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Island of Light:  
The Development of Artificial Illumination in  
Early Modern England

By

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## Introduction: The Story of Light in Early Modern England

London.<sup>1</sup> The city with a thousand boats in the river, shipping goods from across the entire globe to the teeming, bustling markets and shops. Where those same shops sold piles of elegant Chinaware alongside counterfeit rubbish. The city with parks and gardens where middle-class families could comfortably relax on their evening strolls. Full of meandering lanes, nearly any nationality could be found and nearly any book could be read. The city with rampant crime, poverty, and corruption, especially concentrated in its endless slums which housed untold thousands. The city that was choked by the black coal smoke burned by scores of furnaces and fueling its powerful manufactories. The city that never slept: full of bright, glass lamps that illuminate nightly work and pleasure, the blazing lights of its main bridge dramatically reflecting off the surface of the Thames below. The epicenter of artificial illumination, this city built a network of lamps that dwarfed anything on the continent and soon inspired similar constructions across Europe. This is London in 1700.<sup>2</sup>

Before the Victorians and the steam locomotive, before the tumults and turmoil of the nineteenth century, London already had the characteristics of a modern global city. Crucially, its residents could do many of their activities at nearly any hour. Restrictions on nighttime

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<sup>2</sup> Peter Clark, ed., *The Cambridge Urban History of Britain: Volume 2, 1540-1840* (Cambridge: Cambridge University Press, 2000), esp. 315-346; 575-672; Will Cavert, *The Smoke of London: Energy and Environment in the Early Modern City* (Cambridge: Cambridge University Press, 2016).

movement were steadily decreasing in the decades leading up to and immediately after the turn of the eighteenth century. In part because of its ability to operate round the clock, London was able to develop more rapidly than other European cities. And why could London operate round the clock? I argue that, at least in part, the answer is to be found in the remarkable burst of artificial lighting in late seventeenth and early eighteenth-century London.

As it is at the center of all these developments, the story of public light is not quite the story of London, but it is one that takes place primarily within London. In 1690 a London committee considered whether “to Light the Streets, and all other Publick Places, from the hours of Six to Twelve at night.”<sup>3</sup> In 1691 a royal order proposed to “Light the City of London and Suburbs” so that “All Persons that desire, may be accommodated with the aforesaid Lights.”<sup>4</sup> And in 1692 the English Parliament passed a bill to construct street lights throughout London: “to be plac’d all of a height in a Range of about 80 foot distance, on both sides the way in Broad streets; and in narrow Streets, one Range.”<sup>5</sup> Intense controversy over the creation of this network resulted in a period with a disordered mish-mash of lighted and unlighted streets throughout the burgeoning imperial capital. For decades, strikingly similar legislation faced strikingly similar resistance. Opponents of lighting London’s streets flocked to the presses. Workers refused to install lighting, citing their opposition to the disruptive, mercantile lifestyle lit nighttime streets would surely foster. Meanwhile, investors in lighting companies fought one another over alleged

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<sup>3</sup> City of London Court of Common Council, *To the Honourable Committee, Appointed by the Right Honourable the Lord Mayor, Court of Aldermen, and Commonalty of the City of London, in Common-Council Assembled, to Receive Proposals for the Benefit of the Orphans of London. Proposals Humbly Offered for the Better Lighting of All the Streets, Lanes, Allies, and Publick Courts within the City of London, and Liberties Thereunto Belonging.* (London: 1690).

<sup>4</sup> Edmund Heming, *By Virtue of a Patent Granted by King Charles II. for a New Invention of Lamps with Convex Glasses*, July 1, 1691 (London: 1691).

<sup>5</sup> *A Proposal for Enlightening the Streets in London and Westminster, According to a Bill Prepar’d for That Purpose Humbly Submitted to the Consideration of the Lords Spiritual and Temporal, and Commons in Parliament Assembled.* (London: 1692).

abuses of patent law: some stakeholders maintained that anyone could set up convex lamps while others insisted that only they held the exclusive right to do so.<sup>6</sup> These battles raged for decades at various points spurring public meetings, lawsuits, and even a crime spree of stolen lamp fixtures.

In the course of a decade, London rapidly transitioned from a city where artificial illumination was unsystematic, privately provided, and unenforced, to one in which a centralized network of complex lamps operated on nearly every street, for which taxpayers were charged a set rate, not unlike modern utility companies. Why were lights initially adopted so quickly, after centuries of decentralized illumination? Why, too, after that quick burst of illumination, did resistance to centralized artificial light appear sporadically for at least the next few decades? The aim of this thesis is to argue that the answers to these questions lie in the broader story of modernization in late seventeenth- and early eighteenth-century Britain.

All these motions, arguments, and fights exemplified a messy sort of modernization. Light, politics, commerce, and time were linked during this period, and the transformation in artificial illumination cannot be understood without reference to the rest. Only upon reading the story of light in relation to other modernization stories does the importance of these changes become clear.

Because my goal is to examine why lights were treated the way they were, this thesis contains a somewhat lopsided use of sources, worth pointing out in brief here. To highlight how Britons, and especially Londoners, in the late seventeenth- and early eighteenth-century talked about light, I spend a large portion of the text describing in detail the contours of how several key actors wrote about light. These sections are lengthy and derived from a careful reading of

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<sup>6</sup> I use “convex lamp” to refer to the technology itself. The Convex Lamp Company was one of the leading producers of this technology, and I therefore use the capitalized “Convex Lamp” when referring to their specific product.

their relevant source material. Later sections, which are shorter, describe the expansion of lighting companies, city contracts for their technology, and popular references to artificial light, which necessarily require a more ‘zoomed out’ view.

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Several scholars have proposed answers to the questions I pose above. Historians of urban Britain have often included lamps in their stories of urban growth. Other scholars, particularly those writing early in the twentieth century, explain the role of artificial light in terms of inexorable human development. More recently, the rise of cultural history has led others to emphasize the role of darkness in the development of street lighting. To them, Early Modern Europeans shared a common fear of darkness, which could only be resolved by the eventual centralization and expansion of public light that took place in the seventeenth and eighteenth centuries.

Because artificial light took off in the cities—and especially in London—questions about its history most often arise in the context of urbanization. It is now a common view to hold that rapid urbanization entailed dramatic upticks in the population of townships, reforms to the structure of local governance, and a sizable increase in commercial ventures, among other concurrent, and less important, changes, such as lighting. Peter Borsay, for example, whose book is perhaps the most important within this historiography, devotes two and a half pages to light, arguing that urban illumination was simply one trend among many; light has no particularly significant place in the story of urbanization nor does it turn up in other parts of his book.<sup>7</sup> For him, English cities were able to rapidly light themselves simply because the cities were expanding and clamoring for a plethora of new technologies.

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<sup>7</sup> Peter Borsay, *The English Urban Renaissance: Culture and Society in the Provincial Town, 1660-1770* (Oxford: Oxford University Press, 1989), 72-74.

An entirely independent literature seeks to answer these questions on the basis of a human desire for innovation. Beginning with Matthew Lukiesh in 1920, sporadic essays and monographs have touched on the history of artificial light by linking it to notions of inevitable development.<sup>8</sup> Lukiesh's ideas, peppered with proclamations of light's centrality to "the march of civilization," were the first in a long line of accounts which isolate light from the rest of human life.<sup>9</sup> Because "without light, mankind would be comparatively inactive about one half of its lifetime," artificial lamps stand out among all inventions; it exists in a league of its own "for light is one of the most prominent agencies in the scheme of creation."<sup>10</sup> To Lukiesh and others of this position, the same reasons exist for the expansion of artificial light wherever it happens: human beings desire progress, which requires agency, which is increased by the presence of light. Lukiesh's writings spurred many of the trends we still see today. The best account of artificial public light in Early Modern Britain, a short article published during the Blitz in 1941 by E.S. de Beer, makes a similar argument. In this account, the explosion of artificial light in late seventeenth- and early eighteenth-century London was simply the result of an omnipresent human desire for light, and its expansion in Early Modern London was met with relatively little real resistance.<sup>11</sup> "Advancing civilization brought new needs," de Beer writes, as "the growth of literacy and commerce, and higher standards of comfort in the great houses, slowly generated a demand for more light."<sup>12</sup> Though the invention of new lighting methods was slow, de Beer

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<sup>8</sup> Matthew Lukiesh, *Artificial Light: Its Influence Upon Civilization* (New York: Century, 1920).

<sup>9</sup> Lukiesh, *Artificial Light*, 4.

<sup>10</sup> Lukiesh, *Artificial Light*, 8; 14.

<sup>11</sup> E.S. de Beer, "The Early History of London Street-Lighting" *History* 25, no. 100 (March 1941), esp. 311-315.

<sup>12</sup> de Beer, "The Early History of London Street-Lighting, 312.

argues that it simply followed directly from “the slow growth of demand” for light, buttressed by a basic human desire for agency.<sup>13</sup>

More recent historiography has criticized the lack of reference to culture in works like those of Lukiesh and de Beer. These newer works, notably those by Nina Edwards, Craig Koslofsy, and A. Roger Ekirch, show that what writers like Lukiesh and De Beer, who emphasize that light is part of a fundamental developmental impulse, miss, is that their accounts can do little to explain why light does not expand in most periods and places besides Early Modern Britain.<sup>14</sup> Making the desire for light a fundamental impulse of humanity prevents us from examining why particular forms of illumination were developed in specific, highly contingent circumstances, and perhaps more important, why some forms of illumination were welcomed by the people who experienced them and others faced resistance.<sup>15</sup>

These recent authors have gone on to explain the growth of artificial illumination by tying things together more broadly in Early Modernity. Scholars who study the history of the night have associated crime, deviance, and darkness, each of which were labeled harmful by Early Modern authorities and thereby treated as threats to diminish. Of these recent accounts, Koslofsky’s monograph spends the most time attempting to show why light was important to the figures he studies. In it, he traces what he calls “nocturnalization,” defined by “the ongoing expansion of the legitimate social and symbolic uses of the night.”<sup>16</sup> The goal of Koslofsky’s monograph, for example, is to “show how early modern men and women mapped the contrast

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<sup>13</sup> de Beer, “The Early History of London Street-Lighting, 312.

<sup>14</sup> Craig Koslofsky, *Evening’s Empire: A History of the Night in Early Modern Europe* (Cambridge: Cambridge University Press, 2011); Nina Edwards, *Darkness: A Cultural History* (London: Reaktion Books, 2018); A. Roger Ekirch, *At Day’s Close: Night in Times Past* (New York: W.W. Norton & Company, 2005).

<sup>15</sup> de Beer, “The Early History of London Street-Lighting.”

<sup>16</sup> Koslofsky, *Evening’s Empire*, 2.

between darkness and light... onto early modern culture, and how this culture in turn helped structure the distinction between night and day.”<sup>17</sup> The point, then, is that night and day are conceptual categories through which multitudinous cultural symbols can be filtered and reflected. His story is one in which a disordered sort of colonization gradually assimilates the European night into what was essentially a longer day. In this reading, artificial illumination expanded not because it is the response to a fundamental human desire, as Lukiesh and de Beer argue, but because it was a response to a *specific* cultural fear of darkness which was omnipresent in Early Modern Europe.

