OFFENSIVE TORPEDOES,

The following article, for which we are indebted to a writer in the *Times*, will be read with much interest. Commencing with the observation that however important the torpedo may be as a defensive agent there can be little doubt that it will prove a most formidable naval arm when science, ingenuity, and mechanical skill shall have perfected its employment as a weapon for attack, he proceeds historically :—

"As an engine especially applied to naval warfare, we first meet the torpedo under the form of an explosion ship. The first recorded instance of this method of employing locomotive mines was in 1585, when the inhabitants of Antwerp destroyed a boom which had been thrown across the Scheldt by the Duke of Parma while he was besieging the town. A number of vessels filled with gunpowder and combustibles of various kinds were arranged so as to explode either by clock work or slow match, and were then allowed to drift with the tide against the boom. The result was most successful- the explosion vessels blew up with terrific violence, destroyed a great part of the boom, and killed 800 of the enemy.

"During the wars of the 17th century we frequently used explosion vessels, and in 1809 a boom in Basque Roads was successfully destroyed by this means by Admiral Cochrane. But as the science of torpedoing advanced, this method came to be looked upon as a very crude and wasteful way of expending gunpowder, and for many years it was quite given up. The tremendous effect, however of the explosion of the gunpowder magazine at Erith, in October, 1864, appears to have led Admiral Porter, of the United States Navy, in the following December, to attempt the destruction of Fort Fisher by an explosion vessel. The powder vessel was towed in and anchored at about 400 yards from the fort; the party in charge then applied the match and took to their boats. In due time the vessel exploded, but beyond creating a temporary panic among the sleeping garrison, no injury resulted. This is the last recorded instance of the use of an explosion vessel. The method could only be successfull applied under special conditions, and as the explosion ship was always abandoned by her crew and left to the mercy of the wind and waves for a considerable distance, the chances were against her ever reaching her destination, unless drifted to it by a direct current. With a view of obviating this difficulty, an artillery officer in 1862 proposed to the Ordnance Select Committee that explosion ships should be steered by electricity. He suggested that by a system of electro-magnetic leverage it would be possible so to govern machinery in connection with the steam engines of the vessel, but the whole operations of going ahead, reversing, and steering would be completely under the command of an operator at a distance, and that an explosion ship paying out a cable astern could thus, without crew, be put in motion and steered in any direction. This novel proposal was, however, at that time in advance of the age, and it was not until about ten years afterwards that any trials were made in this direction.

"The matter appears to have been brought to the notice of the Russian Government in 1871 by Lieutenant Colonel Von Schelina. The propelling power was a screw worked by compressed air, and the torpedo was steered from the shore by means of electricity. The idea was subsequently taken up in this country and in Germany, and several successful experiments have been made on a small scale; indeed, it is reported that the German Admiralty have determined to adopt a locomotive torpedo of this kind. It is difficult, however, to understand the *rôle* of such a machine on a small scale. To be able to govern the movements from a distance of a gigantic explosion vessel containing several hundred tons of gun cotton or dynamite might, under certain circumstances, lead to the successful accomplishment of some great *coup d'essai*, but to adapt all the necessary paraphernalia to a mere torpedo boat appears unnecessary—*le jeu vant pas la chandelle*.

"During the 17th and 18th centuries many attempts were made from time to time to destroy vessels by means of drifting torpedoes; and in 1800 an American, Robert Fulton, endeavoured, to introduce into the English service a torpedo boat of novel construction. Since that time the art of approaching an enemy's vessel unobserved and exploding a mine beneath it has gradually developed, and it may confidently be affirmed that *specially constructed boats* by means of which torpedoes may, with considerable secresy and safety, be brought into contact with an enemy's vessel and exploded on impact, will hereafter form an essential feature in torpedo tactics. The most promising mode of employing this method is that known as the 'outrigger system,' in which *the torpedo is at the end of a long* spar which is thrust out from the bows of the boat. This system was much used by both parties during the late American war, and it has since then been largely developed, both in this country and in America. For a ship of war's launch the spar would be about thirty feet long and six inches diameter at the but, tapering to four inches at the top. The torpedo, a 100lb. case of gunpowder or guncotton, would be fastened to an iron rod hooped on to the top of the spar raised so as not to enter the water, would stealthily approach the enemy's vessel under cover of darkness or fog. When close up the extremity of the spar would be lowered so as to place the torpedo about 10ft. under water, and in this position the torpedo boat would drive full tilt against her adversary.

