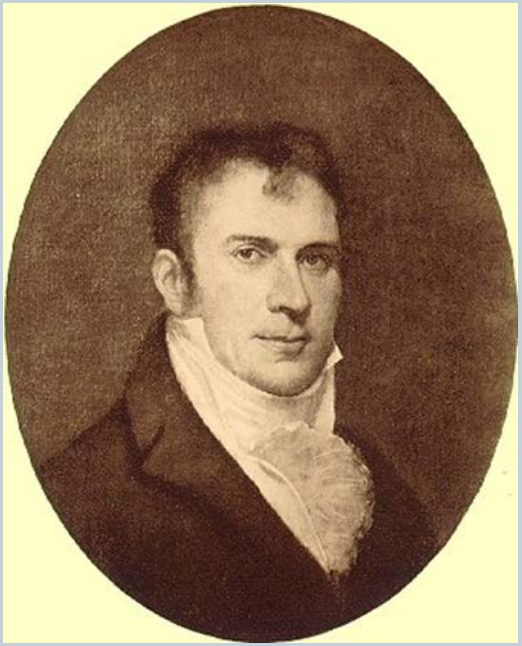
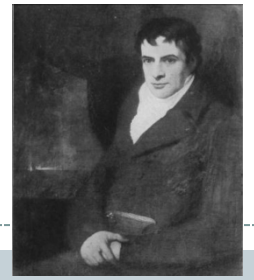
Robert Fulton: Maritime Engineer

ANDREW MIKOLAJCZYK



The *North River*

- The *North River* was the first commercial steam driven boat to sail the Hudson River
- “She was described in the night, as a monster moving on the waters, defying the winds and tide, and breathing flames and smoke”
- The *North River* changed the face of New York and the greater Hudson Valley forever



Robert meet Robert

- Robert Fulton met Robert Livingston in the dismal winter of 1802
- Robert Livingston was a wealthy politician whom was already rooted in American History
- He helped in the writing of the Declaration of Independence and a U.S ambassador
- Fulton and Livingston met on a diplomatic trip to France, where Fulton had become quite the social climber

Let's Invent!

- That night Livingston entertained Fulton with his notions of steam travel which intrigued the young inventor
- Fulton had toyed with steam propulsion on a number of occasions, but never had the funds or desire to see it through
- Fulton and Livingston agreed to build one of these ships propelled by steam

Boats Running on Steam??

- Fulton had the design in his head to put a steam engine on a large extended fishing boat
- Fulton was convinced that the engine best suited must come from England, specifically Watt & Co
- In 1806, Robert Fulton arrived in New York and began the legendary construction of the *North River*
- He spent nearly a year retrofitting the engine to fit and operate on the medium sized fishing boat

Let's Pick a Name

- The ship was ready to launch on August 17th 1807
- The boat was named the *Clermont* after the Hudson River home of Robert Livingston
- Fulton preferred to call the ship the *North River*, which is how he referenced it whenever writing logs for the ship

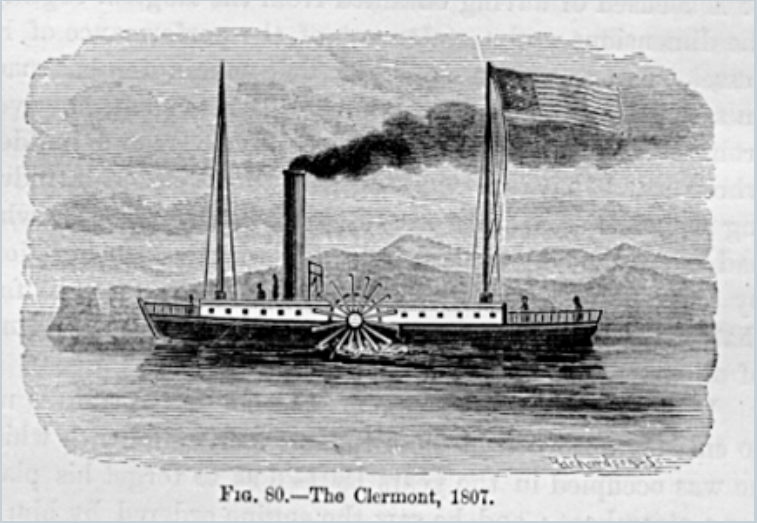


Fig. 80.—The Clermont, 1807.

