The displacement of the “ King Edward VII.” was 16,350 tons, the length 425 ft., beam 78 ft., draught 26¾ ft.; the H.P. 18,000, while the designed speed was 18½ knots. Eight vessels of this class were built, five being ordered in 1902 and three in 1903.

The principal changes to be noted in the development of the battleship type from 1885 to 1902 are:—(1) The successive improvements in armour by the introduction of the Harvey and Krupp processes, which enabled either a saving of weight to be effected for the same degree of protection, or a greater degree of protection to be provided for the same weight. (2) The belt armour was extended longitudinally and upward, shielding a greater portion of the hull and giving increased protection to the stability and to the secondary armament of the vessel. (3) Improvements in guns and explosives, by which more effective gun-fire was obtained with guns of smaller calibre and less weight than those previously in use. (4) The growth in importance of the secondary armament. (5) Improvements in machinery—the adoption of higher steam pressures, lighter and faster-running engines, and of water-tube boilers—which effected great savings in weight for a given power, and enabled increased speed to be obtained in successive ships.

Sir William White held office for nearly seventeen years, and during that period a very large number of vessels of various classes were added to the British navy. He retired in February 1902, and was succeeded by Mr Philip Watts, F.R.S. (b. 1850), who was knighted

in 1905.

In 1903 the design of the vessel which afterwards became the "Lord Nelson ” was approved, her armament then including four 12-in. and twelve 9·2-in. guns, all of 50 calibre and all mounted in pairs in gun-houses above the upper deck. It was, however, decided to build the three additional "King Edwards ” above referred to, in order to complete the squadron of eight vessels of the same type. In the “ Lord Nelson,” as afterwards laid down in 1905, the con­dition that the vessels of this class should be capable of being docked in existing docks at Chatham and Devonport led to the reduction of the secondary armament to ten 9·2-in. guns, instead of twelve 9∙2-in. guns. Only two vessels of the class were built, the “ Lord Nelson ” by Palmers Co. and the “ Agamemnon ” (fig. 60, Plate XIV.) by Beardmore & Co. They are 410 ft. long, 79½ ft. beam, 27 ft. draught, 16,500 tons displacement, 17,500 I.H.P. and 18½ knots speed. The general arrangements of the guns and armour are shown in fig. 61 ; the 12-in. guns are carried in pairs at each end of the ship in gun-houses upon barbettes protected by 12-in. armour, and the ten 9∙2-in. guns are carried in gun-houses on the broadside, the midship gun-houses having single and the others pairs of guns instead of each having a pair of guns as originally contemplated. The gun-houses carry 8-in. and 7-in. armour, and the bases of the gun mountings are protected by a citadel of 8-in. armour rising to the upper deck and unperforated for doors or ports. There are also twenty-four 12-pdr anti-torpedo-boat guns carried upon super- structures and a hurricane deck. The water-line is protected by 12-in. armour amidships, tapering to 6 in. forward and 4 in. aft, associated with protective decks. (See Shipbuilding.)

Admiral Sir John Fisher (Baron Fisher of Kilverstone) became First Sea Lord of the Admiralty on the 20th of October 1904, and very shortly after he took office Lord Selborne, First Lord of the Admiralty, announced that the Board had appointed “ a Special Committee on Designs to assist them and the Director of Naval Construction in the consideration of certain questions to be submitted to it by the Board in connexion with the features of the future designs of different types of fighting ships.” The Committee began to sit in December 1904. Their recommendations were approved in 1905 by the Board and embodied in the designs of the “ Dreadnought ” type of battleships, and the “ Invincible ” type of

cruiser, as well as in new types of torpedo-boat destroyers.

The principal features of the “ Dreadnought ” design were as follows (Park Paper Cd. 3048 of 1906):—

*Armament.—*“ Ten 12-in. guns and twenty-four 12-pdr. Q.F. anti- torpedo-boat guns and five submerged torpedo tubes.

‘ In arranging for a uniform armament of 12-in. guns it became at once apparent that a limitation to the number of guns that could be usefully carried was imposed by considerations of the blast effect of the guns on the crews of those guns adjacent to them. It is obviously uneconomical to place the guns in such relative positions that the blast of any single gun on any permissible training should very seriously hamper the use of one or more of the remaining guns.

“ While it is recognized that broadside fire is held to be the most

important in a battleship, all-round fire is also considered of great importance, since it lies in the power of an enemy to force an op­ponent, who is anxious to engage, to fight an end-on action.

