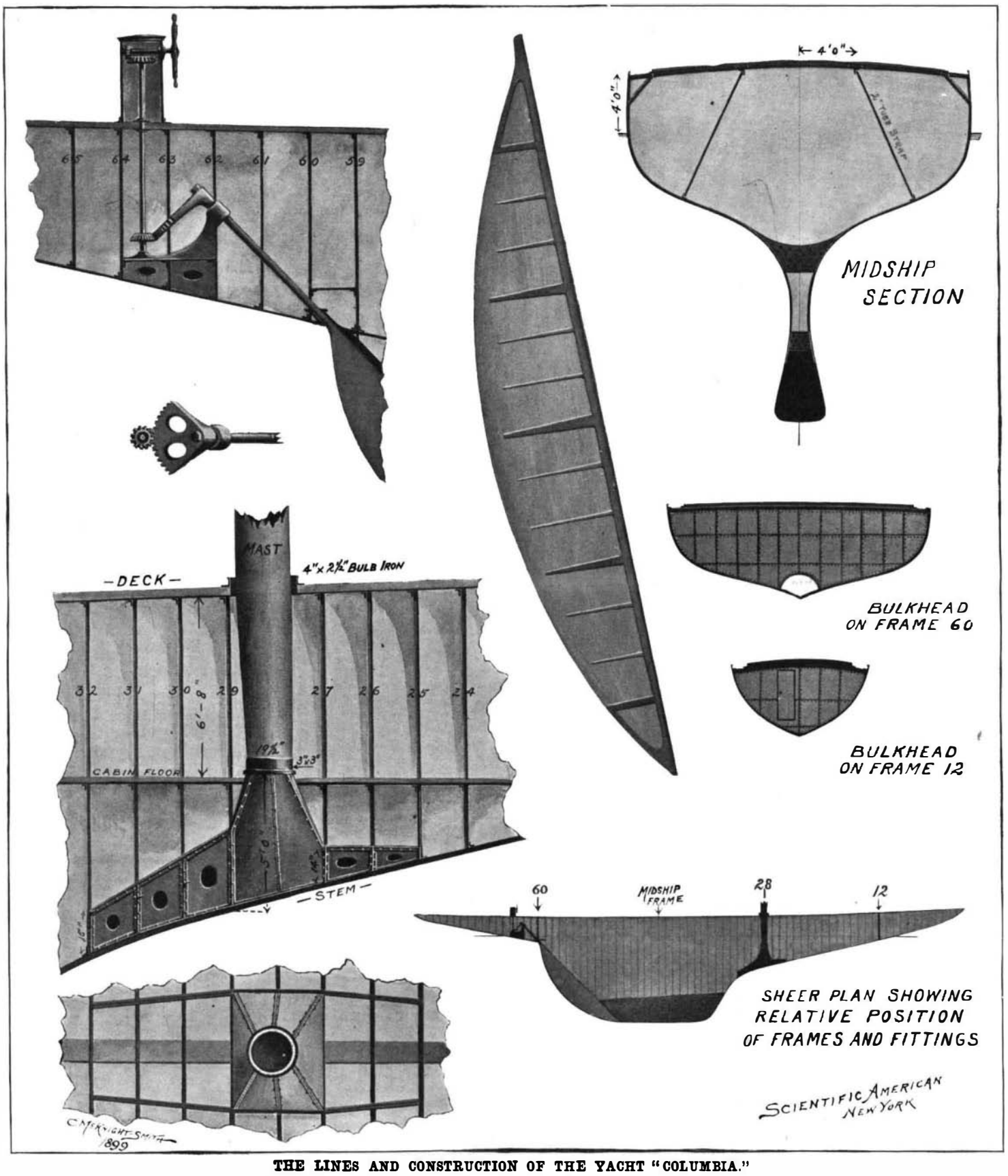
THE LINES AND CONSTRUCTION OF THE YACHT "COLUMBIA."

