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SCIENTIFIC AMERICAN SUPPLEMENT

No. 909.

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Price 10 cents. For sale by all newsdealers.

SATISFACTORY TRIAL OF THE WAR SHIP NEW YORK.

The official trial of the New York took place at sea on May 22, over a 40 knot course, off the coast of Massachusetts, and the new cruiser has come up to expectations, showing an average speed of more than twenty-one knots per hour for four hours, although she had been designed to make only twenty knots.

The revolutions of the engines averaged 135, boiler pressure 168 pounds, and the average speed for the four hours was given approximately by Admiral Belknap, the head of the trial board, as 21 1-10 knots, with a possibility of slight correction for tidal influences. This fine performance was especially satisfactory to the builders of the New York, the Messrs. Cramp, as they had thereby earned a premium of $200,000, their contract with the government having stipulated that they should receive $50,000 for each quarter knot of speed attained in excess of twenty knots per hour.

The contract for the New York was signed August 28, 1890, her cost to be $2,985,000, and her keel was laid Sept. 30 following. From her plans, she was described by Secretary Tracy as a splendid example of an all-around war ship, having an unusual combination of great offensive and defensive powers with extraordinary coal endurance and a high rate of speed. She is of 8,150 tons displacement, 380 feet 6 inches long on the water line, 64 feet 10 inches broad, and her mean draught is 23 feet 3 inches.

She has twin screw vertical triple-expansion engines, designed to furnish 16,500 maximum horse power, and a report of the trial shows this was exceeded, the figures as given being over 17,000 horse power. She has a coal capacity of 1,500 tons, with which she can steam 13,000 miles at a ten knot rate without recoaling. She has four complete decks, including the flying deck or bridge that carries the boats, and her protective deck of steel is 6 inches thick on its sloping side portions, which extend 4¾ feet below the water line. Coal may be also so stowed on the armor deck as to afford further protection.

The main battery of the New York consists of six 8-inch and twelve rapid-fire 4-inch guns; her secondary battery of eight 6-pounder and four 1-pounder rapid-fire guns and four Gatlings. What particularly struck the British Vice-Admiral Hopkins in inspecting the ship was the excellent protection given to the guns, which is far superior to anything on the Blake. The barbettes of four of the 8-inch guns have a thickness of ten inches, and the conical revolving shields on the same guns are seven inches thick. The sloping armor beneath the barbettes between the upper and the gun deck is five inches thick, as are also the ammunition tubes. The four broadside 8-inch guns have a protection of two inches. The 4-inch guns are mounted in sponsons four inches thick, with protective shields covering the ports. Even the 6-pounders have two-inch protection. Her freeboard to the upper deck is about twenty feet, and her 8-inch guns are twenty-five feet above the water line, so that they get an effective fire in all conditions of the sea. There are six above-water torpedo tubes, one at the bow, one at the stern, and two on each broadside. She has no sail power, but carries two military masts with double fighting tops.

As seen at anchor just before her trial trip, the new cruiser is said to have looked like a steamship of strong rather than graceful lines, her breadth giving an impression of power, which was intensified as the development of her great speed was exhibited. She was rough looking, not yet having had her finishing touches, but in her thorough efficiency and evident adaptation for the uses for which she had been built, she commanded the unqualified admiration of the large group of able officers which had been brought together to pass judgment upon her.

THE MAINTENANCE OF THE SPEED OF WAR SHIPS.

We elsewhere give the record of the remarkable trial trip of the armored cruiser New York, as made off the New England coast. Last March her unofficial trial trip showed a speed exceeding twenty knots. Then she was accorded first rank among the war ships of the world. Her official trial corroborates that judgment. It shows how, in the matter of speed, an armored man-of-war can equal a passenger ship. The American line ships Paris and New York in speed compare with the new cruiser. Yet it is very doubtful if a year from now, without long preparation, the record of the trial trip of the war ship could be duplicated. The passenger liner on the other hand is kept going back and forth across the ocean at all seasons, without rest, and has to hold her average under all conditions. The cruiser, for four hours with forced draught, driving showers of burning coals out of her smoke stacks, shows a speed not much greater than the modern passenger ship has to keep up day and night under quiet steaming for a week at a time. The heavy armored war ship, compared with the ocean liner, suggests the working horse and the racer. The four-hour trial is a *tour de force;* the true record would be given by a run from Sandy Hook to Queenstown and return.

