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Edison vs. Westinghouse: A Shocking Rivalry

The inventors' battle over the delivery of electricity was an epic power play

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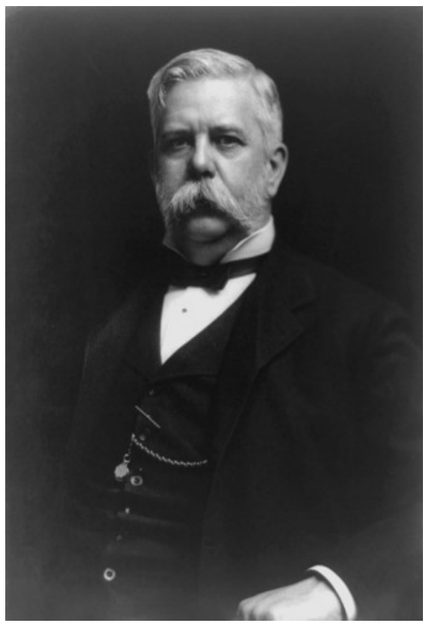
smithsonian.com
October 11, 2011

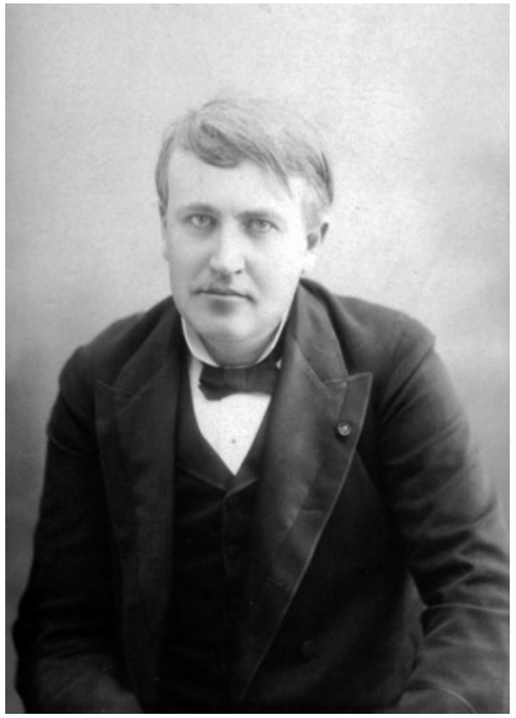


George Westinghouse. Photo:
Library of Congress

Steve Jobs and Bill Gates. They were genius rivals: two American titans who transformed the technology industry and lived to see their visions of computers and electronic devices in billions of homes and offices around the world. Still, their philosophies and personalities were as different as night and day, or Macs and PCs, and over the years, they could not resist needling and antagonizing each other as they staked their claims in the global technology marketplace.

“The only problem with Microsoft is they just have no taste,” Jobs famously said in 1996. “They have absolutely no taste. And I don’t mean that in a small way, I mean that in a big way, in the sense that they don’t think of original ideas, and they don’t bring much culture to their products.”

In 2006, when Apple released its popular Mac vs. PC ads, wherein a hip young Jobs-like character interacts with a bumbling, back-office, brown-suited Gates type, Gates was clearly irritated. “I don’t know why acting like it’s superior. I don’t even get it,” Gates said. “If you just want to say, ‘Steve Jobs invented the world, and then the rest of us came along,’ that’s fine.”



Thomas Edison. Photo by Victor Daireaux

Yet despite the barbs, (and occasional lawsuits) and despite the obvious competition, both Jobs and Gates were smart enough to know that there was room in the consumer market for Apple and Microsoft to coexist, and over the years, neither was too proud or too stung by the other's words to stop them from entering into various partnerships along the way. (In fact, in 1997 Microsoft infused Apple with $150 million in cash at a time when Jobs was brought back by the board of directors to serve as interim CEO, as Apple was suffering crippling financial losses.) The same, however, cannot be said for Thomas Edison and George Westinghouse, who, more than a century ago, engaged in a nasty battle over alternating and direct current, known as the "War of Currents." Both men knew there was room for but one American electricity system, and Edison set out to ruin Westinghouse in "a great political, legal and marketing game" that saw the famous inventor stage publicity events where dogs, horses and even an elephant were killed using Westinghouse's alternating current. The two men would play out their battle on the front pages of newspapers and in the Supreme Court, in the country's first attempt to execute a human being with electricity.

