

AN ABSTRACT OF THE THESIS OF

Alice Hall for the degree of Master of Arts in History of Science presented on April 29, 2008.

Title: Plague in London: A Case Study of the Biological and Social Pressures Exerted by 300 Years of *Yersinia pestis*

Abstract approved:

Lisa T. Sarasohn

The Second Pandemic had a profound impact on the people of Europe. In the few years between 1347 and 1350, a new epidemic disease spread across the entirety of Europe and killed between one third and two thirds of the population. While this initial wave was important, the real significance of this disease is that after the first wave, plague remained present in Europe as an endemic disease with occasional sporadic epidemic outbreaks. In this manuscript, I examine, in detail, plague patterns in London, culminating in the last major outbreak in 1665, and I review evidence that the Second Pandemic resulted from *Yersinia pestis*. During the course of the epidemic, material wealth increased and living patterns changed in ways that altered plague distribution patterns. Although Londoners did not make much progress in understanding the etiology of plague or in developing treatment protocols, their experience with plague, combined with traditional beliefs and practices, allowed them to develop ordinances that successfully reduced the threat of plague, at least for some members of Greater London. In 1563, the focus of London's plague was central London, and both poor and

wealthy parishes suffered equally. During the final 100 years of the pandemic, the mortality differential between poor and wealthy parishes increased and wealthy central parishes were less severely devastated than poor parishes on the periphery. Because of the unique way in which plague is spread, the increased wealth enabled some Londoners to increase their distance from rats, and their fleas, enough to decrease their risk of infection by plague.

© Copyright by Alice Hall
April 29, 2008
All Rights Reserved

Plague in London: A Case Study of the Biological and Social Pressures
Exerted by 300 Years of *Yersinia pestis*

by
Alice Hall

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Arts

Presented April 29, 2008
Commencement June 2008

Master of Arts thesis of Alice Hall presented on April 29, 2008.

APPROVED:

Major Professor representing History of Science

Chair of the Department of History

Dean of the Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Alice Hall, Author

ACKNOWLEDGMENTS

I am grateful for all the help I received in the process of doing this research and writing this thesis. Virtually every person I know provided me with help and support.

My committee, Dr. Lisa Sarasohn, Dr. Robert Nye and Dr. Paul Kopperman, read my work attentively including reading several chapters of this very long thesis multiple times. They repeatedly raised challenging, pertinent, and difficult questions and they expected well reasoned and concrete answers within the context of the thesis. Thus, my thesis is immeasurably stronger. In addition, they gave me the freedom to take on the huge topic that had sized my interest. I would also like to thank Dr. Nye, who encouraged me to make a change in my program that allowed me to get some financial support, assistance that was truly appreciated.

I also need to thank my family who put up with me when I was stressed and concerned about how my thesis was progressing, and who read my thesis with an eye to improving clarity and flow, assistance that can clearly be seen in the final product. Particular thanks need to be extended to Don Hall for making the maps, which I could envision in my head, appear on paper.

Thank you all, for all the help and support.

TABLE OF CONTENTS

| | <u>Page</u> |
|---|-------------|
| 1 Introduction | 1 |
| Nomenclature | 18 |
| 2 Biological Overview: <i>Yersinia Pestis</i> | 22 |
| 3 Plague Epidemics | 37 |
| Three Plague Pandemics | 37 |
| The Plague of Justinian: the First Pandemic | 39 |
| Medieval and Early Modern Plague: the Second Pandemic | 41 |
| The Modern Pandemic: the Third | 43 |
| British Epidemics | 49 |
| Medieval British Epidemics | 50 |
| Epidemics in Summary | 55 |
| 4 London | 57 |
| London Plague Epidemics | 73 |
| Seven Epidemics in London's Last 100 years of Plague | 89 |
| 1563 | 89 |
| 1578 | 92 |
| 1593 | 95 |
| 1603 | 102 |
| 1625 | 106 |
| 1636 | 113 |
| 1665 | 115 |
| In Conclusion | 125 |
| 5 Literature Review and Argument for <i>Yersinia Pestis</i> | 126 |
| Conclusions | 162 |
| 6 The Medical Context | 164 |
| 7 Material Culture, Social Customs and Civic Regulations | 192 |
| Urban Construction | 202 |
| Religion | 206 |
| Public Gatherings | 213 |
| Sanitation, Garbage and Cleanliness | 215 |
| Cloth, Clothing, Fibers | 222 |
| Dog Catching | 227 |
| Flight | 234 |
| Public Health: Quarantines and Restrictions on Vagabonds | 237 |

TABLE OF CONTENTS (continued)

| | <u>Page</u> |
|--------------------|-------------|
| 8 Conclusion | 245 |
| References | 256 |
| Appendix | 267 |

LIST OF FIGURES

| <u>Figure</u> | <u>Page</u> |
|----------------------------|-------------|
| 1. Map of London | 59 |
| 2. Plague 1593 | 100 |
| 3. Plague 1603 | 104 |
| 4. Plague 1665 | 117 |

LIST OF TABLES

| <u>Table</u> | <u>Page</u> |
|--------------------------|-------------|
| 1. London Plague | 89 |
| 2. London Parishes | 101 |

LIST OF APPENDICES

| <u>Appendix</u> | <u>Page</u> |
|------------------------|-------------|
| | 267 |
| A—1577 | 268 |
| B—1578(?) | 269 |
| C—1593 | 281 |
| D—1608 | 283 |
| E—1625 | 288 |
| F—1625 | 292 |
| G—1625 | 297 |
| H—1625 | 299 |
| I—1629 | 299 |
| J—1636 | 300 |
| K—1636 | 301 |
| L—1665 | 334 |
| M—1593, Kellwaye | 342 |