Today, the historiography of Early Modern light rests roughly where Koslofsky, Edwards, and Ekirch left it. In response to the problems of earlier accounts from writers like Lukiesh and de Beer, they introduced a degree of contingency to their explanations and included analyses of culture in addition to their references to the technologies of illumination. Yet their story, though it resolves the problems of teleology latent in those of Lukiesh, de Beer, and the like, fails to account for the highly contingent processes that affected lighting, and its interpretation, on the ground. Their emphasis on a common cultural fear of darkness in Early Modern Europe prevents them from looking closely at the specific circumstances in which light arose. Why did London light itself in the 1680s and 1690s, and not a century earlier, when—according to these stories—the fear of darkness was equally ubiquitous? What about the tangible expansion of light and its impact on material conditions? Or its political relevance? As I seek to demonstrate, light was not merely about *night*; it was about the expansion of agency, contested as this was. I propose that it is both possible and warranted to go further. The symbolic

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<sup>17</sup> Koslofsky, *Evening's Empire*, 14.

characteristics of night are an important part of the story of artificial illumination, but I argue below that light has dramatic implications for behavior not discussed in his book.

I draw my methods from an extension of the historiography of light in periods besides Early Modernity, which has included specific studies of the contingent contexts in which lighting technologies arose.<sup>18</sup> Conspicuously, these historians have nearly always begun their accounts with the invention of coal-derived gas lighting in the early nineteenth century.<sup>19</sup> In a sense, doing so is completely reasonable. The gas industry employed a larger portion of the British population than earlier oil lights ever demanded, and it reshaped British society more thoroughly than any previous method of artificial illumination.<sup>20</sup> In sheer numbers, gas lamps have been more important than oil lamps. From the remarkable chronicles of illumination in the early nineteenth through to scholarship of the late twentieth century, it is clear from these texts that artificial light, derived from gas, was a crucial element of nineteenth-century modernization. But in all these accounts the Early Modern night appears dark and unimportant, while a brief glance at classic works about even medieval Europe shows that nightlife has always existed in some form.<sup>21</sup> Moreover, as I argue, the modernizing tendencies of seventeenth-century states extended well

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<sup>18</sup> See especially Meghan E. Strong, *Sacred Flames: The Power of Artificial Light in Ancient Egypt* (Cairo: American University in Cairo Press, 2021); M. E. Falkus, “The Early Development of the British Gas Industry, 1790-1815” *The Economic History Review* New Series 35, no. 2 (May 1982): 217-234.

<sup>19</sup> Noteworthy are Chris Otter, *The Victorian Eye: A Political History of Light and Vision in Victorian Britain, 1800-1910* (Chicago: University of Chicago Press, 2008); Sandy Isenstadt, *Electric Light: An Architectural History* (Cambridge: MIT Press, 2018); David E. Nye, *American Illuminations: Urban Lighting, 1800-1920* (Cambridge: MIT Press, 2018). It is as though someone made a rule that one can only study public lighting if one begins in the nineteenth century. Exceptions to this rule are microhistorical and unlinked to the broad narratives I mention above. See, for example, Strong, *Sacred Flames*; Jeremy Zallen, *American Lucifers: The Dark History of Artificial Light, 1750-1865* (Chapel Hill: University of North Carolina Press, 2019). And then there are the books that simply describe, in literal fashion, how different lamps worked: Catherine M. V. Thuro, *Oil Lamps: The Kerosene Era in North America* (Brettleboro: Echo Point Books, 2018); Brian Bowers, *Lengthening the Day: A History of Lighting Technology* (Oxford: Oxford University Press, 1998).

<sup>20</sup> Falkus, “The Early Development of the British Gas Industry.”

<sup>21</sup> For example, Jacques Le Goff, *Time, Work, & Culture in the Middle Ages*, trans. Arthur Goldhammer. (Chicago & London: University of Chicago Press, 1980).

into the realm of light and dark. While nineteenth-century gas lamps are surely an essential object of study, their expensive, dimmer predecessors are crucial as well.

In addition to making use of techniques pioneered by historians of light in other contexts, I draw heavily on the historiography of late seventeenth-century Britain to contextualize this thesis. These debates over lighting began in the 1680s, when rapid modernization under James II and then William and Mary took place in the realms of the military, finance, and bureaucracy, while larger trends of urbanization, commerce, and global politics continued to bring England closer to modernity. Most prominently, the revolution of 1688-1689 was characterized by modernizing impulses on both sides—absolutist Catholicism for James II and his supporters in contrast to Whiggish modernization for the revolutionaries.<sup>22</sup> Understandably, histories of this period have traditionally emphasized the politics of the Glorious Revolution and the wars it spawned. The history of this period is well-trod, with each of these events and movements being the subject of a multiplicity of studies. In none of the above stories do these political changes matter. They matter to this thesis. As I argue, a study of the language employed in lighting company propaganda reveals close links to the modernizing impulses these historians have identified.

Existing answers to the questions I pose have a crucial element in common. Light, as they portray it, is an autonomous thing. It exists to enable other things, and it is sometimes enhanced or diminished by social trends or contingent changes. For early scholars like Lukiesh, light was an element of a teleological understanding of history. For more recent scholars, like Koslofsky, light was produced as a result of a common cultural disdain for darkness. But for all of them, illumination is rarely *about* anything besides light and darkness. Light, to these authors, should

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<sup>22</sup> I take this discussion primarily from Steve Pincus, *1688: The First Modern Revolution* (New Haven: Yale University Press, 2009).

be studied outside of specific references to the contexts in which particular lighting technologies emerged. To them, light stands in a league of its own.

I suggest, in contrast, that it is precisely *because* light is omnipresent that it does *not* stand in a league of its own. Artificial light, like any tool, only matters insofar as it is used—by whom, when, and for what purpose. The ability to see, and therefore do things, is important because of what is done, not because of the new ability. Even a history of the ability to see, rather than of the things seen and done, would require the historian to examine how historical figures wrote about what they saw and what it meant to them. Light is a worthy object of study, then, because it offers insight into whatever it affects. In short, the study of artificial light demands that we begin from an implicitly contextual approach.

Artificial light is a difficult thing to study. It moves in and out of the historical record in convoluted ways. Few surviving documents mention lighting; fewer still are about it. But all depended on its presence. It is understandable that histories of light avoid potentially overwrought linkages between their subjects and other sub-fields, but, as I argue, this eminently reasonable scholarly impulse to avoid generalization has parched our ability to properly understand artificial light as a form of modernization. The story of artificial light is one in which temporality becomes centralized—regulated by the state even—as it is politicized, shifting into its place as the central metaphor of the Early Modern world. The contextual approach, in which we seek out evidence for who was experimenting with, arguing about, and constructing lamps, and why, enables us to trace the mutually constitutive relationship between artificial light and modernization. Light is not a mere part of modernization, though it is a part. Rather, artificial illumination is a technique of modernization. The contextual approach, then, is also dialectical:

light tells us about modernization and modernization tells us about light. In essence, the two must be examined in tandem.

I use the loaded term “modernization” throughout not because I propose a new model of modernization or find the term unproblematic but because many of the traits typically associated with the word—namely, the centralization of power in a developed state, the presence of a significant capitalist or at least proto-capitalist economy, rapid technological innovation, a commonly accepted historical narrative of progress, and an increasingly rationalized society—all fit the trends I describe.<sup>23</sup> Tying light to modernization simultaneously emphasizes modernization and makes light more important than it would otherwise appear. This linkage emphasizes modernization because it shows that artificial light, a technology that has so dominated the world since the seventeenth century to the point of being nearly unnoticeable, is closely linked to an extremely particular set of centralizing impulses in late seventeenth and early eighteenth-century England. In doing so it becomes clear that artificial light is no unbiased factor which merely enables anything an actor wants; it is a specific, contingent technology which is conducive to particular forms of social order. This emphasis makes light more important than it would otherwise be, too, because as soon as we realize the significance of light in the quest for modernization, it becomes a factor which is impossible to ignore.

Light’s omnipresence makes a comprehensive story near impossible. But valuable insight is still discernable. Here, I narrow my focus onto the noteworthy changes in English illumination

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<sup>23</sup> The sources on this subject are far too pervasive and thoughtful to do them justice in a single footnote. See, at the very least, Max Weber, *Readings and Commentary on Modernity* ed. Stephen Kalberg (Oxford: Blackwell Publishing, 2005); *The Protestant Ethic and the Spirit of Capitalism* trans. Talcott Parsons (New York: Routledge, 2001); Immanuel Wallerstein, *The Modern World System I: Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century* (Berkeley: University of California Press, 2011 edition); William Gibson, Dan O’Brien, and Marcus Turda, eds., *Teleology and Modernity* (New York: Routledge, 2020).

which began in the 1680s and continued through the first few decades of the eighteenth century. I begin with a review of light in England prior to the invention of the convex streetlamp. From there, I argue that these lamps were successfully constructed, first, because their proponents took advantage of the interrelated languages of commercial improvement, charity, honor, and progress. To do so, I closely examine a series of pamphlets, proclamations, and propaganda pieces. Second, I shift into a broader view of the lighting companies, exploring how their genteel connections, business structure, and overall social status enabled their products to be met with a welcoming reception in 1680s and 1690s England. Put together, the use of compelling modernization narratives by wealthy investors, working with a flexible corporate structure and eminent social connections, enabled artificial light to develop in England like it had never done before. Light is surely worth examining in more contexts, but my hope is that this thesis can be a start.

### **Before**

Light had been a subject of law for centuries before the conflicts of the late seventeenth and early eighteenth centuries. Indeed, English parliaments, councils, and kings had enacted a plethora of decrees about artificial lighting prior to the seventeenth century. The difference was in scale and in technique, but before we can introduce the seventeenth-century changes, a review of the history they responded to is in order.

At least as early as 1388, the City of London placed restrictions on public movement at night.<sup>24</sup> More evidence survives from the fifteenth century. Several fifteenth and sixteenth-century laws were enacted throughout England to encourage householders to place lanterns outside their homes during early hours of the night. Often these restrictions were only applicable

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<sup>24</sup> E.S. de Beer, "The Early History of London Street-Lighting," 313.

during the “dark” parts of a year, usually between September and March and only when the moon was barely showing, depending on the criteria of local authorities. Often these laws referred to such periods as “Dark Nights.” Sporadic laws were similarly enacted in a few other chartered cities, but the growing suburbs of London had few if any such restrictions.<sup>25</sup> In the early seventeenth century, taxes were sometimes appropriated to provide candles based on a new reading of the Relief of the Poor Act.<sup>26</sup> Based on the lengthy gaps of time between laws related to light, the fact that, when they were proposed, they often included claims that few similar laws existed, and the reactions of late seventeenth-century commentators, it is highly unlikely that these early laws were enforced to any significant extent.

Indeed, strict application of these laws may well have been reserved to wartime or other crises. Despite centuries of regulation, it was only at the height of the Civil War in 1645, for example, that Oxford’s nights became closely regulated. In that year a royal proclamation ordered that “every Evening upon shutting in of day-light, and when the Nights shall be dark, [the inhabitants of Oxford should] cause lights to be hung... towards or into the Streets.”<sup>27</sup> At first glance this decree was in line with those from earlier and perhaps even later periods. But it limited the lighting to a short period of time, in between darkness and the ritual “tip-too” which signaled the time for the close of activities.<sup>28</sup> In tandem with this rule was a set of harsh requirements: all places of business must close in the evening. Any person outside after this call

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<sup>25</sup> It is difficult to say whether London appears so central to pre-1680s lighting law simply because of surviving source bias, but regardless, the shift toward centralized light which I discuss below is a story which begins in London. At least as far away as York, similar restrictions were being enacted in the fourteenth century. See Thomas Parsons Cooper, *Lights O’ York: The Story and Romance of Seven Hundred Years Street Lighting* (1935), British Library (hereafter BL) 010352.b.40.

