Thomas Edison and Nikola Tesla – The Current Wars – How America Got Electrified.

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Compiled and interpreted by Bob Primak. Revised after the presentation.

(Image URLs point to the articles these images came from, unless otherwise noted.
Some URLs are as seen with the Chrome 78 media viewer "view image" function.)

(Note: the photo URLs in this document do not correspond with the images used in my presentation. Do not attribute the images in any video of my talk with these references.)

This is a timely topic, as there is a new movie based on the Edison vs. Tesla "Current Wars" which has been released to theaters this month (October, 2019).

<movie page imdb> Image #01The Current Wars
URL: IMDB The Current War review https://www.imdb.com/title/tt2140507/
Image URL: The Current War https://www.imdb.com/title/tt2140507/mediaviewer/rm3820066305

Note about the term "The Current Wars" – This term vastly predates the latest movie adaptation. It seems to have been coined by some of the New York area newspapers of the early 1900's. The 2017 movie, which is only now being released to theaters, was a victim of the Harvey Weinstein Company's association with the *#MeToo* movement's allegations about the former Hollywood movie executive. The movie itself is not the best adaptation of the story, according to Rotten Tomatoes (Two Stars).

See:

https://www.vanityfair.com/hollywood/2019/05/the-current-war-movie-release-date

https://www.rottentomatoes.com/m/the_current_war

https://www.imdb.com/title/tt2140507/

No, I'm not going to show you this movie today, nor the dozens of other (some better) dramatic recreations of the historic moment when America's cities and farms got electrified. I also will not extol the many virtues of either Edison or Tesla as alleged "geniuses".

<Edison and Tesla Image> Image #02 Edison and Tesla
https://www.nationalgeographic.com/content/dam/archaeologyandhistory/rights-exempt/history-magazine/2016/07-08/battle-currents/edison-tesla-15.adapt.1900.1.jpg

There is much, way too much, mythology surrounding both men, and many conflicting claims about patent priorities. Tesla in particular had great difficulty asserting his patent claims. This extended way beyond his breakup with Edison over a $50,000 challenge, which Edison reneged on, or Tesla's voluntary giving up of his $12-million (in that time) contract with George Westinghouse to develop what we now know as the AC electric power grid.

As you will see, neither man ever completed what we today would call college or university. In fact, Edison had little formal education, and had a great disdain for scientific calculations and impractical

experiments. Tesla on the opposite extreme, was a profoundly impractical man, having little taste for business dealings, and socially uncomfortable, though when he had to he was a consummate showman.

Both men were light sleepers. Tesla said he only slept two or three hours a night, and Edison hardly slept at all when he had an idea he was pursuing. While Tesla was able to get through school up to his second year of University (and several years of technical education) Edison was so restless and disruptive in school that by age 13 he had been pulled out of school and placed into a job with a railroad by his parents.

In his later life, Tesla became quite eccentric, and he came up with increasingly impractical inventions. Part of Tesla's problem with the scientific community was that he had an eidetic memory – he could remember in perfect details things he had seen or read. (In fact, his teachers often accused him of cheating because he could reproduce exactly what he had read without having the books in front of him.)

This trait also allowed Tesla to come up with fully visualized plans for inventions without writing anything down on paper. (This was one reason he had only 300 patents, compared with over 1,000 patents owned by Edison when he died.)

I won't comment or answer any questions about Tesla's eccentricities or scientific theories, as they have little bearing on the central theme of the development of the American electric power production and distribution system. I also won't have time to discuss the many, many unrelated inventions of Edison, like the phonograph or some aspects of motion picture production devices. Likewise, Tesla's claims and inventions about wireless transmission of electricity and radio waves lie largely outside of today's topic. (If there's time today or some other time, we as a group can explore these other aspects of Edison and especially Tesla.)

Thomas Edison – Biography up to the Current Wars:

<Young Edison> http://edison.rutgers.edu/educationinventor.htm

Two illustrations: Learning to do Business: Early Entrepreneuship (Printing the Herald)
and Intinerant Telegrapher (Edison at 16 years old) (Note how grown-up some teenagers looked back then!)

Of the two, Edison was older, and he was born and raised in the United States.

Thomas Alva Edison was born on February 11, 1847, in Milan, Ohio.