Plague in London: a Case Study of the Biological and Social Pressures
Exerted by 300 Years of *Yersinia Pestis*

1 Introduction

In 1348, the first major epidemic since the Plague of Justinian swept across virtually all of Europe dramatically changing its disease climate. This plague not only altered the biological conditions under which Europeans lived, but by killing as much as half the population during the initial epidemic wave, it dramatically affected social conditions.¹ Although effects of plague were felt across the entire European continent and beyond, the social changes the plague produced across the various kingdoms of Europe varied greatly because of local cultural conditions. In England, the epidemic and the decline in population facilitated social and cultural changes.² Changes in material

¹ Barbara Harvey quoted in Colin Platt, *King Death: The Black Death and Its Aftermath in Late-Medieval England* (Toronto: University of Toronto Press, 1996), 14. Estimates of the percentage of the English population that was killed in this initial epidemic vary considerably from a low of five percent postulated by Shrewsbury to 60 percent suggested by Ole Benedictow. Samuel K. Cohn points out that some localities experienced seventy-five percent mortality; For more information on mortality, see Jr. Cohn, Samuel K., *The Black Death Transformed: Disease and Culture in Early Renaissance Europe* (London: Arnold, 2002), 2; Ole J. Benedictow, *The Black Death 1346-1353: The Complete History* (Woodbridge, UK: The Boydell Press, 2004), 342-379, 380-384.

² John Hatcher, *Plague, Population and the English Economy 1348-1530* (Cambridge: The Economic History Society, 1977), 11; In *King Death*, Platt traces changes in the population of villages, many of which became smaller or disappeared after the onslaught of plague. These changes were the direct result of high mortalities, and had the effect of altering long established farming patterns and balances between wages and supplies. Some manors were virtually deserted as peasants left the least productive land of individual manors. Platt postulates that peasants were attracted to the best run and most productive manors. In addition, despite depopulation the

culture affected relationships between rats, fleas and people, and these changes help to explain the eventual disappearance of plague from Britain.

There was a gradual increase in the general level of affluence during the 300 years plague was endemic in England, although during this period there were also increasing disparities between the mortality rates of poor people and those who were better off. Almost certainly, these changes involved differences in human behavior and in material culture. An exploration of the conditions of plague and its impact on the early modern period requires an investigation of conditions during the earlier part of the epidemic. Comparing information from the duration of the epidemic may explain not only why the poor suffered greater rates of mortality than the rich, but also how a single pathogen, *Yersinia pestis*, presented so differently over the course of the various pandemics.

In this manuscript I examine in detail the patterns of plague outbreaks in Britain and affirm that plague, the disease produced by *Yersinia pestis*, was the disease of greatest significance during the late medieval and early modern periods. Additionally, I examine how, because of the unique way in which plague is spread, changes in material wealth and in living patterns affected the course of epidemics. Some of the strategies used to combat plague were useless or worse, and yet during the more than 300 years that plague was endemic, 1348 to 1665, changes in lifestyles created an environment in Britain that was much less conducive for the survival of *Y. pestis*. In the years after

population of London continued to grow. These changes suggest that plague helped to break the ties that had traditionally tied peasants to the land.

plague disappeared from Britain, social and material changes continued, so that when plague was reintroduced to Britain in the early 1900s, it made few inroads into the country and produced only a small outbreak. I examine contemporary societal understanding of epidemics as portrayed by public health measures and common treatment modalities as a way to interpret the changes in epidemic patterns that occurred in this still enigmatic disease.

Plague affected personal and societal behaviors and so it is important to investigate how the changes in human behavior and social patterns affected the pattern of disease spread. The pattern of plague epidemics among humans is complex, involving as it does the complex interaction of the relationship between fleas and rats to humans. Thus, anything that people did that changed this relationship had an impact on the extent and severity of plague outbreaks. Human behavior has affected, negatively and positively, mortality levels inflicted over the course of plague epidemics. Failure to provide palliative care due to fear increased mortality levels, while human behaviors that changed environmental conditions or produced loud noise and commotion that could have frightened rats away might have decreased morbidity rates. Blacksmiths, whose work environment necessarily involves noise and does not provide anything edible for rats, had lower than average mortality rates during plague epidemics.³

Although plague posed a danger throughout Britain, epidemics in small towns and villages were sporadic, while plague was virtually ubiquitous in London from the

³ Ole J. Benedictow, "Morbidity in Historical Plague Epidemics," *Population Studies* 41, no. 3 (1987): 425-426.

time it first appeared in 1348 until 1665 when the last major epidemic occurred there. London was the country's largest city, a major shipping port, the economic hub of England, the city most closely associated with the seat of government, and the center of plague in England. Because of this, plague deaths were watched and tracked more closely in London than in the rest of Britain. In 1519, causes of death began to be recorded sporadically during plague years, but by 1629 the Bills of Mortality recorded the causes for all deaths in London.⁴ These records show that there were only a very few years when plague was completely absent, and equally significantly, records indicate that plague become epidemic only sporadically.⁵ By the late 1500s, people had begun to notice that in England plague was more devastating among the poor than among the more wealthy.⁶

Europeans have been studying the series of plague epidemics that ravaged Europe between 1347 and the 1720s, since plague first erupted across the continent in

⁴ Paul Slack, *The Impact of Plague in Tudor and Stuart England* (London: Routledge & Kegan Paul, 1995), 148.

⁵ The term epidemic comes from the Greek, *epi* upon and *demos* people, "Samuel Johnson, in his *Dictionary of the English Language* (1755), defines epidemic as a disease that 'falls at once upon great numbers of people.'" *Dorland's Medical Dictionary 30th Edition* defines the term epidemic as disease "occurring suddenly in numbers clearly in excess of normal expectancy;" For more information see Charles de Paolo, *Epidemic Disease and Human Understanding: A Historical Analysis of Scientific and Other Writings* (Jefferson, NC: McFarland and Company, 2006), 1-3.