A Revolutionary Ship

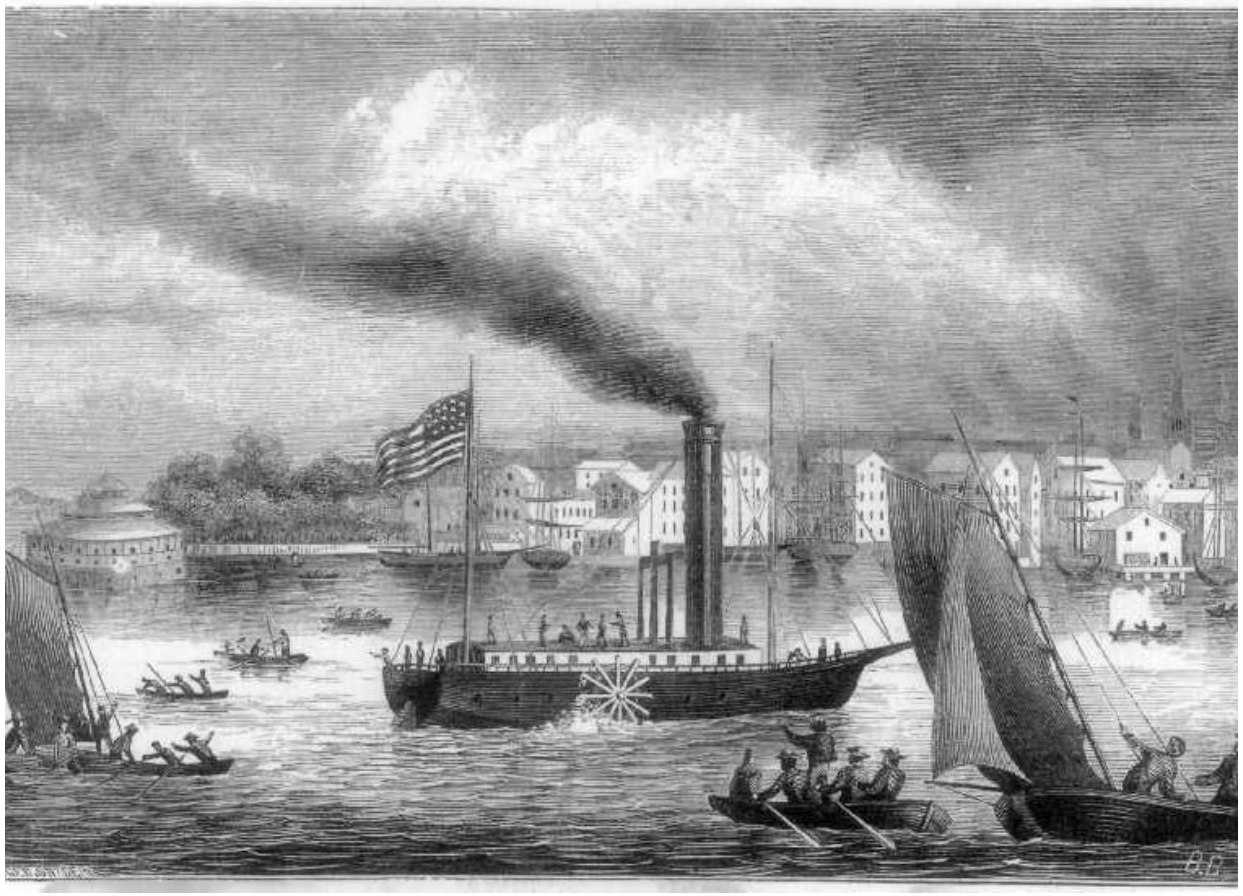
- The *North River* was a remarkably designed ship that was economically feasible
- The *North River* Dimensions: length, 43m (142 ft) Max width, 4.3m (14ft) Max height, 19m (62 ft) draught 4.8m (15ft 9in) Displacement, 1210 tons, Average speed, 4.7 mph
- The *North River* was a relatively average size boat with one major modification; the steam engine increased its weight and speed significantly
- The boiler was a low pressure type, 20 feet deep and 8 feet broad which became problematic in terms of floatation for the long and slender vessel