Nothing is more definitely settled than the deterioration in steaming qualities of naval vessels. In their naval reviews and competitions the British authorities have found the greatest discrepancies between claimed speed and that attained in practice. This is independent of accidents. Often a long trip of a modern naval cruiser is a chronicle of breakdowns; leaky boiler tubes, and troubles with the machinery are noted with a frequency which would be very disastrous to the ocean passenger service, if such ships as the Campania or Paris were subject thereto. But the liners appear to be free from such disturbances. It seems as if the only way to maintain a ship in good condition is to keep her in action. The long periods of rest of the naval vessels are periods of deterioration. There is no doubt that in case of war the naval reserve ships drawn from the passenger service would give far superior results in long cruising powers. The regular navy vessels would probably fall far short of the ocean liners when the question of sustained speed over a three or four thousand mile course was in question.

The preservation of the bottoms from marine growth is a most important problem. Our ships have to visit tropical seas. Lying at anchor in the harbors, their bottoms rapidly become foul, and several knots speed is at once lost from this cause. So far, the only adequate protection is to sheath the hull with heavy planks, and over this to put a sheathing of copper or of yellow metal. The intervening wooden sheathing is required to prevent galvanic action, which otherwise would corrode the steel plates. The ship's displacement is materially increased by this process; but is claimed that the gain in speed due to improved bottom offsets this disadvantage. Zinc and other materials have been experimented with, but invention has not yet reached the point of adequately protecting a ship's bottom from barnacles and seaweed.

DEATH OF MOSES G. FARMER.

The sad announcement of the death of Moses G. Farmer, at Chicago, marks the departure of one of the pioneers of modern electricity. He was so anxious to see the electrical exhibit at the Columbian Fair that he went to Chicago, it is said, against the advice of his physician. He contracted a cold and died there of pneumonia on May 25, aged 73 years. He was born Feb. 9, 1820, at Boscawen, N. H., and graduated from Bowdoin College in 1844. He at once began his life's work in electricity. In 1846 he invented an electro-magnetic engine which he used to drive a car on a model railroad. He next became engaged in telegraphy. Telegraphing by induced currents, the application of the current to submarine blasting and to torpedoes, and apparatus for striking fire alarm bells engaged his attention during these early days. He was appointed superintendent of the Boston Fire Alarm Telegraph, appearing as one of the pioneers in electric fire signaling. He early made experiments in dial telegraphy and in duplex and quadruplex transmission, his patent on duplex transmission dating back to 1858. In Thompson's *Electro-Magnet* he is cited as one of the early discoverers of the principle of self-excitation of the dynamo. This was in October, 1866. His other work covered a wide field of experimentation, including investigations of the velocity of light, electric registering apparatus, distribution of current for electric lighting, determination of the velocity of circulation of the blood and other subjects. Several of his inventions were exhibited at the World's Fair, and are spoken of as among the interesting features of the display. In spite of his advanced age, he is described as most enthusiastic over the electrical display. For many years he was attached to the United States navy torpedo station at Newport, R. I.

A EUROPEAN authority on cholera believes that cholera can be exterminated by going to the root of the evil. This disease is endemic at the delta of the Ganges River in India, in a low area of about 7,500 square miles, caused by the putrefying remains of animal and vegetable life cast into the river by the inhabitants and constantly floating about. Formerly the fellaheen of Egypt interred their dead on the borders of the river Nile, and the bodies were then washed out into the stream during the annual overflow of the river, and were carried down to spread disease throughout the delta. Since an end has been put to this custom, the plague no longer harasses the country. It would doubtless be difficult, if not impossible, to restrain the natives of India, inhabiting the region of the Ganges, from casting their dead into the waters of the sacred stream; but the author thinks this difficulty might be obviated by compelling the people to cremate their dead and then throw the ashes on the bosom of the river.

THE triple expansion engine for ships was first designed by Peter Ferguson (of Fleming & Ferguson, of Paisley), who fitted them on board ship in 1872. To the late Dr. Kirk, however, is due the general adoption of this class of engines, through the clearness with which he demonstrated their superior economy.