⁶ City of London (England) Court of Common Council, *Articles to Be Enquired of, What Orders Haue Bene Put in Execution, for the Restreinyng of the Infected of the Plague, within the Citie of London and Liberties Thereof* (London: J. Day, 1577). Although these queries into the national compliance with Plague Orders makes no direct references as to whether the rich or poor were more afflicted by plague, they do ask if the poor were treated more severely, or restrained more than the rich.

1347. In fact, some Europeans were aware of the disease's outbreak in the East and had followed its progress before it entered Europe. The *Historia Roffensis*, a chronicle of the Rochester cathedral priory, describes the beginning of plague: "A great mortality of men began in India and, raging through the whole of infidel Syria and Egypt and also through Greece, Italy, Provence and France arrived in England, where the same mortality destroyed more than a third of the men, women and children."⁷ Guy de Chauliac, surgeon to Pope Clement VI, noted its spread throughout the East and into the West. In *Great Surgery* written in about 1363, Chauliac wrote:

I call it great, because it covered the whole world, or lacked little of doing so. For it began in the East, and thus casting its darts against the world, passed through our region toward the West. It was so great that it left scarcely a fourth part of the people. And I say that it was such that its like has never been heard tell of before; of the pestilences in the past that we read of, none was so great as this. For those covered only one region, this the whole world; those could be treated in some way, this in none... Many were in doubt about the cause of this great mortality. In some places, they thought the Jews had poisoned the world: and so they killed them. In others, that it was the poor and deformed: and they drove them out. In others, that it was the nobles: and they feared to go abroad.⁸

Treatises by learned physicians admitted that some sort of natural phenomenon or process might be responsible for the disease's prevalence, although most believed that God was ultimately responsible. Europeans were unsure if the disease was a secondary result of a natural phenomenon, or if God's primary intention was to punish them for their lack of faith as much as to punish infidels for adhering to the wrong faith.

⁷ *Historia Roffensis*, quoted in Rosemary Horrox, ed., *The Black Death* (Manchester: Manchester University Press, 1994), 70.

⁸ Guy de Chauliac, quoted in Anna Montgomery Campbell, *The Black Death and Men of Learning* (New York: AMS Press, 1966), 3.

When plague arrived in Europe, it became a focus of inquiry. A dozen plague treatises written by physicians and surgeons during the first two years of the epidemic have survived. In these treatises, the authors discuss methods for avoiding plague and treating victims. In addition, the authors attempted to explain the causes of the disease. Authors of these treatises explored many possible general causes of the plague, the majority of which included the production of poisonous vapors. Various explanations for the production of these vapors were offered, including a planetary conjunction on March 20, 1345, a battle between solar rays and the Indian Ocean, and earthquakes in 1347.⁹ Medieval physicians and surgeons assumed that if they could discover the causes of the disease, they would be able to help prevent outbreaks and cure victims.¹⁰ Despite years of study, many questions about the plague outbreaks remain unanswered, notably, why did plague arrive when it did and what caused it to disappear after several hundred years of devastation? Although it has long been accepted that closing houses with plague victims and their families locked inside increased European plague mortality rates, the full impact of human behavior on plague epidemics is yet to be discovered. Not only is an overall explanation for pattern of plague pandemics still a mystery, but even the general pattern of plague epidemics remains unresolved, in large part because

⁹ Ibid., 40-46.

¹⁰ The Paris Medical Faculty, quoted in Horrox, ed., *The Black Death*, 158-9; Campbell, *Black Death and Men of Learning*, 66. Because of beliefs about the poisonous vapors north facing houses on hills were considered to be the most healthful.

it is unclear to what extent Europeans distinguished between epidemics of different diseases.¹¹

Interest in questions and problems produced by plague epidemics of the past has waxed and waned. During the centuries when plague ravaged Europe, it was a focus of interest and inquiry; in the years from 1348 to 1500 as many as 1,000 plague treatises spread throughout Europe.¹² However, because very little progress was made in treating or preventing plague, when other diseases entered Europe, the focus of inquiry shifted away from plague to the new diseases such as syphilis.¹³ Nonetheless, while plague

¹¹ J. F.D. Shrewsbury, *A History of Bubonic Plague in the British Isles* (Cambridge: Cambridge University Press, 1970), 52, 127-128, argues that even in 1348 people died of causes other than plague. He further says that assumptions that subsequent epidemics were primarily plague are wrong, and that contemporaneous descriptions of the 1360-1 epidemic as plague were wrong; Joseph P. Byrne, *The Black Death*, ed. Jane Chance, *Greenwood Guides to Historic Events of the Medieval World* (Westport, CT: Greenwood Press, 2004), 27; Slack, *Impact of Plague*, 25; Cohn, *Black Death Transformed*, 105-109. Cohn says that medieval chroniclers made an attempt to differentiate between diseases and reserved the term “Big Death” for what we now refer to as plague. When discussing other diseases that produced high mortality “Big Death” or a variant was very rarely used. Cohn also notes that few tracts were written about diseases other than plague.

¹² Cohn, *The Black Death Transformed*, 66; Nancy G. Siraisi, in *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (Chicago: The University of Chicago Press, 1990), writes that 281 plague tracts were written between the mid-fourteenth century and 1500, 128.

