1880.

NEW ZEALAND.

DEFENCES OF NEW ZEALAND.

REPORT

BY

COLONEL P. H. SCRATCHLEY, R.E., C.M.G.

Presented to both Houses of the General Assembly, by command of His Excellency.

Melbourne, 1st March 1880.

YOUR EXCELLENCY,

1. I have the honor to submit, for the consideration of Your Excellency and your Government, a Report upon the Defences of New Zealand.

2. I desire to acknowledge the ready assistance, that has been afforded me by the officers of the several departments of the Government concerned in the object of my enquiry, together with the valuable information which I have received from the officials of the Harbor Boards of the ports visited by me.

3. As some time must elapse before a decision can be come to in reference to the recommendations contained in the Report, it is desirable, in order to save time, that I should be authorized to proceed with the preparation of the necessary plans for the batteries, which I propose should be erected at the several ports.

4. With regard to the other steps that may become necessary, to give effect to the decision of the Government on the whole subject of defence, I shall be glad to act as its adviser in the matter.

I have the honor to be,

Your Excellency's most obedient servant,

P. H. SCRATCHLEY,
Colonel R.E.

His Excellency Sir Hercules Robinson,
G.C.M.G., &c., &c., &c.,
Governor and Commander-in-Chief,
New Zealand.

REPORT ON THE DEFENCES

OF

NEW ZEALAND.

Probable nature and degree of attack to which New Zealand is exposed.

Before entering upon the question of the measures which should be adopted for the protection of New Zealand against foreign aggression, in the event of the mother country being at war with a foreign power, it is necessary to consider the nature of the attack to which the colony is likely to be exposed.

Sir W. Jervois' views on the subject.

His Excellency Major-General Sir. W. Jervois has pointed out, in his reports on the defences of the Australian Colonies, that "there is" "no probability of an expedition on any extensive scale being" "despatched against Australia. In the improbable event of Great" "Britain ceasing to hold the command of the seas, such an expedition" "might perhaps be undertaken with a view of subjugating the Colonies," "finally annexing them, and instituting some form of despotic govern-" "ment. The very existence of the British Empire, however, depends" "upon her naval supremacy, and the question must obviously be con-" "sidered on the assumption that that supremacy is, as it undoubtedly" "will be, maintained."

"In the event of Great Britain being engaged in hostilities with" "any great maritime power, the enemy would retain the most powerful" "portion of his fleet in European waters, or in the Atlantic, for the" "protection of his country or for operations in the immediate neigh-" "borhood of hostilities. If he sent his fleet, or any considerable portion" "of it, on an expedition against the Australian Colonies, a sufficient" "part of our Home fleet would in turn be set free to intercept it, and" "squadrons in the Pacific, on the China, the Australian, and Indian" "stations, might, if necessary, be concentrated to oppose it."

"But whilst the bulk of the enemy's naval forces would be" "occupied in the immediate scene of action in Europe or America, he" "might no doubt despatch one or more cruisers" and possibly an iron-clad "to operate against our maritime commerce, or make a descent" "upon" one of the New Zealand ports, which "from being undefended" "or insufficiently protected, would offer a tempting object of attack." "Eluding our cruisers, and appearing suddenly" on the coast of New Zealand, "the enemy might capture the merchant vessels in the harbors;" "or—under the threat of bombardment, or after actually firing into one" "of the towns—demand and obtain a payment of money; or this object" "might be attained by an enemy landing a small force in the vicinity" "of a town, if steps were not taken to meet such a contingency."

It is from this point that I propose to discuss the subject of the defence of New Zealand.

New Zealand in different position from Australian Colonies as regards attack.

New Zealand stands, as regards attack, somewhat in a different position from the Australian Colonies. In Australia there are few harbors of importance, which are not the centres of large populations; and consequently the resources in men and appliances for defence are to be found where they are most wanted. In New Zealand, on the contrary, the population (414,412) is scattered over a wide area, and there are several large harbors, possessing equal claims to be especially protected. There are also many settlements on the coast which are exposed to attack, but which it is not possible—without throwing too heavy a burden on the resources of the colony—to include in a general scheme of defence.

Defence of New Zealand by naval means alone not practicable.

The fact that New Zealand possesses a seaboard of over 2,200 miles, and that the principal harbors are situated at great distances apart, effectually disposes of the idea of attempting to defend the colony by naval means alone. Even the possession of a ship in one or more of the harbors, or a small squadron for general defence, could not be relied upon as a sufficient protection for individual ports scattered over a length of coast from North to South of over 1,000 miles.

For instance, supposing an attack were made upon Auckland, when the ship or squadron was at Lyttelton, two or three days must inevitably elapse before the protecting ship could reach Auckland, during which time much mischief might have been done. If the squadron had happened to be at sea, instead of in a port, an extra day or even more might elapse.

Or again, a feint by a single ship on one port might be made, to draw the squadron away from the real point of attack.

For these reasons it is obvious that the principle, upon which the defence of New Zealand at the present time should be based, is to place each of the principal harbors in a position to repel attack from one or two hostile cruisers; and at the same time to afford points of support, and—in case of disaster, of refuge—to such of Her Majesty's ships as would, in time of war, be detached to co-operate in the general defence of Australia and New Zealand.

Description of seaboard.

The colony of New Zealand comprises two principal islands of considerable extent, and Stewart's Island to the south, which is very small and unimportant. In both the large islands numerous bays and inlets of the sea are found, which constitute fine natural harbors; but as yet the population is small and the trade inconsiderable, except at certain principal points.

In the North Island, which embraces an extent of coast amounting to nearly 1,250 miles, the only ports of importance are Auckland, in the north, and Wellington (Port Nicholson), in the south, 600 miles apart. The harbors on the west coast, such as Hokianga, Kaipara, and

Manukau, afford good anchorage and spacious accommodation, once the bars at their entrances have been passed. There are also the small bar harbors of Waikato, Whangaroa, and Kawhia, together with a few open roadsteads such as New Plymouth, &c.

On the east coast are Russell—where coal can be procured—the Thames, and Tauranga further south. There are good roadsteads also at Gisborne and Napier.

In the South Island the coast line is about 1,130 miles ; the two principal harbors are Lyttelton and Otago, both on the east coast, and situated about 190 miles apart.

There is also a good harbor further south, at the Bluff, which holds an important position, as being the last port of departure and the first of call for vessels trading between New Zealand, Tasmania, and the southern ports of Australia.

The minor harbors are Akaroa, Nelson, and Picton, but there are several roadsteads, such as Timaru and Oamaru, on the east coast ; and Hokitika, Greymouth, and Westport, on the west coast, where breakwaters are being constructed to shelter vessels in all weathers.

Coal is exported from Greymouth and Westport, and at the latter place especially there are extensive and valuable deposits.

The sounds along the south-western portion of the coast are numerous, with very great depth of water, but they are not of any practical value, being surrounded by high and precipitous mountains, without any settlements on their shores.

Places likely to be attacked

It will be gathered from the foregoing statement that the only places of sufficient importance to require local protection at present are Auckland, Wellington, Christchurch, Dunedin, and possibly Invercargill. No doubt an enemy might occupy one of the minor harbors, such as Russell, Tauranga, Nelson, Picton, or Akaroa, with a view to making special preparations for an attack upon one of the large ports above referred to—or he might issue from them to capture passing vessels—or again, he might lie off such roadsteads as are to be found at Gisborne, Napier, Timaru, or Oamaru, for the purpose of levying contributions.

Such operations could be counteracted either by naval means or by providing local protection for each place ; but as a large expenditure would have to be incurred in order to provide against all these contingencies—and the country cannot at present afford the outlay—I shall consider more particularly the measures necessary for the defence of the five principal harbors of the colony, and confine myself to giving an outline of the principles upon which that of the other places should be based.

The towns, situated on the principal harbors, can only be approached by sea through channels which afford, more or less, natural facilities for the provision of fixed defences. These defences should consist of land batteries—rendered self-defensible and independent of

external support—in combination with offensive and defensive torpedoes; and the best mode of providing against attacks made by bodies of men, landed for the purpose of turning them, will be to maintain local troops capable of meeting the enemy in the field.

Floating *versus* fixed defences.

It has been suggested that floating defences might with advantage be adopted in preference, or as auxiliaries, to batteries on shore; but, in my opinion, there would be no gain in substituting the floating for the fixed element of defence, for the following reasons:—Floating defences, whether armoured or unarmoured, are very much more expensive in first cost and in maintenance, and they require periodical renewal. If armoured, they are liable to be destroyed by offensive torpedoes, and to be disabled from accidents to their screws. Unarmoured vessels, such as gunboats, can in addition be destroyed by artillery fire or by ramming, and their steering gear, boilers, and engines, are much exposed to damage.

The fire from floating structures cannot be as accurate as that from artillery mounted on fixed platforms on land; and, moreover, the cost of maintaining land works in repair is very small, if ordinary care be exercised. They can be added to in order to increase their defensive power, and can be rendered practically impregnable. I consider, therefore, that land batteries will suffice for all requirements.

Introduction of torpedoes has altered conditions under which schemes of defence have to be considered.

Prior to the introduction of torpedoes as reliable weapons for offensive and defensive warfare, the conditions, under which schemes of defence for harbors in general had to be considered, were very different from those which exist at the present time. It is generally acknowledged that, where the channel is perfectly clear, a vessel steaming at full speed may run past batteries with comparatively little risk and that, unless obstructions are placed across the entrance to a port—to delay and arrest the advance of hostile ships—a determined enemy will not be prevented from forcing his way in. These obstructions, however, must be thoroughly efficient, not readily removed, and well and sufficiently protected by artillery fire.

These conditions are fulfilled by submarine mines, placed in the water so that their exact position cannot be discovered by the enemy and thereby avoided; they have now been generally adopted, and it is considered that, in most cases, their employment renders it unnecessary to provide second lines of defence.

Sir W. Jervois' recommendations for the Australian harbors.

For the harbors of the Australian Colonies, Sir W. Jervois has recommended batteries, armed with heavy rifled ordnance, together with submarine mines in the channels, and torpedo boats for attacking the enemy's vessels. For the protection of the principal cities near the seaboard, from attacks by bodies of men landed from the enemy's ships, he has proposed the maintenance of local forces capable of operating in the field.

This is the plan of defence which I consider well adapted for the harbors of New Zealand, provided it is designed so as to be carried out by degrees. Measures to be taken, at once, for placing the colony in a position to resist the attack of one or two cruisers, and in the future, the scheme to be extended to afford protection against more formidable attacks. In this manner the burden would be adjusted to the resources of the country.

Description of means and appliances at present available for defensive purposes.

In order that the reasons which have led me to this conclusion may be clearly understood, it is desirable to consider briefly the several means and appliances at present available for defensive purposes.

Defensive works.

First, with regard to defensive works :—Where expense has not to be specially considered, it is advisable to provide a few guns completely protected against the enemy's fire, supported by other pieces, mounted *en barbette*. The first plan involves the employment of bomb-proof chambers or casemates, constructed with fronts either wholly of iron, or of masonry combined with iron shields. In both cases the guns fire through ports, and there are bomb-proof roofs over them. Unless these roofs, and the fronts of the casemates, are destroyed, the guns cannot be silenced. When guns are so protected they can be placed near to the level of the sea with perfect security. The cost of this mode of construction, however, is so great as to render it inapplicable to the defence of the New Zealand harbors.

The *barbette* principle of mounting ordnance is much less expensive, and admits of the guns being placed at a higher level above the water, so as to compensate largely for the loss of complete cover by the increased difficulty which the ship experiences in replying to their fire. By this method, which I propose to adopt, the guns fire over earthen parapets, and the lateral range of each piece is greatly increased, thereby reducing the number of guns and gunners required. At the same time considerable protection is afforded against the enemy's fire, by placing the guns about 90 feet apart and providing high parapets in front, which completely screen the gunners from view, except when actually in the act of loading and sighting. The large traverses of earth between the guns isolate each piece in separate pits or emplacements, and give cover for expense magazines to contain the ammunition for the battery.

The reduction in the number of the men required for each battery is a point of great importance, as it lessens the cost of providing garrisons for the defences.

Submarine electrical mines.

Under the protection of the guns in the works on shore, submarine mines or torpedoes should be placed in those channels by which an enemy must pass in order to enter the ports. There are three kinds of fixed or defensive torpedoes :—the *observation*, the *electro-contact*, and the *mechanical*. All these kinds are laid in the water at varying depths, according to the purpose they are intended to serve. Their charges are proportioned to the depth from the surface at which they are placed. The mines may be *buoyant* (*i.e.*, floating in the water), or *ground* (*i.e.*, laid on the bottom). They are generally distributed in three or more rows across the channel, and they may be fired by observation, that is to say, at the will of two observers on shore—situated at convenient distances apart, and in telegraphic communication

with each other—who simultaneously watch the vessels approaching the mines, and by means of electrical appliances are able to fire the particular mine over which any vessel may be passing; or, in the case of very narrow channels, each row may be fired by one observer on shore, as the vessel passes over it.

