Industrial Waste Management and Urban Environments in Medieval England, 1300 – 1600

by

Erin Kurian

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This paper demonstrates how key industries impacted urban environments in late medieval England from 1300-1600CE through an examination of city laws, ordinances, and rulings. It focuses on the municipalities of Bristol, Coventry, Leicester, London, Northampton, and York, all of which had a considerable urban population in this time and sufficient primary sources to conduct this study. This paper contributes to the historiography by proposing a middle ground between previous economic and public health histories on urban industries. Though English municipalities understood and acted to mitigate the impact of industrial contaminants and resource depletion on people and urban spaces, they often did not have the ability to do so. Authorities pursued trades which produced the most waste and tried to exercise regulatory controls over how and where tradesmen operated, how artisans could dispose of waste, who could buy industrial by-products, and where a trade took place.

A consideration of butchery, fishers and fishmongers, tanners and leather workers, and brewers reveals a struggle between artisans and authorities and artisans and themselves in pursuing a hospitable environment. Artisans and authorities had both societal and commercial and societal interests. Artisans also had their reputation to uphold as the informal market threatened their business. Despite a strong pull towards clean spaces, artisans often created waste in pursuit of profit, easier working conditions, and little ability to dispose of necessary by-products in any other way. These industries are inherently resource intensive and wasteful and their position in cities multiplied these unwanted consequences of industry.

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INTRODUCTION

To date, studies into industry and urban landscapes have been wide in scope and generally focused on either economic changes and advancements or on industry's impact upon public health. Some studies have been more specific, focusing on a single profession or trade, or on a single city or town. This thesis proposes a middle ground. It intentionally looks at specific crafts that best demonstrate how authorities regulated industry, but it widens the scope to understand not only how those trades polluted but also how they exploited nearby natural resources.

Through an examination of city laws, ordinances, and rulings, this paper demonstrates how key trades impacted the urban landscapes in which they were situated. I focus on the municipalities of Bristol, Coventry, Leicester, London, Northampton, and York from 1300-1500CE, all of which had a considerable urban population in this time and sufficient primary sources to conduct this study. It centres on the trades of butchers, fishers and fishmongers, tanners and leather workers, and brewers, all of which were subject to the most stringent laws concerning urban landscapes. English municipal governments understood, and acted to mitigate, the impact of industrial contaminants and resource depletion on people, urban spaces, and coinciding natural ecosystems from these trades. Urban governments thus exercised regulatory oversight by defining where trade could take place, how tradespeople could dispose of their waste, who could buy industrial by-products, and at what time acquisitions could occur, and, more generally, how a trade must be conducted.

Urban artisans did not operate in isolation. First, they developed vast networks of fellow craftspeople to conduct their craft in resource-limited cities [Figure 1]. Tanners, for example, relied on oak farmers, lime manufacturers, brewers, vegetable farmers, and butchers to provide

essential raw materials. In turn, tanners provided resources to curriers, horners, lorimers, and cordwainers. Second, artisans drew resources directly from nature. A comparison of what they consumed from the environment against what they expelled into it clarifies the problem urban authorities faced [Figure 2]. Industries depleted valuable natural resources, leaving the environment worse off than before they arrived. Though this is the story of many organized societies, in the late medieval period, new industries and centuries of hitherto unprecedented population growth exacerbated the problem in the fourteenth century. English municipal governments, faced with these mounting challenges, controlled not only how and which resources could be exploited but what could be done with their disposal.

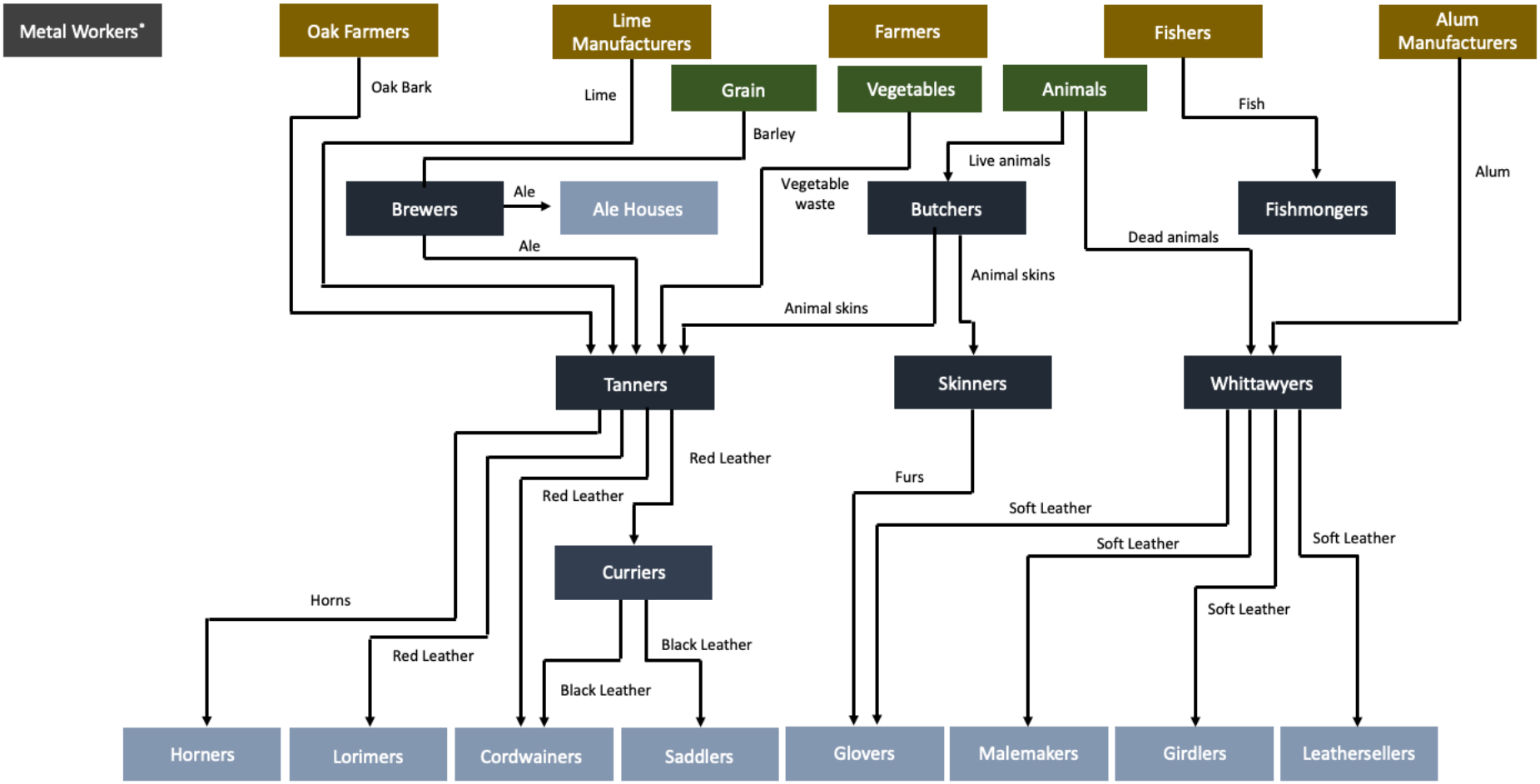

Figure 1: Butchers, fishmongers, tanners, and brewers, the trades that serve them, and the trades they serve.

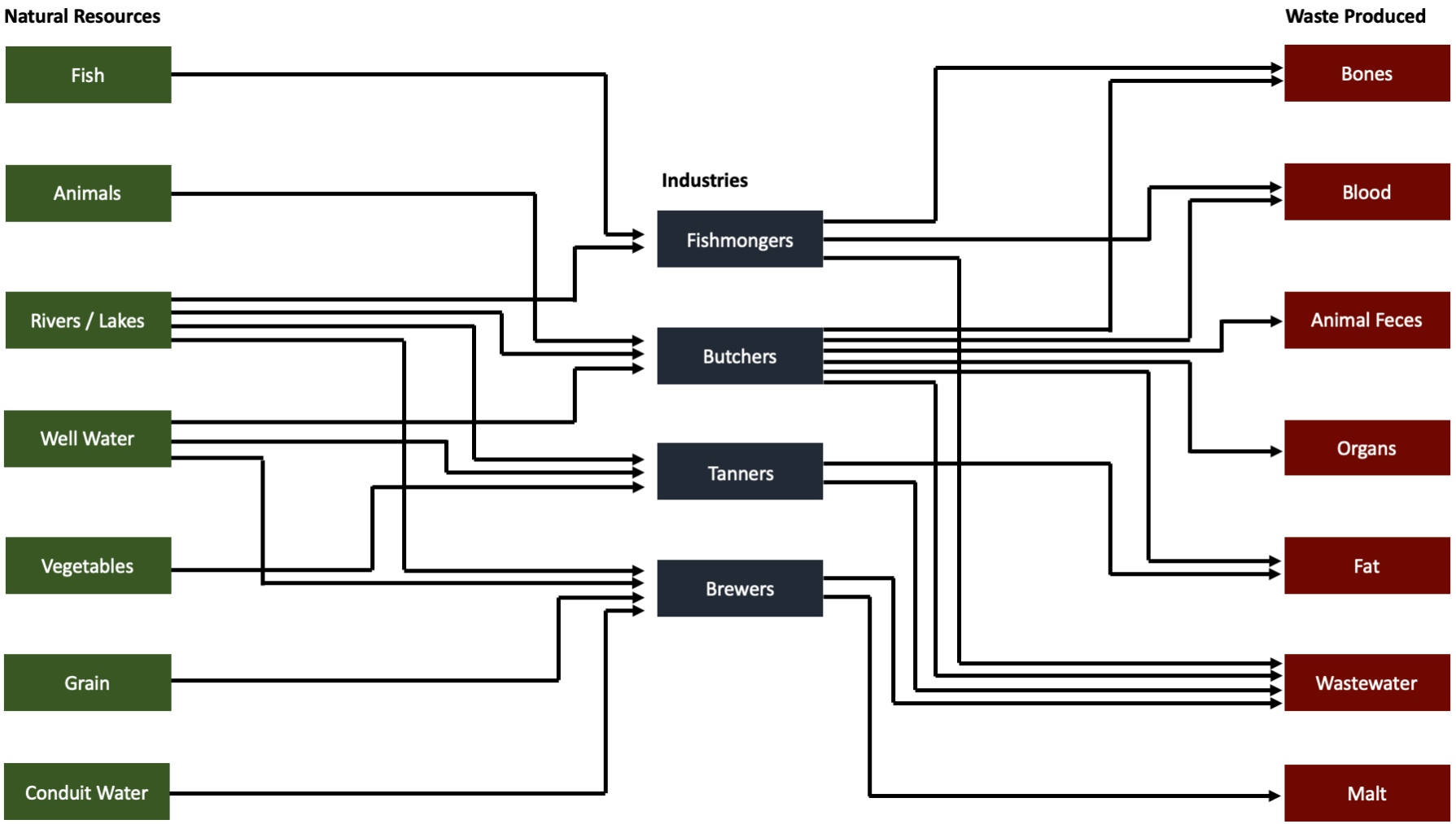

Figure 2: Natural resources used, and the waste produced by butchers, fishmongers, tanners, and brewers.

To make my case, this thesis follows a clear plan. First, chapter one begins with a brief overview of medieval ideas on health. The chapter explores how a medieval townsperson navigated their environment and identified waste or other contaminants. The chapter then turns to the physical environment to explore the broader context of urban spaces and the spread of disease. It explores the secondary literature, both in historical and in archeological studies, to determine what works scholars have already done and to identify the gap which this thesis seeks, in part, to fill. The chapter then draws upon medieval city records to identify more broadly what townspeople and authorities identified as waste and how they attempted to regulate its disposal.

Chapter two defines industry, craft guilds, and the broader marketplace. It acts as a foray into economic history and uses a rich historiography to explain how craft guilds came into existence, the proliferation of markets, and how these two developments fundamentally altered urban spaces. The proliferation of markets made it possible for trades to specialize, and for groups of artisans to come together to create a guild. For the first time since the Roman period, artisans could truly specialize. This allowed for cities to grow larger, for industries to flourish, and, in tandem, for the problems of sanitation and waste management to grow.

The third chapter focuses on butchers. I begin with butchery because it has benefited from the greatest amount of scholarly attention. Cities had several approaches to controlling butchers and their waste. Most municipalities compelled butchers to practice their craft outside of city walls, but, notably, London was not able to remove its butchers from the city centre. This chapter examines the impact of external or internal butchers, and how butchers leveraged their power to control butchers' waste.

Chapter four addresses fishers and fishmongers. Fishers and fishmongers faced many of the same regulations as butchers, but due to their ability to procure their own product, and the

unspecialized nature of the trade, authorities subjected them to abide by a unique set of regulations. Cities often regulated the means by which fishers caught fish to mitigate aquatic stock depletion. Fishmongers also faced unique discrimination against their trade. The chapter presents a case study of a single nuisance case to show how we can see the lengths to which fishmongers went to protect their reputations and customer base.

The fifth and largest chapter focuses on leather workers. The leather working trades were vast, employing a significant proportion of the English population. This chapter centres upon tanning and tawying, the processes of turning animal hide into leather. The analysis lays out the vast resource requirements for leathermaking, and the networks that supported the craft, and the scope of its environmental impact. The chapter then turns to regulation from both local and royal levels of government, since this trade offers one of the earliest examples of the crown becoming involved in the minute details of a craft. The ability of tanners and tawyers to squander resources and produce poor quality products elicited a strong response from legislators.

Chapter six focuses on brewing and ale houses. Although brewing was typically a household activity, as industry began to specialize, some people were able to dedicate themselves to the craft full-time. Those who did so relied upon clean water, a resource which cities carefully protected. Some English cities built conduits which brewers sought to exploit. Regulations concerning conduit access demonstrate how cities protected their natural resources and in turn how brewers and ale houses persevered to secure an income.

The final chapter takes a step back to look at how industry shaped urban environments. It explores how densely-packed urban dwellers viewed ownership of their streets and resources. By looking at the repetition in laws issued for these crafts and at other archeological indicators, I address the problem of urban sanitation. Medieval English cities were not clean, neither by our

standards, nor by theirs. Medieval urban dwellers and their regulators participated in an uphill battle when it came to waste management and resource depletion. Industries in pursuit of ever more efficient production processes often made this battle more difficult.

CHAPTER I

1.1 Medieval Understandings of Health

Medieval people had complex understandings of health, their bodies, and the role nature plays in maintaining them. By the fourteenth century, learned, university-trained physicians inherited most of their medical ideas from ancient authorities like Aristotle, Plato, Galen, and Hippocrates and from the generations of medieval Arabic and Latin commentators who had absorbed older Greco-Roman theories. Great medieval physicians, such as the Persians Ibn Sina (*La.* Avicenna; 980 – 1038) and Ali ibn al-'Abbas al-Majusi (*La.* Haly Abbas; 982 - 994), were among the first in centuries to compile, distill, and comment upon the wisdom of the ancient world. Thanks in part to their efforts, by 1300, Galen's fundamental expositions were taught in Latin at major European universities.[1] Ideas about healthcare, however, were not confined to elites alone. They trickled down from elite institutions and influenced town dwellers and policy makers. Indeed, medieval authorities understood both personal and communal health as necessary pursuits for the preservation of Christian society.[2] To maintain their reputation, moreover, medieval cities sought to maintain the health of their residents.

Medieval people understood the human body to have three basic constituents: the naturals, the non-naturals, and the contra-naturals. The naturals consist of elements, complexions, humors, and the *spiritus*, each of which require balance to preserve health. Complexion, too, is a careful balance of the qualities of hot, cold, wet, and dry, each pair of which correspond to one of the four elements, fire, water, air, and earth. Complexions can be influenced by one's innate

[1] Nancy G. Siraisi, Medieval & Early Renaissance Medicine: An Introduction to Knowledge and Practice. (University of Chicago Press, 1990), 84.

[2] Carole Rawcliffe, *Urban Bodies; Communal Health in Late Medieval English Towns and Cities* (Suffolk: The Boydell Press, 2013), 59.

constitution, age, sex, location, and diet.[3] The four humours are blood, phlegm, yellow bile (choler), and black bile (melancholy), each of which also correspond with a pair of complexions and an element. It was thought that people physically create humours by moving digested food to the liver, which transforms it into any of the four humours.[4] Humoral matter can then pass into the veins (transformed then into the *spiritus*, vital spirit, or natural spirit) to provide nourishment to the organs. When the humoral matter travels to the brain it is filtered through a network at the nape where it mixes with breathed air and activates the brain which powers sense perception, including the imagination, memory, and bodily movement.[5] Any imbalance in this complex system can result in a sanguine, choleric, phlegmatic, or melancholic temperament and corresponding sicknesses. A serious deficiency in any of the four humours could be fatal.

The non-naturals consist of physiological, psychological, and environmental conditions which can alter the natural balance of the body. Generally, they are defined as air, exercise, sleep, food and drink, secretion and excretion, and mental affections. Of most concern to urban authorities was air. Air has powerful connotations, with purgatory and hell thought to have the smell of pitch and sulphur, and heaven the scent of flowers.[6] Scents were thought to be composed of fine particles which can be combined into a vapour and enter the body through the nose, mouth, or even the skin.[7] Air did not require odour to affect one's constitution, and putrefied air was often used as an explanation for illnesses.[8] For example, in 1371 London

[3] Siraisi, *Medieval & Early Renaissance Medicine*, 102.

[4] Carole Rawcliffe, "'Delectable Sightes and Fragrant Smelles': Gardens and Health in Late Medieval and Early Modern England," *Garden History* 36, no. 1 (2008): 8.

[5] Rawcliffe, "'Delectable Sightes and Fragrant Smelles'," 8.

[6] Rawcliffe, "'Delectable Sightes and Fragrant Smelles'," 7.

[7] Siraisi, *Medieval & Early Renaissance Medicine*, 123.

[8] Siraisi, *Medieval & Early Renaissance Medicine*, 128.

banned butcher's waste from the Thames claiming "the air in [London] has been greatly corrupted and infected, and whereby the worst of abominations and stenches have been generated, and sicknesses and many other maladies have befallen persons dwelling in [London]."[9] Bad sights too had the potential to affect one's humours. The eye was considered a passive organ which absorbs the figure of a sight into the head.[10] For example, in 1390 the sight of salted fish sitting on carts "stinking and rotten" was viewed as an "abomination to the people" and "unwholesome to the human body."[11] Although germ theory was absent from how people viewed the world around them, medieval senses could deliver people from some of the dangers correlated with rot or contamination.

