American Illuminations

Urban Lighting, 1800–1920

DAVID E. NYE

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David E. Nye

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Overabundance of light produces multiple blindings.

—*Walter Benjamin*

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Introduction

Imagine that every night for the last thousand years, a satellite circled the earth taking night photographs. If they were assembled in a ten-minute time-lapse film, one could observe the diffusion of lighting. For the first five minutes there would be occasional spots of light when cities burned down, volcanoes erupted, or forests caught on fire, with long periods of darkness. Fireworks might also be visible occasionally in close-ups of China, and about halfway through the film they would burst forth in Italy and spread to the rest of Europe. In the last third of the seventeenth century, faint streetlights would begin to appear, first in Paris and almost immediately afterward in other cities. But only after 1800 in the last two minutes of the film would the cities be marked by orange-reddish spots from gaslight, first in Birmingham, Manchester, and London, and soon after on the Continent and in North America. This first great energy transition reached cities in much of the world by the middle of the century, notably in the British and French colonies. The number of illuminated places and intensity of the lighting increased for the rest of the century, bursting to a brighter level when electric arc lights were adopted after 1875, and intensifying further as businesses and households adopted incandescent lighting. In the twentieth century, light spread along highways into the countryside.

The film would accurately suggest that cities were the nodal points for two energy transitions, first to gas and then to electricity, both of which reinforced the city's political and economic importance. There were moments of particularly intense illumination, such as world's fair sites that dimmed when they closed down, but otherwise the spread of illumination proceeded with little check to the present day, with the

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exception of the wartime blackouts in the 1940s. From a satellite, every city can now be located, while much of the surrounding countryside remains obscure. This book is about these two energy transitions as they were experienced in public space. The argument focuses especially on the years from circa 1870 to 1920, when the illuminated urban world was understood to be the pinnacle of civilization's conquest of nature.

The process of illumination was far less uniform than the Olympian perspective of satellite photography might suggest. Not all cities adopted the same lighting systems, and there was considerable variation in energy consumption as Europeans and North Americans tried out different forms of public lighting in the nocturnal landscape. Many different system designs were possible using gas and electrical technologies, and the now-familiar form of US cities had not yet been decided. As late as 1905, only one home in twenty had electricity, and both gas and electricity were first experienced in public spaces that were brighter than most domestic interiors.[1] The night city became more alluring as the hours of commerce expanded and the pleasure-seeking public increased.

How should one understand this process? In a pioneering work, Wolfgang Schivelbusch argued that the "industrialization of light" had "disenchanted night." While his *Disenchanted Night* was full of interesting observations and awakened interest in the cultural history of lighting, the present work takes issue with some of his findings. It is hardly surprising that more than three decades after his groundbreaking book appeared, its conclusions need to be revised or in some cases rejected. Schivelbusch asserted that the centralization of energy systems promoted the centralization of business.[2] More recent work has found that the availability of electrical power often had the opposite effect. Steam engines were expensive and required continual maintenance, imposing high costs and a scale of operation that favored larger enterprises. For example, steam-driven printing presses were too expensive for small print shops, which continued to use muscle power until driven into bankruptcy. Electrical motors helped smaller printers to survive, as these businesses did not need to own and operate an expensive generating system on their premises.[3] The same was true of electrical furnaces and electric lighting for other enterprises. For every enormous illuminated advertisement, there were hundreds of small electric signs that promoted small businesses. The

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effect of electrical service was frequently to decentralize, whether in the dispersal of people in a household where every room had electric light, the population into suburbs served by electrical subways and streetcars, or electrical tools into small industries that relied on skilled labor. It is true that industry consolidated in this time period, but it does not follow that electricity always promoted this process. The shift in energy regime from steam to electricity made power cheaper, easier to acquire, and more flexible in use. If electricity made possible the assembly line factory, it also enabled many small enterprises to survive and compete successfully, especially where skilled labor and differentiated products were involved.[4] Electricity was an enabling technology, and its effects were complex.

