

## Some Aspects of Victorian Torpedo Warfare

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**SUMMARY** The discovery of the remains of a second-class torpedo boat at Queenscliff, Victoria has highlighted the need for further research into the development of torpedo warfare in the State of Victoria with particular reference to the Whitehead torpedo and the two second-class torpedo boats purchased from J. I. Thornycroft and Co. by the Victorian Government in 1882.

### 1. INTRODUCTION

In 1983 members of the Maritime Archaeology Association of Victoria uncovered the remains of a second-class torpedo boat believed to be the *Lonsdale* at Queenscliff, Victoria (1). The Victorian Government purchased two second-class torpedo boats the *Lonsdale* and the *Nepean* and one first-class torpedo boat the *Childers* from J. I. Thornycroft and Co. of Church Wharf, Chiswick, England, in 1882. A third second-class torpedo boat the *Gordon* was purchased from J. S. White & Co. of Cowes on the Isle of Wight, in 1885; and a second first-class boat, the *Countess of Hopetoun* was purchased from Yarrow and Co. of Poplar, London in 1890 (2). Of these five boats the hulls of only two now remain. The *Countess of Hopetoun* rests in shallow water off Swan Island, Victoria, and what is believed to be the *Lonsdale* lies buried in the sand at Queenscliff.

### 2. THE DEVELOPMENT OF THE IRON CLAD WARSHIP

In order to understand the important role that these vessels played in Victoria's coastal defences it is necessary to place them in their appropriate historical context. In the nineteenth century naval warfare underwent considerable change as the age of wood and sail gave way to iron and steam. The first steam propelled warship was the *Demologus*, designed in 1812 for the United States Navy by Robert Fulton (3). By the 1850's the smooth-bored guns and solid shot of the Nelson era were being replaced by rifled breach-loading guns firing explosive shells. The use of large guns with greater penetrating power and explosive shells accelerated the development of armour plating. Building upon their experiences with armoured batteries during the Crimean War the French launched the world's first seagoing ironclad warship in 1859. The *Gloire*, designed by S Dupuy de Lôme had a wooden hull protected by wrought iron armour 4.3 to 4.7 inches thick, displaced 5,617 tons and was armed with 36 large bore guns. The British countered this threat to their naval supremacy with the *Warrior*. Launched in 1860, the *Warrior* was the first major warship to be built wholly of iron. Designed by Scott Russel and Isaac Watts, the *Warrior* was 380 feet long, displaced 7,137 tons, mounted 28 seven-inch guns and was capable of steaming at a speed of 14.5 knots one knot faster than the *Gloire* (4). The building of the *Gloire* and the *Warrior* started an arms race between Britain and France in which Britain, with her greater industrial capacity, was the ultimate victor.

With the launching of the *Devastation* the first mastless capital ship in 1871, the break between the era of wood and sail was complete. The *Devastation*, with four 12 inch guns in two centre-line-turrets and armour eight to fourteen inches thick, could be said to be the forerunner of the modern battleship. Designed by Edward James Reed the *Devastation* had two steam engines, each driving its own propeller shaft thereby overcoming the main objection to the mastless capital ship, the fear that it would be without motive power in the event of a mechanical breakdown (5).

For a short time in the 1860's it appeared that the seas would be dominated by those nations which could afford to build and maintain fleets of ironclad warships. This was all to change with the development of a new weapon in 1866, the Whitehead torpedo. The Whitehead torpedo was designed to strike the ironclad warship in its most vulnerable area, the unprotected portion of the hull below the waterline.

### 3. TORPEDO WARFARE

Prior to 1860 torpedo warfare and mine warfare were synonymous. The first recorded attempt to detonate an explosive charge placed below the waterline of a vessel was that of David Bushnell during the United States' War of Independence (1775-1783), using a one-man submarine of his own design Bushnell attempted to attach a mine to the hull of H.M.S. *Eagle*. Unfortunately for Bushnell the mine exploded without causing any harm.

During the American Civil War (1861-1865) the Confederate states made some significant contributions to torpedo warfare when they resorted to 'unconventional methods' of naval warfare in an attempt to overcome the Union Navy's superior strength (6). Both the mine and the spar torpedo were used by the Confederates against the Union Navy. The spar torpedo boat was a steam launch armed with an explosive charge on the end of a long pole. Approaching its target under the cover of darkness the spar torpedo boat placed the explosive charge below the waterline of the target vessel and then detonated it. The Confederacy had considerable success with torpedo warfare, albeit at great personal cost, and set the scene for further developments in submarine warfare.

