

THE GROWTH OF OUR NAVY SINCE THE WAR.

Apart from its attraction as a brilliant naval spectacle, the review of the Atlantic fleet by President Roosevelt at Oyster Bay was essentially a demonstration of the fact that our modern navy (at least as regards its most powerful fighting elements) has been built up during the years which have intervened since the late Spanish war. Proof of this is found in the fact that among the forty-five ships that were drawn up in those four great parallel lines, each over one mile in length, there were only five vessels that were prepared for hostilities at the opening of the war in 1898, and these, moreover, are among the least effective ships in the several classes to which they belong. Among the battleships that had received their baptism of fire were the "Indiana" and "Iowa"; among the monitors the "Puritan"; among the protected cruisers the "Minneapolis"; while the torpedo boat "Rogers" was the only vessel among the destroyers and torpedo boats that was in commission at the commencement of the war. Judged on the basis of modern requirements, and bearing in mind the vast improvement in guns, armor, and speed in our later ships, it is not stretching the point to say that ninety per cent of the effective fighting efficiency of the ships at Oyster Bay is to be credited to our naval development during the last eight years. In proof of this, we have only to state that if the 16,000-ton "Louisiana" were to engage the "Indiana" and "Iowa," it would be merely a question of time before the two older ships were crippled or sent to the bottom; for with her superior speed the "Louisiana" could place herself at a range at which her own guns were fully effective, but at which the low-velocity guns of the older ships would have difficulty in reaching the mark, or in striking a vital blow should they send a shot home.

The fighting power of the fleet is unquestioned; for its twelve battleships and four armored cruisers would be a fair match for the combined forces of Japan and Russia at the battle of the Sea of Japan, which included eleven battleships and eight armored cruisers of modern construction.

The present article, in conjunction with that published in our issue of September 1, enables us to present a summary of the present available fighting forces of the United States navy; for having shown in the earlier article the salient features of the ships assembled at Oyster Bay, we will now enumerate the other and larger portion of our fleet which, by virtue of its being absent in Pacific waters, or on other stations, was not available for the review.

Commencing, then, with the battleships, we find that in addition to the twelve at Oyster Bay, there are eight other battleships, most of them of recent completion, which are either in commission or about to go into commission, and that we have now under construction eight

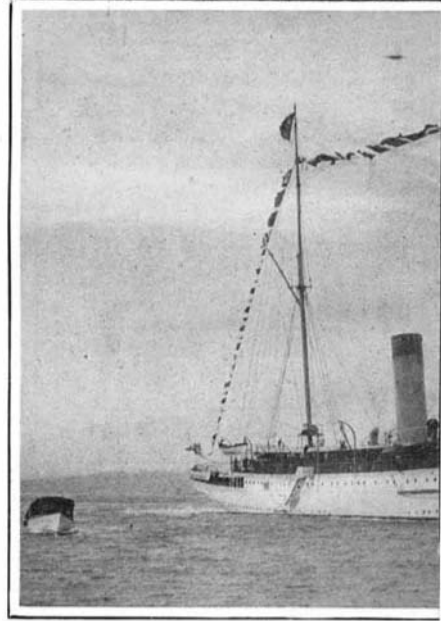
"Mississippi," of 13,000 tons, which are smaller editions of the "Louisiana," carrying the same battery of 12-inch and 8-inch guns, and mounting eight in place of twelve 7-inch guns, but designed for about one knot less speed, or 17 in place of 18 knots an hour. Of the same type as the "Louisiana" are the "Kansas," the "Vermont," the "New Hampshire," and the "Minnesota," all equaling the "Louisiana" in speed and armament, but including several minor improvements in the armor and the internal arrangements. Finally, we have the recently-authorized battleships "South Carolina" and "Michigan," of 16,000 tons and 18½ knots speed, whose main armament will consist entirely of 12-inch guns, of which eight will be carried.

Summing up, we find that the United States navy includes, in addition to the twelve battleships that were present at the review, seven completed first-class battleships, and eight that are under construction, making a total of twenty-seven, as compared with a total of only six battleships built or under construction at the opening of the Spanish war. To these must be added the second-class battleship "Texas," which figured in the war. This gives a total of twenty-eight battleships of all classes.