Thomas Edison received little formal education, and left school in 1859 to begin working on the railroad between Detroit and Port Huron, Michigan, where his family then lived.

(*Note:* Edison's parents felt they had to pull him out of school, because he was so restless and disruptive. This description and his allegedly sparse sleeping habits have led some biographers to speculate that Edison had ADHD. I don't know about this, but it seems plausible.)

During the Civil War, Edison learned the emerging technology of telegraphy, and traveled around the country working as a telegrapher. He had developed serious hearing problems, which were variously attributed to scarlet fever, mastoiditis or a blow to the head.

<Young Man Edison> https://www.kaplancollection.com/the-cased-collection/thomas-edison/
(Read the commentary at the bottom of this page.)

From 1870 to 1875, Edison worked out of Newark, New Jersey, where he developed telegraph-related products for both Western Union Telegraph Company (then the industry leader) and its rivals.

<Edison Telegraph> http://www.telegraph-history.org/edison/appletons/index.html
(Note at the bottom of this page, the List of Contributors document. “Thomas A. Edison, Ph.D.” – but this man never even went to High School! Honorary Degree?)

Despite his prolific telegraph work, Edison encountered financial difficulties by late 1875, but with the help of his father was able to build a laboratory and machine shop in Menlo Park, New Jersey, 12 miles south of Newark.

<Menlo Park Lab> http://content.time.com/time/photogallery/0,29307,1999191,00.html
(Image #1, exterior. Image#3, interior. Image #4 phonograph. Image #5 light bulb. Image #6 many of Edison’s underpaid and overworked assistants, exterior of lab.)

In 1877, … his work with the telegraph and telephone led him to invent the phonograph … The device made an immediate splash, … and the press dubbed Edison “the Wizard of Menlo Park.”

<Edison in his lab>http://content.time.com/time/photogallery/0,29307,1999191,00.html
(Image #7. I think this was not Edison himself. Note the batteries on the floor. Edison also worked on improving alkaline batteries.)

https://www.history.com/topics/inventions/thomas-edison

[1878-1882] The development of a practical incandescent, electric light.

Up to that time, nothing had been developed that was remotely practical for home use. Edison's eventual achievement was inventing not just an incandescent electric light, but also an electric lighting system that contained all the elements necessary to make the incandescent light practical, safe, and economical.

[Eventually, he and his many assistants developed the carbon filament electric light bulb. Tungsten filament bulbs came later.]

<Edison’s light bulb> http://content.time.com/time/photogallery/0,29307,1999191,00.html
(Image #5 light bulb.)

https://www.nps.gov/edis/learn/historyculture/edison-biography.htm

Tungsten became the material of choice for filaments because they produced twice as much light and lasted much longer. With further exploration, the Edison-era tungsten-filament light bulb was further developed and was filled with inert gas instead of being encased in a vacuum. This greatly reduced a dark residue that would develop on the inside of the glass globe due to its vacuum construction.

https://www.nostalgicbulbs.com/blogs/vintage-bulbs/carbon-filament-vs-tungsten-filament

The first public demonstration of the Edison's incandescent lighting system was in December 1879, when the Menlo Park laboratory complex was electrically lighted. Edison spent the next several years creating the electric industry. In September 1882, the first commercial power station, located on Pearl Street in lower Manhattan, went into operation providing light and power to customers in a one square mile area; the electric age had begun.

https://www.nps.gov/edis/learn/historyculture/edison-biography.htm

<Pearl Street power station> https://ethw.org/Pearl_Street_Station

Tesla Biography and Life until the "Current Wars"

<Nikola Tesla as a Child> https://teslauniverse.com/nikola-tesla/images/illustration-nikola-tesla-child-playing-stream-near-his-birthplace

(This site has many nice images of Tesla. Note however that there are few photographs. Tesla like George Westinghouse, did not like to have his photo taken, unless he was demonstrating something for investors.)

Nikola Tesla was born on July 10, 1856 in Smiljan in the Austo-Hungarian Empire (modern-day Croatia). He was an ethnic Serb.

His mother, Djuka Mandic, was an inventor of household appliances.

He attended the Realschule, Karlstadt in 1873, the Polytechnic Institute in Graz, Austria and the University of Prague. (Tesla left the University before graduating.)

