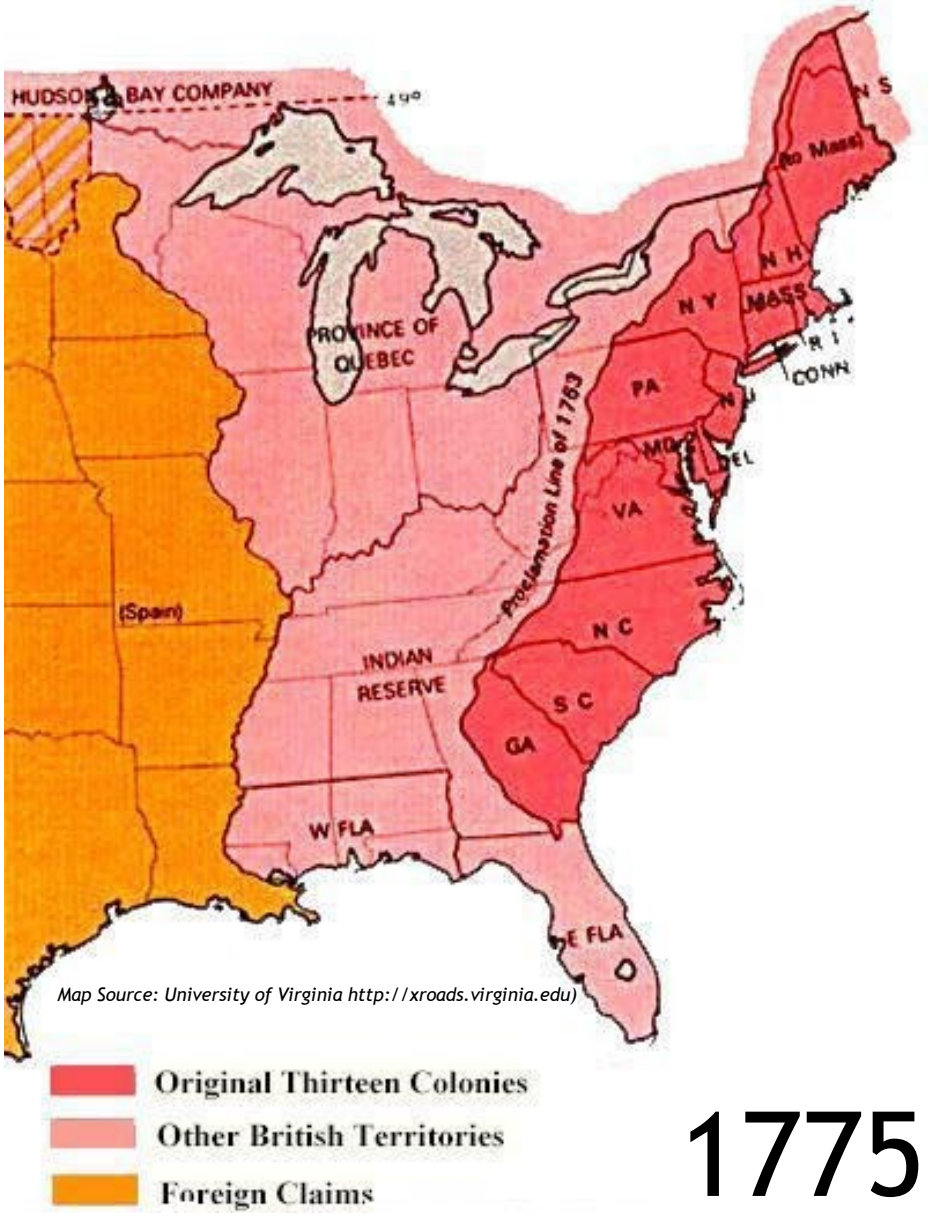
Early Transportation Milestones*

Circa 4000 B.C.	**Domesticated Horse (Central Asia)**
.	**Canal (Mesopotamia**
Circa 3500 B.C.	**Wheel (Mesopotamia)**
Circa 3000 B.C.	**Sailing Ship (Egypt)**
Circa 700 B.C.	**Tunnel aka Barrel Vault (Mesopotamia**
	Aquaduct (Assyria)
Circa 500 B.C.	**Glider (China)**
Circa 350 B.C.	**Road (Rome)**
Circa 300 B.C.	**Cast Iron (China)**
Circa 250 B.C.	**Lighthouse (Egypt)**
Circa 200 B.C.	**Arched Bridge (Rome)**
.	**Battery (Iraq and Egypt)**
Circa 100 B.C.	**Concrete (Rome)**
Circa 20 B.C.	**Aqueducts (Rome)**
Circa 700 A.D.	**Wrought-iron (Medieval Europe)**
Circa 900 A.D.	**Black Powder (China)**
Circa 1230 A.D.	**Rocket (China)**
Circa 1500 A.D.	**Rope Suspension Bridge (Inca Empire)**
Circa 1620 A.D.	**Submarine (England)**

* First known existence

U.S. States and Territories



Map Source: University of Virginia http://xroads.virginia.edu)

1775

1776
Declaration of Independence

Image Source: The Library of Congress

1776

Propeller Submarine

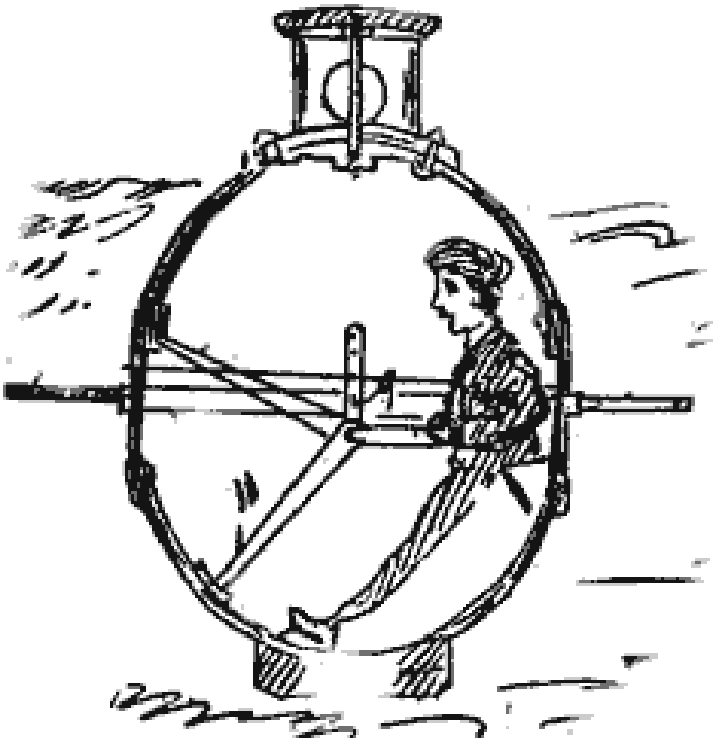


Image Source: U.S. Navy

Who: David Bushnell

Where: USA

Why: First submarine know to be propelled by device other than oars.

The first military submarine and the first known submarine in the U.S. was *Turtle*, a hand-powered egg-shaped device designed by David Bushnell to accommodate a single man. It was the first verified submarine capable of independent underwater operation and movement, and the first to use a screw propellor for propulsion (versus oars). During the Revolutionary War, the *Turtle* (operated by Sgt. Ezra Lee, Continental Army) tried and failed to sink a British warship in New York harbor.

1779
Iron Bridge

Who: Abraham Darby III (Engineer) and King George (Funding)

Where: England

Why: As the first iron bridge, it paves the way for longer and stronger bridges.

Image Source: Matthew Picket, Penn State University

Abraham Darby advanced the mass production of iron goods in the early 1700s. His grandson Abraham Darby III constructed the world's first iron bridge which was built over the Severn River near Coalbrookdale, England in 1779. Nearly all bridges of this era designed to carry heavy loads were made of wood or stone. Funding for the Iron Bridge was provided by King George. His desire was to improve the England's access to the area's coal. Prior to its construction, the nearest bridge was 2 miles. Ferry service was difficult and dangerous---especially in the winter.