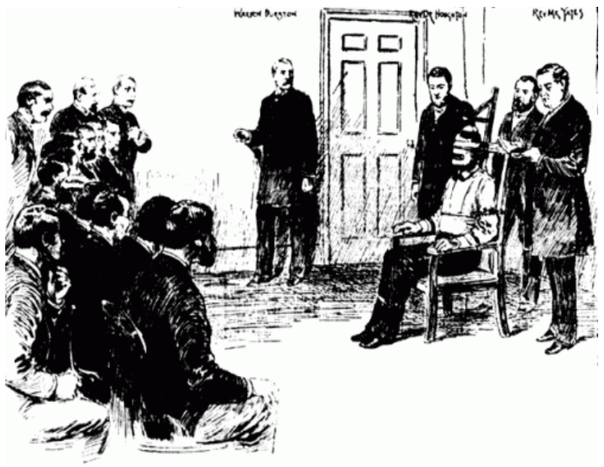
After Edison developed the first practical incandescent light bulb in 1879, supported by his own direct current electrical system, the rush to build hydroelectric plants to generate DC power in cities across the United States practically guaranteed Edison a fortune in patent royalties. But early on, Edison recognized the limitations of DC power. It was very difficult to transmit over distances without a significant loss of energy, and the inventor turned to a 28-year-old Serbian mathematician and engineer whom he'd recently hired at Edison Machine Works to help solve the problem. Nikola Tesla claimed that Edison even offered him significant compensation if he could design a more practical form of power transmission. Tesla accepted the challenge. With a background in mathematics that his inventor boss did not have, he set out to redesign Edison's DC generators. The future of electric distribution, Tesla told Edison, was in alternating current—where high-voltage energy could be transmitted over long distances using lower current—miles beyond generating plants, allowing a much more efficient delivery system. Edison dismissed Tesla's ideas as "splendid" but "utterly impractical." Tesla was crushed and claimed that Edison not only refused to consider AC power, but also declined to compensate him properly for his work. Tesla left Edison in 1885 and set out to raise capital on his own for Tesla Electric Light & Manufacturing, even digging ditches for the Edison Company to pay his bills in the interim, until the industrialist George Westinghouse at Westinghouse Electric & Manufacturing Company, a believer in AC power, bought some of Tesla's patents and set about commercializing the system so as to take electric light to something more than an urban luxury service. While Tesla's ideas and ambitions might be brushed aside, Westinghouse had both ambition and capital, and Edison immediately recognized the threat to his business.

Within a year, Westinghouse Electric began installing its own AC generators around the country, focusing mostly on the less populated areas that Edison's system could not reach. But Westinghouse was also making headway in cities like New Orleans, selling electricity at a loss in order to cut into Edison's business. By 1887, after only a year in the business, Westinghouse had already more than half as many generating stations as Edison. The concern at Edison was palpable, as sales agents around the country were demoralized by Westinghouse's reach into rural and suburban areas. But Thomas Edison had an idea. Surely Westinghouse's system must be more dangerous, what with all that voltage passing through the wires. "Just as certain as death," Edison predicted, "Westinghouse will kill a customer within 6 months after he puts in a system of any size."

In November 1887, Edison received a letter from a dentist in Buffalo, New York, who was trying to develop a more humane method of execution than hanging. Having witnessed a drunk man accidentally kill himself by touching a live electric generator, Alfred P. Southwick became convinced that electricity could provide a quicker, less painful alternative for criminals condemned to death. Perhaps the Wizard of Menlo Park might have some thoughts about the best electric current "to produce death with certainty in all cases." Edison, who opposed capital punishment, at first declined to get involved with Southwick's project. But when the dentist persisted, Edison, recognizing the opportunity that had landed in his lap, wrote back to say that although he would "join heartily in an effort to totally abolish capital punishment," he did have some thoughts about electric currents in which to dispose of "criminals under sentence of death."

"The most effective of these," he wrote, "are known as 'alternating machines,' manufactured principally in this country by Mr. Geo. Westinghouse, Pittsburgh."

In June 1888, Edison began to demonstrate the lethal power of alternating current for reporters. He rigged a sheet of tin to an AC dynamo and led a dog onto the tin to drink from a metal pan. Once the dog touched the metal surface, it yelped and"the little cur dog fell dead."



Sketch of the execution of William Kemmler on August 6, 1890, using alternating current. Image: Wikipedia

Electricity will kill a man "in the ten-thousandth part of a second," Edison told one reporter shortly after the demonstration, and he was quick to remind him that "the current should come from an alternating machine."