Schivelbusch treats the industrialization of light as a process driven by capitalism with rather uniform effects in Europe and the United States. His book's organization expressed this point of view, as his five chapters treat the lamp, street, nightlife, drawing room, and stage. The organization implied that cultural differences were minor, and streets, shops, homes, and theaters everywhere were much the same. They were not. As I show in *Technology Matters*, summarizing the work of other scholars, technological change is by no means uniform and is shaped by culture.[5] Moreover, a new technology only gradually displaces an old one, in a process examined in chapter 2. There are discernible patterns in energy transitions, whether one examines the shift from gas to electricity, or the shift to renewable energies occurring today. But these transitions are not automatic. They occur at different rates and have different outcomes in different societies.

Gas was not only a new fuel. It replaced sporadic and decentralized lighting with a centralized, uniform system. Nor was electricity simply a replacement for gas. For millennia, burning had always created light, yet electricity was not fire. A gas system transmitted organic energy directly to the consumer, who created some waste products when the gas was burned. An electrical system converted different kinds of energy (wind, falling water, or steam) into a single, inorganic form that passed through a consumer's devices and left nothing behind. The waste was displaced to distant mines, oil wells, power plants, and the like. Gas was organic and direct; electricity was inorganic and indirect.[6]

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Schivelbusch not only misunderstood electricity's economic effects, undervalued the extent to which culture shapes technology, and did not conceptualize the shift from gas to electricity as an energy transition but also adopted the dominant metaphor of "disenchantment" to explain the meaning of artificial lighting. This evoked romantic conceptions of what nighttime was once like, as though the world before 1800 had been poetic and enchanted compared to a drab industrial aftermath. Yet study of the public response to gas and electric lighting suggests that lighting itself was often mesmerizing, replacing dull night with enlivening color, and opening up the city to new forms of commerce and pleasure. To see this excitement as disenchantment demands a presentation of the "enchanted" world before artificial lighting, but Schivelbusch's book does not make such a presentation, and his title remains an unsubstantiated metaphor.

Schivelbusch recognized that artificial lighting expanded life into the night, but he missed transatlantic cultural differences. For instance, he treated expositions only briefly, as though they were a uniform phenomenon, and gave the impression that Europe, particularly Paris, set the pace. By 1898, in fact, the lighting at US expositions was more intense, subtle, and artistic, and based on more comprehensive and coordinated planning. Schivelbusch saw the Paris Exposition of 1900 as the epitome of early electrical development.[7] It was not. As explained in chapter 5, technical experts found these Parisian electrical displays to be out of date and incoherent, and the event relied to a considerable degree on gas lighting. Likewise, a reader of Schivelbusch does not learn that until after 1900, London's streets were mainly lighted with gas, in dark contrast to intensely electrified New York. Nor did Schivelbusch recognize that in 1903, the per capita consumption of electricity in Boston and Chicago exceeded that in Paris or Berlin by 400 percent. Such an enormous technical difference expresses a cultural contrast, for the functional and symbolic aspects of illumination were always intertwined.

This book asks why Americans developed such intense urban lighting and how they used it to shape their urban culture, as compared to European developments. The first chapter examines the Renaissance tradition of illuminations and civic celebrations, which persisted in Europe and spread to the United States, where it merged with a vigorous parade

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tradition. Chapter 2 reviews the two energy transitions—to gas and then to electricity. Chapter 3 explores why, despite having access to the same technologies, Britain and the United States developed different public lighting systems. Chapter 4 looks at tower lighting, a US system briefly widespread in the Middle West, South, and West that expressed a different aesthetic and value system than the now-familiar rows of streetlights that line US streets. Chapter 5 examines spectacular lighting at expositions from Paris in 1881 to Buffalo in 1901 as well as Saint Louis's annual Veiled Prophet celebrations and other regional events. These urban spectacles increased interest in lavish, permanent lighting installations. Chapter 6 discusses the commercialization of public space using both gas and electric lighting, culminating in giant advertising signs, scintillating downtowns, and the dramatic lighting of skyscrapers, bridges, and public monuments. By 1900, this nocturnal landscape was a hallmark of popular culture. Yet many in Europe and some in the United States considered this cityscape garish as well as visually incoherent, and chapter 7 explores the City Beautiful movement's efforts to create a more harmonious aesthetic at events such as the Hudson-Fulton Exposition of 1909 and a series of expositions that culminated in 1915 in San Francisco. Chapter 8 then turns to how spectacular lighting became a part of the US political system, including parades, presidential inaugurations, and the lighting of national symbols like the Statue of Liberty. The final chapter concludes the argument that the forms and uses of public lighting were by no means inevitable. Only after considerable experimentation was spectacular lighting made a seemingly natural part of streets, skyscrapers, landmarks, and events. However inevitable they may seem today, they are social constructions that express political and social values.

