are some superb photographs of international yachts, notably "Columbia" and "Shamrock II." Also to the left of the hall is the entrance to the famous grill room, and to the billiard room and café. The grill room, which measures 30 feet by 68 feet, is an unique feature in this

very handsome building. It is entered by a few steps that lead down from the hallway, the room itself being somewhat below street level. Particular interest attaches to it from the fact that it has been built and fitted out to reproduce, as far as possible, the 'tween-decks of an old wooden sailing ship. The floor is deck-laid and the frames and deck beams are reproduced with fidelity, the illusion being greatly enhanced by the crowning of the deck beams and by the fitting of hanging knees complete with their bolts, etc. The dark oak furniture has been designed to harmonize with the room and the whole effect is both artistic and ship-shape. From the entrance hall access is had to the second floor by a broad marble staircase, the balustrades of which are richly carved in conventional marine designs. Directly opposite the staircase is a circular breakfast room, with a domed roof, while to the left a doorway gives access from the landing to the large model room. This noble hall (for it is nothing less) has the generous proportions of 45 feet width and 96 feet length, with a clear height of 26 feet to the roof, which is enriched with deeply carved beams and a cathedral-glass skylight.

This room is the pride of the club house, and justly so. It is furnished in dark oak. The elaborate carving and the dark leather upholstery, combined with the quiet tone of the color scheme, give the room a particularly rich and restful atmosphere. A continuous wall seat, broad and leather-upholstered, extends around the walls, while above this the walls are covered with what is probably the largest single collection of yacht models in the world, there being nearly five hundred in all. Above the models is a broad gallery carried on heavily carved brackets, and the

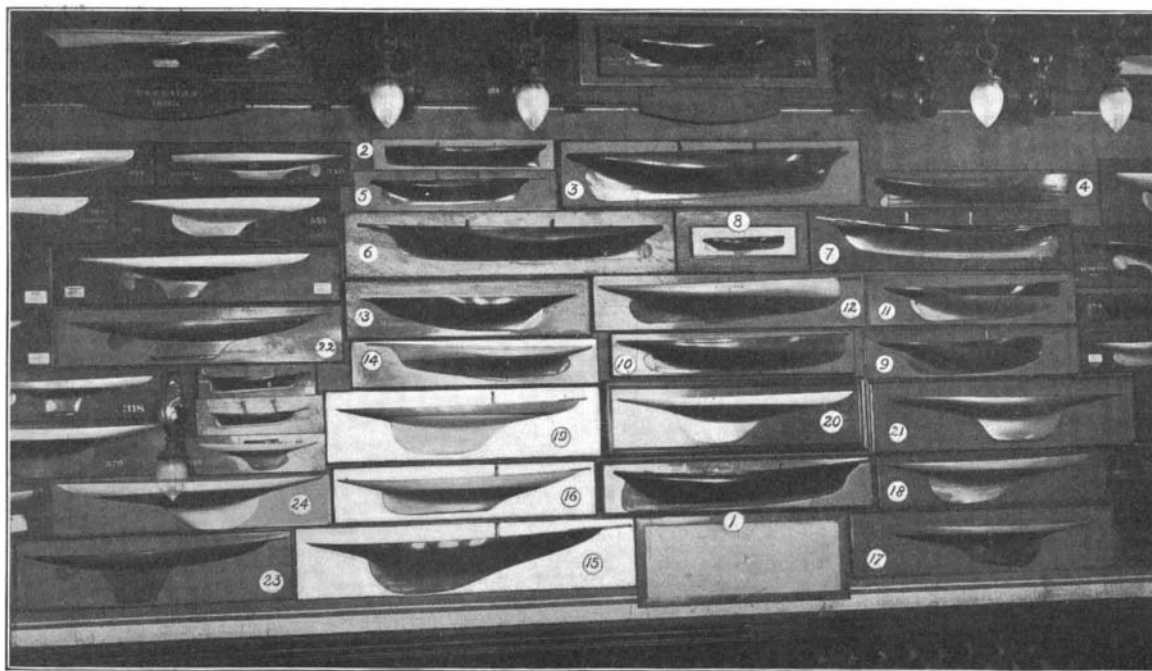
the possession of the "America" cup. When the club moved to its present quarters, the idea suggested itself of grouping the "America" cup contestants together, and placing them in chronological order, so that the yachts that competed in any particular period might be compared side by side. The result is seen in the accompanying photograph, which represents the north wall of the large model room; and it is safe to say that among the numerous histories that have been written of the "America" cup, brief and lengthy, good, poor, and indifferent, there is none that tells the story with such meaning and fidelity as does this picturesque, and, to the yachtsman, extremely fascinating group of models.

