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Fulton and Underwater Warfare

Robert Fulton was a painter, engineer and great inventor whose vision was only limited by the technology of the time. Fulton worked with steam engines to power boats and submarines, torpedoes to wage war, and the building and improvement of canals for inland waterway transportation. He is most notably credited with inventing the first viable steamboat for commercial use, which operated on the Hudson River from New York to Albany. However, he is also noted for his work with submarine warfare that resulted in the building of the working submarine, Nautilus, and destructive torpedoes.

Robert Fulton was born in Little Britain Township**,** Lancaster County, Pennsylvania, in 1765. As a young boy, Fulton was interested in painting. In 1782 at seventeen years of age, Fulton left his native town for Philadelphia to seek his fortune.[1] Here Robert continued his work as an artist honing his skills by painting miniatures and portraits. He made social contact with Benjamin Franklin who allowed him to paint his portrait. He then gave Robert letters of introduction to others who then commissioned him to paint. With the money he had earned through painting, he bought his mother a farm and also acquired lots for his three sisters and brother.

At the same time as the purchases of property for his family, Fulton had a serious attack of inflammation of the lungs accompanied by spitting of blood which must

[1] Dickinson, H W. Robert Fulton Engineer and Artist, His Life and Works. London, New York: John Lane; Toronto: Bell & Cockburn, (1913): Chapter 2

have warned him that he was not robust physically.[2] He traveled to the warm springs in Virginia where being the sociable person he was made more acquaintances. It was during this time that he finally decided that he would travel to Europe.

He traveled to England at the end of 1786 arriving there at the beginning of 1787. He had but forty guineas in his pocket not a large sum truly to start life with in a new country.[3] Though at the time he didn't have any friends in England, he did have a letter of introduction from Benjamin Franklin to Benjamin West. He was most likely welcomed warmly by the West's and asked to stay with them until he found another place to stay. West recommended rooms at Mr. Robert Davy's which had just been vacated by William Dunlap. Fulton most probably worked under West's direction during his early time in England where he would frequently come in contact with many famous people due to Benjamin West's reputation. Fulton continued his work as an artist painting portraits and miniatures for well-heeled lords and other people. During this period, he also exhibited some of his work in the Royal Academy in London. Although it is not known why he did so, Fulton suddenly stopped being an artist. He may have reluctantly admitted to himself that he did not possess talent of the high order necessary then, as now, to bring a man into the front rank of artists. It is more probable that he was dissatisfied with the pecuniary results so far achieved, which, for a man who had turned thirty were somewhat [meager].[4]

As quickly as he had stopped being an artist, Fulton turned to designing and engineering. He first designed a mill that was supposed to have an improved means for

[2] Ibid. Chapter 2
[3] Ibid. Chapter 2
[4] Ibid. Chapter 2

cutting “marble and or other stone”[5] He also began to work on canal systems with use of steam engines to move vessels along them.

When Fulton went to France in 1797, he still pursued his canal engineering dreams, but this soon fell by the way side as he began to work on designing submarines and torpedoes, better known today as sea mines. He wanted to create these items to help defend ports from aggressive navies, thus opening the sea to all free from such aggressors and allowing free trade to flourish. Fulton formed the Nautilus Company to build what he called a “plunging boat” that would dive under water to perform tasks of war. He then wrote a letter, which was more like a contract, to the French Directory with six provisions: one, the French Government would pay the Nautilus Company for the ships that they sunk; two, that all prizes of British Vessels and Cargoes taken by the Nautilus Company; three, that the Government give to the Nautilus Company the exclusive right to deploy this invention from all the ports of France unless the government builds their own for which they would have to pay the company; four, the invention would not be used against America unless it was first used against the French; fifth, if peace is reached with Britain within three months of the letter they were to pay the company for their time and work; six, the company wanted commissions for the men operating the submarine, since it went against the laws of war and so that they would be treated as prisoners of war and if violence was used on them, the French would retaliate four fold. In response to Fulton’s letter the French halved the money requested for ships sunk, they would not to be reimbursed if peace is reached before its completion unless the building of the vessel

[5] Ibid. Chapter 3

is the cause of peace, and the commissions were refused. [6] Even after these negotiations, Fulton's plan was rejected by the French Government.