The battle of the currents had begun. Westinghouse recognized what Edison was up to and wrote the inventor a letter, stating, "I believe there has been a systemic attempt on the part of some people to do a great deal of mischeaf and creat as great a difference as possible between the Edison Company and The Westinghouse Electric Co., when there ought to be an entirely different condition of affairs." Edison saw no reason to cooperate, and he continued his experiments at varying levels of voltage with dozens of stray dogs purchased from neighborhood boys in Orange, New Jersey at 25 cents each. Edison's research was soon proving that alternating current was, as he said, "beyond all doubt more fatal than the continuous current." By the end of the year, Edison arranged a demonstration before a New York State committee impaneled to investigate the use of electricity in executions. At his West Orange laboratory, the inventor wired electrodes to several calves and a horse; even though the animals' deaths were not quick, the committee was impressed. New York State expressed a desire to purchase "three Westinghouse alternating-current dynamos," but Westinghouse refused to sell them for the purpose of what was now being described as "electrocution." It did not matter. An electricity salesman named Harold Brown was commissioned by the state to build an electric chair, and Edison was paying him behind the scenes to use alternating current in his design. Somehow, Brown got his hands on some AC dynamos.

When New York State sentenced convicted murderer William Kemmler to death, he was slated to become the first man to be executed in an electric chair. Killing criminals with electricity "is a good idea," Edison said at the time. "It will be so quick that the criminal can't suffer much." He even introduced a new word to the American public, which was becoming more and more concerned by the dangers of electricity. The convicted criminals would be "Westinghoused."

Westinghouse was livid. He faced millions of dollars in losses if Edison's propaganda campaign convinced the public that his AC current would be lethal to homeowners. Westinghouse contributed $100,000 toward legal fees for Kemmler's appeal to the U.S. Supreme Court, where it was argued that death in the electric chair amounted to cruel and unusual punishment. Both Kemmler and Westinghouse were unsuccessful, and on August 6, 1890, Kemmler was strapped into Harold Brown's chair at Auburn prison and wired to an AC dynamo. When the current hit him, Kemmler's fist clenched so tight that blood began to trickle from his palm down the arm of the chair. His face contorted, and after 17 seconds, the power was shut down. Arthur Southwick, "the father of the electric chair," was in attendance and proclaimed to the witnesses, "This is the culmination of ten years work and study. We live in a higher civilization today."

Yet behind the dentist, Kemmler began to shriek for air.

"Great God! He's alive!" someone shouted.

"Turn on the current! Turn on the current instantly!" another screamed. "This man is not dead!"

But the dynamo needed time to build its current, and Kemmler wheezed and gasped before the horrified witnesses as the electricity began to course through his body. Some witnesses fainted while others vomited, as it appeared that Kemmler was on the verge of regaining consciousness. The back of his coat briefly caught fire. Minutes passed until Kemmler finally went rigid. The current stopped and he was pronounced dead by Dr. Edward Spitzka, who predicted, "there will never be another electrocution."

Westinghouse was horrified by the reports of Kemmler's execution. "It has been a brutal affair," he said. "They could have done better with an ax."


ELEPHANT ELECTROCUTED FOR MURDER.

The photograph shows Topsy, the elephant electrocuted at Coney Island for murdering three men. A current of 6-000 volts was used. Topsy was the original baby elephant.

Topsy the Elephant was electrocuted by Thomas Edison's technicians at Coney Island before a crowd of thousands. Photo: Chicago Tribune

Thomas Edison believed that future executions by AC current would go more smoothly, "without the scene at Auburn today." To further demonstrate the lethal nature of alternating current, he held a widely attended spectacle in Coney Island, New York, where a circus elephant named Topsy was to be executed after she was deemed to be too dangerous to be around people. The elephant had killed three men in recent years—one a trainer who had tried to feed Topsy a lit cigarette. Edison had Topsy fitted with copper-wire sandals, and before a crowd of thousands, an AC current of 6,000 volts was sent coursing through the elephant until she toppled to her side, dead.

Despite all of Edison's efforts, and despite his attempts to persuade General Electric otherwise, the superiority of the AC current was too much for Edison and his DC system to overcome. In 1893, Westinghouse was awarded the contract to light the Chicago World's Fair, bringing all the positive publicity he would need to make alternating current the industry standard. For his part, Edison later admitted that he regretted not taking Tesla's advice.

Sources

Books: Mark Essig, *Edison & The Electric Chair*, Walker and Company, 2003. Craig Brandon, *The Electric Chair: An Unnatural American History*, McFarland & Company, Inc., 1999. Gilbert King, *The Execution of Willie Francis: Race, Murder, and the Search for Justice in the American South*, Basic Civitas Books, 2008.

Articles: ""Wait Till the NEXT One!" *Newsweek*, February 11, 2007. http://www.thedailybeast.com/newsweek/2007/02/12/wait-till-the-next-one.html Creating Jobs" by Steve Lohr, *New York Times*, January 12, 1997. "Steve Jobs and Bill Gates: It's Complicated" by Jay Greene, CNET News, Microsoft, August 24, 2011. "Coney Elephant Killed" *New York Times*, January 6, 1903.

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Gilbert King is a contributing writer in history for Smithsonian.com. His book won the Pulitzer Prize in 2013.