in rig, to suit the longer and larger vessels; and steel masts, with wire rope standing rigging and various labour-saving appliances, have been introduced. The larger ships also carry steam winches for various purposes, steam windlasses, and steam steering gear, but the general appearance of the vessels has changed very little.

*Barges.—*Rivers and canals abound with barges of various types, such as the Thames barge, the Tyne wherry or keel, and the Dutch galliot or pink. The Thames barge, which may be taken as a repre- sentative vessel of this class, has a length of from 70 to 80 ft., and a carrying capacity of from 100 to 120 tons on about 6 ft. draught. Like the Dutch galliot, she is provided with lee-boards, and is fore- and-aft rigged with sprit-sail and jigger.

In recent years the use of barges or lighters has been extended beyond river and canal service, and rapidly increasing numbers are now used, in addition, for sea transport. For example, on the east coast of England lighters of about 500 tons carrying capacity are used in the coal trade. The system has been carried much farther on the Great Lakes of North America, where cargo barges are in use of over 350 ft. in length, and approaching 5000 tons displacement when loaded. On the east coast of the united States barges, built sometimes of wood and sometimes of steel, are employed, carrying from 2000 to 4000 tons of coal, oil, grain, &c.

*Smacks or Cutters.—*This type of rig is still largely adopted in the merchant service for small vessels, usually called smacks, of a length, say, from 60 to 90 ft., and a displacement from 150 to 200 tons. They are single-masted, sharp-built vessels, provided with fore-and-aft sails only, and fitted with a running bowsprit; they have no standing jib stay. Such vessels were at one time generally used for coasting passenger traffic. The term "cutter ” is also applied to an open sailing boat carried on board ship.

*Schooners, Brigs and Brigantines.—*A schooner (fig. 7, Plate 1.) is usually a two-masted vessel, with yards only on the foremast and fore-and-aft sails on the main. The foresail is not bent to the yard, but is set flying. In some cases there are no yards at all and the schooner is then called a fore-and-aft schooner, a schooner with yards being sometimes called a square-rigged schooner. Before the days of steam, two- and three-masted schooners, known as “ Fruiterers,” were extensively employed in the fruit trade from the Western Islands, Italy, Malta and other orange-growing countries to London. In the ’fifties as many as three hundred were thus em­ployed ; they kept their place till the ’eighties, and some even yet survive the introduction of steam as a motive power. They were beautifully modelled craft, and very fast under canvas. A brig is a two-masted vessel having yards, or square-rigged on both masts. A brigantine is a two-masted vessel having the foremast square-rigged, as in a brig, the main mast being rigged as in a schooner. Much of the coasting trade of the world is carried on by schooners, brigs and brigantines. These vessels were formerly employed in the Baltic, and to some extent in the West Indies and the Mediterranean. Schooners such as the above are usually from 80 to 100 ft. long, 20 to 25 ft. broad, 10 to 15 ft. deep, and have a gross tonnage of 130 to 200 tons. Brigs are generally larger, varying in tonnage from 200 to 350 tons; they are from 90 to 115 ft. long, from 24 to 30 ft*.* broad, and from 12 to 18 ft. in depth of hold. Brigantines usually occupy, as to size, a position intermediate between schooners and brigs.

Vessels somewhat larger than two-masted schooners and brigs, but of a similar form, are often rigged as three-masted schooners and as the so-called barquentines. The former is like a schooner with a third or mizzen mast added, this being rigged fore and aft, as is the main mast. The latter resembles a brigantine with a third mast added, which is also fore-and-aft rigged. The two rigs thus very nearly resemble each other : both types are square-rigged on the foremast, and fore-and-aft rigged on the main and mizzen; but while in the former the foresail is set flying, in the latter it is bent to the yard.

Larger vessels than these are sometimes fitted with four, five, six and even seven masts, as fore-and-aft schooners. A large number of vessels fitted in this manner are much in favour for the coasting trade of America. Fig. 8 (Plate I.) shows the “ Helen W. Martin, a five-masted wooden schooner, built in 1900 in the United States; she is 280 ft. 6 in. long, 44 ft. 9 in. broad and 21 ft. depth of hold, and her gross tonnage is 2265. Another vessel built at the same time, also of wood, and named the “ Eleanor A. Percy,” is 323 ft. 5 in. long, 50 ft. broad and 24 ft. 8 in. depth of hold, with a gros3 tonnage of 3402; she is rigged as a six-masted schooner. An interesting vessel of this class was the seven-masted schooner, “ Thomas W. Lawson,” built in 1902 by the Fore River Ship and Engine Co., Quincy, Massachusetts, of steel, 368 ft. long, 50 ft. beam, 34½ ft. depth of hold, and on a draught of 26 ft. 6 in. of 10,000 tons displace­ment, thus being the largest vessel yet constructed for sailing only. She was recently wrecked on the Solly Isles.