Designer Herreshoff has never been known to take a retrograde step. Each yacht that he has turned out in any class has been faster than its predecessors, and we have every confidence, therefore, that "Columbia" will be superior to "Defender." In an article published in the Proceedings of the United States Naval Institute, in 1897, on the subject of the yacht "Defender," Naval Constructor Hobson (now of "Merrimac" fame) says:

"The idea that gives the distinguishing feature to this advanced type is the realization of extreme sail-carrying power from a great metacentric height—initial and under inclination—realized from the disposition of weights. The great metacentric height, and consequent sail-carrying power, is derived more from the element of weight than from the elements of form. The method adopted in realizing the low position of the center of gravity is that of reduction in weight of hull and fittings, and the addition of weight to the keel—the weight being taken from the upper portions and added to the lowest point. The method of realizing a reduction of high weights is the use of light materials and light scantlings, with a light method of construction and fastenings. The reduction of frictional resistance and the liability to deterioration are sought in the use of manganese bronze for water-washed portions."

Comparing "Columbia" with "Defender," the question arises as to where she exhibits a gain in construction and form over the earlier boat. In general, it may be said that, while she derives equal sail-carrying power from the element of weight due to her light construction — in which respect, in spite of the absence of aluminum, she is probably at least equal to the "Defender"—she derives more power from the element of form than did the "Defender." She has a gain in distribution of weight, due to the fact that her lead is carried lower down, that the keel is straight and level on the bottom for its full length, and that the greatest thickness of the lead is within a few inches of its bottom, and not, as in the "Defender," two or three feet from its lowest point. This is evident from a comparison of the midship section of the "Columbia," as given above, with that of the "Defender." From the same section it will be seen that the changes in form in the new boat will give her considerably more stiffness and power. The bilge is considerably harder, that is to say, it rounds with a shorter radius, the floor is flatter, with less dead rise, and the curve where the floor rounds into the keel has a smaller radius than in the "Defender." The effect of these changes is that the center of displacement of the hull proper is raised, while at the same time, as we have just seen, the center of gravity of the lead is lower. These changes, coupled with an increase of over a foot in the beam, will evidently enable the new boat to carry a heavier press of canvas than the "Defender." At the same time, although her beam is greater, the lines of the "Columbia," because of her greater length, are finer than those of the older boat. She is from a foot to a foot and a half longer on the waterline and between 5 and 6 feet longer on deck. Her overhang, both forward and aft, is truly enormous, being about 18 feet forward and 22 feet aft as against 15 feet forward and 17½ feet aft in the "Defender." The lines are carried out in a gradual sweep that will give the boat long and easy sailing lines when she lies down under a press of canvas. The topsides amidship have a slight "tumble home" or inward inclination, but this only extends for a short distance amidship, and, as will be seen from the sections at frames 12 and 60, the sides flare out liberally on the counter and toward the bow.



THE LINES AND CONSTRUCTION OF THE YACHT "COLUMBIA."

Length on water line, 89 feet 6 inches; beam, 24 feet 2 inches; draught, 20 feet.

It will be evident from the drawings and our description that the "Columbia" is more completely of the fin-keel type than was the "Defender." The fin is narrower, the lead lower, and the body of the boat is wider and not so deep.

As regards the constructional details, the drawings which we herewith publish speak for themselves. The deck beams are of bulb angle steel rolled to a special section, above which there is a system of diagonal intersecting steel straps, forming a horizontal trussing to distribute the lateral strains of mast and stays and resist the torsional and racking strains to which the hull is subject when in a seaway or heeling to a strong breeze. Above the horizontal strapping is a two-inch deck of wood. The wood deck does not extend to the outside rail, but finishes on either side at steel deck-stringers, which form, as it were, the chords of the deck trussing. The stringer is 20 inches wide amidships, and tapers to 10 inches at the bow and stern. Along its inner edge is a 1¾×1¾ inch steel angle, and on the outer edge is riveted a steel bulb angle, 1¾×3¼ inches, the bulb flange forming the rail of the boat. About 6 feet below the deck is a very light platform deck forming the cabin floor, and a series of 2-inch tubular steel struts extends diagonally from the deck beams to the side of the vessel just above the platform deck, the struts being fastened at each end to longitudinal bulb angles which extend fore and aft beneath the deck beams and across the frames at the points indicated in the drawings. About the neighborhood of the garboard strakes, where the floor rounds into the keel, the vessel is strengthened by a series of steel plates, as shown, which extend from frame to frame throughout that part of the body of the boat which lies immediately above the lead keel.

