THE WORLD'S MOST POWERFUL BATTLESHIP

DREADNOUGHT AND HER ARMAMENT IN THE VAN OF FIGHTING SHIPS

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THE British battleship Dreadnought, launched from Portsmouth dockyard by the King on February 10, marks a notable advance in naval design. It is not, of course, revolutionary, as was the French La Gloire of 1857 or the American Monitor of 1862. The type is as clearly evolved from the Lord Nelson class as that class is derived from the King Edward VII group. But, new departure or not, no ship of war has since the advent of the La Gloire—now historically famous as the first seagoing ironclad—and of the Monitor aroused so much technical interest and excited so much public curiosity.

It is at this stage impossible to describe with exactness all the elements of the Dreadnought's design, for its secrets have been kept with such admirable closeness that the facts are known only to a limited circle. Even so eminent a critic as Sir William White, late chief constructor of the British navy, seems to have based an adverse opinion of the type on wrong assumptions; and it is safe to say with the London Engineer, if a person of his enormous experience could be led into error, how less likely is it that the opinions and deductions of lesser lights will prove correct. It may therefore be well to add that the general description of the Dreadnought has been taken from conservative and apparently reliable accounts that have appeared in such trustworthy journals as the Engineer and Engineering of London and the Naval and Military Record of Plymouth.

During the five months that the Dreadnought has been under construction sufficient truth has, however, been whispered to prove that the new ship is an incorporation of ideas, some suggested and some, older and evolutionary, confirmed by the results of the Russo-Japanese sea war. It is fairly well known, for example, that the vessel is to possess an enormous concentration of offensive and defensive energies through the installation of a main battery of 12-inch guns, that the usual intermediate battery has been eliminated, that the Babcock-Wilcox water tube boilers are to develop 23,000 horsepower and that the turbine engines are expected to give an average sea speed of twenty or twenty-one knots. The armor protection is to be distributed over a large area and to be thick enough to resist the direct impact of 12-inch projectiles fired over a range of 3000 yards. The ship's underwater body is to be arranged so as to furnish a reasonable immunity from automatic torpedoes and fixed or floating mines. One further advantage is the gain in fighting simplification, due to the single class and the uniform service of the ammunition needed.

So far as the usual technical data go it is stated by London Engineering "that the Dreadnought is 500 feet long, 82 feet in beam and at a displacement of 18,000 tons will draw 26 feet of water. The boilers are of the Babcock & Wilcox type, with a pressure of 250 pounds; there are four propeller shafts, and with a horsepower of 23,000 the speed will be about twenty-one knots. Apart from the novel feature found in the abolition of the secondary armament, there are several other notable departures from accepted design. Two stern posts and two rudders, placed some twenty feet apart, are provided. The ten twelve-inch guns of the main armament are arranged in three barbettes, each mounting a pair of guns on the keel line, one on the poop, one abaft the funnels and one on the high forecastle. The other two pairs will be in hooded barbettes, located on either bow, so that the fire ahead will be from six guns, the fire astern from two and on the broadside from no less than eight. This is a very great gain indeed, for there can be small doubt that broadside is far more important than end-on fire. The Dreadnought will, when need arises, be a good ship in a chase; her stern fire is, of course, weak, but then she is not likely to be found showing her stern to anything that floats. The torpedo defense gun is now spoken of as an eighteen-pounder, but the number to be mounted is not stated."

It is, however, claimed in other quarters that the foregoing disposition of the main armament is not accurate, and that the twelve-inch guns (45-caliber in length) are to be mounted at nearly the same level on the upper deck. Two of these are to be carried in a forward and two in an after barbette, situated on the fore and aft line of the ship. Three are to be mounted each in a single barbette on either broadside. This disposition of the big guns is, therefore, a close reproduction of that installed in the Lord Nelson, the only substantial changes being the substitution of 12-inch ordnance for the 9.2-inch intermediates of the earlier design. Whichever plan is adopted, the cumulative effect of eight guns fired together in broadside must be enormous, and the effect even of a single shot, owing to the great increase in energy of these latest gun types, must be most destructive even at the new fighting ranges. It should be kept in mind that future actions will probably be fought at ranges so extended that only the heaviest shots will in any final sense count. The flat trajectory—the line of projected flight—can also be so low that no zone of safety will exist within effective torpedo range.