The *spiritus* was considered especially susceptible to unpleasant sights and smells and can retreat into the heart or brain if provoked causing palpitations, breathlessness, paralysis, and fainting.[12] Medieval people sometimes carried pleasant smelling items or averted their eyes if confronted with something unpleasant to the senses. Of course, urban authorities understood that epidemic illness came from more than what one perceived as sickness. Medical practitioners used individual horoscopes to explain why some in a community breathing the same air succumbed to disease while others did not.[13] One's birth time compared to the placement of the moon, stars, and planets was thought to have affected one's innate constitution and therefore could make one especially immune from or susceptible to assorted illnesses.

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[9] H. T. Riley, ed., *Memorials of London and London Life in the 13th, 14th and 15th Centuries* (London: Longmans Green, 1868), 357, http://www.british-history.ac.uk/no-series/memorials-london-life.

[10] Rawcliffe, *Urban Bodies*, 125.

[11] Riley, *Memorials of London*, 516.

[12] Rawcliffe, "'Delectable Sightes and Fragrant Smelles'," 8.

[13] Siraisi, *Medieval & Early Renaissance Medicine: An Introduction to Knowledge and Practice*, 129.

1.2 Filth and Disease

1.2.1 Historiography

How dirty was the average urban environment in medieval England? For most historians of the late nineteenth and early twentieth centuries, common beliefs dictated that all pre-modern peoples lived in a constant and unrelenting state of filth. Public sanitation laws which were enacted in the Victorian era reinforced this idea. It was not until historian Ernest L. Sabine published his three formative articles on butchery, city cleaning, and latrines in the 1930s that scholarship began to reassess this view.[14] In these articles, Sabine surveyed medieval city records from London to reveal the many policies the city put in place to ensure clean streets. He placed cleanliness within an historical context. His conclusion across all three articles was that medieval people, like their modern counterparts, did have standards of cleanliness and strove to achieve them. Since the publication of those articles, historians have sought to understand how a pre-modern city could achieve clean streets without modern luxuries like covered sewers, plumbed toilets, modern chemicals, and sanitation vehicles.

Since Sabine, Dolly Jørgensen has come the closest to continuing the work that he started. Jørgensen's three articles covering cooperative sanitation, government control of sanitation, and urban swine management are surveys of public health policy in England in the Middle Ages.[15] Jørgensen argues that the presence of street gutters in cities proves that urban environments were

[14] Ernest L. Sabine, "Butchering in Medieval London," *Speculum* 8, no. 3 (1933): 335–53; "Latrines and Cesspools of Medaeval London," *Speculum* 9, no. 3 (1934): 303–21; "City Cleaning in Medieval London," *Speculum* 12, no. 1 (1937): 19–43.

[15] Dolly Jørgensen, "Cooperative Sanitation: Managing Streets and Gutters in Late Medieval England and Scandinavia," *Technology and Culture* 49, no. 3 (2008): 547–67; "'All Good Rule of the Citee': Sanitation and Civic Government in England, 1400-1600," *Urban History* 36, no. 3 (2010): 300–315; "Running Amuck? Urban Swine Management in Late Medieval England," *Argicultural History* 87, no. 4 (2013): 429–51.

controlled.[16] Jørgensen's central argument is that urban medieval English city dwellers did not live in squalor and experienced a level of cleanliness in their day-to-day lives. Her argument is not to diminish the difficulty involved in achieving what cleanliness there was, nor to overstate how clean the city was. Instead, Jørgensen proves that medieval people had the good sense to keep the space around them as free from waste as possible.

The Pre-Modern Healthscaping Group led by Guy Geltner at the University of Amsterdam has published the greatest number of studies on this topic, with a focus on continential urban spaces. "Healthscaping" is Geltner's term to describe preventative healthcare measures enacted in urban spaces. The term has not achieved widespread acceptance and is largely only used for his project. Studies from this group have focused largely on individual cities and have yet to reach broader conclusions about public health practices within a given region or kingdom. Geltner's work does echo, though, the English parallels that assert that the inhabitants of pre-modern cities cared about sanitation. In mid-fourteenth century Ghent, for example, the city government decreed that all residents must keep the space in front of their residence clean shortly after the arrival of the Black Death.[17] In Bologna, a small group of officials had the task of inspecting the city's roads, wells, buildings, markets, and other infrastructure to document hazards including improperly disposed waste, unsafe buildings, wandering animals, and the activities of prostitutes.[18] The example from Bologna goes far beyond the enforcement that has been documented in English cities, especially in the fourteenth and fifteenth centuries.[19]

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[16] Jørgensen, "Cooperative Sanitation," 553.

[17] Jenna Coomans, "The King of Dirt: Public Health and Sanitation in Late Medieval Ghent," *Urban History* 46, no. 1 (April 18, 2018): 91.

[18] Taylor Zaneri and Guy Geltner, "The Dynamics of Healthscaping: Mapping Communal Hygiene in Bologna, 1287-1383," *Urban History*, 2011, 6.

[19] The "healthscaping" project still has two years of funding and there is hope more will come out of the work their interdisciplinary team is doing on the much-understudied topic on the continent.

The only comprehensive study of medieval public health in any European region is Carole Rawcliffe's book *Urban Bodies: Communal Health in Late Medieval English Towns and Cities.* The book is a thorough survey of medieval ideas on health and the body, environmental concerns, food and nourishment, and disease. Rawcliffe dismantles Victorian accounts of a filthy medieval world by systematically providing evidence of concern for public health from an impressive number of local archives. She argues that spiritual and physical health were both seen as necessary and something that city officials regarded as worthy of their intervention to achieve.[20] The book identifies multiple contaminants to urban areas including excrement, prostitution, commercial by-products, disease, and smoke and argues that though each of these is different in their make-up, all were seen as threats.

1.2.2 English Urban Environments

Medieval English town dwellers were generally responsible for cleaning their own waste and the streets in front of their homes. In Coventry, Bristol, and London this was legislated, but Magnusson also argues that urban dwellers cleaned their outdoor spaces to retain a good reputation with their neighbours.[21] Clean streets were a source of commercial and civic pride, so cities invested in keeping them tidy. In London and York, the king often ordered the streets to be cleaned by way of his administrative staff and charged aldermen to see that it was done.[22] Those

[20] Rawcliffe, *Urban Bodies*, 89.

[21] Mary Dormer Harris, ed., *The Coventry Leet Book: Or Mayor's Register Containing the Records of the City Court Leet or View of Frankpledge, A.D. 1420-1555, with Divers Other Matters*, trans. Mary Dormer Harris, vol. I–II (New York: Kraus Repritn Co, 1971), 23; Francis B. Bickley, ed., *The Little Red Book of Bristol*, vol. 2 (London: Henry Sothran & CO., 1900), 229; Roberta J. Magnusson, "Water and Wastes in Medieval London," in *A History of Water*, ed. T. Tvedt and E. Jakobsson, (London: I. B. Tauris & Co. Ltd, 2006), 303.

[22] A.H. Thomas, ed., *Calendar of the Plea and Memoranda Rolls of the City of London*, vol. 1, 1323–1364 (London: His Majesty's Stationary Office, 1926), https://www.british-history.ac.uk/plea-memoranda-

who did not clean the area in front of their dwellings could be charged by city-appointed street cleaners for their services.[23] Street cleaners most often practised their trade by night.

To prevent cesspits and ditches from negatively impacting life, city governments appointed specific areas in which street cleaners and residents could dispose of waste. Most midden ditches existed initially beyond city limits, but with urban expansion, some encroached upon living quarters. This occurred, for example, in London where a cesspit and build up in the river Fleet caused such a stench that it was said to have affected the health of inmates in the nearby prison.[24] In other instances, ditches sat too far away, and residents created their own nearby pits for their waste. This occurred in Perth, and in 1336 officials ordered all dung, offal, and other refuse to be removed from a ditch at the door of the castle because it was attracting animals.[25] In Coventry, officials ordered the ditch to be cleared and kept free from dung, indicating that even the contents of a ditch could be subject to control.[26] For those that lived close to a river, running water was a constant temptation for the problem of waste disposal.

Rivers provided cities an easy and convenient way to dispose of unwanted waste but using this resource could have dire consequences. Many cities installed large gutters in their streets to expel rainwater and other liquid materials to a nearby river.[27] Gutters, though, were prone to blockages. So, in Coventry, throwing dung in a gutter resulted in a 2s. fine.[28] In Norwich, a

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rolls/vol1; *Calendar of the Close Rolls Preserved in the Public Record Office, Edward III*, vol. 2, 1330–1333 (London: London Public Record Office, 1898), 610, https://archive.org/details/calendarclosero02offigoog.

[23] Jørgensen, "Cooperative Sanitation," 564; Magnusson, "Water and Wastes," 303.

[24] Riley, *Memorials of London, 279*.

[25] *Calendar of the Close Rolls Preserved in the Public Record Office, Edward III*, vol. 3, 1333–1337 (London: London Public Record Office, 1898), 697, https://archive.org/details/calendarclosero03offigoog.

[26] Harris, *The Coventry Leet Book,* 54.

[27] Jørgensen, "Cooperative Sanitation," 553.

[28] Harris, *The Coventry Leet Book,* 30.

citizen created his own gutter connecting to the main gutter and then placed a muckheap so high upon it that carts could not pass on the streets.[29] Streets were often ordered to be cleaned of dung and offal, whether within gutters or not.[30] For those who lived close to rivers, gutters were unnecessary as materials could simply be dumped directly into the river. In York, waterways were already showing signs of pollution in the early eleventh century.[31] Due to the growing stench and filthy banks of urban rivers, cities implemented more and more legislation regarding what could be disposed there. Though some tradesmen were allowed to dispose of their waste in the river, most citizens were not. In London, officials banned residents from disposing of used floor rushes, dung, filth, or other noxious matter in the Thames.[32] In Coventry, the town permitted no man or servant to dispose of excrement or other filth in the river.[33] This did not prevent rivers from accumulating filth. In London the banks of the Thames were frequently ordered cleansed due to noxious smells and unpleasant sights.[34] In 1374, in Norwich, one John de Gissing was charged with dumping 100 cartloads of muck into the river.[35] In 1425 in Coventry, men were responsible for cleaning the river in front of their dwelling.[36] One John

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[29] William Hudson, ed., *Leet Jurisdiction in the City of Norwich during the XIIIth and XIVth Centuries with a Short Notice of Its Later History and Decline from Rolls in the Possession of the Corporation* (London: Bernard Quaritch for the Seldon Society, 1892), 11.

[30] Examples can be found in: Thomas, *Calendar of the Plea and Memoranda Rolls of the City of London*, 610; Harris, *The Coventry Leet Book,* 30; Christopher A. Markham and Rev. J Charles Cox, eds., *The Records of the Borough of Northampton* (Order of the Corporation of the County Borough of Northampton, 1898), 268.

[31] Gary King and Charlotte Henderson, "Living Cheek by Jowl" the Pathecology of Medieval York," *Quaternary International* 341 (2014): 133.

[32] *Calendar of the Close Rolls Preserved in the Public Record Office, Edward III*, vol. 13, 1369–1374 (London: London Public Record Office, 1911), 416, https://archive.org/details/calendarofcloser13grea.

[33] Harris, *The Coventry Leet Book*, 91, 445.

[34] Riley, *Memorials of London,* 295-296; *Calendar of the Close Rolls Preserved in the Public Record Office, Edward III*, vol. 10, 1354–1360 (London: London Public Record Office, 1908), 422, https://archive.org/details/cu31924091767941.

[35] Hudson, *Leet Jurisdiction in the City of Norwich*, 68.

[36] Harris, *The Coventry Leet Book,* 100.

Mongomery was charged 20s. for clogging and stopping the common river with waste in front of his tenement to the annoyance of his neighbours.[37] River conditions appear to have been a continuous problem in Coventry with the River Sherbourne being ordered to be cleaned again in 1432 and 1444.[38] Pollution in rivers caused serious problems for cities that could not manage it. Due to the dumping of waste and silting, the River Fleet ceased to be navigable and became a sewer. Rivers could also supply drinking water, water for ale and cleaning, and bathing. Medieval people understood that contaminated water and environments could cause disease.

Crowded urban conditions combined with unsanitary surroundings to create the perfect environment for infection to spread. Common diseases in urban medieval England included leprosy, tuberculosis, dysentery, diphtheria, typhus, and plague: all bacterial infections.[39] Parasites, too, were common due to contamination of food and water.[40] Anemia and vitamin deficiencies were frequent problems.[41] The Great Famine of 1315 – 1317 pushed many hungry and desperate people toward cities in search of work and nourishment. These poor inhabitants were especially vulnerable to their environment and were more exposed to disease. Such vulnerable populations, moreover, created the perfect host environment for the *yersinia pestis* pandemic of 1349 and may explain why as much as 50% of urban populations succumbed so quickly. Sabine argues that although sanitary conditions became much worse in the immediate

[37] Harris, *The Coventry Leet Book,* 100.

[38] Harris, *The Coventry Leet Book,* 209.

[39] Rawcliffe, *Urban Bodies*, 65; Brittany S. Walter and Sharon N. DeWitte, "Urban and Rural Mortality and Survival in Medieval England," *Annals of Human Biology* 44, no. 4 (2017): 344.

[40] King and Henderson, "Living Cheek by Jowl"," 137.

[41] Rawcliffe, *Urban Bodies,* 63.

decade following the onset of the plague, subsequent measures resulted in overall cleaner cities by the end of the fourteenth century.[42]

[42] Sabine, "City Cleaning in Medieval London," 27, 43.

CHAPTER II
DEFINING INDUSTRY

2.1 Craft Guilds

Craft guilds shaped and fought for the life that artisans enjoyed in the Middle Ages. Although the term "craft guild" is used most often in the historiography and will continue to be used in this thesis, it is important to note that contemporary artisans would have referred to their organizational structures using terms analogous in modern English to communes, boroughs, fraternities, corporations, or guilds.[43] Economic historians commonly view craft guilds as a necessary intermediary in the economy as it transitioned from one of personal transactions to impersonal capitalist transactions. From the eleventh century onward, business transactions were becoming increasingly impersonal, and customers and merchants could no longer rely on someone's innate morality as a condition of sale.[44] Kin-group support was rendered irrelevant as cities grew to the tens of thousands, so merchants instead had to prove they were of good repute to secure a sale.[45] One way to prove one was of good repute was to belong to a craft guild or fraternity.

Craft guilds acted on behalf of a group of specialized artisans to protect and fight for their best interests. The actions of craft guilds can be divided into two categories: the first is concerned with the social and religious aspirations of its members; and the second had to do with

[43] Susan Reynolds, "Medieval Urban History and the History of Political Thought," *Urban History Yearbook* 9 (1982): 14–15.

[44] Christelle Mougeot, "From the Tribal to the Open Society: The Role of Medieval Craft Guilds in the Emergence of a Market Order," *The Review of Austrian Economics* 16, no. 2 (2003): 171.

[45] Gervase Rosser, "Crafts, Guilds, and the Negotiation of Work in the Medieval Town," *Past & Present* 154 (1997): 9–10.

the occupation itself.[46] To prove they were of good moral character, craft guilds usually had a religious component embedded in the organization or had an associated fraternity that cared for their reputation. Craft guilds and fraternities prayed for members and their families, required high standards of sobriety, upheld Christian values, provided financial compensation for lost wages due to injury or illness, and provided for widows and the families of deceased members.[47] For their businesses, craft guilds would buy raw materials, enforce quality standards, negotiate with powerful merchants, supply cheap credit, fix prices, sustain systems for the transfer of skills, and protect members from exploitation.[48] In exchange for paying taxes and pledging members to military participation, craft guilds negotiated protection from urban elites, and could influence laws within city governments.[49] Protection from urban elites allowed artisans to enter contracts with more powerful people in confidence they would not be exploited.

There has been much debate in the historiography about what role craft guilds played in the medieval economy.[50] Nineteenth and early twentieth-century historians followed the work of Turgot and Adam Smith in depicting pre-modern craft guilds as archaic institutions that imposed irrational restraints on competitive markets.[51] Craft guilds, therefore, granted social instead of

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[46] Heather Swanson, "The Illusion of Economic Structure: Craft Guilds in Late Medieval English Towns," *Past & Present* 121 (1988): 37–38.

[47] Stephan Epstein, "Craft Guilds in the Pre-Modern Economy: A Discussion," *The Economic History Review* 61, no. 1 (2008): 155; Swanson, "The Illusion of Economic Structure," 37; Rosser, "Crafts, Guilds, and the Negotiation of Work," 10.

[48] Stephan Epstein, "Craft Guilds, Apprenticeship, and Technological Change in Preindustrial Europe," *Journal of Economic History* 58, no. 3 (1998): 685; Epstein, "Craft Guilds in the Pre-Modern Economy," 155.

[49] Epstein, "Craft Guilds, Apprenticeship, and Technological," 685. The influence of craft guilds on city laws will be discussed further in Chapter 4. In particular, regarding how the leather guilds fought to have their sole rights to practice their craft protected in London.

[50] An in-depth summary of this debate can be found in: Gary Richardson, "A Tale of Two Theories: Monopolies and Craft Guilds in Medieval England and Modern Imagination," *Journal of the History of Economic Thought* 23, no. 2 (2001): 217–42.

[51] Epstein, "Craft Guilds in the Pre-Modern Economy," 155.

economic benefit. Lipson, writing in the first half of the twentieth century, described guilds as industrial organizations that were employed by town councils for economic growth, but that in fact hindered competition.[52] Scholars in the late 1970s and 1980s began to challenge this view and instead paid more attention to the political, legal, and market context of craft guilds as independent actors. Adams, who looked at the fraternal aspects of guilds in relation to both industry and the household, is an early example of this shift.[53] This shift has not been absolute, and scholars are still debating the merits of each interpretation.[54] Other scholars have found a middle ground between the two theories and instead define craft guilds as instruments of urban governments to enforce compliance but extend that compliance to social norms as well.[55] Regardless of the true economic impact, most scholars agree that craft guilds wielded political power to some degree.

Craft guilds restricted participation, a fact that varied over time and between cities. Generally, craft guild organizations were hierarchical. Craft guilds often permitted journeymen and even women (normally the daughters and wives of members) to participate in meetings, but reserved voting rights to male masters.[56] Unlike today, it was rare for journeymen to outnumber masters at any given time.[57] This meant that everyone in attendance usually had a voting member

[52] Swanson, "The Illusion of Economic Structure," 30; Ephraim Lipson, *An Introduction to the Economic History of England: The Middle Ages* (London: A. and C. Black, 1915), 384–85.

