

= French submarine Mariotte =

The French submarine Mariotte (Q74) was a submarine built for the French Navy prior to World War I. Intended to accompany the fleet , she was designed for high speed on the surface . Although the navy was unsatisfied with her performance on the surface , the boat had a higher underwater speed than any French submarine before or during the following 35 years . Mariotte was plagued with engine problems during her construction and the navy spent years fixing the various issues before finally commissioning her five years after beginning construction . During the war , she participated in the Dardanelles Campaign , but had to be scuttled after she became entangled in the cables of a minefield on her first attempt to penetrate the Dardanelles .

= = Design and description = =

Mariotte was the winning design in a competition conducted by the Ministère de la Marine (Navy Ministry) in 1906 for a submarine (displacing 530 metric tons (520 long tons)) that could accompany a squadron of battleships on the surface and had a submerged range of 100 nautical miles (190 km ; 120 mi) . The winning design , by Constructor , First Class (Ingénieur de 1ère classe) Charles Radiguer , was optimized for good sea @-@ keeping qualities and high speed with moderate buoyancy , a long , thin hull , and high freeboard . The most unusual feature of his design was the prominent forecastle that was built atop the forward part of the pressure hull , while the rear was virtually awash . This odd configuration gave the boat her nickname of toothbrush (brosse à dents) .

The submarine actually displaced slightly more than planned , 545 metric tons (536 long tons) surfaced and 634 metric tons (624 long tons) submerged . She measured 64 @.@ 75 meters (212 ft 5 in) between perpendiculars and had a beam of 4 @.@ 3 meters (14 ft 1 in) . Mariotte had a maximum draft of 3 @.@ 82 meters (12 ft 6 in) and had a depth of 7 @.@ 25 meters (23 ft 9 in) from the bottom of her keel to the top of the conning tower . This latter was faired into the rear of the forecastle . Two lead weights were located in the keel and could be dropped in an emergency .

Her hull was divided into nine compartments and she was fitted with five internal trim tanks , an internal central ballast tank and three external ballast tanks . She had a test depth of 35 meters (115 ft) . Mariotte had two rudders , one above the waterline for submerged use and the other below the waterline for regular use . She had two sets of diving planes , fore and aft , to control her depth below the water . The boat was evaluated in 1914 and the commission felt that she was generally successful except for her surface speed and range . It noted that she had problems with a following sea as the superstructure rapidly filled with water , but drained slowly so that she was much heavier by the bow and would tend to wallow . It also felt that she was insufficiently buoyant and had mediocre stability on the surface .

For surface running , the boat was powered by two Sautter & Harlé six @-@ cylinder , 700 @-@ metric @-@ horsepower (690 bhp ; 515 kW) diesel engines , each driving a 1 @.@ 72 @-@ meter (5 ft 8 in) propeller . When submerged each propeller was driven by a Breguet 500 @-@ metric @-@ horsepower (493 shp ; 368 kW) electric motor using electricity from two 124 @-@ cell batteries . Mariotte could reach 14 @.@ 2 knots (26 @.@ 3 km / h ; 16 @.@ 3 mph) on the surface and 11 @.@ 7 knots (21 @.@ 7 km / h ; 13 @.@ 5 mph) underwater . This latter speed was a record that would not be exceeded by a French submarine for 35 years . On the surface , the boat had a range of 1 @, @ 658 nmi (3 @, @ 071 km ; 1 @, @ 908 mi) at 10 knots (19 km / h ; 12 mph) , submerged , she had a range of 143 nmi (265 km ; 165 mi) at 5 knots (9 @.@ 3 km / h ; 5 @.@ 8 mph) .

She was armed with four internal 45 cm (17 @.@ 7 in) torpedo tubes in the bow and two Drzewiecki drop collars in the forecastle . Two reloads were stowed internally , which gave her a total of eight torpedoes . During World War I , the boat probably used Modèle 1911V torpedoes . These had a 110 @-@ kilogram (240 lb) warhead and a range of 2 @, @ 000 meters (2 @, @ 200 yd) at a speed of 36 knots (67 km / h ; 41 mph) .

= = Construction and service = =

Mariotte , named after the physicist Edme Mariotte , was ordered from the Arsenal de Cherbourg on 31 December 1906 . The boat was laid down on 30 March 1908 and launched on 2 February 1911 with only the starboard electric motor in place . The port electric motor was under repair at the time and was installed from 3 May to 21 June and a brief series of trials were conducted . The boat was refitted and further repairs were made to the port @-@ side motor , although continuing problems with her propulsion system often immobilized Mariotte into 1912 . She was able , however , to conduct diving , torpedo and underwater speed trials in August and September 1911 . The boat was lightly damaged when the air heater of a Modèle 1909R torpedo exploded in its tube on 27 December . Her diesel engines , three years delayed by problems during factory testing , were installed from 1 March to 28 July 1912 . They were judged satisfactory after the oil sump and the compressors were changed . After repeated breakdowns , Mariotte conducted her testing of the diesels from 23 October to 11 December and she was finally commissioned (armement définitif) on 5 February 1913 after a complete overhaul of her propulsion system .

The boat was assigned to the 2nd Division (escadrille) of the Light Squadron of submarines on 16 January and she joined them at Calais on 11 February . Mariotte visited Brest on 20 February and was inspected by Rear Admiral Charles Eugène Favereau . During the inspection the oil @-@ fired galley stove in the forecastle exploded , lightly burning two sailors . The boat was in Calais for the visit of King Christian X of Denmark later in the year .

When World War I began in August 1914 , Mariotte was transferred to the Mediterranean Squadron at Toulon where she patrolled off the coast of Provence . In July 1915 , she was transferred to Mudros to attempt to penetrate the Dardanelles . After making a reconnaissance flight over the straits and having studied the reports of the British submarines that had successfully entered the Dardanelles , Lieutenant de vaisseau Auguste Farbre ordered his crew to cast off on the evening of 25 July . Escorted by the French destroyer Poignard to the mouth of the Dardanelles , she rounded Cape Helles on the surface , but dived to avoid being spotted by a searchlight about an hour later and attempted to pass underneath a minefield near Çanakkale . The boat became entangled in the cables and when she surfaced in an unsuccessful attempt to free herself , she was immediately engaged by a Turkish gun battery at close range . Mariotte could not submerge because her conning tower had been penetrated by shells so Farbre decided to scuttle the boat and surrender . The Turks ceased fire when he signaled his surrender and so his crew was able to destroy documents and equipment before opening the seacocks to sink the submarine . The wreck lies off Cape Nara near a Turkish naval base at a depth of 5 meters (16 ft) .