<sup>26</sup> Cooper, *Lights O’ York*, 12.

<sup>27</sup> *A Proclamation for Preventing of Disorders in the Night-time, in the Garrison of Oxford* (Oxford: Leonard Lichfield, February 3, 1645). I have maintained the original dates here and throughout.

<sup>28</sup> *A Proclamation for Preventing of Disorders in the Night-time*.

was to be “removed and carried to the guard,” and, after further transgression, be punished by “putting them in the Guard.”<sup>29</sup>

In 1645, Oxford had become a wartime city. Light was an essential tool to regulate its populace. By narrowing the window in which its inhabitants could see outside of their lodgings, the Royalist forces were able to closely maintain control over its streets, and perhaps gain a few conscripts from among the unwilling students. What was different about this order was its clear, strict enforcement mechanisms. While earlier laws occasionally delineated small fines, this was the first to include physical patrols and the threat of imprisonment (or worse).

It is difficult to say whether this was the first instance of strict regulation of public light in England, but it does appear that those from earlier times and places were either unenforced or the records of their enforcement have been lost. Because the records of these Oxford laws remain, it would have been quite strange to lose the historical record of none of the rules but all of their enforcement mechanisms. More likely is that Charles and his followers were breaking new ground out of wartime necessity. Still, this law placed much of the responsibility for lighting on the individual—making lights the responsibility of the individual housekeeper, restricting their use to a short period in which outside travel was considered respectable, and providing no funding for the lighting used. In a sense, this proclamation took traditional rules and placed them under a newly strict sort of public enforcement. Innovation in enforcement is important, but the lighting itself was still operated according to the old rules.

Laws of streets, housing, and other urban matters tended to ignore light. When it came to the laws of public streets—where the role of artificial light eventually became most prominent—lamps were not mentioned for most of the seventeenth century. The 1662 order for the

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<sup>29</sup> *A Proclamation for Preventing of Disorders in the Night-time.*

maintenance of roads, which is typical of the period, barely mentioned light at all, squeezed between lengthy discussions of rocks which should be removed to ease the flow of traffic, in a single sentence. “From the time it grows dark, until nine of the clock at night,” it orders, residents “shall set forth lights.”<sup>30</sup> Immediately thereafter, the order moves on to other matters. The same can be said for other directives about public streets through most of the seventeenth century.<sup>31</sup>

The most promising opportunity to light the streets of London came in the immediate aftermath of the 1666 Great Fire, when the Crown established a commission to rebuild the city. Yet for all of the efforts of Christopher Wren and his colleagues to widen streets, restrict building materials, and more, they paid no attention to lighting the city. Yet again, nothing happened. Proposals to reconstruct the city ranged from the mild to the fantastically ambitious, yet light was hardly anywhere to be found. One early proposal which exemplifies this trend contains instructions for the length and width of every street in the city, the materials and height of most buildings, and even the taxes to be levied on each house based on its location. Yet it included nothing about light.<sup>32</sup> A sampling of subsequent laws and orders designed to aid the reconstruction efforts turns up nil when it comes to light. Even moving into the early 1670s,

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<sup>30</sup> Maurice Newport, *By the Commissioners Appointed by His Majesty, for the Repairing the High-Wayes and Sewers, and for Keeping Clean of the Streets, in, and about the City of London and Westminster, &c.* (London: Printed for J. Grismond, 1662).

<sup>31</sup> England and Wales Parliament, House of Lords. Die Sabbathi, 13, Martii, 1646 *Whereas the Severall Streets within the Cities of London and Westminster, and the Places about the Same, are by the Carelesnesse of such as are to Repaire and Amend the Same so Broken and Ruinous, that they can Hardly be Passed without Great Danger* (London, For J. Wright at the King Head in the Old Baily, 1647); Corporation of London Lord Mayor, *By the Mayor, to the Alderman of the Ward of [Blank] : Whereas by a Late Act of Parliament, for Repairing the High-Waies and Sewers and for Paving and Keeping Clean of the Streets in and about the Cities of London and Westminster, &c. (Amongst Other Things) Enacted and Commanded.* London, Printed by James Flesher], 1662.

<sup>32</sup> Val Knight, *Proposals of a New Modell for Re-Building the City of London with Houses, Streets, Wharfes, to Be Forthwith Set out by His Majesties and the City Surveyors with the Advantages That Will Accrue by Building the Same Accordingly.* (London: H. Bruges, for Samuel Speed, 1666).

when construction was shifting into maintenance or expansion upon what had already been rebuilt, parliamentary and city rules paid little attention to how they might light the city.<sup>33</sup>

Despite the willingness of many architects and commentators to rethink virtually every part of what it meant to be a Londoner, from the style of streets to the design of bridges and housing, it is apparent that light was virtually ignored during the reconstruction after the Great Fire.

Samuel Pepys's classic diary can be another lens into the start of these shifts, though it ends before the bulk of them took place. Pepys mentioned light 237 times in his diary. More than half of the time in which Pepys discussed light he did so in the context of describing the illumination of a place he visited.<sup>34</sup> Pepys's London was a city without standardized or centralized lighting. Pepys often had to employ various workers to light his travel during evening-time. In one of his earliest entries in 1661, he "took up a boy that had a lanthorn, that was picking up of rags, and got him to light me home."<sup>35</sup> In 1665 during the plague he "walked quite over the fields home by light of linke," that is, a torch made from pitch, carried by "one of my watermen."<sup>36</sup> Years later on September 21, 1668, Pepys went out on the town. He saw a play, interacted with some friends, and eventually was out past dark. To see the path across the

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<sup>33</sup> For example, City of London, *Whereas in and by the Additional Act of Parliament for Rebuilding the City of London, It Is Enacted, That the Lord Maior and Court of Aldermen Shall Be and Are Thereby Impowered and Required to Cause All and Every the Sheds, Shops and Other Buildings ... to Be Taken down and Removed ...* (London: Printed by Andrew Clark, 1673); City of London, *This Court Taking into Their Consideration, That the Utmost Time Appointed for Taking down and Removing All Such Sheds, Shops, and Other like Buildings, Which Have Been Erected since the Late Dismal Fire ...* (London: Printed by Andrew Clark, 1674).

<sup>34</sup> This is not even to mention the subtle ways that light enters the text without being named as such, which I have set aside for the sake of brevity but would be worth examining in detail in a future study.

<sup>35</sup> Samuel Pepys, *The Diary of Samuel Pepys, 1661* ed. Robert Latham and William Matthews (Berkeley: University of California Press, 2000), 59. Interestingly, this note is on Lady-Day, the traditional day in which many old laws of lantern-hanging, which began on Michaelmas of each year, subsided.

<sup>36</sup> Samuel Pepys, *The Diary of Samuel Pepys, 1665* ed. Robert Latham and William Matthews (Berkeley: University of California Press, 2000), 340.

Thames, he and his boatman traveled “by link-light, it being mighty dark.”<sup>37</sup> A person of relative means like Pepys could afford to routinely hire impoverished Londoners to carry torches alongside him, but many others may not have been able to do so.

Light was something that Britons had certainly thought about and written about before the late seventeenth century. Indeed, early scientists experimented with light regularly.<sup>38</sup> But laws about light were few and enacted infrequently. As far as it is possible to discern, enforcement of what did exist was sparse or negligible. Technologies of lighting remained much the same as what they had been for centuries. And significantly, no centralized network of lamps existed. Soon enough, this was all to change.

### **During – A Close Look**

Beginning in the 1680s, the situation began to change. Whereas a patchwork of earlier laws and interpretations about light had sporadically popped up here and there, this decade saw Londoners, and then the English and British in general, begin to establish centralized systems of artificial illumination. Compared to the absence of lighting in the flood of proposals to rebuild London in the late 1660s, the sudden embrace of artificial lamps in this period is striking.

Technical innovation arrived first, between 1675 and the mid-1680s. It is unclear who first developed a convex glass lamp, but in 1675 Richard Reeves received a patent for attaching glass to a contraption with candles in its center.<sup>39</sup> In 1684 Edward Wyndus received a separate

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<sup>37</sup> Samuel Pepys, *The Diary of Samuel Pepys, 1668-9* ed. Robert Latham and William Matthews (Berkeley: University of California Press, 2000), 313.

<sup>38</sup> A large literature exists on the role of light and color in Early Modern science. For example, one can reference an entire 2015 special issue of *Early Science and Medicine*, of which the introduction is particularly helpful: Tawrin, Baker, Sven Dupré, Sachiko Kusukawa, and Karin Leonhard, “Introduction: Early Modern Color Worlds” *Early Science and Medicine* 20, no. 4/6 (2015): 289–307. Perhaps the most prominent primary source example is Issac Newton’s *Opticks: or, A treatise of the reflections, refractions, inflexions and colours of light* (1704).

<sup>39</sup> More information on this particular patent is in de Beer, “The Early History of London Street-Lighting,” 315-316. I was unable to locate this patent but have little reason to doubt de Beer’s account.

patent for a similar light.<sup>40</sup> And another inventor, and future shareholder in the Convex Light Company, Charles Hara received a grant about a decade later in 1685 or 1686.<sup>41</sup> At first these inventions made relatively little impact, and then they suddenly exploded onto the scene.

The first significant expansion of public light, generating the first controversy about the techniques of lighting, began in the late 1680s. The patents which Charles II had granted years earlier were finally coming into use. London was becoming a burgeoning metropolis full of opportunity; filling it with lights appeared both desirable and profitable. Conflict soon boiled over, however, as investors filed lawsuits contesting the right to profit from this infrastructure, the guilds protested infringement on their traditional monopolies, and commentators clashed over where the lights should be built, when, and by whom. The Convex Light Company was founded sometime in the middle of the 1680s, and it rapidly began pushing for state backing in its quest to light the city of London.<sup>42</sup> Nearly immediately another company calling themselves the Lucidaries began manufacturing their own versions of the lamps. And in 1691, Edmund Heming, one of the principal investors and managers of the Convex Light Company, exited it to form a rival institution called the Light Royal Company.<sup>43</sup> The conflicts and connections among these three joint-stock companies are remarkably revealing about the reception of artificial streetlights in London.

The new lighting companies, though they were rivals, quickly developed a remarkably consistent style of advertisement to appeal to potential investors and buyers. Together, they argued that lamp technology represented everything desirable under the sun. Lamps would allow

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<sup>40</sup> de Beer, “The Early History of London Street-Lighting,” 316.

<sup>41</sup> *A New and Usefull Invention for Light Very Beneficial by Sea and Land* (London: 1686).

<sup>42</sup> National Archives of the UK (TNA) C113 39. Several documents in this box date from 1665-1667, allowing me to estimate these years as the first for the company.

<sup>43</sup> The Light Royal Company is alternatively spelled “Light Royal,” “Light Royall,” and “Light Royalle.” I use the first in all instances besides direct quotations.

workers to labor at any hour of the day, travel to continue unperturbed by darkness, and a litany of deviant behavior would be vanquished by the light of the lamp.