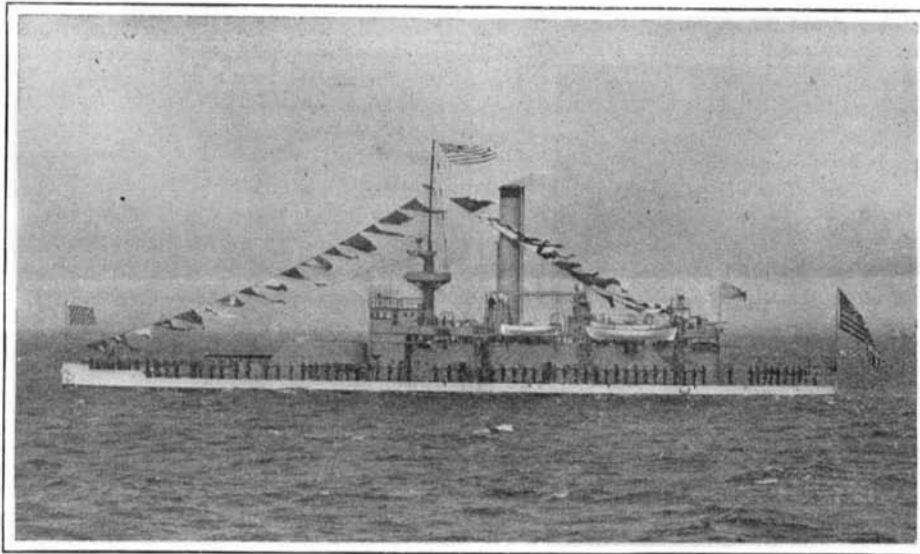
In addition to the four new armored cruisers present at the review, our navy includes the "California" and "South Dakota," of 13,680 tons, which belong to the same class, and the older armored cruisers "Brooklyn" and "New York," the former of 9,215 tons, and the latter of 8,200 tons displacement. We have also under construction the "Tennessee," "Washington," "Montana," and "North Carolina," which are improved vessels of the "California" class, being of 1,000 tons greater displacement and mounting four 10-inch breech-loading rifles in place of four 8-inch, and also carrying an additional pair of 6-inch guns in the secondary battery. In the armored-cruiser class the advance since the war has been very satisfactory, for out of these ten powerful vessels, only the two smallest and least powerful were in commission in 1898; none of the other eight having

"Wyoming," "Amphitrite," "Miantonomoh," "Monadnock," "Monterey," and "Terror." These, with the exception of the "Monterey," are old vessels; and the services of the whole class would have to be confined strictly to harbor defense. Adding these six to the four at the review, we have a total of ten monitors on the effective list to-day.

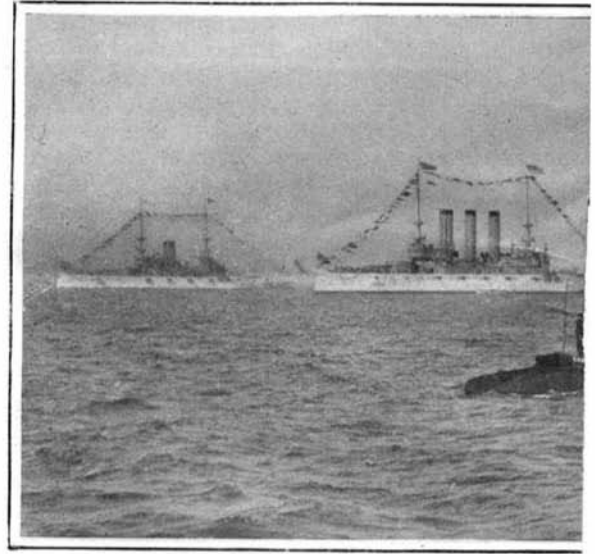
In the protected cruiser class, in addition to the "Minneapolis" (which was present at the review), we have the sister ship "Columbia," of 7,350 tons and 22.8 knots trial speed; while in the "Tacoma" class of protected cruisers the navy includes the three vessels "Chatanooga," "Des Moines," and "Galveston," of 3,200 tons. The most modern of the protected cruisers not present at the review are the "Charleston," "Milwaukee," and "St. Louis," three new vessels of 9,700 tons displacement and 22 knots contract speed, each carrying as a main armament fourteen 6-inch rapid-fire guns. Outside of the ves-