¹³ Syphilis first appeared in Europe in 1493 and quickly became the topic of many medical treatises and a central element in the debate over the extent and significance of the knowledge that the ancients had of all diseases. For information on early treatises and descriptions of this new disease see Claude Quétel, *History of Syphilis* (Baltimore: The Johns Hopkins University Press, 1990), 11-32, 323; Jon Arrizabalaga, John Henderson, and Roger French, *The Great Pox: The French Disease in Renaissance Europe* (New Haven and London: Yale University Press, 1997); Roy Porter, *The Greatest Benefit to Mankind* (New York: W.W. Norton and Company, 1997), 166-167; Paul A. Russell, "Syphilis, God's Scourge or Nature's Vengeance? The

remained a common but terrifying feature of the disease landscape, medical treatises providing methods for avoiding and treating plague continued to be written and printed.¹⁴ During the Enlightenment there was great faith that human study and ingenuity would almost inevitably produce progress in human health and living conditions. As a result, interest in the chaos caused by past scourges subsided. Plague outbreaks slowly receded east with the last major outbreak in London in 1665, in Marseilles in 1720, and the final outbreak in Moscow in 1771. Smallpox became controllable when Lady Mary Wortley Montagu (1689-1762) introduced to England a method of inoculation she had learned of in Turkey; thus, the investigation of plague,

German Printed Response to a Public Problem in the Early Sixteenth Century," *Archive for Reformation History* 80 (1989): 286-307; For a sampling of contemporaneous commentaries see Girolamo Fracastoro, *Fracastor: Syphilis or the French Disease a Poem in Latin Hexameters*, trans. Heneage Wynne-Finch (London: William Heinmann Medical Books, 1935); Ulrich Von Hutton, "De Morbo Gallico," in *Classic Descriptions of Disease: With Biographical Sketches of the Authors*, ed. Ralph H. Major (Springfield, IL: Charles C Thomas, 1939/1519), 34-41n; Nicolo Leonicensi, "Concerning the Epidemic Which the Italians Call the French Disease but the French Call Neapolitan," in *Classic Descriptions of Disease: With Biographical Sketches of the Authors*, ed. Ralph H. Major (Springfield, IL: Charles C Thomas, 1939/1497), 15-17.

¹⁴ Simon Kellwaye, *A Defensative against the Plague: Contayning Two Partes or Treatises: The First, Shewing the Meanes How to Preserve Us from the Dangerous Contagion Thereof: The Second, How to Cure Those That Are Infected Therewith. Whereunto Is Annexed a Short Treatise of the Small Poxe: Shewing How to Governe and Helpe Those That Are Infected Therewith* (London: John Windet, 1593); Jon Arrizabalaga, "Facing the Black Death: Perceptions and Reactions of University Medical Practitioners," in *Practical Medicine from Salerno to the Black Death*, ed. Luis Garcia-Ballester, et al. (Cambridge: Cambridge University Press, 1994); Ron Barkai, "Jewish Treatises on the Black Death (1350-1500): A Preliminary Study*," in *Medicine from the Black Death to the French Disease*, ed. Roger French (Aldershot: Ashgate Publishing Company, 1998); W. P. Barrett, ed., *Present Remedies against the Plague Etc., Shakespear Association Facsimiles* (Oxford: Oxford University Press, 1933).

which was seen to be a symptom of past failures, fell out of favor.¹⁵ Interest in plague did resurface in London in the 1720s as a practical response to the threat of a plague outbreak that was raised by the epidemic in Marseille, and then again in the 1750s when England feared an outbreak because of plague in the Crimea.¹⁶ For the most part, the influence of the Enlightenment made future improvements more significant than the investigations of large scale destruction and societal failures of the past.¹⁷

However, by the beginning of the twentieth century, events conspired to make the study of plague and the devastation it had wrought in previous centuries appear of increasing relevance. These events called attention to the devastating social impact of plague as much as to its medical and health aspects. In 1894, bubonic plague erupted in Hong Kong and began to spread around the world. This outbreak drew attention to plague but, as importantly, the large scale disruption and chaos caused by World War I produced an increased interest in the extensive disruptions produced by the initial

¹⁵ The Enlightenment's lack of concern for past failures is demonstrated by the writings of Voltaire (1694-1778). Voltaire, *Voltaire: Letters on England*, trans. Loenard Tancock (London: Penguin Books, 1980), 53-56. When Voltaire wrote about disease he wrote about the smallpox inoculation process introduced to England by Lady Montagu but did not address either the Marseilles or earlier plague epidemics. In *Candide*, Voltaire addressed the issue of contemporaneous disasters and disease. In it he wrote about war, syphilis, and the Lisbon earthquake.

¹⁶ Robert Mayer, "The Reception of a *Journal of the Plague Year* and the Nexus of Fiction and History in the Novel," *English Literary History* 57, no. 3 (1990): 531.

¹⁷ Roy Porter, *The Enlightenment*, ed. Richard Overy, Second ed., *Studies in European History* (New York: Palgrave, 2001), 63.

plague outbreak of 1348 in Europe.¹⁸ Although World War I was followed by a devastating global flu outbreak that killed “millions upon millions of people in a year or less,” these deaths caused by the 1918 epidemic do not seem to have spurred inquiry into historic disease outbreaks.¹⁹ It was World War I, which provided a firsthand demonstration of worldwide chaos, together with the Modern Pandemic, a plague pandemic that began in Hong Kong in 1894, that eventually increased interest in earlier plague pandemics and the devastation and societal changes they produced.

Plague continues to be of interest because, from the vantage point of the first decade of the twenty-first century, the threat of inescapable pandemics is again all too real. The threats seem to be myriad, as new diseases are constantly being discovered and old diseases are being found in new places. AIDS continues to spread and kill worldwide, and although the virus that causes it has been isolated, the speed with which it mutates has not only confounded attempts to treat the infected and to create a vaccination, but it has also challenged conceptions about how viruses behave.²⁰ The

¹⁸ G. G. Coulton, *The Black Death* (New York: Robert M McBride and Company, 1929), 9.