Soon enough, talk of the new lamp technology came to the royal court. A 1686 publication described how the king had recently seen an exhibition of the new lights from the Lucidarie Company.<sup>44</sup> At first glance, it appears somewhat strange that a small light company—not even the most important one in London—was able to put on a show for the royal court. Yet this occasion displays the reach of connections between investors in artificial light technology and the English political elite. This event shows how intensely the companies were competing for favor. Similarly, it is evident that the expansion of artificial illumination was a topic on the minds of many at court. By forcefully competing for patronage, the Lucidarie Company showed how promising the prospects were for whoever could obtain contracts to light the streets of England. The modernizing impulse of the court likely had something to do with this demonstration, too: to invite pioneering inventors to showcase their work to the Royal household, and to then publish an immensely laudatory account of their visit like this one, implies a powerful courtly support for the new technologies of light which had recently been invented.

In addition to showing the surprisingly significant sway that the investors in the Lucidarie Company had at the court in Whitehall, this report demonstrates the wide range of applications to which light could be essential. Notably, the proclamation celebrates all sorts of potential uses of the equipment, including lighthouses, ships, houses, universities, courts, and streets. Taking care to appeal to merchant interests, the text emphasizes that the lights “will be of very great use to

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<sup>44</sup> *A New and Usefull Invention for Light.*

Shops.”<sup>45</sup> In addition, it highlighted that the new lights would allow street cleaners to work better at night, improving the upkeep of London’s public areas (including the disposal of human waste), appealing to those in doubt of the measure’s benefits. Last, and most important, this proclamation advocated for an extension in the times in which streets were lighted by three hours greater than the existing law required. Already themes of commerce, progress, and labor were being closely linked to light.

In 1687, these themes were picked up and expanded upon in the literature published by competing companies. A proposal by Edmund Heming, for example, who had recently left the Convex Light Company after a dispute with its other investors, took everything further. His new joint-stock company, named “The Light Royal Company,” and their version of lamps named the “Light Royals,” rapidly worked to seize the market. Already in 1690 the Light Royal Company proposed to light the streets “and all other Publick Places” of London from six to twelve every night.<sup>46</sup> Like the competing proposals of other companies, this document is worth examining closely because it highlighted how the proponents of lighting took advantage of the languages of progress, labor, and charity to advance their interests.

Heming’s proposal aimed to attach any investment in his new company’s lamps to London’s Orphan Bill, a regular spending measure which was supposed to go to assist struggling children but which was co-opted by expensive riders to pay for other investments the Aldermen and Court

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<sup>45</sup> *A New and Usefull Invention for Light.*

<sup>46</sup> City of London Court of Common Council, *To the Honourable Committee, Appointed by the Right Honourable the Lord Mayor, Court of Aldermen, and Commonalty of the City of London, in Common-Council Assembled, to Receive Proposals for the Benefit of the Orphans of London. Proposals Humbly Offered for the Better Lighting of All the Streets, Lanes, Allies, and Publick Courts within the City of London, and Liberties Thereunto Belonging.* (London: s.n., 1690). Like the above proclamation, the six to twelve time proposed here would have been an extension of the more traditional period of lighting that ending earlier in the evening. It is not entirely clear whether earlier writers would have wanted to extend the duration of lantern light if they could, because it may have been the case that the longevity of the new lights contributed to the willingness of these commentators to propose extensions to their burning time.

of Common Council desired. To justify putting this expense in the Orphan's bill, which the others did not, Heming's advertisement included a list of ways that light was said to benefit the lives of the city's downtrodden. This list of benefits can serve as a window into the thought processes behind the expansion of artificial illumination.

Heming's proposal was trying to hit every possible desire of the Court of Common Council's membership. The document claims that the Light Royal "is extraordinary useful for to hang as Branches in Churches, in private Courts, Halls, Hospitals, and Work-Rooms, where the Old Lights are not fit to use."<sup>47</sup> It mentions manufacturing, too, making this proposal the first apparent mention of workhouses in the published sources which discuss artificial light. In fact, the potential uses of the Lights Royal in labor was evidently a key part of why "this Light will be much more beneficial to the Publick, and profitable to the Orphans."<sup>48</sup> The ability to work at all hours of the day was a crucial point in favor of these lights, linking them to labor and the idea of perpetually-returning income. And half the profits (not revenue) of the lights were to be made available to the City of London. Heming claimed that the new company's lights could clean up the streets, making it less likely that London's residents would commit crimes and easier for them to be caught if someone still chose to carry out deviant activity. Heming argued that the lights would help workers, making it so that they could labor throughout dark evenings and well into the night. An unstated implication was that these same lights could be used in the interior of workhouses, too, so that costs could be saved on windows and ventilation while workers would have improved vision, and therefore create products of higher quality with greater speed. Some of the people who might be deviants could even become conventional workers instead. And

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<sup>47</sup> Court of Common Council, *To the Honourable Committee... Proposals Humbly Offered for the Better Lighting of All the Streets, Lanes, Allies, and Publick Courts.*

<sup>48</sup> Court of Common Council, *To the Honourable Committee... Proposals Humbly Offered for the Better Lighting of All the Streets, Lanes, Allies, and Publick Courts.*

where does all the wealth from this newfound labor go? Two places, of course: the orphans, for whom the proposal was still dedicated, and the City of London Court of Common Council, where the proposal was considered. Leftover earnings were to be pocketed by the Light Royal Company. In exchange for all this, the Court of Common Council was supposed to “do all that in them lies to promote, encourage, support, and maintain the said Light Royal.”<sup>49</sup> And perhaps most important, Heming asked the Court to “promote the setting up the Light Royal by their Recommendation of the same to all Parts of the Kingdom,” including inscriptions on the lights to encourage military recruitment. Light was linked to labor, charity, and agency—all the while seeming to be an excellent investment for the leaders of London. Another proposal extolled the virtues of the lights, saying that “their Light will be delightful and useful and useful to Passengers, without glaring or dazzling the Eye.”<sup>50</sup> The same themes were recurrent in the rest of the literature produced during this period of heightened competition.

Some Londoners still needed to be sold on the benefits of this invention, however. The amount of such literature produced suggests that resistance, or at least indifference, to the lighting schemes proposed by the dueling companies was widespread. Another of Heming’s publications, for example, made the hard sell to potential buyers. This document, published and distributed throughout London, included a section of justifications for his company’s city light contract. Mixing justifications to maximal effect, it included the observation that, for many, it was cheaper to pay rates to the light company than to continue hanging one’s own lanterns. Heming reiterated the common refrain point that “At night, “for want of a more durable Light, many abuses are committed.” To the shopkeepers, Heming was keen to point out that increased

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<sup>49</sup> Court of Common Council, *To the Honourable Committee... Proposals Humbly Offered for the Better Lighting of All the Streets, Lanes, Allies, and Publick Courts*.

<sup>50</sup> *Proposals, about Lights for This City, to the Right Honourable the Lord Mayor, Court of Aldermen, and Common Council*. (London, England: s.n., 1690).

light would likely improve the amount of money spent on goods. The new lamps were sure to “accommodate[e] Trade much better than before”<sup>51</sup>

A bill was soon drafted and funding secured. Now that the powers that be were on their side on paper, it was up to the companies to decide who would win the city’s lighting contract. Edmund Heming was at the forefront, and his new Lucidarie Company formed a pact with the Convex Light Company of which he had recently been a part.<sup>52</sup> The cartel was contracted to construct lights on every street in London and keep them lighted based on the classic “Dark Night” formula, but now from six until midnight.<sup>53</sup> Though some of the proposals made a year earlier had suggested permanent light, Heming’s was tapered back to this one. Ceasing the light at midnight, though, was still a multiple-hour expansion of the usual rule, explained more thoroughly above, which had asked for lanterns to be darkened after an hour or two of their evening lighting. His rivals were bolder. They told the city they could operate their fixtures through the night.<sup>54</sup> That way, their lamps could far more effectively prevent “Tumults, Insurrections, Murders, Robberies, and Mischiefs” and “Add to the Beauty and glory of this City, Convenience of Passengers, and Safety of Traders...[and] Improve the Consumption of our Native Growth and Manufacture.”<sup>55</sup> They also proposed to maintain a steady rate of payments collected for each night, not merely those on which lamps burned. In doing so, they worked to make nighttime artificial illumination a permanent feature of city life. But it was not light for its own sake—it was light for the sake of a specifically English form of modernization. Darkness

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<sup>51</sup> Edmund Heming, July 1, 1691. *By Virtue of a Patent Granted by King Charles II. for a New Invention of Lamps with Convex Glasses* (London, England: s.n., 1691).

<sup>52</sup> TNA, C 113/39, “Agreement between The Proprietors.”

<sup>53</sup> Heming, *By Virtue of a Patent Granted*.

<sup>54</sup> *A Proposal for Enlightening the Streets in London and Westminster, According to a Bill Prepar’d for That Purpose Humbly Submitted to the Consideration of the Lords Spiritual and Temporal, and Commons in Parliament Assembled*. (London, England: s.n., 1692).

<sup>55</sup> *A Proposal for Enlightening the Streets*.

meant not only laziness; it meant violence and criminality. Light, in contrast, meant progress, and everything desirable under the sun.

Though many commentators noted how lights expanded the horizons of London life, two especially striking expository accounts are worth examining in depth. In contrast to the plethora of arguments made on the basis of trade, labor, or safety, these defend lights on the grounds that they were built by the most honorable Britons, enabled the best of all possible forms of commerce, and expanded the realm of Godliness on earth. Particularly noteworthy is an anonymous 1689 essay about the life of Edmund Heming, one of the original partners in the Light Royal Company. Lighting, according to this essay, was honorable—but how lighting was constructed was more important than the presence of the new convex streetlights. Indeed, given no issues in construction, distribution, or payment, the essay suggests that lights could be a miraculous invention: they had “given great Satisfaction to the Publick,” that “the Publick doth receive great Benefit by this Projection [of light],” so much so that any access to light is a great innovation for which the entire public should be grateful.<sup>56</sup> The new convex lamps were to expand the realm of the public good while their creator embodied a particular vision of English honor achieved through hard work and commercial activity.

The essay makes Heming’s efforts out to be honorable because he devoted so much to them. It was Heming’s “unhappiness... to have to do with a sort of rapacious Men, that were in expectation of getting Money by the Invention [of convex lights].”<sup>57</sup> This text, then, forms part of a trend toward modernity in ways beyond the mere technology of lighting: it endorses an ethic of labor, linking work to virtue and success. This element of the text is noteworthy in part

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<sup>56</sup> *The Case of Edmund Heming, Who First Set up the New Lights in the City of London* (London: 1689), 3.

<sup>57</sup> *The Case of Edmund Heming*, 11.

because it does not challenge old ideas of honor or gentility—it suggests that one attains honor and gentility *through labor*. Yet during this period merchants regularly hoped to increase their social standing by claiming nobility, both in the realm of titles (usually acquired through purchases but sometimes granted after a period of service to the state) and custom: when one acted like a member of the gentry, one would be signaling one’s worth in the eyes of their peers.<sup>58</sup> Light, crucially, was portrayed as a tool by which a gentleman could appear gentlemanly—by engaging in wholesome, proper modes of commerce.

