

ships cannot stand against the shells fired from rifled guns ; whilst ironclads are penetrated at distances according to the weight of the guns.

The 35-ton gun has a 12-inch bore, and with a charge of 130 lbs. of pebble powder will penetrate 12-inch iron plates at a distance of 2,000 yards.

The next most powerful gun is the 25-ton, with a 12-inch bore, and a projectile 18 inches long, weighing 600 lbs., the performance of which is much short of the above.

The 18-ton gun has a 10-inch bore, firing projectiles of 400 lbs., with a battering charge of 60 lbs. of powder. The effective range of this gun is from 1,500 to 1,700 yards. This piece is said to give the best comparative result for its weight of any now made. The "Cerberus" at Melbourne is armed with four of these guns.

The 12-ton gun has a bore of 9 inches, and the 6½ ton of 7 inches.

The above are known as the Woolwich pattern guns, constructed on Fraser's principle of breech-coil, and cost about £70 a ton. The demand for heavy guns, both for shore and sea service, to meet the requirements of the Imperial Government, is so great, that I question whether any of the above mentioned could be got for some years to come.

The most useful gun for the Colony, and one likely to be obtained, and at a very much smaller cost than any of the foregoing, is that mentioned by Captain Hutton—the 68-pounder smooth-bore gun, converted on Palliser's principle into a 7-inch rifled gun. It has given results equal to the 6½-ton built gun of the same calibre. One of these Pallisers was tested with charges of 30 lbs. of powder, and a bolt increased by 10 lbs. each discharge, until with a 680 lbs. bolt the inner tube cracked. The battering charge of this gun is 22 lbs.

The Moncrieff carriage is coming largely into use at home, and has lately been improved. There is no part of it that could not be made in the Colony. The cost of mounting guns on this principle is much less than iron embrasures and mantlets, appliances now considered essential against rifled guns.

Breech-loaders are not in favour ; they are not such hard hitters, are more complex and liable to get out of order, and not so strong, as muzzle-loaders. They have also the disqualification of filling the casement or pit with smoke when the breech is opened after firing.

Torpedoes are a most powerful aid in the defence of harbours, and, owing to the improvement made in the manufacture of gun-cotton, are now easily managed. Late events in Europe show how safe harbours may be made by torpedoes covered by guns from the shore.

There is an instrument called "Davidson's Collimator" which enables guns to be laid at night so as to cover accurately the object aimed at in daylight, and when the gun is not in action. By this means torpedoes can be protected in the darkest night.

Two 7-inch Palliser's guns in this harbour would give a good account of any force likely to escape the attention of the Imperial authorities ; the cost would be small, and well balanced by the sense of security against the risk of insult and loss of property which at present exists. A sufficient force to fight the guns could be got from the Artillery and Naval Volunteers, and also to cover them against surprise until aid can be sent from Dunedin. Torpedoes might be placed in charge of the Pilot Establishment at the heads.

The question of covering these guns by rifle-pits or redoubts is one of detail ; the main question, the position of the battery, is one that can best be dealt with by a military engineer. I believe Colonel Mould, R.E., has reported on this subject.

The covering force must be armed with breech-loaders. Men armed with muzzle-loading rifles in the present day are simply nowhere for the purposes of war. I believe that practically the Snider is the best weapon extant.

There is no doubt but that an ironclad gun-boat is the most efficient defence for a harbour. In smooth water the platform would be as steady as a shore battery, and an enemy could not run past her and get out of range. The annual cost, however, is very great. The "Cerberus" is a mistake—that is to say, the same number of guns might be carried on a better principle and at less cost, by placing them in a vessel or vessels of a different construction, as the "Staunch," for instance.

Captain Hutton's suggestion as to a small detachment of Marine Artillery from the Naval Force on the station being put in charge of the harbour defence batteries, is worthy of consideration. It is possible that the Imperial Government may be made to see that a disaster of the kind contemplated, would cause a heavy loss to English underwriters at a port like this, where a large value of home shipping is generally lying.

If, however, no help in this direction is to be depended upon, the constitution of the Defence Force for this purpose must be looked to. The standard of efficiency of the Volunteers must be raised, and a stricter discipline maintained. This would cause a falling off in the number now on the rolls, which should be made up by a call on the Militia. Mr. Cardwell's Bill, recently before Parliament, provided for the country being divided into districts, which are each rated at so many men on a percentage of the population ; the number of efficient Volunteers is deducted from the rate, and the balance short, if any, made up by calling out that number of Militia.

This will act as a stimulant to the Volunteers, and also to the public to encourage the Volunteer movement. Employers of labour, for instance, would give the time to their employés necessary for day drills and occasional encampments, which at present are not possible.

The fact of a call of the Militia to make up the quota would give the public a direct interest in the efficiency of the Volunteers.

Limiting the number of Volunteers to the quota determined upon would also be greatly beneficial in maintaining a higher standard of efficiency.

I have, &c.,

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