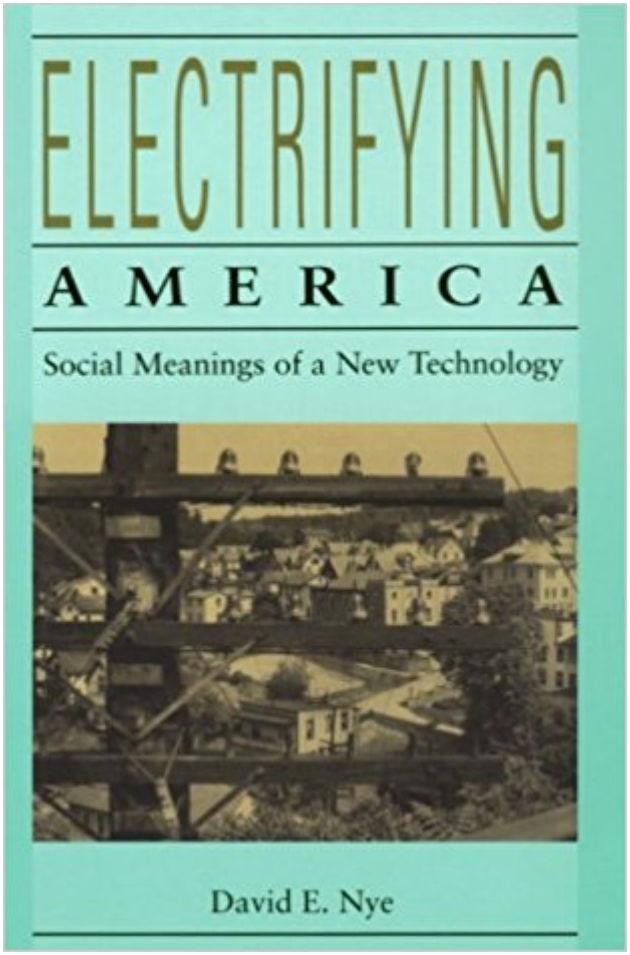
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Electrifying America: Social Meanings Of A New Technology, 1880-1940



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Synopsis

How did electricity enter everyday life in America? Using Muncie, Indiana -- the Lynds' now iconic Middletown -- as a touchstone, David Nye explores how electricity seeped into and redefined American culture. With an eye for telling details from archival sources and a broad understanding of cultural and social history, he creates a thought-provoking panorama of a technology fundamental to modern life. Emphasizing the experiences of ordinary men and women rather than the lives of inventors and entrepreneurs, Nye treats electrification as a set of technical possibilities that were selectively adopted to create the streetcar suburb, the amusement park, the "Great White Way," the assembly line, the electrified home, and the industrialized farm. He shows how electricity touched every part of American life, how it became an extension of political ideologies, how it virtually created the image of the modern city, and how it even pervaded colloquial speech, confirming the values of high energy and speed that have become hallmarks of the twentieth century. He also pursues the social meaning of electrification as expressed in utopian ideas and exhibits at world's fairs, and explores the evocation of electrical landscapes in painting, literature, and photography. Electrifying America combines chronology and topicality to examine the major forms of light and power as they came into general use. It shows that in the city electrification promoted a more varied landscape and made possible new art forms and new consumption environments. In the factory, electricity permitted a complete redesign of the size and scale of operations, shifting power away from the shop floor to managers. Electrical appliances redefined domestic work and transformed the landscape of the home, while on the farm electricity laid the foundation for today's agribusiness.