These chapters concern a few European cities, notably London and Paris, and the fifteen largest US cities in 1900: New York (3.4 million), Chicago (1.7 million), Philadelphia (1.3 million), Saint Louis (575,000), Boston (561,000), Baltimore (509,000), Cleveland (382,000), Buffalo (352,000), San Francisco (343,000), Cincinnati (326,000), Pittsburgh (321,000), New Orleans (287,000), Detroit (286,000), Milwaukee (285,000), and Washington (279,000).[8] At the time, the transformation of night space in these cities was thought to have specific, desirable consequences. It was widely believed that illumination was a check on crime,

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and that it expanded the public sphere, not least for women.[9] More generally, public lighting was regularly discussed in terms of social uplift, especially during the Progressive era, notably at world's fairs and among supporters of the City Beautiful movement. Light seemed to measure a city's progress. Command of energy was understood to be essential to technical advances, prosperity, and a higher level of culture. When H. G. Wells visited New York in 1906 he thought, "New York is lavish of light, it is lavish of everything, it is full of the sense of spending from an inexhaustible supply."[10] The apparently perpetual supply of energy seemed to guarantee a cornucopia of goods as well as round-the-clock stimulation and excitement.

Positive views of electrification were qualified both in the nineteenth century and after. During the Progressive era, electricity increasingly came from coal-fired power plants that polluted the air and threated human health. The plants reduced sunlight while exposing the lungs to noxious gases and soot particles.[11] Fears of air pollution were not strong enough in either Europe or the United States, however, to prevent extensive coal burning to produce gas and electric light.

To a degree, social elites employed electrical displays to project their social status and justify their power. Electric lighting was more than an overt means of social control that made the city more visible to the police. In addition, from the Renaissance onward, the court, aristocracy, and urban elites used electrical displays to transform the appearance of the city as well as to excite awe and admiration. But one must not suppose that hegemonic intentions were always realized. Had local elites in the United States been more unified, they might have imposed a uniform pattern of illumination with a coherent aesthetic such as that at a world's fair. In practice, though, electrification was often a matter of consumer choice. Through imaginative lighting, small businesses created distinct identities. Neighborhoods used lighting displays to express a local identity, such as New York's Chinatown or Little Italy. Electricity became a tool of self-expression that to a considerable degree resisted the efforts of reformers to make over cities to resemble the great expositions. US electrification was frequently less hegemonic than individualistic, expressing a mosaic of social worlds, and resulted in lively landscapes of consumption such as Coney Island and Times Square.

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The appearance of the night landscape was not always foreseen or controlled. The large number of actors, public and private, large and small, produced unexpected juxtapositions and transformations, notably in city centers where businesses vied for attention, and large electric signs were continually being erected and replaced. The effect of this landscape on the average citizen could be defamiliarization. By night, the city was radically altered. Many in the City Beautiful movement bemoaned what they saw as the incoherence and visual cacophony of an increasingly commercialized public space.[12] Others, such as Ezra Pound, embraced New York at night as an expression of modernism. "No urban nights are like the nights there; I have looked down across the city from high windows. It is then the great buildings lose their reality and take on their magical powers."[13]

Michael Foucault argued that modern civilization created a hybrid form of social space, which he called "heterotopia," which "is capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible."[14] The great expositions enacted such a heterotopian transformation each evening, as visitors saw elaborate lighting effects alter the entire grounds. A cadre of engineers became specialists in creating such transmutations, staged as performances just after darkness had fallen. Foucault specifies that "heterotopias are most often linked to slices in time," and begin "to function at full capacity when men arrive at a sort of absolute break with their traditional time."[15] Few things could be more traditional than nightfall, which had always divided human experience into two quite-distinct periods. To break through the darkness with massive lighting displays erased this demarcation and declared human independence from the rhythms of nature. The illuminated city, with its bright boulevards, skyscrapers, and spectacular electric signs, seemed to exemplify progress, representing the triumphant light of civilization. Like the world's fairs, illuminated cities were widely understood to be dynamic utopian landscapes, while an unelectrified city was backward.