¹⁹ Alfred W. Crosby, Jr., *America's Forgotten Pandemic: The Influenza of 1918*, New Edition ed. (Cambridge: Cambridge University Press, 2003), 311; Campbell, *Black Death and Men of Learning*, says that having suffered through the medical community's inability to prevent or control the 1918 flu, people in the 1920s were not surprised by medieval inability to prevent plague devastation, 8.

²⁰ Not only was the clear link between cancer and a virus (HIV) new, but HIV (and FIV) were remarkable for having large numbers of variants that continue to develop even after infection. See Cecilia Cheng-Mayer et al., "Biologic Features of HIV-1 That Correlate with Virulence in the Host," *Science* 240, no. 4848 (1988): 80-82; Stephen J. O'Brien, *Tears of the Cheetah: And Other Tales from the Genetic Frontier* (New York: St Martin's Press, 2003), 4, 107-17.

Second Pandemic and HIV epidemics occurred centuries apart and epidemiologically behave very differently, yet the problems and questions that societies encounter as they attempt to control the spread of a fatal disease are remarkably similar. The study of plague epidemics of medieval and early modern Europe can serve as a warning of possible dangers and provide an encouraging example of a society that managed to survive, despite devastating death tolls.

Although HIV is a widespread infectious disease threatening the world in the twenty-first century, it is by no means the only infection that is challenging societies and epidemiologists. The list of new diseases and the potential for new diseases seem almost endless. Ebola, a hemorrhagic fever, has been breaking out sporadically in isolated communities in west Central Africa. In addition to humans it has ravaged animals such as gorillas and only after extensive searching for the host population have three species of fruit bats been identified as potential reservoirs.²¹ Moreover, the recognition of Hantavirus pulmonary syndrome (HPS) in 1993 drew attention to the fact that disease agents with the potential to produce new epidemics are still a threat despite modern science. HPS also served as a reminder that traditional learning and social patterns often develop in response to disease threats. The Navajo people of the southwest have traditional routines of cleanliness that were based on mythological events. These beliefs discouraged waste and garbage in the house, factors that might entice deer mice into having close contact with humans; thus these beliefs, and their

²¹ Eric M. Leroy et al., "Fruit Bats as Reservoirs of Ebola Virus," *Nature* 438, no. 1 (2005): 575-76.

associated behavior likely protected Navajo people from infection from the Hantavirus.²²

The Severe Acute Respiratory Syndrome (SARS) outbreak in Asia and the ongoing examples of avian flu jumping the boundary between species, from fowl to humans, have reminded people that despite all the medical knowledge and technology available in the twenty-first century, another wide scale and un-treatable human epidemic is a very real possibility. Societies might one day face an epidemic with morbidity and mortality rates similar to those of plague epidemics of the past; thus, inquiry into these epidemics is not driven exclusively by a desire to examine the chaos of historic periods. Inquiry is also driven by a desire to understand the infrastructure and cultural strengths that permitted society to function despite mortality rates that sporadically exceeded 20 percent. These mortality rates were high enough to make even the task of burying victims an almost insuperable burden. In the light of the distress produced by the insignificant anthrax threats that occurred in 2001, the ability of historical societies to continue to function during plague epidemics, despite catastrophic mortalities, is truly awe-inspiring.

²² Mark Jerome Walters, *Six Modern Plagues and How We Are Causing Them* (Washington: Island Press/Shearwater Books, 2003), 120-123; David R. Harper and Andrea S. Meyer, *Of Mice, Men, and Microbes: Hantavirus* (San Diego: Academic Press, 1999), 47. These two authors have a very different take on the depth of the Navajo understanding of the relationship between mice and disease. Centers for Disease Control and Prevention, *Navajo Medical Traditions and Hps* [Web Site] (Centers for Disease Control and Prevention, 2004 [cited November 12, 2005 2005]); available from <http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/navajo.htm>.

The study of the Second Pandemic provides an example of human survival and interaction with a mysterious and misunderstood epidemic force. Furthermore, comparison of the plague's impact during the initial epidemics with the impact of the final epidemics of the pandemic serves as a reminder that human behavior can have a direct influence on disease patterns as well as the reverse. The study of plague epidemics of the past provides a reminder that broad societal factors can be as significant as medical care in determining the outcome of epidemics.

Studies of individual resistance to infection by HIV have provided evidence that plagues of the past have had a direct and significant influence on the genetic composition of Western Europeans. A genetic mutation that probably originated in Scandinavia and was distributed though Europe by Viking invaders appears to be the best known and most effective natural defense against AIDS.²³ This mutation, known as CCR5- Δ 32, is believed to have originated, or at least to have been very rare, 2000 years ago, but about 700 years ago Europeans experienced a disease or other natural force that favored survival of people who had this mutation; thus the mutation became much more common.²⁴ At present it is unclear what disease selected for this mutation, but it must have been a disease that devastated Europe in the late middle ages. Two diseases being

²³ Alison P. Galvani and Montgomery Slatkin, "Evaluating Plague and Smallpox as Historical Selective Pressures for the CCR5- Δ 32 HIV Resistance Allele," *PNAS* 100, no. 25 (2003): 1576-79.

²⁴ Gerard Lucotte, "Frequencies of 32 Base Pair Deletion of the (Δ 32) Allele of the HIV-1 Co-Receptor Gene in the Caucasians: A Comparative Analysis," *Infection, genetics, and Evolution: Journal of Molecular Epidemiology and Evolutionary Genetics in Infectious Diseases* 1, no. 3 (2002): 201-205; O'Brien, *Tears of the Cheetah*, 237.

investigated for providing this selective force are *Y. pestis* and the variola virus, which produces smallpox. People who have inherited this mutation from both parents appear to be immune to HIV, and HIV seems to develop more slowly in those who have inherited the mutation from only one parent. In addition to slowing the disease progress, having one copy of the mutated gene seems to confer some resistance against contracting AIDS.²⁵ If it can be made, the identification of the disease or diseases that selected for this genetic mutation in northern Europe will provide a powerful argument for that disease having been a significant factor in the epidemics of the medieval and early modern periods.

