BOOMS AND NETS.

ANTI-SUBMARINE DEFENCES.

BRITISH DEVICES IN THE WAR.

(By Our Naval Correspondent.)

It has been one of the subjects of criticism of our pre-war naval administration that insufficient provision was made for the defence of the principal ports and bases against submarine attack. Mr. Balfour admitted, when First Lord, that there was no harbour on the east coast when war broke out which was adequately protected against the under-water menace, and Lord Jellicoe described in his book how the Grand Fleet had to keep cruising almost continuously in the early days of hostilities, because, owing to the want of a secure anchorage, it was safer at sea than in harbour. Although it is known, in a vague sort of way, that the deficiency in this respect was remedied, nothing has hitherto been made public concerning the manner in which this was done.

The following brief account of the work involved makes known for the first time how a large establishment at Shotley, near Harwich, was organized for the provision of nets and other kinds of obstructions; how, in addition to the many thousands of persons employed on shore in this work, a force of about 6,000 men was at one time engaged in laying the defences and maintaining them; and how, besides protecting all the important British harbours and bases, the British Admiralty also undertook all the defences required by the French Government, and supplied large quantities of material to Italy.

UNFAILING RESOURCE.

In August, 1914, there were only eight naval ports in the whole of the British Empire protected by boom defences, and these booms were of an obsolete type, designed only to resist attack on the surface of the water. As far as the Grand Fleet was concerned, until proper obstructions could be provided the only thing to do was to improvise contrivances for the purpose, and the first of these, designed by Captain Donald S. Munro, King's Harbour Master, came into use at Cromarty on October 26, 1914. A few days later an obstruction for the Rosyth base was fitted in position. About this time a serious effort was made, under the directions of Captain F. C. Learmonth, R.N. (now Rear-Admiral and Hydrographer of the Navy), to protect all the bases in use by the Fleet against submarine attack. Not only did this involve a large amount of work, but there was little or no data upon which to proceed. It was another case of the unfailing resourcefulness of the British naval officer.

As a first step, a depôt was established at the port of Harwich, under the general supervision of Rear-Admiral G. C. Cayley, C.B., assisted by Lieutenant Holmes, R.N., and it was arranged for nets to be made by naval labour at the Training Establishment at Shotley without interfering with the instructional courses there. The Admiralty obtained the cooperation of Messrs. Bullivant and Co. (Limited), of Mark-lane, the wire rope manufacturers, and they in turn secured the assistance of a leading firm of chain and anchor manufacturers, Messrs. W. Griffin and Sons (Limited), of Cradley Heath. In time, many other firms were also engaged. As quickly as possible, enormous quantities of flexible steel wire rope, chain cable, anchors, buoys, and other ironwork were concentrated by Messrs. Bullivant at the Harwich depôt, and the experience of the firm was also valuable in designing suitable anti-submarine net defences. The organization at Shotley and Harwich continued until the end of hostilities, for the demand was unceasing. Badly off as were the British naval bases, the French authorities found themselves in an even worse position, and appealed for our assistance, and help was also rendered to Italy. An illustration of the magnitude of the work done in the port of Harwich may be obtained when it is stated that in the month preceding the signing of the armistice the total deadweight of prepared material awaiting shipment overseas exceeded 25,000 tons, with an approximate value of £500,000 sterling.

Some splendid work was put in by the young seamen and boys at Shotley in making the nets. During an ordinary day's work on one class of steel wire nets the staff turned out 4,210 wire rope splices of all sizes, and 36 nets, totalling a distance of 2,880 yards. The average daily record during the period from October 1 to November 16, 1917, was 1,070 splices of all classes of wire rope, from 2in. to 5in. in circumference. The keenness displayed was even carried into the sports of the sailors, for at the local athletic meeting in August, 1917, a competition was held, and wire splicers from the Shotley establishment completed a splice of 4in. circumference flexible steel wire rope in 2min. 5sec. Only those conversant with wire splicing can fully appreciate this wonderful performance. After all the material for a complete defence had been prepared, it was necessary to provide detailed drawings, so that the defence could be laid in accordance with a considered plan immediately it reached its destination. This method gave good results in practice, and eliminated all chance of confusion.

