Excursion steamers working round the coast are frequently of similar type to this vessel, but of less length and less extensive open promenade decks. A popular south coast pleasure steamer, built in 1909, is the paddle boat “ Bournemouth Queen,” shown in fig. 17 (Plate X.). She is 200 ft. long, 24 ft. breadth moulded and 48 ft. 6 in. outside guards, 8 ft. moulded depth, tonnage 353 tons gross, 139 tons net ; she can carry 610 passengers on a No. 3 certificate and 704 on a No. 4 certificate. Her displacement at 5 ft. 2 in. load draught is 406 tons and her speed 15⅜ knots. The “ King Edward,” a steamer which began to ply on the Clyde in 1901, is 250 ft. long, 30 ft. wide, 10 ft. 6 in. deep to the main deck, and 17 ft. 9 in. to the promenade deck. She was the first passenger steamer to be driven by Parsons steam turbine. Her speed is 20 knots. A second turbine steamer, the “ Queen Alexandra,” began to run on the Clyde in 1902; she is generally similar to the “ King Edward,” but larger and faster.

These vessels are popular because of their great speed and the absence of vibration. They have been followed by others such as the “ Kingfisher ” on the Thames and the “ Atalanta ” on the Clyde. The latter being 227 ft. long, 27 ft. beam, depth 10 ft. 6 in., draught 5 ft. 6 in., displacement 520 tons and gross tonnage 400; the machinery of 2500 H.P. gives a speed of 18 knots, and is of interest as it was utilized for very extensive shop experiments to obtain data for the construction of the turbines of the great Cunarders. Numerous steamers of this class are to be found on the rivers and coasts of the Continent, but the finest are employed on the rivers and harbours of America, together with large numbers of a smaller class. Most of the light-draught river steamers of the United States are built of wood, but those employed elsewhere are usually built of steel. The “ Hendrick Hudson ” (fig. 18, Plate III.), built of steel in 1906, one of the most famous river boats of America, carries 5000 passengers, for whom five decks, which have a breadth of 82 ft.—the full width over the paddle-boxes—are set apart. She is 380 ft. long, 45 ft. breadth moulded, 13 ft. 5 in. moulded depth, draught 8 ft., freeboard amid- ships 6 ft. 3 in., tonnage gross 2847 tons. The old walking-beam arrangement of engines, for many years a distinctive feature of American river steamers, is in this vessel replaced by inclined, three- cylinder, compound, direct acting engines; her feathering paddle wheels are 24 ft. in diameter and 16 ft. 6 in. wide, and her speed is 22 knots.

Some of the boats of the Fall River Line are larger than the “ Hendrick Hudson ”; the “ Puritan ” is 420 ft. long, of 7500 I.H.P. and 4650 tons gross; the “ Priscilla,” built in 1904, is very similar to the “ Puritan,” but is 44o ft. long and 20½ ft. depth moulded; her moulded breadth is 52½ ft. and her decks extend to an extreme breadth of 93 ft. ; her tonnage is 5292 tons gross ; the side wheels are 35 ft. in diameter and 14 ft. wide, driven by inclined engines of 8500 I.H.P., and running at about 24 revolutions per minute maintain a speed of about 15 knots on service. A still larger vessel of the same type is the “ Commonwealth,” which is 456 ft. overall; breadth of hull 55 ft., breadth of decks outside guards 96 ft., horse power 11,000. The “Puritan,” “ Priscilla ” and “Commonwealth ” run on night service only to Fall River through Long Island Sound, and the accommodation provided is very large; the “ Priscilla,” for instance, can sleep 1500 persons besides her crew of over 200. In these vessels the freeboard is carried to one deck higher than in the “ Hendrick Hudson,’’ to enable them to accomplish the exposed ocean portion of their passage with safety; and they form a link between the fast river steamer and the fast cross-channel steamer. Similar passenger vessels are employed on the Great Lakes, an example being the “ City of Cleveland" (fig. 19), built in 1908, of the following dimensions: length overall 404 ft., breadth hull proper 54 ft., width over paddle- boxes 92 ft. 6 in., depth 22 ft.; tonnage 4568 tons gross, 2403 tons net. She is built of mild steel, divided into 10 principal water-tight compartments and fitted with a cellular double bottom, and has a water chamber of 100 tons capacity to check rolling in a sea way. The engines are compound, three-cylinder, inclined, connected directly to cranks on the paddle-wheel shaft, the diameters’ of the cylinders being one of 54 in. and two of 82 in., and the stroke 8 ft. ; eight single-ended cylindrical boilers fitted with Howden forced draught supply steam at 160 lb, and on service the vessel can maintain 20 m. or 17∙5 knots per hour without difficulty, developing about 6000 I.H.P. at 28 revolutions per minute.