As society again faces the threats of large scale epidemics, without medical cures, the study of the way people understood and responded to the Second Pandemic is once again relevant. I explore this pandemic by focusing on London because it played a pivotal role in the plague cycle and because information on its aggregate population is more complete, over the course of more years, than for other locations in England. However, London also presents some difficulties for analysis; the patterns plague exhibited there were not always duplicated throughout the country. It had an atypical population just by being the largest city in Britain, and it had a relatively young, mobile and male-dominated population. During the late medieval and into the early modern periods, London's population grew, even though its death rate often exceeded its birthrate, because people, both peasants and merchants, were drawn to London for the

²⁵ Jon Cohen, "Receptor Mutations Help Slow Disease Progression," *Science* 273, no. 5283 (1996): 1797-1798.

economic opportunities it provided.²⁶ Because of this in migration, scholars have found that the poor, illiterate people of London are less easily tracked as individuals and members of specific family groups than are peasants. In the countryside some manorial records allow historians to track changes in the tenancy of individual freeholds, thus providing considerable information on individuals and their families.²⁷ Despite the limitations, a concentration on London has many advantages. Although details from the early epidemics are scarce, London provides the researcher with an increasingly complete records from the later epidemics. London records include several first-person accounts of London plague epidemics, and plague pamphlets, as well as parish and city records. Further, because plague was endemic in London throughout the period of plague epidemics between 1348 and 1665 known as the Second Pandemic, residents of the city were under more pressure to modify their behaviors than were inhabitants of places where plague was less common. The special place that London held in relation to

²⁶ In the period between 1348 and 1550 the population of London grew although the population of England was not increasing. According to Maurice Keen, *English Society in the Later Middle Ages 1348-1500* (London: Penguin Books, 1990), 15, people came to London to create the capital to buy their way into the gentry; Colin Platt, *King Death: The Black Death and Its Aftermath in Late-Medieval England* (Toronto: University of Toronto Press, 1996), 20, notes that the only way a city could maintain its population “was through continuous inward migration.” Even as late as 1660 London was maintained by migration; A. Lloyd Moote and Dorothy C. Moote, *The Great Plague: The Story of London's Most Deadly Year* (Baltimore: Johns Hopkins University Press, 2004), 26, note that “One-sixth of ... [Charles II's] subjects who survived to adulthood would live at some time in the metropolitan area.”

²⁷ This is especially true during the first century of the plague epidemics when manorial rolls can provide details about changes in land holdings, while there is very little information about who died in London. See Platt, *King Death*, 1-18; Shrewsbury, *History of Bubonic Plague*, 51, 82.

Britain as a whole and in relation to plague epidemics has long been recognized by officials and scholars. Recognition of London's role in spreading plague throughout England can be seen in the plague orders, that were issued in 1625 by the King and his Privy Council, rather than by London authorities. The Royal orders were theoretically directed at the region beyond the London liberties, but they were clearly targeted at London. These orders required the suppression of "the grievous Infection of the Plague, and to prevent the increase thereof, within the Citie of London and parts about it."²⁸ Despite their lack of authority over London liberties, the King and his Privy Counsel clearly understood that controlling plague in London was important to controlling plague in the rest of the country.

Printed plague orders were variously issued both by the monarch in conjunction with the Privy Counsel and by the London Corporation. They spelled out the measures that were to be undertaken by individual citizens and by local government to limit the impact of plague and to control its spread. They were issued, reissued verbatim, and in edited versions. Surviving plague orders that date from between 1578 and 1665 provide

²⁸ England and Wales James I (1603-1625), *Orders Thought Meet by His Maiestie, and His Privie Councill: To Be Executed Throughout the Counties of This Realme, in Such Townes, Villages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Aduice Set Downe by the Best Learned in Physicke within This Realme, Containing Sundrie Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preseruacion of His Good Subiects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected* (London: Printed by Iohn Bill, 1625), np.

In quoting from original sources I have modernized most typical typographical elements, so that I use current conventions on when to use i or j and I use s, w, or v when appropriate rather than f, vv, or u; however, I maintain the spelling of the original, in hopes that doing so maintains a sense of immediacy.

valuable insights into how plague was understood and how its transmission was explained in Stuart and Tudor England. Because so much of this material was repeatedly issued with very few changes, I think that the understanding and concepts demonstrated in these orders substantially predate the earliest of the printed versions.²⁹ These official plague orders were often published together with medical advice from “the best learned in Physicke within this Realme.”³⁰

In addition to the medical advice published along with the plague tracts, I have examined Simon Kellwaye’s medical treatise *A Defensative Against the Plague*. It was published in 1593, during a plague epidemic, shortly after the first of the English plague orders were published. The work is dedicated to “Robert Devorax, Earl of Essex and Ewe, Vicount of Hereforde, Lord Ferrer of Chartley, Borchet, Louayne, Master of the Queens Horse, Knight of the noble order of the Garter.”³¹ In the flowery dedication Kellwaye says that he has written this advice in emulation of the heathen “Stoikes” and

²⁹ In 1518 the government drew up orders to prevent plague but it was not until 1574 that the first plague orders were printed. See F. P. Willson, *The Plague in Shakespeare's London* (Oxford: Oxford University Press, 1963), 15.

³⁰ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Maiestie, and Her Priuie Councill, to Be Executed Throughout the Counties of This Realme, in Such Townes, Uillages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Aduise Set Downe Vpon Her Maiesties Expresse Commaundement, by the Best Learned in Physicke within This Realme, Contayning Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preseruation of Her Good Subiects from the Plague before Infection, as for the Curing and Ordring of Them after They Shalbe Infected* (London: Christopher Barker, 1578(?)), np.

