

thriving, happy, and proud of their success. There was an ivory carver from Islington, a man who had been in the employ of Rimmol, the performer; a farmer from Portland; 1 from Meath, and, above all, a portly and sporting butcher from Monmouthshire, who does not regret foxhunting at home. Of course, they had to do hard work and lead a rough life at first, but they have made such progress in two to three years that they are convinced that in a few years more the settlements will be 300 miles North of Toronto. I think, therefore, that Colonel Jervois and our military advisers may allay their fears as to the defence of Canada, especially as the men are ready to defend themselves."

The value of *torpedoes* as an offensive weapon has been freely discussed in the columns of the VOLUNTEER REVIEW, it is however, held by many landmen and some seamen in England that it is and will be an all important agent in deciding future naval battles.

Without needlessly disregarding or unduly depreciating the value of the weapon, we hold it has yet to be proved to what extent it can be used at all, except the conditions of naval warfare in the future prescribe that all engagements should take place in *still water*, we cannot see how the torpedo could be manœuvred; especially if it is to become the armament of every known type of vessel. Its congener, the *fire-ship*, has not been effective, and necessitated the condition of being able to grapple with its antagonist to be of any use whatever, as far as the application of the *torpedo* has been tried; it also demands *contact* as a necessity of success.

It is evident, therefore, that whether naval engagements in the future be fought in line, line a-head, line a breast, by *peletons* of three or four ships, each vessel will be manœuvred to avoid contact. The idea of ramming will not suggest itself till an opportune moment arrives, and that must be through accident or unskillfulness; and after the power of artillery is exhausted, the heave and roll of a vessel, taking the *Devastation* as an example, will be too great to allow the *torpedo* (provided she was armed with the necessary apparatus) being projected with effect, and the uncertainty of its operations would militate against its use.

We have been led to those considerations by the perusal of a paper by Lieut J. TOWNSEND BUCKNILL, R.E., published in the journal of the *Royal United Service Institute*, Vol. XVI, No. LXXIII, entitled "Description of the *torpedo* boats *Fortune* and *Triana* United States Navy," as follows:

"Those vessels were employed as tugs during the civil war and were lying at Washington Navy Yard in 1872, one of them, the *Fortune*, had then been converted into a *torpedo* boat and in commission, but the other was undergoing a refit and alteration so as to convert her into a similar *torpedo* vessel."

"The Navy yards of the United States are

all open to the public; and although I could gain very little information respecting these *torpedo* boats, I was enabled by a hurried inspection of the *Triana* to take the following details, the approximate accuracy of which can be relied upon:—Size, 170 to 180 tons; length over all, 180 feet; beam about 25 feet; draught from 8 to 9 feet; engine, 125 H.P. single vertical cylinder direct acting; speed, 7 knots; burns 11 tons coal in 24 hours, carries 95 tons; rig fore and aft schooner pole masted, spread of canvas unknown, but small; free board about five feet; bulwarks about three feet; top hamper as usual, with American tugs.

The deck of the *Triana* had been removed and she was being strengthened throughout, but more especially in those portions near the bow.

"About four or five feet below the normal water line, an iron nozzle was fixed in line with the stern or fore foot by means of two ears which were rivetted to the sides of the vessel. This nozzle which projected in front of the stem was bored out to form a hole a little over 10 inches in diameter, and in the top of the nozzle a large U shaped aperture into which an iron door could swing when the *torpedo* was pushed from the interior of the vessel. This door in its normal position hung by its own weight vertically across the opening, which led into the interior of the vessel by a large brass pipe (10 inches diameter internally) that was attached to the inner side of the nozzle, had an inclination upwards towards the stern of about 1 in 6 or 1 in 5, and at a distance of apparently some seven or eight feet from the stern, the pipe terminated in a flange by which it was attacked by screw bolts to a valve box . . . containing a valve to be worked by hand. To the inner side of the valve box another brass pipe was attached by screw bolts, and the pipe was only cylindrical for a distance of 12 or 14 inches, after which the upper half was entirely cut away. . . . The segmental portions were supported on three brackets . . . the bracket . . . was made in two separate pieces, so as to give room for the motion of a wheel 12 inches diameter, grooved to carry $1\frac{1}{2}$ inch wire rope, the (other two) brackets were provided with a deep central slot, so that the wire rope could work through them. . . . Behind this arrangement were four larger cast-iron brackets placed at central intervals of about four or five feet. Upon these and in the brass tube before mentioned . . . slid the *torpedo* outrigger which consisted of a cast iron tube some 23 feet long, $7\frac{1}{2}$ to 8 inches internal diameter left rough, and having an external diameter of 10 inches, obtained by turning in a lathe. This tube weighs about one ton. The outer end that is projected in front of the vessel and carries the *torpedo* was reduced for a length of about one foot to a diameter of eight or nine inches and was cast solid for 5 or 6 inches at

the extremity, and a small hole about $\frac{3}{4}$ inch diameter was bored centrally through which the electric wires for the firing arrangements were to be led. The tube was to run in and out by the wire rope before mentioned. The rope was in two pieces and the ends of each attached to a link that keyed to two small ears cast on the bottom of the tube at its inner extremity.

"The remainder of rope was coiled on the right and left side respectively of a grooved drum (9 grooves) about 20 inches diameter, thus when one rope was coiled in the other was slackened out, and *vice versa*. The drum was carried on suitable brackets fixed to the end of the wooden beam and was turned by a cogwheel of like diameter (72 cogs) gearing into a smaller wheel (24 cogs) driven by two handles worked by men standing on either sides of the beam, on one side of the drum was fixed a pawl and ratchet. To the inner end of the tube an iron guide $\frac{1}{2}$ by $1\frac{1}{2}$ inches was studded, this engaged in a groove $\frac{1}{2} \times \frac{1}{2}$ cut in the side of a rail bolted to the brackets and brass piece . . . and the tube was thus prevented from turning as it ran in and out. About 16 inches from the inner end of the tube a one inch screw plug was fixed in the top it projected about 2 $\frac{1}{2}$ or three inches, its use I could not discover.

"Should the wire rope slacken by stretching, it could be tightened up. . . . The axle of the wheel was suspended by two hanging arms pivoted on the brass pipe just inside the valve box, and a forked arm engaged the axle inside these arms. This forked arm terminated in a $\frac{3}{4}$ -inch rod threaded at its extremity to receive two nuts. The rod passed through a lug cast on the bottom of the valve box, and by altering the set nuts on either side of this lug, the wire rope could be tightened up or slackened off as required.

"I was informed that the *torpedo* employed was of cast iron about four feet long, 10 inches external diameter, and that the charge was contained in an internal copper cylinder. Also that the *torpedo* case was attached to the end of the tube by an iron ring fitting on the reduced part of the tube and over the inner end of the case. This ring is destroyed by the explosion of the *torpedo* but the tube remains uninjured, the charge being limited to 100 or 120 lbs. of cannon gun powder. I was informed by a high authority that it was possible to load, run out fire and run in, in from three to four minutes, and the arrangement gave the greatest satisfaction."

In the *Triana* class of *torpedo* boats a bulkhead was placed about 42 feet from the bow; behind this was stowed the coal, and then came another bulkhead 20 feet behind the first, a powerful steam bilge pump was fixed in the fore-castle as an additional precaution; portions of the engine and boiler were above the water line and much exposed