<Young Tesla> https://en.wikipedia.org/wiki/File:Tesla_1879_teslauniverse.jpg

He took a job as an electrical engineer at a telephone company in Budapest in 1881. He constructed a telephone repeater and engaged in various branches of engineering and manufacture.

https://www.nps.gov/edis/learn/historyculture/edison-biography.htm

In 1882, Tesla discovered the rotating magnetic field, a principle of physics that forms the basis for nearly all devices that use AC power.

<Rotating Magnetic Field> https://teslauniverse.com/nikola-tesla/images/drawing-nikola-tesla-working-prototype-his-ac-induction-motor

(text from:)
https://www.businessinsider.com/nikola-tesla-inventor-biography-2017-7#in-1882-tesla-discovered-the-rotating-magnetic-field-a-principle-of-physics-that-forms-the-basis-for-nearly-all-devices-that-use-ac-power-7

Later, while he was in Strasbourg, France in 1883, he built a prototype of the induction motor (an AC motor powered by electromagnetic induction) and tested it successfully. Since he couldn't get anyone in Europe interested in it, Tesla came to the United States to work for Thomas Edison in New York.

Induction motors

<rotating magnetic field> https://www.askiitians.com/iit-jee-magnetism/magnetic-dipole-magnetic-flux/

<Induction Motor> https://www.explainthatstuff.com/induction-motors.html

(Good overview of how AC induction motors work:)
https://www.explainthatstuff.com/induction-motors.html

<Young Tesla> https://onedio.co/content/heres-genius-inventor-nikola-teslas-nutrition-diet-11938
(This is not a good Tesla reference, just a good reproduction of an image of young Tesla.)

In 1884 Tesla arrived in the United States with little other than the clothes on him and a letter of introduction to the famed inventor and business tycoon Thomas Edison. Edison's DC-electrical works were fast becoming the country standard. Edison hired Tesla and the two were soon working vigorously alongside each other, making improvements in Edison's inventions.

<Tesla with Edison> https://www.indiatoday.in/education-today/gk-current-affairs/story/tesla-edison-history-1023468-2017-07-10
(Here's how the two rivalling inventors stack up: 1. Brilliance)

However, several months later, Tesla and Edison parted ways because of a conflicting business-scientific relationship, which historians attributed to their incredibly different personalities. While Edison was a power figure who focused on marketing and financial success, Tesla was not business minded and was somewhat vulnerable.

<arc street lighting> https://commons.wikimedia.org/wiki/File:Carl_Saltzmann_Erste_elektrische_Stra%C3%9Fenbeleuchtung.jpg
(This painting was of the first electric arc lamp in Berlin.)

After parting ways with Edison in 1885, Tesla received funding for the Tesla Electric Light Company. His task, as given by his investors, was to develop improved arc lighting. After successful completion of the project, Tesla was forced out of venture and for a time had to work as a manual laborer in order to survive.

https://www.indiatoday.in/education-today/gk-current-affairs/story/tesla-edison-history-1023468-2017-07-10

The Tangle of wires in Lower Manhattan, New York City, caused by different voltage needs of DC power systems:

<Wires New York 1880s> https://io9.gizmodo.com/photos-from-the-days-when-thousands-of-cables-crowded-t-1629961917
(Including what a hurricane did to similar wires in Boston in 1881. The New York City Blizzard of 1885 prompted the law requiring burying of cables and wires in that City.)

(next page)

In the early days of electric power usage, widespread transmission of electric power had two obstacles. First, devices requiring different voltages required specialized generators with their own separate lines. Street lights, electric motors in factories, power for streetcars and lights in homes are examples of the diversity of devices with voltages requiring separate systems. Secondly, generators had to be relatively near their loads (a mile or less for low voltage devices). It was known that long distance transmission was possible the higher the voltage was raised, so both problems could be solved if transforming voltages could be cheaply performed from a single universal power line.