[53] Swanson, "The Illusion of Economic Structure," 30; Charles Phythian Adams, *Desolation of a City: Coventry and the Urban Crisis of the Late Middle Ages* (Cambridge University Press, 1979), 105–8.

[54] An example of the modern debate can be found in the exchange of the following articles: Sheilagh Ogilvie, "Whatever Is, Is Right'? Economic Institutions in Pre-industrial Europe," *The Economic History Review* 60, no. 4 (2007): 649–84; Epstein, "Craft Guilds in the Pre-Modern Economy"; Sheilagh Ogilvie, "Rehabilitating the Guilds: A Reply," *The Economic History Review* 61, no. 1 (2008): 175–82.

[55] See: Rosser, "Crafts, Guilds and the Negotiation of Work," 3–31.

[56] Rosser, "Crafts, Guilds and the Negotiation of Work," 20.

[57] Rosser, "Crafts, Guilds and the Negotiation of Work," 18.

to support their interests, whether husband, father, or master. In smaller towns, women had a more visible presence in craft guilds, and were sometimes granted voting rights.[58] In times of labour shortages, some guilds sought to include women more equitably to garner the funds they were accustomed to.[59] Despite their occasional inclusion in formal institutions like craft guilds, women's economic contributions could be found most often in the informal labour market.

Placing too much importance on the economic activity of craft guilds risks excluding the informal labour market. Most individuals and family units did not restrict themselves to one occupation. For example, butchers often worked both their formal trade (butchery), participated in the corresponding craft guild, and reared animals. A butcher's wife might also have her own trade like brewing or something involving textiles (sewing, mending, etc.). A single-family unit could have three or more formal trades contributing to their overall income but only participated in the craft guild of their primary occupation. Therefore, historians looking at records for information about the labour market risk emphasizing the power of formal craft organizations because they are well represented in the records. The informal market was a threat to craft guilds and to city governments who sought to regulate the markets. Throughout the fifteenth and sixteenth centuries, there were efforts to force artisans into choosing a single craft.[60] This struggle can be seen in the Leather Act of 1563 where the cordwainers lobbied to ensure that tanners and curriers would not be able to participate in their craft (see chapter six below).

The informal market also ensured that craft guilds had little hope in establishing an absolute monopoly in their respective trade. This is especially true in crafts in which their skills

[58] Rodney Hilton H., "Woman Traders in Medieval England," *Women's Studies: An Interdisciplinary Journal* 11, no. 1–2 (1984): 144.

[59] Hilton, "Woman Traders in Medieval England," 141.

[60] Swanson, "The Illusion of Economic Structure," 38.

were easy to acquire like brewing. So long as individuals outside of a craft guild produced a similar product, monopolies could not occur. With the consolidation of crafts however, city governments became increasingly concerned about the potential for monopolies to occur in key suppliers to other industries. For example, Swanson argues that butchers and tanners were subject to such a high degree of scrutiny by councils because of their potential to form monopolies.[61] Butchers and tanners both possessed highly specialized skills and provided raw materials to many other artisans. As we see in chapters four and six, butchers and tanners used their collective power to influence city governance, but there is no evidence that they ever approached the necessary capacity to become a monopoly.

2.2 The Proliferation of Markets

The market was a central place for economic, social, and cultural exchange. Markets attract prestige, visitors, and monetary gain for a city and were often the primary place where tradespeople made their income. Most of what tradesmen like butchers, fishmongers, and tanners produced would ultimately end up for sale at market. The proliferation of markets formalized the exchange of goods. Regular market times, quality-controls, enforcement of debts, and price setting benefited the customer, the seller, and the city in which the commerce took place. The customer benefited from knowing that the product they bought at market was of quality and at a fair price. Most sellers were also consumers of other goods, but their business benefited from an fixed place and time to sell goods which attracted regular and reliable customers. Cities benefited from attracting nearby town-dwellers to charge them fixed prices for their access to markets, tax their purchases therein, and collect any fines for any offenses they commit while there. Many

[61] Swanson, "The Illusion of Economic Structure," 43.

cities' reputation hinged on the quality of their market. Urban authorities used markets as a regulatory tool. Therefore, it is essential to understand how markets operated, changed the medieval economy, and controlled the trades that operated within them.

The beginnings of urban markets and commercialization in England were first theorized by economic historians who posited that markets were a step in the "natural progression" towards capitalism and the modern economy.[62] Postan disagreed, and instead argued for a greater emphasis on agricultural contributions, and the relationship between peasants and their resources.[63] In his book, *The Medieval Economy and Society,* Postan argues that population growth in the High Middle Ages surpassed land capacity and thus landholdings became so small that peasants needed to find extra employment or learn a trade to supplement their income. These ideas have since been challenged. Marxist scholars argued that lords exploiting their peasants were also to blame for the lessening of resources overall.[64] Others criticized Postan's lack of emphasis on agricultural innovations, the relationship between demography and economics, and his conclusions on money.[65]

Richard Britnell developed a new theory of commercialization in his book *The Commercialization of English Society, 1000-1500.* Britnell identifies several reasons for the commercialization of society including an increase in the availability of coinage, especially per-

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[62] Lipson, *An Introduction to the Economic History of England*; L.F. Salzman, *English Trade in the Middle Ages* (Oxford: Clarendon Press, 1931); Eric E. Hirshler, "Medieval Economic Competition," *Journal of Economic History* 14, no. 1 (1954): 52–58.

[63] Michael Moïssey Postan, *The Medieval Economy and Society: An Economic History of Britain, 1100-1500*, vol. 1 (University of California Press, 1973).

[64] John Hatcher, "English Serfdom and Villeinage: Towards a Reassessment," *Past & Present* 90, no. 1 (1981): 3–39; Rodney Hilton H., *Class Conflict and the Crisis of Feudalism: Essays in Medieval Social History* (London: The Hambledon Press, 1985), 139-151.

[65] Mark Bailey, *A Marginal Economy? East Anglian Breckland in the Later Middle Ages* (Cambridge University Press, 1989); Christopher Dyer, *An Age of Transition?: Economy and Society in England in the Later Middle Ages* (Oxford University Press, 2005).

capita (contrary to Postan's view), a dense market structure, urban expansion, and greater opportunities for specialization.[66] In his previous articles, Britnell established himself as an authority on English markets. He argues that the crown could assert control over trade and resources through local markets, and therefore required them to be licensed and supervised from the twelfth century onward.[67] From 1200 to 1349 thousands of markets became licensed by the English crown, each acting as a hub of trade and social interaction in towns and cities.[68] This growth of markets was directly correlated with an increase in the use of currency being used for trade.[69] The increase in trade, in turn, was critical for allowing rural tradespeople to find buyers and therefore expand their business.[70] This expansion allowed for greater specialization within crafts themselves and further innovation within. England became known for the quality of its leather and wool and was able to produce them in abundance for export. Therefore, Britnell was able to prove that markets were intrinsically linked with economic growth in England.

Despite some scholars challenging his ideas, Britnell's work remains the backbone of the history of commercialization and markets in England. Further studies have sought to discover the specific circumstances of guilds and towns within that structure. Markets fundamentally changed work structures and which opportunities were available to the average worker. Of course, it cannot be overstated that the vast majority of people were still working the land in some sort of

[66] Richard H. Britnell, *The Commercialization of English Society, 1000-1500* (Manchester University Press, 1996), xiv.

[67] Richard H. Britnell, "English Markets and Royal Administration Before 1200," *The Economic History Review* 31, no. 2 (May 1, 1978): 189.

[68] Richard H. Britnell, "The Proliferation of Markets in England, 1200-1349," *The Economic History Review* 34, no. 2 (May 1, 1981): 209, 212.

[69] Britnell, "The Proliferation of Markets," 212–13.

[70] Britnell, "The Proliferation of Markets," 215.

subsistence farming. For those who did branch out and move to growing cities, markets created a greater number of opportunities.

Elites often used markets to take advantage of the large numbers of people who congregated in them. James Masschaele states that kings and sheriffs made use of markets to disseminate news, as a place for public punishment, and a manifestation of the crown's power.[71] With over 1,000 being licensed across the kingdom, markets were the easiest way to reach a vast number of people in both urban and rural centres. Markets changed how cities were planned, with many markets replacing churches as the central focus of smaller communities.[72] Due to their prominence, markets became social spaces in which prosperous people would dress up to be seen. This led to criticism that people treated markets with greater reverence even than mass.[73] Both announcements and punishments took advantage of crowds to disseminate news or create a place for public humiliation in which criminals would be subjected to a public shaming.[74] It is in this way that markets became integral to a town's infrastructure, creating a space which drew people together and created opportunities for commerce.

A variety of people took advantage of these new opportunities for commerce and specialization to create new trades. Maryanne Kowaleski, in her book *Local Markets and Regional Trade in Medieval Exeter*, argues for the critical role that the urban centres played in linking trade networks and determining how marketing systems worked.[75] Kowaleski looks at

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[71] James Masschaele, "The Public Space of the Marketplace in Medieval England," *Speculum* 77, no. 2 (2002): 384.

[72] Masschaele, "The Public Space of the Marketplace," 388.

[73] Masschaele, "The Public Space of the Marketplace," 390.

[74] Masschaele, "The Public Space of the Marketplace," 400.

[75] Maryanne Kowaleski, *Local Markets and Regional Trade in Medieval Exeter* (Cambridge University Press, 2003), 2.

medieval Exeter's ability to link with international trade networks. She states that "the appearance of such occupations as beer-brewer, butcher-grazier, pewter and pinner, and increasing specialization in the leather, cloth and clothing trades, reflect the impact of growing consumer demand."[76] As is seen in the leather industry, the availability of internationally sourced products like alum allowed for the trade to innovate and expand. Rodney Hilton similarly argues that this specialization often created opportunities for women. Division of labour by gender for newer trades was not fully developed and during times of labour shortage, wives or daughters were often sought out for working hands.[77] Women played an even larger role in production in smaller trades and in smaller villages where gender roles in the labour force may not have been as detrimental to their social mobility.[78] The emergence of markets thus created opportunities for those who might have otherwise had none. While the emergence, prominence, and economics of market creation have been extensively studied and debated, much less work has been done on how their proliferation impacted urban physical environments.

[76] Maryanne Kowaleski, "A Consumer Economy," in *A Social History of England, 1200–1500* (Cambridge University Press, 2006), 258.

[77] Hilton, "Woman Traders in Medieval England," 141.

[78] Hilton, "Woman Traders in Medieval England," 144.

CHAPTER III
BUTCHERS

Butchery is the medieval trade academics have most considered for its environmental impact. This is due to it being one of the most regulated trades; it produced an excess of noisome by-products in every town center. For ease of transport, animals were most often brought to butchers alive and slaughtered within cities. Butchers usually operated in two different spaces. The first was the scalding house, usually located outside or near to city walls, often pushed out by city authorities who wanted to distance butchers' waste products from the general population. The second was at market near city centers for ease of access to customers, and other tradespeople who used their by-products (tanners bought the skins, horners the horns etc.). The scalding house and transport from scalding house to market created problems. Complaints about blood and entrails clogging street gutters were not infrequent, and many urban centers sought to regulate the disposal of such offal. Polluted rivers were also a problem as butchers could wash away the blood and offal to the detriment of those downstream. It is because of these many regulations that historians have had a wealth of sources upon which to base their studies.

3.1 Historiography

Sabine was the first historian to study the butchers of London. He discussed the general regulation of the trade, scalding houses, general butchering places, and the problems of disposing of their filth in the fourteenth century. Sabine argued that the most serious offense a butcher could commit was selling bad meat to his consumers and, although such sales were regulated, they were not the only grievous offence a butcher could commit.[79] Central to all his papers is

[79] Sabine, "Butchering in Medieval London," 337.

Sabine's argument that medieval Londoners were aware of the damage to public health butchers' waste could cause but they were unable to find adequate solutions.[80] He emphasizes just how difficult disposing of simple waste within the infrastructure of a medieval city could be.

In 1976 Philip E. Jones published *The Butchers of London,* an in-depth study of London butchers from medieval to early modern times. His stated goal for the book was "to ensure the Liverymen of the Company are fully conversant with the long and inspiring history of their guild."[81] In his chapter *Markets and Slaughterhouses,* Jones examines the important struggle between the butchers of London and city authorities, each seeking to control the streets surrounding the slaughterhouses.

The Centre for Metropolitan History's *Feeding the City* project, which was supervised by Bruce Campbell and Derek Keene and researched by James A. Galloway and Melanie Murphy, sought to understand more generally how food reached London's growing population. Among their goals was to measure the impact commercialization and a rising population had on London's hinterland, which had the burden of supplying food and other goods. They identified three points of sale within the city which were local markets, to merchants at point of production, and direct selling in the metropolis.[82] Land use in England was heavily regulated, with forestry and agriculture controlled to ensure supply for all those who needed it. Galloway and Keene estimated that for London alone they needed about 70,000 acres of managed woodland in 1300 to account for the city's fuel and building needs.[83] Most of the fuel was produced in Middlesex,

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[80] Sabine, "Butchering in Medieval London," 352.

[81] Philip E. Jones, *The Butchers of London: A History of the Worshipful Company of Butchers of the City of London* (London: Secker & Warburg, 1976), ix.

[82] James A. Galloway and Margaret Murphy, "Feeding the City: Medieval London and Its Agrarian Hinterland," *London Journal* 16, no. 1 (July 18, 2013): 6.

[83] James A. Galloway and Derek Keene, "Fuelling the City: Production and Distribution of Firewood and Fuel in London's Region, 1290-1400," *The Economic History Review* 49, no. 3 (1996): 469.

Surrey, Kent, Essex, Buckinghamshire, and Hertfordshire which demonstrates how vast of a hinterland London needed to sustain itself. *Feeding the City* concluded its research officially in 1994 and though participants in the project have been able to publish more from their research, there is still a need for more historians to take advantage of their methodologies to reach broader conclusions. Though this project touched on butchery and supply to butchers, there still remains more research to be done on this topic.

Butchery has always had a strong connection to urban environments. David R. Carr, Dolly Jørgensen, and Carole Rawcliffe have all made contributions to help us understand the vast impact butchers' waste had on cities.[84] Each identifies how eager city officials were to regulate butchers, their livestock, and by-products. Their research summarizes the general regulations surrounding butchers' waste. Though this thesis very much follows in their example of providing a multi-city overview of the problem of butchers' waste and how it was regulated, I hope to provide more connections to industrial waste as a whole. Rawcliffe is the only scholar who has attempted this in her book *Urban Bodies.*[85]

Several scholarly studies note the historical importance of butchers and their role as urban polluters. Historians such as Maryanne Kowaleski, Derek Keene, and Richard Britnell reference butchers in their studies of Exeter, Winchester, and Colchester, respectively.[86] Moreover, the archeological record from medieval York, for example, confirms that butchery was polluting waterways as early as the eleventh century. This included unwanted industrial contaminants such

[84] David R. Carr, "Controlling the Butchers in Late Medieval English Towns," *The Historian* 70, no. 3 (September 1, 2008): 450–61; Jørgensen, "Running Amuck? Urban Swine Management," 429-51; Rawcliffe, *Urban Bodies,* 147-152, 241-245.

[85] Rawcliffe, *Urban Bodies,* 147–52.

[86] Kowaleski, *Local Markets*, 188; Richard H. Britnell, *Growth and Decline in Colchester, 1300-1525* (Cambridge University Press, 1986), 237–38; Derek Keene, *Survey of Medieval Winchester*, vol. 1 (Oxford: Clarendon Press, 1985), 255–59.

as animal blood, fat, and feces.[87] Poor sanitation posed a real threat to human populations in towns via the spread of diseases such as tuberculosis which spread under unsanitary conditions. The presence of feces in city streets likewise increased occurrences of intestinal worms and other parasites.[88] By enacting controls to bury waste and keep it out of the streets and waterways, urban centers decreased the frequency of infection caused by improper sanitation, thereby improving the living conditions of their residents.

3.2 The Butcher's Craft

Although the act of butchering an animal has been done for thousands of years, evidence that it was a distinct occupation during the post-Roman period is first found in England in 932.[89] The occupation was rendered unnecessary until the proliferation of markets allowed people to pursue trades apart from farming and thereby gain distance from the food they consumed. Farmers and traders brought larger livestock into cities for slaughter.[90] Commerce relating to animals was conducted through a system of markets, and some butchers even had rural pastures to maintain their own animals or to fatten animals up prior to consumption. These were by no means small operations. Many urban butchers could deal in large enough quantities to take on a

[87] King and Henderson, "Living Cheek by Jowl," 136.

[88] King and Henderson, "Living Cheek by Jowl," 157.

[89] N. J. Sykes, "From Cu and Sceap to Beffe and Motton: The Management, Distribution, and Consumption of Cattle and Sheep in Medieval England," in *Food in Medieval England: Diet and Nutrition*, Medieval History and Archaeology (Oxford University Press, 2006), 69.

[90] Most of what we know about smaller fowl like chicken and geese comes from manorial records, therefore we do not have good estimates on how much poultry was brought into cities or how much was kept by urban households. Chickens in late-medieval England tended to be free range, so if kept in large amounts would have been a constant presence in the streets of any city. Unlike urban swine however, fowl is not recorded in public nuisance cases indicating they were either not a nuisance or kept in smaller numbers. More information about swine consumption in manors can be found in: Philip Slavin, "Chicken Husbandry in Late-Medieval Eastern England: c. 1250–1400." *Anthropozoologica* 44, no. 2 (2009): 35-56; "Goose Management and Rearing in Late Medieval Eastern England, c. 1250–1400." *Agricultural History Review* 58, no. 1 (2010): 1-29.

commission from the army, as did certain Canterbury butchers of the early fifteenth century in support of the Hundred Year's War.[91] The availability of fresh meat was so reliable that most urban dwellers had no need for preserved meats.[92]

Butchering an animal is messy. To butcher animals adequately at quantity most butchers would work at a scalding house otherwise referred to as the "shambles" named after the benches on which meat was displayed. Shambles such as those at Eastcheap in London developed into full neighbourhoods where butchers lived with their families and apprentices above or beside the scalding houses in which they worked. Butchers first incapacitated and then slaughtered the animal, usually through exsanguination. Next, they poured boiling water over the carcass to loosen the bristles and skin the animal. They then removed the organs and entrails and cleaned them of blood and feces. The animal was then hung and split to carve out prime cuts of meat. Butchers then sold the prepared meat, skin, and entrails at the market exclusively. Before markets opened, butchers often sold horns, hooves, and other appendages to approved buyers like horners and tanners.[93]

3.3 Regulation

In 1370, Richard Bayser and his wife Emma built a scalding house in their tenement in Pentecostelane Lane in St. Nicholas Shambles in which they slaughtered pigs. Brother Robert de Madyngton, guardian of Greyfriars, complained that the blood, hair, and other filth from their

[91] Heather Swanson, *Medieval Artisans: An Urban Class in Late Medieval England* (England: Basil Blackwell, 1989), 137.

