History of Distribution: From Ancient Times to Present Day

This Timeline provides a fresh look at the history of water distribution from ancient times to the present day.

Credits: This timeline was developed by a Subcommittee of the Distribution and Plant Operations Division (DPOD) of AWWA. The following members contributed to the development of the timeline:

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The Subcommittee acknowledges the efforts of Ken Mercer, Dawn Flancher and Ari Copeland who served as AWWA staff liaisons to the Subcommittee. The Subcommittee also thanks Melanie Yamamoto of AWWA for the graphic design of the timeline. Funding for the development of the timeline was provided by the TEC.

Sources for all information in this poster are provided on the attached page.

ANCIENT

Around 3100-1100 B.C., Mesopotamian engineers built very large weirs and diversion dams to create reservoirs and canals to carry water long distances across the flat countryside.

The Noria, or Egyptian Wheel is thought to be the first vertical water wheel in history. It dates from the early Roman Empire, around 700-600 B.C.

Around 1500 B.C., ancient Egyptians built large, flat-bottomed basins for growing crops along the riverbanks and simple sluices that diverted water into them at the peak of flood.

The Minoans appear to be the first civilization to use underground clay pipes for sanitation and water supply between 2700-1401 B.C.

Constructing “qanats,” slightly sloping tunnels driven into hillsides containing groundwater, probably originated in northwestern Persia (now Armenia) around 700 B.C.

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Archimedes, one of the greatest thinkers of ancient Greece, developed the Archimedes screw invention around 282-212 B.C. It was used to lift water from a lower elevation to a higher elevation by means of an internally threaded tube.

Siphon Principle–Hero, a Greek who lived after 150 B.C., was the first known hydraulic engineer. He modernized the collection of water using the siphon principle.

As recorded by the Roman Sextus Julius Frontinus, nine aqueducts were constructed and in operation prior to his appointment as Commissioner. The first aqueduct was built in 312 B.C., and several more were added over the centuries.

By dates 101-200 A.D., during the Han Dynasty, the Chinese used chain pumps that lifted water human foot pedaling, hydraulic waterwheels, or rotating mechanical wheels pulled by oxen.

First valves were most likely introduced sometime after 43 A.D. in Britain.

American Water Works Association
Dedicated to the World’s Most Important Resource™
Incan engineers constructed a distribution system at Machu Pichu in 1450.

Cast iron pipe was first installed at Dillenburg Castle in Germany in 1455.

Between 1301-1400, a 5.5 km lead pipeline was installed to convey water from Tybourne Brook to London.

Leonardo da Vinci’s treatise Del moto e misura dell’acqua summarized the state of the art of hydraulics circa 1500. He was the first recorded to observe that as a size of a conduit decreased, the velocity of flow increased.

In 1785, an engineer with the Chelsea Water Company in England, Sir Thomas Simpson, invented the bell and spigot joint, which has been used extensively ever since.

In 1804, the first municipal water treatment plant, designed by Robert Thom, was built in Scotland.

The first full-scale cast iron pipe system for the distribution of water was installed in 1664 at Versailles, France.

Records indicate the first water systems in the United States were in Schafferstown, Pa., in 1746, and in the Moravian settlement that is now Bethlehem, Pa., in 1754.

In 1842, the Croton Aqueduct project completed, supplying water to New York City.

The first cast iron pipes were laid in the United States in Philadelphia, Pa., in 1817.

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In 1864 at Versailles, France.

In 1865, Siemens & Halske began production of the first closed-pipe current meters in 1865.

In 1874, Chicago installed one of the first steam-driven pumping systems in the mid-1860s.

Perhaps the most important pump invention of the industrial age was the centrifugal pump invented by John Appold in 1851.

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During the Middle Ages (500-1500 A.D.), water supply was no longer as sophisticated as before. These centuries were also known as the Dark Ages because of a lack of scientific innovations and experiments. After The Fall of The Roman Empire, enemy forces destroyed many aqueducts and distribution system structures.

In 1350, Dillenburg Castle was the first castle in Europe to use cast iron piping.

In 1450, the first lead pipe was installed in England.

In 1455, the first true water pipe was installed in Germany.

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**MODERN AGE**

The first compound meter, which contained a low-flow displacement meter and a high-flow turbine unit, was patented by J.A. Tilden in 1903.

The first use of cement-mortar lining of pipes took place in Charleston, S.C., in 1922.

Concrete cylinder pipe was introduced in the early 1940s.

The first commercial hydraulic analysis software was developed by the Datcis Corporation in 1957.

A new trenchless technology, horizontal directional drill, was first used in the water industry in the late 80’s-early 1990s. This method allowed pipe installs without digging up the ground.

**Present day**

A key meeting in 1991, sponsored by USEPA and AWWA, brought together investigators in water quality modeling and led to USEPA’s development of a distribution water quality model.

Water quality modeling was introduced in the 1980s as well as leak detection technology to prevent loss of water in the systems.

The McIlroy Network Analyzer was used by utilities from the early 1950s through the early 1970s to simulate water flow.

In 1970s, bolted steel tanks with factory applied coatings became available.

In the 1970s, fused PVC first was developed and used in the early 1990s. This option allowed for fast installations of pipe for water distribution without using traditional methods to join the pipes together.

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**J.A. Tilden received the first patent for a disc meter in 1892, and a conical disc meter was sold by G.A. Bassett in that same year.**

**Chicago installed its first electric centrifugal pumps in 1910.**

**President Franklin D. Roosevelt speaks at the dedication of Hoover Dam, which sits astride the Colorado River in Black Canyon, Nevada in 1935.**

**PVC pipe was first developed in Germany in the 1930s, and it was introduced in the United States in the 1950s.**

**By 2001, more than 90 percent of the U.S. population is served by community water systems.**

**One of the most innovative inventions of the 19th century was the Herschel Standard Venturi, which was developed by Clemens Herschel and introduced in 1887.**

**Polyethylene encasement of iron pipes was first developed in 1951 to mitigate the effects of corrosive soils on metal pipes. In the mid 1960s the use of polyethylene pipe was developed and used for the first time in water distribution.**

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**The first standardization of cast iron water pipes in Britain occurred in 1917 with the publishing of British Standard 78.**

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To learn more about the awesome history of water distribution, check out these sources:

Web-based Sources:
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11. http://www.romanaqueducts.info
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7. EPA, 2000, The history of drinking water treatment, Environmental Protection Agency, Office of Water (4606), Fact Sheet EPA-816-F-00-006, United States