Specialized Systems

Much of early electricity was direct current, which could not easily be increased or decreased in voltage either for long-distance transmission or for sharing a common line to be used with multiple types of electric devices. Companies simply ran different lines for the different classes of loads their inventions required. For example, Charles Brush's New York arc lamp systems required up to 10 kV for many lamps in a series circuit, Edison's incandescent lights used 110 V, streetcars built by Siemens or Sprague required large motors in the 500 volt range, whereas industrial motors in factories used still other voltages. Due to this specialization of lines, and because transmission was so inefficient, it seemed at the time that the industry would develop into what is now known as a distributed generation system with large numbers of small generators located near their loads.

https://en.wikipedia.org/wiki/History_of_electric_power_transmission

The result was a lot of duplication of power lines and generating plants, and most of the wires were overhead. This was not only unsightly, it was unsafe. The outdoor lighting (street lighting) was arc lighting, which ran on 3,000 volts or more. Street cars used DC electric motors, which ran on 500 volts. And of course, indoors lighting and radios needed far lesser voltages to be safe. In fact, indoors gas lighting was still in use for this exact reason.

Then Edison and his colleagues developed a long-lasting incandescent electric lamp, known now as the Edison Light Bulb. ***(repeating from above in Edison's brief early biography)***

<Carbon filament light bulb> http://content.time.com/time/photogallery/0,29307,1999191,00.html (Image #5 light bulb.)

Up to that time, nothing had been developed that was remotely practical for home use. Edison's eventual achievement was inventing not just an incandescent electric light, but also an electric lighting system that contained all the elements necessary to make the incandescent light practical, safe, and economical.

[Eventually, he and his many assistants developed the carbon filament electric light bulb. Tungsten filament bulbs came later.]

https://www.nps.gov/edis/learn/historyculture/edison-biography.htm

So, there were two seemingly distinct issues involved:

One was the problem that DC generated electricity does not step up and down in voltage easily. It is possible to devise a DC transformer and a DC capacitor (what we call "transformers" which sit on modern electric utility poles) but it isn't very practical.

<AC Dynamo> https://edisontechcenter.org/generators.html
(Notice at the bottom of this web page the differences between the generator dynamo from Fulsom, CA ca. 1885 vs. Tesla's design used at Niagara Falls – illustrated near the middle of the page with an inset of Tesla -- for Westinghouse Electric.)

Ever since AC dynamos (like the ones Tesla was inventing and improving on) were introduced, AC electricity generation looked like it would be easier and cheaper. Hydro-electric power is much simpler to generate if the outside of the turbine is spinning, rather than the core. And hydro power was very much cheaper, if you had a handy waterfall nearby. (So you didn't have to build a dam and wait for the reservoir to fill behind it.) In the Eastern United States, the best example of a natural source of hydro power is Niagara Falls, New York/Canada. (In the West, a similar project on a much smaller scale was built in Oregon.)

<Niagara Falls early power plant> https://www.teslasociety.com/exhibition.htm

But Niagara Falls is hundreds of miles away fro New York City. DC power would not easily travel this distance. What was needed were very high voltage power transmission lines, on the order of tens or hundreds of kilovolts. The step-up and step-down at what we now call sub-stations was nearly impossible with DC electricity.

This was where Edison, with his many shareholder-investors and Tesla, with his business partner George Westinghouse, really parted ways.

<Edison vs. Tesla> https://blog.relecura.com/2019/04/tesla-vs-edison-we-bring-our-i-index-to-this-match-up/
(This blog entry has an interesting take on how Tesla's patents and Edison's patents stack up.)

Tesla had worked for Edison for a year at Menlo Park, NJ, but a dispute arose over pay and a $50,000 challenge:

The Bet. Tesla insisted that he could increase the efficiency of Edison's prototypical dynamos, and eventually wore down Edison enough to let him try. Edison, Tesla later claimed, even promised him $50,000 if he succeeded. Tesla worked around the clock for several months and made a great deal of progress. When he demanded his reward, Edison claimed the offer was a joke, saying, "When you become a full-fledged American, you will appreciate an American joke." Edison offered a $10/week raise, instead. Ever prideful, Tesla quit, and spent the next few months picking up odd jobs across New York City. Nikola Tesla: ditch digger.

Edison was notorious for the low wages he paid his workers, and due to his own lack of sleep habits, the long hours he often demanded. Tesla didn't mind the hours, but the pay was not enough to support his lifestyle. Even then New York apartments were very expensive. Tesla famously bragged about ony sleeping about two to three hours per night. (I suspect this was only when he was working on a project. His notorious nervous breakdowns may have been due in part to lack of sleep, leading to mental and physical exhaustion. But this is speculation.)