Referring to the engraving, model 1 represents the historic "America," a fore-and-aft schooner, 80 feet on the water-line, 94 feet over all, 22½ feet beam, and drawing 11½ feet. In a frame directly below the "America" model is the original drawing of the yacht's lines from which she was built, a truly classic sheet of paper. The group does not contain the model of any of her competitors. Number 2 is the model of the "Magic," which beat the "Cambria," model 3, the first English yacht to challenge for the cup, by 39 minutes and 12.7 seconds, corrected time. Another competitor among the fleet of fifteen yachts that sailed against the "Cambria" was the schooner "Madeline," model 4, which came in about fourteen minutes after the English boat. The "Cambria" was a keel schooner, 108 feet on the water-line, 21 feet in beam, and drawing 12 feet of water, and her defeat by the centerboard schooner "Magic," a much smaller craft, was an extremely creditable performance. These races took place in August, 1870,

and the owner of the "Cambria," not to be discouraged by his defeat, challenged for a race to take place the next year, and brought over the "Livonia," model 5, a keel schooner, 115 feet 2 inches on the water-line, with 23 feet 7 inches beam, and 12 feet 6 inches draft. In the first race, which took place October 16, 1871, the centerboard schooner "Columbia," model 6, was selected as being the best suited to the light-weather conditions on that day. She won from "Livonia" by 25 minutes and 28 seconds. The second race was also won by the "Columbia" in 10 minutes and 33 seconds. For the third race, as there was a strong breeze blowing, the keel-schooner "Dauntless," celebrated for her heavy-weather work, was brought to the line. Just before starting she was disabled, and the "Columbia" took her place.

After a series of mishaps the latter came home 15 minutes and 10 seconds behind the "Livonia." In the fourth race, the challenger met the celebrated keel-schooner "Sappho," model 7, 120 feet on the water-line, which beat the "Livonia" by 30 minutes and 21 seconds, and again in the last race by 25 minutes and 27 seconds. The next two challengers came from Canada. The first was a centerboard schooner, the "Countess of Dufferin," which was beaten by the "Madeline" in the first race by 10 minutes and 59 seconds, in the second race by 27 minutes and 14 seconds. The other Canadian challenger was the 64-foot centerboard sloop "Atalanta," which succumbed to the 61-foot centerboard sloop "Mischief," model 8. She was badly beaten in the first race by 28 minutes 20¼ seconds; in the second race, 38 minutes and 54 seconds.

From this time on, all the races for the cup took place between single-masted vessels. The cutter "Genesta," model 9, 81 feet on the waterline, 15 feet beam, 13 feet 6 inches draft, met defeat in 1885 at the hands of the centerboard sloop "Puritan," model 10, which was 81 feet 1½ inches on the water-line, 22 feet 7 inches beam, and 8 feet 10 inches draft, losing the first race by 16 minutes 9 seconds, and the second race by 1 minute and 38 seconds. The following year the cutter "Galatea," model 11, 87 feet on the water-line, and of the same beam and draft as "Genesta," was defeated by the "Mayflower," model 12, 85 feet 6 inches on the water-line, 23 feet 6 inches beam, and 9 feet 9 inches draft. The first race being won by 12 minutes 2 seconds, and the second race by 29 minutes 9 seconds. Then came "Thistle," model 13, of 86 feet 6 inches water-line, 20 feet 3 inches beam, and 14 feet draft, which was beaten by



1. America.	5. Livonia.	9. Genesta.	13. Thistle.	17. Valkyrie III.	21. Shamrock II.
2. Magic.	6. Columbia.	10. Puritan.	14. Volunteer.	18. Defender.	22. Jubilee.
3. Cambria.	7. Sappho.	11. Galatea.	15. Valkyrie II.	19. Shamrock I.	23. Pilgrim.
4. Madeline.	8. Mischief.	12. Mayflower.	16. Vigilant.	20. Columbia.	24. Constitution.

#### REMARKABLE GROUP OF CUP YACHT MODELS.

gallery wall is also covered with models, although there is still space left for a considerable addition in the future. A very impressive feature of the room is the massive mantel of stone which stands in the center of the west side of the room opposite the entrance. Distributed throughout the room are various glass cases containing completely-rigged models of yachts; and arranged in various convenient positions throughout the room are curios and mementoes, several of them being of the late Spanish war. Another room of which the club members are justly proud is the library, which measures 32 x 46 feet, while adjoining it is a 28 x 34 foot chart room. Both of these rooms are well lighted and extremely comfortable; in fact, the sense of comfort, which should be a *sine qua non* in every club house, is the most conspicuous impression that one carries away from this superb building. Not by any means the least interesting room is the committee room, where important matters affecting the international yacht club races are debated and determined upon. The New York Yacht Club has grown in the half century or more of its existence at an astonishing rate, particularly in the past ten or fifteen years, the total membership upon the rolls of the club being now about two thousand.

#### A GROUP OF FAMOUS YACHT MODELS.

Probably the most numerous, and certainly the most interesting, group of yacht models in the world, is that which adorns the walls of the New York Yacht Club, where not far short of five hundred models of yachts are to be found. The special interest of this collection is to be traced to the fact that a large proportion of the models are those of yachts which have been engaged in the long series of contests which have been held for