Electro-contact mines are self-acting, when in an active state, and are intended to explode when struck by the hostile vessel in passing over them. They are, however, completely under the control of the observer on shore, who can render them passive at any time to permit of friendly ships entering the port. This self-acting apparatus may be applied either to ground or to buoyant mines.

Mechanical mines.

Mechanical mines are divided into two classes:—the electro-mechanical, the action of which depends upon self-contained electrical apparatus; and the mechanical, which are fired by mechanism.

Both these methods of ignition are enclosed within the torpedo, and do not require connection with the shore as in the case of observation and electro-contact torpedoes, to which submarine wires are attached to connect them with the electrical instruments on land. The mechanical mines are consequently far less costly.

Application of mines.

The application of the several kinds of mines depends upon various circumstances. For a well defined and narrow channel, where there are suitable sites for the observers on shore, observation mines are preferred. In the case of a wide channel, the width may be narrowed by means of electro-contact mines; and the gap left for the navigation of friendly ships may be defended by observation mines.

The mechanical mines, designed up to the present time, are dangerous equally to friend and foe, when once rendered active by the removal of the safety apparatus which is employed in laying them; for that reason they can only be used to close unfrequented channels, and after they are placed in position, it is a service of danger to remove them. They are not, therefore, applicable at present to the New Zealand harbors.

Efficiency of submarine mines.

Owing to the great improvements effected in the application of torpedoes, submarine cables and charges of gun-cotton, with their appurtenances, can, in favorable situations, be laid permanently on the actual spots where they are required, and arrangements can be made for firing the mines with facility. There need, therefore, now be no fear that torpedoes will not be in their places when required, and will not be effective against ships attempting to force the entrance to a port, provided always that they are protected by artillery fire, so as to prevent their removal by the enemy.

Reasons why they are not at present applicable to New Zealand harbors.

It should be observed, however, that they entail the employment of delicate instruments, requiring skilled hands and steady, cool, heads for their manipulation; otherwise they may become a source of considerable risk not only to those who use them, but to the friendly vessels which should pass over them in safety. Although the entrances to the principal harbors of the colony generally present favorable conditions for this species of defence, such as a slight rise and fall of tide

good bottom, absence of disturbing influences from heavy seas, &c., it is quite evident that efficient and reliable torpedo defences could not be established without the most careful preparation, and without the services of a large body of men thoroughly trained to the work.

But the difficulty lies not so much in the application, as in the maintenance, of a system of defensive torpedoes when established. This will be more fully appreciated if the several modes, by which an enemy may destroy them, are considered. It is obvious that any plan, offering a prospect of success for clearing a passage through the torpedo defences of a port, must, in a great measure, depend upon the amount of active and passive resistance to be encountered. It would be unwise not to assume that an enemy would come provided with all the appliances necessary for the undertaking. On the part of the defenders, the great object to be attained is to keep the enemy in ignorance of the exact position of the mines; and it is indispensable, as I have already stated, that the channel should be sufficiently swept by artillery fire. In such cases the enemy would be driven to operate under cover of darkness, or after the defender's fire had been subdued.

Modes of attack likely to be adopted by an enemy to remove the mines.

The three modes of attack likely to be adopted are by countermining, creeping, or sweeping. Countermining is the term applied to the operation of destroying the defenders' mines by the explosion of heavy charges in their proximity. Creeping is the process of removing electrical cables, mines, &c., by dragging for them along the bottom by means of grapnels. Sweeping is employed to ascertain the position of mines by dragging a rope up or down a channel. These operations might be counteracted or rendered more difficult by providing an advanced system of mines—or by dummy mines—and by other obstructions in the water; but it would also be necessary to protect the approaches by guard boats, especially at night, and to illuminate the channels with electric lights. These measures would add largely to the expense of maintaining the defences in time of war.

If the question under consideration were that of defending only one harbor, such as Wellington, I should be inclined to recommend the adoption of defensive torpedoes, as that city is the seat of Government, and the head quarters of the telegraph system of the colony. There would consequently be less difficulty in establishing a reliable organization for the purpose.

Cost of submarine defences.

But when all points are carefully weighed, and it is borne in mind that there are other harbors of equal importance to be dealt with, I am led to the conclusion that it would not be practicable, at the present time, to maintain in a state of efficiency complete systems of submarine defences at each place, excepting by an expenditure of money entirely beyond the power of the colony to afford. I estimate that £20,000 would be required for the establishment of complete systems of defensive mines at Auckland, Wellington, Lyttelton, and Port Chalmers, inclusive of works, torpedo stores, and equipments, but exclusive of the cost of laying the mines in time of war. A torpedo corps, numbering at least 150 men, would have to be raised; buildings for the reception of

the stores would also have to be erected; and a small staff maintained at each place to look after the equipments. On the outbreak of war, the mines would be laid by detachments of the torpedo corps, and men would have to be permanently stationed on the spot to look after them.

Establishment of a Torpedo corps at Wellington.

At the same time, looking at the fact that the scheme of defence proposed cannot be considered to be complete without submarine mines, and that, at some future time, defensive mines may be introduced, I think it advisable to establish the nucleus of a Torpedo corps at Wellington, and to arrange for the instruction of a certain number of employés in the Telegraph Department. I will refer to this matter hereafter.

Offensive torpedo boats recommended

It has already been pointed out that guns alone will not prevent hostile vessels from forcing their way into a port; therefore—in the absence of submarine defences—it becomes necessary to fall back upon *offensive* torpedoes to support the batteries on shore.

There are several descriptions of offensive torpedoes, but the kind best suited for New Zealand harbors is the spar torpedo, which can be adapted for use from boats of almost any size, such as ordinary steam launches and pinnaces. Sir William Jervois has fully recognised their importance, for he has advised the Australian Governments to purchase torpedo boats, and, when ordering steam launches in the future, to bear in mind the practicability of their being so designed as to be available in time of war.

It has been ascertained by experiment that a charge of 35 lbs. of gun-cotton can be exploded at a depth of 10 feet, and at a distance of 22 feet from the stem of a 37-foot steam pinnace, without injury to the boat or fittings; but that a charge of 50 lbs. of gun-cotton is likely to seriously damage the boat. Torpedo boats are designed to carry one or two torpedoes, the charges being fixed at the end of spars 40 feet long, and fired by electricity. When fitted for service, they are partially covered forward, to throw off the water—which would otherwise be shipped on the explosion of the torpedo—and rifle-proof shields are provided for the man working the outrigger and for the steersman.

Mode of attacking an enemy's vessel with torpedo boats.

The mode of attacking a vessel would be somewhat as follows:—If a single boat be used, it should approach the enemy's vessel as stealthily as possible; at 200 or 300 yards distance, according to circumstances, the spar should be rigged out, the boat put at full speed and steered for the point intended to be struck; at about 30 yards off the engines should be slowed, so that the torpedo may be brought into contact without risk of the outrigger breaking off, and the instant the torpedo touches the ship's side it should be exploded. If several boats were available the attack should be made from different directions, and, when practicable, it should be directed against the vital parts of the ship, viz., the engines, boilers, and screws.

No doubt the attack upon an enemy's vessel with torpedo boats will be a service of great danger, but I am quite satisfied that there will

be no difficulty in obtaining volunteers for the purpose in the harbors of the colony. The higher the speed of the boats and the larger the number employed, the greater the certainty of a successful attack, which as a rule should be conducted at night or at early dawn.

The number I propose should be supplied for each of the principal harbors is not less than three.

It is possible that there are already steam launches at the ports to be defended which could be made available in time of war, provided an agreement were entered into with their owners and the necessary fittings procured; but it is to be understood that three new boats for each harbor are absolutely necessary. They should be procured from England or built in the colony—in the latter case a pattern vessel should be obtained.

Advantages to be gained from employment of torpedo boats.

The advantages to be gained from the employment of torpedo boats are many. They are admitted to be most formidable weapons against ships in the hands of daring and determined men. They could be procured almost at once, and are not very costly either to purchase or to maintain. They do not require specially trained men for working them, beyond the seamen and engineers who are to be found in every port. Lastly they can be utilized in time of peace for the Government service.

Modes of attack upon the harbors of colony open to an enemy.

After an inspection of the several harbors of the colony, I find that the conditions, under which the question has to be considered in each case, are very nearly similar, and that there are four modes of attack open to the enemy:—

1. He may endeavor to force the entrance in order to take up a position inside a harbor, from which he will command the town and shipping.
2. He may attempt to land a body of men with the object of overcoming the resistance of the local troops assembled to resist his advance; and, if successful, he might either levy a contribution and retire, or attempt to capture the batteries with a view to the permanent occupation of the harbor.
3. He may bombard the town and shipping from positions at sea, conveniently situated for the purpose.
4. He may blockade the entrance to the port.

Although the first and second modes of attack can be easily met by the proposed system of defence—batteries, torpedoes, and land forces; the third and fourth operations would be best dealt with by naval means.

It may be observed, however, that the possession of the torpedo boats, which I have recommended, would probably afford a simple way of counteracting the bombardment from the open sea—and even the blockade of the port—if the boats were made of such a size as to admit of their being conveyed, on board of a powerful steamer, to a convenient point, from which to launch them against the enemy's vessels.

Former projects for defence of colony.

Hitherto little provision of any kind has been made for the defence of New Zealand against foreign aggression. Projects for the protection of its harbors have been brought forward at different times, and in 1871, Sir W. Jervois submitted proposals for their defence by means of batteries and torpedoes, but no action was taken in the matter. Volunteers have been enrolled throughout the country, but no attempt has been made to give them a special organization for defensive purposes. In 1878 a committee, which assembled in London to consider the defences of the colonies, made certain recommendations, which agreed with Sir W. Jervois' suggestions. Acting upon the advice of this committee, the Government has procured from England a number of 7-inch and 64-pounder rifled guns, with a complete equipment for mounting them, and the necessary supplies of ammunition.

Recent action taken by Government.

Power of 7-inch and 64-pr. rifled guns now in colony.

I may here observe that the 7-inch gun, when fired with a charge of 30 lbs. of powder and a Palliser projectile of 112 lbs., is capable of piercing at 500 yards 8 inches of unbacked armor plate, or 6 inches backed by 18 inches of wood, 7 inches at 1,000 yards, and 6 inches at 2,000 yards. This gun also fires a double shell with a bursting charge of 10 lbs. 12 ozs. The 64-pounder, although not an armour-piercing gun, will be nearly as effective as the 7-inch piece against unarmoured vessels. The 7-inch gun would be fired up to 4,000 yards, and the 64-pounder up to 3,500 yards. With well trained men both pieces could be loaded and fired at the rate of about one round per minute, and—assuming a vessel to be steaming past a battery at a speed of ten knots an hour—each gun, which could be directed upon her, would be able to fire six shots for every 2,000 yards of her course within range of the guns. From 12 to 15 men should be allowed for working each gun, besides men for the service of the magazines, &c. The guns have been provided with wrought-iron carriages and traversing platforms of the latest pattern, and will fire over parapets from 6 to 7 feet high. Their lateral range will be from 120° to 150°, according to the position of each piece, and they can be depressed 5°.

Should it be decided in the future to increase the armaments—either by adding other works to, or extending, the batteries, which it is now proposed to construct—more powerful ordnance should, of course, be selected capable of coping with armoured vessels; but the guns now in the colony are sufficient for present requirements.

Defence requirements at each place.

Having thus discussed the principles upon which the defences of New Zealand should be established, and detailed generally the means that are available, I will proceed to enquire into the requirements of each place. I will keep in view the necessity of only recommending such measures as are well within the resources of the colony at the present time—but which may be added to in the future, when funds are available and the places to be protected increase in importance—whilst, at the same time, care will be taken that complete efficiency is secured by the recommendations now brought forward.

It is essential to bear in mind not only that the first cost of the defences has to be carefully considered, but, what is even of greater importance, the annual expense of maintenance.

Auckland. Population, 24,772.