In all fairness, these two men could not have been more different in their thought styles, their work styles, and their personal habits. (Among other eccentricities, Tesla was a terrible germaphobe, possibly a result of a serious illness during his teen years.)

https://mentalfloss.com/article/30140/acdc-tesla%E2%80%93edison-feud

Edison is not recorded as directly addressing Tesla at any time, but he did say famously:
“Two per cent is genius and ninety-eight per cent is hard work.” (1898 Ladies Home Journal version.)

https://quoteinvestigator.com/2012/12/14/genius-ratio/

Tesla on Edison: "If he had a needle to find in a haystack he would not stop to reason where it was most likely to be, but would proceed at once, with the feverish diligence of a bee, to examine straw after straw until he found the object of his search. ... I was almost a sorry witness of such doings, knowing that a little theory and calculation would have saved him ninety per cent of his labor."
—New York Times, October 19, 1931 (the day after Edison died)

https://mentalfloss.com/article/30140/acdc-tesla%E2%80%93edison-feud

But the professional dispute was mainly over the advantages and drawbacks of DC vs. AC electric power.

When considering a power distribution system, the term “safety” cannot be generally applied to all DC power or all AC power. Line workers in Lower Manhattan were routinely getting electrocuted in part because some DC distribution systems carried very high voltages, but also because the companies which were stringing wires all over the place did not have a central coordinating company, there were no regulatory rules, and contractors often did quick and dirty installations which were not properly labeled or grounded.

Here’s that great illustration again from the Edison period in Lower Manhattan showing exactly what a “spider web” of wires wires the place was turning into.

https://upload.wikimedia.org/wikipedia/commons/thumb/a/a9/Blizzard_1888_01.jpg/220px-Blizzard_1888_01.jpg (Previous illustrations from the collection at: https://io9.gizmodo.com/photos-from-the-days-when-thousands-of-cables-crowded-t-1629961917 .)

Tesla and others soon recognized that AC power could solve this problem. With the availability of step-down transformers, high voltage (high tension) lines could be kept out of residential neighborhoods, or even buried within city limits, while medium voltage (medium tension) lines could be strung along main streets, and any side branches could be stepped down further to supply households and businesses, or lower voltages could be stepped up for factories and other higher voltage consumers. A single distribution network could thus replace the spider-web of wires. This is only possible using AC power, because of the need for transformers, capacitors and other components which work only with AC power.

Tesla’s contributions to solving some of the problems of electric power distribution were several:

First, the scientific knowledge and engineering skill to recognize that AC power was better suited than DC power in important ways.

Second, a good AC motor (see biography above).

Third, a good design for hydroelectric turbines which could generate large amounts of AC electricity.

And many patented ideas and devices relating to step-up and step-down AC transformers, large scale capacitors and other components of today's electric power grids.

<Tesla, Westinghouse and Edison> https://www.historyextra.com/period/victorian/edison-westinghouse-tesla-real-history-behind-the-current-war-film/

Tesla eventually raised enough money to found the Tesla Electric Light Company, where he developed several successful patents including AC generators, wires, transformers, lights, and a 100 horsepower AC motor. Always more of a visionary than a businessman, Tesla ended up selling most of his patents (for the healthy but finite sum of $1 million) to George Westinghouse, an inventor, entrepreneur, and engineer who had himself been feuding with Edison for years. In fact, Westinghouse was more of an economic participant in the War of Currents than was Tesla. Their partnership, one can imagine, made the eventual popularizing of AC that much more bitter for Edison.

https://mentalfloss.com/article/30140/acdc-tesla%E2%80%93edison-feud

Edison, feeling threatened both personally and financially, launched an aggressive negative PR campaign against Tesla's AC power distribution network plans.

First, some mention should be made of George Westinghouse, with whom Tesla partnered to create the first AC electric power distribution systems.

George Westinghouse and Nikola Tesla

Tesla always believed the future of distributing electricity relied on AC, and left the job after Edison rejected his ideas as "splendid", but "utterly impractical".

An undeterred Tesla spent the next few years raising money for his own laboratory, including a stint digging ditches for Edison's wires, and developing an AC system. His induction motor used a game-changing polyphase current (AC flowed in waves, so this filled in the 'troughs' with multiple voltages) to generate a rotating magnetic field (meaning fewer mechanical parts to maintain). Tesla had the ideas, but not the capital and business knowhow.

