guns, the 13-in. guns being mounted in pairs in turrets on the upper eck, and the four 8-in. guns singly in turrets at the corners of the superstructure deck. They were followed by the “ Iowa ” of 11,346 tons, laid down in 1893; and in 1896 by the “Kearsarge” and “Kentucky,” whose principal dimensions were:—length 368 ft., beam 72 ft., mean draught 23 ft. 6 in., displacement 11,525 tons, I.H.P. 10,500 and speed 16 knots as designed, 12,000 l.H.P. and 16¾ knots being reached on trial. They carried four 13-in. guns in turrets 15 in. thick, four 8-in. guns in turrets 9 in. thick, fourteen 5-in. Q.F. guns, twenty-seven smaller guns, and four torpedo tubes ; and at the above displacement they carried 410 tons of coal, but could stow 1590 tons. They had a novelty in the shape of two double-storeyed turrets, one forward and one aft. In this arrange­ment a second turret is superposed or built on the first, the structure so formed turning as a whole; a pair of 8-in. guns is mounted in the upper turret, and a pair of 13-in. guns in the lower. A later example of American design is furnished by the five first-class battleships of the “ Georgia ” class (fig. 65), laid down in 1902, which have a displacement of 15,320 tons, length 435 ft., beam 76 ft. 10 in., and a mean draught of 24 ft.; they have a complete water-line belt of Krupp armour, from 11 in. to 8 in. thick, tapering to 4 in. at the bow; above this belt there is a belt of lighter armour, 6 in. thick and 245 ft. long, forming a battery for the 6-in. Q.F. guns, which extends to the upper deck; there are also four turrets—two large double-storeyed turrets, as in the “ Ken­tucky,” placed one forward and one aft, and two smaller turrets, one placed on each side forward. The larger turrets carry each a pair of 12-in. guns and a pair of 8-in. guns, and are protected by a maximum thickness of 11-in. armour, and the smaller carry each a pair of 8-in. guns and are protected by 6½-in. armour. In addition to the four 12-in. and eight 8-in. guns thus disposed, there are also twelve 6-in. guns on the main deck and some forty-two smaller guns.

Machinery of 19,000 I.H.P. was provided for a speed of 19 knots, and both were exceeded on the trials of the vessels. They carry 900 tons coal on the trial draught, and when fully loaded with 1900 tons of coal have a draught of 26 ft. This comparatively shallow draught is a distinctive feature of all the early United States battle- ships, but in later years a notable increase of draught was accepted. Between the “ Kearsarge ” and the “ Georgia ” were built in 1896-1898 the “ Alabama,” “ lllinois ” (fig. 66, Plate XVI.), and “ Wisconsin,” somewhat similar to the “ Kearsarge,” carrying four 13-in. guns and fourteen 6-in. guns, and in 1899-1901 the second “ Maine,’’the“ Missouri ’’and "Ohio," which more nearly resembled the “ Georgia,” as they carried 12-in. guns for their main armament.

The “ Georgia ” class was followed by two much larger vessels the “Connecticut” and “Louisiana,” laid down in 1903; they were 450 ft. long, 76 ft. 10 in. beam, 17,600 tons displacement and 24 ft. 6 in. draught when loaded with 900 tons coal, and 26 ft. 9 in. draught when loaded with full complement of ammunition and stores and 2200 tons coal; and they marked a great advance in fighting power. While retaining four 12-in. guns for the main armament, they carried eight 8-in. and twelve 7-1n. guns as a secondary arma­ment, and they were well protected, guns and armour being arranged as shown in fig. 67. Engines of 16,500 I.H.P. were provided for a speed of 18 knots, and both were considerably exceeded on trial. In these and later American vessels tall towers of open lattice-work, somewhat resembling the Eiffel Tower, were fitted instead of hollow steel masts for supporting signal and fire-control arrangements.

While the vessels of the “ Connecticut ” class were building in 1904, two other very similar but smaller vessels, the “ Idaho ’’and “ Missis­sippi,” were also laid down, of 13,000 tons with reduced armament and armour and less speed.