Another standout source, a poem written to commemorate these new lamps, gestures toward a different series of answers to the question of artificial illumination. How would this new sense of agency, of control over the natural world, affect one’s understanding of human endeavor? Light is associated with divinity in many religions, including the relevant Christian sects common in London in the late seventeenth century. Yet this light was artificial—if light is the purview of God and his angels, the construction of public lighting is a defiant act, in which humanity claims the power of the heavens for itself. The essay on Heming, instead, interprets lighting to expand the realm of that which is good. More light meant more time—for work, for leisure, for whatever the commentator desires.

A 1691 exaltation of lighting in verse tries to both pose and answer these questions. The new lamps were symbolic of the emerging modern world, heralding an unprecedented degree of human agency. The poem celebrates the new lights, but finishes on the somewhat glum point that, “When we compare our times with those are past/We cry, this age of greater Light can boast/I’ll say, too, if this invention hit/Else swear, our Age wants Wit as well as light.”<sup>59</sup> The

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<sup>58</sup> Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994).

<sup>59</sup> *On the Late Invention of the New Lights* (London: R. Roberts, 1691).

new convex lights were a blessed invention, allowing business to be conducted at all hours of the day while banditry, prostitution, and other deviant activities were (at least in theory) pushed away from the public eye.<sup>60</sup> Perhaps most essential in this poem, and clear in those last lines, is that the new lights helped usher in a new era, articulated most clearly by how the word “age” appears routinely here and throughout the text. The effort to stake out novelty is crucial for our interpretation of this period. Early lines claim that “We”—that is, the residents of London—did “prove the Milky Way... is but a street of some such Lights,” telling us, quite clearly, that this power once reserved for the heavens—the creation and shining of light—has been progressively seized by mere mortals.<sup>61</sup>

Light, which had previously been the realm of God, was becoming a technique by which humanity could control its own fate. Mixing the language of light and epoch formation, this poem traced the emergence of precisely the sort of seventeenth-century transition into scientific empiricism that heralded the lighting techniques it discusses.<sup>62</sup> The spread of artificial lamps, it suggests, were indicative of a new era in human empowerment—for better or for worse. Most sources refrained from the dramatic imagery of this poem, but its exceptional nature is no reason to dismiss the fact that the poem simply took things a step further than the rest. In a direct extension of the arguments already developed elsewhere, it argued that the increased activity enabled by lighted streets would inevitably expand the realm of godliness.

The dramatic expansion of artificial illumination appears to have been effective in large part because of the successful deployment of modernization narratives on the part of lighting companies. Light enabled trade, labor, safety, profit, and even godliness; darkness was the bane

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<sup>60</sup> This point is a recurrent theme in cultural histories of light and darkness. See, for example, Koslofsky, *Evening's Empire*, 19-48; Ekirch, *At Day's Close*, 3-58; 149-260.

<sup>61</sup> *On the Late Invention of the New Lights*.

<sup>62</sup> Shapin, *A Social History of Truth*.

of each. But this expansion was not unquestionably welcomed by everyone in England. Indeed, the degree to which pro-lighting propaganda was necessary suggests a surge of backlash as the state began to impose centralized illumination on its populace. Several tracts were published in opposition to the lighting measures, largely written by the guilds who resented the infringement on their traditional monopolies over the city's candle making and iron fixture construction that the joint-stock lighting companies represented, but also by a collection of merchants and residents who worried about how near-permanent illumination would affect their lives. How did these opponents articulate their opposition? At first glance, one might be inclined to think that, because of the powerful modernizing impulse of the lightning companies and their supporters, opponents might embrace a sort of anti-modern rhetoric. Such a guess could hardly be further from the truth. Opponents agreed with virtually every modernizing impulse of the companies; their opposition was grounded in a series of specific complaints about who was constructing lamps, where, when, and how they would be operated.<sup>63</sup> The points of agreement and disagreement offer useful insight into how light was linked to the overall structure of English life.

The old guilds protested joint-stock ventures that infringed on their traditional arenas of dominance, while observers complained of excessive brightness and labor issues. Things would not be as easy as the convex patent holders wanted. The Company of Tinn-Plate workers, the guild responsible for constructing Lamps across London, sharply protested the efforts of the new lighting companies. They lodged complaints against both local and Parliamentary rulings, but

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<sup>63</sup> It is entirely possible that the general acceptance of the sort of modernization I describe is a consequence of geography. London was the epicenter of this story, and other British cities later followed suit. It may have been the case that opposition to artificial light in the countryside, to the extent that it existed (since artificial streetlights were not brought to the countryside until much later) may have been framed by opposition to urban modernization. However, the sources we do have are from the cities, and by and large they at least claim that they agree with the stated goals of the light companies.

potentially more indicative of the general mood of British society was their public advertisement campaign.<sup>64</sup> The Company never questioned the value of setting up convex lamps throughout the capitol, or indeed, throughout the entire island of Britain. Instead, they advertised how the investors in the convex light patent were outside the bounds of their legal authority. Seemingly to whip up public pressure where legal remedies failed, this advertisement series emphasizes the rights of guilds to control the capitol's construction. The advertisement opened with the claim that, like other patents, that for convex lamps rests on the condition that "if it should prove grievous to any of [the monarch's] Loving Subjects, the Patent... be void."<sup>65</sup> Because they no longer supervised all construction, and because they held old rights to do so, the Tinn-Plate company saw the construction of these new inventions to be harmful—but the problem was never the inventions themselves.

It was the corporate structure underwriting the new inventions which so concerned the old guilds. Corporate structure limited how, when, and where lights could be built. As joint-stock ventures expanded, lighting was caught up in the conflict between the old and the new. Perhaps because of the influence investors already held in the London administration, "The Company of Tinn-Plate Workers therefore thought it advisable to make Public to the World" these complaints.<sup>66</sup> Light was a thing to be appreciated, supported by all; it was the specifics of how light was created that posed a threat to the company. This trend, of light seeming welcome but the construction of lighting technologies being questioned, appears time and again in the resistance to convex enlightenment.

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<sup>64</sup> *Brief Reasons Humbly Offered, against Passing the Bill for Convex-Lights* (London, 1692).

<sup>65</sup> *An Advertisement from the Company of Tinn-Plate-Workers of London; Concerning the Erecting of Lamp Lights* (London, 1690). Spelling has been corrected and standardized.

<sup>66</sup> *Advertisement from the Company of Tinn-Plate-Workers*.

Another group of pamphlets took a different tack. These polemicists abhorred monopoly. They firmly opposed both the Tinn-Plate Guild and the potential monopoly of a light company. In a multi-pronged approach, one anonymous pamphleteer argued that all monopolies were necessarily harmful, that the Convex Light Company deserved no monopoly, and that the company had infringed on patent law. Strangely, they claimed that the 1684 patent was already an (unintentional) monopoly, and that it was unwarranted because “Convex Glasses [had already] been used above forty years in this kingdom for Lights.”<sup>67</sup> It acknowledged that the city authorities were perfectly within their right to attempt to “Light the City,” but took issues with the mechanisms by which the city had proposed to do so. Monopoly, in this telling, would prevent innovation in lighting methods and the ability to improve the lamps would stagnate. The inability to refine lighting methods would effectively freeze any gains derived from the lights, unable to develop further or expand on their early modernizing effects. The entire framework of this particular monopoly was at fault, too. In addition to accusing the Convex Light Company of abusing its power to overcharge customers, the author criticized Parliament and the London Court of Common Council of overstepping their bounds by allowing the patent holders to completely design, construct, and maintain their own network of lamp fixtures. Instead, the institutions of the state should have limited themselves to simply protecting the specific design from being copied by other companies. Strikingly, the author attacked the payment scheme for being corrupt and “directly contrary to the Magna Carta, and the fundamental right of the subject.”<sup>68</sup> There was some cause for these complaints: the lighting grant given to the Convex Light Company included the complete authority for the company’s employees to tax

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<sup>67</sup> *Brief Reasons Humbly Offered, against Passing the Bill for Convex-Lights* (London, England: [s.n.], 1692).

<sup>68</sup> *Brief Reasons Humbly Offered, against Passing the Bill*.

householders directly, with no oversight or legal recourse on its methods or amounts extracted. A sort of tax farming was an easily predictable result.<sup>69</sup> The pamphleteer was blunt. “Should this Bill pass, it gives the Power to Strangers to set up Lights London, by their own authority; and to Employ what Agents they please, at all Times in the Night, with Ladders to Trim their Lights, not subject to the Government and Laws of the City.”

More questions about the nature of patent law and monopoly abounded. Yet another polemicist maintained that Edmund Windus, the holder of the patent on Convex Lights, did not invent them. Instead, yet another anonymous author argued, with unsubstantiated claims, that “such Glasses for Light have been used in lanthorns, about Twenty Years since.”<sup>70</sup> But there was a solution: a legal battle. The Tinn-Plate Company, according to this publication, intentionally violated the Convex Light Company’s patent in order to be sued by the Convex Light Company and bring litigation over the patent to court. Perhaps caught by a case of bluster, they claimed that the case was still being litigated but it was sure to end in the abolition of the Convex Light patent. It reveals that, first, enough profit was expected from these lights that anyone capable of laying claim to their ownership would leap at an opportunity to do so. Second, it shows that, even at the moment of their construction, it was unclear who exactly invented the new lights and who deserved to reap the profits of their production. And perhaps most important, it demonstrates how resistance was framed in technical terms, couched by references to corporate structure, patent law, and monopoly. Indeed, this broadside writer, like the others, proceeded into

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<sup>69</sup> I discuss this issue in greater detail below, and it comes to light in the context of the Convex Light Company’s internal records, especially TNA C 8 518/98, “The Schedule;” “The Second Schedule.”

<sup>70</sup> *Objections against Passing the Bill as Desired by the Proprietors of the Lights Now Generally Used.* (London, England: s.n., 1692)

a digression about monopoly, which, it claimed, would “discourage Ingenuity and Invention for the publick Good.”<sup>71</sup>

Another attack on the Convex Light Company began by repeating all these criticisms. Taking much the same tack yet again, this writer accused the investors in the Convex Light Company of abusing their power because “the Greatest part” of their income “has been exhausted in Stock-Jobbing” because all these investors had artificially inflated the value of their stocks or, even worse, “giving great Sums of Money to others who would have set up their Lights, whom they could not restrain by their patent.”<sup>72</sup> Because, like many of the others, this document is anonymous, it is difficult to say at first glance who was involved in its creation. A key subsection can, however, clue us in to its authorship. In a sudden twist, the pamphleteer declared that the Light Royal (built by the Convex Light Company’s largest competitor) was newer, brighter, and “not dazzling or prejudicial to the Eyes.” From there on, the polemicist extolled the harms of the Convex Light Company by comparing it directly to the Light Royal Company. The Light Royal was, apparently, “fit to be used in all Churches, Halls, Courts, Work-rooms, Staircases, Stables, and other places where the Other Lights cannot be used,” and for anyone concerned about the costs of these (supposedly) superior devices, they were “much cheaper” than the brand name Convex Light.<sup>73</sup> Interestingly, this argument included a subsection explaining that the Lights Royal were “more beneficial to the Publick, because much more Glass (now a considerable Manufacture of this Kingdom) is used.” By appealing to manufacturing

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<sup>71</sup> *Objections against Passing the Bill as Desired by the Proprietors of the Lights*, 1. Curiously, the writers of this piece also claimed that the Convex Light Company and its partners were marketing an inferior product, “There being a much better Light for the Publick now Invented.” Whose alternative light is unclear; no other record mentions a separate, superior light technology.