Another of our drawings shows the method of stepping the mast, which is placed at frame 28. The mast-ring is a bulb angle steel, 2½ × 4 inches, and measures 26 inches in diameter, the mast being 21¼ inches in diameter at the level of the deck. The mast step, which is 6 feet below the deck, consists of a half-inch steel plate which is slightly disheddownward, and carries above it a steel ring forged from a 3 × 3 angle. Below the plate is another ring, 2 × 2 inches, the two rings and the plate being firmly riveted together. The step is carried by a strong box-like structure of steel plating, the bottom of which is riveted to the hull plating and to the frames. The fore and aft strains are distributed over a considerable section of the hull by means of steel keelson plates which extend forward between frames 27 and 25, and aft between frames 29 and 32. All of this work is flanged and carefully riveted and forms an extremely light, strong, and well-designed construction. The distance from the deck to the step plate is 6 feet 4½ inches and from the plate to the stem of the vessel about 5 feet. The depth of the "Columbia" at this point is therefore about 11 feet. The deck and hull in the wake of the mast are also stiffened by six 1⅛-inch round steel stanchions, three on each side, which extend diagonally from the mast step to the deck stringers which form the scuppers or waterway of the yacht.

Others of our drawings show the construction of the rudder and the novel methods which have been devised for carrying the same, together with the new form of steering gear, which was designed specially

for the "Columbia." The rudder post is about 27 feet in length over all. It enters the hull between frames 59 and 60. Here it is provided with a stuffing-box to prevent the entrance of water. The rudder consists of bronze plates riveted upon a frame, as shown in the enlarged drawing, and it is 4 inches thick at the post and tapers to between 1 and 2 inches in thickness on the outer edge. To the top of the rudder post is attached a steering quadrant, of the form shown in the small drawing of the same. It extends to the rear and downwardly and engages a bevel wheel carried at the bottom of a vertical shaft which rises through the deck, and carries at its upper end another bevel wheel, which is itself in engagement with a bevel wheel on the shaft of the steering wheel. Immediately below the quadrant the rudder-post passes through a heavy casting which is bolted to a plate steel foundation and serves as a top bearing for the post and at the same time carries practically the whole weight of the rudder, which is kept in place by the usual pintles and gudgeons. At frames 20 and 60 are watertight bulkheads of light plating.

Will "Columbia" win? We can only say that she is a logical development and an unquestioned improvement on "Defender," and "Defender" is a few minutes faster than the fastest boat that has ever come for the "America" cup.

SEA LION ROOKERIES OF SOUTHERN CALIFORNIA.

BY C. F. HOLDER.

The fact that the authorities of San Francisco, in answer to an appeal from the fishermen, have begun a warfare against the sea lions of the vicinity, calls attention to the few remaining and very interesting rookeries in Southern California. A half century or so ago sea elephants lived in large herds on Santa Catalina Island, but they were utterly and completely wiped out of existence by the sea elephant hunters, who waged continual war upon them. The same influence has been directed against the sea lion, which is soon destined, if not protected, to disappear from the Pacific coast of North America.