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Customer Reviews

David Nye casts his bright light on everything from assembly lines to washing machines, from the plummeting price of urban electricity to the usefulness of electric incubators in chicken farming...Mr. Nye succeeds not simply because he knows his technology, but also because be understands the complexity of American culture...[He] has the breadth of knowledge and the good sense to see the significance in paintings like Edward Hopper's 'Nighthawks'...and to weave such observations into the very armature of his argument that electricity transformed not only American life but the American self. (John R. Stilgoe New York Times Book Review)"Nye undertakes the monumental, and previous uncompleted, task of examining the social transformations that a new source of energy initiated. The result is a highly sophisticated and innovative account which crosses over several disciplinary lines." (Dwight W. hoover, Director, Center for Middletown Studies, Ball State University)"David Nye has provided what has so often been lacking in the history of new technologies - a sustained and comprehensive analysis of electricity's social and cultural impact. From factory to household, from trolley line to exposition, and from rural hamlet to Great White Way, Nye explores both how people selectively employed electricity to change their lives and how they constructed and reconstructed its cultural 'meaning.' Through absorbing details and casr studies, Nye affords us an intimate view of the "public relations" and personal relevance of electricity as it was incorporated into the everyday life of individual families, of mushrooming cities, and of the entire nation." (Rolan Marchand, Professor of History, University of California, Davis. Author of Advertising the American Dream)"David Nye is pioneering a new kind of technological history by showing how social and cultural systems shape technological ones. This is a wide-ranging, provocative study." (Rosalind Williams, Associate Professor, Humanities Dept., MIT)"Nye tells a compelling story of how people react to a new technology when they see the potential for both personal and social transformation. As a Tennessee farmer said in 1930--'The greatest thing on earth is to have the love of God in your heart and the next greatest thing is to have electricity in your home.' This is a delight." (G. Terry Sharrer, Curator of Agriculture, Smithsonian Institution)"David Nye, in Electrifying America, continues to provide leadership in integrating material culture with the traditional focus of American Studies on the realm of symbolic meaning." (David W. Nobble, Professor of American Studies and History, University of Minnesota)

David E. Nye teaches American history at the University of Copenhagen. He has published books on Henry Ford and Thomas Edison, as well as Image Worlds, a study of photography and corporate identities at General Electric.

"Electrifying America: Social Meanings of a New Technology, 1880-1940" by David E. Nye, MIT Press, Cambridge, 1990. This 479 page paperback provides a detailed look at the social implications of electrification in America. Thomas Edison invented the electric incandescent light, but in the process he also invented the electric utility. Just as the integrated circuit led to the personal computer and a host of new technologies, electrification lasted from 1890 to 1930, and for most of that period was the largest consumer of invested capital. (The railroad investment age is given as 1835-1890; the automobile investment age must be 1910+.)The focus of the book is Muncie, IN, a mid-size American city which has been much studied by social scientists. It is sometimes called "Middletown" in these studies. The book covers street and commercial lighting, streetcars and interurbans, electrification of industry, and rural electrification.Arc lights were the first artificial electric lights. They were known from 1802, but a power source was problematic until 1877, when Philadelphia's Franklin Institute concluded the Charles F. Brush dynamo (Brush Electric, 1880) was most practical. Orders poured in. An arc lighting system was installed at the courthouse in Wabash, IN, in 1880, four months after Edison demonstrated his electric light at Menlo Park. By 1881, New York, Boston, Philadelphia, Baltimore, Montreal, Buffalo, San Francisco, Cleveland and other cities had Brush arc light streetlight systems. By 1882, St. Louis had a Brush arc system installed for its Fall Festival. (Brush Electric became part of General Electric in 1891.)Developers soon realized lighting up the night attracted crowds. Lighting demonstrations were featured at expositions from 1883 (Louisville) to 1904 (St. Louis). Department stores, Marshall Field in Chicago and Jordan Marsh in Boston, were early adopters of arc lighting. Electric light was cleaner than gas, produced no smoke, no odor, no moisture, and no oxygen consumption. In addition, reduced risk allowed lower fire insurance rates.Edison began sales to the public in 1885. Small DC systems were installed at Mt. Carmel, Sunbury (on the Susquehanna River in central PA), Johnstown, PA, Laramie, WY, Topeka, KS, Jackson, MI, in abt 1885, and in seven major buildings in Chicago. Streetlights, businesses, and upper class homes were early customers. Most urban homes were electrified between 1915 and 1930. In Muncie, electric service was provided from 5 a.m. to 11 p.m., at a flat rate, unmetered. But initially only 100 watts was available, often a single light in the center of the house. Some homes were wired for as little as $10, payable in installments. Fire alarm boxes, burglar alarms, and watchman clocks were available in Muncie by 1889.The book provides

