

ENGLISH ENGINEER'S ANALYSIS OF SQUADRONS OF SPAIN AND UNITED STATES.

The London Engineer is responsible for the comparison between the Spanish and United States navies published herewith.

"As the effective components of the two squadrons now facing one another in West Indian waters are considerably modified by the completion and purchase of additional vessels, their relative forces have been correspondingly changed since we last described them. The accompanying diagrams denote precisely the existing condition of the two groups of battleships, armored cruisers, and protected vessels which are of recent type, it being assumed that they—and not the older ships—will occupy the van of the fighting line in the event of war being declared. The diagrams, therefore, are illustrative of these types alone, and are framed upon the displacement, indicated horse power, weight of metal thrown, energy of fire, extent of armament, and relative speeds of twenty-five vessels, sixteen of them being Spanish and nine from the United States. America has other ships available, but so has Spain, and a more useful comparison can be drawn by adhering to the more important ships.

The totals of displacement, indicated horse power, extent of armament, combined weight and energy of projectiles thrown in one minute's fire, together with the average speeds of the vessels contained in the two respective fleets, are shown comparatively on the dia-

rather exceeds that of the ships of Spain; also that the guns are more in number. Here, however, any fancied superiority in the average qualities of the vessels composing the two groups ends. We have carefully analyzed the conditions as regards efficiency of fire, and separated the various types of quick-firing guns from those of ordinary character which happen to have the same caliber. The result of investigation, however, proves that, though the number of separate pieces of ordnance carried in the Spanish ships is less than that contained in the American squadron, the weight of metal thrown and the fire energy developed is far greater; the weight of projectiles fired usefully in one minute being 40,811 lb., or practically 20 tons, against only 37,808 lb.; while the fire energy is 1,529,516 foot-tons, against only 1,120,323 foot-tons as capable of being delivered by the ships of the United States. These are significant facts. The main factor in the product of gun power on the Spanish vessels is the output of energy created by the 47 quick-firing guns of 5.5-inch caliber; just as in our own squadron in Chinese waters, the chief element of gun power is derived from the 6-inch-quick-firing gun.