In the period between 1865 and 1895 a number of inventors applied their minds to the problem of devising a self-propelled torpedo, capable of delivering and detonating an explosive charge below

the waterline of a vessel: Whitehead 1866, Barber 1873, Lay 1880, Patrick 1880, Ericsson 1880, Brennan 1885, Nordenfellt 1888, Sims-Edison 1889 and Howell in 1894 and 1895. Of these the most successful was Robert Whitehead. Whitehead, an expatriate English engineer living and working in Fiume, now Rijeka, in Yugoslavia, was approached in 1864 by Giovanni de Luppis, a retired Austrian naval officer, with a design for a wire-guided, clock-work driven, torpedo. De Luppis's torpedo proved to be unworkable, but it provided the stimulus for Whitehead to develop his own torpedo (7).

#### 4. THE WHITEHEAD TORPEDO

Whitehead had little faith in the protection provided by patents and kept the designs and constructional details of his first torpedo a closely guarded secret. His first torpedo constructed in 1866 had a speed of 6.5 knots and a range of 220 yards. Over the next two years the running performance of his torpedo was gradually improved and by 1868 it was capable of achieving speeds of seven knots and a range of 700 yards. These results were sufficiently promising for the Austrian Navy to place their first orders for Whitehead torpedoes. After extensive trials the Royal Navy ordered their first batch of Whitehead torpedoes in 1870. In 1871 the Admiralty purchased the manufacturing rights for 15,000 pounds and began what was to be a most fruitful partnership with Robert Whitehead. In the years that followed various improvements were made. The original engine based on two eccentric cylinders having a sliding valve to divide the volume into two parts was replaced by a twin cylinder Vee which was in turn, replaced by a three-cylinder radial engine built by Peter Brotherhood Ltd. of Peterborough. By 1875 the 14-inch diameter torpedo had a speed of 18 knots and a range of 550 yards. A foreman mechanic at the Royal laboratories, Woolwich, was responsible for the introduction of contra-rotating propellers thereby reducing the torpedo's tendency to roll on its own axis. By this time the torpedo had achieved a plateau in its development and no major modifications were made until the introduction of the gyroscope for azimuthal steering in 1895 (8).

#### 5. THE DEVELOPMENT OF THE TORPEDO BOAT

Although the Royal Navy had purchased the rights to manufacture the Whitehead torpedo in 1871 and had armed some of its capital ships with Whitehead torpedoes soon after, it took five years for them to find the ideal vessel for torpedo warfare. The solution to their problem was the torpedo boats developed independently by John Isaac Thornycroft and Alfred F Yarrow. These fast, highly manoeuvrable boats with their low flat silhouettes overcame the main problems associated with the torpedo's limited range and slow speed. The precursor to the torpedo boat was Thornycroft's *Miranda*. Designed in 1871 the *Miranda* was an extremely light steel boat 45 feet 6 inches in length powered by an inverted, double cylinder, direct-acting steam engine with six inch diameter cylinders and an 8 inch stroke capable of reaching a speed of 600 revolutions per minute producing a speed over 16 knots (9). The Royal Navy's first torpedo boat was the *Lightning*. Designed in 1876 by Thornycroft, the *Lightning* had a length of 81 feet and was powered by a two cylinder compound engine that developed 390 indicated horse-power at 450 revolutions per minute which gave the boat a speed of 18.5 knots (10).

#### 6. VICTORIAN INTEREST IN TORPEDO WARFARE

The Victorian Naval forces first expressed an interest in the use of Whitehead torpedoes and torpedo boats for naval warfare in October 1877 when the Commanding Officer, Captain Mandeville wrote to the Under Treasurer Mr Symonds requesting: "A steam torpedo launch of the 'Thornycroft' pattern, which class of vessel has a speed of from 20 to 24 knots, and fitted to use both the Whitehead and Harvey torpedoes, would be a great acquisition to the colony, and could be used for laying torpedoes for defensive purposes [mines] as well as acting on the offensive either inside or outside Port Phillip Heads, ..." (11). Negotiations for the purchase of Whitehead torpedoes and a torpedo boat to carry them proceeded slowly until the Russian scare of 1883 provided the stimulus for the Victorian Government to purchase from Thornycrofts two second-class torpedo boats designed for coastal defence and sheltered waters and one first-class torpedo boat capable of operating independently.

Victoria was not the only colony to purchase torpedo boats from Thornycrofts at this time. New Zealand ordered four second-class boats, whilst Tasmania and Queensland each ordered one second-class boat. New South Wales had purchased two locally built torpedo boats in 1878. These were the *Acheron* and the *Avernus*. Designed by Norman Selie and built by the Atlas Engineering Company of Pymont. They had a length of 82 feet 6 inches, a beam of 10 feet 6 inches and a draught of 4 feet. Powered by surface condensing engines of 200 indicated horse-power the *Acheron* and the *Avernus* reached speeds of 16 knots (12). The *Acheron* and the *Avernus* were the only torpedo boats not built in Europe or America and deserve their own niche in maritime history.