Social Event of the Century

- The sendoff was magnificent and covered by the press
- Livingston made it a social event which Fulton was irritated about and who, “perceived the maiden voyage as an experiment, not a gala”
- Fulton was nervous, but his ambition quelled his fears and allowed him to stay focused
- Fulton told the American Citizen publication that the steamboat would, “certainly make an exceedingly valuable acquisition to the commerce of the Western States”

Described as “a backwoods saw-mill mounted on a scow and set on fire,” the trip was loud, but entertaining

Fulton led the crew in singing “Ye Banks and Braes o ‘Bonny Doon,” a song that his descendants say was a favorite



How’d She Run?

How'd She Run?

- The boat traveled 150 miles up the Hudson River from New York City to Albany, in thirty-two hours (minus two for the overnight layover)
- Upon conclusion of his voyage Fulton immediately set out making improvements to the *North River* and prepared it for commercial voyage on September 4th 1807

Finally, Compensation

- Commercial service would begin on Friday the 4th of September, at 6 a.m. in the morning, and arrived at Albany, on Saturday, at 6 p.m. in the evening
- The steamboat was a complete success because it was the most practical, economical, and commercially successful application ever to be designed
- After his success, Fulton focused on the commercial monopoly

More Ships!!!

- Fulton was contracted to build steam-powered ships all along the east coast as well as more for the Hudson and other rivers
- Thirteen of Fulton's sixteen designs were operating at the time of his death in 1815
- These included, the *Car of Neptune*, *Paragon*, *Richmond*, *and Firefly* on the Hudson, the elegant *Fulton* on Long Island Sound, five ferries running from Manhattan to New Jersey and Brooklyn, the *Washington* on the Potomac, and the *Vesuvius* and *Aetna* on the Mississippi
- Fulton's Manhattan ferry system remains to this day a primary means of transportation for New Yorkers

More Inventions

- Fulton first designed a mill that was supposed to have an improved means for cutting “marble and or other stone”
- Fulton also began work on canal systems with use of steam engines to move vessels along them
- Fulton began to work on designing submarines and torpedoes, better known today as sea mines
- Fulton wanted to create items that would help defend ports from aggressive navies, thus opening the sea to all free from aggressors and allowing free trade to flourish

Wait, He Invented the Submarine too??

- Fulton is noted for his work with submarine warfare that resulted in the building of the working submarine, Nautilus, and destructive torpedoes
- Fulton formed the Nautilus Company to build what he called a “plunging boat” that would dive under water to perform tasks of war

Fulton designed the submarine to have a crew of three and could remain submerged underwater for 3 hours

Length: 21 ft, 3 inches (6.47 m)
Diameter: 6 ft, 4 inches (1.93 m)

The Nautilus

Make it Like a Fish

- The submarine was propelled by a screw mechanism when underwater and a sail while on the surface and using rudder to maneuver the vessel in both instances
- The vessel was to sink and float using ballast the same principle as a fish's swim bladder
- Fulton built his first submarine, the Nautilus, and launched it on July 24, 1800