excellent coverage of the streetcar and interurbans. Streetcars grew out of the congestion in major cities caused by dependence on the horse. People tended to live within about 5 mi. of downtown businesses, and the streets were filled with horse carts and coaches. Street railroads using horse-pulled cars were adopted after small steam engines proved unacceptable due to noise, dirt, and they frightened horses. But horse cars did little to relieve congestion.Thomas Edison undertook development of electric streetcars at Menlo Park with support from Henry Villard in 1880-82. Villard had been a leader in financing the Northern Pacific Railroad, and later was president of Edison General Electric Co. Stephen Field built an early electric streetcar system in Stockbridge, MA. Edison and Field merged their companies to form Electric Railway Co., which had a demonstration line at the Chicago Railway Exposition in 1883. Early systems used a third rail. The advantages of the overhead trolley were recognized by 1885.Frank Sprague developed an improved DC electric traction motor which used a compressed spring motor mount for isolation from vibrations on the car axle but yet solidly meshed with a drive gear on the axle. His design succeeded in Richmond, VA in 1887, and could manage an 8% grade. His company was acquired by Edison GE. Over 200 cities ordered systems by 1890.The streetcar was faster than horses, typically 10 mph, and more economical. The need for stable personnel was avoided. The service life of a horse was only four years, and each ate his value in feed each year. Plus diseases could shut down service. Cable car technology was the only competitor, but it was more costly to build and less efficient due to need to pull heavy cable throughout the system. Many street railways were converted from horse to electric streetcars and extended with additional real estate development.The adoption of streetcars opened a new era. Fast transportation allowed cities to expand-on average an additional six miles. The new neighborhoods had their own class structures. Middle class made the first wave of "escapes to the suburbs" in pursuit of the Victorian ideal of "closer to nature." Factories could be further from downtown with working class families clustered around them. Department stores developed because people could still come downtown to work or to shop in stores with a wider array of merchandise.With the these new developments came the bungalow. The bungalow was developed in California in about 1900 and gradually spread eastward. It was a rejection of the traditional Victorian concept of large homes with space for servants and instead featured modern progressive concepts: simple, informal, efficient, thrifty, economical. Multipurpose rooms were the norm rather than dedicated spaces like sewing rooms or parlors.Streetcars also gave rise to trolley parks. Trolley parks were amusement parks located on the fringe of town. They were formed by streetcar companies to increase ridership at midday and on weekends when traffic was otherwise slack. Coney Island is perhaps the best known one, but Muncie had one by 1900. Rides were often based

on streetcar mechanisms, e.g., the roller coaster. Streetcar companies had open Summer cars that provided a pleasant breezy ride to the trolley park.Streetcar companies were soon unionized. Strikes were not uncommon. They also were susceptible to corruption and manipulation. Key citizens often controlled the companies and made fortunes in real estate by extending lines into new areas and then selling lots. They could be a corrupting influence on city governments. Cases of streetcar companies bribing city council members are well documented. Schedules could be disrupted or fares manipulated for political effect or financial gain.The book also covers the intercity electric streetcar lines known as interurbans. Streetcar technology was adapted to run at high speeds. Lines were constructed connecting many cities. (They were standard gage; some modern rail lines were originally constructed as interurban lines.) Fast acceleration made their travel time about the same as steam railroads, but fares were about half that of passenger trains. A network of lines made it possible to travel from Chicago to Buffalo and in the Northeast and West. Muncie has 10 to 12 interurbans to Indianapolis per day with a travel time of about two hours. In Wisconsin, interurban service began in 1897.Interurbans sold electricity to the farms and small communities along their routes. Interurbans also carried farm produce, milk, dairy, US mail, and small packages as from Montgomery Ward or Sears. Interurbans made it possible for many to shop at department stores or go to the movies.The peak passenger year for US streetcars was 1922-23. Thereafter traffic declined as the automobile began to dominate. Similarly, interurbans declined after 1935 when the federal government forced them to give up their electric utility service. The utility business had better growth potential while interurban demand declined during the depression.The same electric traction technology allowed the creation of subways, which were impractical with steam engines due to smoke and fumes. Subways are mentioned only briefly in the current volume. The technology also allowed for electric locomotives which worked well in tunnels such as those under the Hudson River in New York City. Ultimately this technology led to the development of modern diesel electric locomotives. Those aspects are omitted in the current volume.Electrification also resulted in significant changes in manufacturing. Previously mills had been powered by water wheels or by steam engines. These were arranged to power a rotating overhead shaft which was then connected to individual machines by leather belts. This system resulted in multistory buildings located close to waterwheel sites. Electrification allowed the water wheel to turn dynamos so the power could be transmitted electrically. Each machine could now have its own electric motor-allowing greater flexibility. Henry Ford’s assembly line was possible due to electrification-which made conveyor belts possible.The age of industrial electrification ran from 1880 to 1930, but until 1900 or so, the thrust was lighting. Brighter lights made operating a factory 24