Turning to the principal places which need local protection, I will commence with Auckland. This town is situated on the south shore of the harbor, at about 4,000 yards from the entrance, the width of which is 2,000 yards. There are three channels by which ships can approach this entrance, but they join in two, outside the Heads, where the navigable width is reduced to 1,500 yards by a shoal, at the end of which there is a lighthouse on piles. Once past this light a ship can steer a straight course up the harbor for a distance of 4 miles, the average width being 1,000 yards with 4 to 12 fathoms of water. Thus she might take up a position beyond the town with the object of firing into it. If there were no defences a vessel could also lie off the entrance and bombard the town at a range of 4,000 yards. It is obvious, therefore, that the best plan, to secure the town and shipping from destruction, will be to place one or two batteries at the Heads, with submarine mines between them, in the channel, in order to prevent the enemy entering the port; but, for the reasons which have already been explained, I provide three torpedo boats in the place of the mines.

The North Head is an admirable position for a battery, as it commands the entrance at easy range, together with all the approaches and the interior of the port. Okahu Point, on the opposite shore, also affords a favorable site for guns to co-operate with those on the North Head. The North Head work should be armed with three 7-inch and three 64-pounder M.L.R. guns, two guns facing outside and four on the entrance, with two of the latter looking up the harbor. For the present I do not recommend the second battery, which, when provided, should be armed with three heavy guns. I propose instead to utilize an available 40-pounder B.L. gun on a travelling carriage, which should be put into thorough order. In time of war this gun should be placed in position on Resolution Point, to the east of Judge's Bay, where it would face the entrance and fire upon a ship which might be passing the batteries. It could also be moved to the west side of the town in case she attempted to go up the harbor. There is another 40-pounder B.L. gun, which was destroyed by an accident some years ago. I have arranged for its examination, and should it be practicable to have it repaired I propose that the gun should be sent to England for the purpose. Failing this it should be replaced.

With the battery on North Head armed with six guns, about 50 shots could be fired at a ship—whilst passing in at a speed of 10 knots an hour—during 4,000 yards of her course, the range at no time exceeding 2,000 yards. The three torpedo boats would be ready to pounce upon the hostile vessel, and, if more than one cruiser appeared before the port, each would have to be attacked in detail.

It has been proposed to place two batteries—one on each side of Judge's Bay, facing the entrance—instead of at the Heads, for the reason

that the latter will require permanent garrisons in time of war, and also be liable to be captured by a *coup de main*. When considering the description and number of the forces required for the defences, proposed for the New Zealand ports, I shall explain that there need be no difficulty in providing this garrison. Moreover, the sites at Judge's Bay are altogether too retired from the entrance, and too close upon the town, to admit of an effective defence. They are also badly placed for protecting the submarine mines which may be added in the future. The liability to capture can be met by rendering the work self-defensible by its garrison, and by occupying the crown of the hill in rear.

An enemy, being prevented from attacking Auckland by sea, would no doubt consider whether he could not gain his object by throwing a body of men on shore, at some convenient spot outside, where a landing could be effected. To the south the city could only be reached by a long détour; to the north, an enemy might take up a position, on the north shore of the harbor—from which to fire into the city—at ranges varying from 2,000 to 3,000 yards. Such an enterprise would have to be met by a field force, the constitution of which I will refer to hereafter, and, if the attack were from the north, the signal station on Mount Victoria would have to be occupied.

The third mode of attack, viz., bombardment of the city and shipping from the sea, has already been referred to as not being practicable so long as there was a battery at the Heads.

Wellington. Population, 18,953.

Wellington, the seat of Government, is situated on the west shore of Port Nicholson, at a distance of seven miles from the entrance. This extensive inlet is about eight miles long and six miles broad, with deep water throughout, and is generally free from obstruction.

The entrance to Port Nicholson is through a channel, which is about 2,000 yards wide for a length of 5,000 yards. Inside the mouth of the entrance there is Barrett's Reef, which divides it into two channels —the main entrance, which is 1,300 yards across and perfectly straight, and Chaffer's Passage, which is about 500 yards at its narrowest part. Both channels have more than six fathoms of water. Owing to Chaffer's Channel taking a bend to the north of the reef, a hostile vessel could not pass along it without a pilot. The difficulties of forcing the entrance would consequently be greatly increased if both passages could be obstructed by torpedoes—the main one against hostile and friendly vessels, and Chaffer's Channel only against the enemy.

For the reasons, however, which have already been given, when describing the mode of applying submarine mines, this proposal cannot now be entertained, as it would involve too large an expenditure at present, and require elaborate arrangements during time of war. The proposal is mentioned in order that it may be borne in mind in the future, and complete data may be obtained as to the practicability of carrying it out.

Some years ago it was suggested that batteries should be placed on Ward's Island, Hallswell Point, and a site to the north of the city, in order to concentrate a heavy fire on the bay in front of the town. All these points are, however, more than 3,000 yards apart; whilst at the Heads the entrance is only 2,000 yards wide, and there are favorable positions for land batteries. Under these circumstances, therefore, it is manifestly preferable to keep the enemy's vessels outside the port, and to defend Wellington, against attack by sea, by placing a battery at the Heads on Dorset Point—armed with three 7-ton and three 64-pounder rifled guns—and providing three torpedo boats of the kind which I have already described.

A battery on the opposite shore, and submarine mines across the channel, could be added in the future, should it be considered necessary to augment the defences. For the present, one work and the torpedo boats will suffice. The number of shots that could be fired at a ship, passing at ten knots an hour, during 5,000 yards of her course through the channel, would exceed fifty.

The arrangements for manning the work will be considered hereafter, and, as it is about eight miles distant from Wellington, it should be rendered self-defensible by a stockade and ditch on the land side and by scarping the rock on the sea side. It will also be desirable to construct a small defensible post on the signal station overlooking the battery, to be garrisoned in the event of an enemy attempting to land.

The enemy, finding the Heads defended, might attempt to attack Wellington by landing at one of the adjacent bays, and marching into the city from thence. This operation, although no doubt difficult, is not impracticable, for a landing could be effected during all but southerly weather at Island Bay, situated about 6,000 yards to the west of the entrance and 4,000 yards from the southern portion of the city. From this point a valley extends towards the city, thus affording more favorable ground for the operation than Lyall Bay to the east of the former, where the sea generally breaks in all weathers. From Lyall Bay there are two roads into Wellington, one which skirts the shore of Evans Bay and Lambton harbor, and the other which runs over a high range of hills. Some apprehension has been expressed that an enemy might land in Porirua harbor, distant twelve miles from Wellington, with a fair coach road all the way, which could however be easily obstructed. This being a bar harbor with an entrance not easy of navigation, it is only available for small vessels—except in fine weather and with off-shore winds, when large vessels may anchor within the line of the outer Heads.

Although I consider that a landing at the points mentioned is extremely improbable, it is manifestly preferable to be prepared to meet the contingency, and this can best be done by the maintenance of a field force.

The possibility of hostile vessels bombarding the city, from outside the entrance to the port, is a risk that can be safely disregarded. An enemy could, no doubt, throw shells into Wellington as the ranges

are not too great, but he could do little damage, considering that the object fired at could not be seen. Probably the best plan of meeting this mode of attack would be by employing the spar torpedo boats, in the manner I have already suggested.

Port Lyttelton and Christchurch. Population, 26,653.

Port Lyttelton, in the South Island, is the port of Christchurch, from which it is distant seven miles. The town of Lyttelton stands on the north side, about 8,000 yards from the entrance of the harbor, which is six miles in length, and a little over 2,000 yards in width. The depth of water is eight fathoms at the entrance and shoals to three fathoms opposite the town; consequently, a ship intending to threaten Lyttelton, or to destroy the shipping within the port, must proceed at slow speed in order to come to a stop before arriving opposite the town. At the same time, as there is deep water close in to both shores, an enemy could enter during night and day without difficulty, but he could not pass beyond the reach of guns mounted on either side. The requirements for the protection of Lyttelton being nearly similar to those at Wellington, I propose to adopt the same defensive measures, viz., batteries on shore and torpedo boats, to be afterwards supplemented by submarine mines.

Owing to the land on both sides of the entrance being high, with precipitous slopes, it is impossible to find suitable sites for batteries for the purpose of keeping an enemy outside the Heads. The guns, therefore, will have to be mounted about half-way up the harbor, and it would be preferable to have them on both sides, on account of the facility with which hostile vessels could pass close in shore and be partially screened from fire.

I have selected sites on the spur of a hill, west of Camp Bay, on the southern side of the harbor, and on two points on the opposite shore, to the west of Gollan's Bay.

Considerations of expense and the difficulty, which might be experienced in rapidly reinforcing the garrison on the southern side, induce me to recommend that, for the present, only the works on the northern side should be constructed with an armament of two 7-inch and two 64-pounder rifled guns, the latter being so placed as to flank the shore below the former. Commencing at the maximum range of the 7-ton guns, more than forty shots could be fired at an enemy's ship before she came abreast of the batteries. The battery on the southern side should be designed for two powerful, and two medium-sized, rifled guns, together with two field pieces. Owing to the works on the northern side being within easy reach of Lyttelton by road, they will be conveniently situated for training artillerymen and for being readily supported in the event of an attempt to capture them by a *coup de main*.

In the absence of any batteries for the defence of the harbor no landing could be effected within the Heads, which could not be resisted with the local forces proposed for the place. It has been suggested,

however, that if the battery were constructed on the southern side an enemy might enter Port Levy and send a small body of men across the range of hills—over 1,000 feet high—which separates the harbor from the port, with a view to capturing the work and bombarding the town and shipping. Such an operation is not at all likely to be undertaken, as it would be extremely difficult considering the very rough nature of the country; and, as the battery would be well secured from assault, it could not be seized by any force such as would probably be landed.

It has also been urged that the weak point of Lyttelton and Christchurch is that both places are open to attack from the direction of Sumner—a small settlement at the mouth of the River Avon, situated eight miles from Christchurch, which city is reached by a perfectly level road. The road to Lyttelton passes over the saddle of a hill at a height of 1,100 feet, and an enemy landed near Sumner could reach a position, overlooking the port, in less than two hours.

Unless the enemy possessed a force, superior to that of the defenders, he would not attempt to land his men on an open beach where—even if he succeeded in obtaining a footing—his retreat might possibly be cut off by a change of wind or weather. Operations of this sort, therefore, are not likely to be undertaken if a small field force is maintained at Christchurch to counteract them.

Port Chalmers and Dunedin. Population, 35,026.

The harbor of Otago is a narrow estuary, about twelve miles long, nearly parallel to the coast, from which it is separated at its upper end by a narrow neck of land, called the Ocean Beach, 1,500 yards wide at its narrowest part.

Dunedin, the city of the province, is situated at the upper end of this estuary; and Port Chalmers, which is in railway communication with the city, lies about half-way between it and the sea. Although a considerable expenditure has been incurred in improving the channel leading up to Dunedin, the shipping lies at Port Chalmers.

Dunedin is exposed to two modes of attack by sea. An enemy might pass in through the Heads and appear before Port Chalmers—in order to destroy the shipping lying there—or, he might take up a position off the Ocean Beach, half a mile from the shore—from which he could see the city within easy range—and, by bombarding it, enforce submission to his demand for a contribution.

It is extremely improbable that he would be able to land on this beach, as the sea breaks upon it throughout the year; nor, in fact, is there any favorable point to be found for such an operation along the coast outside the harbor.

The defence of the entrance has first to be considered. The channel being rather intricate, with a bar across it, the navigation is somewhat difficult. Point Harrington, within the Heads, affords an admirable site for a battery, to face the entrance and command the channel, which at this point is narrowed by shoals to a width of 400 yards. I propose that the work should be designed for five guns, but

that it should only be armed at present with two 7-inch and one 64-pounder rifled guns. Two field pieces should be added to protect the rear of the work, and to fire upon the adjacent beaches, which cannot be well protected from the battery without a considerable increase in its armament. The chances of a landing on these beaches are so small that the field guns will suffice.

This battery, with three guns, and the three torpedo boats, will suffice for present requirements. In the future two more guns and submarine mines can be added. A ship, steaming at ten knots, would be exposed to fifty shots from the three guns, during the time she took to come within, and pass beyond, their maximum range; thirty shots would be at ranges varying from 400 to 2,000 yards.

Bombardment of Dunedin from the sea.

With regard to the bombardment of Dunedin from the open sea, this is a danger the extent of which should be well considered before the expenditure, required for the defence of Port Chalmers, is incurred. Some doubt has, I understand, been expressed as to the likelihood of a bombardment being resorted to by an enemy, in order to enforce a compliance with his demands for a contribution of money. I think the wisest course will be to make provision for meeting all reasonable contingencies, for—so long as the shipping in Port Chalmers was secured from capture—I believe the enemy would be justified in shelling Dunedin from the open sea.

