introduction of compound armour and the adoption of steel instead of iron for the building material, both of which date from his time, allowed of greater armour protection and of other advantages, including increased speed, &c.

Sir Nathaniel Barnaby was succeeded in October 1885 by Mr W. H. White (afterwards Sir W. H. White, F.R.S.). The battleships then building were of four different types and included two of the “ Colossus ’’ class, six of the “ Admiral ” class, two “ Trafalgars,” and the

“ Victoria ’’ and “ Sans Pareil.” Their completion proceeded very slowly, and no new battleships were laid down till 1889, when the Naval Defence Act resulted in a reconsideration of the subject by the Board of Admiralty.

Before coming to a decision various designs were discussed, and the First Lord convened a meeting, not only of the members of the Board, but of a number of distinguished and experienced naval officers as well as the Director of Naval Ordnance and the Director of Naval Construction. Subsequently the Board issued instructions for the preparation of detailed designs em- bodying the features which were agreed upon as being most desirable; and on these designs the seven barbette battleships

of the “ Royal Sovereign ” class and the

turret ship “ Hood ” were built.

The general arrangement of guns and armour in the vessels of the “ Royal Sovereign" class is shown in fig. 54. They were 380 ft. in length,

75 ft. beam, 27⅛ ft. draught, 14,150 tons displacement, 13,000 I.H.P., and 17½ knots speed.

The coal bunkers can hold 1450 tons, of which 900 tons is included on the above displacement. For three-fifths of the length amidships the side is protected by an 18-in. belt of armour, a horizontal 3-in. protective deck being worked across the ship at the *middle* or *belt* deck ; between the belt deck and main deck 4-in. side armour is worked. Before and abaft the belt curved protective decks 2½ in. thick were worked, extending down to the ram forward and covering the steering gear aft. Four 13½-in. B.L. 67-ton guns were fitted in pairs in pear-shaped barbettes forward and aft, protected by 17-in. armoured barbettes extending down to the belt deck; ten 6-in. Q.F. guns were fitted, four being on the main deck in 6-in. armoured casemates, which were adopted in these vessels for the first time; sixteen 6-pdr. and twelve 3-pdr. Q.F. guns were fitted, and seven torpedo tubes. The “ Royal Sovereign ” was laid down at Portsmouth in September 1889, floated in February 1891, and completed in May 1892. (The six upper-

deck 6-in. guns were protected by 5-in. casemates added 1901 to

The “ Hood ” was similar in displacement, armament, armour, horse-power, speed and general dimensions, but was of less freeboard, the heavy guns being fitted in turrets revolving on armoured redoubts of reduced heights.

The "Centurion ” and “ Barfleur,” laid down in 1890, were designed as sheathed second-class battleships for service in distant waters; they were 360 ft. in length, 70 ft. beam, 25 ft. 6 in. mean draught, 10,500 tons displacement, 13,000 I.H.P., and 18¼ knots speed. They were armed with four 10-in. B.L. guns in circular barbettes of 9-in. armour, ten 4·7-in. and twenty-two small Q.F. guns, and five torpedo-tubes, four of the 4∙7-in. guns being on the main deck in

casemates of 5-in. armour; the armour belt was 12 in. thick, the protective decks 2 in., and the side armour between belt and main decks 3 in. thick. They were re-armed and improved in 1902-1903.

The “Renown” (fig. 55, Plate Xll.), laid down in 1893, was 380 ft. long, 72 ft. beam, 25 ft. 6 in. mean draught, 12,000 l.H.P., and 18 knots speed, armed with four 10-in., ten 6-in., fourteen 12-pdr. and eight 3-pdr. guns, and five torpedo tubes. She was the first vessel in the British navy to be protected by Harveyized armour; the belt armour had a maximum thickness of 8 in., the barbettes were of 10-in. armour, the casemates 6 in., and the decks 2 in. to 3 in. thick. An innovation was made in the form of the protective deck, the sides being bent down to the level of the lower edge on the side armour, while the midship por­tion was kept flat at the level of the upper edge of the side armour. This method of construction was followed in all succeeding British battleships.

The “Majestic,” laid down about the same time, was an unsheathed first-class battleship, 390 ft. long, 75 ft. beam, 27½ ft. mean draught, 14,900 tons displacement, 12,000 I.H.P., and 17 knots speed ; her bunkers held 2000 tons of coal, of which 900 tons are included in the displacement named. Her armament consisted of four 12-in. wire-wound guns, which were more powerful than the heavier 13½-in. guns of the “ Royal Sovereign,” twelve 6-in. Q.F., eighteen 12-pdr., twelve 3-pdr. and smaller guns, and five torpedo tubes, four of them submerged. Her protective deck was 2½ in. thick on the flat part

amidships and 4 in. thick on the sloping sides; above the deck a broad belt of 9-in. Harveyized armour was fitted, rising to the main deck. The barbettes were protected by 14-in. armour, and all the 6-in. guns were protected by 6-in. case- mates. The Majestic ” was laid down at Portsmouth on the 5th of February 1894, floated on the 31st of January 1895, and completed in December 1895.

Nine vessels of the same class were built, the last being the “ Hannibal ” (fig. 56, Plate XIV.), completed in April 1898. In two of the vessels, “ Caesar ” and “ Illustrious,” the bar­bettes were made circular, central revolving hoists being fitted and the guns arranged to load at any angle of training, a system which was adopted in the heavy gun mountings of all the later British

battleships.

The “ Formidable ” and “ London ” classes, laid down from 1898 to 1901, differ very sljghtly from each other, and for all practical pur­poses may be taken as identical, the main difference being in a re­arrangement of the armour protection to the bow in the later ships. The former class consists of the three battleships “ Formidable,” “ irresistible ” and “ implacable,” and the latter of the five battle- ships “London,” “ Bulwark” (fig. 57, Plate XV.), “Venerable,” “ Queen ” and “ Prince of Wales." These classes represent a development of the “ Majestic ” class, being 400 ft. long, 75 ft beam, 26 ft. 9 in. draught, and 15,000 tons displacement, the belt being of the same general thickness and extent as in the “ Majestic,” but of Krupp steel, protection being given to the bow by 2-in. side-plating. In the “ Formidable ” the protective deck proper was formed as in the “ Majestic,” but thinner, being 2 in. to 3 in. thick, and a second protective deck, 1 in. thick, was formed at the main deck, giving a flat top to the citadel formed by the side belt and the bulkheads. In the “ London ” class the lower protective deck was thinner and the upper one thicker than in the “Formidable" class, the protection being extended forward by thinner material, tapering to 2 in. at the bow, and the forward transverse armour bulkhead being omitted. The 12-in. guns in both classes were