hours per day more efficient, but initially the old inline power systems for machines were retained. Facilities with power plants often installed dynamos to make their own electricity. In 1900, factories consumed half of the electric power produced, but electricity provided less than 5% of their power requirement. Electric motors were mostly adopted after 1900, resulting in major changes in manufacturing by World War I.Samuel Insull is mentioned only in a cursory way in this volume. He was an Edison associate who is best known for his role in creating the electric utility industry. He was CEO of Commonwealth Edison in Chicago where he pioneered basic concepts. He believed in large efficient generating plants, diverse customers to balance load, and differential pricing to attract off peak customers. His ever larger generating plants meant that for years the price per kilowatt hour of electricity constantly fell as generation became more efficient and costs were spread over an ever growing customer base.During his tenure, the issue of regulating utilities was addressed. Utilities are natural monopolies. Competition is impeded by limited space, and would be impossibly inefficient. In 1905, Insull participated in a private Commission on Public Ownership. The commission concluded that utility companies should use standardized bookkeeping and be subject to public oversight. The concept was adopted for regulation of utilities in all states except Delaware by 1921 (as an alternative to government ownership as favored in Europe).Finally the book describes rural electrification, i.e., the Tennessee Valley Authority and the Rural Electrification Administration. As electric utilities spread across the country, they gradually brought electricity to most of the US. In rural areas service tended to be extended in the northeast (truck farming and dairy) and in the West (irrigation), areas with greater electrical demand. Executives believed that Midwestern and Southern farmers had too little need to support electric grids to serve them. As a result in the late 1920s, less than 10% of the 6.5MM farms in the US had electricity. When the Roosevelt administration proposed TVA and REA to serve rural areas, electric utilities vigorously opposed the new competition. TVA was begun in 1933; REA in 1935.Nye's book does an excellent job answering many of the questions left unanswered in Jill Jonnes' "Empires of Light."Ã Â Empires of Light: Edison, Tesla, Westinghouse, and the Race to Electrify the WorldÃ Â His book is loaded with factual details, but the effort to deal with the many social aspects sometimes bogs down in verbiage. A few questions remain unanswered. After Tesla's AC proved more successful than Edison's DC, how did 60 Hz and 120v become standards for residential use? Edison is well known to have had trouble insulating the wires for his system. Who developed the wire towers, magnet wire enamels, and insulating varnishes that made motors and generators possible (before the development of modern synthetic resins largely after 1920)? Lower fire insurance rates were mentioned, but how were building codes adapted to electrical requirements? How did Underwriters

Laboratories and their standards come about? How were electrical plugs standardized? Who mass produced fractional horsepower electric motors to make them inexpensive enough for consumers?Electrifying America is a welcome addition to the collection of technology history. References, index, photos.