What, it may be asked, will the Admiralty do with a ship of this tremendous power when she is commissioned? With the ten 12-inch guns of the latest type opposed to the four mounted in even the best foreign battleships, she should be equal to any two vessels now afloat. In defensive qualities she will, thanks to the thickness and quality of her armor, be immune from damage by gunfire at ordinary battle ranges. It is generally believed that the Dreadnought will be assigned to the Atlantic fleet, which is the "pivot" force of the British navy. In the late "battle practice" the King Edward VII, flagship of this fleet, when steaming at fifteen knots, fired eleven shells from her four 12-inch guns and hit ten times a target distant nearly three and a half miles. Thirty-one rounds were discharged with her four 9.2-inch guns, making fifteen hits, and out of seventy-one rounds twenty-six hits were scored by the 6-inch guns. If the Dreadnought, with ten 12-inch guns, equals the record the target will, under similar conditions, be pierced twenty times. In addition to the Dreadnought the Atlantic fleet will include, irrespective of armored cruisers and other components and auxiliaries, seven battleships of the King Edward VII type, each mounting four 12-inch, four 9.2-inch and ten 6-inch guns. Assuming that circumstances enabled each of these eight men-of-war to put in a full broadside every minute, the following weight of shells would be discharged:

	Pounds.
Dreadnought	6,800
Seven King Edward VII's	51,940
Total	58,740

The calculation is based on the modest assumption that from each 12-inch gun one shell will be fired a minute, from each 9.2-inch two and from every 6-inch five. This rate is frequently exceeded, but it may suffice as an average for a fleet of eight ships. On this basis the total discharge each minute from the Atlantic fleet firing broadside-on at an enemy is more than twenty-six tons of metal. Presuming the standard of the King Edward VII's 12-inch guns is maintained, twenty-three tons would get therefore home in the ships of any foe that chanced to be the objective. Nothing so overwhelming as this concentrated destruction has ever been conceived in the brain of man. It is impossible to picture the result of one minute's well directed fire at an enemy's ships, and when the gunners get the range and fire as at target practice, one minute being followed by others, the effect will be annihilation. To this length has the contest for sea power gone, and even this is not the end.

These possibilities result from the astonishing advances in heavier ordnance. Until within a few years the British 12-inch gun was 40 calibers in length and developed a velocity of about 2500 feet per second. It is interesting to learn that each of the 45-caliber 12-inch guns of the Dreadnaught is to be something like 30 per cent more powerful than the 12-inch employed two years ago. It will have double the power of the 9.2-inch, nearly five times the power of the 7.5 and eight times that of the 6-inch. Between 1892 and 1902 the collective muzzle energy from one round of battleship guns increased 22 per cent, whereas between 1902 and 1906 the advance has been 147 per cent.

Moreover, the maintenance of energy and penetrative power at long range is favored by a greater weight of projectile, and heavy guns have as a corollary the advantage over light pieces. At long ranges the improved optical devices for sighting and range finding demanded have been speedily provided by inventive ingenuity, and this combination of the various devices with a natural aptitude for getting on the target and with a rational and progressive training is producing results that are nearly marvelous.

The maximum fighting range of the Dreadnaught's 12-inch guns, for example, is five miles, and the chances of hitting targets at this distance are quite good. "Since we have been developing larger battleships," declares Captain Wainwright, U. S. N., in the Proceedings of the Naval Institute, "the power of hitting with big guns has been increasing by leaps and bounds. All ordnance material has improved, and the training of officers and men has become scientific. Now the heaviest guns can be fired as rapidly as the intermediate guns could be fired formerly, and with them they can make more hits than the lighter guns could make in earlier times. The old theories of a 'smothering fire' and 'a greater number of units' must be allowed to die, as one or two hits from the big guns can destroy soft ends and wreck weak battery spaces, and such guns alone are able to attack the life of the ship. What use is there in having a large intermediate battery if its power is de-

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