1781

Steam Engine

Who: James Watt (Inventor)

Where: Scotland

Why: The increased efficiency of the Watt engine and its ability to be used for multiple purposes led to the general acceptance of steam power in industry.

In 1712, English blacksmith and inventor Thomas Newcomen demonstrated the first operational and practical use of an industrial steam engine—making it possible for miners to pump water from deeper mine shafts. While repairing a Newcomen engine in 1763, Scottish engineer James Watt realized he could make the engine more efficient. With financial backing from English businessman Matthew Boulton, Watt produced a rotary-motion steam engine in 1781 that was ideal for draining mines, but could also be used to drive many different types of machinery. By 1829, Watt's steam engine was used all over the world – pumping the water supply in Paris, grinding sugarcane in Brazil, spinning cotton in the U.S., and milling flour in Germany.

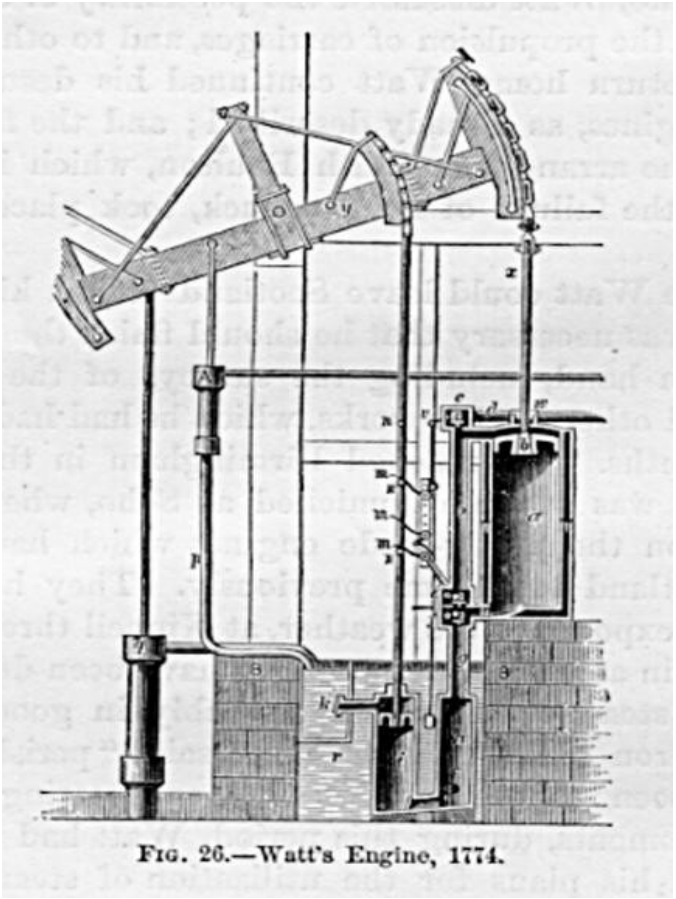


FIG. 26.—Watt's Engine, 1774.

Invention of the steam engine also led to innovations in transportation such as the steamboat and steam locomotive. Watt and his investment partner were motivated by the desire to profit on the sale of the engine.