The first two American “ Dreadnoughts,” the “ Michigan ” and “ South Carolina,” were laid down in 1906; they are 450 ft. long, 80 ft. 3 in, beam, displacement 16,000 tons and draught 24 ft. 6 in. when carrying 900 tons of coal, increasing to 17,620 tons and 27 ft. draught when fully loaded. Engines of 16,500 l.H.P. are provided for 18∙5 knots, and the armament consists of eight 12-in. guns mounted in four pairs, two pairs forward and two pairs aft, all on the middle line and arranged so that the guns of the second pair sweep over the turrets of the adjacent pair nearer the extremities of the vessel; an anti-torpedo boat armament of twenty-two 14-pdr. guns is provided, but no secondary armament. The sides and barbettes are protected by 8 in. to 12 in. of armour, the belt armour tapering to 4 in. at the bow and stern. In 1907 the “ Delaware” and “ North Dakota” were laid down; the size of the vessels was increased to 20,000 tons in order to carry 12-in. and 14-in. guns behind armour from 12 in. to 8 in. in thickness and obtain a speed of 21 knots, and they are 510 ft. long, 85 ft. beam, 26 ft. 10 in. mean draught. Ten 5-in. guns are carried on the main deck behind 5-in. armour, two are carried on the main deck forward and two aft, in casemates. Curtis turbines are fitted in the “ North Dakota ” and reciprocating engines of the latest type in the “ Delaware the boilers pro­vided on each ship are for 25,000 I.H.P.; on trial the “Delaware” developed 28,578 I.H.P. and recorded a speed of 21∙56 knots, while the “ North Dakota" reached 31,826 H.P. and 22∙25 knots.

Parsons turbines were adopted for the four battleships next laid down. The first two, the “ Florida ” and “ Utah,” commenced in 1909, are very similar to the “ Delaware,” but of 21,825 tons displacement and 28 ft. 6 in. mean draught. The second pair, the “ Arkansas ” and “ Wyoming,” begun in 1910, are of much greater displacement, viz., 26,000 tons; 8100 tons greater than the Dreadnought ” and 3500 tons greater than the “ Orion.” They are 554 ft. long, while a beam of 93 ft. and the same mean draught of 28 ft. 6 in. have been accepted. Turbines of 33,000 H.P. are provided for a speed of 20·5 knots, four propellers being fitted as in H.M.S. “ Dreadnought.” The coal to be carried on trial has been increased to 1650 tons, in place of the 1000 tons in preceding vessels. Twelve 12-in. and twenty-one 5-in. guns are carried and vanadium steel armour of 8-in. to 11-in. thickness is fitted on sides and barbettes, associated with protective decks of increased thickness. Six pairs of 12-in. guns are carried, all on the middle line; the foremost pair is 34 ft. above the designed load-line, the second pair 40 ft., and the third pair 32 ft.; the aftermost guns are 25 ft. above water, the next forward 32 ft. and the third pair from stern again at a height of 25 ft. Twenty-one 5-in. anti-torpedo-boat guns are carried, and the complement of officers and men has reached the high total of 1100. The main armament of the later vessels, “ New York ” and “ Texas,” is composed of ten 14-in. instead of twelve 12-in. guns, and the displacement is increased to 27,000 tons and the H.P. to 35,000.

*Germany.—*In 1885 Germany had one first-class battleship, the “ König Wilhelm,” of 9567 tons displacement, and four smaller vessels, the “ Baden,” “ Bayern,” “Sachsen” and “Württemberg,” of 7400 tons each. The “ Kaiser ” and “ Deutschland,” central­battery ships designed by Sir Edward Reed, and two turret ships, the “ Preussen ” and “ F. der Grosse,” followed shortly afterwards. The “ Kaiser ” and “ Deutschland ” were 285 ft. in length, had a displacement of 7600 tons, 8000 I.H.P. and 14½ knots speed; were armed with eight 22-ton guns and one 18-ton gun, and had side armour of a maximum thickness of 10 in. The vessels of the “ Preussen ” class were sea-going ships of the “ Monarch ” type, 308 ft. in length and of 6750 tons displacement and 14 knots speed, with belt armour of a maximum thickness of 9¼ in. and turret armour 8¼ in. thick.

In 1891 an advance was made by laying down the “ Brandenburg class of 9901 tons, carrying six 11-in. guns in three barbettes, one forward and one aft, and one on the middle line amidships. They were followed by the five first-class battleships of the “ Kaiser ’ class, the last of which, the “ Kaiser Friedrich III.” (fig. 70, Plate XVI.), was finished in 1900. They are of 10,900 tons displacement, length 377 ft., beam 66 ft. 10 in., draught 25 ft. 9 in., 13,000 l.H.P. and 18 knots speed. They have belts of Krupp steel extending from the after