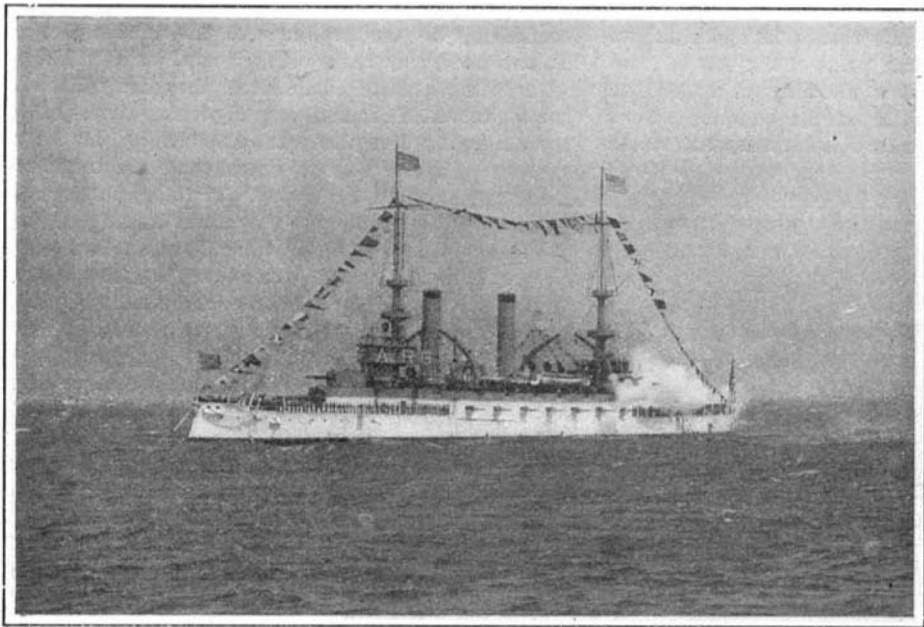
Yacht "Mayflower," From Which



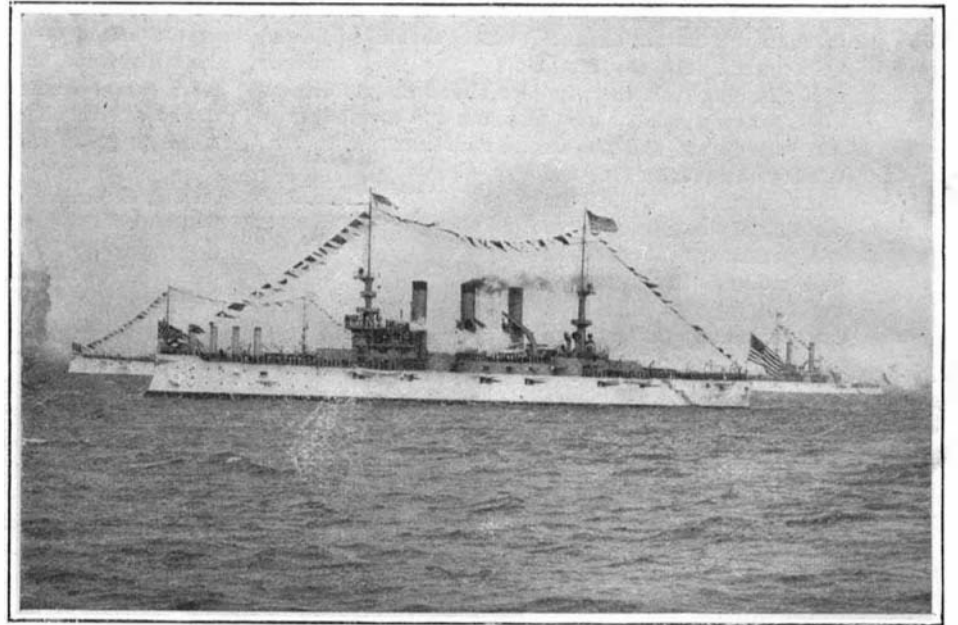
Monitor "Florida."
3,225 Tons; 12.4 Knots.



