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THE WEAK POINT IN OUR NAVY.

There is much food for thought on the part of our Board of Naval Strategy as it watches the game of hide and seek which is being played between Admiral Sampson's powerful, slow-moving battleships and the elusive fleet of armored cruisers under Admiral Cervera. The fleet that crept slowly along the northern coasts of Cuba and Hayti, its speed restricted by an inexorable law to the speed and coal capacity of its harbor defense monitors, was the embodiment, as far as guns and armor go, of the very highest powers of attack and defense. But with a trial speed of 10.5 knots, a probable sea speed of 7 or 8 knots, and a very limited coal capacity, the monitors had to be taken in tow at a 5 knot gait, to insure their reaching the objective point with a reserve of fuel in their bunkers. While our squadron was approaching from the westward, the less powerful but swifter fleet of Spain was speeding at a 12 knot gait to the eastward, and was able to reach its objective and prearranged coaling rendezvous in the Caribbean Sea, fill its bunkers, and make its next move on the checkerboard unmolested. With its advantage of 8 or 10 knots over Sampson's squadron of battleships and monitors and of 3 or 4 knots over the "Flying Squadron," coupled with its steaming radius of 7,000 to 10,000 knots, the armored cruisers were now free to make any one of several diversions in favor of the beleaguered island of Cuba. They might run to Porto Rico and take up a strong position under the guns of the fort; they might sweep in a wide circle to the eastward of the islands and menace our Atlantic coasts; or they were free to remain off the Venezuelan coast, drawing our fleets to the southward, and then speed swiftly to the northeast to effect a junction with a possible second Spanish squadron in the shelter of San Juan Harbor.

The present situation teaches a lesson. It proves the usefulness of speed as an offset against mere defensive power, and the inestimable value of speed and offensive power when combined in a fleet composed of identical armored vessels. Although the Spanish cruisers are not capable of contending with our battleships and are certain to be sunk if they attempt it, they would be more than a match for our two armored cruisers the "Brooklyn" and "New York," which are our only armored ships having sufficient speed to hunt them down, and it would certainly go hard with our unarmored and scattered scouting and patrol fleet if Cervera should run to the eastward around the Sampson and Schley squadrons and make a raid up the Atlantic seaboard.

The Spanish fleet in its relation to our blockade of Cuba is what naval strategists call a "fleet in being," that is to say, a fleet which, while it is inferior in strength to the enemy, is in such a condition that it is a constant menace to his operations, and as long as it exists obliges him materially to defer, modify or abandon his predetermined plan of campaign. That the Cape Verde fleet is a "fleet in being" is proved by the fact that its sudden appearance in the West Indies obliged us to postpone, as was advocated long ago in these columns, the intended invasion of Cuba.

It may be asked, Why should we not combine with the "Brooklyn" and "New York" the fast cruisers "Minneapolis," 23 knots; "Columbia," 22.8 knots; "New Orleans," which it now appears is credited with 22½ knots; and "San Francisco," 20 knots; and run down the Spanish fleet? The reply is, as we have already suggested, that these four ships were never designed to stand up against 11-inch armor-piercing guns. If well placed, a single shell from these guns, weighing nearly 600 pounds and filled with high explosives, would be sufficient to put them out of action, even if it did not send them to the bottom. The answer to an 11-inch gun is an 11-inch gun or one of equal penetration, and not the 6-inch and 4-inch guns carried on these vessels; the answer to 12-inch belts is a 12-inch belt or its equivalent, and if to this combination of guns and armor the enemy's ships add the feature of high speed, we must match it with high speed.

It is this trinity of elements that makes up the armored cruiser, and it is just because Spain happens to have and we happen to be without any members of this type that, in spite of our naval superiority, we may be unable to strike the decisive blow by getting rid of the "fleet in being" for some time to come. It is, of course, possible that, before these lines are published, the Spanish admiral may have elected to give battle, or, by skillful strategy upon the part of our fleets, have been so hemmed in as to be forced to fight.

Whatever may be the issue, the situation has already proved that our lack of armored cruisers presents a weak point in the make-up of our navy; one that has already caused us not a little apprehension as to our ability to maintain the blockade, and that may result in the naval campaign being drawn out to an unexpected length. The composition of our navy was determined with a view to coast defense and in agreement with a national policy into which never entered the thought of blockading islands and hunting down hostile armored fleets upon the high seas. We can do nothing to remedy the matter as it stands; but it is in our power to provide against the future by the immediate authorization of several armored cruisers in a supplementary naval appropriation bill.