#### 7. THE VICTORIAN SECOND-CLASS TORPEDO BOATS PURCHASED IN 1882

The discovery of the hull of a second-class torpedo boat at Queenscliff in 1983 has highlighted the need for further research into these vessels. A detailed description of the *Lonsdale* and *Nepean* was published in the *Argus* for 8 July 1884:

'Their extreme length is 63 ft. and beam 7 ft. 6 in. and speed about 16 knots; draught or water, about 3 ft. 6 in. The hull is divided into watertight compartments, and the forward part contains the space to be occupied by the crew, and the torpedo launching tubes and gear. The boiler is of the locomotive type, having a working pressure of 130 lbs per square inch. The heating surface of the fire-box is equal 25.95 square feet, and that of the 124 tubes 239.8 square feet. The engines are compound surface condensing having cylinders of 8½ in. and 13½ in., respectively, with 8 in. stroke and are of 100 indicated horse-power. There are also an air-pump, feed-pumps and donkey-pump. The fan is 2ft. 3 in. in diameter and makes about 1,300 revolutions per minute. It also has a circulating engine, making about 500 revolutions per minute. Aft the engine room is a cabin with accommodation for two officers, fitted similarly to the large boats. These

boats are not fitted with the steam-steering arrangement nor with the forward auxiliary rudder, which are among the interesting features of the *Childers*. The conning tower in these boats is fitted with a telegraph communicating with engine and boiler rooms as in the large boat. Their armament consists of two 14 in. Whitehead torpedoes. They are also fitted with an arrangement by which steam from another boiler can be introduced among the water in the boiler of the boat, so as to heat it quickly and set up steam in a few minutes ... The second-class boats, although sea-going, are not intended to keep the sea, but they are provided with lifting links and gear and as, when fully equipped, they weigh only about 11 tons, they can be transported by larger vessels or by rail. Torpedo boats of this type are believed to be specially adapted for the defence of a coast abounding in creeks, bays and estuaries or in a sea studded with islands, as their small size would enable them to lie in ambush unseen and sally forth at a favourable moment to inflict damage to an enemy.' (13)

In 1888 serious doubts as to the suitability of the second-class boats for the waters of Port Phillip were raised by Captain Thomas, the Commanding Officer of the Victorian Naval Forces. In a memorandum to the Secretary for Defence dated 4 June 1888, he states;

'The second-class boats belonging to the Colony though much improved by recent alterations are very wet and roll heavily in a seaway and could not be trusted to make good practice in bad weather such as is often experienced in Port Phillip.'

The modifications were probably the removal of the forward torpedo tubes and the reconstruction of the bow section of each boat. The use of the forward torpedo tubes for launching torpedoes had been discontinued in favour of Dann's Universal Dropping Gear sometime before 1888 (14).

Despite the inherent problems of the second-class boats they were regular participants in the Annual Easter manoeuvres, however, it is difficult to assess how effective they would have been in an armed conflict, as there are no records of a second-class torpedo boat participating in actual warfare. The general consensus of opinion is that they would have been of limited use because of their small size and general lack of seaworthiness.

The *Lonsdale* and *Nepean* were transferred to Commonwealth control in 1901 and in December of that year they were put up for auction, the bids failed to reach the reserve of 400 pounds and they continued to take part in exercises until 1909. In 1912 *Lonsdale* and *Nepean* were placed on the slipway at Williamstown and stripped of most of their fittings. Once again they were offered for sale, this time by tender. On the 4th, 6th and 10th of June, 1914, advertisements were placed in the Melbourne *Age* and *Argus*, no tenders were received by the due date, and the hulls remained at Swan Island. Gillett reports that *Lonsdale* and *Nepean* were subsequently broken up on the banks of the

Yarra in 1929-1930, and cites a photograph of the hull of the *Nepean* at Fisherman's Bend, Port Melbourne in support of his claim (15). If the boat in the photograph is the *Nepean* then the boat found at Queenscliff must be the *Lonsdale*, however, it is impossible to separate these boats on structural differences as they were identical in all respects.

#### CONCLUSIONS

The team that unearthed the remains of the second-class torpedo boat at Queenscliff were fortunate that they uncovered the conning tower which was made of quarter inch steel plate, the rest of the hull was constructed of one sixteenth inch thick galvanised steel plate which has probably been reduced to corrosion products. If a full scale excavation takes place it is unlikely that any substantial artefacts will be found, all that one could expect to find would be a few ribs, the keel and the conning tower. Exposing what remains of the hull to the atmosphere would undoubtedly accelerate corrosion and could not be justified unless there was a commitment to preserve whatever was uncovered.

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