Electrifying America is one of the most interesting books I've ever read. Reading it is almost like traveling back to the time of gaslight and candles when homes had no appliances and electric streetcars allowed creation of the first suburbs.The book is more about the impact of electricity on everyday life than about the great personalities of the influential innovators like Edison, Tesla, Insull and Ford, who are only given casual mention.Electrifying America begins at the time of the great expositions, or Worlds Fairs, such as the Pan American, Trans Mississippi, Panama Pacific and the tremendously popular Columbian (Chicago 1892-3) where there were elaborate displays of lighting and exhibits of the latest electrical equipment. It also tells of the early public demonstarations of street lighting.Being an engineer and a researcher of productivity, I especially appreciated the discussion of the enormous manpower savings made possible by electrifying factories. An example given was a glass jar manufacturing company that replaced manual glass blowers with machinery and used things like an overhead (bridge) crane to move heavy items across the factory. In addition to drastic labor savings total output increased several fold. Electric lighting greatly improved working conditions in factories and also greatly reduced fires, with large reductions in insurance premiums, often enough to pay for the lighting.Another well described example is the Ford River Rouge plant, which was the world's largest factory, built for maximum efficiency and the first large scale center of mass production. Nye describes how electricity made completely new plant layouts possible and how electric motors revolutionized machine tools. (Eighty years later I was still using techniques like those pioneered at River Rouge to design manufacturing plants).There is presented little in the way of statistical analysis, science or engineering. Economists should note that the decades of the highest economic growth in US history, 1890 to 1910, coincided with the beginnings of electrification and the street railway system.While cities were electrified by the end of the 1920's, the vast majority of farms did not have electricity until the late 1940's, largely made possible through the efforts of the Rural Electrification Administration and the Tennessee Valley Authority.Nye discusses the modern electrified household with new labor saving appliances like electric irons, washing machines, toasters and ranges. He also discusses the changing role of women in the workplace, the decline of domestic servants, the beginning of home economics, and the change from skilled artisans to semi-skilled factory workers.Electricity's influence on art, literature and language are also

discussed.This is a fine example of a well researched and documented book, with many pages of footnotes, a bibliography and an index. Thoroughly enlightening and a pleasure to read.A shortcoming of this book is that it keeps to it’s name as being a social history. For a more technical book I recommend Hunter & Bryant "A History of Industrial Power in the U.S., 1780-1930: Vol 3: The Transmission of Power" which will be remembered as one of the best history of technology or economic history books on the subject and perhaps one of the great books in this field from the 20th century. Good luck finding it though. I recommend going to your library and getting one through the inter-library loan.For the impact of efficiency in electrical generation see Ayes, Ayres and Warr’s papers "Exergy, Power and Work in the US Economy 1900-1998" and "Accounting for Growth: The Role of Physical Work", which update thinking about economics. For a more technical perspective see: A History of Industrial Power in the U.S., 1780-1930: Vol 3: The Transmission of Power by Louis C. Hunter, one of the best history of technology books on the subject.

There are few examples of the introduction of a new physical principle that had more profound effects on human civilization than electricity. Fire is the only thing that would probably surpass it, but the historical record of that discovery doesn’t exist. Nye documents the many ways in which electricity changed America, with a number of surprises. It is a bit long and redundant, but overall I enjoyed it very much. It is very useful to reflect on something that saturated every aspect of our lives, yet we take for granted. Another book that I just started reading on this topic is The Age of Edison: Electric Light and the Invention of Modern America by Ernest Freeberg. Now let’s develop fusion, the next revolution!

This book goes beyond an analysis of technological development; it presents an interpretation of American history from the perspective of available technology, and comes up with a novel take on the zeitgeist of the nation. Setting aside politics and wars, it gets to immediate practical questions such as "Why did I grow up in this house, and why is our community in its current condition?". Nye addresses the critical transition from "history" (George Washington, Abraham Lincoln, hand-plowing, and outdoor privies) to "modern" (indoor plumbing, suburban homes, cars, television, service economy) - a much-overlooked gap that mystified me for decades. Although not a historian myself, I found this book, readable, enlightening, and hugely entertaining.

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