<George Westinghouse and Nikola Tesla>
https://teslaresearch.jimdo.com/niagara-falls-power-project-1888/

A Pittsburgh industrialist named George Westinghouse had both. Unlike his competitor Edison, who enjoyed his celebrity, Westinghouse kept himself private and did not like having his photograph taken. He was a savvy businessman, having made his fortune on the railroad, and immediately recognized the importance of Tesla's work to his own ambitions for AC. As well as offering Tesla a job as a consultant, Westinghouse bought the patents for $60,000 in cash or stock and $2.50 for each horsepower of electricity sold – all worth millions today.

Westinghouse Electric Company, which had been created before Tesla's involvement, posed a threat to Edison's monopoly. Westinghouse targeted rural areas that could not be reached by DC's small transmission range and managed to undercut rival business in the towns and cities by selling at a loss. By late 1887, he had built 68 power plants to Edison's 121. To make matters worse, Edison faced

competition from other DC companies too, such as Thomson-Houston. With the proliferation of electrical providers came expensive lawsuits over patents, which dragged on for years.

https://www.historyextra.com/period/victorian/edison-westinghouse-tesla-real-history-behind-the-current-war-film/

The Current Wars

So Edison launched his attacks against the safety of AC electricity.

Taking note that Westinghouse's AC generators were spreading across the country faster than his DC alternatives, Edison began publicly questioning the safety of the Tesla-created system, stating, "Just as certain as death, Westinghouse will kill a customer within six months after he puts in a system of any size."

He was so dedicated to discrediting Westinghouse and Tesla that he took a sheet of tin, poured water on it then attached it to an AC power source. In front of reporters he had invited to his lab, he had a dog try and drink the water, the animal falling over dead as soon at its mouth came in contact with the electrified metal.

Following his dog executions, he put together a demonstration for a New York committee charged with researching whether electricity could be used to put people to death.

Making sure to clarify he was using AC, Edison would go about attaching electrodes to calves and even a horse.

<horse electrocution>
Edison & the Elephant NOT in the Room
https://ez.analog.com/b/engineering-mind/posts/edison-the-elephant-not-in-the-room
(Did you know that Edison's first lab was in Boston?)

The animals' deaths were not quick, but his point was made.

Edison also helped fund New York State's first in the nation electric chair, and what followed was a lengthy and painfully cruel execution of axe murderer William Kemmler.

Edison did not stop there.

Coney Island's Topsy the elephant was by far Edison's biggest victim.

Described in the Chicago Tribune as "the original baby elephant," Edison reportedly agreed to put down the giant after it had killed three men.

Well, you can guess the rest.

<Topsy Electrocution> https://imgur.com/gallery/69kK3

https://www.nydailynews.com/news/national/thomas-edison-history-electrocuting-dogs-horses-people-article-1.2969425

Did Edison really electrocute Topsy the Elephant?
http://edison.rutgers.edu/topsy.htm

https://weelunk.com/a-view-from-the-moon-big-idea-the-fractional-gravity-experiment-part-3/3-bizarro-by-dan-pirara-the-alleged-elephant-in-the-room-22b6b0329ea4d80a67fa17897b220aa4-image/
(Sorry, I just had to give Topsy a chance to testify at his own trial.)

In spite of all these theatrics, and the equally grisly deaths of several line workers, AC power and Westinghouse Electric were selected to light up the Chicago 1893 Columbian Exposition. A year earlier, in 1892, Edison Electric and Thomson-Houston merged to form General Electric. GE went with AC power, and essentially the Current Wars were winding down.

The news that the Chicago World's Fair of 1893 – also called the Columbian Exhibition to celebrate 400 years since Columbus reached the New World – would be powered by electricity set off a bidding war. It was another success for AC as Westinghouse won the contract by underbidding GE, providing his company with its most public and spectacular display yet.

<City of Light 1893> https://teslauniverse.com/nikola-tesla/images/spectacular-city-light-columbian-exposition-powered-teslas-ac

The fair, while a monumental triumph in its own right, also gave Westinghouse the reputation needed to secure the highly desired contract to build a hydroelectric plant on the Niagara Falls. By the time the great machinery began generating power, on 16 November 1896, for the city of Buffalo more than 20 miles away, there could be no doubt that AC had won the War of the Currents.

https://www.historyextra.com/period/victorian/edison-westinghouse-tesla-real-history-behind-the-current-war-film/

First Part Ended here – Stopped the presentation at the end of the meeting.