Fulton was persistent in his pursuit to persuade the French to adopt his idea. It paid off because in 1798 a commission was appointed to review his proposal. The commission wrote a very detailed description of the vessel discussing how it was going to work and its size. The submarine was to have a crew of three men and would remain submerged up to three hours at a time. It was propelled by a screw mechanism when under water and a sail while on the surface and using a rudder to maneuver the vessel in both instances. The vessel was to sink and float using ballast the same principle as fish's swim bladder.[7] The commission also submitted many problems they foresaw with different parts of the design which Fulton modified to defeat the scrutiny and improve his design. However, the commission's report did little to gain any attention and his plan was once again dropped.

After the overthrowing of the Directory in 1799, favorable consideration of Fulton's submarine proposal appeared to be more hopeful.[8] Whether Fulton obtained permission to build a submarine or only had a tacit understanding with Forfait, we do not know but Fulton's next letter, dated 20 Germinal (10 April, 1799), announces that the Nautilus which he is having made in the workshop of C. Perrier is on the point of being finished.[9] Fulton proceeded to build a model of his vessel, the Nautilus, and launched it on July 24, 1800. The vessel's trials took place on the Seine at Bapeaume. Fulton was accompanied by two others and the two dive trials lasted eight and seventeen minutes,

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[6] Ibid. Chapter 5
[7] Ibid. Chapter 6
[8] E. Taylor Parks, "Robert Fulton and Submarine Warfare," *Military Affairs* vol. 25, No. 4 (1961): 178.
[9] Dickenson, Chapter 6.

respectively. Both trials were a success and the Nautilus was moved to Havre for open sea trials.

At Havre, Fulton preformed many experiments with his vessel. He tested how long three men could last submerged with a candle for light. He tested the Nautilus' speed and maneuverability submerged and on the surface and also noted that a compass is not affected by being submerged. He also began to test his torpedo at Havre with success in destroying his target. During these experiments Fulton also tried to approach and destroy British brigs that were sailing off the coast, but to no avail. His attempt to blow up the English brigs that were cruising along the coast was frustrated not by accident but by design because Fulton's movements generally were known to the British Admiralty.[10] Fulton's experiments being known by the British show that the British were not willing to tempt fate by letting their ships become easy targets for Fulton. However, as will be discussed, the British Admiralty didn't believe that Fulton's invention was practical. He was given a grant of 10,000 francs by the First Consul in the spring of 1801 and moved his testing to Brest. He also did some more work with his torpedoes and successfully destroyed a 40 ft. sloop from a distance of 628 feet.[11] With the resignation Forfait as the Minister of Marine, and the appointment of Admiral De Cres, an "old school" officer to the position, Fulton lost the interest of the government in his inventions.

Fulton then turned his attention to creating a practical steamboat for commercial navigation. He formed a partnership with Robert R. Livingston an American Envoy in

[10] Dickenson, Chapter 6.
[11] Parks, 178.

France. He began experimenting and his results in 1803 were far from encouraging.[12] He would work again with Livingston in America on the Hudson River trying to do the same.

In December 1803, Fulton met with an agent of the British government in Amsterdam who persuaded Fulton to come to England. In 1804, during the truce between France and England, Fulton traveled to London where he entered into a contract with William Pitt, Chancellor of the Exchequer, and Lord Melville, First Lord of the Admiralty, for the use of his "plan of attacking fleets by submarine bombs."[13] Under the contract, he agreed to reveal the basics of his plans to Sir Home Popham. Also, he was to receive 200 pounds a month; credit not to exceed 7,000 pounds for his preparations; necessities from dockyards; 40,000 pounds compensation for his "submarine mode of attack," if it proved practical and the government wasn't able to use it; 40,000 pounds for the destruction of an enemy "decked vessel" or a feasible amount decided on by a commission; he is to receive half the value of vessels destroyed while he is in command and one fourth after he leaves command for fourteen years; plans of any sort are not to be shown to anyone; and arbitrators are to settle any differences arising from the contracts execution.[14] The plans that the contract stipulated be provided was done so and delivered to the commissioners that were to judge the applicability of Fulton's work. The results from the commissioners showed interest in the torpedoes, but none in the submarine. Fulton was given the chance to prove the usefulness of his torpedoes and he worked on readying an expedition to attack Boulogne Harbour. On the night of October 2, 1804 the expedition met with no success in the eyes of the British. However, a pinnace was

[12] Dickenson, chapter 7
[13] Parks, 178.
[14] Dickenson. Chapter 7

destroyed by the expedition but, this went unnoticed by the British. Many of the British officers disliked this method of attack and had little faith that it would work.