One of the most interesting herds found in Southern California is on Santa Catalina Island. The rookery is on the extreme southeastern end, where a small group of rocks rise above high water and are connected to the mainland at low water. Here the sea lions make their headquarters and live unmolested, being protected by local rules. They number perhaps one hundred, and are controlled or dominated by two or three large bulls. The accompanying graphic photograph shows about one-half the herd on the beach in the month of May, when they leave the rocks and take to the beach near at hand, where the young are born. The herd is shown menacing a boat which is floating off the shore, the photographer being in the near foreground.

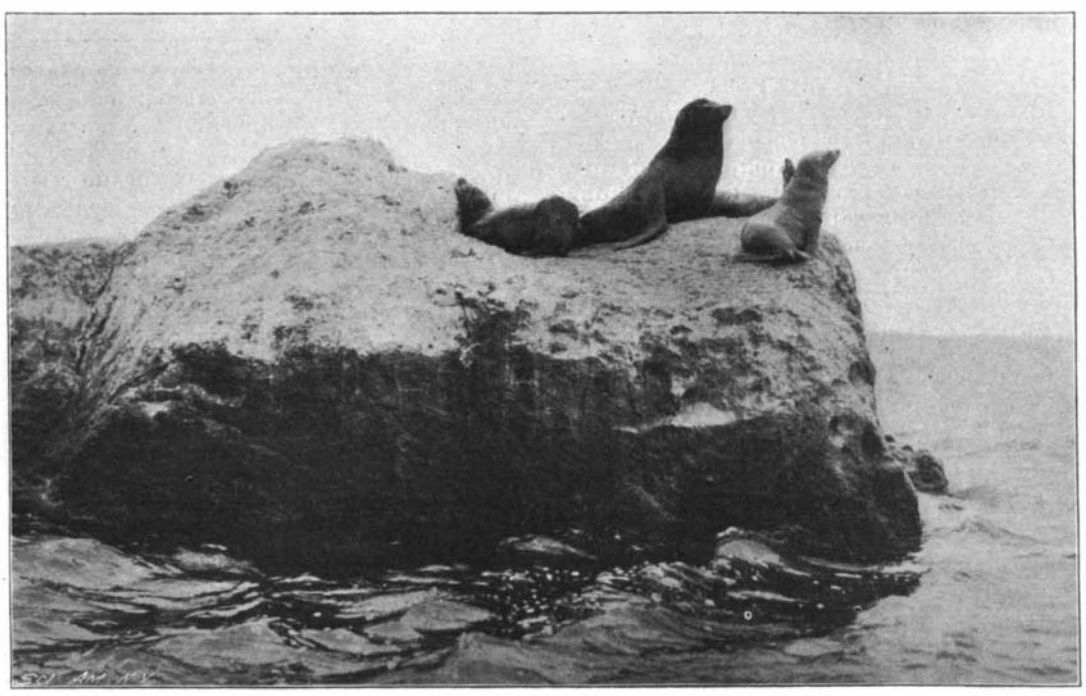
Their actions are very interesting, and at this time they make vigorous protests when a fishing boat approaches; yet they are so tame that they allow visitors to row within fifteen or twenty feet of them and appear to be perfectly indifferent. Santa Catalina is nearly sixty miles around and offers many inducements for seals and sea lions at various points; but for some reason they have selected this spot that is by no means smooth, though it can be called a lee, and is open to the fierce southeast gales of winter; in the summer and most of the year the rookery is protected.

HERD OF SEA LIONS ON SANTA CATALINA ISLAND.

In view of the complaint of the fishermen of San Francisco that the sea lions were devastating their grounds, some inquiries were made at the island mentioned; but while it was acknowledged that the one hundred or more sea lions consumed large quantities of fish, except in certain instances to be referred to, the animals were not considered a nuisance. I believe, however, that the sea lions devour a vast amount of fish and that the fishermen do not appreciate or feel it, as this island is remarkably rich in its supply of fishes. The sea lions bask on the rocks nearly all day, and at about four o'clock start out, singly or in groups, on a feeding trip upshore. The young sea lions, the yearlings and two-year-olds go in bands, and often make their trip apparently for pleasure. They enter Avalon Bay like porpoises, swimming at the top of their speed, bounding out of the water in twos and threes and more, making the circuit of the bay in a few moments. After dark, generally from nine to ten or later, the large sea lions enter the bay to feed. They are scavengers in a sense, feeding on any dead fish that may have been washed offshore or thrown away by the fishermen. At this time they make the little rock-bound bay reverberate with their barking. Bringing the fish from the bottom, they rise to the surface and, with violent swings from side to side, endeavor to tear it into pieces, in which they ultimately succeed. The old males are rarely if ever seen feeding in the daytime.