“In the arrangement of armament adopted, six of the guns are mounted in pairs on the centre line of the ship; the remaining four guns are mounted in pairs on the broadside. Thus eight 12-in. guns (80% of the main armament) can be fired on either broadside, and four, or possibly six, 12-in. guns (or 60% of the main armament) can be fired simultaneously ahead or astern.

“In view of the potentialities of modem torpedo craft, and considering especially the chances of torpedo attack towards the end of an action, it is considered necessary to separate the anti- torpedo-boat guns as widely as possible from one another, so that the whole of them shall not be disabled by one or two heavy shells This consideration led the Committee to recommend a numerous and widelv distributed armament of 12-pdr. Q.F. guns of a new design and greater power than those hitherto carried for use against torpedo craft.”

*Freeboard.—*" In order to give the ship good sea-going qualities and to increase the command of the forward guns, a forecastle is

provided giving the ship a freeboard forward of 28 ft.—a higher freeboard than has been given to any modern battleship.”

*Armour.—*" The main armour belt has a maximum thickness of 11 in., tapering to 6 in. at the forward and 4 in. at the after extremity of the vessel; the redoubt armour varies in thickness from 11 in. to 8 in.; the turrets and fore conning tower are 11 in. thick, and the after conning tower is 8 in, thick; the protective deck varies from 1¾ in. to 2¾ in. in thickness.

“ Special attention has been given to safeguarding the ship from destruction by under-water explosion. All the main transverse bulkheads below the main deck (which will be 9 ft. above the water­line) are unpierced except for the purpose of leading pipes or wires conveying power. Lifts and other special arrangements are pro­vided to give access to the various compartments.

*Speed.—*“ Mobility of forces is a prime necessity in war. The greater the mobility the greater the chance of obtaining a strategic advantage. This mobility is represented by speed and fuel en­durance. Superior speed also gives the power of choosing the range. To gain this advantage the speed designed for the 'Dreadnought' is 21 knots.”

*Type* *of Machinery.—*“ The question of the best type of propelling machinery to be fitted was also most thoroughly considered. While recognizing that the steam-turbine system of propulsion has at present some disadvantages, yet it was determined to adopt it because of the saving in weight and reduction in number of working parts, and reduced liability to breakdown; its smooth working ease of manipulation, saving in coal consumption at high powers and hence boiler-room space, and saving in engine-room complement ; and also because of the increased protection which is provided for with this system, due to the engines being lower in the ship; ad­vantages which more than counterbalance the disadvantages. There was no difficulty in arriving at a decision to adopt turbine propulsion from the point of view of sea-going speed only. The point that chiefly occupied the Committee was the question of pro­viding sufficient stopping and turning power for purposes of quick and easy manoeuvring Trials were carried out between the sister vessels 'Eden' and 'Waveney' and the 'Amethyst' and 'Sapphire,' one of each class fitted with reciprocating and the other with turbine engines; experiments were also carried out at the Admiralty Experimental Works at Haslar, and it was considered that all requirements promise to be fully met by the adoption of suitable turbine machinery, and that the manoeuvring capabilities of the ship, when in company with a fleet or when working in narrow waters, will be quite satisfactory.

" The necessary stopping and astern power will be obtained by astern turbines on each of the four shafts. These astern turbines will be arranged in series, one high and one low pressure astern turbine on each side of the ship, and in this way the steam will be more economically used when going astern, and a proportionally greater astern power obtained than in the 'Eden' and ‘Amethyst.'"

*Radius of Action.—*“ The ship has a total coal-bunker capacity of 2700 tons, and with this amount of coal she will be able to steam about 5800 sea miles at economical speed, and about 3500 sea miles at 18½ knots after allowance has been made for bad weather and for a small amount of coal being left in the bunkers. Stowage for oil fuel has been arranged for, but oil fuel has not been taken into account in estimating the radius of action, which, of course, will be greatly increased thereby.”

*Accommodation.—*“ Considerable attention has been devoted to the arrangements for the accommodation of the officers and men. In view of the increasing length and greater power of modern ships the usual position of the admiral’s and captain’s quarters right aft is becoming more and more open to objection. Up to the present the principal officers have been berthed at the farthest possible distance from the fore bridge and conning tower, where their most important duties are performed. It has been decided that in this ship the admiral's and captain’s quarters shall be placed on the main deck forward, near the conning tower, also that thí officers’ quarters shall be placed forward, both on the main deck and on the upper deck, in the fore part of the ship. Ample accommodation