Fulton complained to the government that he wasn't receiving the provisions that were agreed upon in his contract. He said the he wasn't getting enough vessels, crews and material to properly carry out his experiments. In turn he received the materials and cooperation and made another attack on Boulogne Harbour on September 30, 1805 again with no success. Upon this failure, Fulton wanted to set up a demonstration that would prove the feasibility of his torpedoes. He was allowed to use the Dorothea, a captured Norwegian ship, for his demonstration in front of William Pitt's residence and many other distinguished guests. It was a success; the Dorothea was blown in two. This accomplishment was met with mixed reviews from the Ministers in the government. Earl St. Vincent said, "Pitt was the greatest fool that ever existed, to encourage a mode of war which they who commanded the seas did not want, and which if successful would deprive them of it." On the contrary Lord Castlereagh said, "The success of Mr. Francis's experiment gives me great confidence in our means of annoying the enemy in their own ports with little comparative risk to ourselves." However, the defeat of the French and Spanish naval effectiveness in October 1805 and the loss of his supporters in the government led to the end of Fulton's work in England on his torpedoes.

Fulton addressed the new Ministers with his proposal and asked them to fulfill the contract by either continuing the experiments or offer a settlement.[15] He also pursued the possibility of the British reconsidering the adoption and use of his submarine. Though unsuccessful in the previous, tests were resumed with torpedoes against the enemy. Fulton desired to return to America and even though he was continuing with his

[15] Parks, 180.

experiments he asked that the settlement of 40,000 pounds, as stated in the 1804 contract, be made and the British free to use his "mode of warfare as they think proper." [16] Though he did make further attempts with his torpedoes in 1806, he was met with opposition from Lord Grenville, the new First Lord of the Admiralty, and Fulton settled his accounts and received the money owed to him by the government. He also asked that arbitrators be appointed to help determine what he was owed under the contract and said it would not interfere with the current experiments. He assured the British that the French new nothing of the technical nature of the submarine since they had not paid him. He wrote in another letter that, "Submarine Navigation [was] Practicable and one of the most useful or dangerous inventions." He concluded by writing, "…[Submarine navigation] will work a total revolution in maritime affairs…"[17]

Fulton returned to America in December of 1806 where he continued work with torpedoes. In July 1807, he held a demonstration for the government, at which the James Madison, Secretary of State, and Robert Smith, Secretary to the Navy, were present. Though the demonstration was a success little was done to adopt Fulton's torpedoes since ways to guard against them had been patented and were effective. Fulton published a book on *Torpedo War, and Submarine Explosions* in 1810 and it covered work that he had done in the field from France to England. This book was written to influence congress to consider his invention. In his book, he suggests large numbers of rowboats equipped with harpoon mechanisms for catapulting charges into the hulls of enemy ships.[18] This was to increase the effectiveness of the weapons and was going to be demonstrated in October of 1810. He also includes information on how torpedoes can be

[16] Ibid. 181. Fulton to Charles Grey, Mar. 17, 1806, Fulton Papers, Department of State.
[17] Ibid. 181. Fulton to lord Howick, Apr. 17 1806, Ibid.
[18] Robert Fulton. *Torpedo War and Submarine Explosions*, (New York 1810), 1-4.

used in defense of a harbor. The anchored torpedo, so arranged as to blow up a vessel which should run against it…knowing the depth of water in all out bays and harbours, it is only necessary to fix the weight…[to] hold it ten, twelve, or fifteen feet below the surface at low water.[19] After the presentation of his intentions to use torpedoes as offensive and defensive weapons and the successful demonstration in New York harbor, little is done to further pursue and refine them.

Fulton's submarine and his torpedoes were amazing inventions just ahead of their time. He preformed amazing tasks with the technology he had at hand by creating such viable items. Also many nations saw these weapons as sneaky and treacherous devices. Though Fulton had the noble intention of ending aggression at sea, others did not see it in the same light. Had his inventions been picked up by any of the governments he had offered them to or his research not forgotten, they may have advanced much further and been in use sooner than they were. This would have changed the face of many wars, especially those that had used submarines extensively.

[19] Ibid. 8.

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