[92] Sykes, "From Cu and Sceap to Beffe and Motton," 70.

[93] Authorities supported by guilds sought to define the limitations each trade must operate within. Among those limits was laws on who was allowed to buy raw materials. More information about this arrangement is covered in Chapter 6.

scalding house flowed through the common streets and into his garden causing a large stench.[94] Indeed, Madyngton was not the only one to complain about the flow of blood from St. Nicholas Shambles. Commoners, prelates, and nobles who owned homes between the shambles and the Thames complained in 1369 that the blood running through the streets caused a nuisance.[95] The stench from the shambles was so strong that one commented that "a man hardly dare dwell in his house."[96] The offal produced from the shambles had been described as a great corruption, poison, abominable, sickness causing, and putrid. Despite these strong descriptions, London was never able to rid itself of the butchers of St. Nicholas Shambles, nor did it always want to. There they remained until the Great Fire of 1666 and even then, they only moved to another location within the city walls.

The butchers of London first settled in Eastcheap, and as early as the twelfth century, the area was predominately a flesh market.[97] Despite most of their stock coming from the country via Smithfield, butchers settled near the city centre indicating that proximity to customers was more important than proximity to livestock producers. Through the thirteenth century, the butchers of Eastcheap gravitated west to settle in St. Nicholas Shambles [Figure 3]. In 1244, the King's Justices required all stalls within St. Nicholas Shambles to be numbered and those who held them to be documented as they considered the stalls part of the king's highway and therefore the king's property.[98] The retailing of meat was confined to these stalls and those

[94] Helena Chew M and William Kellaway, eds., "London Assize of Nuisance, 1301-1431: A Calendar" (London Record Society, 1973), British History Online, https://www.british-history.ac.uk/london-record-soc/vol10.

[95] *Calendar of the Close Rolls, Edward III*, Vol 13, 31–32.

[96] *Calendar of the Close Rolls, Edward III*, Vol 13, 178.

[97] Jones, *The Butchers of London*, 71.

[98] Jones, *The Butchers of London*, 74.

within other marketplaces alone. These restrictions remained in place for several reasons. The mayor stated that the sale of meat from homes could lead to fraud and deception.[99] Restricting butchers to sell only at market also allowed for authorities to collect rent which was set at 18s. per annum for the butchers of St Nicholas Shambles by Henry III, though it is unclear from the record whether this was actually paid.[100]

Despite most butchers not having ownership of their shambles or stalls, authorities generally allowed butchers to operate as they pleased so long as they did not interfere with the lives of those around them. Due to the amount of waste butchers produced, however, oversight was essential. Drainage was inadequate and sloped both north towards Greyfriars and south towards the Thames, to the annoyance of those on either side. Those living near butchers contended with odours - the scent of rotting flesh and blood – and with polluted surfaces. Butchers faced discrimination from those who thought blood unwholesome, an impurity to be avoided. Blood running through the streets and into gardens such as those of Greyfriars also brought pathogens and disease-bearing insects, of course, but for the inhabitants at the time the primary nuisance was the smell.

[99] Jones, *The Butchers of London*, 75.

[100] Jones, *The Butchers of London*, 76.

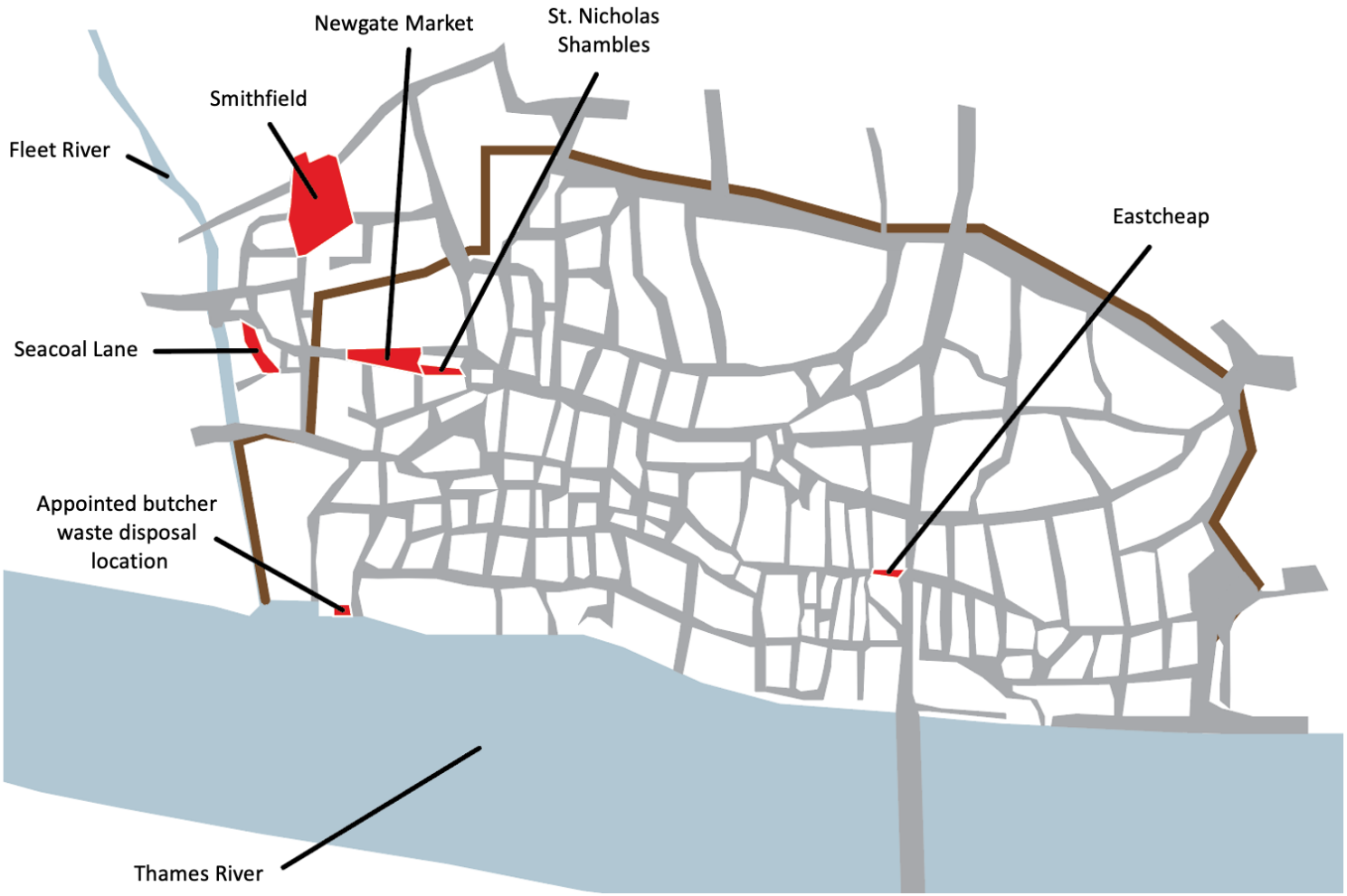

Figure 3: Map of London, circa 1550 highlighting places butchers frequented.[101]

[101] Map of London created by consulting: John Norden, "London." Engraving. Speculum Britanniae: The First Parte: An Historicall, & Chorographicall Discription of Middlesex. London, 1593. British Library, Janelle Jenstad and Kim Mclean-Fiander, eds. Civitas Londinvm. The Map of Early Modern London. Victoria: University of Victoria, 2021.

To prevent the most egregious of butchers' waste from being dumped in the streets, in 1343 authorities in London appointed a piece of land in Seacoal Lane by the Fleet where butchers could dispose of entrails.[102] Following a particularly dry year in 1353, regulators deemed that location inadequate for the butchers' needs and injurious to surrounding residents' health.[103] Without water to remove entrails, butchers left them to fester in damp conditions. In 1355, a benefactor gifted the butchers a new location on the Thames for them to dispose of their waste.[104] The king protected this gift by forbidding anyone from interfering with the butchers or their servants while transporting their waste the 1.3 kilometres to this appointed location, indicating that proper disposal of butcher's waste was a priority for not only the town but the kingdom.[105] There, butchers built a make-shift bridge, named "Butcher's Bridge," to more easily dispose of their waste in the river. This solution did not last long.

By 1361, city authorities changed tactics and no longer prioritized keeping the butchers within London. This is more typical of other English cities in which authorities banned butchers from slaughtering animals within city walls. In 1361 a royal order decreed that the slaughter of all large animals should be done in the villages of "Stetteford" to the east or "Knyghtebrugge" to the west, and that "Butcher's Bridge" be demolished. [Figure 4].[106] This order coincided with a surge of plague within London. The order was reissued in 1369 (also a plague year), 1370, 1371,

[102] Riley, *Memorials of London*, 214.

[103] Jones, *The Butchers of London*, 78.

[104] Jones, *The Butchers of London*, 78.

[105] *Calendar of the Close Rolls, Edward III*, Vol. 10, 225.

[106] *Calendar of the Close Rolls Preserved in the Public Record Office, Edward III*, Vol. 11, 1360–1364 (London: London Public Record Office, 1909), https://archive.org/details/calendarofcloser11grea.

and 1387, but to no avail.[107] Commoners, prelates, and nobles whose homes were between the shambles and the Thames complained that sheriffs did not uphold the order to remove the butchers from the shambles.[108] They never did, and that the butchers never moved despite the risk of one year of imprisonment. Orders in 1395 and 1402 reverted to requiring all those who cast dung and offal into the streets to remove it without specifying a destination for proper disposal.[109]

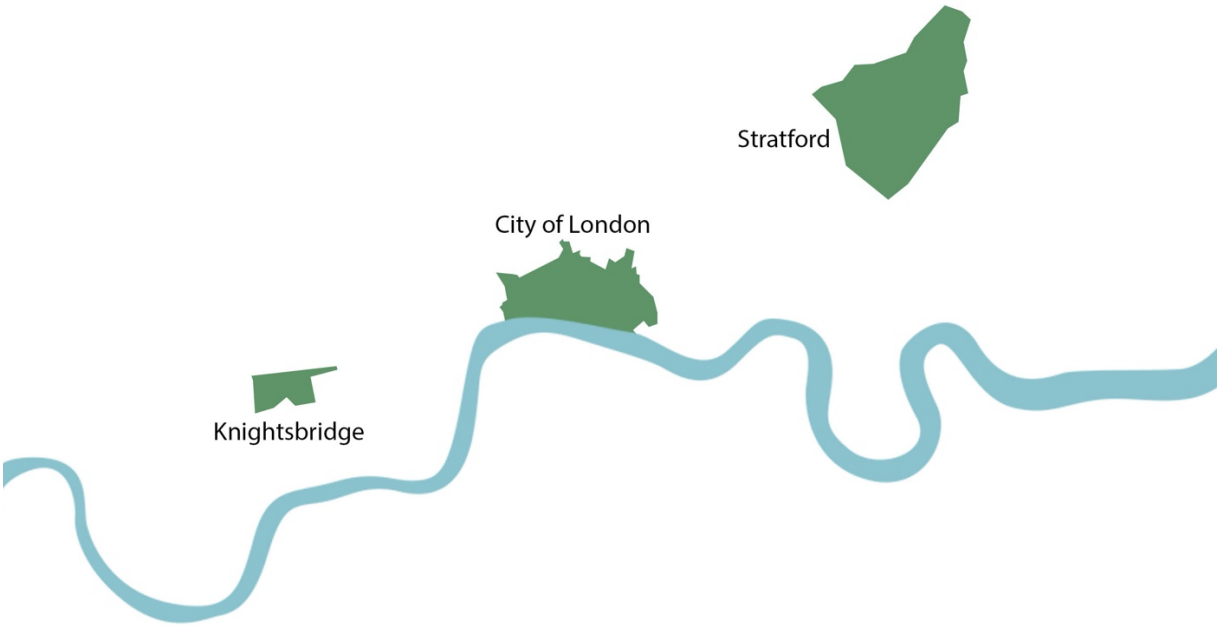

Figure 4: The City of London tried to push the butchers of St. Nicholas Shambles to Knightsbridge and Stratford.

[107] *Calendar of the Close Rolls, Edward III*, Vol 13, 31, 178; Riley, *Memorials of London,* 356-58; *Calendar of the Close Rolls Preserved in the Public Record Office, Richard II*, Vol. 3, 1385–1389 (London: London Public Record Office, 1914), 304, https://archive.org/details/calendarofclo03grea.

[108] *Calendar of the Close Rolls*, Vol 13, 31–32.

[109] *Calendar of the Close Rolls Preserved in the Public Record Office, Henry IV*, vol. 2, 1402–1405 (London: London Public Record Office, 1929), 5, https://babel.hathitrust.org/cgi/pt?id=inu.30000116794961&view=1up&seq=5.

It is not clear from the records why the butchers of St. Nicholas Shambles never relocated permanently. Those few butchers who did move outside city walls raised their prices to accommodate the new cost of transport causing some outrage across the city,[110] which shows that there was some local support for keeping them within the city, but the scale of that support is unclear. Sheriffs ignored both royal and civic authorities' orders to remove butchers, demonstrating that there was a disconnect between regulation and enforcement. The butchers' guild could have had a considerable influence within London, or connections among those charged with enforcement. Their proximity to local markets, including nearby Newgate Market, was also important to the butchers' guild. If butchers remained close to the market, it was easier for their meat to remain fresh for customers. Proximity to the market also made it easier for regulators of the trade to ensure meat was fresh, correctly cut, and otherwise unadulterated. The City of London tried to push butchers out to Knightsbridge and Stratford, neither of which had adequate access to the Thames or any other body of water. It is possible that if the city had provided them with a more advantageous location, they might have moved without issue. With the butchers remaining in place, they continued to be a nuisance for those living nearby.[111]

One problem many cities faced was that of swine roaming within city limits. Pig rearing was a relatively inexpensive way for many households to produce meat and to remove unwanted waste, and pigs were one of the few farm animals that adapted well to urban environments. City dwellers valued pigs precisely because they ate almost anything and most of their parts were, in turn, edible (people consumed pig blood, organs, intestines, ribs, and meat and preserved lard

[110] Jones, *The Butchers of London*, 78–80.

[111] Jones, *The Butchers of London*, 80–81.

and bacon). While pigs ate human waste from gutters, a habit that benefited the town, they also created their own waste (up to 1.3 litres per pig, daily) which was hazardous for people going about their daily lives.[112] The problem of urban swine was made worse by butchers who not only raised their own swine but butchered other people's pigs for a fee. Authorities often tied the whole problem of urban pigs to butchers regardless of who owned the pig that transgressed.

In Coventry, authorities ordered all pigs to be slaughtered by a butcher at the scalding house under strict regulation.[113] In 1421, officials forbade anyone from owning more than one pig within the city, including butchers who frequently kept stalls full of pigs within their scalding houses.[114] Authorities also banned pigs from roaming the streets, gardens, or pastures with fines ranging from 4d. to 40d. depending on the degree of the offense.[115] There is some evidence, however, that swine continued to hold a special position in society as they were the only animal permitted to be butchered within city walls.[116] Pigs lost this special status in 1448 and were relegated to be butchered at the scalding house outside the city like other large animals.[117] Like their London counterparts, authorities also banned Coventry butchers from feeding swine entrails of other beasts.[118] This was done to prevent both disease in pigs, and to prevent pigs from congregating at places where offal was discarded.

Coventry authorities also controlled where and when butchers could conduct their trade and dispose of their waste more generally. Every butcher was required by law to have meat to

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[112] Jørgensen, "Running Amuck? Urban Swine Management," 434.

[113] Harris, *The Coventry Leet Book,* 32.

[114] Harris, *The Coventry Leet Book,* 27.

[115] Harris, *The Coventry Leet Book,* 27.

[116] Harris, *The Coventry Leet Book,* 27.

[117] Harris, *The Coventry Leet Book,* 232.

[118] Harris, *The Coventry Leet Book,* 389.

sell at market every Saturday.[119] Butchers were prohibited from slaughtering or selling animals in the common road, and if they were caught doing so, the meat was to be given up to the common profit of the city.[120] Authorities restricted waste from being thrown into the streets or in the river Sherbourne, instead designating a place under "Poody Crooft" where waste was to be disposed.[121] They even required butchers to throw their waste into the middle of the pit, ensuring the offal did not pile up on the sides.[122] Butchers could not take offal to the pit at any time; instead they were required to dispose of their waste by night and were prohibited from taking their waste through the streets at all on Fridays and Sundays.[123] Similar laws can be found in many other cities across the kingdom.

Though most English cities mirrored Coventry's laws and required butchers to work outside of city limits, Winchester permitted their butchers to remain within. Winchester had about eleven butchers through the late Middle Ages, and most were charged with sanitary offenses (ten in 1299, and nine in 1350).[124] Though Winchester had a small number of butchers compared to other cities, they still caused a nuisance. A custom forbade butchers from slaughtering their animals in the High Street.[125] City authorities appointed to butchers a location to dump their offal into the river, but butchers often could not be bothered to deliver it the half kilometer distance.[126] Unique to Winchester was their problem of butchers' dogs roaming the

[119] Harris, *The Coventry Leet Book,* 32.

[120] Harris, *The Coventry Leet Book,* 43.

[121] Harris *The Coventry Leet Book,* 43.

[122] Harris, *The Coventry Leet Book,* 389.

[123] Harris, *The Coventry Leet Book,* 108, 360.

[124] Keene, *Survey of Medieval Winchester*, 256.

[125] Keene, *Survey of Medieval Winchester*, 257.

[126] Keene, *Survey of Medieval Winchester*, 258.

streets. These dogs were likely used to herd cattle and bait bulls in local bull rings.[127] Similar to the problem of swine in other cities, dogs created a nuisance and distributed their own waste about town. Authorities required dogs to be kept inside during certain hours to minimize the disturbance to the town.

