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Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954

Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

Royal United Services Institution. Journal

Publication details, including instructions for
authors and subscription information:

<http://www.tandfonline.com/loi/rusi19>

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Published online: 11 Sep 2009.

To cite this article: Major-General Alexander B. Tulloch C.B., C.M.G. (1901)

Gibraltar, Royal United Services Institution. Journal, 45:277, 312-315, DOI:

[10.1080/03071840109417446](https://doi.org/10.1080/03071840109417446)

To link to this article: <http://dx.doi.org/10.1080/03071840109417446>

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GIBRALTAR.

By Major-General ALEXANDER B. TULLOCH, C.B., C.M.G.

THIS grand old Rock, which has stood fourteen sieges and been in the possession of Great Britain for nearly two hundred years, has lately become of even greater value to England than it was when it underwent its last siege of nearly four years; the closing scene of which was the repulse of forty-seven of the enemy's line-of-battle ships, the destruction of ten of their specially constructed floating batteries, and the silencing of the besiegers' heavy guns on the land side; and this by a garrison on the verge of starvation and with but ninety-six guns available for defence.

Owing to political changes and the increased size of the Fleet, another naval base besides Malta is absolutely necessary for us in the Mediterranean, and the position of Gibraltar at the mouth of the Straits and midway between England and Malta, answers the requirement exactly. The only drawback, however, is, that owing to the increased and increasing range of modern guns, the whole of the horseshoe-shaped bay, of which the rock forms one side, and which is only 5 to 6 miles across, may be covered by the fire of guns from the Spanish mainland. Ships lying alongside the breakwater and moles would be safe enough, and the docks would not come to much harm, were it not that a range of high ground on the north side of the bay, of which the highest point, 1,000 feet, known as the Queen of Spain's Chair, $5\frac{1}{2}$ miles distant from the docks, looks into the whole of the new works; while the east and west spurs of the range coming down to the sea would give possibly slightly closer gun positions.

It will at once be asked, How was it that the west, or Spanish side, of the Rock was chosen for the dock, and not the east, which has only the open sea in front of it? Unfortunately, that side also is open to and within range of the eastern spurs of the ridge of hills already mentioned; there is no foreshore there suitable for reclamation on which to build machine shops, slips, and such like; the Rock on that side comes steeply down to the water's edge, and the whole of the works and breakwater would have to be built out in deep water; and last, but not least, eastern gales, having the whole sweep of the Mediterranean, send in a very heavy sea on that side, from which the western bay with its extensive anchorage is free.

With the engineering talent and appliances of the present day, the works now under construction might have been made on the east side of the Rock, but the additional expense would have been immense; and, balancing the respective advantages and disadvantages of both sides, an inspection of the sites at once shows that the naval and military

authorities were right in making the new harbour and docks on the west. A short account of the works now in progress will, possibly, be interesting not only to professionals, but also to the tax-payers at home, who have to find the £4,000,000 which the harbour, docks, etc., will cost before they are finished.

Although the necessity for naval docks and a refitting establishment at Gibraltar have been under consideration for sometime, nothing was done until 1895, but in the following year the deep-water foundations of the moles and breakwater were commenced, and the plant for the great concrete block factory laid down by the Admiralty engineers. Two years ago the completion of the harbour works and the construction of the docks were let to the well-known contractors, Topham, Jones & Railton, who will require four years more to finish everything.

The general scheme can be simply explained by stating that it consists of an extension of the naval or south mole, towards the north-west, to a total length of 3,500 feet, and the old commercial mole on the north, in a westerly direction to a total length of 2,790 feet, the space between the ends of the respective moles being filled in by an intermediate breakwater, 2,700 feet long, and an arm at right-angles to the new end of the old mole 1,500 feet in length, the width of the openings at each end of the intermediate breakwater being respectively 600 and 650 feet. The moles and breakwater enclose a sheltered anchorage, triangular in shape, about a mile and a half in length, and half a mile in breadth at the base, which is formed by the old mole and its extension; the apex of the triangle is formed by the entrance to the docks at the inner extremity of the south or naval mole, the old line wall of rampart and parapet forming an almost straight line on the land side from the docks to the inner extremity of the old or north mole.

The anchorage space will be as follows:—70 acres, with a depth of 35 feet; 33 acres, with 33 feet; 150 acres, with 30 feet; and about 55 acres, with from 20 to 30 feet. The depth of water along 2,600 feet of the inner side of the new mole, the intermediate breakwater and old mole being 35 feet; the arm will have 30 feet. All this is exclusive of an immense space of shallow water closer inshore, which could be dredged if required.

From the inner side of the new portion of the old mole, five jetties, 300 feet long and 75 feet broad, will be built, and large covered sheds for coals will be placed on the mole and also on the arm, where commercial coal will be stored, and the present hulks in the outer anchorage got rid of. Naval coal-sheds will also occupy nearly the whole of the south mole, but a glance at the breadth of the mole shows that it could not hold sufficient, and more coal space for naval requirements will have to be found.

