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## IRON-CLAD SHIPS OF WAR IN CONGRESS.

A bill has been introduced into the Senate, in accordance with the recommendation of the Secretary of the Navy, providing for the appointment of a Board of Naval Officers to examine into and report on the expediency of building one or more iron-clad ships of war. Efficient measures should have been taken long ago to carry out such provisions as are contained in this bill, and as we clearly pointed out in the SCIENTIFIC AMERICAN of December 1, 1860, when Congress was then holding its last session. It is never too late, however, to do right, and this movement, although tardy, is in the right direction. This is a most important subject, and all the experience which can be obtained to guide us should be sought after with avidity. It has been brought up several times lately in the British Parliament, and discussed at some length; and in a late speech of the Duke of Somerset, we find a very satisfactory history of the experiments which have thus far been conducted in England.

He stated that the first experiments were with iron plates one inch thick; these the shot broke in pieces with the greatest ease. Chain armor, india-rubber, and hempen matting were next tried; these were also found to be utterly useless. Next they tried Armstrong guns against 4½-inch iron plates, but they found that solid shot sometimes pierced them also. In building iron ships, the Duke stated that "it was a great problem when to stop, because thin iron would not do, and it became a matter of great difficulty how to make such vessels safe. Government, however, had extended its orders, and seven iron-plated ships would soon be ready."

The experiments with 4½-inch iron plates and Armstrong guns have satisfied the British naval authorities that these can resist shells perfectly, and nothing but solid, long-pointed shot, discharged from the most effective, largest rifled cannon can break them. In firing a broadside from the largest class of frigates with 100-pound pointed shot, at an iron-clad vessel, not more than three or four shot would enter the vessel, and these would be so spent as to do but little injury. Such vessels, then, with present experience, are almost proof against solid shot; while against shells, they are perfect proof.

No time, therefore, should be frittered away in tedious technicalities before taking efficient measures to build at least two mail-clad ships of war. The navy is now the overwhelming power which belongs to the government, and we should not fail to adopt every measure to make it more complete. Now is not the time to deliberate in cold debates about the expediency of such vessels; it is not only expedient, but necessary, that they should be built, and we trust that the Senate will pass the bill amended, so as to authorize their building at the earliest date possible.

## AMERICAN FIRE ENGINES FOR EUROPE.

The great fire which recently destroyed such a large amount of property in London, is stated to have originated in a few bales of jute hemp which became ignited by spontaneous combustion. It is well known that hemp, cotton, sawdust, and several other substances, are very liable to become spontaneously ignited if saturated with grease. Many fires have been thus caused, and the owners of stores and factories should all be made aware of this fact for the better security of their property. And yet, with all the necessary care which can be exercised, perfect immunity from fire never can be expected. Fires will take place as long as there are combustible materials in the world, and while great care and vigilance may prevent their frequency, the best means should always be provided for their rapid extinguishment when they do occur.

It is well known that the London Fire Brigade was composed of a most efficient body of men, but it seems that they were furnished with fire engines which would have been considered tolerable machines in America thirty years ago. Had they been provided with our improved engines, and especially our latest steam engines, the fire referred to would soon have been subdued after it was first observed. The *Engineer* (London) states that one of the hand fire engines in that city throws only about ninety gallons of water per minute; whereas, one of the common American hand engines will throw three times this quantity. A few steam fire engines have been built in London, but they are very inferior to ours, especially their boilers, which take fifteen minutes to get up steam to a working pressure; whereas our steam fire engines can get up steam in five minutes, thus affording evidence that they can generate about three times the quantity in the same period of time, and of course they are thus able to accomplish about three times the amount of work.

The boiler is the most essential part of a steam fire engine. The American boilers have very thin water spaces, and a large heating surface, and they therefore combine compactness with great evaporative efficiency. On the other hand, the English boilers have large water spaces, and they are therefore heavy and clumsy, faults which should always be avoided in portable engines. We advise the authorities of London to have several steam fire engines built after the American style, or what would be better, order a score of such engines from New York.

## THE GREAT DEFEAT.

It may be that the great disaster at Bull's Run is not to be attributed to General Scott's arrangements. Large armies are more subject to panics like that which occurred there than small ones are, and when such a panic takes place in an army, the larger the numbers, the greater the disaster. Still, even if the movement had been successful, we have no doubt that Gen. Scott's combinations would have been universally condemned by military authorities.

Napoleon Bonaparte said that good generalship consisted in having a force superior to that of the enemy present at the point of attack, and it was the principal aim of his maneuvers to accomplish this result.