Battleship "Alabama." Flagship "Maine."
11,552 Tons; 17 Knots. 12,500 Tons; 18 Knots
Submarine



Battleship "Kearsarge." 11,520 Tons; 16.8 Knots.



Battleship "Louisiana." 16,000 Tons; 18.8 Knots.

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WARSHIPS SALUTING AT THE OYSTER BAY REVIEW AS THE PRE

other battleships, either of the general type of the 16,000-ton "Louisiana" or improvements upon her. Among the vessels that are completed are the "Connecticut," of 16,000 tons, a sister ship to the "Louisiana"; the "Georgia" and the "Nebraska," of 14,948 tons, belonging to the same class as the "Rhode Island"; the "Ohio," of the "Maine" class, 12,500 tons; the "Wisconsin," of 11,653 tons, sister to the "Alabama"; and the "Oregon" and "Massachusetts," of 10,500 tons, of the same class as the "Indiana." Among the battleships under construction are the "Idaho" and

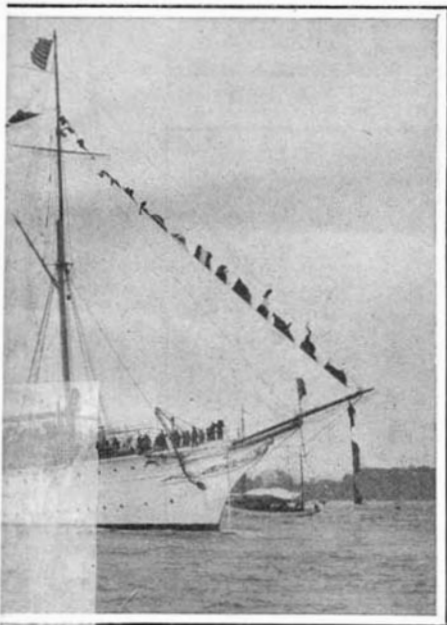
been authorized until some years later. Our armored cruisers, and particularly the latest four, carrying 10-inch guns, are among the most satisfactory ships that have been designed by our Bureau of Construction, and their similarity in armament, speed, and protection gives us a fleet of eight of these vessels, which is even more complete and effective than the eight armored cruisers of the Japanese which did such good service in the late war.

In the division of monitors the navy contains, in addition to the four which figured at the naval review, six others, the

sels above named, there are twelve other protected cruiser of varying age and efficiency, many of which have been rebuilt and rearmed; they will be useful for the many duties which lie outside of that of joining issue in a general line engagement. In this class we have altogether twenty-three ships, varying in size from the 9,700-ton "Charleston" down to the 3,000-ton "Atlanta" and "Boston."

In the unprotected cruiser class, we have three vessels the "Detroit," "Marblehead," and "Montgomery," of about 2,100 tons and 18½ knots speed, and allied to these ar

three scouts, the "Chester," "Birmingham," and "Salem," of 3,750 tons and 24 knots speed. The gunboat class includes sixteen vessels ranging from the 2,300-ton "Topeka" down to the 839-ton "Bancroft;" and following these in their order of value are eight unarmored composite vessels, in which are included such gunboats as the "Annapolis" and "Princeton;" four training ships; and a class of twenty-one small unarmored gunboats of 500 tons or under, which is largely made up of vessels acquired in the Philippines at the close of the Spanish war.



the President Reviewed the Fleet.

In addition to the six torpedo-boat destroyers and six torpedo boats present at the review, the navy includes ten other destroyers of similar design, and also thirty additional torpedo boats. In the class of submarine boats are eight vessels, two of which, the "Shark" and the "Porpoise," were present at Oyster Bay. At the end of the naval list come twenty-two converted yachts; four

cause of our strength in battleships and armored cruisers of the latest type, and the fine shooting of our men at target practice, we are entitled surely to be bracketed as second with the navy of France, even though numerically we are behind her.