The range into the heart of the town, from the position that could be taken up by the ship, would be 4,000 yards, and the place the enemy would be firing into would cover a large area; every shell, therefore, thrown into the city would, doubtless, do some damage; but, beyond creating considerable consternation, I do not think there need be any serious apprehension of the result of a bombardment. At the same time the erection of two batteries—one for three guns on Lawyer's Head to the east, and the other for two guns on the west of the beach—would be the most effectual way of keeping the enemy's ships at such a distance from the shore as to render a bombardment impracticable. It would, of course, be preferable to place powerful ordnance at these points, because the ranges are practically limited only by the power of the guns; but as there are already three rifled guns available—one 7-inch and two 64-pounders—they might be mounted on Lawyer's Head; the provision of a second battery and more powerful armament being deferred until the future. If, however, economy must be exercised in the matter, reliance could, for the present, be placed upon the light guns of the field force which it is proposed to maintain at Dunedin, the sand hills along the beach affording admirable positions for them. It may be observed that, in favorable weather, the plan, already suggested, of driving off hostile vessels—by means of torpedo launches, conveyed to the spot by a steamer—might be adopted.

Bluff harbor and Invercargill. Population, 3,761.

Bluff harbor, situated at the south-east corner of the South Island, is the port of Invercargill, a city which is rising in importance. It is also the first port of call, and the last of departure, for the steamers

trading between Melbourne and New Zealand. It does not, however, approach in importance any one of the four principal harbors of the colony, the defence of which has already been considered. The harbor can receive vessels of large tonnage, and is being improved, but the entrance is narrow, and the navigation rather difficult. It would, therefore, be easy, by means of fixed defences, to keep an enemy outside beyond bombarding range of the wharves and shipping.

This is a case where, owing to the narrowness of the channel, about 600 yards wide, probably the cheapest and most effectual way of barring the entrance would be by submarine mines, well covered by artillery fire. In order that the mines should not be disturbed by the rapid tidal current, which flows at from 5 to 7 knots an hour, they would have to be laid at the bottom of the sea, and fired by observation. But this element of defence cannot be adopted at the present time, for reasons which have already been fully explained.

Again, the extent of the trade of the port would not justify the employment of torpedo boats, although—in the event of steam launches being required for commercial and other purposes in future years—they should be designed as far as possible with that object.

In consequence of the smallness of the population at the Bluff, some difficulty would also be experienced in getting the number of men required for manning any defences that might be provided. No reliance could be placed on assistance from Invercargill, as it could not be brought to the port in time to be of service—excepting in the event of a land attack, which would, no doubt, be best met by a field force, held in readiness in that city, to be sent down by railway when an attack was apprehended.

Looking to the future, however—when fixed defences will be required—the best site for a battery will be found on Te Wae-wae Point on the north shore—its armament being composed of five powerful and two medium rifled guns, the latter having a sufficient lateral sweep to command the rear of the work and flank the beach outside the entrance.

Although it is obvious that the Bluff is not at present of sufficient importance to justify any large expenditure for its protection—such as that proposed for the defence of one of the large harbors of the colony—yet it stands in a different category from Nelson, for example, for its harbor is capacious, well sheltered, and not difficult to enter. Moreover it is much exposed to attacks by sea and land, whilst the harbor at Nelson is small and not easy of access by sea. At the Bluff an enemy might land on the north shore and fire into the town and shipping from Te Wae-wae Point; or he might land in a bay to the westward, from which a position, commanding the port at a range of 1,000 yards, could be reached.

The occupation of Te Wae-wae Point, with the defensible work already referred to, would render the first operation very difficult and hazardous; whilst the field force from Invercargill would be available to repel the other mode of attack.

Invercargill itself is not exposed to attack, as it is situated eighteen miles by railway from the Bluff, and the only approach to it by water is up the New River, which is not deep enough to admit vessels drawing over 7 feet.

I am of opinion, therefore, that the present requirements will be met by the maintenance of a field force at Invercargill, composed of field artillery and infantry of the strength I shall hereafter detail.

Nelson, Timaru, Oamaru, and other places.

For the defence of Nelson, Timaru, Oamaru, and other places—which are not large enough to require local defences—I propose that small bodies of riflemen, provided with field artillery, should fulfil the double purpose of keeping hostile vessels at a distance from the shore with their guns, and also of resisting predatory attacks on land, undertaken with the object of levying contributions. The fact of such organizations being in existence would probably be in themselves a security against any attempt of the nature contemplated being made.

Possibility of vessels passing into harbors at night.

It is sometimes advanced as a weak point in a scheme of defence by coast batteries that an enemy could pass them at night. At Wellington, Auckland, and Lyttelton this would perhaps be practicable, but at Port Chalmers and the Bluff there is much less likelihood of its occurring. At all events electric lights should be provided at each port, to illuminate the channels and approaches, and the entrances should be patrolled by means of one or more torpedo boats, which in time of war would always have to be kept ready for action. As regards the suggestion that an enemy might pass in thick weather, there is not the least probability of his attempting to do so, considering the difficulty he would experience of finding his way and the risk he would run of being attacked by the torpedo boats. When submarine mines are added to the proposed defences, the electric lights would prevent the enemy attempting to remove them without being seen from the batteries; and in foggy weather the hostile vessels would be exposed to the additional risk of being blown up.

Removal of buoys and beacons and extinguishing lights.

It has also been urged that a sufficient protection could be obtained by the removal of the buoys and beacons, and by extinguishing the lights at the several ports, during time of war. No doubt without lights an enemy would not attempt to enter the ports at night; but the removal of buoys and beacons is not a measure upon which much reliance should be placed, for hostile vessels could pass in without them in day time; or they would lie off the port until they procured the services of a pilot or of the captain of a merchant vessel, captured for the purpose. The inconvenience and increased difficulty friendly vessels would experience, if such measures were adopted, are points not to be lightly disregarded.

The defensive measures adopted for the New Zealand harbors should not be dependent upon chance, but they should be well con-

sidered and prepared beforehand in time of peace. It would not be possible to extemporize defences which would be reliable, and it is well to bear in mind that extemporized defences are generally very costly and of doubtful value. The true policy will be to look upon the defence preparations, made in time of peace, in the light of an insurance against the risks the colony will be exposed to in time of war.

Number and description of forces required for proposed defences.

Having examined in detail the defence requirements of the principal harbors of the colony, and briefly suggested the basis upon which the protection of other settlements on the coast should be established, I will proceed to consider the number and description of the forces necessary in connection with the proposed system of defence.

It will be noted that the conditions under which the subject has to be discussed—as regards the various places to be protected—are almost identical; thus, the principal cities and ports of New Zealand are exposed to attacks by sea, and possibly to raids by bodies of men landed from an enemy's ships, with the object of turning the fixed defences, or of gaining the end in view by a direct attack on the cities.

The plan of defence—proposed for the present—comprises fixed defences on land, supplemented by spar torpedo boats, together with the necessary men for manning the batteries and boats, backed by local forces so organized as to be capable of operating in the field. In every case it is proposed to keep the enemy's vessels outside the ports—and thus give the defence a superiority over the attack,—for it is obvious that an enemy, attacking any of the New Zealand ports, would be fighting at a disadvantage if, before he could reach the object of attack, he had to run the gauntlet of fire from batteries and, at the same time, be exposed to the attack of torpedo boats—kept well concealed from view until the ships were actually engaged in navigating the channels at the entrance.

First, then, as regards the men required to work the guns and defend the batteries against assault.

If expense had not to be considered, the best plan would be to maintain a sufficient number of permanent artillerymen at each port who, in time of war, would reside in the batteries. The necessity for permanent garrisons in the batteries has been urged as a reason against guns being placed at a distance from the object to be protected. It is obvious, however, that—under any circumstances in time of war, and wherever the batteries may be situated—men must reside in them to keep everything in order and ready for the guns to open fire at the shortest notice. Consequently the best arrangement will be one that provides a nucleus of permanently enrolled men—placed in the batteries on the outbreak of war—supplemented by a sufficient force to complete the gun detachments and garrison the works at the time of attack.

Armed constabulary to furnish permanent detachments for batteries.

There already exists in the colony a force—the armed constabulary—of a very superior character. The depôt for this force is at Wellington ; and, in order to render it in every way fitted to supply the permanent detachments for the batteries, it would only be necessary to appoint a qualified artillery instructor and provide the necessary appliances for drill. Every man after he had passed in infantry drill—to enable him to perform his ordinary duties—should be put through a course of gunnery instruction, including shot practice. The amount of knowledge, required to work the ordnance in the several batteries, will be small and easily acquired, as all the guns will be alike in character, and similarly worked and mounted.

Naval brigades to be established to furnish auxiliary detachments and crews for torpedo boats.

The auxiliary detachments, which are to reinforce the permanent men, should be organized on a system analogous to the naval reserve which is maintained in Victoria for service afloat and on shore. Under the purely volunteer system there is practically no hold over the men. By the Victorian system the men serve under a Discipline Act, receive retaining fees, and are compelled to attend drill.

Where the number of men required at each place is small, it is important to avoid the creation of a number of small corps—an evil which, in the New Zealand Volunteer Force, has reached such serious dimensions as to be fatal to military efficiency. I propose, therefore, to establish at Auckland, Wellington, Lyttelton, and Port Chalmers naval brigades, which would furnish detachments for working the guns, garrisons for the batteries, and crews for the torpedo boats. In this manner the defence against attack by sea would be in the hands of one commander at each port.

Considering that everything will depend upon the efficiency of the proposed batteries, it is imperative that the gunners should be carefully trained men, who would be available when required. Under the system proposed this training could be ensured, as the men would be paid for attendance at drill.

Secondly. With respect to the crews of the torpedo boats:—The number of boats proposed is twelve—three at each of the principal ports : Auckland, Wellington, Lyttelton, and Port Chalmers. At least three men would be required for each boat: one to command, an engineer for the engines, and one man to work the spar torpedo. The sections of the naval brigades entrusted with the torpedo boats might number in peace time ten men. In time of war the crews would have to be permanently enrolled, and so increased as to have men in reserve to fill up vacancies, and ready for duty, day and night, so long as the war lasted.

The same arrangements would be required at other places on the coast, where Government or private steam launches were available for defensive purposes.

Under the proposed organization the strength, in time of war, of the permanent and auxiliary detachments of coast artillery and of the boats' crews would be as follows :— Strength of coast artillery and torpedo boats' crews.

Harbors.	Number of Guns.	Number of Officers, Non-commissioned Officers, and Men in Detachments—		Torpedo Boats' Crews.	Totals.
		Of Constabulary.	Of Naval Brigades.		
Auckland	Six in one battery	25	100	20	145
Wellington	Six in one battery	25	100	20	145
Lyttelton	Four in two batteries	25	100	20	145
Port Chalmers ...	Three in one battery	25	100	20	145
Grand Total		100	400	80	580

Constabulary	100
Naval Brigades	480
	580

The foregoing numbers include the gun detachments and the necessary garrisons for defending the batteries against a *coup de main*. In time of peace, the strength of the naval brigade at each place might be reduced to 80 officers and men.

At Dunedin, the artillerymen required for the battery at Ocean Beach, which is to be armed with three guns, may be composed entirely of volunteers; the strength, including garrison, being fixed at 80 officers, non-commissioned officers, and men. This battery, being close to the city and not exposed to sudden attack—as in the case of the batteries at the entrances to the ports—would not require a permanent garrison on the outbreak of war. Volunteer garrison artillery at Dunedin.

Great care will have to be exercised in recruiting the officers and men for the naval brigades. A large proportion should be taken from the seafaring population; all the men should be able-bodied, and the majority accustomed to manual labor. Special regulations* for the government of the corps will be necessary. Naval brigades.

Next, as to the constitution and strength of the field forces recommended. Constitution and strength of field forces.

Economy being the first consideration, the idea of maintaining a nucleus of permanent infantry at each place cannot, under present circumstances, be entertained, nor is it quite clear that such a step is necessary. At the same time, it is desirable to draw attention to a source from which, by due preparation in time of peace, a substitute could, in time of war, be drawn for the permanent infantry referred to.

* A copy of the regulations, in force in Victoria, will be found in the Appendix.

Formation of reserve from armed constabulary.

I understand that it is intended to fill the ranks of the police force of the colony from men who have served in the armed constabulary. If, while serving in the police, the military training of the men were kept up—an arrangement not attended with much difficulty—it is obvious that a reserve would be created which, in time of war, would furnish a most valuable nucleus of trained men of the highest class for the volunteer field forces. But it would be possible to go further, and to throw open to the armed constabulary employment in all departments of the State, on condition that the non-commissioned officers and men agreed to serve in a reserve for a term of years, and be liable to be called out in time of war.

