compressed air, the contents of which, by means of a suit­able firing valve *d*, can be instantaneously admitted into the gun. When the torpedo is to be discharged this firing valve is opened, and the compressed air in the reservoir forces the torpedo out at a high velocity, a tripper δ pro­jecting through the top of the gun throwing back the starting lever of the torpedo on its way out. From below water the torpedo is discharged through a tube, the muzzle of which forms part of the stem of the ship, the tube being fitted with an outside valve which prevents the water from entering while the torpedo is placed in the tube. Latterly powder has been used instead of compressed air for the ejecting force.

The Lay torpedo is a boat of cylindrical form, the fore part being charged with an explosive. The motive power is carbonic acid gas generated in the usual way. As only a very small portion of the boat is visible on the surface, two guide rods, one on each end of the vessel, mark its position at any part of its run. The boat can be started, stopped, and steered by means of an electric cable, con­taining several insulated wires, which is paid out from the boat as it travels.

The Sims torpedo is cigar-shaped, and is suspended to a boat­shaped float. The torpedo is propelled by screws driven by an electric motor situated in the body, the current for which is supplied from a dynamo ashore. The electric cable is coiled on a drum in the torpedo, and pays out as the torpedo advances. The torpedo is also steered from the shore by an electric current. Its speed is about 12 knots.

The principle of the Brennan torpedo is as follows. The torpedo contains two drums upon which a large amount of pianoforte wire is wound. One end of the wire from each drum is taken to large drums ashore, which are revolved by a steam-engine. By winding up on the large drums ashore a rotatory motion is imparted to the drums in the torpedo, which by means of gearing revolve two screw propellers, aud these drive the torpedo through the water. The torpedo can be steered from the shore in any direction, by winding on one drum faster than the other, which alteration in motion moves a vertical rudder on the torpedo.

The Ericsson torpedo is a long fish-shaped weapon, made of wood, and weighted so as to have little or no buoyancy. The charge is contained in a metal case at the fore end. It is pro­pelled by a charge of gunpowder, out of a submarine gun fixed in the bows of a ship. Its range is about 300 feet, and it fires on impact.

Outrigger, Drifting, and Towing Torpedoes.—Before the introduc­tion of the Whitehead, vessels armed with torpedoes were princi­pally supplied with the outrigger torpedo. The explosive is con­tained in a metal case secured to the end of a steel or wooden pole, which lies fore and aft in the vessel carrying it. The pole can be rigged out until the torpedo is submerged a short distance ahead of the vessel, and is fired on contact with the enemy’s side, either by an operator in the boat completing the electric circuit, or by the circuit being completed by a circuit closer in the torpedo. In rivers, or places with a current, drifting torpedoes can be used. They should be suspended from floats, and arranged in groups or pairs connected together by a rope, so that they may catch across the bows of a vessel at anchor. They can be fired after a given lapse of time by clockwork and other devices, or can be so arranged that the firing arrangement is released on a catch being withdrawn by the action of a propeller wheel, which remains stationary as long as the torpedo drifts with the current, but is revolved by the force of the current when the torpedo is stopped. Towing torpedoes are constructed to diverge from either side of a ship when towed, which is effected by shaping the torpedo like an otter. The torpedo tows on the surface, and, on striking a ship’s side, the head con­taining the charge drops off, and fires as its weight tautens a line connecting it to the body.

Torpedo Boats.—The great improvements made of late years in machine guns have rendered the outrigger and towing torpedo of little value for torpedo boats, as it would be almost impossible to approach a vessel near enough to use them before the boat would be destroyed by the storm of missiles which would be fired at her. All torpedo boats under construction, and most of those already completed, are therefore armed with the Whitehead torpedo. A modern torpedo boat is built entirely of steel, the plates often not exceeding 1/16 inch in thickness, as, in order to get the necessary high speed, the minimum of weight consistent with the necessary strength is of the first importance. There are three classes of boats, known as first, second, and third. The first are capable of keeping the sea on their own account ; the second are for harbour defence ; and the third can be carried on board a ship.

The following table gives the dimensions and other details of a boat of each type :—

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type of Boat. | Length. | Beam. | Dis­place­ment. | Full  Speed in Knots. | Indicated Horse- Power at Full Speed. | Boiler Pressure, lb per Square Inch. | Distance Boat can steam with Coal carried at | |
| Full  Speed. | Half  Speed. |
| 1st class..  2d class...  3d class... | Ft.  135  86  64 | Ft. in.  13 0  11 0  7 6 | Tons.  88  30  12∙5 | 23  20  16∙5 | 1150  450  150 | 140  125  120 | Knots.  400  150  100 | Knots.  2000 400 250 |

The boilers and machinery are protected by coal, and an armoured tower protects the steering gear and telegraphs for controlling the engines.

Torpedo Nets.—The introduction of the modern torpedo boat has caused great attention to be paid to any means which will protect a ship from the torpedo. Most nations are adopting steel-wire netting, suspended from booms attached to the ship’s side, the booms keeping the nets sufficiently far off to prevent any damage being done to the bottom by the explosion of the largest charge carried by a Whitehead. This netting, besides being cumbersome and heavy, cannot be used unless the ship is stationary or nearly so, so that in many cases it would be useless, but for ships at anchor it is of great value. Increased cellular subdivision is also being given to ships under construction, and special vessels, called “torpedo catchers,” are being built by most nations. A torpedo catcher is a vessel of superior size and strength, but with the same high speed as a torpedo boat, the principal arm of the torpedo catcher being machine guns. (E. P. G.)

TORQUATUS. See Manlius.

TORQUAY, a watering-place of England, is finely situated on the northern recess of Tor Bay, Devonshire, and on the Dartmouth and Torbay branch of the Great Western Railway, 12 miles north of Dartmouth, 23 south of Exeter, and 220 west-south-west of London. Owing to the beauty of its site and the equability of its climate, it is the favourite watering-place of Devon, and, being screened by lofty hills on the north, east, and west, and open to the sea breezes of the south, it has a high reputa­tion as a winter resi­dence. The tem­perature seldom rises as high as 70° in summer or falls below freezing point in winter The lower ground is occupied by shops, hotels, and the plainer class of houses, while man­sions and villas occupy the pictur­esque acclivities of the well-wooded limestone cliffs, commanding a great variety of fine views. There are still some remains of the original Torre abbey, founded for Præmonstratensians by William, Lord Brewer, in 1196. They stand to the north of the modern man­sion, but, with the exception of a beautiful pointed-arch portal, are of comparatively small importance. On the south of the gateway is an old 13th-century building, known as the Spanish barn. On Chapel Hill are the remains of a chapel of the 12th century, dedicated to St Michael, supposed to have formerly belonged to the abbey. St Saviour’s parish church of Tor-Mohun, or Tormoham, an ancient stone structure, was restored in 1874. The old church at St Mary Church, to the north of Torquay, has been rebuilt in the Early Decorated style; and in 1871 a new tower was also erected as a memorial to Dr Phillpotts, bishop of Exeter, who with his wife is buried in the churchyard. St John’s church, by Street, is a very fine example of modern Gothic. Among the principal