(At some point, I would like to present the shorter sections on Edison and Tesla's later years, after the Current Wars. This could be combined with the rivalry and patent disputes of Marconi vs. Tesla, regarding the development of radio.)

Sidebar: Tesla vs Edison: the AC/DC current wars make a comeback
https://cosmosmagazine.com/technology/tesla-vs-edison-the-ac-dc-current-wars-make-a-comeback

When solar produced electricity has to be fed back into the AC power grid, problems arise. New DC transformers, not practical in the early 20th Century, are now making Edison's dream of a DC power network look more practical in some specialized situations involving renewable energy sources. Off-grid applications are also making DC networks look good for emergency power backup and local distribution.

My Take on Tesla vs. Edison
(This section was not part of the original presentation.)

(as backdrop) <Tesla vs. Edison> https://www.matrixdisclosure.com/ac-dc-nikola-tesla-thomas-edison/
(Again, this article is trash, but the photo composite looks good.)

I feel it is necessary to point out that in spite of both men having contributed greatly to our modern electric power infrastructure, Tesla does tend to get the short end of the stick when it comes to recognition. And very unfairly, Tesla's 19th century thinking has attracted 21st century New Agers who totally misread both the content and the cultural and historical context of Tesla's words and writings. One result has been a plethora of myths about what Tesla actually said and wrote, and numerous Conspiracy Theories about Tesla's later inventions, including a so-called Death Ray, supposedly successful Free Energy Collectors, and allegations that he knew of hidden energies, called Orgone, which emanate from natural crystals and organic chemical reactions. Only a fraction of Tesla's journals and papers have been retained; the rest disappeared after his death, and especially when the US Government got wind he had tried to market his Death Ray to Russia during World War II. So arise some Deep State Conspiracy Theories. There also have been false claims that the oil industry somehow suppressed Tesla's Free Energy ideas. So where Tesla is remembered, he is often revered as someone he was not.

On the other hand, many armchair psychologists keep coming up with equally far-out theories about What Was Wrong With Tesla? Some say he was autistic (he almost certainly was not). Some say he had OCD (doubtful, though he was a germaphobe). What is not as often mentioned is so-called Genius Syndrome, which often mimics autistic traits or OCD, but is an entirely different disorder. (Like Einstein, Tesla's actual IQ was never tested.) The fact is, when he had to, Tesla could interact socially. He was well-dressed, though his style never modernized. He was good-looking by all contemporary accounts, and a persuasive speaker, both publicly and privately. His unusual characteristics do not need to be classified as pathological, though he was a very odd fellow in many ways.

Edison is also often characterized as someone he was not. But the problem here is that Edison is often given personal credit for the work of his entire laboratory staff. And of course, Edison bought patents for devices and methods he himself and his staff did not invent. (Reminds me of Bill Gates, in a way.) But more than anything else, Edison was able to stay in the good graces of wealthy patrons. This is probably why until recently Edison was a household name, but Tesla was not. I would say that there is as much a Cult of Edison as there recently has been a Cult of Tesla. Both views are wrong. Both men deserve credit for propelling the world into the 20th Century, and yet both men had their limitations, being solidly stuck in 19th Century thinking, business practices and social customs.

Footnote – Why is Tesla Motors called by Tesla's name?

Elon Musk was not involved in the company when it was named.

https://www.businessinsider.com/who-is-tesla-named-for-2013-8

<Tesla Car> (bottom of page)

(Note also the photo of Tesla with Einstein.) (1921 photo)

Tesla detested Einstein's Relativity Theory. Einstein is not recorded as publicly mentioning Tesla in any noteworthy way. Tesla did try to "hang out" with Einstein and many others in the physics community of his day. But very few respected Tesla as a scientist, as his ideas were stuck in 19th Century physics, much of which had been debunked or superseded. Typically, this rejection did not deter Tesla from persisting in hanging out with (and arguing with) other scientists.

(next page)

– Bob Primak – October 24, 2019 –

(Note: before uploading as PDF, I had to convert bookmarks to the actual URLs for the images or articles they came from. These images are not the ones I used in the presentation.)

URLs added October 26, 2019 . With additional materials.