"Assuming the attack to be successful, and that a torpedo containing 100lbs. of gun cotton was detonated under and in contact with the ship's bottom, the probability is that the biggest ironclad afloat, unless specially built in water tight compartments, would sink in a few minutes. Moreover, recent experiments have demonstrated that when a ship is at anchor it is most difficult by any system of improvised defence to guard thoroughly against an attack by well manned and active torpedo boats. In spite of a crinoline framework of spars and booms projecting round the ship, supplemented by numerous guard boats rowing round and round, one or more torpedo boats, driven at full speed on a dark night, may succeed in leaping the obstacles and driving their infernal machines against the vessel. In fact, the only defence which seems to offer any prospect of success is some means by which a bright light can be constantly brought to bear on the surface of the water to a considerable distance round the ship. The experiments last spring with the Wilde magneto-induction machine, by which vivid flashes of electric light were thrown on the water, may possibly lead to most important results in this direction. It is said that no boat could approach the light within a mile without being discovered, and that on a very dark night the *Times* could be read at a distance of 2000 yards from the induction machine when the beam of light was brought to bear. An attack by outrigger torpedo *boats during the daytime would rpobably* end in failure, and if night can be turned into day the defence will gain a great advantage.

"There are, however, two systems of locomotive torpedo warfare that do not depend for success on stealthy tactics. The well known Harvey torpedo consist of a peculiarly shaped case capable of containing about 100lb. of gun cotton, and intended to be towed in such a manner that it will take up a position more or less on the quarter of the vessel to which the tow line is attached. The advantages of this system are that the torpedo can be towed by any vessel, and that a vessel with torpedoes in tow is to some extent secure against being rammed, the ram keeping off through fear of being torpedoed. Whether this system can successfully compete with the ram is, however, a question that mainly depends on speed and seamanship, and it can only be finally decided by actual contest.

"Lastly, we have the motive torpedo, or sea devil," as it may aptly be termed. Doubtless this is one of the most infernal machines that has ever yet been devised by man for the destruction of his fellow man. The 'Whitehead' or fish torpedo is an example. In appearance the Whitehead torpedo somewhat resembles a large shark. *It is a long steel cylinder somewhat thicker* than a man's body, with a venomous pointed snout at one end and rather graceful looking tail at the other end. The rear half of its body contains those mysterious intestines by which it receives its motive power, the front half is packed with gun cotton, and the snout holds the detonating fuse. This marine monster is moved through the water by a screw at the tail driven by small engines, which are worked by a reservoir of compressed air. The torpedo can maintain a speed of about nine knots for about 300 yards, but it will run a mile at a less speed, and it can be so adjusted as to maintain its direction at any depth under water desired by the operator.

"The 'fish' is generally launched from a tube immersed about 4ft. below the water; it immediately dives under water to the depth to which it has been 'set,' and then continues to move on at that depth in a direct course until the reservoir is exhausted. It can be launched either from a boat or from an ironclad by night or by day. The officers who have been engaged bringing the Whitehead system to perfection in this country have carried out numerous experiments and have made many important improvements; but its effect on future naval tactics cannot be accurately *judged until some experience has been gained* in real war. It may turn out to be difficult of employment in actions on the high seas, and its use may have to be confined to calm waters and adjacent ports; but the system will undoubtedly be largely tried in the next naval war."

TORPEDO WARFARE.

(From Broad Arrow.)

At various periods, commencing some three years ago, the *Broad Arrow* has called attention to the importance of the torpedo experiments in progress in this and other countries. *With much pleasure, therefore,* we have seen the question warmly taken up by the Press, and notably by the *Times*, since we last adverted to the subject. If our contemporary is to be believed, Whitehead's "Fish Torpedo," which affords us