been added to the fleets of foreign navies, the boats built by Messrs Schichau of Germany and Normand of France having especially achieved success in the attainment of high speeds on trial. The “Bainbridge" class (fig. 120, Plate XXV.), built for the U.S. navy in 1901, are 245 ft. long, 23 ft. 7 in. wide, draw 6 ft. 6 in. of water, and have a displacement of 420 tons. Their sea-going speed is 29 knots, and their armament consists of two 18-in. torpedo tubes, two 3-pdr. Q.F, guns, and five 6-pdrs. The destroyers building in 1910 are of 742 tons with a speed of 29½ knots.

German destroyers are numbered consecutively, the numbers being prefixed by letters indicating the yard where built. Thus, S for Schichau works, Elbing; G, Germania works, Kiel; V, Vulcan works, Stettin. Numbers below 90 arc appropriated *for* torpedo-boats. Two destroyers only have names, viz. S. 97, which also bears the name “ Sleipner,” and is fitted to serve as the emperor’s yacht; and one without a number named “ Taku,” late “ Hai­jing,’’ taken from China in 1900, but built at the Schichau works in 1898. (The British navy list also contains the name of a destroyer “ Taku,” built at the same works in 1898, and also taken from China in 1900.) The German torpedo-boat flotilla is divided up into sections, each section led by a division boat of much larger size than the others. These division boats increased in size, from *226* tons displacement, 1800 I.H.P. and 21 knots speed in 1887, to 374 tons, 5500 I.H.P. and 28 knots speed in 1898. Division boats are numbered D 1 to D 10, and of these two bear names, D 1 that of “ Carmen,” and D 2 “ Alice Roosevelt.” Since 1898 torpedo-boat destroyers have been built in place of division boats. The first 46, built between 1898 and 1906, are of very similar type, the length gradually increasing from 207 to 216 ft., the displacement from 394 to 480 tons, engine-power from 5400 to 6500 I.H.P., speed from 26½ to 28 knots, while the breadth remained at 23 ft., and the draught at 7¾ ft. G 137, built at Kiel in 1906, is 235 ft. long, 560 tons displacement, 11,000 I.H.P., and obtained 33∙9 knots speed. The nominal speed of the 48 vessels which followed is 30 knots, but several have exceeded this speed on trial. Recent destroyers are about 620 tons displacement, 12,000 H.P., and speeds of 34 to 36 knots have been reported. They are armed with two 24-pdr. Q.F., two machine- guns and three torpedo tubes, while two of 950 tons and 18,000 H.P. were launched in 1910.

In 1902-1903 Japan built in her own yards three destroyers of 375 tons, 6000 I.H.P. and 29 knots, armed with two 12-pdr. and four 6-pdr. guns and two torpedo tubes. She had previously obtained a number of boats from Messrs Thornycroft & Yarrow. The “ Niji” (fig. 121, Plate XXV.) was one of the “ lkadzuchi ” class built by Messrs Yarrow; of 340 tons displacement, 6000 l.H.P. and 31 knots speed, armed with two 12-pdr. and four 6-pdr. guns and two torpedo tubes, and may be taken as typical of all of the foreign built Japanese destroyers. Between 1904 and 1908 Japan built 35 destroyers of 375 tons, 6000 l.H.P. and 29 knots, carrying six 12-pdr. guns and 2 torpedo tubes; and in 1910 was building two ocean-going destroyers, the “ Umikaze ” and “ Yamakaze,” of 1150 tons, 20,500 H.P. and 35 knots, armed with two 4-1n. and five 12-pdr. guns and three 18-in. torpedo tubes.

The largest torpedo-boat destroyers building by France in 1910 were of 750 tons displacement, 14,000 H.P., 31 knots speed and armed with two 3∙9-in. and four 9-pdr. guns and four torpedo tubes; Russia was building vessels of about 1000 tons and of 35 knots speed.

*Submarine Boats.—*About 1880 much attention began to be paid by several of the naval powers to the development of the submarine boat, the United States and France in particular.

The history of the subject goes back at least 300 years, but the first undoubted success with a submarine vessel was achieved by David Bushnell in America in 1775. It was worked by one man, for whom it provided just sufficient room; its general appearance, according to Bushnell’s own description, bore some resemblance to two upper. tortoise shells of equal size joined together, the entrance to the vessel being represented by the openings in the swellings of the shells at the animal’s head; the body of the vessel was constructed of wood. The operations on board were entirely manual. By an oar in form of a screw with its spindle passing through the top the boat was sunk or raised, by another oar at the after end it was propelled; a rudder was used for guidance, and in some cases for propulsion; valves admitted water when submergence was required, and hand pumps discharged this water when it was desired to come to the surface, and a detachable weight of 200 lb was also supplied for emergency use. The air in the boat was capable of supporting the operator for thirty minutes; and as soon as he brought the boat to the surface, two air pipes, for discharge of foul and supply of fresh air, opened automatically. A compass, a pressure- gauge, and a sounding-line and lead were among the fittings. Behind the vessel was a large magazine containing 150 lb of powder, and a time-control for exploding it. From the magazine was led a rope to a wood screw at the fore part of the crown of the boat, and this screw, being worked from within, could be driven into the object to be destroyed in such a manner as to keep the magazine required for the explosion in position after it had been detached from the boat. During the War of Inde- pendence the boat was submerged beneath the British warship “ Eagle,” and the operator attempted to attach the wood screw to her bottom planking: in this he failed, apparently simply because he did not let go his detachable weight and so get enough upward pressure to drive the screw into the plank. The magazine was released and exploded an hour afterwards, but at some distance from its intended position.

The problem of submarine navigation received the practical attention of Fulton during the time that he was making his experiments upon steam propulsion, and even at an earlier