AIR MOTORS FOR STREET RAILWAY TRACTION.

An important street railway plant, whose operation will be watched with considerable interest, is about to be installed in this city on a portion of the lines of the Metropolitan Street Railway Company. It will be remembered that a few miles of this company's extensive lines have been operated for some time by compressed air motors, which are of the compound type and built under the Hoadley patents. On another stretch of road in this city the Hardie compressed air motor has been in successful operation. The distinctive feature of the Hardie motor is the use of a tank of hot water to heat the compressed air before it is used in the cylinders. A fully illustrated description of this machine will be found in the SCIENTIFIC AMERICAN for August 15, 1896, where it is shown in service on the lines of the Third Avenue Railway Company, New York; another motor of the same type built for the elevated roads was illustrated in the SCIENTIFIC AMERICAN of January 30, 1897.

The new plant will include a power house on the property of the Metropolitan Company in West Twenty-third Street opposite the Pennsylvania terminal, and in addition to the power house the contract calls for the equipment of twenty cars with compressed air. The air compressor will be of the Ingersoll-Sergeant four-stage single-acting type, provided with intercoolers between each pair of cylinders and a final cooler after the fourth-stage cylinder. The air cylinders will be vertical and will be set under a vertical cross-compound Allis engine.

It is interesting to note that the American Air Power Company, to whom the contract has been let, was formed by a combination of the Hoadley-Knight and Hardie Companies. The new plant and equipment will embody the experience gained by the two experimental lines to which reference has been made above, and as both of these tests have shown satisfactory results, it is safe to say that the new Twenty-eighth and Twenty-ninth Streets equipment will represent the very latest advance in compressed air traction. The Metropolitan Street Railway Company has now in operation four different systems: the cable, underground trolley, compressed air and the horse car. The probabilities are that of these four, two only will survive—the underground trolley and compressed air: the former being used on what might be called the trunk lines running north and south on Manhattan Island, and the compressed air motors working the crosstown branches.

LAUNCH OF THE BATTLESHIP "ALABAMA."

The first-class battleship "Alabama" was successfully launched at the Cramps' shipyard on May 18 in the presence of less than one hundred invited guests. The work of cutting away the blocks that held the ship in place was commenced at half past twelve, and the "Alabama" took the water in less than half an hour.

We have so recently described this vessel (see SPECIAL NAVY SUPPLEMENT) that it will be sufficient to recapitulate the leading features of her design, which are as follows: Length on load water line, 368 feet; beam, 72 feet 5 inches; mean draught, 23 feet 6 inches; displacement, 11,525 tons. Her maximum coal supply will be 1,200 tons, and she will be driven at a speed of 16 knots by twin vertical triple expansion engines of 10,000 horse power. This result will be obtained under a moderate forced draught. She will carry a complement of 489.

The armor will be of the latest Harveyized nickel steel and will be more complete than in any ship of our navy. The belt will be 16½ inches thick amidships, tapering toward the ends. Above this will be a wall of 5½ and 6-inch armor protecting the rapid-fire battery. The main battery of four 13-inch guns will be placed in 15-inch turrets above 17-inch barbettes, and the rapid-fire battery of fourteen 6-inch guns will be sheltered behind six inches of steel. The secondary rapid-fire battery will consist of sixteen 6-pounders, four 1-pounders and one Colt. The maximum concentration of fire dead ahead will be two 13-inch and two 6-inch guns; astern it will be the same, and on the broadside the concentration will be four 13-inch and seven 6-inch.

Our readers who are familiar with the details of our earlier battleships will notice that the 8-inch gun which forms such a conspicuous feature in the "Indiana," "Iowa" and "Kentucky" types has disappeared altogether in the "Alabama." This is in accordance with the latest theory or fashion in battleship design, which is to have only three main types of guns: the armor-piercers, generally not less than 12-inch; the rapid-fire battery, of not less than 5-inch caliber; and the secondary rapid-fire battery, of 6 and 1-pounders. The first type is for the penetration of the belt armor and demolishing of the barbettes and turrets, the second type is intended for wrecking the lighter armor, 8 inches or less in thickness, and the "pounder" guns are for the destruction of torpedo boats and the attack of unprotected gun positions. The 8-inch gun has been thrown out because it is heavier than necessary for the attack of light armor and not powerful enough to penetrate belts and barbettes, except at close range.