In Victoria the foot police has, for many years, been recruited from a corps of paid artillery maintained for defence purposes.

By such inducements a superior class of men would be attracted to the ranks of a force organized on the proposed model. They would be content to serve for small pay in consideration of the chances of obtaining permanent and well-paid appointments under the Government, as a reward for efficient service and good conduct. At the same time, the evils would be avoided which inevitably result from the maintenance of armed bodies of men in time of peace, with insufficient employment and indifferent prospects of advancement.

Under such a system the defensive power of the country would be increased year by year, and there would be absolute security that a small, but thoroughly trained, force would be immediately available when it was wanted.

Description of field forces.

In the absence of this reserve of trained men, a volunteer force will have to be relied upon, of sufficient strength at each place, to repel such an attack as is likely to be made by one or two cruisers landing from 200 to 300 men. For this purpose a field force of 500 men should be maintained—at Auckland, Wellington, Christchurch, and Dunedin* —comprising 30 mounted men, 70 field artillery, and a battalion of infantry 400 strong. In time of peace, the infantry might be reduced to 250 men.

In this manner a compact body of men would be provided at each of the principal harbors, with a definite sphere of action. The battery at the entrance to the port being secure from capture—owing to its being enclosed and self-defensible by its garrison—the field force would be free to act to the best advantage in repelling an attack by land.

Mounted men.

The mounted detachment might be designated "Mounted Rifles," a description of force better suited to the work required of them than cavalry. The officers and men should be good horsemen, and expert in the use of the sword and rifle. They should be trained especially with the view of acting in time of war as scouts, escorts, and orderlies. Reconnoitring and the conveyance of accurate intelligence should be carefully practised.

Field artillery.

The field artillery should be taught such movements as are likely to be required on service. The men should be armed with carbines, and properly instructed in their use, in order not to be

* At Port Chalmers an extra company of infantry, 50 strong, should be maintained.

entirely dependent upon the infantry for support. An annual course of shot and shell practice should be sanctioned, but, instead of allowing every man, whether efficient or not, to take part in the course before he was individually fitted for it, permission should only be granted as a reward for efficient service. Thus it would be possible to set up a high standard of efficiency to which volunteers, from their superior intelligence, can readily attain if properly instructed.

Infantry. The infantry should be formed into a battalion commanded by a major, and composed of four companies, each 100 strong. The whole aim, in training volunteer infantry, should be to make the men good marksmen and good skirmishers. Considering the little leisure and the few opportunities that the officers and men can devote to drill, it is waste of time to attempt more than the simplest battalion movements. But, inasmuch as the introduction of breech-loaders has necessitated an extended order of fighting, it becomes the more important to see to this individual training of each soldier, by insisting upon a thorough knowledge of squad and company drill in close and extended formations, before battalion movements and skirmishing are attempted.

Staff. The staff, required for the force at each place, should comprise a commanding officer, an adjutant, obtained from the ranks of the Imperial army—who would undertake the duties of drill instructor for the infantry and mounted men—and an artillery instructor for training the coast and field artillery, who would also act as master gunner for the batteries and armaments. Where there are already sergeant-instructors for the infantry they should be retained, and a qualified officer of volunteers selected to hold the appointment of acting adjutant to each field force.

Volunteer engineers. At Auckland and Christchurch there are already volunteer engineers, and it is desirable to retain them at a strength of 50 officers and men, on account of their being recruited from a very desirable class ; but, in other cases, it will suffice to appoint qualified volunteer officers to the staff of each commander of the field forces, to whom would be entrusted the consideration of all military engineering matters, connected with those forces and with the works of defence. Should any field works be required, or any works have to be done at the batteries, they could be executed by civil labor, under the direction of these staff officers.

Torpedo corps. I have already suggested that, although it is not possible, at the present time, to provide submarine defences to bar the entrances to the ports, arrangements should be made to establish a school for the instruction of the employés of the Telegraph Department in torpedo work. The object of this proposal is to create a corps, whose duty would be to study the subject and carry out experiments, to watch what is going on in England and elsewhere in torpedo matters, and to collect information concerning the harbors of the colony. A small torpedo equipment should be purchased, and a corps of 40 officers and men formed under the direction of the head of the Telegraph Department of the colony. To this corps would be entrusted the preparation of the electrical appliances connected with the proposed torpedo boats.

Forces at Invercargill and other places.

The requirements of Invercargill and other places, which are not to be protected by local defences, have yet to be considered.

Invercargill, not being exposed to an attack by land owing to its distance from the sea, does not require a field force for its protection; but it is advisable to maintain a small body of men for guarding the Bluff against the attacks, to which I have already shown it is likely to be exposed. A field force 250 strong, composed of a battery with three guns and two companies of infantry, will be found sufficient for the present. In time of peace the force might be reduced to 200 men.

At Timaru, Oamaru, Nelson, Napier, Gisborne, and other places on the coast which are open to attack, and where volunteer corps are already established, it is desirable to provide one strong company of infantry, a section of which should be instructed in field-gun drill; the object being, as already explained, to simplify and place the defences of each place under the control of one commander.

Description and strength of local forces required.

To sum up, therefore, the following is a statement of the description and numbers of the local forces required for the defence of the four principal harbors and cities, and of Invercargill:—

Description of Force.		Auckland.	Wellington.	Lyttelton and Christchurch.	Port Chalmers and Dunedin.	Invercargill.	Total.
Coast Artillery	Constabulary ...	25	25	25	25	...	100
	Naval Brigades	100	100	100	100	...	400
Torpedo Boats' Crews		20	20	20	20	...	80
Volunteer Garrison Artillery ...		...	...	...	80	...	80
Total for Coast Defences ...		145	145	145	225	...	660
Field Forces (Volunteers)	Mounted Detachment ...	30	30	30	30	...	120
	Artillery	70	70	70	70	50	330
	Engineers	50	...	50	...	...	100
	Infantry	400	400	400	450	200	1,850
Total for Field Forces ...		550	500	550	550	250	2,400
Grand Total	War Establishment ...	695	645	695	775	250	3,060
	Peace Establishment* ...	480	430	480	560	200	2,150

Having decided what should be the strength and description of the troops, required for the scheme of defence proposed for New Zealand, the next step is to ascertain whether they can be furnished from the existing local forces.

The following tabulated statement—taken from a report on the Volunteer Force, presented to both Houses of the General Assembly in 1879—gives the volunteer corps in existence on the 30th June 1879.

* The detail of the peace establishment will be found in the Appendix.

Return of volunteers at present in New Zealand.

Return of the Number and Strength of Corps of Volunteers in each District.

District.	Cavalry.		Artillery.		Engineers.		Rifle.		Naval.		Totals.		Remarks.
Auckland	...	...	1	91	1	89	6	389	1	106	9	675	
Waiuku	1	65	...	...	...	...	4	211	...	...	5	276	
Waikato	2	197	...	...	...	...	1	79	...	...	3	276	
Taranaki	1	67	...	...	...	...	18	918	...	...	19	985	
Wanganui, Patea, and Rangitikei ...	4	257	...	...	...	...	12	770	...	...	16	1,027	
Wellington and Wairarapa ...	...	...	1	76	...	...	6	370	1	176	7	622	
Napier	...	...	1	61	1	68	...	...	...	...	2	129	
Poverty Bay	...	...	1	60	...	...	1	60	...	...	2	120	Increase since 1st August 1878 :—
Bay of Plenty	1	33	...	...	...	...	1	107	...	...	2	140	*North Island*—Adults 2,191
Thames	...	...	...	...	1	160	6	457	1	158	8	775	*South Island*—Adults 350
Total North Island ...	9	619	4	288	3	317	57	3,351	3	440	73	5,025	
Nelson	...	...	1	79	...	...	3	197	1	52	5	328	
Marlborough	...	...	...	...	...	...	4	272	...	...	4	272	
Canterbury	1	113	2	125	1	73	3	199	...	...	7	510	
Oamaru	...	...	1	65	...	...	3	174	...	...	4	239	
Dunedin	...	...	2	197	...	...	11	696	2	180	15	1,073	
Invercargill	...	...	2	153	...	...	3	137	...	...	5	290	
Lake	...	...	...	...	...	...	3	204	...	...	3	204	
Westland	...	...	...	...	...	...	2	108	...	...	2	108	
Total South Island ...	1	113	8	619	1	73	32	1,987	3	232	45	3,024	
Total all New Zealand ...	10	732	12	907	4	380	89	5,348	6	672	118	8,049	

As I have already explained, the constabulary will furnish the permanent detachments for the batteries, at the entrance to the harbors; and their reinforcements and garrisons, together with the crews of the torpedo boats, will be provided from naval brigades, which are to be formed under a new organization. At Dunedin volunteer artillerymen are proposed for the battery on the Ocean Beach, if constructed.

It will be seen, on examining the return, that there are already corps of naval volunteers at Auckland, Wellington, Port Chalmers, and Dunedin, numbering 106, 176, 77, and 103 respectively. It will only be necessary, therefore, to convert the corps at Auckland, Wellington, and Port Chalmers into naval brigades, each with a war establishment 120 strong, and to form a brigade at Port Lyttelton of the same strength. At Dunedin the naval volunteers need not be retained unless the Ocean Beach battery is erected.

Remarks as to coast and country corps.

As regards the field forces, although there are not, at present, sufficient men enrolled, no difficulty will be experienced in obtaining the number required.

With respect to the remaining corps on the coast, it may be desirable that they should be retained in both islands; but their strength and constitution should be on some recognised principle.

The retention of country corps in the North Island for the maintenance of internal order does not come within the scope of the present enquiry; but, so far as the defence of the country against foreign aggression is concerned, the advantage of having volunteers at such places as Queenstown, Frankton, Cromwell, and Arrowtown—almost in the centre of Middle Island—is not apparent; and I feel bound to observe that any corps, situated at a distance from the point to be defended, will not be of much value.

With volunteers it will be impossible, in time of war, to arrange for their rapid concentration, and, if complete efficiency has to be attained, it will be best to rely only on those men, who are actually residing within a few miles of the point likely to be attacked. The question under consideration is that of repelling the sudden attacks of one or two cruisers ; and so long as the volunteers are scattered throughout the two islands—without apparently much regard to the points to be protected—there will be weakness everywhere, the protection of the country against a foreign enemy will not really be provided for, and there will be no adequate return for the large annual outlay incurred.

I am aware that an impression prevails that, in time of war, these corps would afford valuable reserves from which to draw the necessary forces for defence, and that their organization into fighting bodies could be safely left to the time when the emergency arose. To oppose with success the sudden attacks that an enemy would probably make upon the shores of New Zealand, the armed forces of the colony should be ready on the spot, commanded and administered in peace and war upon one and the same system. If the object is to foster the military spirit of the country it is probable that it could be done equally as well, and probably better, by adopting a less costly organization. The military

forces of New Zealand have done good service in the field, reflecting the greatest credit on both the officers and men engaged; and the volunteers have shown patriotic spirit and devotion in giving their time, and in many cases their money, to the service of the State; but I fear that their energies will be misdirected and wasted unless a better organization is adopted.

Rifle companies in South Australia.

The principle of making a distinction between forces—maintained so as to be immediately available for defence against foreign aggression—and others, which are established for the encouragement of rifle-shooting and other reasons, has already been recognised in South Australia. In that colony there are volunteers for the defence of Adelaide, and rifle companies distributed in the inland districts, which are liable to be called out for service against a foreign enemy or for the maintenance of internal order.* These rifle companies cost very little to maintain, they are governed by less stringent regulations than the volunteers, and the State only provides arms, accoutrements, and ammunition. Each company is periodically inspected, and is only required to possess an elementary knowledge of drill.

I believe that such an organization—not necessarily the same, but partaking of a similar character—would be well adapted to certain districts of New Zealand.

Inspections of volunteers held at Auckland, &c.

The inspections, which I held of the volunteers at Auckland, Wellington, Christchurch, Dunedin, and Invercargill, were necessarily brief, and I had no opportunity of testing the efficiency of the officers and men, except at drill of an elementary character; nor could I, in so short a time, ascertain the extent of the military knowledge possessed by the officers. At the same time I was very favorably impressed with the force, and I am satisfied that it lies in the power of the officers, by a closer application to their duties, to remedy most of the shortcomings that I noticed. The great want in the force is the same as that which is common to all volunteer forces, and does not appear to be easily supplied, viz., that, owing to the difficulty of getting the men to turn out for daylight drill, it is not possible to teach them some of the most essential portions of a soldier's training—drill in extended order and combined movements, such as would have to be executed in the presence of an enemy, and whereby both officers and men learn to work together and rely upon each other. Bad habits are contracted by the officers and men from constantly drilling in sheds by gaslight. The absence of continuous training is also a cause of general complaint. To these and other matters my attention was directed during my inspections; and I will now proceed to explain briefly the recommendations, which I have to make in respect to the force. Many of my suggestions are

Defects in present organization.

