= HMS Resistance ( 1861 ) =

HMS Resistance was the second of two Defence @-@ class ironclads built for the Royal Navy in the 1860s . She was the first capital ship in the Royal Navy to be fitted with a ram and was given the nickname of Old Rammo . Resistance was initially assigned to the Channel Fleet upon commissioning , but was transferred to the Mediterranean Fleet in 1864 , the first ironclad to be assigned to that fleet . She was rearmed in 1867 and became a guardship when recommissioned in 1869 . The ship was reassigned to the Channel Fleet in 1873 before reverting to her former duties in 1877 . Resistance was decommissioned in 1880 and was used for gunnery and torpedo trials beginning in 1885 . The ship was sold for scrap in 1898 and foundered in 1899 en route to the breaker 's yard . She was salvaged and later scrapped .

= = Design and description = =

The Defence @-@ class ironclads were designed as smaller and cheaper versions of the Warrior @-@ class armoured frigates . This meant that they could not fit the same powerful engines of the Warrior @-@ class ships and were therefore 2 knots ( 3 @.@ 7 km / h ; 2 @.@ 3 mph ) slower and had far fewer guns . The naval architect Sir Nathaniel Barnaby , a future Constructor of the Navy , considered that , in terms of combat , a Defence @-@ class ship was worth one quarter of a Warrior .

HMS Resistance was 280 feet ( 85 @.@ 3 m ) long between perpendiculars and 291 feet 4 inches ( 88 @.@ 80 m ) long overall . She had a beam of 54 feet 2 inches ( 16 @.@ 51 m ) and a draft of 26 feet 2 inches ( 8 @.@ 0 m ) . The ship displaced 6 @,@ 070 long tons ( 6 @,@ 170 t ) and had a ram in the shape of a plough , the first capital ship in the Royal Navy to be fitted with one . The hull was subdivided by watertight transverse bulkheads into 92 compartments and had a double bottom underneath the engine and boiler rooms . Resistance was 128 feet 8 inches ( 39 @.@ 2 m ) shorter overall and displaced over 3 @,@ 000 long tons ( 3 @,@ 000 t ) less than the Warrior @-@ class ironclads .

= = = Propulsion = = =

The Defence @-@ class ships had a single two @-@ cylinder trunk steam engine made by John Penn and Sons driving a single 21 @-@ foot ( 6 @.@ 4 m ) propeller . Four rectangular boilers provided steam to the engine at a working pressure of 20 psi ( 138 kPa ; 1 kgf / cm2 ) . The engine produced a total of 2 @,@ 329 indicated horsepower ( 1 @,@ 737 kW ) . During sea trials on 25 August 1873 , Resistance had a maximum speed of 11 @.@ 4 knots ( 21 @.@ 1 km / h ; 13 @.@ 1 mph ) . The ship carried 450 long tons ( 460 t ) of coal , enough to steam 1 @,@ 670 nautical miles ( 3 @,@ 090 km ; 1 @,@ 920 mi ) at 10 knots ( 19 km / h ; 12 mph ) .

The ironclad was ship rigged and had a sail area of 24 @,@ 500 square feet ( 2 @,@ 276 m2 ) . The lower masts and bowsprit were made of iron to withstand the shock of ramming . Resistance could make about 10 @.@ 5 knots ( 19 @.@ 4 km / h ; 12 @.@ 1 mph ) under sail and the funnel was semi @-@ retractable to reduce wind resistance while under sail alone . The ship 's propeller could be hoisted up into the stern of the ship to reduce drag while under sail . She was re @-@ rigged as a barque from September 1864 to April 1866 before returning to her original ship rig .

= = = Armament = = =

The armament of the Defence @-@ class ships was intended to be 18 smoothbore , muzzle @-@ loading 68 @-@ pounder guns , eight on each side on the main deck and one each fore and aft as chase guns on the upper deck , plus four rifled breech @-@ loading 40 @-@ pounder guns as saluting guns . This was modified during construction to six rifled 110 @-@ pounder breech @-@ loading guns , ten 68 @-@ pounders and two 32 @-@ pounder smoothbore guns , the only such weapons ever mounted in a British ironclad . Both breech @-@ loading guns were new designs

from Armstrong and much was hoped of them . Four of the 110 @-@ pounder guns were installed on the main deck amidships and the other two became chase guns ; all of the 68 @-@ pounder guns were mounted on the main deck . Firing tests carried out in September 1861 against an armoured target , however , proved that the 110 @-@ pounder was inferior to the 68 @-@ pounder smoothbore gun in armour penetration and repeated incidents of breech explosions during the Battles for Shimonoseki and the Bombardment of Kagoshima in 1863 ? 64 caused the navy to begin to withdraw the gun from service shortly afterwards .