DEFENCES IN WORKING.

The first bases to be provided with the new obstructions were naturally those on the east and north-east coasts. Lord Fisher, in the chapter of his "Memories" published in *The Times* last Wednesday, refers to the protection given to the Humber, the nearest spot to Heligoland, which "at enormous cost and greatly redounding to the credit of the present Hydrographer of the Navy, Admiral Learmonth (then Director of Fixed Defences) . . . was made submarine-proof, and batteries were placed in the sea protecting the obstructions, and moorings laid down behind triple lines of defence against all possibility of hostile successful attack." Early in 1915, arising out of the naval bombardment of the forts at Gallipoli, the resources of the Shotley net-making establishment were again called upon to produce a mine-catching net specially designed to be towed up the Dardanelles in advance of the attacking warships for the purpose of deflecting the numerous floating mines which the Turks had begun to launch down the stream at our vessels. This net was duly produced and shipped to the Mediterranean.

One of the greatest efforts in connexion with boom defences was the project to close the Dover Straits during 1915 and 1916 with a net defence of the heaviest type. This barrage was placed in position from the English to the French coasts, but the heavy and incessant labour involved in maintaining it, and repairing breakages, led to its being abandoned after 12 months. Apart from its practical utility, it had a very great moral effect upon hostile submarines, a large number of which were diverted elsewhere. In addition to submarine net defences, others were constructed to combat torpedo and surface craft attack. For this purpose, pile-dolphin defences were erected, as in the Firth of Forth, and between the dolphins, torpedo nets of a special design were stretched. In addition, various other devices were introduced into these dolphin defences for the purpose of dealing with possible attacks from "boom smashers" and submarines. With the development of the coastal motor-boat, fresh schemes had to be thought out for dealing with attacks from this type of craft. Information on this branch of the subject was collected daily, and plans developed without delay, so that before the close of the war a means of defence against attacks by C.M.B.'s had been perfected.

SUPPORTING VESSELS.

To meet the needs in *personnel* arising out of the operations of laying and fixing boom and net defences, the Admiralty turned once more to the North Sea fishermen. Many hundreds of trawlers and drifters were employed as supporting vessels, tenders, and the like, and the majority of the crews of the various craft so employed were from the fishing community. When the need for trawlers and drifters for minesweeping became urgent it was necessary to release a number of these vessels from the Boom Defence Service, and to make good this loss a special type of dumb craft was designed and built, which proved very successful. Fourteen such vessels, specially fitted, were utilized with good results in the last Dover Strait Barrage, in which they were moored in two continuous lines across the Channel. It is also an interesting fact that in 1915-16 a complete boom defence *personnel*, with submarine net defences, was dispatched from England to the White Sea.

The following figures illustrate the magnitude of the work done by the Admiralty Submarine Boom Defence Department, so far as net defences were concerned. The figures relate to the defences provided by the Shotley net-making establishment to meet the requirements of the British and Allied Navies:—

	Mileage.	Dead weight.	Cost.
Great Britain—		Tons.	£.
United Kingdom	412	76,000	6,750,000
Overseas	105	13,570	850,000
Allied Powers	80	15,650	1,600,000
Total	597	105,150	9,200,000

It may be mentioned that when America entered the war she was fully informed of the British measures for the protection of harbours against submarine attack, both by memoranda and drawings being supplied to the United States naval authorities by an officer with boom defence experience, and by visits of American naval officers to Shotley. As a result of their investigations the United States Navy Department adopted the British methods of net and boom defences. A satisfactory feature of the service was the immunity from mishap. Notwithstanding the hazardous nature of the work, necessitating the handling of great weights in exposed positions, the operations were carried out with very few accidents. It was also practically free from hostile interference, only two vessels having been sunk by enemy action, involving a total loss of 21 lives.