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(Illustrated articles are marked with an asterisk.)

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FAILURE OF THE DYNAMITE CRUISER VESUVIUS. This novel type of war boat is declared by our best naval advisers to be of little use in her present condition, and it is recommended that she be altered into an ordinary torpedo cruiser.

The striking success which attended the experiments of Lieut. Zalinski in New York harbor, 1887, in throwing projectiles charged with dynamite from pneumatic guns located on shore, led to the belief that similar weapons might be successfully used on shipboard; and the government, anxious to possess itself of an arm that appeared to be at once novel and formidable, hurried forward the construction of the Vesuvius.

The Vesuvius is a steel ship of 725 tons displacement, 252 feet long over all, and 26 1/2 feet wide. She is without masts, and practically unarmored. She draws a maximum of nine feet of water; the mean draught is eight and one-half feet. Her engines, which have been illustrated and described by us, are of four-cylinder, triple-expansion type. They actuate twin screws, and give a speed of about twenty knots an hour.

In the forward part of the ship the three pneumatic guns that form her armament are placed. These are built into the ship. Their muzzles are carried forward and project above the deck near the bow. They are 15 inches in diameter, fifty-four feet long, made of thin cast iron, not rifled, the vanes upon the projectile being relied on to give any desired axial rotation.

The full-sized shell for this gun is 1 1/4 inches in diameter, and its body is about seven feet long. Back of the body is a tail fitted with spiral vanes, which secures its alignment and rotation. The body is made of thin drawn brass tubing, and will hold 600 pounds of high explosive, dynamite or gelatine, the whole weighing about 1,500 pounds when charged.

The air by which the projectile is driven is compressed under a pressure of 2,000 pounds per square inch into tubular reservoirs.

No attempt has ever been made to test the guns with a full charge of the explosive, by reason of defects in the mechanism which render dangerous the operations of loading and discharge.

The naval bureau considers this vessel in no respect fitted as a gun platform for artillery of this description, even if the latter proved of any military value. It will be readily appreciated that, unarmored as the Vesuvius is, her stores of high explosives and a large portion of the length of her guns are completely exposed to the fire of rapid-fire ordnance.

The vessel, as is well known, possesses only indifferent steering qualities, and this being the case, it is probable that two torpedo boats of the type of the Cushing, armed with an automobile torpedo and with rapid-fire guns of smaller caliber, would very much overmatch her. It is considered, therefore, that the question of the value of the guns for war purposes should receive an early conclusion.

It is believed that the range of efficiency of the Vesuvius would be greatly increased by turning her into a torpedo cruiser. Her displacement is such that, with her dynamite guns removed and a battery of considerable power placed for fore and aft fire, supplementing the larger calibers of rapid-fire guns with a number of 6-pounders, this vessel would then become a formidable antagonist for any of the unarmored types.

Her tubes, however, would be useful should they pass the necessary test for shore stations, or perhaps for a moored battery in harbor defense. The number of these weapons ordered for the land fortifications at New York, Boston, and San Francisco will also give opportunity to thoroughly investigate their value under more favorable circumstances than exist on board the Vesuvius.

HEAVY GUNS AND THE BEST ARMOR.

As the result of the efforts made during the last half dozen years, the position of the country as to means of offense and defense has been vastly improved. Not only have we the fine new vessels of the white squadron, with many other and more formidable ships approaching completion, but in the manufacture of heavy guns and armor we have about passed the experimental stage, and in several private establishments, as well as in the government shops, are now turning out both guns and armor believed to be equal to or better than any made heretofore in Europe.

have been carried out with great thoroughness, and the work of production is now being pushed in American shops and by our own skilled mechanics.

In the recent report of Commodore Folger, chief of the Bureau of Ordnance, an interesting account is given of the armor tests conducted during the year, and the report says the bureau considers that two important results have been achieved: First, a better plate, of American manufacture, has been produced than the department was able to purchase abroad a year ago; secondly, it has developed a new principle in the manufacture of armor, of American origin, which will furnish greater protection to the vital parts of a vessel of war than any other system hitherto employed.

The expenses of the bureau for the year are estimated at \$4,780,291, of which \$4,186,250 is to be applied toward the armament of new vessels authorized to be built. The number of guns required to arm the new vessels is placed at 347, ranging in caliber from 4 to 13 in. The guns completed number 155, of which 117 were 6 in. caliber; 294 sets of forgings have been ordered, and 246 have been delivered. Although none of the ships authorized to be built requires guns of 16 in. caliber, it is believed that such guns may be needed, so the necessary plans have been made, and authority is sought for construction of one of them.

The trials of smokeless powder, invented and manufactured at the torpedo station, are said to have resulted so satisfactorily that it is believed that within a very short time the use of gunpowder will be entirely abandoned in calibers of six inch and below it, being replaced by one of the smokeless powders. An order for 50,000 pounds of gun cotton, the best known high explosive for naval use, has been placed with the Duponts on condition that a complete plant be erected. The condition has been accepted, and with the assistance of the naval experts a plant capable of turning out 1,000 pounds a day will be in operation in two months.

After recounting the efforts made to secure an effective automobile or fish torpedo, the report says: "The present state of work, in connection with automobile torpedoes and their accessories, is such as to justify the belief that the installation of outfits on board vessels will commence early in the coming year, and that our navy will soon be equipped with torpedo outfits equal, if not superior, to those possessed by foreign nations." Touching the submarine gun now approaching completion, the report says: "A further consideration of the subject of submarine artillery inclines the Bureau to the belief that it will prove a valuable and important adjunct to our defensive armament, particularly when mounted on board of vessels intended especially for ramming. It seems possible that the chances of the ram being able to reach her antagonist with destructive effect will be quadrupled by the addition of this weapon to her means of offense."

Under the head of armor it is announced that negotiations are in progress to cause the plate to be delivered by the Bethlehem Company for the double turret monitors and the Maine and Texas to be of nickel steel. The armor ordered from Carnegie, Phipps & Co. is to be of the same material, the department supplying the nickel; 800 tons of ore for that purpose were purchased last year.

Public School Finances.

The public school finances of thirty-one States have now been published by the Census Bureau. The census bulletins Nos. 54, 98, and 141 contain these interesting statistics. They give the number of pupils enrolled, amount expended on salaries and miscellaneous accounts, and total expenditures. These are given in sum totals and reduced to sums expended per capita of pupils enrolled, and the total expenditures are also reduced to sums per capita of population. Many other tabulations of the money employed in the various functions of the public school system are also given. To all interested in education and the much-debated public school system these figures will be of the highest interest.