The 7 @.@ 9 @-@ inch ( 201 mm ) solid shot of the 68 @-@ pounder gun weighed approximately 68 pounds ( 30 @.@ 8 kg ) while the gun itself weighed 10 @,@ 640 pounds ( 4 @,@ 826 @.@ 2 kg ) . The gun had a muzzle velocity of 1 @,@ 579 ft / s ( 481 m / s ) and had a range of 3 @,@ 200 yards ( 2 @,@ 900 m ) at an elevation of 12 ° . The 7 @-@ inch ( 178 mm ) shell of the 110 @-@ pounder Armstrong breech @-@ loader weighed 107 ? 110 pounds ( 48 @.@ 5 ? 49 @.@ 9 kg ) . It had a muzzle velocity of 1 @,@ 150 ft / s ( 350 m / s ) and , at an elevation of 11 @.@ 25 ° , a maximum range of 4 @,@ 000 yards ( 3 @,@ 700 m ) . The 110 @-@ pounder gun weighed 9 @,@ 520 pounds ( 4 @,@ 318 @.@ 2 kg ) while the 40 @-@ pounder weighed 3 @,@ 584 pounds ( 1 @,@ 625 @.@ 7 kg ) . All of the guns could fire both solid shot and explosive shells .

Resistance was rearmed during her 1867 ? 68 refit with fourteen 7 @-@ inch and two 8 @-@ inch ( 203 mm ) rifled muzzle @-@ loading guns . The new guns were heavier so fewer could be carried . The shell of the 15 @-@ calibre 8 @-@ inch gun weighed 175 pounds ( 79 @.@ 4 kg ) while the gun itself weighed 9 long tons ( 9 @.@ 1 t ) . It had a muzzle velocity of 1 @,@ 410 ft / s ( 430 m / s ) and was credited with the ability to penetrate a nominal 9 @.@ 6 inches ( 244 mm ) of wrought iron armour at the muzzle . The 16 @-@ calibre 7 @-@ inch gun weighed 6 @.@ 5 long tons ( 6 @.@ 6 t ) and fired a 112 pounds ( 50 @.@ 8 kg ) shell . It was credited with the nominal ability to penetrate 7 @.@ 7 @-@ inch ( 196 mm ) armour .

= = = Armour = = =

The Defence @-@ class ships had a wrought iron armour belt , 4 @.@ 5 inches ( 114 mm ) thick , that covered 140 feet ( 42 @.@ 7 m ) amidships . The armour extended from upper deck level to 6 feet ( 1 @.@ 8 m ) below the waterline . 4 @.@ 5 @-@ inch transverse bulkheads protected the guns on the main deck . The armour was backed by 18 inches ( 460 mm ) of teak . The ends of the ship were left entirely unprotected which meant that the steering gear was very vulnerable . They were , however , sub @-@ divided into many watertight compartments to minimize any flooding .

= = Construction and service = =

HMS Resistance was ordered on 14 December 1859 and laid down a week later by Westwood , Baillie at their shipyard in Cubitt Town , London . She was launched on 11 April 1861 , commissioned in July 1862 and completed on 5 October at the cost of £ 258 @,@ 120 . After completion she served in the Channel Fleet until 1864 when she was transferred to the Mediterranean Fleet , the first British ironclad assigned to that fleet . In 1867 the ship was paid off in Portsmouth for refit and re @-@ armament . Resistance recommissioned in 1869 as guardship in the River Mersey and served there until 1873 when she returned to the Channel Fleet . In 1877 the ship resumed her post as Mersey guardship until she was paid off in 1880 at Devonport .

In 1885 Resistance began to be used as a target for the testing of armour against the effects of torpedoes and gunfire . She was sold for scrap on 11 November 1898 . She foundered in Holyhead Bay whilst under tow to the breakers on 4 March 1899 and was later raised and scrapped at Garston , Liverpool .