*Cross-Channel Steamers.—*Cross-channel steamers are of a heavier type than those just considered and require higher freeboard and better sea-keeping qualities to be able to make passages across more exposed waters in all weathers. Over 200 such vessels are employed carrying mails, passengers, luggage, cattle and merchandise between Great Britain and Ireland, the Isle of Man, and continental ports. The mail service between Holyhead and Kingstown has for many years employed a number of splendid vessels of this class. The four paddle-steamers, “ Ulster,” “ Munster,” “ Leinster ” and “ Con- naught;” built in 1860, were 337 ft. long, 35 ft. broad and 19 ft. deep; their speed was 18 knots with 6000 I.H.P. A vessel of the same type, but larger, named the “ Ireland,” was added to the fleet in 1885. In 1896 and 1897 four new twin-screw steamers were built, and received the same names as the four vessels built in 1860, which they have replaced. Their length is 360 ft., breadth 41 ft. *6* in., depth 29l ft., tonnage 2633 tons gross, 733 tons net, and displacement 2230 tons at 14 ft. 6 in. load draught. Their engines are of 9000 I.H.P. and sea-going speed 23 knots, over 24 knots having been

reached on trial. They have sleeping-berths for 238 first-class and 124 second-class passengers, and large dining and other public rooms for general accommodation.

In recent years large numbers of very fine vessels of the cross­channel type have been built for other services. In 1903 the “ Queen,” the first turbine vessel for the Dover-Calais service, was built by Messrs Denny of Dumbarton; she is 310 ft. long and ob­tained 21¾ knots. In 1905 the “ Invicta ” was built of the same dimensions and boiler power, and by means of improved turbines the speed was increased to 23 knots. In the same year the Midland Railway Company ordered three vessels each 33o ft. long, 42 ft. beam and 25 ft. 6 in. moulded depth ; and a fourth similar but a foot wider. Two of these vessels, the “ Antrim ” and “ Donegal,” were fitted with four-cylinder triple-expansion engines driving twin screws; the third and fourth, the “ Londonderry ” and Manxman,” were fitted with turbines of 6000 and 8000 H.P. respectively. All had cylindrical boilers of the same dimensions. The “ Antrim ” did better than the “Donegal” and obtained a speed of 21∙86 knots with very remarkable economy; of the turbine vessels, the “ Manxman ” did better than the “ Londonderry,” reaching 23·12 knots, and proving more economical than the “ Antrim ” at all speeds above 14 knots.

Other successful vessels of this class are the “ St George ” and three sister vessels, 350 ft. long, 2500 tons displacement, 11,000 H.P. and 22½ knots speed, built for the Great Western Railway Company for service from Fishguard to Rosslare; and the “ Princesse Elisabeth,” of 24 knots, employed on the Dover-Ostend service. But all these vessels were surpassed by the “ Ben-my-Chree,” built at Barrow

for the Isle of Man Steam Packet Company. She is 375 ft. long, 46 ft. beam, 18 ft. 6 in. moulded depth, carries 2549 passengers on a No. 2 certificate, and displaces 3353 tons at 13 ft. 5 in. draught. On trial she attained 25½ knots on the measured mile, and maintained 24½ knots for over 6 hours; on service she averages 24 knots at sea and 23 knots between the Liverpool landing stage and Douglas pier. Numbers of cross-channel steamers are owned by continental com­panies, among which the “ Prinses Juliana ” (fig. 20, Plate III.) and her two sister vessels, belonging to the Zeeland Steamship Company of Holland, run on the night service between Quecnboro’ and Flushing. They are 35o ft. long, 42 ft. 6 in. beam, 16 ft. 4 in. depth, gross tonnage 2885 tons; they have four-cylinder triple-expansion engines of 10,000 H.P., and attained 22½ knots on the mile, and 22 knots on a six hours’ run ; they have excellent accommodation for 35o passengers.

For services on which relatively large cargoes and fewer passengers are carried smaller vessels of less speed are built, such as the “ Rowan,” built by Messrs D. & W. Henderson & Co. for the Laird Line service between Glasgow and Dublin. She is 292 ft. long, 38 ft. beam, 17 ft. 6 in. depth moulded, has sleeping accommodation for 200 passengers, triple-expansion engines, and a speed of 16 knots.

In America a number of vessels of the cross-channel type have recently been built. One of these, the “ Governor Cobb,” 290 ft. long, 54 ft. beam, 20 ft. 6 in. moulded depth, 14 ft. draught loaded, was the first merchant vessel in America to be driven by turbines. She was followed by the “ Harvard ” and “ Yale ’’ of the same type, 407 ft. overall, 63 ft. extreme breadth, 16 ft. draught loaded; they carry 800 passengers and 600 tons freight on a night service between New York and Boston; turbines of 10,000 H.P. give them a speed of 20 knots, making them at the time the fastest sea-going vessels on the American coast.

The “ Prince Rupert,” “ Princess Charlotte,” &c., recently built for service on the western coast of Canada, also belong to this section. The first-named (fig. 21, Plate III.) is 306 ft. long, 42 ft. beam, 24 ft. moulded depth. At 15 ft. draught her displacement is 3150 tons, of which 1000 tons is cargo ; she is of 3379 tons gross, 6000 I.H.P. and her speed 18} knots. The “ Prince George ” is similar to the “ Prince Rupert ” and obtained 19∙2 knots on trial at 13 ft. 3'in. draught and 2622 tons displacement; both vessels can carry 220 first-class and a