<sup>72</sup> *Reasons Humbly Offered against the Passing of a Bill, for the Sole Use of Convex-Lights, or Glasses*. (London, England: s.n., 1692).

<sup>73</sup> *Reasons Humbly Offered against the Passing of a Bill*.

interests, and the readers who may support them, this document linked light to progress like all the others. It was not opposition to the construction of lights—it was in opposition to the construction of lights *by the Convex Light Company*.

It is useful to highlight just how similar the broadsides against the Convex Light Company and its legally mandated monopoly were, and then, to seek out explanations for why. These attacks shared themes, language, and even most of their talking points. One explanation is that some may have been written by the same organizations. More arguments designed to favor the Light Royal Company streamed in. One notable demonstration, written in 1693, insisted on the superiority of Lights Royal, among other things. Accusing the Convex Light Company of being full of corrupt and conniving merchants, it still insisted on the value of artificial light. Right away, readers would be struck by the claim that “the Partners of the [Convex] Lights, has as much as in them lies in endeavored to break in upon the Rights, Priviledges, and Ancient Customs of the City of London.”<sup>74</sup> This document, echoing the complaints of others, emphasized that not as many streets had been lighted as the Convex Light Company had promised, that delays in construction and quality control were causing difficulties for Londoners who had prematurely halted their purchases of lanterns and thereby left without any light at night, and that the Convex Light Company had hardly spent enough money on Orphans to be worth rewarding. In fact, part of the complaint lodged here is that the Convex Lights were so shoddily built that they always “give a very Blearing Light, unpleasant and hurtful to the Sight.”<sup>75</sup> Most strikingly, the pamphlet accused the Convex Light Company of sponsoring vagabonds to traverse around

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<sup>74</sup> [To the] Right Honourable the Lord Mayor, Court of Aldermen, and Commonalty of the City of London, in Common Council Assembled Reasons Humbly Offered against the Old Lights, Called Convex-Lights. (London, England: s.n., 1693).

<sup>75</sup> [To the] Right Honourable the Lord Mayor, Court of Aldermen, and Commonalty of the City of London, in Common Council Assembled Reasons Humbly Offered against the Old Lights, Called Convex-Lights. (London, England: s.n., 1693),

London and destroy any Light Royal they encountered. “Several of [The Convex Light Company’s] chief Officers and Servants was often in the company of those Persons” who committed the crimes, and that these same offenders “did break the Glass [of the Lights Royal] with a great Steel Bow, such as they commonly kill Deer with.”<sup>76</sup> The weapon was “Now in the Custody of the Proprietors of the Light Royal.”<sup>77</sup> Another employee of the Convex Light Company apparently threatened to burn down the house of the Lord Mayor of London as retribution for being found guilty of civil disorder.

In other parts of this literature, concerns about “interest” bedeviled the printed debate. A 1693 presentation, given after the passages of the lighting bills, warned that opportunities for abuse could be rampant in the structure of lighting payments. Because the monopoly granted to the Convex Light Company and its partners “shall Destroy some parts of the Glasiers Trade... [a] great part of the Horners Trade; and great part of the Tallow-Chandlers Trade,” these guilds opposed their construction<sup>78</sup> They were responsible for fashioning the centuries-old lamp designs out of horn, glass, and tallow which were being replaced by the new convex lights. On top of the litany of trade which would be threatened by the new lights, it was important to note that the monopoly would “put a stop to all Ingenious Men to think no more for a Publick Good, when it’s possible there might be Lights yet found out much better then [sic] what is already [invented].”<sup>79</sup>

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<sup>76</sup> *[To the] Right Honourable the Lord Mayor... Reasons Humbly Offered against the Old Lights, Called Convex-Lights.*

<sup>77</sup> *[To the] Right Honourable the Lord Mayor... Reasons Humbly Offered against the Old Lights, Called Convex-Lights.*

<sup>78</sup> *[To the Right Honourable] the Lord Mayor, Aldermen, and Commonalty of the City of London Gentlemen, You Are Now Going to Encourage the Lighting the City of London, It’s Hoped You Will Take the Same Care of Your Incorporated Members and Other Artists, as the Parliament Hat Already Done of All Their Majesties Subjects in This Case It Was Proposed to the Parliament That the Lamp-Lights Might Be Established, but Wholly Rejected for Reasons Hereafter Mentioned ...* (London, England: s.n., 1693).

<sup>79</sup> *[To the Right Honourable] the Lord Mayor, Aldermen, and Commonalty of the City of London Gentlemen, You Are Now Going to Encourage the Lighting the City of London.*

Last, the attack finishes by complaining about the shoddy construction of Convex Lights, which left the streets of London “worse lighted now than ever,” so that “several Streets [were] not lighted at all.”

In January 1693, a tentative settlement was reached between the feuding companies. The Light Royal Company was allowed to maintain its already operating lights in Cornhill and the Royal Exchange, despite the monopoly given to the Convex Light Company.<sup>80</sup> By grandfathering in the parallel light technologies, both companies could maintain a degree of profit. Within a few years, the two largest companies—the Convex Light Company and the Lights Royal Company—had written agreements amounting to an uneasy truce.<sup>81</sup> Each of them had made their profits by showing how their lights could appeal to merchants, manufacturers, and everyday residents of London. The propaganda wars of these articles, pamphlets, motions, and proposals are laden with imagery of modernization. By adopting the imagery of progress, lighting companies successfully portrayed themselves in positive and appealing terms.

### **During – A Broad Look**

The same trends intensified and spread beyond the city of London proper. In 1694, funding was appropriated to construct lights in several parts of England, though the focus remained on London proper.<sup>82</sup> By the first decade of the eighteenth century, the Company of the Convex Lights and its competitors were already buying up land for the production, construction,

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<sup>80</sup> *[To the] Right Honourable the Lord Mayor... Reasons Humbly Offered against the Old Lights, Called Convex-Lights.*

<sup>81</sup> TNA C 113/39 “Partner’s Names.” This document is undated, but it was sandwiched between a set of papers from the late 1690s and some of the names it includes, such as Charles Hara, were figures who were active primarily at this time. I estimate that this document was produced in the middle to late 1690s.

<sup>82</sup> *An Exact Abridgment of All the Statutes of King William and Queen Mary Now in Force and Use / by J. Washington.* (London, England: Printed by the assigns of the Kings printers and by the assigns of R. Atkins, etc., 1694), 2-3. These are unnumbered pages; I refer here to the list on pages 2-3 of the document.

and maintenance of their lights. Indeed, lamps were commonplace enough in 1700 that a street fight between two soldiers that took place “by the light of a Lamp” was hardly strange.<sup>83</sup> In that year, the Convex Light Company was operating 2,056 lamps distributed throughout the entire country of Middlesex.<sup>84</sup> By moving outward and taking a broad look at where lights were constructed, how the Convex Light Company (which had come to dominate the market) operated, and how sources bases such as urban histories and travel narratives discuss light, we can test the accuracy of the modernization story suggested by close studies of the printed documents above. English light companies had access to a steady stream of capital both because of their corporate structure and the connections of their leaders, which enabled them to construct the unprecedented lighting networks they created. Wily business strategies, which included large-scale purchases of land, further kept the Convex Light Company afloat. Popular histories and narratives of England relayed the uses of light during the late seventeenth and early eighteenth century, bringing the messages of pamphleteers and propagandists to a broader public. A broad view of the world in which the pamphleteers were operating, then, can show why their causes were so successful.

The joint-stock system allowed lighting companies to raise enough revenue to begin constructing their lights at a large enough scale to be taken seriously. Early on, a single lamp could cost as much as eight pounds to manufacture before labor costs, which is equivalent to roughly 2,066 pounds today.<sup>85</sup> The first inventor of a convex light, Richard Reeves, made little to no profit on his invention because he was unable to market it to a broad public nor receive the

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<sup>83</sup> *Post Boy* March 2, 1700.

<sup>84</sup> TNA C 113/29, “The Number of Lamps Lighted the Winter 1700.”

<sup>85</sup> TNA C 113/39, “Costs;” Bank of England Inflation Calculator, <https://www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator>. Estimate made with a starting year of 1690 and a finishing year of 2021.

funding necessary to continue producing his lamps. But Edward Wyndus and Charles Hara could, because they enticed investors with the language of progress and the structure of joint-stock companies. At least seventeen major investors contributed to Hara's Convex Light Company, and at least twenty-three to Heming's Light Royal Company.<sup>86</sup> The pamphlet wars between the companies often reported a steady stream of new investors in the businesses, too, ensuring that funding would always be available when it was needed.<sup>87</sup> To take off, the companies depended on a set of willing and able investors, which was present in London of the late seventeenth century.

In 1696 Edmund Heming, who was at this point operating a partnership between the Convex Light Company and the Light Royal Company, purchased and custom-built a large workshop in Paddington for the construction of his lamp fixtures.<sup>88</sup> In the next few years, his company purchased tracts of land to set up maintenance workshops throughout London. By 1700 the Convex Light Company owned property north of the city proper in St Pancras, south of the Thames in Lambeth, Vauxhall, and Battersea, east in Limehouse, west in Kensington, along with five individual plots off Great Peter Street in Westminster.<sup>89</sup> The company used this land to maintain their lamps, keeping residents of London happy and willing to continue paying their newly imposed light taxes. Later, if the Company hit a slump, they could lease or sell these holdings to maintain an overall profit.<sup>90</sup> In addition to the joint-stock structure, then, the early

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<sup>86</sup> TNA C 113/39, "Partners of the Convex Lights;" "Partners of the Light Royall."

<sup>87</sup> For example, *[To the] Right Honourable the Lord Mayor... Reasons Humbly Offered against the Old Lights, Called Convex-Lights*.

<sup>88</sup> TNA C 5/246/11.

<sup>89</sup> London Metropolitan Archives (LMA), B/NTG/1243-1245; 1492-1530; 1596-1650 B/NTG/1839-1852; 2340; 2433-2459; 2494-2503; 2589-2606; 2607-2647; /2648-2657; /2666-2672; 2900-2924.

<sup>90</sup> LMA 2433-2459; 2589-2606.

decision of the Convex Light Company to invest in properties throughout London enabled it to continue supplying its network of lamps while others may have failed.

The most straightforward way to chart out where lights were constructed and when is by examining the records of these new companies, especially the Company of the Convex Lights. Their account books display slow, steady growth after an initial burst of energy. Similarly, the descriptions of “Walks,” or the regions to which a Company employee was assigned to patrol, demonstrate gradual growth. In 1694, the Company spent a total of 29,712, 14 shillings and 3 pence to construct their lights.<sup>91</sup> By 1701 its expenses were less than a quarter of what they had been, and stood at 5,831, 9 shillings and 2 pence.<sup>92</sup> After the rapid initial construction phase in London, the company settled into a new period of slow, steady growth. In the early eighteenth century, costs hovered between 5,000 and 7,000 pounds annually.<sup>93</sup> This steady growth allowed the Company to make gradual acquisitions while continuing to invest in land for workshops and to lease to others.