Americans long celebrated electrification as a turning point in historical experience. In 1939, Consolidated Edison's exhibit at the New York world's fair depicted electrification as a break in space and time.[16] Visitors walked along a full-sized cobblestone street that depicted 1892,

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where they saw small shops, an ice wagon, a horse-drawn streetcar, and gas streetlights. They glimpsed housewives washing clothes by hand or cooling themselves with handheld fans. After this "Street of Yesterday," they entered the brilliantly illuminated "Avenue of Tomorrow" with smooth asphalt streets, sleek automobiles, and skyscrapers with well-lighted plate glass windows. The two landscapes told the public that electrification had broken the grip of darkness and ushered in the modern world. Yet the transition from gas to electricity had not been as sudden as this exposition pavilion suggested, for it had required half a century.

Moreover, illuminated modernity was fraught with contradictory implications. As T. J. Jackson Lears demonstrated in his magisterial *No Place of Grace*, many Americans were uneasy with the cultural effects of the second industrial revolution. Particularly the educated and upper class began to idealize the preindustrial past, cultivate arts and crafts, celebrate medieval cathedrals, retreat to pastoral settings, or sojourn in Europe, where the rush of progress seemed less pressing. But "by exalting 'authentic' experience as an end in itself, anti-modern impulses reinforced the shift from a Protestant ethos of salvation through self-denial to a therapeutic ideal of self-fulfillment in this world."[17]

Electrification expressed contradictory possibilities. On the one hand, the United States was a commercial civilization, where businesspeople, joined by engineers and progressive reformers, sought to increase society's rationality and productivity. Mastery of electricity assisted this rationalization, whether by controlling the flow of street traffic with semaphores, lengthening the workday with new lighting systems, speeding delivery of messages through the telegraph and telephone, or packing more experiences and more production into each day. On the other hand, electricity increased the allure of new pleasures that detracted from the work ethic and self-control at amusement parks, vaudeville shows, dance halls, pleasure gardens, rooftop restaurants, the cinema, and much else. The metaphor of disenchantment is inadequate to describe these contradictions. The electrified city was the site of both rationalization and the intensification of pleasures. It was both a productive dynamo and the Great White Way. Illuminations were woven into urban cultural life, and found expression in commerce, architecture, landscapes, spectacles, patriotic events, tourism, entertainment, and

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politics. Taken together, the many cultural uses of lighting created a heterotopian city that was alluring yet undefinable, more vivid and yet less concrete, perpetually bright and yet transient in its details. The city had become both a vast mechanism that hummed through the night and an undying fireworks.

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In recent years, books on the history of gas and electric lighting have been so numerous that a chronological list can only be suggestive: Israel's definitive biography *Edison: A Life of Invention* (1998), Schlor's international comparisons in *Nights in the Big City* (1998); Jakle's invaluable US case studies in *City Lights: Illuminating the American Night* (2001), Sharpe's expansive *New York Nocturne: The City after Dark in Literature, Painting, and Photography* (2008), Otter's innovative *The Victorian Eye: A Political History of Light and Vision in Britain, 1800–1910* (2008), Nye's history of blackouts in *When the Lights Went Out* (2010), Werrett's groundbreaking *Fireworks: Pyrotechnic Arts and Sciences in European History* (2010), Koslofsky's indispensable *Evening's Empire: A History of the Night in Early Modern Europe* (2011), Baldwin's US cultural history, *In the Watches of the Night: Life in the Nocturnal City, 1820–1930* (2012), Tomory's *Progressive Enlightenment: The Origins of the Gaslight Industry, 1780–1820* (2012), Carlson's definitive study *Tesla: Inventor of the Electrical Age* (2013), Freeberg's

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wide-ranging *The Age of Edison: Electric Light and the Invention of Modern America* (2013), Barnaby's new slant on nineteenth-century Britain in *Light Touches: Cultural Practices of Illumination, 1800–1900* (2017), and two groups of essays on the lighting of cities, Isenstadt, Petty, and Neumann, *Cities of Light: Two Centuries of Urban Illumination* (2015), and Meier, Hasenöhrl, Krause, and Pottharst, *Urban Lighting, Light Pollution, and Society* (2015).

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