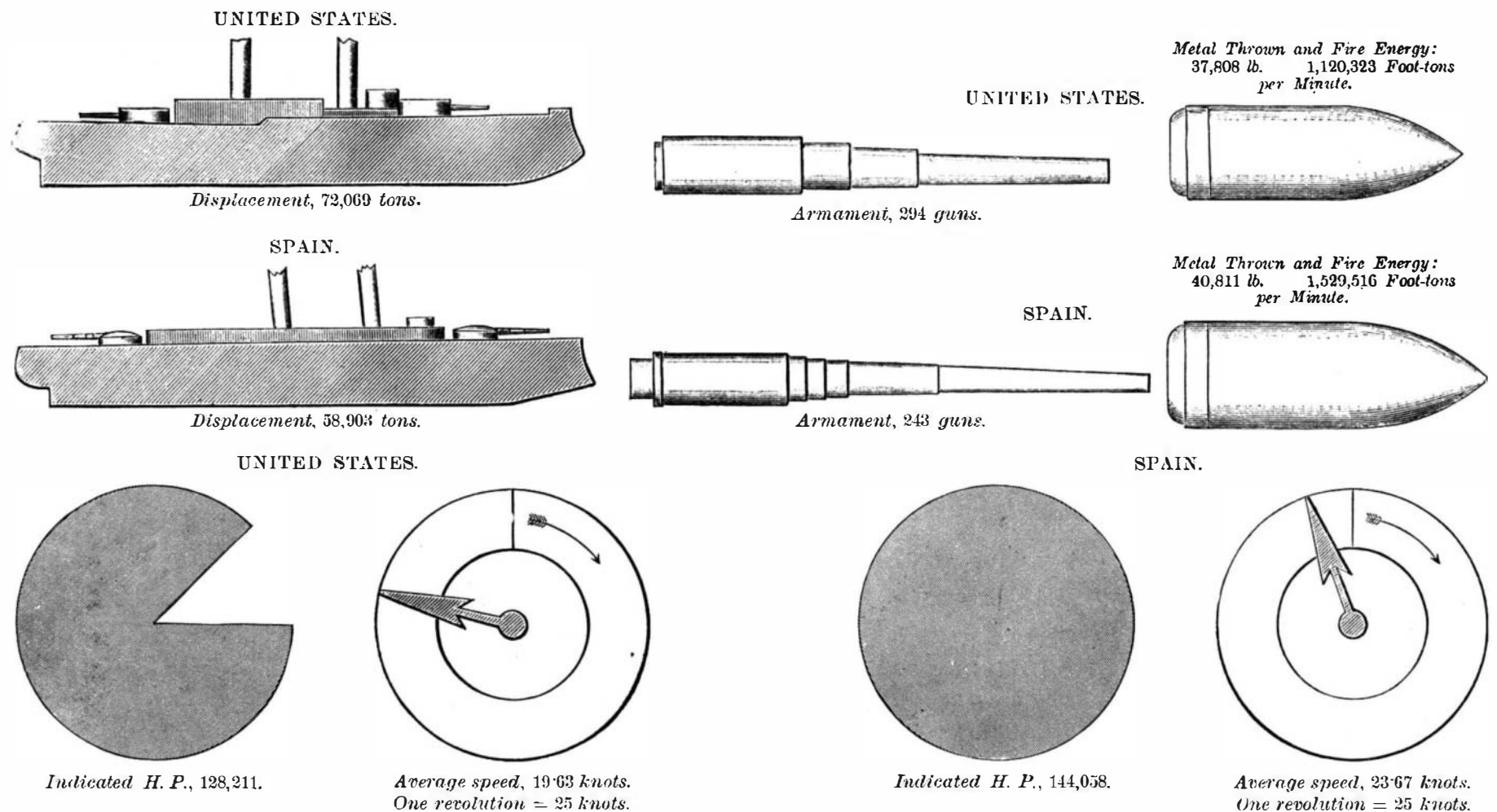
We ourselves, when visiting an important United States cruiser, took the opportunity of pointing out to the gunnery officer the unwisdom of mounting the old-fashioned 6-inch ordinary breech-loading gun in a brand new up-to-date ship of 22 knots speed. It is a fact, nevertheless, that out of thirty 6-inch guns car-

Cuba and Porto Rico run out, she must depend upon colliers which can run into and from blockaded ports; and the United States armed mercantile cruisers should be able to render this a very perilous little game.

A great deal, too, depends upon the man behind the gun. The 3,000 Swedish sailors who are to form part of the complement of the United States vessels might be excellent material if fighting in defense of their own hearths and homes; but naval warfare of the present day is no pastime—it is a grim and ghastly reality, swiftly executed, and no hirelings of an alien state are likely to come well out of such a terrible ordeal. In point of fact, we do not believe that the Yankees thoroughly understand the spirit of mischief that they seem so determined to evoke."

ANALYSIS OF SPANISH AND UNITED STATES SQUADRONS—A REPLY.

We feel compelled to criticize an article which appeared in The Engineer of April 15, and is reproduced on this page, on the subject of the American and Spanish navies. The writer attempts to prove that the Spanish fleets in the Atlantic have a positive advantage over those of this country in every point of comparison save two. He professes to select from each navy the ships which would be available in West Indian waters to "occupy the van of the fighting line." Of these he finds sixteen in the Spanish navy and



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gram; so they need not be repeated in the text. But these totals are most instructive. It will be observed that the displacement of the United States vessels

United States.	Knots.	Displacement.	I.H.P.	Guns.
Indiana ...	15.5	10,288	9,738	42
Massachusetts ...	16.2	11,410	10,403	44
Iowa ...	16.1	9,250	11,000	36
Brooklyn ...	21.9	8,200	18,769	30
New York ...	21	7,475	17,401	27
Columbia ...	22.8	7,475	21,500	27
Minneapolis ...	23	7,475	21,500	27
San Francisco ...	20.2	4,083	10,400	22
New Orleans ...	20	3,600	7,500	24

The United States vessels are arranged in three groups: Battleships, armored cruisers and protected cruisers.