Considering all these restrictions, some butchers were creative with how they disposed of their waste. One order from Coventry prohibited butchers from attaching drains to their stables, or houses, or any other loophole that would permit them to dispose of their waste in a way counter to written law.[128] In several instances butchers threw or buried offal and blood in unapproved spaces in the hope of not being caught. In Norwich, a butcher was charged 2s. for burying offal near the king's highway and thereby poisoning the air.[129] In York, 1372, butchers cast their waste near the walls of a church so often that flies and other vermin were breeding in the church.[130] In Northampton, a law was passed in 1460 that prohibited butchers from hiding their waste in the woods.[131]

Most of the laws city authorities enacted which affected butchers were remarkably similar. In looking at a sample of some of the most populated cities within England [Figure 5], most had laws which restricted where butchers could conduct their trade, how they could keep their swine, and how they could dispose of their waste. It is possible that cities borrowed these rules from one another, but more likely, cities confronted similar problems and reached similar solutions. Though the laws had similar results, the wording of each was unique to its own town

[127] Keene, *Survey of Medieval Winchester*, 257.

[128] Harris, *The Coventry Leet Book*, 107–8.

[129] Hudson, *Leet Jurisdiction in the City of Norwich*, 23.

[130] *Calendar of the Close Rolls, Edward III*, Vol 13, 438.

[131] Markham and Cox, *The Records of the Borough of Northampton*, 229.

and geography. The frequency with which these laws were enacted was also different. Authorities in London, Coventry, and York for example appear to have consistently fought with butchers to keep their waste out of public areas. While Leicester and Northampton may also have had the same struggles, the frequency of their laws does not reflect that, and indeed might show that their legislation was more effective at maintaining control over butchers' waste.

	London	York	Bristol	Coventry	Beverley	Leicester	Northampton	Winchester
Butchers restricted from slaughtering animals in public streets.	X	X	X	X	X	X	X	X
Butchers restricted from slaughtering animals within the city.	X	X		X	X	X		
Swine restricted from wandering the streets.	X		X	X	X	X	X	X
Butchers required to dispose of their waste in a specific location.	X		X	X				X
Butchers required to cut up waste into small pieces before disposal.	X			X				X

Figure 5: Laws affecting butchers waste in cities across England

CHAPTER IV
FISHERS & FISHMONGERS

England, surrounded by the ocean and having many rivers, had no shortage of either fresh or saltwater fish. By the fourteenth century, cart traffic with coastal fish reached the interior of the kingdom, so many inland urban dwellers could expect a variety of fish at their local market.[132] Though many cities placed harsh restrictions on fishing in their local rivers, fishmongers procured fish from ponds, trade networks, and by going further afield to more rural areas. In general, fishmongers faced a challenge not of supply, but of competition.

Despite their numbers, fishmongers were among the largest of the trades; they were also the least organized. Unlike butchers and tanners, fishmongers did not organize until the late Middle Ages. Some of their difficulties in organizing had to do with the vast nature of the trade which employed both formal and informal workers within its ranks. Fishmongers divided themselves between those who sold freshwater fish and those who sold saltwater fish. Freshwater fish were often caught with fishgarths which fishers made of timber or wicker and deployed in a river.[133] Authorities subjected fishgarths to heavy regulation because they were a shipping hazard and were often put up in or near cities.[134] Saltwater fishing was more of an international affair and subject to middlemen selling fish between the fishers and fishmongers. These middlemen were also subject to heavy regulation due to their ability to slow the selling process down which could potentially result in rotten fish reaching customers.[135] Many women employed themselves

[132] Richard Hoffmann, "A Brief History of Aquatic Resource Use in Medieval Europe," *Helgoland Marine Research* 59 (2005): 24.

[133] Swanson, *Medieval Artisans*, 18.

[134] Swanson, *Medieval Artisans*, 18.

[135] Swanson, *Medieval Artisans*, 19.

as fishmongers, especially those who traded in saltwater fish.[136] Fish farming became common for monasteries and noble houses to ensure a consistent supply and those who tended to the fishponds often kept themselves apart from the main group of fishmongers. More than anything else though, fishing, especially freshwater fishing, required little specialization. The trade was ripe for chefs, innkeepers, and other trades people to participate in informally to the detriment of those who made their living exclusively through fish. Those who did fashion themselves primarily as fishmongers incurred frequent attacks on their reputation. Depending on the town and the time of year, a fishmonger could enjoy the same status as prestigious trades or be degraded to represent the lowest of them.[137]

Urban dwellers relied on fishmongers for essential nourishment during times of fast and famine. Overall, Europeans preferred meat with their bread or porridge, but fish protein was a good substitute when necessary, and both poor and wealthy individuals enjoyed it regularly.[138] Fish, moreover, was well suited to various methods of conservation (salting, curing, brining). Ritualistically, the Roman Catholic Church prohibited the faithful from consuming meat during approximately one third of the year: that is, during the forty days of Lent, every Friday, and during periods prior to major feast days. During fasts, however, the Church allowed the consumption of fish. This practice heightened demand throughout the year. Medieval ideals of a healthy diet promoted fresh over saltwater fish, but for those in urban spaces, there is little evidence of consumers preferring one over the other.[139] As inhabitants of an island, English consumers also had relatively easy access to fresh fish throughout much or all of the year.

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[136] Swanson, *Medieval Artisans*, 19.

[137] Swanson, *Medieval Artisans*, 20.

[138] Hoffmann, "A Brief History of Aquatic Resource Use," 23.

[139] Hoffmann, "A Brief History of Aquatic Resource Use," 23.

4.1 Historiography

Richard Hoffmann is the preeminent scholar of medieval fish. His work focuses on the fishing industry in Europe as a whole and has greatly expanded how scholars understand the industry. Hoffmann, through collaborations with archeologists and scientists, has found evidence of the fish trade being a continental affair with varieties from all over Europe available far from where they had been caught.[140] Hoffmann has also demonstrated how Europeans influenced the environment by looking at fish consumption and distribution. Species of fish Europeans liked to eat came under stress and thus became more difficult to procure.[141] Monasteries and other large estates created artificial fishponds in reaction to these difficulties and to secure a consistent fish supply.[142] Hoffmann's work proves that medieval people did not hesitate to modify their environment in a quest to meet their unique needs.

Little has been studied about the impact of fishmongers on the urban environment. We know that some medieval town dwellers complained of the disruptive scent of fish in open markets, but medieval people tended to treat the odour with greater tolerance than the smells produced during the process of butchering land animals.[143] Rawcliffe reported that fishmongers were not permitted to dispose of their waste in the public gutters and authorities instead obliged them to dispose of their waste directly into the Thames.[144] By virtue of the trade itself, waste was

[140] Hoffmann, ""A Brief History of Aquatic Resource Use," 22-30.

[141] Richard Hoffmann, "Economic Development and Aquatic Ecosystems in Medeival Europe," *The American Historical Review* 101, no. 3 (1996): 648.

[142] Hoffmann, "Economic Development and Aquatic Ecosystems," 659–62.

[143] Sandra Billington, "Butchers and Fishmongers: Their Historical Contribution to London's Festivity," *Folklore* 101, no. 1 (January 1, 1990): 97–98.

[144] Rawcliffe, *Urban Bodies*, 197.

something that fishmongers would have had to deal with, and primary city records reflect that they were regulated.

4.2 Regulation

The aldermen and mayor of London, along with those in power at the guildhall, fought to maintain Thames fish stocks. Though it was common to see boats carrying fish from as far as the continent, local fishmongers and casual fishers also fished directly from the Thames. One of the most common and simple methods for catching fish was to cast a net into the water to catch fish within the threading. Fisher nets were composed of rope tied in knots, and authorities subjected these knots to the most stringent regulations. City officials charged men who cast nets with too-small mesh in 1320, 1329, 1344, 1349, 1385, 1386, and 1388.[145] In many of these cases, fishmongers themselves informed local authorities about the violations of their peers. Nets with mesh too tight caught immature fish known as 'fry'. If caught too soon, these fish would not have time to mature and reproduce, thereby depleting the overall supply of fish in the Thames. In the record, authorities indicate a concern specifically for the supply of roach, flounder, dace, and lamperns, specifically.[146] In 1329, all net mesh was required to be one and half inches, and by 1385 this had increased to two inches which suggests that there had been an overall depletion of fish in the Thames and a greater need to protect the stocks to ensure future supply and profit.[147] Authorities ordered burnt all nets that did not meet these requirements. One regulation also

[145] Riley, *Memorials of London*, 135, 172, 219–20, 244–45, 483, 487, 508–9.

[146] Riley, *Memorials of London*, 487.

[147] Riley, *Memorials of London*, 171, 483.

prohibited nets called ‘pursnets’ which had a stone attached to sink it.[148] Such nets had the potential to catch too many fish and thereby also deplete the available stocks.

In London, authorities also restricted where fishmongers could sell their wares. Though butchers had more waste to contend with, the stench of fish ensured fishmongers’ waste was also subject to frequent regulation. In 1351 authorities permitted fishmongers to sell their wares only within stalls at Stocks Market, Bridge Street (New Fish Street), and Old Fish Street [Figure 6].[149] At Stocks Market specifically, authorities appointed particular days for butchers, poulters, and fishmongers to sell their wares in rotation so as to not to crowd the space.[150] Those who sold wares like oysters, mussels, and salt fish within the city instead had to wander the town for authorities did not permit them to take up a stall or to stand still in any one location.[151] Interestingly, this law is the opposite of laws passed for butchers and fishmongers whom authorities prohibited from selling their wares in the streets at any time.

[148] Riley, *Memorials of London*, 508–9.

[149] Riley, *Memorials of London*, 268.

[150] Riley, *Memorials of London*, 223.

[151] Riley, *Memorials of London*, 508–9.

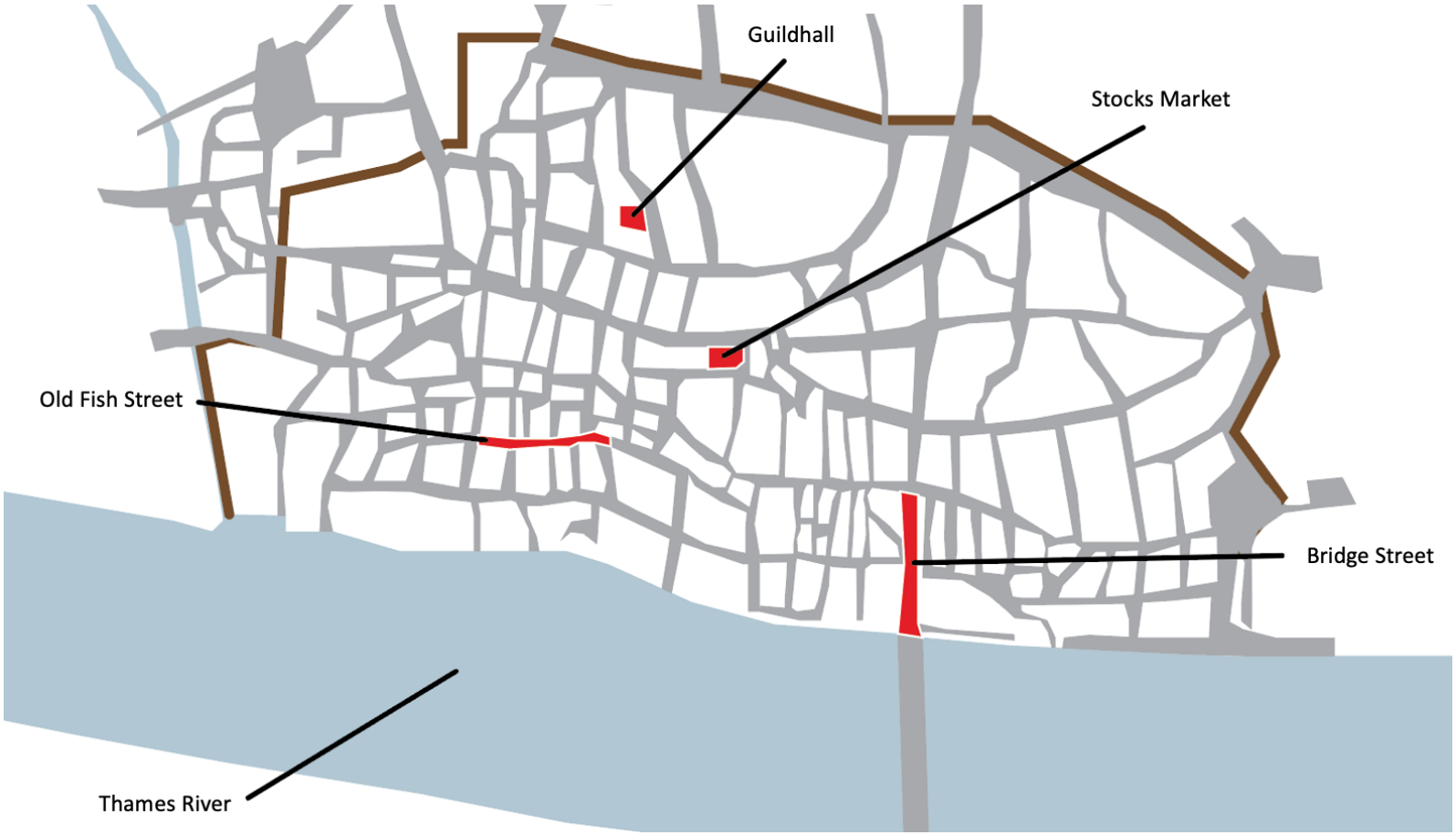

Figure 6: Map of London indicating where fishmongers sold wares.

Fishmongers still disobeyed these rules in seeking profit or convenience. In 1372 one Margery Howe was charged with selling stinking and rotting fish at Stocks Market.[152] In a similar instance in 1382, several men charged John Welburgham of selling rotting fish to them.[153] The aldermen presiding over the dispute convicted Welburgham and forced him to pay the men 6d. The aldermen also sent Welburgham to the pillory for one hour where his rotting fish were set on fire under him, a common punishment for this crime.

Rotting fish also had the potential to betray criminals, as was the case in 1390 when a well emitted such an egregious stench that onlookers complained of illness when they walked by.[154] Upon investigation, authorities found many rotted pikes at the bottom of the well. The fishmongers of the city immediately went before aldermen of the city to save the reputation of their trade and requested that an inquisition take place. Authorities, in what may have been an anti-Semitic trope or scapegoating, deduced that a mercer named Salamon Salamon hired servants to cart pikes to the well. Salamon had also carted 24 barrels of salted eels to a nearby cellar. The alderman and six fishmongers of London went to investigate the cellar and thye declared twelve of the barrels "rotten, abominable, and altogether unwholesome to the human body."[155] Salamon was compelled to remove the rotted barrels from the city and bury them.

The above case study demonstrates how eager the fishmongers of London were to defend the reputation of their trade. With so much competition from foreign merchants, and informal traders, the ability to uphold a reputation, especially in a mostly unspecialized trade was closely guarded. Those who disobeyed the rules set by city authorities and the guildhall by either

[152] Riley, *Memorials of London*, 367.

[153] Riley, *Memorials of London*, 464.

[154] Riley, *Memorials of London*, 516.

[155] Riley, *Memorials of London*, 517.

creating netting too tight or hiding rotting fish were a threat to the livelihoods of those men who belonged to the fishmongers' guild. Moreover, the willingness of fishmongers to report their colleagues instead of opting to collectively exploit these devices shows that helping to maintain the fish supply and the cleanliness of streets was considered reputable behaviour and beneficial to the trade. This behaviour was reputable not only among elites but also by London people of all classes who consumed the fish they sold.

York officials also feared for the fish within their river, but not from overfishing or catching fry; in this instance, they worried that the fish stock was threatened by urban waste. In fact, by 1403, residents of York had put so much filth into the River Fosse that a "great part of the Fosse [had] become dry land, and year by year most of the fish thereof [were] destroyed."[156] The king ordered the city to make enclosures between the river and the drains or other places where residents dispose of their filth to catch it before it plumets into the water.[157] All men with private gutters were also ordered to create catch basins for the same purpose. Again, in 1407, the king forbade anyone from throwing dung, offal, or filth into the River Fosse or near its bank.[158] King and Henderson identify York as having major difficulties with maintaining basic sanitation within the city.[159] The diminishing fish population in the Fosse was one of the consequences city officials needed to address.

Northampton also faced difficulties maintaining the fish population in the River Nene. Like in London, Northampton fishers tried to use nets with smaller meshes, and ones which sank to

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[156] *Calendar of the Close Rolls, Henry IV*, Vol 2, 85.

[157] *Calendar of the Close Rolls, Henry IV*, Vol 2, 84.

[158] *Calendar of the Close Rolls Preserved in the Public Record Office, Henry IV*, vol. 3, 1405–1409 (London: London Public Record Office, 1931), 297, https://babel.hathitrust.org/cgi/pt?id=inu.30000115586319&view=1up&seq=5.

[159] King and Henderson, "Living Cheek by Jowl," 136.

the bottom to catch more fish to generate a higher yield.[160] Officials banned the use of nets with smaller mesh but also required that all fish caught had to be at least five inches before going to market. Colchester officials too restricted the size of nets fishers could use in its river (the Colne) and required fishers to only fish in specific rivers and lakes farther away from the city centre.[161]

In urban centers, fishmongers found themselves subject to some laws unique to their trade. For example, in Coventry, no fishmonger was allowed to cut fish on the same board he had cut them on the week before.[162] In Leicester, no fisher could throw their dirty water into the high street on pain of "grievous amercement."[163] In general, officials also required fishmongers, like butchers, to control their offal, but unlike butchers, fishmongers did not also have to contend with live animals.

[160] Markham and Cox, *The Records of the Borough of Northampton*, 258.

[161] W. Gurney Benham, trans., *The Red Paper Book of Colchester* (Colchester: Essex County Standard Office, 1902), 22, https://archive.org/details/cu31924028166183/page/n4/mode/1up.

[162] Harris, *The Coventry Leet Book*, 312.

[163] Mary Bateson, ed., *Records of the Borough of Leicester Being a Series of Extracts from the Archives of the Corporation of Leicester, 1327-1509*, vol. II (London: C. J. Clay and Sons, Cambridge University Press Warehouse, 1901), 21, https://babel.hathitrust.org/cgi/pt?id=njp.32101076191038&view=1up&seq=9.

CHAPTER V
LEATHER WORKERS

English leather is synonymous with quality thanks to the work of medieval leather workers in cities like London, Northampton, Chester, and Exeter. Tanning, the process of turning animal skins into leather, was largely an urban occupation because of the high demand for meat in cities. There was also a great demand for leather goods. People relied on leather for everyday products like shoes, saddles, belts, bottles, and containers. To meet this demand, craftsmen occupied up to fourteen distinct leather trades, all with unique specialities.[164] These leather trades alone employed more than 10% of the total urban population in England.[165] In cities which specialized in the trade, that number could go as high as 15%.[166] Considering the numbers involved in the leather trade, its urban footprint was considerable. After butchery, tanning and tawying were the most regulated trades due to their waste and by-products. Cities sought to control where tanners and tawyers could conduct their trade, how they could tan or taw leather, and what raw materials they could use to do so.