The Convex Light Company also employed several men to walk rounds through London to mark and keep track of its property in each region. Whether these employees also took on the responsibility of setting the lights and activating their burns is more difficult to say, but regardless, the records of their circuits through London describe precisely how many lights were constructed on each street. Indeed, these same records could serve as a sort of census document as they included the number of households on each street as well as their lights. Most of these walks are undated, but those for which a year can be identified tell the same tale. John Davis, one of these employees tasked with walking through the streets to monitor the Company’s property,

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<sup>91</sup> TNA C 113/39, “Lamps in General.”

<sup>92</sup> TNA C 113/39, “An Account of the Yearly Charge in Managing [sic] the Convex Lamps.”

<sup>93</sup> TNA C 113/39.

was assigned forty streets to patrol in 1703.<sup>94</sup> This figure was typical, with others generally being assigned between 30 and 45 streets, and sometimes fewer if they were tasked with examining the lights in the more sparsely populated suburbs.<sup>95</sup> These walks usually included between 50 and 200 lamps, again depending on the density of the neighborhoods they included. Londoners would interact with the employees of the Convex Light Company regularly, seeing them walking and monitoring the status of the lamps.

Taxes were due to the company as well. The Corporate records fail to include detailed descriptions of their tax collection methods, but regardless, pre-set sums of money, usually two or three shillings but dependent on the neighborhood, were regularly due to the Company from each householder. Failure to pay would result in fines or an unstated punishment subject to the will of local authorities.<sup>96</sup> By employing Londoners to routinely supervise the lights and exacting regular taxes to pay for their upkeep—likely collected by the same employees—the Convex Light Company maintained its most direct stream of revenue.

Several of the most prominent partners in the Convex Light Company and the Light Royal Company maintained connections with the London elite. John Johnson, a key investor and partner in the Convex Light Company, served in the London Court of Common Council between 1681 and 1683, and thereafter was an Alderman for Farringdon Within until his death in 1698.<sup>97</sup> In the 1690s he was also involved in a committee for the East India Company and worked as an assistant for the Royal African Company.<sup>98</sup> Another major investor, Robert Briscoe, was a

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<sup>94</sup> TNA C 113/39, “John Davis’ Walk.”

<sup>95</sup> TNA C 113/39.

<sup>96</sup> TNA C 113/39, “You are to appear.”

<sup>97</sup> “John Johnson,” *The London Directory of 1677* (London: Chatto & Windus, 1878); J. R. Woodhead, *The Rulers of London 1660-1689 A Biographical Record of the Aldermen and Common Councilmen of the City of London* (London: London & Middlesex Archaeological Society 1966).

<sup>98</sup> “John Johnson,” *The Rulers of London 1660-1689*.

member of the Court of Common Council for at least one term.<sup>99</sup> Others were merchants listed in the 1677 directory.<sup>100</sup> The Light Royal Company attracted many members of the city's merchants, including the man who would become one of their major investors, John Rawlinson.<sup>101</sup> Their most influential partner was Thomas Tuckfield, who, like John Johnson and Robert Briscoe, served in the Court of Common Council and had notable political connections.<sup>102</sup> By enticing the investment and even partnership of these figures, the lighting companies ensured that challenges to their monopoly would be met unsympathetically by the state. More important, these connections enabled the proprietors of the lighting companies to maintain the powerful portrayal of their lights that they had developed in the 1680s.

A broader view of urban histories, travel narratives, and newspaper accounts reaffirms the fact that the late seventeenth and early eighteenth centuries were crucial to the story of artificial light. Urban and civic histories were a genre that exploded onto the scene in the eighteenth century. During this period, it became popular for wealthy Britons to fund short books about the history of the city in which they lived. These histories are a useful source for any urban history of Britain, and the trends which took shape in them can help demonstrate when light entered and left popular consciousness. There is a clear trend in urban histories in which those written at the beginning of the eighteenth century—within a decade or two of the rapid centralization of writing in London—include references to technology of public, artificial light. But as lighting technologies became common, banal, and finally an accepted part of British life,

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<sup>99</sup> The compilers of *The Rulers of London* list two persons named Robert Briscoe and speculate but could not prove that they were the same person. Both were members of the Court of Common Council, though one has a lengthy list of other positions as well. "Robert Briscoe," *The Rulers of London 1660-1689*.

<sup>100</sup> For example, "Edward Stacy," *The London Directory of 1677*.

<sup>101</sup> "John Rawlinson," *The London Directory of 1677*. Also see "B. Rawlins;" "Mr. Edwards;" (for George Edwards), and "William Smith," *The London Directory of 1677*.

<sup>102</sup> "Thomas Tuckfield," *The Rulers of London*.

urban histories no longer mentioned them. Light was important to the writers of urban history for only a few decades, decades in which light was most hotly contested in London and when it grew fastest. Put together, these sources demonstrate that artificial light was unimportant, or at least left unacknowledged, prior to the 1680s, when they suddenly began including data about lampposts in their writings. After a few decades, the mentions of artificial light begin to fade away, showing that the new technology had become largely accepted as a normal part of urban life.

Early urban histories only mentioned light in the context of architecture. John Brydell's 1676 urban history *Camera Regis*, for example, mentioned the illumination of St. Paul's Cathedral and St. James' Palace.<sup>103</sup> Similarly, John Stow's famous *Survey of London*, which was updated and reprinted several times after its initial 1603 publication and serves as a vital source for historians of urban Britain, only references streetlights when pointing out how particular buildings were constructed.<sup>104</sup> Early seventeenth-century travel guides for London often mentioned which inns were best lighted and safest, occasionally noting the brightness of the streets on which the inns stood. Yet, the city as a whole never came up in these guides.<sup>105</sup> Close

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<sup>103</sup> John Brydall, *Camera Regis, or, A Short View of London: Containing the Antiquity, Fame, Walls, Bridge, River, Gates, Tower, Cathedral, Offices, Counts, Customs, Franchises &c. of That Renowned City: Collected out of Law & History and Methodized for the Benefit of the Present Inhabitants /* (London: Printed for William Crooke at the Green Dragon without Temple Barre, 1676), 86; 107.

<sup>104</sup> John Stow, *A Survey of London* ed. C.L. Kingsford (Oxford: Clarendon 1908).

<sup>105</sup> For example, John Taylor, *The Carriers Cosmographie, or, A Briefe Relation of the Innes, Ordinaries, Hosteries, and Other Lodgings in and Neere London : Where the Carriers, Waggons, Foote-Posts and Higglers Doe Usually Come, from Any Parts, Townes, Shires, and Countries, of the Kingdomes of England, Principality of Wales, as Also from the Kingdomes of Scotland and Ireland : With Nomination of What Daies of the Weeke They Doe Come to London and on What Daies They Returne, Whereby All Sorts of People May Finde Direction How to Receiue or Send Goods or Letters unto Such Places as Their Occasions May Require : As Also Where the Ships, Hoighs, Barkes, Tiltboats, Barges and Wherries, Do Usually Attend to Carry Passengers and Goods* (London: Printed by A.G. [i.e. Anne Griffin], 1637) or the more academic but similar thematically William Lithgow, *The Present Surveigh of London and England's State : Containing a Topographical Description of All the Particular Forts, Redoubts, Breast-Works, and Trenches Newly Erected Round about the Citie on Both Sides of the River, with the Severall Fortifications Thereof. And a Perfect Relation of Some Fatall Accidents, and Other Disasters, Which Fell*

studies of St. Pauls or other parts of England which were published in the early eighteenth century do more to point out the role of artificial light. One such 1716 analysis of St. Paul's cathedral points out when light fixtures were installed in the streets below the building.<sup>106</sup> Others followed suit.<sup>107</sup> Likely because it was written past the period of controversy, the 1722 updated edition of Stow's *Survey*, still hardly mentions the recent innovations in lighting London's streets.<sup>108</sup> Put together, the sudden interest in artificial light which appears around the turn of the eighteenth century and fades after a few decades demonstrates how the proprietors of the lighting companies were able to successfully appeal to a broad audience when needed, after which their lights were constructed and everyone went on their way.

Because of the success the lighting companies had in seizing and controlling public narratives, the commentating public eventually began to expect lighted streets and complain when any issues were anticipated with the convex lamps. In 1706, the *Post Man and the Historical Account* published, and criticized, a rumor that the "proprietors of convex lights" were not going to light the streets of Middlesex that coming winter. The notice was clear: the rumor was not to be believed; the proprietors still fully intended to light the streets beyond the center of

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*out in the City and Countrey, during the Authors Abode There. Intermingled Also with Certaine Severall Observations Worthie of Light and Memorie.* (London: Printed by J.O., 1643).

<sup>106</sup> William Dugdale, *The History of St. Paul's Cathedral in London, from Its Foundation.* (London: Printed by G. James, for J. Bowyer, 1716).

<sup>107</sup> Richard Rawlinson, *The History and Antiquities of the City and Cathedral-Church of Hereford: Containing an Account of All the Inscriptions, Epitaphs, Etc. upon the Tombs, Monuments, and Grave-Stones. With Lists of the Principal Dignitaries; and an Appendix, Consisting of Several Valuable Original Papers.* (London: Printed for R. Gosling, 1717).

<sup>108</sup> William Stow, *Remarks on London : Being an Exact Survey of the Cities of London and Westminster, Borough of Southwark, and the Suburbs and Liberties Contiguous to Them ... : Places to Which Penny-Post Letters and Parcels Are Carried, with Lists of Fairs and Markets ... : To What Inns Flying-Coaches, Stage-Coaches, Wagons, and Carriers Come, and the Days They Go out ... : Keys, Wharfs, and Plying Places on the River of Thames ... : Description of the Great and Cross Roads from One City and Eminent Town to Another, in England and Wales ... : The Rates of Caochmen [Sic], Chairmen, Carmen, and Watermen ...* (London: Printed for T. Norris and H. Tracy, 1722).

London as they had previously hoped.<sup>109</sup> By the 1710s the Convex Light Company maintained a standard, oft-distributed form for households who failed to pay the proper rates for maintaining the lights.<sup>110</sup> In 1713, the *Post Boy* celebrated how during several major celebrations (including some 'traditional' imagery, such as a maypole), the “Streets were as light by Night as Day,” allowing Britons to celebrate unimpeded by the darkness of the night sky.<sup>111</sup> The age of illuminated nights had commenced.

### **Conclusion: After**

By 1725 the lights had spread well beyond London. While in the early eighteenth century the Convex Light Company had already carried out patrols into the outer suburbs of London, they now began to construct their fixtures throughout the rest of Southern England.<sup>112</sup> It was difficult to find large numbers of trained workers, however, so the Company began to recruit through newspapers. Two 1725 issues of the *Daily Courant* are representative of this period. One makes an offer from proprietors of convex lights asking for oil and offering to give materials to put up streetlights in Middlesex, and the same notice ran in the *Daily Post*.<sup>113</sup> In it, the company gave an offer for workers who want to set up streetlights in several parts of Middlesex; the lights were already manufactured and ready for assembly, “pursuant to the Direction of the Act of Parliament.”<sup>114</sup> With demand steady, the issue became maintenance and expansion beyond southern England.

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<sup>109</sup> “Advertisements and Notices,” *Post Man and the Historical Account*, September 3, 1706,

<sup>110</sup> TNA C 113/39, “You are Hereby Summoned.”