Spain.	Knots.	Displacement.	I.H.P.	Guns.
A. Oquendo ...	20	7000	13,000	28
I. Maria Teresa ...	20.25	7000	13,758	28
Vizcaya ...	21	7000	13,000	26
Cristobal Colon ...	20	6840	14,000	38
Emp. Carlos V. ...	20	9235	18,500	20
Pelayo ...	16	9900	8,000	19
Alfonso XIII. ...	20	5000	11,000	22
Lepanto ...	20	4826	12,000	20
Audaz ...	30	400	8,000	6
Furor ...	28	300	6,000	6
Osado ...	30	400	8,000	6
Pluton ...	30	400	8,000	6
Terror ...	28	300	6,000	6
Ariete ...	26.1	97	1,600	4
Azor ...	24	108	1,600	4
Rayo ...	25.5	97	1,600	4

Spanish vessels in four groups: Armored and protected cruisers, destroyers and torpedo boats.

ried in the United States ships now under consideration, only six are quick-firing. There is an important difference, too, as regards speed and handiness in favor of the Spanish vessels, the average rate of her ships being 23.67 knots per hour, against an average of 19.63 as ruling in those of the United States. This degradation in the average is due to the comparatively slow steaming of the three battleships. It is difficult to see where the usefulness of these heavily armed floating citadels comes in except to capture and sink the "Pelayo." The main factors of projectile weight and fire energy which the American squadron possesses are due to the slow-firing 13-inch and 8-inch guns of these battleships. Yet there is small chance of their ever catching a glimpse of the swift, handy armored cruisers of the "Vizcaya" type, and still less chance of getting an effective shot at them. Were these weapons the rapid-firing 8-inch guns recently perfected by the Elswick firm, and which—we are delighted to say—are to be mounted in our cruisers of the "Diadem" type, it would be quite another story. But they are not, and we fear that the United States may find that their obstinate determination to arm their new vessels with guns which are the creation of their own genius has landed them in a dilemma at this juncture. Spain has wisely copied and purchased some of the best guns of all nations, including the productions of Krupp and Schneider-Canet, and she is, relatively, in a better position now as regards the armament of her recent vessels than the United States.

The great difficulty for Spain will, of course, be centered in the fact that she fights from a base more than 3,000 miles away. When the coal supplies in

only nine in that of the United States, and working on this basis he figures out that Spain could silence our fleets by superior gun-fire and outmaneuver them by superior speed.

By way of showing the unfairness of the comparison in detail, as well as in its comparison of totals, we have drawn up the tables on the next page basing our selection of American ships upon the principle laid down by our contemporary, viz., that the ships must be up to date and capable of operating in our first line of defense. It will be seen at a glance that the whole comparison is mischievous and misleading.

In the first place, the United States is credited with nine instead of twenty-seven ships, or just one-third of the ships that are actually engaged in or available for the West Indian waters. Two of the ships omitted are battleships, one the "Oregon," of over 10,000 tons displacement and about 17 knots speed, carrying a heavier armor-piercing armament than any ship in the world to day; the other the "Texas," of nearly 18 knots speed, and armed with 12-inch guns, a ship presenting the most stable gun platform of any vessel in our navy.

Even after excluding eighteen out of the twenty-seven ships which on The Engineer's basis of calculation should have been enumerated, our contemporary finds that the United States ships have the larger total displacement, 72,069 tons against 58,903 tons; but the writer proceeds to discount this superiority by proving that our fleet is relatively cumbersome and slow. This he does by throwing in the speed of the eight Spanish torpedo boats in striking an average speed for the whole fleet, by which maneuver he reaches an average speed of 23.67 knots for the Spanish fighting line.