Tanning is an ancient process. Evidence of tanned leather has survived from ancient Sumerians, Egypt, Central Asia, China, Rome, and Greece.[167] Ancient tanning practices are similar to medieval ones and involved treating animal skin with fatty materials like brains and

[164] John Waterer, *Leather in Life, Art and Industry*, 1st ed. (London: Faber, 1946), 66.

[165] L. A. Clarkson, "The Leather Crafts in Tudor and Stuart England," *The Agricultural History Review* 14, no. 1 (1966): 38.

[166] Exeter in the fourteenth century reported numbers as high as 15%. Maryanne Kowaleski, "Town and Country in Late Medieval England: The Hide and Leather Trade," in *Work in Towns 850-1850*, ed. Penelope L. Corfield and Derek Keene (Leicester University Press, 1990), 57; L. A. Clarkson, "The Organization of the English Leather Industry in the Late Sixteenth and Seventeenth Centuries," *The Economic History Review* 13, no. 2 (January 1, 1960): 245.

[167] Waterer, *Leather in Life, Art and Industry*, 130.

marrow and combining them with smoked sage.[168] In pre-dynastic Egypt there were already small-scale industrial processes conducted to tan hides, including the vegetable tanning process which was common practice until the 1960s.[169]

England was praised across Europe for its leather. Hides ranked with cloth among the leading articles for both foreign and domestic trade.[170] For an example of scale, from 1435 to 1436, Southampton alone imported 38,000 skins, and exported 27,000.[171] Most of those imported came from elsewhere in the British Isles including Ireland which also had a lucrative leather trade.[172] A surplus in animal skins driven by a high demand for meat kept leather prices low across England. By the sixteenth century, the value of a beef carcass was ten times that of the hide, and sheepskin was less valuable than both wool and meat.[173] Some of the surplus in sheepskins is thanks to the advent of paper in England. During the fifteenth century, the price of paper fell forty percent, and despite the decreasing cost of sheepskins, the price of parchment rose by about the same amount.[174] By the sixteenth century, paper had replaced parchment in popularity.[175]

5.1 Historiography

[168] Roy Thomson, "Leather Manufacture in the Post-Medieval Period with Special Reference to Northamptonshire," *Post-Medieval Archaeology* 15, no. 1 (April 30, 2014): 161.

[169] Thomson, Leather Manufacture in the Post-Medieval Period," 161, 164.

[170] Louis Francis Salzman, *English Industries of the Middle Ages* (Oxford: Clarendon Press, 1923), 248.

[171] Kowaleski, "Town and Country in Late Medieval England," 63.

[172] Kowaleski, "Town and Country in Late Medieval England," 63.

[173] Clarkson, "The Leather Crafts in Tudor and Stuart England," 26.

[174] Richard Leslie Hills, *Papermaking in Britain 1488-1988: A Short History*, Bloomsbury Publishing, 2015, 2.

[175] Hills, *Papermaking in Britain*, 2.

Despite its importance, scholars largely overlooked leather until the 1960s, at which time they began to produce studies into quality regulation and guild structures. Since then, there has been very little new work on leather production outside of archeology. That discipline continues to excavate pre-modern tanning sites across England and thereby to shape our understanding. Any mention of the environmental impacts of the tanning industry have been brief and dwarfed by the attention butchery gets in scholarship. Why has tanning been so neglected? It is less mentioned in Leet courts, where many scholars find environmental regulations, but was comparably regulated across England. Tanning, though, was a less visible process. It is easier to recognize the effects of blood, fat, and entrails in streets and waterways than tanning solution and alum. Despite this, the effects of tanning on urban environments were significant, and affected daily life for many city-dwellers and especially those involved in the trade.

5.1.1 History

John Waterer was among the first to study the leather industry. Waterer was a respected English leathergoods designer who strove for higher standards of design. His book, *Leather in Life, Art and Industry,* begins by tracing the origins of the leather trade and continues to follow the history of the many leather guilds from the Middle Ages to the 1940s. His subsequent article, "Craftsmanship and Leather"*,* argues that the industrial processes of leather making remained virtually unchanged until World War II.[176]

The first professional historian to focus on the leather industry in a meaningful way was L. A. Clarkson. His articles "The Leather Crafts in Tudor and Stewart England," "The Organization

[176] John Waterer, "(IV) Craftsmanship and Leather," *Journal of the Royal Society of Arts* 96, no. 4765 (March 26, 1948): 245–60.

of the English Leather Industry in the Late Sixteenth and Seventeenth Centuries," and "English Economic Policy in the Sixteenth and Seventeenth Centuries: The Case of the Leather Industry," still form the basis of what we know today about English pre-modern leatherworking regulation.[177] Clarkson focused on the economic and political implications of the leather trade with a focus on quality regulation and guild relations. Even in the early 1960s Clarkson identified the leather industry as grossly understudied in English historiography and despite his efforts, this remains true.

Since 1960, scholars tend to focus on the leather industry as a subset of enquiries into "industry". Sylvia Thrupp, thus, in her book *Medieval Industry, 1000-1500* identifies the leather industry as one of huge importance, with high demand and employment.[178] Heather Swanson too has identified the leather industry as one of the main trades in pre-industrial urban centers with a full chapter devoted to it in her book *Medieval Artisans: An Urban Class in Late Medieval England.* Here Swanson focuses on labour relations among leather traders and artisans and how the government interceded in those relationships.[179] The trade was reduced to its labour relations and regulations instead of seeking to understand the trade as a whole.

5.1.2 Archeology

The excavation of a late fifteenth- through seventeenth-century tanning complex in Northampton is one of the greatest archeological contributors to our understanding of pre-industrial tanning practices in England. Archeologists from the Northampton Development

[177] Clarkson, "The Organization of the English Leather Industry"; "English Economic Policy in the Sixteenth and Seventeenth Centuries: The Case of the Leather Industry," *The Bulletin of the Institute of Historical Research* 38, no. 98 (November 1965): 149–62; "The Leather Crafts in Tudor and Stuart England."

[178] Sylvia L. Thrupp, *Medieval Industry, 1000-1500* (London: Collins, 1971).

[179] Swanson, *Medieval Artisans: An Urban Class in Late Medieval England*, 53-66.

Corporation excavated 46 tanning pits at two sites. These pits were clay-lined and are either circular or rectangular, though the reason for the different shapes remains unknown.[180] There is evidence that tanners processed cattle, sheep, pig, horse, dog, cat, deer, and rabbit on site. The presence of cat and rabbit challenged previous assumptions about which animals tanners used.[181] Chemical indicators also suggest the use of vegetable tanning methods for cattle, sheep, and horse hides.[182] Wells provided the site with a continuous supply of water because of the abnormal distance of this particular site from running water.[183] Northampton relied on the leather industry for its economic health well into the twentieth century so this site was in constant use and the excavation's findings reflect that.

Archeologists have likewise excavated sites in Leicester and London and revealed similar findings as in Northampton. The site in Leicester excavated in 1993-1994 revealed significant deposits from the Roman, Saxon, medieval, and early modern periods.[184] Unique to this site is evidence that tanners and tawyers worked together, which is different from other English urban centers.[185]

5.2 Networks

[180] Michael Shaw, "Early Post-Mediaeval: Tanning in Northampton, England," *Archaeology* 40, no. 2 (March 1, 1987): 47.

[181] Michael Shaw, "The Excavation of Late 15th- to 17th-Century Tanning Complex at The Green, Northampton," *Post-Medieval Archaeology* 30, no. 1 (January 1, 1996): 90.

[182] Shaw, "Early Post-Mediaeval," 46.

[183] Shaw, "Early Post-Mediaeval," 46.

[184] I Baxter, "Late Medieval Tanners Waste and Pig Skeletons in Early Post-Medieval Pits from Bonners Lane, Leicester, England, UK," *Anthropozoologica* 28 (1998): 55.

[185] Baxter, "Late Medieval Tanners Waste," 55.

Earlier I demonstrated how tanners and tawyers worked in partnership with butchers to obtain hides [Figure 7]. This meant that they were the beneficiaries of work that caused quite a disturbance, both in terms of noise and odour. Washing skins in water, too, caused a significant disturbance for town dwellers. To understand the actual impact of the leather industry, then, on environment and resources, we must begin at the start of the supply chain [Figure 8]. Tanners and tawyers did not work in isolation and purchased semi-processed materials to refine for their own product.

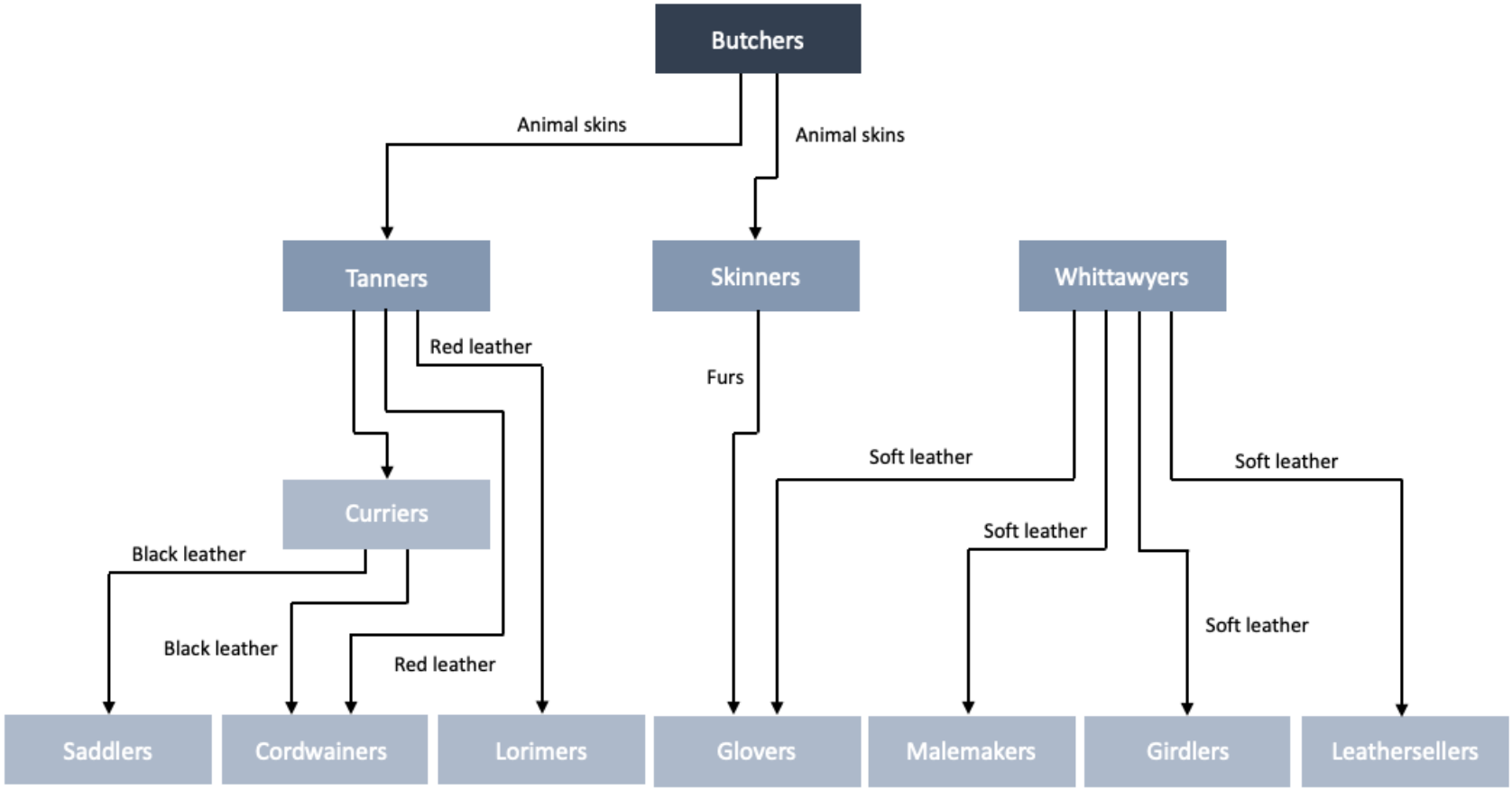

Figure 7: The supply chain of leather manufacture as studied excluding suppliers

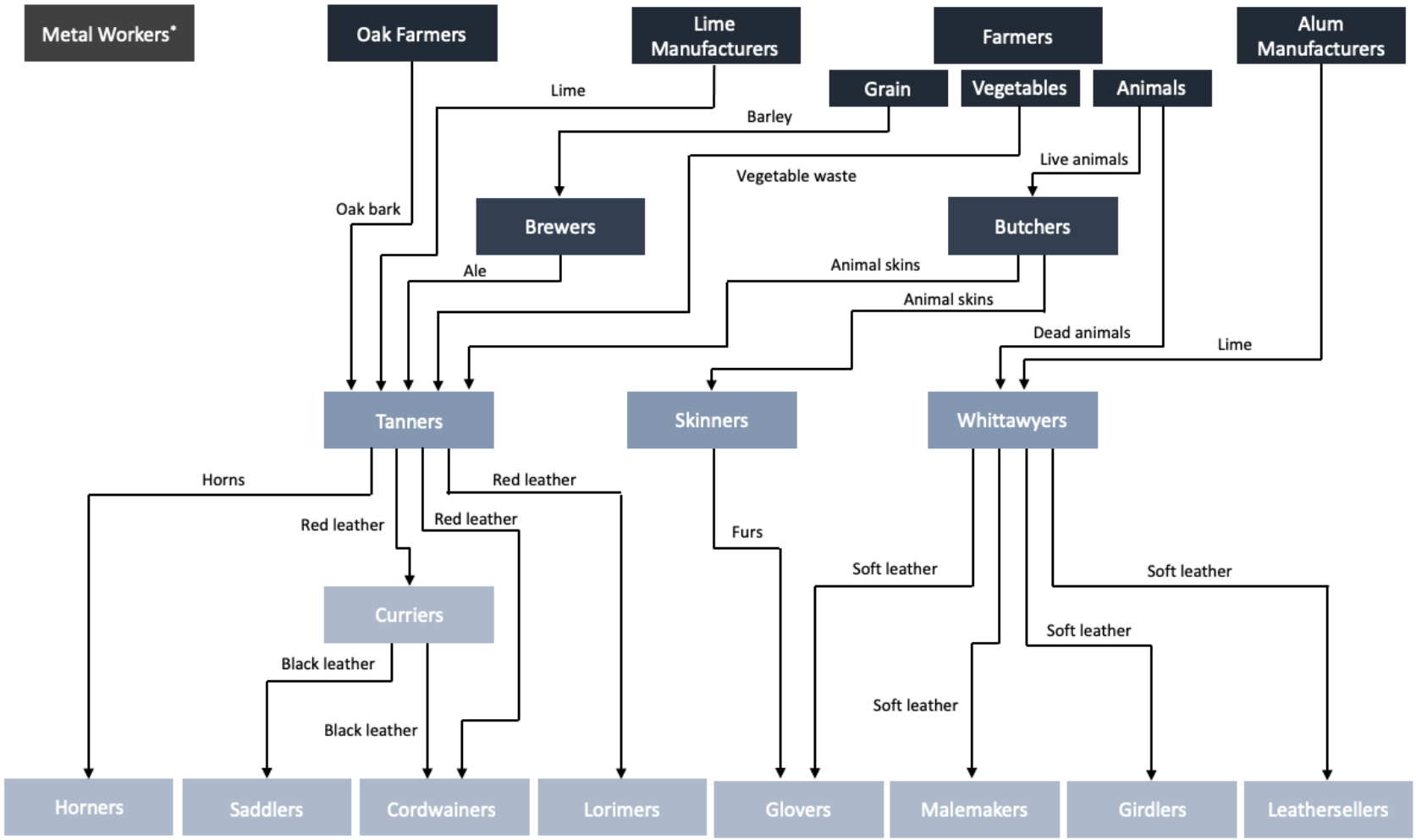

Figure 8: The true supply chain of leather manufacture including suppliers.

**Metallurgy is outside of the purview of this study but supplied tools to all listed in the above diagram.*

5.3 The Craft of Tanning and Tawying

Tanners passed down the technique, or, to use the medieval English phrase, the "mysterie," of their trade from generation to generation. Tanning skins into leather permanently alters the protein structure of the skin to make it more durable and less susceptible to decomposition. This process is highly effective, with tanned leather surviving for centuries before decomposing. Tanning was predominately an urban occupation. Its resource intensity required access to many professionals including butchers to acquire raw materials. To understand how resource intensive this process was, it is necessary to understand the entirety of the tanning process.

Tanning a hide took between 12 to 18 months to complete, depending on its thickness. The first stage which prepared the skin for tanning could take between 3 to 9 months. In most cities, tanners had the monopoly to purchase skins from a butcher who would sell them with horns, tails, hooves, and other appendages intact.[186] Tanners would first remove appendages and then wash skins in running water to remove blood and fat. This need for running water meant it was advantageous for tanneries to be built close to rivers, often to the detriment of those downstream. If tanners did not wish to process skins immediately, they cured them by salting or drying them until use. This delayed decomposition, but did not prevent it, and skins still needed to be worked within a few months to prevent rot or mold. Once a hide was cleaned of blood and salt, the tanner next loosened and removed the hair and flesh.

Skin is composed of three layers: the outer layer is the hair or root system, the inner layer is the fleshy fat layer, and the middle layer is the main skin structure, the only layer needed to make leather. Removing the inner layer can be easily done with a fleshing knife. Removing the

[186] Salzman, *English Industries of the Middle Ages*, 245.

outside layer is much more difficult. Hair needs to be softened by either encouraging it to rot or a chemical process. The simplest but least effective method is to fold the skins backward and soak the hair with urine or stale ale to encourage the hair to decompose. The most effective process involves soaking the skin in a lime solution.[187] Once the tanner loosens the hair from the outside layer, he then scrapes the skin off with a fleshing knife. Often tanners re-soaked the skins in lime to make certain all hair follicles came loose and to ensure a higher quality. This "re-liming" process was eventually outlawed in England by the Leather Act of 1563 due to concerns about lime supply, and risks associated with over-liming.[188] The crown repealed the Act in 1604.