³¹ Kellwaye, *A Defensative against the Plague*, A2r. Kellwaye’s patron, Robert Devereux, 2nd Earl of Essex (1566 –1601) was one of Queen Elizabeth’s favorites.

“Romanes” who sacrificed for their countries unlike people “in this declining dotage of the world [when] the most part of men are prone to follow their owne preferments, delighting in selfe-love and greedy snatching at the toppe of fickle fortunes wheel.”³²

Kellwaye says that he has written the treatise so that anyone who reads it can learn how to avoid the plague, “as also how to order, governe and cure those that are infected therewith.”³³ The title page further emphasizes that his medical advice is provided as a service to the country. The recommendations that Kellwaye offers are similar to that offered with the plague orders, but his treatise is longer and provides a much broader range of recipes and his tone is more florid. Extensive summaries of these orders, as well as the long medical treatise written by Simon Kellwaye, are included as appendices.

Nomenclature

The disease that devastated England and much of the rest of Europe for several hundred years has been referred to by many different terms. The initial wave of death that swept across Europe was often simply referred to as “the great mortality.” The following couple of outbreaks were named individually; the second outbreak was referred as the *pestis secunda* or *pestis puerorum* because the victims were

³² Ibid., A3v.

³³ Ibid., A3r.

predominantly young people.³⁴ The next major outbreak was referred to as the *pestis tertia*, but after this outbreak in 1369, subsequent outbreaks were often referred to simply as “pestilence” or “the peste” or “sickness.” Shrewsbury notes that in the 1500s the term most certain to indicate plague was “the great sickness.”³⁵ The term Black Death did not come into common usage until after 1665.³⁶

Probably “Black Death” originated as an over-literal translation into English or a Scandinavian language of the Latin terms *pestis mors* or *mors alta*.³⁷ These Latin terms had been intended to signify a terrible pestilence rather than the more literal Black Death. More recently it has been commonly assumed that the term describes the color of a body infected by plague. The term Black Death has also been linked to clinical symptoms of the disease.³⁸ It has been widely assumed to indicate the occurrence of severe petechial hemorrhaging, or bruising, which produces black splotches all over the

³⁴ Robert S. Gottfried, *The Black Death: Natural and Human Disaster in Medieval Europe* (New York: The Free Press, 1983), 130.

³⁵ Shrewsbury, *History of Bubonic Plague*, 161, 172.

³⁶ *Ibid.*, 37. Shrewsbury cites the OED III as jointly attributing the term Black Death to the work of Mrs. Penrose (Mrs. Markham) in 1823 and “Babington’s translation of Hecker’s *Der Schwarze Tod* in 1833.”

³⁷ Philip Ziegler, *The Black Death* (New York: Harper Torchbooks, 1969), 17-18.

³⁸ Graham Twigg, *The Black Death: A Biological Reappraisal* (New York: Schocken Books, 1985), 205-207. Twigg cites several authors from the late 1800s and early 1900s, who linked the term Black Death to several different and “characteristic” and diagnostic symptoms of plague.

victim.³⁹ Although plague, like many other diseases, can occasionally produce black splotches, there is no evidence that the term Black Death is in any way descriptive of plague symptoms.⁴⁰

The use of the term Black Death poses several difficulties. Although it did not originate until late in the 300-year plague epidemic cycle, the term Black Death was then used primarily to designate the initial 1348 outbreak in the medieval/early modern plague cycle and to differentiate the initial outbreak from the Great London Plague of 1665.⁴¹ These terms were intended to differentiate two great epidemics, not the disease per se. Over time, the final London epidemic has receded in significance and the term Black Death has come to signify the disease rather than a specific plague epidemic. This shift in meaning presents a problem because the term Black Death is not used in reference to plague epidemics of the present, nor to the pandemic referred to as the Plague of Justinian that began in 540 A.D., although these epidemics are generally thought to have been the result of the same disease.⁴² A second problem created by

³⁹ Robert Sullivan, *Rats: Observations on the History and Habitat of the City's Most Unwanted Inhabitants* (New York: Bloomsbury, 2004), 136.

⁴⁰ Shrewsbury, *History of Bubonic Plague*, 37; John Kelly, *The Great Mortality: An Intimate History of the Black Death, the Most Devastating Plague of All Time*, 1st ed. ed. (New York: Harper Perennial, 2006), 23; Ziegler, *The Black Death*, 17-18.

⁴¹ Zeigler, *The Black Death*, 18. According to Zeigler this is Cardinal Gasquet's (1846-1929) explanation for the term.

⁴² Shrewsbury, *History of Bubonic Plague*, 18-19; Kelly, *Great Mortality*, 41; William H. McNeill, *Plagues and Peoples* (Garden City: Anchor Press, 1976), 170-171; Mark Achtman et al., "Yersinia Pestis, the Cause of Plague, Is a Recently Emerged Clone of Yersinia Pseudotuberculosis," *PNAS* 96, no. 24 (1999): 14043;

referring to the first wave of the pandemic by the term Black Death and to later epidemics by other terms is that it creates a false dichotomy between epidemics. Using the term Black Death to designate the initial medieval outbreak also creates the impression that the initial outbreak was of primary significance. The initial onslaught in 1348 was the most widespread and devastating; however, the full impact of the plague on European society and material culture was produced by the almost continuous presence of plague for over three centuries.

