

to shot. The steam was super-heated in a dome surrounding the funnel at least 10 feet above the deck. To a certain extent these vessels are experimental only, but several vessels (number unknown) of the United States Navy, ostensibly tug and despatch boats, are in reality torpedo boats fitted up on the tubular principle described, or on some modification of it. In some the tube is thrust out by a screw, worked by steam power, but the arrangement described was preferred as being the simplest and best.

"It is I think evident that the Americans have in this apparatus sought as much as possible to minimize the mechanical intricacies to a certain extent inherent in this *torpedo*, and, if the information I received be correct, viz: that several vessels are armed in this manner, it would appear that the Americans are thoroughly satisfied with the arrangements.

"One of the first considerations obtained by investigating this apparatus is: that the experiments of a foreign power have disclosed the fact, that it is possible to fire a charge of 100 or 120 lbs. of mammoth powder or cannon powder at the end of a cast iron tube of the dimensions given *without damaging that tube*.

"Doubtless a very small charge of dynamite, dualine, compressed gun cotton or nitro-glycerine, would, if detonated in the same position, utterly destroy the cast-iron tube.

"This fact being digested, the next consideration and question that arises whether 100 lbs. of common gunpowder exploded seven or eight feet below the surface and in contact with the outer skin of an iron clad will cause great damage to such a vessel? Another question suggests itself—could not a similar apparatus be placed inside the stern of our existing iron clads? If so, would not the ramming power of such a vessel be enormously enhanced? But the Americans do not seem as yet to have applied this plan of working a *torpedo* from the interior of a vessel to any of their frigates, corvettes, or other cruisers, and I was unable to discover what apparatus they intended to fit on board the three new *torpedo* vessels they had commenced the year before last.

"The following are some of the advantages obtained by the employment of the tubular arrangement for outrigging *torpedoes* that has been described in the foregoing paper:

"1. Power of fixing and working the *torpedo* from a position of comparative safety.

"2. Quickness of the operation of refixing; booming out, &c.

"3. Vessel not impeded or her speed lessened by the apparatus—the tube not being thrust out until just before it is intended to use it.

"4. Everything out of sight of the enemy and the vessel's true character thereby concealed.

"5. By the use of the electric instead of the chemical fuze, danger to friendly vessels

is minimized and accidental explosions from the *torpedoes* striking any snag or other impediment prevented.

"Moreover the explosion of the *torpedo* when in actual contact with the enemy's vessel is ensured, and the chance of a failure such as Captain Davidson experienced when he rammed the *Minnesota* with the Confederate *torpedo* boat *Squib*, and which he attributed to the slowness of action of the chemical non-electric fuze, allowing the *Squib* to recoil a short distance before the *torpedo* exploded, is by the use of the electric fuze guarded against; for it is easy to arrange the electrical portion of the apparatus so that the *torpedo* can be fired either by judgment or by contact—the former being only resorted to when the contact arrangement fails to perform its function—I was unable to discover what the electrical arrangements used by the Americans on board the *Triana* class of *torpedo* vessels actually were.

"In conclusion, I would beg to point out that the Americans seem to have paid more attention to the *torpedo* apparatus itself than to its protection from an enemy's shot. This consideration has been carefully thought out elsewhere, and we have only to combine in the same craft the tubular arrangements described in the foregoing papers with the almost shot proof deck and noiseless engines of other existing and known types of *torpedo* vessels to obtain a thoroughly trustworthy and efficient class of vessels for use on our coast defences."

The foregoing very ingenious paper is accompanied by a series of diagrams of the *torpedo* apparatus described which we cannot give to our readers, but the spaces marked with the asterisks refer to the various designs of the parts described.

Any vessel designed for the purpose of destroying another by means of hidden machinery and devices must possess all the qualities of superior speed and comparative invulnerability; now the *Fortune* and *Triana* are rated by Lieutenant BUCKNILL as having a speed of seven knots, a draught of eight to nine feet water, and all the wonderful apparatus described was fixed in the vessels fore foot about four or five feet below the normal water line with a downward inclination of 1 in 6 or 1 in 5.

In the act of approaching her antagonist we must assume that either vessel will do so stem on. In tug boats of the power and build described there will be a difference of draught of at least two feet between stem and stern, in other words she draws eight feet aft and six feet forward, every pitch she gives will alternately expose above and bury her *torpedo* tube below the water, and it must argue great obliquity of vision on the part of her assailant if she is unaware of her character, if she succeeds in striking the aforesaid antagonist, is there not equal danger to herself if the *torpedo* is fired during contact, or how is it to be propelled so as to strike at all at

any distance, seeing that the explosive will not destroy the nozzle of the tube? How can it be assumed that it will injure an iron clad or even a well built wooden vessel in contact, for it must be remembered that its explosive force will be exerted equally all around the area under water. A shell has the compound powers due to its initial velocity when propelled from gun or mortar and the ignition of its own charge, a *torpedo* has the power of the latter alone acting or supposed to be acting on a semi elastic medium whose resistance increases as the square of the force opposed to it, consequently the action of such explosion is confined to a very limited area on each side, and its power, if any, must be exerted in an upward direction; and here is the real danger of explosions while in contact, experience will prove such to be equally fatal to assailant, if contact is possible, which we hold it is not. Any seaman, unless his vessel is disabled, will take care to prevent being run a-ground.

As the use of the *torpedo* will be limited by the power of the vessel, it is evident the class described are not fitted for this service; and it is also evident that to make the weapon available it must be propelled by the same or a similar explosive agency to that which it carries—and that agency to be capable of being trained with the same accuracy under water as a gun or mortar is trained on land.

Our neighbors are thrifty; they know the value of a name, and a few experiments with *torpedo* boats cost less than our iron-clad fleet—at the same time it furnishes ingenious officers with good subjects for well written papers, and gets talked of in foreign countries as new instances of American ingenuity and enterprise.—Meantime it is like the *Dunderberg*—a huge sell.

Our contemporary, the United States Army and Navy Journal of 4th inst., has an article under the caption of *Canadians invited to Creedmoor*, in which the rather depreciating tone of the communications of a correspondent of the VOLUNTEER REVIEW on the scores made at the first meeting is quoted.

We would remark that it is our rule to insert all communications not libellous, insulting, or subversive of discipline without comment. We do not hold ourselves responsible for the statements of our correspondents, who are gentlemen of standing in the Canadian Army, and whose names are known to us. In this case our contemporary will remember we did not at all share the opinions of the writer of the communication quoted, and we may say it gave us great satisfaction to witness the highly honorable and creditable effort made by the promoters of the National Rifle Association to supply a want in their military organization which was a source of danger to themselves and us, inasmuch as ignorance is the sure provocative of international quarrels, and