* Copies of the Act, under which the South Australian rifle companies are formed, and of the rules of the Rifle Association established in connection with these companies, will be found in the Appendix to this report.

supported by the opinions, not only of the officers appointed last year to inspect the force, but of those volunteer officers with whom I was more immediately brought into contact during my visit.

Searching enquiry necessary before making changes.

At the same time I consider that, before any changes are introduced, it will be necessary to institute a more searching enquiry into the whole subject, and to refer to what is being done elsewhere, and especially in England, where the efficiency of the volunteer forces has been much increased.

Reduction in number of corps.

I have already drawn attention to the necessity for reducing the number of corps. It will be seen from a return in the Appendix to this report, that there are, exclusive of the cadets, 118 corps for a force of 8,032 officers and men; that several corps do not number 40 officers and men, and not more than 13 corps exceed 100 officers and men. The result is that, at some of the parades of a corps, there are not sufficient men to form a squad for drill; and, on the occasion of my inspecting the Auckland volunteers, there were seven corps to make up a strength of 349 of all ranks. The administration and command of a number of small corps is thereby rendered more difficult; and it is necessary, in the interests of economy, discipline, and efficiency, that the present state of things should be rectified.

The remedy is to consolidate, wherever practicable, the corps of infantry into small battalions of four companies each, with one set of rules for their government, one field officer in command, and one list for the promotion of officers. A step in the right direction has already been taken, by the recent consolidation of the batteries of artillery into one regiment for the whole colony.

Uniformity of clothing.

The subject of uniformity in clothing has already engaged the attention of the military authorities; and, from enquiries I have made, I am satisfied that there will be no difficulty in carrying out the proposal, as the majority of the volunteers fully recognise its necessity. The best plan will be to stop at once all issues of clothing of the present patterns, and fix a date after which the uniformity is to take effect. I have reason to believe that a considerable saving on the present capitation vote would be effected if the clothing and equipment of the force were to be placed on a different footing, in order that the materials could be procured in large quantities and at wholesale prices, to be made up locally. At present I am told the cost of clothing some corps is excessive.

Capitation allowance.

With regard to the capitation allowance, I recommend that there should be only one rate for all arms, and that the whole subject should be investigated with the view to ascertaining how the grant has hitherto been expended. A regular audit should be at once instituted, as I am informed that at present there is no Government check whatever on the expenditure, once the amount claimed by each corps has been paid over to it. It is probable that savings may be effected, which will render it unnecessary to increase the allowance; but should any augmentation be found to be necessary, after due enquiry, greater efficiency should be required in return.

The necessity for increased drill, especially in the first year of service, and for daylight parades has already been remarked upon. In the mother country the volunteers have submitted to more stringent conditions of service and efficiency, in return for increased aid from the State. Attendance at a certain number of daylight parades should be one of the conditions enforced in New Zealand. Increased drill and daylight parades.

In a recent report upon the Volunteer Force of Great Britain the necessity for camps of exercise is prominently noticed, as they afford volunteers the only means of acquiring the knowledge and the habits of military life. In fact, once a man has been well instructed in elementary drill, a week of continuous training in camp equals—in the amount of instruction acquired—that obtained otherwise throughout the whole year. Moreover, camps afford the commanders better opportunities of testing the respective merits of the officers serving under them. Camps of exercise and continuous training.

There are other matters connected with the government and organization of the force which require looking into: such as the periodical inspection of the corps; the revision of the regulations; the necessity for a standard as to age, height, and chest measurement; the measures desirable for imparting instruction to officers and non-commissioned officers of volunteers; the extension of the length of service, in order to remove the difficulty, experienced at present, in retaining the men in the ranks for any length of time; and the formation of a reserve. Other matters.

But, besides the large force of volunteers now maintained, there are 39 companies of cadets numbering 2,255 boys—665 in the North Island and 1,590 in the South Island. These cadet companies cost the country several thousands of pounds per annum, and it is doubtful whether much of this expenditure is not wasted, as a large portion of it is required for clothing the boys. An examination of the reports of the inspecting officers for 1879, already referred to, will show that the town cadet corps are not considered equal to the school corps in discipline and efficiency. Cadet corps.

I fully recognise the importance and advantage of cadet corps, but it is to be borne in mind that drill is not of primary importance, the object being rather to train boys to habits of obedience and self control and accustom them to the restraints of discipline. I am satisfied that no good can possibly result from drilling boys at night. The preferable course would be to abolish the present town cadet corps and make arrangements for drilling the boys at all schools by their own masters, —within certain limits as to numbers and under the supervision of the officers commanding districts. The capitation grant might be reduced so as only to cover the incidental expenses of instruction—arms, accoutrements, and ammunition for the older boys being supplied by the State; uniforms not to be insisted on.

Having fully considered the nature of the attacks to which New Zealand is exposed, the places which require local protection, the means Recapitulation of measures proposed.

that are available for defence; and having discussed the requirements of each locality in detail, together with the description and strength of the forces which are necessary for the system of defence which is recommended, I will recapitulate the several recommendations and defensive measures which are proposed in this report :—

I. The four principal harbors of the colony (Auckland, Wellington, Lyttelton, and Port Chalmers) to be defended against naval attack by batteries armed with the ordnance, now in the colony, supplemented by spar torpedo boats which are to be purchased.

II. Additional guns and submarine mines to be added, in the future, as the places increase in importance.

III. The protection of Dunedin from bombardment off Ocean Beach to be effected by a battery—armed with guns available for the purpose—a second battery being provided at some future time; or, if money is not available, the construction of these batteries to be deferred for the present, and reliance to be placed on the battery of field artillery, attached to the field force, which it is proposed to maintain at Dunedin.

IV. The cities of Auckland, Wellington, Christchurch, and Dunedin to be protected, against attack by land, by means of field forces, maintained for the purpose and organized from the existing Volunteer Force.

V. The protection of Bluff harbor by local defences to be deferred, and a field force to be maintained instead at Invercargill—which would be ready, in time of war, to be moved by rail to the Bluff—for the purpose of repelling any attempt made by an enemy to land, with the object of destroying the shipping.

VI. If it should be decided to defend the minor harbors and settlements along the coast, local companies of infantry, with field guns, to be maintained for the purpose.

VII. Naval brigades to be formed at Auckland, Wellington, Lyttelton, and Port Chalmers, and a company of volunteer artillery at Dunedin if required.

VIII. The infantry corps at Auckland, Wellington, Christchurch, and Dunedin to be consolidated into battalions, and field forces organized at those places.

IX. A torpedo corps, and a school of gunnery for the constabulary, to be established at Wellington.

X. Additional field guns, a torpedo equipment for experimental purposes, and four electric lights to be purchased.

XI. The changes necessary for the better government, inspection, and general organization of the volunteer force throughout New Zealand, together with the expenditure required for its maintenance, to be enquired into.

XII. The forces to be maintained—in time of war—for that portion of the defence scheme, which I propose to carry out forthwith, will be as follows :—

(*a.*) *For manning Batteries.*

Constabulary	100	officers and men.
Naval Brigades	400	„
Volunteer Artillery at Dunedin	80	„
Total	580	„

(*b.*) *For Torpedo Boats.*

Naval Brigades—80 officers and men.

(*c.*) *For Field Forces.*

Volunteers { Mounted detachments, Field Artillery, Engineers, Infantry } 2,400 officers and men.

(*d.*) *For Torpedo Corps.*

Volunteers—40 officers and men.

The total forces to be maintained, in time of war, exclusive of the Torpedo corps, would therefore amount to 3,060 officers and men; and, in time of peace, the strength would be reduced to 2,150 officers and men.

The annual expenditure required for the maintenance of these forces, in time of peace, would be as follows :—

1. Staff and Instructors [proportion chargeable to external defence]	£2,000
2. Naval Brigades, 320 officers and men	£5,000
3. Capitation allowance for Volunteers, including Garrison Artillery at Dunedin, and Torpedo Corps—2,190 officers and men	£6,000
4. Camps of Exercise—Annual supply of Ammunition—Contingencies	£4,000
5. Custody of Stores (share of annual expenditure provided in military estimates)	£500
Total	£17,500

In time of war, this estimate would be increased by such items as the pay of the armed constabulary, who might have to be replaced by substitutes, of the additional men required for the naval brigades, and of the permanent crews of the torpedo boats. The Volunteer Force would have to be brought up to its war establishment, and provision made for the payment of the men, whilst employed on military duties, as well for the general expenses of maintaining the defences ready for immediate action.

Comparison between proposed and present annual expenditure.

It is not possible to draw a comparison between the proposed, and the present, annual expenditure without examining in detail the military estimates for this year. Such an enquiry does not come within my instructions, nor would it be profitable to undertake it until a decision has been come to, in reference to the proposals contained in this report. I see no reason, however, to doubt but that, under an improved organization, it will be quite practicable to keep down the total expenditure within the amount of this year's estimate, and at the same time provide not only for an efficient scheme of defence against foreign aggression, but also for maintaining the Volunteer Force generally at its present strength.

At present the expenditure on the volunteers, including the cadets, amounts to £40,374, and yet there is no adequate provision for defence against external attacks. The investigation into this expenditure had better be conducted at the same time as the enquiry, which it has already been suggested should be made, into the organization of the force.

Capital cost of scheme of defence.

The capital cost of that portion of the scheme of defence, which I recommend should be commenced at once, is estimated approximately as follows:—

I.	Batteries at Auckland, Wellington, Lyttelton, and Port Chalmers	£18,000
II.	Torpedo boats for the four principal harbors	£14,000
III.	(*a.*) Surveys and preparation of plans for batteries	£5,000
	(*b.*) Purchase of four electric lights	
	(*c.*) Purchase of experimental torpedo equipment	
	(*d.*) Arming batteries after completion	
	(*e.*) Contingencies and unforeseen expenditure	
		£37,000
	Deduct balance available, at present date, on special vote for defences, say	£9,000
	Amount now required ...	£28,000

To this amount should be added the cost of the battery on Ocean Beach, estimated at £3,000. It is possible that the purchase of additional guns for the field forces can be paid for out of the vote for arms and ammunition in this year's estimates.

Steps necessary to give effect to recommendations in report.

Before I can detail the steps necessary to be taken—in order to give effect to the recommendations contained in this report—a decision will have to be given on the whole question of defence; but it is desirable that authority should be granted for the preparation of the designs for the proposed batteries, as the drawings will take several months to complete. Meanwhile the surveys of the sites which I have selected for the works are in progress.

I further advise immediate action in respect to the torpedo boats, for—in the event of war breaking out before the defensive works are completed—a considerable degree of protection would be afforded by the torpedo boats alone. Designs, prices, and the fullest information on the subject generally should be procured from England; and enquiries made as to the suitability of any steam launches that may be now in use at the several ports of the colony.

P. H. SCRATCHLEY,
Colonel R.E.

Melbourne, 1st March 1880.

APPENDIX.

RETURN of Volunteer and Cadet Corps in New Zealand.