Lime is produced by burning calcium carbonate, which is one of the most common minerals in the earth's crust. When calcinated, it decomposes into carbon dioxide and calcium oxide (quick lime). The process of creating lime for commercial use was labour intensive. The manufacturer first burned quick lime in a kiln with temperatures between 900^{o} and 1100^{o} C, depending on the type of stone used.[189] People at that time also frequently used water to create slaked lime, calcium hydroxide.[190] Both result in a white powdery substance, which could then be carted and sold to tanners for use in their solutions.

Once a tanner peeled or scraped back skins to their middle layer, they could soak them in an alkaline or acidic solution to remove excess lime and soften the leather. The alkaline process was known as "mastering," "bating," or "puering." This involved immersing hides overnight in a

[187] Sometimes wood ash would be substituted for lime.

[188] Great Britain, "An Act Towching Tanners Courrriours Shoomakers and Other Artyficers Occupyeng Cutting of Leather," in *The Statutes of the Realm: Printed by Command of His Majesty King George the Third, in Pursuance of an Address of the House of Commons of Great Britain. From Original Records and Authentic Manuscripts*, vol. 4 (London: Dawsons of Pall Mall, 1810), 429, https://catalog.hathitrust.org/Record/012297566.

[189] Brian Dix, "The Manufacture of Lime and Its Uses in the Western Roman Provinces," *Oxford Journal of Archaeology* 1, no. 3 (November 1982): 335.

[190] Dix, "The Manufacture of Lime," 331.

warm infusion of bird droppings or dog dung. The alkaline process was widely used in England until the 1960s.[191] The acidic solution was preferred by medieval and early modern tanners, presumably due to its product make-up, though also forbidden by the Leather Act of 1563 due to its perishable nature and resource intensity. Referred to as "raising" or "drenching", the acidic process involved soaking the skins overnight in a solution of barley, rye, or ash bark. Vegetable waste would be added to the mixture in intervals to ferment it. Both solutions resulted in skins that were ready for the actual tanning.

Tanning a skin could take more than a year and involved putting skins in vats of stronger and stronger tanning solution. In England, the solution was predominately made up of the liquid from boiled oak bark which is rich in both tannins and colour resulting in the name "red leather" being given to un-curried leather. Other natural sources of tannin include acorns, sumac, gallnut, and chestnut, but oak was so widely available in England that other materials were rarely used.[192] When moved to the strongest solution, skins would often be laid out in layers with oak bark shavings in between to better penetrate the skin with the colour-providing chemicals. This bark was so important to the process that "barker" was an alternative name for a tanner in much of England.[193] Unlike most of the other tanning solutions, the tan-pit odours were pleasant and said to be medicinal. It was reported by John Waterer and Edward Walford that in the Great Plague of 1665, large numbers of Londoners crossed south of the Thames to benefit from the scent.[194]

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[191] Thomson, "Leather Manufacture in the Post-Medieval Period," 164.

[192] Oliver Rackham, *Trees and Woodland in the British Landscape* (London: Weidenfeld & Nicolson, 2020), pt. 1162.

[193] Salzman, *English Industries of the Middle Ages*, 248.

[194] First reference of this I could find was in: Edward Walford, "Bermondsey: The abbey," in *Old and New London: Volume 6*, (London: Cassell, Petter & Galpin, 1878), 117-133. This has been referenced by several other scholars subsequently including John Waterer though none have cited a convincing primary source for this statement.

Skins would then be left in the tanning solution until determined to be complete by a skilled tanner. Hides would then be washed off and hung to dry before going to market to be inspected and sold.

Although it took the tanner twelve to eighteen months to tan any one skin, they would tan many at once resulting in a steady supply of leather for the market. Often skins would be purchased by a currier who would fine the leather down and dress it with oil to create a more flexible material known as "black leather" which was more desirable to many leatherworkers. Tanning leather was the most popular form of processing leather, and tanners had a monopoly on all cattle hides. However, other methods also provided the market with leather goods as well. The second most popular method was tawying or whittawying.

Tawyers were restricted to processing smaller animals, like goats, sheep, hounds, or even cats. Their tanning methods resulted in a softer, more malleable leather that was better suited to clothing (excluding shoes), décor, or bottles. Their counterpart whittawyers (literally white tawyers) used the same methods but instead of getting animal skins from a butcher, they would more often use animals that died naturally. In some towns and under law, whittawyers and tawyers were the same profession so from this point on, I use "tawyers" as shorthand for both.[195] Tawyers began the process much like tanners by liming, removing hair, fleshing, drenching, and scudding the skins to prepare them for further processing. The craftsman would then pummel the hide with a mixture of alum, egg yolk, oil, butter, oatmeal, and flour. Once the skin absorbed this mixture, it was stretched flat and left to dry overnight before a second stretching and pummeling the next day. Once the skin was sufficiently oiled and dried, the craftsman would draw it over a

[195] Both the leather acts of 1563 and 1604 make no differentiation between the two. Other scholars, such as Roy Thompson, have identified them as different professions in certain documentation.

round blunt blade to soften it. Skins were once again hung to dry, often over an oven and then washed in an alkaline mixture before being sold to leather goods manufacturers.

Alum was the most difficult ingredient to obtain for the tawying process. Alum is a chemical compound which is the hydrated form of potassium aluminium sulphate and was most often used to help vegetable and animal dyestuffs bond with cloth fibres to create a more vibrant colour. It was also used in paper production, glue production, purification of water, and tawying. In the Middle Ages, most of Europe's alum supply came from the eastern edge of the Byzantine Empire via Genoese merchants.[196] There were some lower quality alum deposits spread throughout Europe, but they were neither in England nor commercially viable.[197] Alum could be purchased at a reasonable price in England until the Turks took Constantinople in 1453, causing alum prices to spike and the supply in Europe to wane. The Spanish discovered an alum deposit in Spain in 1463 and the market recovered for almost a century, but the Hapsburg Holy Roman Emperor, Charles V, halted exports to England and limited distribution to imperial jurisdictions.[198]

Henry VIII and Elizabeth I both encouraged searches for alum deposits in England, and the English did indeed locate one in 1609 on the North York Moors.[199] Despite this discovery it would take over a century before England would have a reliable supply of alum. Alum production was labour- and material-intensive. It took 50 to 130 tons of shale, six tons of coal,

[196] Martin Günster, "A Holy Alliance: Collusion in the Renaissance Europe Alum Market," *Review of Industiral Organization* 47, no. 1 (August 1, 2015): 5.

[197] Günster, "A Holy Alliance," 5.

[198] Marcus Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry in the Light of Recent Analytical Field Survey by English Heritage," *Industrial Archaeology* 31, no. 1 (May 1, 2009): 55.

[199] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 56.

and one ton of alkali to produce one ton of alum crystals.[200] Once shale was mined, manufacturers would then roast it to convert its alumino-silicates and iron disulphide into aluminium sulphide.[201] They then steeped the burnt shale in water to dissolve the aluminium sulphide.[202] Once the alum liquor was fully strengthened, they ran it off to stone-lined cisterns to allow particulates to settle before they pumped it to the alum house.[203] We know little about the exact process used in alum houses as their close proximity to the sea has meant few survive. Once finished at the alum house, alum was ready for distribution. The North York site operated until 1871.

As has been demonstrated in describing the methods of tanning and tawying leather, each process was resource-intensive and created pollutants. These processes required large amounts of oak, which medieval foresters planted, grew, and harvested once the bark was suitable for tanning and the timber ideal for burning. The appetite for both oak bark and lumber required intensive resource management. Farmers too had to monitor and care for their crops to provide brewers, butchers, and tanners the animals, vegetables, and barley they each required. Farmers, in turn, required fresh water and a steady supply of manure and animal feed. People at the time needed lime to heat in kilns, which released carbon dioxide into the atmosphere during calcination. Alum also released carbon dioxide during processing as well as requiring a intensive mining. Mining activities from alum production alone cause land slippage and marine erosion on the North York Moors.[204] Both lime and alum also required fresh water which caused a need for

[200] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 57.
[201] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 60.
[202] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 65.
[203] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 65.
[204] Jecock, "A Fading Memory: The North Yorkshire Coastal Alum Industry," 67.

the production to either be located by a river or for producers to dig a well, thereby depleting fresh water that could have otherwise been used for crops or human consumption. Butchers and brewers each created a vast amount of waste in their own processes to provide skins and ale to tanners respectively.

Tanners and tawyers themselves created dangerous pollutants. Tanning facilities were often placed near fresh water to clean skins in running water. This resulted in hair, blood, flesh, and fat being washed downstream. Horns, tails, and hooves were removed and often placed in a cesspit until buried. Tanners and tawyers' acidic and alkaline solutions which consisted of bird droppings, dog dung, barley, vegetables, and ash bark created a great stench and would sometimes need to be disposed of and replaced. The river was often the easiest way to dispose of these liquids, or else they sat in pits and were absorbed by the land. Tanning solutions were also disposed of in this way. With all these pollutants created by tanners and tawyers, the government responded to regulate their processes.

5.4 Regulation

Most cities, in tandem with royal authorities, legislated the quality of leather more stringently than the disposal of tanners' waste. In general, cities had two goals when governing tanners: first, to ensure that a quality leather is being brought to market, and second, that the city's resources look and smell clean. Both goals are largely economic. The reputation of a city's goods and appearance could either bring growth or despair to the community. Tanners, then, had two conflicting interests. It was advantageous to them to use and then dispose of water and solutions they used to tan leather quickly, but equally it was important to demonstrate pride in their town by taking care of it. Their livelihoods depended on this balance.

An early example of tanners putting their craft before their city occurred in London. In the twelfth century, tanners moved to the Walbrook in the north of London to take advantage of the water supply there.[205] The Walbrook was a river that ran north of the Thames closely following what is now Gracechurch Street in central London. The water flowed south making it convenient to get fresh water from upstream and allow waste to flow to the larger Thames. In the fifteenth century, the Walbrook was diverted into the now obsolete River Fleet. In 1288, authorities ordered the Walbrook to be cleaned of dung, rotten matter, and other obstructions, much of which can be assumed to have come from the tanners.[206] Households and businesses along the Walbrook, Moor, and the Thames rivers were ordered to have gratings installed to catch larger rubbish items before they were washed downstream.[207] Tanners later moved to the Moor, banks of Fleet, and Southwark as the water supply from the Walbrook lessened, and their trade and city expanded.

The leather guilds continuously sought to protect their right to practise their trade exclusively. Tanners and tawyers frequently lobbied for exclusive access to raw hide and were subject to laws legislating the quality of leather produced, which protected trade groups like the cordwainers. In Coventry, London, and Norwich, laws prohibited tanners from selling ill-tanned hides at market.[208] In London, the law specified that if any ill-tanned hides do come to market that they are to be seized by the cordwainers and forfeited for use of the commonality.[209] The law

[205] Derek Keene, "Issues of Water in Medieval London to c. 1300," *Urban History* 28, no. 2 (August 2001): 167.

[206] Keene, "Issues of Water in Medieval London," 168.

[207] Keene, "Issues of Water in Medieval London," 168.

[208] Harris, *The Coventry Leet Book,* 400–401; Riley, *Memorials of London,* 420; Hudson, *Leet Jurisdiction in the City of Norwich*, 9.

[209] Riley, *Memorials of London,* 421.

encourages tanners to bring only their best leather to market so as to protect consumers of that leather and to prevent the waste of resources like raw hide.

Authorities restricted where tanners and tawyers could practise. Several laws, thus, prohibited tanners from conducting their craft in the highway, or other public spaces. Bristol, in 1331, restricted tanners from conducting their craft "within the walls, to wit in the highways where the majority of the people pass."[210] Bristol also included this restriction again in the "Proclamations of the Town of Bristol" which were forty laws regulating trade and welfare in the fourteenth century.[211] A Northampton assembly of 1556 ordered that all tawyers and tanners clean the town of all bones and forbade them from killing animals, except in appointed places.[212] The town remained concerned with tanners conducting their business in the streets and ordered in 1582 that "no tanners shall cast any dead horse, mare, or gelding, or any hog, dog, or other such carrion on the streets, ways, ditches, or any ground of the town save in the Marehold."[213] This ordinance was also extended to tawyers.

Authorities also prohibited tanners from exploiting public resources like rivers and ditches. In Colchester in 1425, a complaint alleged that the washing of hides in water was affecting brewers' ale.[214] In Ipswich from 1466 the tanning pits were licensed and inspected by authorities to ensure their solutions were not polluting water sources around them.[215] Ipswich frequently fined tanners for polluting ditches and other waterways by attempting to dispose of materials

[210] Bickley, *The Little Red Book of Bristol*, 34.

[211] Bickley, *The Little Red Book of Bristol*, 229.

[212] Markham and Cox, *The Records of the Borough of Northampton*, 264.

[213] Markham and Cox, *The Records of the Borough of Northampton*, 297.

[214] John Cherry, "Leather," in *English Medieval Industries: Craftsmen, Techniques, Products*, ed. John Blair and Nigel Ramsay (London: Hambledon Press, 1991), 296.

[215] Rawcliffe, *Urban Bodies*, 207.

secretly and polluting the proximity.[216] In Northampton a resident made a complaint about tanners and tawyers washing their hides in the river to the annoyance of those passing by into the city.[217] In Norwich residents levied two complaints against a leather dresser and a skinner: one for blocking a public ditch, and the other for throwing the dead bodies of cats into a pit and poisoning the air.[218] No ditch was left unregulated, including those within tanneries which could offend the senses of those who passed by. Northampton authorities ordered that the master of each tannery shall yearly in March bury the bones and waste that had been created.[219]

Royal control over the various processes of producing, buying, selling, importing, and exporting leather began in the time of Edward III.[220] Many of the early royal ordinances concerned hides being poorly tanned, such as a law in 1376 which states: "that all hides badly tanned or curried that were exposed for sale within the liberties of [London]… should be seized by the discreet men of the trade of Cordwainers… [and] be forfeited to the use of the Commonalty."[221] The control the crown possessed over markets extended to controlling how leather was tanned, who bought goods from whom, and where processing occurred.

The Leather Act of 1563 is significant because it was one of the only examples of industrial legislation from that period and was preceeded by five bills and a huge amount of debate.[222] It repealed over sixteen acts going back to Edward III, which were often contradictory

[216] Rawcliffe, *Urban Bodies*, 207.

[217] Markham and Cox, *The Records of the Borough of Northampton*, 217.

[218] Hudson, *Leet Jurisdiction in the City of Norwich,* 12, 29.

[219] Markham and Cox, *The Records of the Borough of Northampton*, 297.

[220] D Dean, "Public or Private? London, Leather, and Legislation in Elizabethan England," *The Historical Journal* 31, no. 3 (September 1988): 529–30.

[221] Riley, *Memorials of London*, 415–28.

[222] Great Britain, *The Statutes of the Realm: Printed by Command of His Majesty King George the Third, in Pursuance of an Address of the House of Commons of Great Britain. From Original Records and Authentic*

and confusing for tanners especially, who were those most targeted by these regulations. The act is focused primarily on heavy leather, but unlike previous acts, it also concerns itself with suppliers to tanners and tanning methods. Clarkson has argued that prior to this act tanning may have been a mystery to those legislating it with often vague and unactionable statements aimed at control.[223] Before this act, tanners regulated themselves either within the confines of a guild or through magisterial oversight of apprentices. This act marks the first of several which concerns itself in the day-to-day aspects of production, and while it was received as a welcome clarification in the law, it also created problems for those trying to follow it.

Several of the articles within the act concern suppliers to tanners. The act restricts butchers from gashing any hide, killing a calf under five weeks old, or tanning the hide themselves. It also restricts butchers from selling raw hides to anyone other than tanners. This act is directly concerned with professionals stepping outside of their trade. This concern in some cases came from guild leaders who pressured legislators to silo each step of production to ensure they were not adopted outside of the trade.[224] In other cases, this concern can be assumed to have come from a desire to ensure trained professionals utilized resources well and produced a quality product. The act also restricts oak bark procurement to the months of April, May, and June, during which the trees were allowed to be felled. This was referred to as "barking time." This is

Manuscripts, vol. 4 (London: Dawsons of Pall Mall, 1810), 429–38, https://catalog.hathitrust.org/Record/012297566.

[223] Clarkson, "English Economic Policy," 153.

[224] These pressures were suggested in the Leather Act of 1559: *Anno Primo Reginæ Elizabethæ at the Parliament Begunne at Westminster, the Xxiij of Januarie, in the Fyrst Yere of the Raigne of Our Soueraigne Lady Elizabeth, by the Grace of God, of Englande, Fraunce, and Irelande, Queene, Defender of the Fayth &c., and There Prorogued till the Xxv. of the Same Moneth, and Then and There Holden, Kept, and Continued, Vntyll the Dissolution of the Same, Being the Eight Day of May Then next Ensuyng, Were Enacted as Foloweth.*, Early English Books, 1475-1640 (STC) (London: Richarde Iugge and Iohn Cawood, Printers to the Queenes Maiestie, 1572), http://search.proquest.com.proxy.lib.uwaterloo.ca/books/anno-quinto-et-sexto-eduardi-sexti-actes-made/docview/2240870564/se-2?accountid=14906.

the first instance of oak being regulated in terms of providing bark to tanners and Clarkson suggested this may be due to the economic downturn within the kingdom at this time.[225]

One of the most controversial and difficult regulations to come from this act concerned lime. Section V restricts tanners from submerging skins in lime for any longer than is strictly necessary, including a subsequent immersion as was common. The act is concerned with tanners "overlyming" their skins which could compromise their further usefulness. No concrete evidence exists as to why this would be a concern for legislators. It is possible that legislators were concerned about lime supply, or perhaps they were misinformed as to what parts of the process were most likely to jeopardize the integrity of the leather. In this same section they conflate liming the skins with the alkaline preparation which are two separate processes. Considering the state's legitimate concerns about using the alkaline process over the acidic process of preparing the skins, it appears their concern regarding subsequent liming was misplaced. This explanation seems likely since in the Leather Act of 1604, re-liming was again permitted while the acidic process was not.[226] The 1604 Act is still concerned with over-liming but leaves the process to the tanner's discretion.

The most common interpretation of the Leather Acts of 1563 and 1604 is one of concern for the quality of the leather that tanners were selling, and protection of separate guilds. This is certainly present and backed by a considerable amount of evidence. No less than five sections deal with craftsmen only conducting the job they were intended to do; for example, curriers not doing the work of tanners.[227] In addition, the act restricts leather from sale outside of a market

[225] Clarkson, "English Economic Policy," 151.