<sup>111</sup> “News,” *Post Boy*, June 2, 1713.

<sup>112</sup> TNA C 113/39; C 113/38.

<sup>113</sup> “Advertisements and Notices,” *Daily Courant*, September 16, 1725; *Daily Post*, September 16, 1725.

<sup>114</sup> “Advertisements and Notices,” *Daily Courant*, September 23, 1725.

Even the resistance to the Convex Light Company took shape in the context of high rates and harsh punishments for tax avoidance. Little of the old resistance to the right of patent or construction appeared. A 1723 group of London shopkeepers who “have been lately very greatly imposed on by the Proprietors of the Convex Lights” organized a series of public meetings at an alehouse to discuss compensation.<sup>115</sup> Later that year a crime spree broke out as someone discovered a method for tearing down and stealing the valuable parts of a Convex Light. But this was no mass movement: newspapers collectively condemned the thief, demanded punishment, and publicized the Convex Light Company’s ten-pound reward for the arrest and conviction of whoever stole the apparatuses.<sup>116</sup> Newspapers reported that lamps must be lighted on every night and any failure to do so should be taken up with the Company.<sup>117</sup> A contest, potentially sponsored by the Convex Light Company, was developed in 1736 to see who could operate the most lights. Increasing the output of the Convex Lights became a competition between neighborhoods. The city’s monuments, too, were celebrated in the same contest: “Last Night (for the first Time) London Bridge appear'd most gloriously illuminated by the Addition of Nineteen Globular Lights to the seven Convex which they only had before.”<sup>118</sup> Light meant order, safety, and progress. The newspapers reported that the contest “shows the Emulation of the Citizens to vie with each other in this Respect, Cornhill, Part of Cheapside, Friday-street, and Newgate-street having for some Time past set this laudable Example, which all must own will greatly

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<sup>115</sup> “Advertisements and Notices,” *Daily Post*, January 23, 1722; “Advertisements and Notices,” *Daily Post*, January 31, 1722.

<sup>116</sup> “Advertisements and Notices,” *Daily Courant*, October 31, 1728; “Advertisements and Notices,” *Daily Journal*, October 31, 1728; “Advertisements and Notices,” *Daily Journal*, November 4, 1728; “Advertisements and Notices,” *Daily Post*, November 4, 1728.

<sup>117</sup> “News,” *Daily Courant*, November 16, 1728.

<sup>118</sup> “News,” *London Evening Post*, December 18, 1731; “News,” *Grub Street Journal*, December 23, 1731; “News,” *Grub Street Journal*, December 23, 1731; “News,” *Fog’s Weekly Journal*, December 25, 1731.

contribute to prevent the Robberies so very frequent in this City.”<sup>119</sup> In the course of just a few decades, artificial, centralized street lighting became uncontroversial and taken as fact.

By 1736 the Convex Light Company suffered from overproduction, and Britons were accustomed to public light. So few new orders were coming in that the Company offered cheap lights to anyone willing to take them.<sup>120</sup> The Company had become a victim of its own success: urban England had so thoroughly grown accustomed to their light that there was nowhere else to expand—at least until the invention of the gas lamp six decades later. City dwellers began to plan their lives around clocks instead of light, confident that the streets would be bright no matter when they needed to traverse them.

In addition to its links to politics, economics, and urbanization, light is exemplary of changes in a more esoteric, but perhaps just as important, element of the Early Modern world: time. A mention of this literature is useful for understanding the sheer range of factors to account for in the study of artificial illumination. Moreover, time, like light, is an omnipresent factor that shapes one’s understanding of virtually all one’s experiences. Because the two, as I want to suggest, are intimately linked, it would make little sense to write about one without at least mentioning the other.

Light fundamentally alters the experience of time. It enables human activity in locations and at times in which activity would otherwise be prohibitively difficult. It shapes how we experience the ebb and flow of time, allowing us to regulate temporality more closely than we could in an unlighted world. We turn, briefly, then, to the story of time. The consensus, to the

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<sup>119</sup> “News,” *London Evening Post*, December 18, 1731; “News,” *Grub Street Journal*, December 23, 1731; “News,” *Grub Street Journal*, December 23, 1731; “News,” *Fog’s Weekly Journal*, December 25, 1731.

<sup>120</sup> “Advertisements and Notices,” *London Evening Post*, June 3, 1736; “Advertisements and Notices,” *London Evening Post*, June 8, 1736.

extent one exists, is that the temporalities that took shape in Early Modern Europe were essentially products of chronometers, trade, and travel. A noteworthy example is E.P. Thompson's immensely influential essay "Time, Work Discipline, and Industrial Capitalism," which hardly mentions light at all.<sup>121</sup> Following Thompson, most accounts of Early Modern timekeeping lean on clocks as the key technology of moderating the experience of time.<sup>122</sup> This traditional story of modern time is that the propagation of (fairly) accurate clocks and watches, beginning in the sixteenth and running through the late nineteenth centuries, enabled the fundamental shift from premodern conceptions and experiences of temporality into the rigid, regimented modern version of time. Even the excellent work that expands the study of Early Modern time to bookkeeping, credit, and the like focuses primarily on how time became increasingly regimented by technologies of temporal division.<sup>123</sup> Historians of science and ideas, too, have long studied the use of sight metaphors in the Enlightenment but left out the role of public illumination.<sup>124</sup> I do not propose to challenge these narratives so much as add to them.

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<sup>121</sup> EP Thompson, "Time, Work-Discipline, and Industrial Capitalism" *Past & Present* 38 (Dec. 1967): 56-97.

<sup>122</sup> Examples are Landes, *Revolution in Time* (Cambridge: Harvard University Press, 1983); Otto Mayr, *Authority, Liberty, & Automatic Machinery in Early Modern Europe* (Baltimore: Johns Hopkins Press, 1986); Mark K. Smith, *Mastered by the Clock Time, Slavery, and Freedom in the American South* (Chapel Hill: University of North Carolina Press, 1997); Michael O'Malley, *Keeping Watch: A History of American Time* (New York: Penguin, 1990). And most texts that deal with time in realms besides that of the clock still use the propagation of clocks as the key measure by which modernity emerges. See, for example, Stuart Sherman, *Telling Time: Clocks, Diaries, and English Diurnal Form, 1660-1785* (Chicago: University of Chicago Press, 1996); Nomi Claire Lazar, *Out of Joint: Power, Crisis, and the Rhetoric of Time* (New Haven: Yale University Press, 2019) or for a later period, Steven Kern, *The Culture of Time and Space, 1880-1918* (Cambridge: Harvard University Press, 1983).

<sup>123</sup> Mary Poovey, *Genres of the Credit Economy: Mediating Value in Eighteenth- and Nineteenth-Century Britain* (Chicago: University of Chicago Press, 2008).

<sup>124</sup> On seeing and Early Modern Science, see Gary C. Hatfield and William Epstein, "The Sensory Core and the Medieval Foundations of Early Modern Perceptual Theory" *Isis* 70, no. 3 (1979): 363-84; Neil M Ribe, "Cartesian Optics and the Mastery of Nature" *Isis* 88, no. 1 (1997): 42-61. On Ocular Metaphors and Philosophy, see Richard Kay, "Dante's Empyrean and the Eye of God" *Speculum* 78, no. 1 (2003): 37-65; Melissa Lo, "The Picture Multiple: Figuring, Thinking, and Knowing in Descartes's *Essais* (1637)" *Journal of the History of Ideas* 78, no. 3 (2017): 369-99; Philip Vogt, "Seascape with Fog: Metaphor in Locke's Essay" *Journal of the History of Ideas* 54, no. 1 (1993): 1-18. And a few examples

Unlike clocks and record books, which spread in parallel, lighting is not a technology that divides time into discrete, ever-smaller units; on the contrary, public streetlamps are technologies of *expansion*—expansion of agency, expansion of labor, and expansion of what can be seen, at the very least. Moreover, traditional historiographies of modern temporality place a great emphasis on mercantile networks over all other forms of social life. Emphasizing mercantile networks is understandable. After all, commerce has been a central theme of British historiography for centuries. Yet the spread of early forms of streetlights paralleled the spread of commercial clocks and record books, making their relationships of particular note if one seeks to outline the emergence of modern temporalities. Though commerce is a crucial part of the story of Early Modernity, I want to suggest that focusing on the modernizing experience of streetlights enables the exploration of daily life without necessarily linking one's subjects to the commercial world of timed meetings, arrivals, and exits. People lived on these public streets, lives of which trade was one (albeit one important) part.

The 1680s through 1720s were crucial to the development of public artificial light. Before this time, lighting was chaotic and scarcely regulated to any noteworthy extent. Several changes had to take place before anything resembling a network of public lamps could be created. Most fundamentally, the technology had to be invented. Traditional candles would burn out eventually without supervision or be extremely dangerous when left unattended. They provided relatively little real light, too, making things especially difficult on nights with no other sources of illumination. Once invented, the new lamps needed to be recognized as useful and

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of their implications for identity: Anthony Pagden, *European Encounters with the New World: From Renaissance to Reformation* (New Haven: Yale University Press, 1994), 51-88; Alexandre Coello de la Rosa, "Representing the New World's Nature: Wonder and Exoticism in Gonzalo Fernández de Oviedo y Valdes" *Historical Reflections / Réflexions Historiques* 28, no. 1 (2002): 73-92; Patricia Simons, "Women in Frames: The Gaze, the Eye, the Profile in Renaissance Portraiture" *History Workshop*, no. 25 (1988): 4-30. I avoid getting at these questions for the sake of some semblance of brevity.

embraced, which was only possible in a society which was learning to prioritize the possibility of round-the-clock activity over the comfort of day-night cycles. It was a coincidence that the convex lamp was invented in the time and place of 1670s England. It was not a coincidence, however, that the lamp was adopted and commercialized on a grand scale. Doing so required institutions which were both willing and able to construct these lamppost networks, a task which was made possible by the expanding structure of the late seventeenth-century English state and the emerging power of joint-stock companies. Only with the right combination of technology, open reception, and effective administration could the whole of London be centrally lighted. Earlier periods may have possessed some of these qualities, but it took all of them put together to succeed.

Even a cursory look at these sources shows that light was a part of something greater. Light meant modernity. On one hand, then, this could be read as simply another banal modernization story. Light enabled things; the fundamental story is about the things enabled rather than the light. But, as I have hoped to show, light was a *crucial* enabler. It is not enough to consign it to a mere footnote in our historiography. It is for this very reason that virtually every scholar who writes about light bemoans its understudied aspect. One hopes that at some point these lamentations will prove more redundant than pertinent. We have not reached that point.

Time shapes life; light shapes time and life. There was no single Early Modern attitude toward artificial light, but the range of attitudes demonstrated by these sources show that, by and large, British commentators framed the rapid transition to centralized illumination within the languages of commercial power, progress, and agency. Light was not merely one among many elements of a modernizing world; it was a central factor which intensified and enabled other trends to take shape. Businesses could hardly stay open without light; workers could barely labor

without light; streets could scarcely be wandered without light. Put together, these sources demonstrate the value of thinking about artificial illumination in the context of modernization—as a crucial part and parcel of the political, economic, and cultural life of seventeenth- and eighteenth-century Britain. Light, thereafter, was there to stay.

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