

# When were the batteries invented

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Isidor Buchmann, Cadex Electronics, Inc

The battery, today's technological necessity, is the result of 400 years of scientific effort.

One of the most remarkable and novel discoveries in the last 400 years is electricity. One may ask, "Has electricity been around that long?" The answer is yes and perhaps much longer, but the practical use of electricity has only been at our disposal since the mid to late 1800s. One of the early electrical attractions that gained public attention was an electrically illuminated bridge over the Seine River during the 1900 World's Fair in Paris.

The use of electricity may go back much farther. While constructing a new railway in 1936 near Baghdad, workers uncovered what appeared to be a prehistoric battery. The discovery was known as the Baghdad or Parthian battery (see Figure 1) and was believed to be 2000 years old, dating back to the Parthian period [The Parthian empire existed in what is now Iran from 247 BC-224 AD. -- Ed.]. The battery consisted of a clay jar filled with vinegar. An iron rod surrounded by a copper cylinder penetrated into the liquid and produced 1.1 to 2 V of electricity.

Not all scientists accept the Parthian battery as being a source of energy because the application is unknown. [There are alternative explanations for the Parthian battery but it does work as a battery. -- Ed.] It is possible that the battery was used for electroplating a layer of gold or other precious metals onto a surface. The Egyptians are said to have electroplated antimony onto copper over 4300 years ago.

## Modern Battery Experiments

The earliest method of generating electricity was by inducing a static charge in some substance. In 1660, Otto von Guericke (1602-1686) constructed the first electrical machine consisting of a large sulphur globe that, when rubbed and turned, attracted feathers and small pieces of paper. Guericke was able to prove that the sparks generated were electrical in nature. The first practical use of static electricity was the "electric pistol," which was invented by Alessandro Volta (1745-1827). An electrical wire was placed in a jar filled with methane gas. When an electrical spark was sent through the wire, the jar would explode.

Volta (see Figure 2) then thought of using this invention to provide long distance communications, albeit only one Boolean bit. An iron wire supported by wooden poles was to be strung from Como to Milan, Italy. At the receiving end, the wire would terminate in a jar filled with methane gas. To signal a coded event, an electrical spark would be sent by the wire to detonate the electric pistol. This communications link was never built.

In 1791, while working at the University of Bologna, Luigi Galvani (1737-1798) discovered that the muscle of

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a frog contracted when touched by dissimilar metallic objects. This phenomenon became known as "animal electricity" -- a misnomer, as was later proved. Prompted by these experiments, Volta initiated a series of experiments using dissimilar metals. He tried combining zinc, lead, tin or iron as positive plates and copper, silver, gold or graphite as the negative plates.

Volta discovered in 1800 that certain fluids would generate a continuous flow of electrical power when combined with a pair of dissimilar metals. This discovery led to the invention of the first voltaic cell, more commonly known as a battery. Volta discovered further that the voltage would increase when voltaic cells were stacked on top of each other. Figure 3 illustrates such a serial connection.

In the same year, Volta released his discovery of a continuous source of electricity to the Royal Society. No longer were experiments limited to a brief display of sparks that lasted a fraction of a second. A seemingly endless stream of electric current was now available.

France was one of the first nations to officially recognize Volta's discoveries. France was approaching the height of scientific advancements and new ideas were welcomed with open arms. By invitation, Volta addressed the Institute of France in a series of lectures at which Napoleon Bonaparte was present as a member (see Figure 4). Napoleon helped with the experiments, drawing sparks from the battery, melting a steel wire, discharging an electric pistol and decomposing water into its elements.

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