1781

Ornithopter

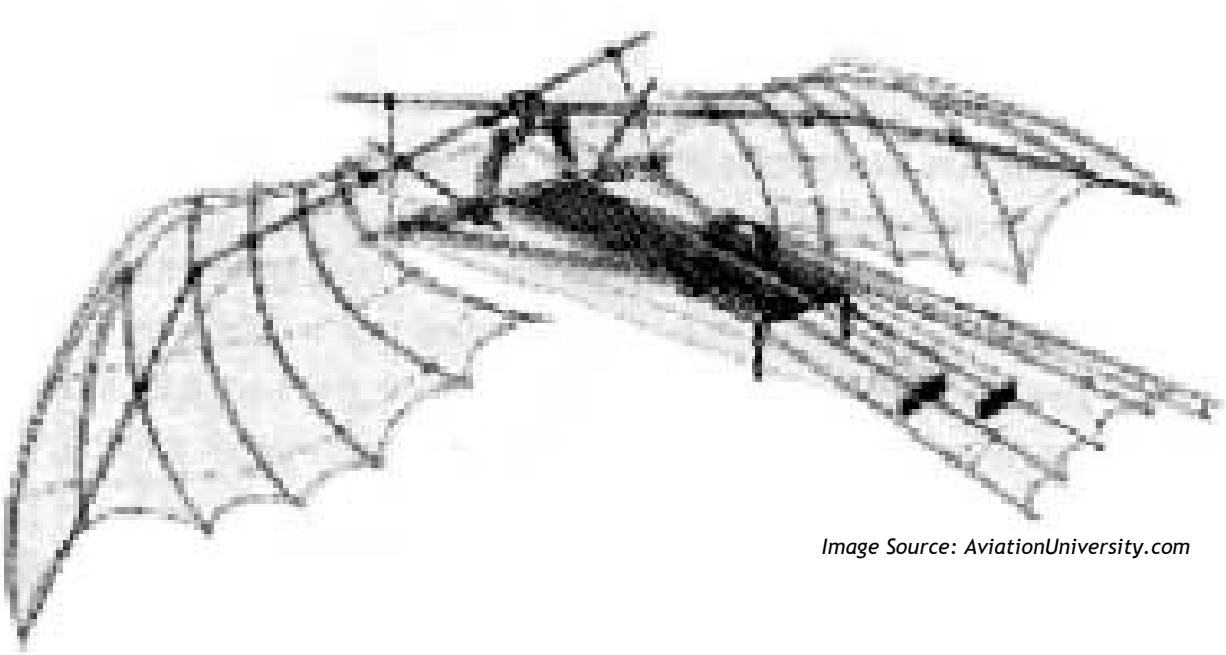


Image Source: AviationUniversity.com

Who: Karl Friedrich Meerwein (Inventor)

Where: Germany

Why: Early flight of a heavier-than-air craft

Karl Friedrich Meerwein, an architect to the prince of Baden, is believed to have flown an ornithopter in Giessen, Germany in 1781. One of the two main approaches to flying, the orinthopter is a flapping-wing machine—similar to a glider. It is considered one of the first "heavier-than-air craft". These craft require strong updrafts or air or a power source to remain aloft.

1783

Hot Air Balloon

Who: Jean-François Pilâtre de Rozier and Francois d'Arlandes (Aviators); Joseph Michel and Jacques Étienne Montgolfier (Inventors)

Where: France

Why: First known hot air balloon flight

Image Source: Wikipedia

The first known human flight in a hot air balloon took place in France in 1783. Jean-François Pilâtre de Rozier and Francois d'Arlandes went 5 miles in a hot air balloon created by the Mongolfier brothers. The air in the paper balloon was heated by a wood fire. The aircraft was not steerable-it flew wherever the wind took it and landed when the air in the balloon cooled. Balloons are lighter-than-air craft. Before the end of the year, hot air was replaced by hydrogen which was a lighter gas than hot air. It could rise higher and did not so directly depend on termperature differences.

1785

Land Ordinance

To raise money, Congress authorizes the sale in the western territories. Land was to be surveyed into square townships, six miles on each side. Each township was then sub-divided into thirty-six sections of one square mile (640 acres.) A small number of sections in each township were to be set aside as compensation to veterans of the Revolutionary War.

U.S. States and Territories

Map Source: University of Virginia

1790

1783 Treaty of Paris – Expansion from the 13 Colonies to the Mississippi River

1800

Battery

Who: Allessandro Volta (Inventor)

Where: Italy

Why: The modern battery paved the way for many transportation advancements.

A battery is a device that stores chemical energy and makes it available in an electrical form. The modern development of batteries started with Allessandro Volta in Italy. The year was 1800. His invention was the first practical method of generating electricity and paved the way for many other technological advancements. In transportation, these include the easier starting of vehicles and electrically-powered automobiles


IN CONGRESS, JULY 4, 1776.

unanimous Declaration of the thirteen united States of Ame

Image Source: Smithsonian Institution