Again: the great importance of fighting behind intrenchments is universally recognized, even for regular troops, and it is many times more important for volunteers.

Now, Gen. Scott had under his command 300,000 men. He chose his own time and place of attack; and he sent 50,000 men against 90,000, the latter posted behind intrenchments which he had allowed them 40 days to construct almost within sight of his headquarters. It requires no technical knowledge of the military art to decide that *that* is not good generalship.

## NATIONAL ENCOURAGEMENT TO THE NOVELTIES OF INVENTORS.

"The present war," says the Philadelphia *Inquirer*, "bids fair to stimulate the inventive faculty of the American people as applied to the military arts. The government will, of course, have a number of new devices submitted to it, and among them it must be expected there will be a great deal of trash. Nevertheless, there may be some wheat in the chaff, and the grain may be worth the labor of sifting. We regret to observe some indications of impatience on the part of the authorities at being pestered with these new projects, and it has indeed been said that the government has about concluded to eschew all novelties, and stand in the beaten paths. We trust, however, that a just discrimination will be exercised, and a proper encouragement extended to merit. War may be regarded as an applied science, and it is progressive like all other sciences."

These are sensible and well-expressed opinions respecting one of the most important questions which can engage our government and people in the present conflict. There are always some leading men connected with every government who are satisfied with things as they are, and who have a horror of all inventions, no matter how important and valuable they may be. No charge of such unwise conservatism is brought against any of our government officials, but it is intimated that they have not patience to examine new inventions submitted to them, and that new projects pester them. We believe that it would neither be expensive nor difficult for government authorities to organize measures for promptly testing every invention that may be useful for the government, submitted for their consideration. A special board of competent officers may easily devote several hours every day to experimenting with new inventions presented to government for adoption. We are well aware that the testing of new inventions relating to firearms and artillery belong to the Ordnance Department, and that some very ably-conducted experiments have been made by its officers, but we believe it would be of great advantage to have a fixed board that would test all inventions nearly as soon as they are submitted, so as to decide upon their merits promptly. In times like the present, the public mind is intensely active, and inventors are incited to discover new and useful improvements. The delay of a few days to examine and test a new invention may be of the deepest injury to the country. Commander Dahlgren, U. S. N., in his treatise on "Boat Armament," after comparing breech and muzzle-loading firearms, says:—

It is not proper to close the road to a full trial of this issue. * * The expenses incurred by the inventors, their great ability, and the excellence of their results, entitle the question to a full and impartial trial. * * Experience will in time supply the full amount of facts required to decide whether the muzzle-loading or breech-loading piece is to be preferred.

We have thus the very highest authority for giving every new invention, claiming the least respectability, a full and fair trial of its merits; and it would therefore be most unwise in government to close the door against new improvements submitted by inventors.

## THE MONSTER CANNONS OF AMERICA AND ENGLAND.

The London *Army and Navy Register* describes the new American principle of casting large guns hollow, and cooling them by means of a current of water through the interior. It considers that this invention has introduced a new era in the casting of large iron cannon, and it describes the monster 15-inch gun which was cast at Fort Pitt Foundry, Pittsburgh, and now mounted at Fortress Monroe.

The largest piece of ordnance hitherto made in England is what is called the "Horsfall gun," which is mounted at South Sea Castle, Portsmouth. It weighs 22 tuns, and throws a solid shot of 360 lbs. It has been tested with charges of 50 lbs. of powder and 130 rounds have been fired. At 18° elevation, its range was 5,000 yards. It was cast in the old way, and is unmistakably inferior to the American gun, inasmuch as a crack about three inches in length has already been formed in its chamber. The American gun has already fired 300 rounds, and the most delicate tests have failed to detect the slightest derangement in it.

Rodman's perforated cake powder, which is used for American artillery, is much superior to the English powder. It starts the shot more gently, and the tendency to bursting is therefore not so imminent. With 40 lbs. of powder as a charge, the initial velocity of the shot of the American gun was found to be 1,328 feet per second; and the greatest range attained at an elevation of 28° was 5,730 yards, the shot being 425 lbs. So far as we know, the American "great gun" is the *greatest* gun in the world. It is true there are some old-fashioned Turkish cannon at Constantinople which can throw shot of 1,200 lbs. weight, but the charge of powder which they can take is so small that no vessel passing the forts at 500 yards distance would receive much harm from them. A single shot from the American gun at Fortress Monroe, striking an iron-frigate, would make it reel as if it had received the concentrated kick of 33,000 horses.

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