Our illustrations taken during the review show the various ships in the act of saluting the President as he steamed slowly up and down the lines in the yacht "Mayflower." Each vessel saluted with 21 guns, the 6-pounders being used for this duty.

Armor and Its Attack.

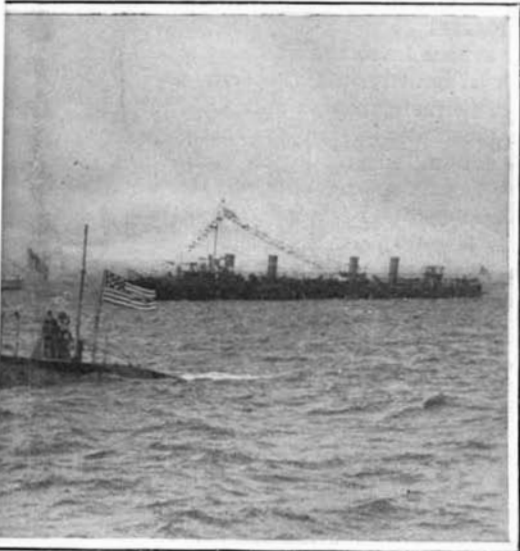
Brevet Major W. E. Edwards, R.A., read a paper before the Engineering Section of the British Association on "Armor and its Attack." He said that the history of armor, as applied either to ships or to forts, went back to a comparatively recent date only. In 1805 Gen. Sir William Congreve put forward designs of a floating mortar battery. Nothing appeared to have come of the proposal, and it was not until 1853 that the absolute necessity of armor as a protection against shell fire was fully realized, and early in 1854 floating batteries were put in hand in the United States, France, and England. Throughout the American civil war of 1861 to 1865 the value of armor was constantly demonstrated, and since then instances could be multiplied, but it was sufficient to say that all reliable evidence, including that afforded by the recent Russo-Japanese war, went to show that armor did not behave in the erratic manner which was sometimes stated. There had been disputes as to the best material for armor and as to the best disposition for the latter in a ship with a view to giving the maximum of protection for the weight at the constructor's disposal, but the value of armor, *per se*, had seldom, if ever, been seriously questioned. The introduction of armor was, of course, met by an increasing power of the gun and the quality and shape of the projectile. This was replied to by thickening and improving the quality of the

conclusion he said that the tendency throughout the world was to mount nothing but the heaviest natures of ordnance upon battleships, and unless plates could be made harder and tougher throughout their mass—as at present appeared possible—it would seem inevitable that the needed protection must be given by using thicker plates, and eventually, perhaps, as the power of ordnance increased, they might go back to the 14 inches, or even thicker, armor of fifteen or twenty years ago. As there must be a limit to the size and displacement possible in a warship, this increase in thickness must entail a corresponding reduction in the area of the heavily armored portions. On the other hand, the existence of quick-firing guns and high explosive shells would always entail the retention of a large amount of thin armor, so that just as the modern battleship now carried but two classes of guns—a main armament of the heaviest that could be conveniently worked together with the smallest quick-firing guns capable of stopping a torpedo-boat destroyer outside torpedo range—the armor would be of two thicknesses only—that capable of stopping heavy armor-piercing shell at medium ranges, and that able to keep out high explosive common shell of 6 inches, or less, caliber.

Death of Prof. Brouardel.