Testing, Testing, Testing

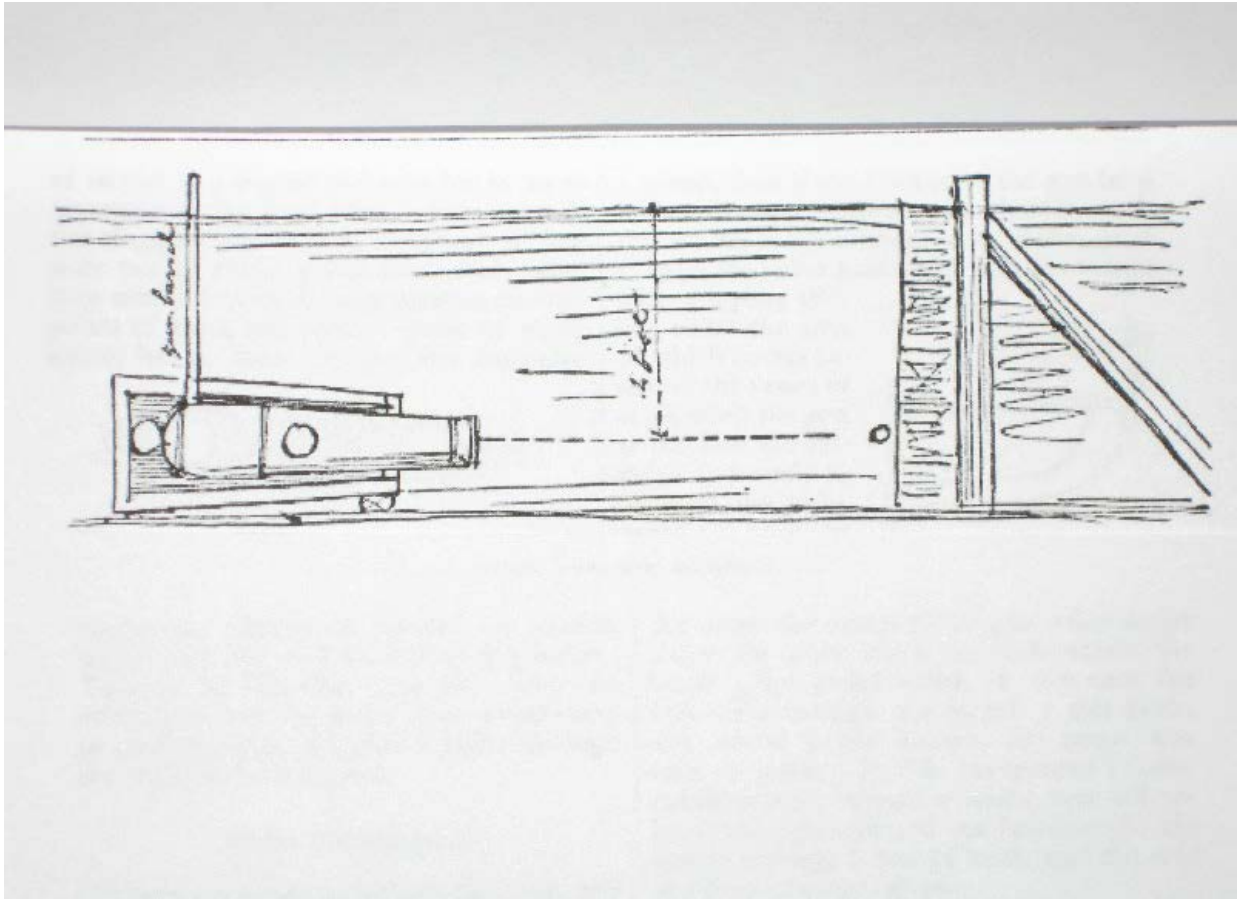
- Fulton performed many experiments with his new vessel
- He tested how long it could stay submerged with a candle for a light, how fast it was and how well it maneuvered submerged and on the surface, and also noted a compass was not affected while being submerged

Arms Creationist

- He also tested his newest weapon, the torpedo, with success
- He then gave a demonstration of his new defensive weapon, the anchored torpedo or the sea mine
- These were designed to destroy when a vessel touched them and had a fixed weight to hold them 10, 12, or 15 feet under water

First design for the torpedo was this underwater cannon that actually worked underwater

He successfully destroyed a 40 ft. sloop from a distance of 628 feet



Underwater Cannon

Great Ideas, No Market ☹

- Even though the torpedo was a success, the French government killed off the project because of a change in officers; the new officer was “old school” and didn’t believe in that sort of warfare
- Fulton moved his projects to England, but ultimately they were shelved even though they were effective
- Fulton moved back to America where he continued his development of the torpedo

Back in the USA

- He demonstrated it to the American government at which James Madison, Secretary of State, and Robert Smith, Secretary of Navy were present
- The demonstration did little to convince the government since there were ways to defend it
- Fulton wrote a book entitled, *Torpedo War, and Submarine Explosions* in 1810 to help convince adoptions of the weapons

Works Cited

- Dickinson, H W. Robert Fulton Engineer and Artist, His Life and Works. London, New York: John Lane; Toronto: Bell & Cockburn, 1913.
- Fulton, Robert. Torpedo War, and Submarine Explosions. Chicago: The Swallow P

  Inc., 1971.
- Parks, E. Taylor. “Robert Fulton and Submarine Warfare,” *Military Affairs* vol. 25,

  No. 4 (1961): 177-182.