District.	Volunteer Corps.	Cadet Corps.	Strength—All Ranks. Volunteers.	Strength—All Ranks. Cadets.	Remarks.
Auckland ...	Staff	... ...	3	...	
	A Battery Artillery ...	... ...	91	...	Available for proposed field force and naval brigade.
	Engineers	... ...	89	...	
	Victoria Rifles ...	... ...	78	...	
	No. 3 Rifles... ...	... ...	66	...	
	Hobson Rifles ...	... ...	82	...	
	Scottish Rifles ...	... ...	59	...	
	Naval Volunteers ...	... ...	106	...	
	Whangarei Rifles ...	... ...	52	...	
	Otahuhu Rifles ...	... ...	52	...	
		Engineer Cadets	...	74	
		Grammar School Artillery Cadets	...	79	
Waiuku ...	Staff	... ...	2	...	
	Waiuku Cavalry ...	... ...	65	...	
	Forest Rifles ...	... ...	56	...	
	Pukekohe Rifles ...	... ...	46	...	
	Tuakau Rifles ...	... ...	59	...	
	Wairoa Rifles ...	... ...	50	...	
		Forest Cadets...	...	11	
		Tuakau Cadets	...	23	
		Pukekohe Cadets	...	42	
Wanganui and Rangitikei	Staff	... ...	2	...	
	Alexandra Cavalry ...	... ...	57	...	
	Wairoa Cavalry ...	... ...	57	...	
	Hawera Light Horse Cavalry	... ...	95	...	
	Patea Light Horse Cavalry	... ...	48	...	
	Wanganui Rifles ...	... ...	98	...	
	Royal Rifles ...	... ...	71	...	
	Palmerston North Rifles	... ...	79	...	
	Waverley Rifles ...	... ...	60	...	
	Normanby Rifles ...	... ...	66	...	
	No. 1 Hawera Rifles ...	... ...	55	...	
	No. 2 Hawera Rifles ...	... ...	53	...	
Patea ...	No. 1 Carlyle Rifles ...	... ...	57	...	
	No. 2 Carlyle Rifles ...	... ...	68	...	
	Manutahi Rifles ...	... ...	29	...	
	Feilding Rifles ...	... ...	75	...	
	Kaikaramea Rifles ...	... ...	59	...	
		Wanganui Cadets	...	54	
Waikato ...	Staff	... ...	1	...	
	Te Awamutu Cavalry	... ...	120	...	
	Cambridge Cavalry ...	... ...	77	...	
	Hamilton Rifles ...	... ...	79	...	
Taranaki ...	Staff	... ...	1	...	
	Taranaki Mounted Rifles	... ...	67	...	
	No. 1 Taranaki Rifles	... ...	61	...	
	Waitara Rifles ...	... ...	61	...	
	No. 1 Inglewood Rangers	... ...	64	...	
	Bell Block Rifles ...	... ...	59	...	
	Urenui Rifles ...	... ...	35	...	
	Okato Rifles ...	... ...	54	...	
	Omata Rifles ...	... ...	43	...	
	No. 2 Inglewood Rangers	... ...	58	...	
	No. 2 Taranaki Rifles	... ...	36	...	
	No. 3 Taranaki Rifles	... ...	75	...	
	Manutahi Rifles ...	... ...	80	...	
	Tikorangi Rifles ...	... ...	30	...	
	Oakura Rifles ...	... ...	41	...	
	Kent Road Rifles ...	... ...	28	...	
	Mangorei Rifles ...	... ...	25	...	
	Waitara West Rifles...	... ...	38	...	
	No. 3 Inglewood Rangers	... ...	95	...	
	No. 4 Inglewood Rangers	... ...	31	...	

RETURN of Volunteer and Cadet Corps in New Zealand—*continued.*

District.	Volunteer Corps.	Cadet Corps.	Strength—All Ranks. Volunteers.	Strength—All Ranks. Cadets.	Remarks.
Wellington	Staff	... ...	2	...	
	D Battery Artillery ...	... ...	76	...	Available for proposed field force and naval brigade.
	City Rifles	... ...	70	...	
	Makara Rifles ...	... ...	60	...	
	Kaiwarawara Rifles ...	... ...	53	...	
	Naval Volunteers ...	... ...	176	...	
		Artillery Cadets	...	61	
		City Cadets ...	...	56	
		College Cadets	...	34	
		Te Aro Cadets	...	96	
	Staff	... ...	1	...	
	Greytown Rifles ...	... ...	53	...	
	Masterton Rifles ...	... ...	73	...	
	Carterton Rifles ...	... ...	61	...	
Napier ...	Staff	... ...	1	...	
	F Battery Artillery ...	... ...	61	...	
	Engineers	... ...	68	...	
		Artillery Cadets	...	24	
Poverty Bay	J Battery Artillery ...	... ...	60	...	
	Gisborne Rifles ...	... ...	60	...	
Opotiki ...	Bay of Plenty Cavalry	... ...	33	...	
	Queen's Native Rifles	... ...	107	...	
Thames ...	Staff	... ...	2	...	
	Engineers	... ...	160	...	
	No. 1 Scottish Rifles ...	... ...	130	...	
	No. 2 Scottish Rifles ...	... ...	102	...	
	No. 3 Scottish Rifles ...	... ...	60	...	
	Rifle Rangers ...	... ...	119	...	
	Native Volunteers ...	... ...	46	...	
	Naval Volunteers ...	... ...	158	...	
		Scottish Cadets	...	44	
		St. George's Naval Cadets	...	67	
Nelson ...	Staff	... ...	2	...	
	H Battery Artillery ...	... ...	79	...	
	City Rifles	... ...	63	...	
	Stoke Rifles ...	... ...	63	...	
	Waimea Rifles ...	... ...	71	...	
	Naval Volunteers ...	... ...	52	...	
		Artillery Cadets	...	71	
		City Cadets ...	...	46	
		College Cadets	...	71	
Marlborough	Staff	... ...	2	...	
	Picton Rifles ...	... ...	75	...	
	Spring Creek Rifles ...	... ...	76	...	
	Renwick Rifles ...	... ...	59	...	
	Blenheim Rifles ...	... ...	62	...	
		Picton Cadets ...	...	91	
		Blenheim Cadets	...	111	
Canterbury	Staff	... ...	6	...	
	Canterbury Yeomanry Cavalry	... ...	113	...	Available for proposed field force.
	C Battery Artillery ...	... ...	61	...	
	E Battery Artillery ...	... ...	64	...	
	Engineers	... ...	73	...	
	No. 1 Canterbury Rifles	... ...	61	...	
	No. 5 Canterbury Rifles	... ...	52	...	
	City Guards ...	... ...	86	...	
		Artillery Cadets	...	51	
		High School Cadets	...	47	
Oamaru ...	Staff	... ...	2	...	
	I Battery Artillery ...	... ...	65	...	
	Oamaru Rifles ...	... ...	69	...	
	Hampden Rifles ...	... ...	47	...	
	Otepopo Rifles ...	... ...	58	...	
		High School Cadets	...	54	
		Citizen Cadets	...	44	
Dunedin ...	Staff	... ...	6	...	
	B Battery Artillery ...	... ...	122	...	Available for proposed field force.
	L Battery Artillery ...	... ...	75	...	
	City Guard Rifles ...	... ...	119	...	

RETURN of Volunteer and Cadet Corps in New Zealand—*continued.*

District.	Volunteer Corps.	Cadet Corps.	Strength—All Ranks. Volunteers.	Strength—All Ranks. Cadets.	Remarks.
Dunedin—*continued*	North Dunedin Rifles	... ...	68	...	Available for proposed field force.
	South District Rifles...	... ...	52	...	
	No. 1 Waikari Rifles...	... ...	57	...	
	No. 2 Waikari Rifles...	... ...	48	...	
	Bruce Rifles ...	... ...	54	...	
	East Taieri Rifles ...	... ...	64	...	
	West Taieri Rifles ...	... ...	45	...	
	Clutha Rifles ...	... ...	71	...	
	Waikouaiti Rifles ...	... ...	55	...	
	Portobello Rifles ...	... ...	63	...	Available for Ocean Beach battery and naval brigade.
	Dunedin Naval ...	... ...	103	...	
	Port Chalmers Naval...	... ...	77	...	
		No. 1 City Guard Cadets	...	44	
		High School Artillery Cadets	...	78	
		High School Rifle Cadets	...	57	
		North District School Cadets	...	100	
		South District School Cadets	...	55	
		Middle District School Cadets	...	100	
		Tokomairiro Cadets	...	59	
		Normal School Cadets	...	100	
		Waikouaiti Cadets	...	41	
		Sandymount Cadets	...	53	
		Dunedin Naval Cadets	...	88	
		Port Chalmers Naval Cadets	...	42	
Invercargill	Staff	... ...	3	...	
	G Battery Artillery ...	... ...	55	...	Available for proposed field force.
	K Battery Artillery ...	... ...	69	...	
	Garrison Band ...	... ...	29	...	
	Invercargill Rifles ...	... ...	61	...	
	Riverton Rifles ...	... ...	76	...	
		Artillery Cadets	...	91	
Lake ...	Staff	... ...	2	...	Inland corps.
	Arrow Rifles ...	... ...	71	...	
	Queenstown Rifles ...	... ...	60	...	
	Cromwell Rifles ...	... ...	73	...	
		Queenstown Cadets	...	38	
		Arrow Cadets...	...	33	
Westland ...	Staff	... ...	2	...	
	1st Westland Rifles ...	... ...	57	...	
	Greymouth Rifles ...	... ...	51	...	
		Hokitika Cadets	...	14	
		Greymouth Cadets	...	41	

EXTRACT FROM REGULATIONS UNDER THE DISCIPLINE ACT 1870, VICTORIA.

69.—Victorian Naval Reserve.

(1.) The persons whose services are engaged as naval forces in the services of Her Majesty's Government in Victoria to be occasionally employed shall, subject to the provisions of the said Act and to the following regulations, be formed into a corps to be called the Victorian Naval Reserve.

(2.) The Victorian Naval Reserve shall consist of such commissioned, warrant, or petty officers and seamen as may from time to time be duly appointed or engaged under the provisions of the said Act, and who shall be entitled, subject to these regulations, each to receive an annual allowance or retainer of sixteen pounds for 1st class petty officers, fourteen pounds 2nd class petty officers, twelve pounds A.B. seamen.

(3.) All members of the naval reserve, when called out by proclamation for actual service, shall be entitled to receive during such period of actual service pay and allowances: the commissioned officers at such rates as the Governor in Council may from time to time direct, and the warrant or petty officers and seamen according to the average rates ruling in the port of Melbourne for petty officers and A.B. seamen during the three months preceding such proclamation.

(4.) All members of the Naval Reserve, when called out by proclamation for actual service, will be appointed to such ship or service as the Governor in Council may direct, and if serving beyond the actual limits of Victoria in company with any of Her Majesty's ships of war, will be subject to the orders of the commissioned officer commanding such ship or ships: Provided always that such orders shall not extend to impressment into any other service, or removal of any member of the Reserve from the ship or service of Her Majesty's Government in Victoria.

(5.) No person is to be accepted who is under five feet five inches in height, or above forty years of age, nor unless he is a British subject, free from physical defect, and in health, character, and every other respect eligible.

(6.) Every applicant must have served afloat either as a seaman, waterman, fisherman, boatman, shipwright, sailmaker, or be now engaged as a ballast craftsman, or in some occupation directly connected with shipping.

(7.) The applicant must produce certificates of good character, or must otherwise satisfy the commanding officer that his character and conduct have been good.

(8.) Any member of the Naval Reserve who, after being enrolled, is discovered to have been at the time of enrolment laboring under disease, or to have sustained injury which incapacitates him, and who has concealed such disease or injury, or who is discovered to have made any false representation or to have produced any false papers on the occasion of enrolment, will at once be struck off the list, and will forfeit all claim to retainer or other advantages of the service.

(9.) No member of the Naval Reserve may, so long as he remains in the Reserve, be enrolled in any other corps.

(10.) When any person is enrolled in the Naval Reserve, a certificate of his enrolment will be delivered to him by the commanding officer who enrols him. This certificate must be taken care of, as it will constitute the proof of his title to the retainer and other advantages of the service. It must be produced every time he appears at drill, in order that the requisite entries may be made.

(11.) All entries on certificates must be made or countersigned by a commissioned officer of the Naval Reserve, and by such officer only.

(12.) If any member of the Naval Reserve accidently loses his certificate, he should make application to his commanding officer.

(13.) With the exception hereinafter mentioned, no express restriction is laid on the occupation of a member of the Naval Reserve, whilst belonging to the Reserve, provided that he complies with the conditions mentioned below, and especially with that condition which requires him to appear before some commissioned officer, once every three months, unless he obtain leave of absence for a longer period.

(14.) Every member of the Naval Reserve must present himself to some commissioned officer of the Reserve in the colony of Victoria, and must produce his certificate to that officer at intervals not exceeding three months each. Consequently, no member of the Reserve may expect to obtain leave of absence (unless under special circumstances) to be away from the colony of Victoria on any voyage which there is reason to expect will exceed three months. Commanding officers will be informed from time to time under what conditions, and in what manner, this leave can be given.

(15.) Before leave is given, a member of the Naval Reserve must satisfy his commanding officer that he is not in arrears for drill, and his arms, accoutrements, and uniform must be returned into store.

(15A.) Any member of the Naval Reserve who is absent from drill for more than two months without leave renders himself liable to be dismissed, and when called upon by his commanding officer will immediately return his arms, accoutrements, and uniform, any deficiency or damage thereto to be made good at his expense.

(16.) The Government of Victoria reserve to themselves full discretion to withhold leave of absence at any time when an emergency arises.