The actions of the large sea lions in feeding here are most interesting, and their speed under water is marvelous. The writer once took as a point of observation a high cliff from which every object on the bottom could be distinctly seen. At one time a single sea lion had surrounded a school of sardines, so terrifying them that they formed a dark ball about six or seven feet around, into which the seal constantly plunged, taking the small fry by the mouthful. The school was so completely terrified that they did not move twenty feet in an hour remaining in the same general position.

So tame are certain sea lions that they sometimes haunt the wharf at Avalon. Standing upright at the bottom, with their tails resting upon it, they watch every movement of the angler, deftly removing his bait when thrown over. At other times they have been known to follow the boat and drive all the fish away which the fisherman by patient chumming had gathered about him. A Venetian fisherman at this island informed the writer that a sea lion often accompanied him to his gill-nets, and every few moments descended to investigate, and literally took the fish from the nets as fast as they entered, rising to the surface and tossing them into the air in seeming derision and outraging every sense of propriety. Yet these fishermen have never made a formal complaint against the seals and sea lions. The reason is doubtless that the sea lion rookery is an attraction to tourists, and nearly all the fishermen are interested in transporting them to the seal rocks; hence what they may lose by the depredations of the animals they gain again in exhibiting the rookery as a curiosity, charging twenty-five cents for the trip. Yet in the opinion of the writer it might be well to restrict the growth of the herd by removing some of the males to other localities. Each seal eats not less than ten rock bass or white fish per day, which at a minimum means the destruction of four or five thousand fish from this region daily. Curiously, the best fishing ground about the island is within two hundred feet of the rookery.



SEA LIONS BASKING.

On San Clemente Island, twenty miles distant, there are two or three good sized rookeries where the animals are comparatively unmolested and where the schools of fish are so plentiful that the ravages of the sea lions are not felt. The writer after much difficulty visited the sea lion rookery on the island of San Nicolas, eighty miles northwest of Santa Catalina. It lies on the leeward side of the island and was at first in very much the same situation as that of Santa Catalina. Here there were a large number of sea lions, but the single lone herder of the island was doing his best to drive them away, and had partly succeeded by shooting into them with bird shot. His hut was near at hand, and the roaring and barking of the animals, according to his statement, made sleep almost impossible; he also said that the animals were dangerous and would attack any one infringing on their domain.

On the island of Santa Cruz, one hundred miles north of Santa Catalina, three distinct rookeries were visited by the writer, one only being large. On Anacapa Island there is a small rookery, and a large one and several small ones on Santa Rosa. In all, there are probably at least one thousand sea lions and seals on the Southern Californian islands, devouring five thousand pounds of fish per day—a large amount, yet hardly appreciable when the vast food supply is taken into consideration, and it will be some time before the sea lions will have to be destroyed to protect the fisheries.

American Exhibits at Paris.

Space is now being actively assigned to American exhibitors. At present the allotments are tentative, and as soon as possible the permanent allotments will be made and the exhibitors will be notified of how much space they will have and where it will be. While no State buildings will be permitted, any State in the Union that contributes a certain amount to the general fund will have a special room assigned to it in the national building.

Several American attractions are planned. One is to be a gold column of the value of $1,000,000; another will be an American trolley line, and the third will be a pier landing, where Americans will take steamers carrying the American flag for the Vincennes woods.