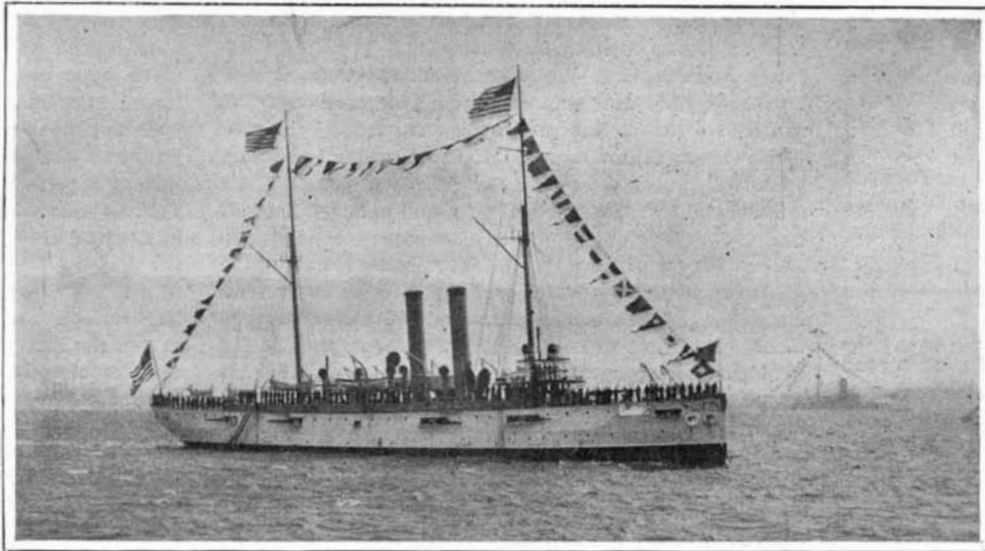
Through the death of Prof. Paul Brouardel, of Paris, on July 23, the world of science has lost a most valuable member. Prof. Brouardel died at the age of sixty-nine, and in his lifetime had held a large number of most important positions in the University of Paris and in the official life of France. He was widely known in English-speaking countries, as well as in France, for his work in connection with legal medicine and hygiene. He was born at St. Quentin, in 1837, and received his early education at the Lycée St. Louis, Paris. He took his M.D. degree in 1865, and after practising at various hospitals became professor in the faculty of medicine in 1879, and two years later a member of the Académie de Medecine. In 1890 Prof. Brouardel became a member of the Académie des Sciences. For many years he was dean of the faculty of medicine at Paris, his work in connection with the medical faculty being chiefly concerned with pathology and legal medicine. Prof. Brouardel occupied a most distinguished position as a medical jurist and delivered a large number of lectures covering many phases of this subject. He published many volumes upon legal medicine in connection with his work as professor at the University of Paris.

Persons called upon to handle paper in the form of sheets, or to turn over the pages of books rapidly, experience considerable difficulty, owing to the fact that the finger tips, soon becoming dry, refuse to readily perform their function in the separation of the sheets. The work is neces-

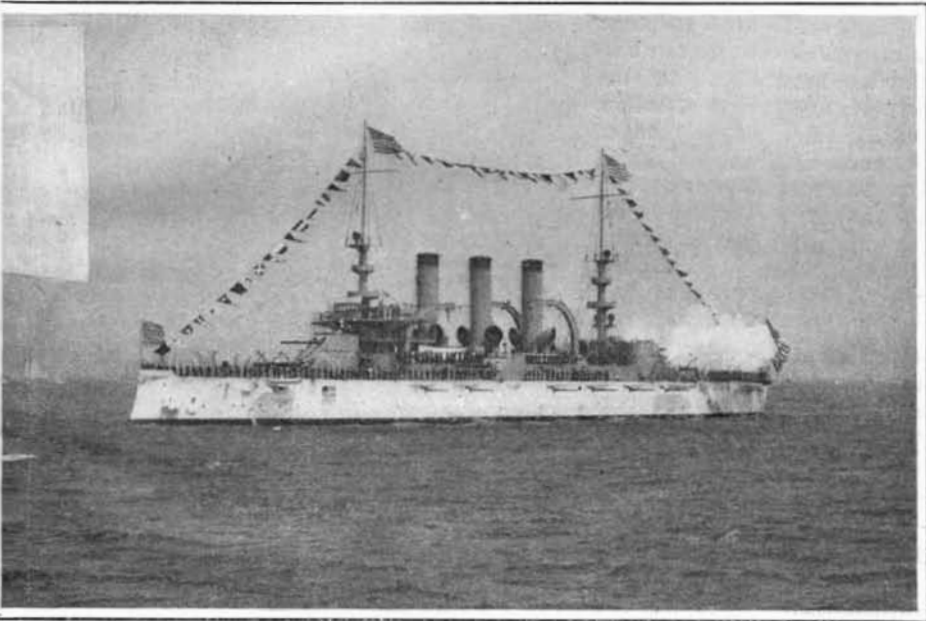


Destroyer "Whipple." 433 Tons; 28.2 Knots.