(17.) It will be the duty of every member of the Naval Reserve, on every fresh engagement he may make for service at sea, to appear before his commanding officer, produce his certificate, and give notice of the nature and length of the proposed voyage or employment, which notice must be repeated on every fresh engagement or change of ship or employment. But where such member of the Naval Reserve is engaged under

the same agreement, in a succession of short voyages in a coasting ship or steamer, he need not give such notice each voyage.

(18.) It will also be the duty of every member of the Naval Reserve to give notice to his commanding officer of any change of residence, or of the place to which letters and notices are addressed for him. Such notice must be given on the first opportunity subsequent to the change.

(19.) The commanding officer will enter and sign the particulars of the engagement in his certificate, and will, if he has obtained permission to be absent more than three months, note the fact in his certificate.

(20.) If any member of the Naval Reserve, without special leave, engages for a voyage away from the colony of Victoria which will probably last more than three months, he will be liable to forfeit all claim to his retainers and to the benefits of the service; and if he breaks the conditions as to quarterly appearance, or fails to give notice to his commanding officer of his intended employment, or of his change of abode or address, whenever it occurs, as required by the above regulations, he will have his retainers stopped, and cannot have them restored except on special application made through his commanding officer to the officer commanding the naval force in the service of Her Majesty's Government in Victoria.

(21.) In event of the Naval Reserve being called out by proclamation, every member of the Naval Reserve is bound to serve ashore or in any vessel belonging to or employed by the Government of Victoria, under penalty of being treated as a deserter and forfeiting all claim on the Government.

(22.) The special object of the Naval Reserve being to obtain the services of a picked body of seamen and others, "trained to the use of arms," it is essential that every member shall be drilled so as to obtain a thorough practical knowledge of the mode of using great guns and small arms.

(23.) The drill will comprise great gun, rifle, pistol, and cutlass exercises, and naval duties generally.

(24.) The time for which each member of the Naval Reserve will be required to drill in each year is twenty-five days, to be made up of one hundred and fifty hours, exclusive of reviews. Time occupied in travelling or being transported to and from the place of drill will be allowed, at the discretion of the commanding officer.

(25.) All members of the Naval Reserve who, without satisfactory cause, neglect to attend drill, or who during drill absent themselves without leave, are liable to the loss of the retainer in addition to such penalty as the Act provides.

(26.) Each member of the Naval Reserve may be allowed to make up two days' continuous drill, which will be reckoned as twelve hours and a half, or six days, should the nature of his employment require it. This will enable him to make up his time, should he, without any negligence on his own part, have fallen in arrear.

(27.) The time during which a member of the Naval Reserve is absent from drill on account of sickness or accident, unless caused at drill, does not count as part of the drill. On his being removed from the sick list, he must perform the proper term of drill required by the regulations. The period of drill to be entered in the certificate is not to include the time during which he is on the sick list unless from accident or injury caused at drill.

(28.) The place of drill will either be some ship, battery, or drill-ground ashore.

(29.) The entire number of shore drills will not be allowed, unless by special authority, to count for more than one hundred hours. The remaining number of hours required for drill must be afloat, either in boats or vessels belonging to the Government of the colony of Victoria. The officer commanding the naval force in the service of Her Majesty's Government in Victoria may at his discretion alter the details of drills, either afloat or ashore, as circumstances may require.

(29A.) Four general musters for inspection of the Naval Reserve will be held each year, and every attested member on the roll on the 1st of January each year, or who may have joined the Reserve during the first quarter of the year, must attend at least three (3) inspections; members joining during the second quarter must attend at least two (2) inspections; members joining during the third quarter must attend one (1) inspection; and all members in addition must go through the musketry instruction and target practice, otherwise they will not be entitled to claim the four quarterly retainer.

(30.) When the Naval Reserve is called out for drill afloat, no day's drill will be counted for more than eight hours.

(31.) Notices will be posted in conspicuous places in the different Naval Reserve divisions, naming the hours of mustering for drill either afloat or ashore.

(32.) Arrangements will be made to transport members of the Naval Reserve to and from the drill ship free of expense. The time of drills afloat will count from the time they first embark until they are again landed.

(33.) Members of the Naval Reserve when on drill will be rated as able seamen, commissioned, warrant, or petty officers excepted, who will rate according to their grade and distinctions.

(34.) Members of the Naval Reserve when being drilled, afloat for one entire day or days, will be victualled according to the same scale as seamen in the Government vessels.

(35.) They will each be supplied with uniform, which must be kept in good condition.

(36.) Drills ashore not to exceed two hours, drills afloat not to exceed three hours, unless upon occasions which will be previously notified.

(37.) Any member of the Naval Reserve injured at drill may be sent for treatment into hospital, or medical aid may be procured by his commanding officer.

(38.) A list of defaulters will from time to time be prepared, showing those members of the Naval Reserve who have not completed their drill. It will be the duty of officers to warn them of the effect of neglect. But if no such personal notice is given, they will, notwithstanding, be held responsible for non-attendance.

(39.) The annual retainer will be paid in four quarterly instalments when required. The quarters are to be considered as commencing on the 1st January, 1st April, 1st July, and 1st October in each year. A proportionate reduction will be made in the retainer on account of the first broken quarter.

(39A.) All members of the Naval Reserve must attend twenty-four hours' drill on shore and twelve and a half hours' afloat during each quarter to entitle them to that quarter's retainer; but should they have passed out of part I. Truck Gun Exercise, they will then be allowed to make up their time for two quarters' retainer any time during each consecutive six months. Members who have passed out of both parts of the Truck Gun Exercise and Musketry Instruction will have the words Trained Man noted in their books, and will be selected for promotion according to their seniority. The captain commanding the Naval Reserve to notify on which days these examinations will take place.

(40.) When a member of the Naval Reserve applies for payment of retainer he must produce his certificate, and satisfy the commanding officer by the entries in his certificate that he has complied with the conditions as to drill, leave of absence, and appearance before some commissioned officer; and if it should appear to such officer that the conditions of the Reserve have been broken, he will forward the certificate to the officer commanding the naval force in the service of Her Majesty's Government in Victoria.

(41.) If he can show that his absence was unavoidable, or any other conditions or rule of the service have been broken through unavoidable circumstances, he may make a special application to have his retainer renewed. Payment of the retainer will not be allowed for the time of absence.

(42.) In the event of the death of a member of the Naval Reserve, the balance of any retainer which may be due to him will be paid to his widow or children (if any). Application for payment of the balance of retainers due to the deceased should be made through the commanding officer.

(43.) When a member of the Naval Reserve, after being called out by proclamation, is released from actual service, his certificate will be returned to him, with the requisite entries of service made therein.

(44.) After the termination of one year, reckoned from the date of certificate, any member of the Naval Reserve will, on giving three months' notice in writing, be entitled to his discharge; provided he is not at the time required by proclamation for actual service, and that no apprehension of danger to the colony exists, of which the Governor in Council is to be the sole judge.

(45.) The Naval Reserve will be continuously maintained unless disbanded or broken up by proclamation in the *Government Gazette*.

(46.) Any member of the Naval Reserve, when not called out for actual service, may, under special circumstances, with the consent of the officer commanding the naval force of Her Majesty's Government in Victoria, obtain his discharge from the Reserve on payment of the sum of £2, if required to replace his uniform.

(47.) Any member of the Naval Reserve may be discharged from the Reserve after fifty-five years of age or for inefficiency or physical inability to serve, or may be dismissed for misconduct in addition to loss of retainer and such other penalty as the Act provides.

(48.) A member of the Naval Reserve, if wounded or injured on service or on drill, will be entitled to the same pension to which any other seaman in the Colonial Navy of Victoria would be entitled for a similar wound or injury; but such pension cannot, except by special permission, be paid in any place not within the colony of Victoria.

70.—Engagement of Persons regularly employed.

The period for which all persons regularly employed under the Act will be sworn in will be for one year, after the expiration of which period any such person can obtain his discharge on giving three months' notice of his intention to apply for the same: Provided always, that at the time no apprehension of danger to the colony exists, of which the Governor in Council is to be the sole judge.

AMENDED REGULATIONS UNDER THE DISCIPLINE ACT 1870.

Clause (24.) The time for which each member of the Naval Reserve will be required to drill in each year is one hundred and forty-four (144) hours, exclusive of reviews. Time occupied in travelling or being transported to and from the place of drill will be allowed at the discretion of the commanding officer.

Clause (26.) Each member of the Naval Reserve may, if the exigencies of the service admit, be allowed to drill in different districts.

Clause (29A.) Any member who cannot satisfy his commanding officer that he has made fair progress in his drills will not be entitled to his retainer.

Clause (36.) Drills on shore not to exceed two (2) hours, drills afloat not to exceed five (5) hours, unless upon occasions which will be previously notified.

Clause (39A.) All members of the Naval Reserve must attend twenty-five (25) hours drill on shore and eleven (11) hours afloat during each successive quarter to entitle them to that quarter's retainer, except those members who have passed out of both parts of truck gun exercise, musketry, and cutlass exercise; they will have the words "trained men" noted in their books, and will only have to drill nineteen (19) hours on shore each quarter; they will also be selected for promotion according to their seniority. The officer commanding the Naval Reserve to notify on which days these examinations will take place.

EXAMINATION OF CANDIDATES FOR APPOINTMENTS IN THE VICTORIAN NAVAL RESERVE.

1.—*For Lieutenant.*

To hold a master's certificate from some recognised marine board, or to pass before the "above board" (viz., the officer commanding Naval Forces of the colony, the officer commanding the Naval Reserve, and the senior lieutenant of the Naval Force) the same examination as required for a master in the Merchant Service.

To have a good knowledge of the following portions of Naval Gunnery :—

Heavy rifled gun exercise.
Revolving gun exercise.
Truck gun exercise.
Field exercise—Parts I., II., III.
Field piece exercise.
Cutlass, pistol, and sword-bayonet exercise.
Weight of charges and bursting charges.
To be able to drill a division of guns efficiently.
To have a general knowledge of the use and practice of torpedoes, and also all the information contained in the miscellaneous chapter of the Naval Gunnery Book.

2.—*For Sub-Lieutenants.*

To hold a first mate's certificate from some recognised marine board, or to pass before the above board the same examination as required for a first mate in the Merchant Service, and to have a general knowledge of the subjects above-mentioned.

3.—*For First Class Petty Officer.*

To have a good knowledge of great gun exercise; also cutlass, pistol, sword-bayonet, and rifle exercises, and to have a good knowledge of a petty officer's duty generally.

4.—*For Second Class Petty Officer.*

To have a fair knowledge of great gun, cutlass, pistol, sword-bayonet, and rifle exercises.

Distribution of Forces under War and Peace Establishments.

WAR ESTABLISHMENT.

Description of Force.		Auckland.	Wellington.	Lyttelton.	Christchurch.	Port Chalmers.	Dunedin.	Invercargill.	Total.
Coast Artillery	Constabulary...	25	25	25	...	25	...	...	100
	Naval Brigades	100	100	100	...	100	...	...	400
Torpedo Boats' Crews		20	20	20	...	20	...	...	80
Volunteer Garrison Artillery ...		...	...	...	...	...	80	...	80
Total for Coast Defences ...		145	145	145	...	145	80	...	660
Field Forces (Volunteers)	Mounted Detachment...	30	30	...	30	...	30	...	120
	Artillery	70	70	...	70	...	70	50	330
	Engineers	50	...	...	50	...	...	...	100
	Infantry	400	400	...	400	50	400	200	1,850
Total for Field Forces ...		550	500	...	550	50	500	250	2,400
Grand Total		695	645	145	550	195	580	250	3,060*
				695		775			

* Torpedo Corps—40 strong—is not included in this total.

PEACE ESTABLISHMENT.

Description of Force.		Auckland.	Wellington.	Lyttelton.	Christchurch.	Port Chalmers.	Dunedin.	Invercargill.	Total.
Coast Artillery	Constabulary...	...	...	...	...	...	...	...	...
	Naval Brigades	70	70	70	...	70	...	...	280
Torpedo Boats' Crews		10	10	10	...	10	...	...	40
Volunteer Garrison Artillery ...		...	...	...	...	...	80	...	80
Total for Coast Defences ...		80	80	80	...	80	80	...	400
Field Forces (Volunteers)	Mounted Detachment...	30	30	...	30	...	30	...	120
	Artillery	70	70	...	70	...	70	50	330
	Engineers	50	...	...	50	...	...	...	100
	Infantry	250	250	...	250	50	250	150	1,200
Total for Field Forces ...		400	350	...	400	50	350	200	1,750
Grand Total		480	430	80	400	130	430	200	2,150*
				480		560			

* Torpedo Corps—40 strong—is not included in this total.

| | | |