[226] Great Britain, *The Statutes of the Realm,* 1039-1048.

[227] Sections III, VII, X, XVI, XIX, XXVIII of the Leather Act of 1563.

where inspectors are charged with examining and approving the leather for sale.[228] Considering the great focus on quality control, this interpretation is valid though it does not consider the full purpose of the act.

Underlying several of the provisions within both acts is a concern for wasting resources within the trade. If the concern were only for the end-product produced, the law could have restricted the acts to only pertain to leather that was sold at market. Instead, they both went into detail regarding how leather was to be prepared, stored, curried, and bought which indicates a greater concern not only for the end user but also for how materials were being handled. Provisions which concern the processes occurring within a specific trade do nothing to protect guilds from exceeding their own domain. For example, in Section V hide is forbidden from being left out in the cold or heat for fear that it will freeze or rot and be rendered unusable. This protects neither tanners from other craftsmen trying to participate in their trade, nor consumers from receiving an unsatisfactory end product because the leather would not be able to go on in the tanning process. This is also true for state concern over the acidic and alkaline solutions. Had any of these steps gone wrong, the skin could not have been tanned and therefore would not reach the open market. This suggests a concern for skins being properly used and not wasted.

Leathermaking was both dependent upon and deleterious to the resources involved in its production. Tanners and tawyers relied upon from a vast network of resource suppliers to be able to create leather. These suppliers often created pollutants of their own to be able to ensure that a quality product was reaching their customers. Tanners and tawyers, however, were

[228] Sections X, XVIII, XX, XXI, XXII, XXIII, XXIV, XXV, XXVI, XXVII, XXVIII, XXIX, XXXII of the Leather Act of 1563.

unique among many of their suppliers because they were most often located in cities where their by-products could be seen, smelled, and sometimes consumed by inhabitants. This proximity made their waste subject to regulation and tanners were called upon to clean the streets and protect resources like rivers from their waste. Even before the industrial revolution, tanners and tawyers exploited and commoditized resources from both far reaching, and local suppliers. It is therefore essential to understand the leather trade from start to finish to understand the environmental impact it had on communities.

CHAPTER VI
BREWING & ALEHOUSES

Ale was a staple in medieval English children's and adults' diet. It was cheap, provided nutrients, and was usually safer to consume than water. It has been estimated that the average working person would consume over three and a half litres of ale per day.[229] With such a vast consumer base and consistent demand, the market for brewing was large with both formal and informal workers engaging in it daily. Ale was relatively easy to produce, and therefore crafted by thousands of small producers rather than a specialized group until the late fourteenth century.[230] To produce ale, the English began by grinding malt, boiling water, and then mixing a mash.[231] They then strained the mash of solids and the brewer added yeast and herbs to taste. Within two days, the mixture was adequately fermented and ready to drink. While most people possessed the raw materials or could easily obtain them, the process required time and consistency lest the ale turn sour.[232] As trades specialized and women sought employment in larger numbers, some households no longer had someone to brew at home. Both small-scale and large-scale brewers emerged to take advantage of the gap in supply. Some wives brewing at home had the opportunity to brew and sell what was not consumed in the home, thereby participating in the informal market. Still others found themselves a consumer base to dedicate to brewing as their sole trade, specializing and organizing in small guilds.

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[229] Milan Pajic, "'Ale for an Englishman Is a Natural Drink': The Dutch and the Origins of Beer Brewing in Late Medieval England," *Journal of Medieval History* 45, no. 3 (May 27, 2019): 286.

[230] Judith M. Bennett, *Ale, Beer, and Brewsters in England: Women's Work in a Changing World, 1300-1600* (Oxford University Press, 1996), 18.

[231] Bennett, *Ale, Beer, and Brewsters in England,* 17.

[232] Bennett, *Ale, Beer, and Brewsters in England,* 19.

Commercial brewers became widespread in the late Middle Ages and served customers in both urban and rural areas. Some produced ale for fellow businesses like inns and hostels which provided shelter, food, and drink for those requiring it and coin to pay. Brewers could also have their own establishments known as ale houses which catered to more local demands. Commercial brewing was widespread. In 1577 for example, in the thirty counties of southern England, there were about 2000 inns and approximately 15000 ale houses.[233] Some brewers would purchase malt but other harvested their own. A commercial brewer could produce up to 1900 litres of ale a day which is enough to serve almost 550 people, though most produced far less than this.[234] In the later fifteenth century some ale houses also started to produce beer. Beer was brought over from the low countries or Denmark in the 1350s.[235] Although today the difference between beer (specifically lager) and ale has to do with the fermentation process, in the medieval England it denoted whether the ingredients included hops, which originated on the continent. Though the addition of hops resulted in more varied flavor, the manufacturing process was more complicated, and required more capital, resulting in beer still not having overtaken ale consumption into the sixteenth century.[236] Common to all kinds of brewing, however, was the need for consistent and clean water, something that many urban centers struggled to maintain.

6.1 Historiography

[233] John Hare, "Inns, Inkeepers, and the Society of Later Medieval England, 1350-1600," *Journal of Medical History* 39, no. 4 (2013): 480.

[234] Bennett, *Ale, Beer, and Brewsters in England*, 20.

[235] Pajic, "'Ale for an Englishman Is a Natural Drink'," 286.

[236] David Postles, "Brewing and the Peasant Economy: Some Manors in Late Medieval Devon," *Rural History* 3, no. 2 (1992): 134.

Although ale was a staple of the medieval English and northern European diet and its production occupied the energies of a huge percentage of the population, there is scant research into its regulation or professionalization. The only book dedicated to brewing in England is *Ale, Beer and Brewsters in England: Women's Work in a Changing World, 1300-1600* authored by Judith Bennett.[237] Bennett identifies the trade as being one of the only ones run predominately by women out of the household. She estimates that approximately half of the households in the countryside and one fifteenth of households in the city supplemented their income with ale production in the thirteenth century.[238] Commercial brewers were relatively rare until the fifteenth century. Bennett notes that though this change correlates with the plague, it is unlikely that the change in population affected this shift in the market.[239] Instead, she theorized that the change correlates with the growth of markets. Markets created a space for people to congregate on a regular basis and therefore provided brewers the opportunity to reach customers more regularly. Despite this commercialization, the craft remained a largely female-dominated one.[240]

When brewing became commercialized, the trade began to be regulated. A couple of instances of brewers being fined for their waste products exist in academic studies but represents only a small fraction of what can be found in primary sources. Rawcliffe identifies one instance in 1421 in Ipswich where a brewer was fined for flooding the gutters with beer and causing a stench.[241] Milan Pajic provides another instance in Great Yarmouth where a brewer was fined

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[237] Though, there are studies into ale consumption and its economic and cultural impacts. See, for example, Philip Slavin, *Beer and Ale for the Brethren: The Provisioning of Norwich Cathedral Priory, 1260 – 1536* (Hertfordshire: University of Hertfordshire Press, 2012).

[238] Bennett, *Ale, Beer, and Brewsters in England*, 19.

[239] Bennett, *Ale, Beer, and Brewsters in England*, 47.

[240] Bennett, Ale, Beer, and Brewsters in England, 45.

[241] Rawcliffe, *Urban Bodies*, 198.

several times for leaving out debris within the town walls and not leaving the lane outside of his house clean.[242] Notably, Pajic states that there is evidence to suggest that both of the brewers mentioned were fined specifically because it was an immigrant who caused the nuisance.[243] Pajic raises an interesting point of why specific people were fined within a trade and others were not. Unfortunately, often there is only a record of the fine imposed and not the underlying reasons for the fine. Therefore more instances of officials levying state power to disenfranchise immigrants in this way are needed to support that argument.

The way many urban brewers obtained their water was through conduits. The only scholar to adequately look at medieval conduits adequately is John S. Lee in his article "Piped Water Supplies Managed by Civic Bodies in Medieval English Towns." Lee argues that "medieval urban communities managed water as a source of power," and therefore urban authorities strictly regulated and protected their conduits once built.[244] Urban authorities needed to consider the purity, reliability, and volume of the supply when considering the needs of domestic and industrial consumers, and Lee argues that generally priority was given to non-commercial consumers, thereby opening the system up to strife between commercial consumers and authorities.[245]

6.2 Regulation

[242] Pajic, "'Ale for an Englishman Is a Natural Drink'," 299.

[243] Pajic, "'Ale for an Englishman Is a Natural Drink'," 299.

[244] John S. Lee, "Piped Water Supplies Managed by Civic Bodies in Medieval English Towns," *Urban History* 41, no. 3 (2014): 370.

[245] Lee, "Piped Water Supplies," 370.

Winchester Cathedral possesses one of the earliest piped water systems in England, from about 970. Other cities and monasteries followed.[246] The English preferred to install airtight pipes (as opposed to open air ones) which allowed them to syphon water up or down hills so long as the outlet was lower than the intake.[247] Some conduits carried water as far as five kilometers.[248] Conduits could be lined with lead which was not seen as a concern.[249] Lead poisoning was first known in the Roman Empire, but the knowledge was largely forgotten until it was rediscovered in the sixteenth and seventeenth centuries. Indeed, many who brewed ale did so with lead-lined vats. Conduits could also be lined with a thick clay to prevent leaking.[250] The construction and repair of these conduits required specialists.[251] Since monasteries developed these technologies first, many cities entered into agreements with them such as in Boston, Bristol, Exeter, Gloucester, Lynn, Sandwich, Scarborough, and Southampton to share their conduits.[252] Some cities such as Bath, Coventry, Lincoln, London, Newcastle, and Stamford produced their own conduits.[253] Cities built conduits with the goal of securing water for individual residents as exemplified in a 1345 London ordinance: "a certain Conduit was built in the midst of the City of London, that so the rich and middling persons therein might have the water for preparing their food, and the poor for their drink."[254] To ensure that urban dwellers had

[246] Lee, "Piped Water Supplies," 370.

[247] Lee, "Piped Water Supplies," 372.

[248] Richard Holt, "Medieval England's Water-Related Technologies," in *Working with Water in Medieval Europe*, ed. Paolo Squatriti, vol. 3, Technology and Change in History (Leiden: Brill, 2000), 92.

[249] For example the conduit at Tyburne in London was lined with lead. Riley, *Memorials of London*, 201.

[250] Holt, "Medieval England's Water-Related Technologies," 92.

[251] Lee, "Piped Water Supplies," 381.

[252] Lee, "Piped Water Supplies," 273.

[253] Lee, "Piped Water Supplies," 369.

[254] Riley, *Memorials of London*, 225.

good water, authorities restricted conduit hours of operation, who could use them, and sometimes charged for access.

In London, authorities appointed people to keep watch over and repair conduits. In their "Medieval Londoners" database, Koweleski and McEwan have identified nine men with the title of "Keeper of the Conduit" or with the last name "Conduit" from 1306 to 1333 alone.[255] In 1310, the Keeper of the Conduit had to swear that he would not sell the water, nor allow brewers or fishmongers to waste it.[256] In 1337, a group of several men came before the aldermen to complain about brewers' activity in their neighbourhood:

> The same commonality of the City cannot be served with water from the said Conduit, as it used to be served; because that men who keep brew-houses in the streets and lanes near the said Conduit, send day after day, night after night, their brewers to the said Conduit with their vessels called 'tynes,'[257] and make the ale which they sell with the water thereof... to the loss of the commonality.[258]

The aldermen banned the use of 'tynes' but did not expressly ban brewers from using the water at that time. In 1345 however, brewers, those who owned brewhouses, or those who made malt were explicitly banned from using the conduits within the City of London.[259] Those who were caught doing so lost their 'tyne' as well as 40d. on the first offence, half a mark on the second, and 10s. on the third. The third offense also included jail time. By 1415, authorities permitted brewers to obtain water by renting from the fountains and great

[255] Maryanne Kowaleski and John A. McEwan, eds., "Medieval Londoners Database," accessed June 29, 2021, https://medievallondoners.ace.fordham.edu.

[256] Riley, *Memorials of London*, 78.

[257] 'Tynes' are large tankards use to carry water.

[258] Riley, *Memorials of London*, 200.

[259] Riley, *Memorials of London*, 225.

upper pipe of the conduit but drawing water from the smaller pipes further in the city was strictly prohibited.[260]

In Coventry, water access was difficult, since the only reliable source of fresh water was their small river. Authorities there strictly controlled residents' access to the conduits. Coventry conduits were locked from 9pm to 4am.[261] One of the benefits of the English closed conduit system was that conduits could be locked simply with a key instead of requiring a watch. Coventry also heavily favoured residential access to conduits with brewers specifically being banned in 1444, 1448, and 1450.[262] In 1483, authorities allowed brewers to use the conduits, but they were charged 6s 8d for access quarterly.[263] By the mid-sixteenth century, however, brewers were once again prohibited from using conduits within the city.[264]

Other cities and brewers found idiosyncratic ways to protect and circumvent municipal regulations concerning conduit use. Officials in Northampton charged brewers (and innkeepers) to use their conduits. Brewers accessing the water within had caused a scarcity for the city, and therefore all people using the water for ale were forced to pay 2s. 6d for every brewing.[265] Northampton officials also only permitted water containers which could "be set under the conduit cocks from time to time."[266] Northampton reissued this order in 1631 and 1652. During a drought in 1607, conduit masters locked the conduits from 7pm to 6am and again from 10am to

[260] Riley, *Memorials of London*, 617.

[261] Harris, *The Coventry Leet Book,* 208.

[262] Harris, *The Coventry Leet Book,* 208, 232, 255.

[263] Harris, *The Coventry Leet Book,* 517.

[264] Harris, *The Coventry Leet Book,* 808, 812.

[265] Markham and Cox, *The Records of the Borough of Northampton*, 255.

[266] The term "cocks" here refers to a stopcock or valve used to control the flow of water. Markham and Cox, *The Records of the Borough of Northampton*, 254–55.

2pm, limiting the time to get water to just eight hours in the day.[267] In Sandwich, two brewers built special conduits separate from the public system to provide themselves with water supplies.[268] In Bristol, brewers were completely prohibited from taking water from the conduit.[269]

Although all trades discussed in this paper required considerable amounts of water, brewers were the only ones regularly restricted from using conduits. Some towns similarly restricted fishmongers (notably London and Coventry), though with less frequency. Good quality water was essential to the flavour of ale. Notably, in Colchester the washing of hides by tawyers corrupted the water used by brewers and therefore the ale made.[270] This difference in use may account for brewers' added desire to obtain clean water from conduits. Not only were conduits more convenient than wells, they were also often closer to the tavern or brewhouse than a river. Brewers likely desired water from conduits for the same reason as residents did: greater convenience.

[267] Markham and Cox, *The Records of the Borough of Northampton*, 254.

[268] Helen Clarke et al., *Sandwich, The "Completest Medieval Town in England": A Study of the Town and Port from Its Origins to 1600* (Oxford: Oxbow Books, 2010), 141.

[269] Bickley, *The Little Red Book of Bristol*, 229.

[270] Benham, *The Red Paper Book of Colchester*, 49.

CHAPTER VII
CONCLUSION: URBAN ENVIRONMENTS

Urban environments are as diverse as the people who inhabit them. Although this paper has sought to find trends across the industrial waste policies of medieval English cities and towns during the later Middle Ages, each city's government was ultimately motivated by its own geography. Our ability to comprehend the complexities of urban industrial waste management depends on historians being willing to reach across disciplines and specialities to gain understanding. Using city records from the thirteenth to sixteenth century, and the broader historiography from health, economic, urban, and labour historians as well as archeologists, this paper has sought to demonstrate that English municipalities understood and acted to mitigate the impact of industries on the urban environment.

In studying urban environments, two basic struggles unfold. The first is artisans fighting against municipal authorities for freedom to conduct their craft as they please. Urban dwellers and their need for access to clean resources and clean streets motivated municipal authorities to intervene in growing industries. In turn, artisans of these industries sought agency to exploit resources and maximize their profits. The crown also motivated municipal authorities to keep their urban spaces clean. A clean urban space boosted commercial traffic and helped the English crown's reputation among other kingdoms (especially in London). This leads to the second basic struggle between artisans themselves. They too had a motivation to keep their cities clean to encourage business. They also wanted to uphold the reputation of their trade among local customers and traders. This motivation, though, frequently came second to the motivation and need to exploit urban and natural resources to create a quality product and turn a profit. Artisans

collated in guilds to combine their power to protect their interests within growing cities with large bureaucracies.

Although municipalities understood the problem at hand, they did not always have the resources or the ability to remedy it adequately. In most instances, cities issued industrial regulation many times over, sometimes spanning centuries. Some of these regulations correlated with larger events like drought or pestilence, but others were simply reissued. Without first-hand accounts, it is difficult to discern the degree of success authorities achieved at protecting urban environments, but there are some clues in both archeological evidence and within the laws themselves. Archeologists have found parasites and other indicators of environmental conditions that had the potential to be vectors for disease.[271] Within municipal laws, environmental problems caused by industrial waste were frequently described as creating unfavourable conditions for fish populations or a stench indicating unsafe drinking water. Authorities did not win the battle against industrial pollution, though they tried to mitigate the worst abuses.

Opportunities for further studies in this field are abundant. Most scholarly work in medieval English urban waste, including this thesis, rely on published primary sources. Unpublished archival documents present new opportunities for a deeper understanding on a city-by-city level. In-depth analyses of medieval English cities, such as Keene's *Survey of Medieval Winchester,* have been done for many major cities, but notably among the top twenty by population, Newcastle, King's Lynn, and Boston have yet to receive the same academic focus.

[271] P Addyman, "The Archaeology of Public Health at York, England," *World Archaeology* 21, no. 2 (October 1, 1989): 244–64; James Greig, "The Investigation of a Medieval Barrel-Latrine from Worcester," *Journal of Archaeological Science* 8, no. 3 (1981): 265–82; Richard Jones, "Elemental Theory in Everyday Practice: Food Disposal in the Later Medieval English Countryside," *Ruralia* 8 (2011): 57–75; King and Henderson, "Living Cheek by Jowl"; John Schofield, "London's Waterfront 1100-1666: Summary of the Findings from Four Excavations That Took Place from 1974 to 1984," *Antiquaries Journal* 99, no. 14 (2019): 63–94; Yeomans, "The Shifting Use of Animal Carcasses in Medieval and Post-Medieval London."

Many of these city-focused studies dedicate a chapter to urban industry and its waste products. Furthermore, the *London Assize of Nuisance,* an assize dealing with neighbourly building and waste disputes dating from 1301 to 1431 has yet to receive a dedicated study.

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