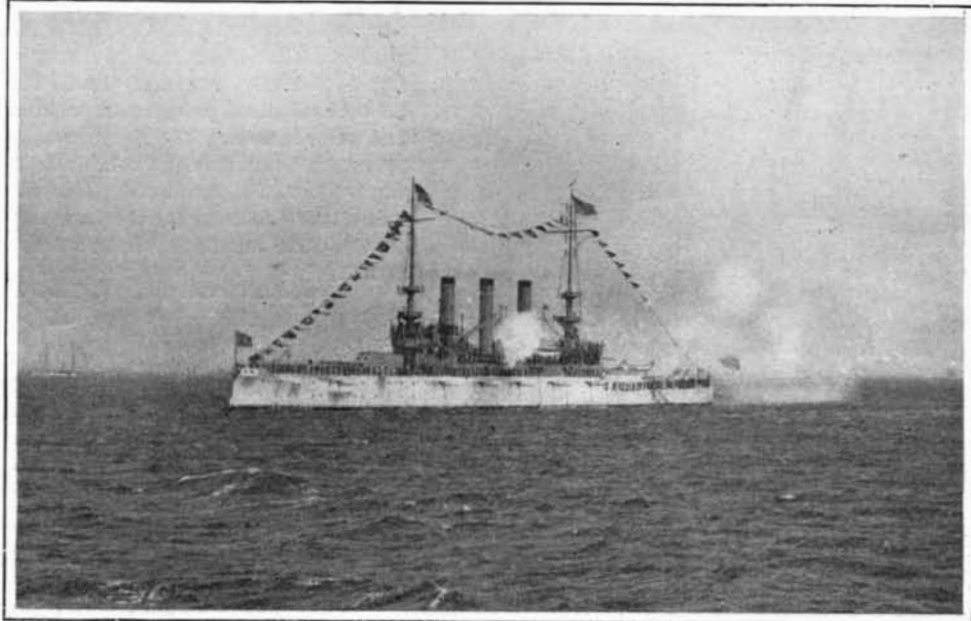
3. e "Shark."



Protected Cruiser "Tacoma." 3,200 Tons; 16.6 Knots.



Battleship "Rhode Island." 14,948 Tons; 19.5 Knots.



Battleship "Missouri." 12,500 Tons; 18.2 Knots.

IDENT STEAMED DOWN THE LINES IN THE YACHT "MAYFLOWER."

auxiliary cruisers of the type of the "Yankee;" eighteen colliers, of which three were present; while the provision ship and water ship were the representatives of fourteen vessels of the class of hospital and supply ships which figure on the naval list.

After all, the true measure of our naval development is our standing relatively to the other leading naval powers; and here we find that whereas, during the Spanish war, we stood fifth or sixth on the list, at the present time our navy is a good third. Indeed, in fighting efficiency, be-

armor, so that in the twenty years between 1858 and 1878 the thickness of the armor increased from 4½ inches to 24 inches. In 1867 wrought iron armor was supplanted by steel and compound plates. Steel was harder, but more brittle than iron, while the compound plate had the advantage of combining a hard steel face to break up the attacking projectile with a tough wrought iron back to hold the plate together. The speaker then proceeded to deal in detail with the various hardening processes, and he went exhaustively into the piercing properties of projectiles. In

sarily slow and tedious, and for this reason it is not always desirable to resort to the use of water from a sponge, as the delicate surface is marked in this manner, and at the same time there are some other inconveniences attached to the use of the sponge. A rubber finger pad has been recently placed on the market for this purpose, and is said to fulfill its mission perfectly. It enables the wearer to turn over the leaves rapidly and certainly, and much precious time is saved. Moistening one's finger by touching the tongue is unclean and exceedingly dangerous.