*Barques and Ships.―*Vessels intended to sail to all quarters of the globe are usually rigged as barques or ships; but, as indicated above, these rigs are very far from embracing all those in use; many others are very common. A barque is a three-masted vessel, square- rigged on the two foremost masts (the fore and main masts) and fore-

and-aft rigged on the mizzen mast. A ship (a ship-rigged vessel) has three masts, each of which is square-rigged. These were the rigs employed in types of vessels now fast passing away, if indeed they must not be considered as already obsolete, in which great speed was the quality chiefly aimed at, and carrying power was of secondary importance. For instance, the “ Phoenician,” built in 1852, had a length of 150 ft. and a net tonnage of 478; the “ Shannon,” built in 1862, was 217 ft. long and her tonnage 1292. The former made the quickest run on record, up to 1852, from Sydney to London, ac­complishing the distance in 83 days; and the latter made a round voyage from Melbourne to London and back from thence to Sandbridge Pier in 5 months and 27 days, handling two full cargoes in the time. The American ship “ Witch of the Wave,” built in 1852, and the British ship “ Cairngorm,” built in 1853, were engaged in the keen competition carried on between Great Britain and the United States for the rapid conveyance of early teas from China to London. The American builders had for some years been more successful than the British builders, and the “Cairngorm” was the first ship which equalled the American ships in speed, and it was, moreover, claimed for her that she delivered her cargo in better condition than the American ships. She was 215 ft. long, and her tonnage was 1250 old measurement, or 938 new measurement. The “ Witch of the Wave ” on her best voyage made the passage from Whampoa to Dungeness in 90 days, the best day’s run being 338 knots in 24 hours, a very remarkable performance. Later, in 1856, the “ Lord of the Isles ” beat the two fastest American clippers then existing in a race from China to Great Britain, one of them only by a few minutes; her length was 183 ft., and her tonnage, new measurement, 630. It is noteworthy that the competition in bringing the early teas home from China, started between British and American ships, was carried on subse- quently between British ships alone. in the memorable race of 1866 from Foo-Chow to London, five ships, the "Ariel,” “ Taeping,” “ Serica,” "Fiery Cross ” and “ Taitsing ” took part. The first three left Foo-Chow the same day—the “ Ariel ” first, followed 20 minutes later by the “ Taeping ” and “ Serica ” together. The vessels separated, and lost one another till they reached the English Channel, when the “ Ariel ” and “ Taeping” got abreast, and raced to the Downs, the former arriving some ten minutes before the latter, the “ Serica ” reaching the Downs a few hours later. These three occupied 99 days on the voyage; the “ Fiery Cross ” and “ Taitsing ” took two days longer, making the passage from Foo-Chow to the Downs in 101 days. The best day’s run on the passage for all these ships differed but little, the “ Fiery Cross ” showing a slight superi­ority in this respect, having run 328 knots in the 24 hours. The time occupied in the above voyages was beaten in 1869 by the “ Thermo- pylae ” and “Sir Lancelot,” both British ships and of composite build ; the times occupied by their passages were respectively 90 days from Foo-Chow to Dungeness for the former, and 88 days from Foo-Chow to Deal for the latter, each taking one day more to get into the docks. The dimensions of the “ Thermopylae ” were 212 ft. by 36 ft. by 21 ft. depth of hold, and of the “ Sir Lancelot ” 197½ ft. by 33¾ ft. by 21 ft. The best day’s run of the “ Sir Lancelot" was 354 knots in 24 hours. Shortly before the above voyage the “ Thermopylae ” made the passage from London to Melbourne in an unprecedentedly short time, namely, 62 days from Gravesend to Port Phillip harbour. With the opening of the Suez Canal and the general introduction of steam, the demand for exceptionally fast sailing vessels of these types has very considerably diminished, and, indeed, almost ceased to exist. The type of cargo sailing ship usually met with to-day is better illustrated by fig. 9 (Plate l.), which represents the “ Victoria Regina,” built of iron in 1881 at Southampton; she is 270 ft. long and has a gross tonnage of 2006.

Ships with four and five masts were employed by several countries during the 19th century. Sometimes, in the case of four-masted ships, these were square-rigged on the fourth or mizzen mast, and sometimes fore-and-aft rigged; in the latter case they were called four-masted barques in Great Britain and shipentines in America. Five-masted ships are sometimes square-rigged on the fourth mast and fore-and-aft rigged on the fifth mast, and sometimes fore-and-aft rigged on both of these masts. The *Naval Chronicle,* vol. vii. (1802), contains par­ticulars of the French privateer “ L’invention,” which was captured by the British ship “ immortalité ”; she was rigged as a four-masted ship, carried 26 guns, and had a complement of 220 men. It is re­markable how little her rig differs from that of modern vessels. A five-masted vessel is described in the same number of the *Naval Chronicle* which was square-rigged on the foremast and fore-and-aft rigged on the other four masts; she was apparently a forerunner of the American five-masted schooner of the present day. The shipen- tine clipper “ Great Republic,” built in 1853, is noteworthy as being the first ship fitted with double topsails, now so generally adopted. She was 305 ft. long and her tonnage was 3400; she could spread 40,500 square ft. of canvas, excluding stay-sails; she had four decks and was built of wood, though her framing was diagonally braced with iron. The shipentine “ Madeleine,” built in France in 1896, is almost identical in rig to the Great Republic ”; her length is 321 it. and her gross tonnage 2892. A five-masted barque “ France, ” built in Glasgow in 1890, is 361 ft. long and has a gross tonnage of 3942. As further examples of the large sailing ships built in recent years may be mentioned the “ Astral” and “ Potosi.” The “ Astral ” was built by Arthur Sewall & Co. at Bath, Maine, in 1900, for the oil trade.