With the exception of the arm at right-angles to the north mole, and a very small portion of the end of the south mole, the whole of the moles and breakwater are all above water, the new mole with the exception of about 200 yards at the end being finished and ready for ships to lie alongside, as is also a considerable length of the centre of the intermediate

breakwater. It will take another year and a half to finish the arm of the north mole, but another twelve months should see the moles and breakwater completed, all with their broad roadways and thick stone parapets.

The docks will be three in number, the largest divisible into two will be 850 feet long, the second 550, and the third 450; with a width of 120 feet in each case, and a depth of 35 feet on the sill at low water. The necessary space for them has been found by cutting off 100 yards of the parade ground by the south mole and banking out the sea. As yet only a portion, about a quarter of the largest dock, where the parade ground formerly was, has been excavated, but the concrete backing for the masonry is already in its place; the excavation of the smallest dock, only commenced six months ago, is already down to the lowest level, but the intermediate dock and the outer portion of the large dock cannot be commenced until the dam cutting off the sea from the intended outer extremity of the docks is completed; this will take another six months.

On the outside of the docks along the foot of the old water-line of the fortification wall a space of foreshore about 500 yards by 150 yards has already been nearly filled in, and on this strongly built sheds for machine shops and repairing establishments have been commenced. Torpedo-boat slips and boat cambers, in continuation of this filled-in shore extending to the ragged staff landing-place, are rapidly approaching completion. All these great works are being carried out by some four thousand Spanish, Maltese, Italian, and even French, workmen, the great bulk being Spanish, with comparatively few British foremen to supervise them; these men give no trouble whatever, and do their work with wonderful intelligence. About fifty of them have learnt to be divers. The pay of an ordinary labourer is 2½ pesetas (about 1s. 6d. English) per day, of eight hours in the winter and ten in the summer; the divers, superior workmen, masons, etc., are, of course, more highly paid.

Some months ago a few socialists from Barcelona brought about a strike, which lasted a fortnight, but at the end of that time so many men had tramped down from different parts of Spain to get the good wages obtainable at Gibraltar that the strike came to an end. The workmen live outside Gibraltar at the Spanish lines and San Roque, walking in and out daily. The works are an enormous boon to the hard-working and poorly-paid peasant of the south of Spain. A considerable amount is said to be sent by these bread-winners to their families living as far north as the Pyrenees.

When testing the ground at the head of the large dock a curious incident was noticed. Below the limestone breccia the borer passed through dark-coloured shale, and when at a depth of 60 feet—that is, 10 feet below the present bottom of the dock—a rush of inflammable gas came up. Geologists could probably at once give some explanation; but as petroleum has been found in the south-east of Spain, it seems a pity the experiment of a little deeper boring was not tried.

The dredgers working over the places where the battering-ships were burnt and sunk might have been expected to bring up some interesting

relics of the last great fight, but as yet only about 4 feet of the muzzle of one of the heavy brass 32-pounders with which they were armed has been found; it has the word "Trabersa" on the chase. The sea bottom, however, is liberally sprinkled with old round shot and unexploded mortar shells, doubtless fired by the garrison.

Of the present defences of Gibraltar it will not do to say more than can be seen by anyone walking along the public road and in the beautiful well-cared-for Alameda gardens. As the heavily-plated casemate batteries along the line wall and in the gardens could not be used with the ships in the new harbour right in front of them, the 18- and 38-ton M.L. guns have been removed and sent home, or otherwise disposed of. The new batteries are all half-way up the Rock and even on the top of it; they are armed with the newest type of heavy breech-loaders and very heavy howitzers, making the old Rock more unassailable than ever. Possibly the armament may be increased by guns in cupolas on the round extremities of the moles and breakwater. The old galleries on the north and north-west front are ready-made casemates for howitzers, to keep down fire from sheltered guns on the high ground already mentioned, which enfilades the sea front. Ships of the "Devastation" class, with an unlimited supply of ammunition close at hand, might also assist in this by going round to the east of the Rock and taking the high ground in flank. When the tremendous fire which could be brought to bear from new pattern guns and howitzers in the upper galleries, 600 and 700 feet above the ground and along the crest line, 1,000 to 1,300 feet high, of the north front, $1\frac{1}{2}$ miles in advance of the dockyard, is considered, the danger which at first sight seems to menace the new harbour from the heights of the Queen of Spain's Chair practically disappears.

Hostilities with a country in which we have so many commercial interests in common seems almost impossible. The Spaniards, although their official history is more amusing than correct, also have good memories, and know that in modern times it was only when unfortunate political events forced Spain into alliances against us that we have been opposed to a nation with which there is every reason to hope we shall always be on the same cordial terms as during the Peninsular War, when for seven years we poured out our best blood, and incurred the heavy debt, with which we are still heavily encumbered, in order to help Spain to drive out the armies of that terrible genius who conquered the rest of Europe, but met his match in the Peninsula.

Note.—Since this paper was written in December last, several sensational statements and diagrams have appeared in English newspapers showing Spanish batteries on the mainland, which could destroy the docks and shipping. It may be some consolation to know that these batteries exist in imagination only, and, if ever constructed on the sites mentioned, could be easily silenced from the Rock.—A. B. T