Because of all the misconceptions associated with the term Black Death, I use the term plague in this manuscript to refer to the epidemic disease that ravaged Great Britain from 1348 through 1665. The term *plaga*, Latin for stroke, came to be associated with these epidemics early in the plague cycle. It was used first by King Magnus Eriksson of Norway and Sweden in 1349, and by the fifteenth century, transformed into the English form of the word, plague had come into common usage in England.⁴³ I chose this term in preference to other options because it is both specific enough to be acceptable to modern sensibilities and general enough to allow for some ambiguity; it is used to describe any number of diseases and other events that produce epidemics or other disasters. The term plague serves as a reminder that the people afflicted by these epidemics did not know exactly with what they were dealing, even though they do seem to have considered plague a discrete and uniquely terrible malady.

Benedictow, *Black Death 1346-1353*, 39; Twigg, *Black Death*, 16; Moote and Moote, *Great Plague*, 5.

⁴³ Benedictow, *Black Death 1346-1353*, 5.

2 Biological Overview: *Yersinia Pestis*

The disease that swept through Europe in 1347-1348 and then remained endemic for more than 300 years was caused by a vector-borne bacteria, *Yersinia pestis*.¹ The nature of the disease and the manner by which it is spread explain, in large part, why medieval and early modern Europeans had so much difficulty understanding plague epidemics and controlling the spread of plague.

In 1894 *Y. pestis* was first identified as the causative agent of the plague outbreak that was raging in Hong Kong. This discovery was made only a couple of decades after a disease was first conclusively linked to a specific microbe. Because the life cycle of *Y. pestis* and the etiology of the disease it produces are both complex, Western Europeans do not seem to have associated plague with either rats or fleas until 1894, after *Y. pestis* was isolated in patients in plague hospitals in Hong Kong. Subsequently, it was identified in dead rats that had been noticed in conjunction with plague epidemics in Yunnan and in Hong Kong. The fact that dead rats were found in

¹ Currently the nature of the pandemic that swept through Europe, Asia and Africa in 1348 is the subject of much debate. Scholars Susan Scott and Christopher Duncan, Graham Twigg and Samuel K. Cohn argue that the disease that ravaged Europe was not caused by *Y. pestis*, while Paul Slack and Ole Benedictow accept the idea that *Y. pestis* was the primary causative agent. Viewpoints range from the idea that the disease must have been bubonic plague to the view that the pandemic could have been anything except bubonic plague; anthrax has been considered a possible alternative disease as has some variant of hemorrhagic fever. However, at the time *Y. pestis* was identified, the disease for which it was responsible, plague, bubonic, pneumonic and septicemic, was assumed to be the same disease responsible for the medieval/early modern plague epidemics. See Cohn, *Black Death Transformed*, 8, 12-14.

conjunction with human plague outbreaks did not provide incontrovertible evidence that rats, let alone fleas, were implicated in human plague, but by 1905 both rats and one of their fleas, *Xenopsylla cheopis*, were linked to the spread of plague.² The Indian Plague commission included an entomologist and the commission was actively pursuing the possibility that fleas were instrumental in the spread of plague.³ In 1908, work in India confirmed that fleas were instrumental in spreading plague from rats to people.⁴

While plague can be spread in a number of ways, the primary means is by flea bites. After fleas bite an infected animal, they take in and then carry the blood and the bacteria to another animal or human. However, even this primary step in the infective process is not simple. Although all fleas can ingest bacteria along with blood if there is a sufficiently high level of *Y. pestis* in the blood, only in flea species with a proventriculus, a part of the foregut, is the infectious process likely to be completed. *Xenopsylla cheopis*, a rat flea, is the most efficient plague vector. In these rat fleas, the bacilli sometimes become established in the fleas' proventriculus. Because virulent bacteria can divide more rapidly than they can be excreted, the bacteria can form a solid mass that blocks the stomach of the flea.⁵ This creates what is referred to as a *blocked*

² Byrne, *The Black Death*, 17.

³ Benedictow, *Black Death 1346-1353*, 11.

⁴ Byrne, *The Black Death*, 17.

⁵ It is probable that all fleas can spread plague; however, not all flea species are equally likely to do so. Of the three species most commonly mentioned in conjunction with the spread of plague, *Xenopsylla cheopis*, *Nosopyella fasciato*, (rat fleas) and

flea. This blockage prevents the flea from absorbing food – blood – into its stomach when it eats. In this condition, the flea becomes hungry and in an attempt to satiate its hunger it feeds voraciously. In this process the gullet becomes distended and overextended because the flea's stomach is blocked. When the flea takes in more blood than it can hold, blood is regurgitated into the next bite, and in this process, *Y. pestis* can be injected into a new host.

Flea species differ not only in their ability to become blocked and thus to spread plague but also in their living and nesting habitats, which also have an effect on the fleas' likelihood of spreading plague. In general, fleas can be divided into two groups based on their patterns of living: those that live on their host and those that live in some sort of nesting material from which they can easily reach their hosts. The human flea, *Pulex irritans*, resides primarily in nesting material such as sheets and bedding and is very sensitive to light. *X. cheopis*, considered the most effective flea for spreading plague, on the other hand, primarily lives on its host and is light tolerant.⁶ Further *X. cheopis* can survive by eating organic material such as grain, which means that it could be successfully transported in shipments even when no rats were present.

Pulex irritans (human flea), *X. cheopis* is clearly the most efficient. It has a proventriculus that easily becomes blocked by the growth of *Y. pestis* and is not easily unblocked Twigg, *Black Death*, 127-128; R. Pollitzer, "A Review of Recent Literature on Plague," *Bulletin of the World Health Organization* 23, no. 2-3 (1960): 357-361. Pollitzer provides the records of which fleas were present at various plague foci as well as information on the relative efficiency of a few varieties of fleas

⁶ Benedictow, *Black Death 1346-1353*, 19.

Infection by *Yersinia pestis* produces septicemia, which is the presence of pathogenic bacteria in the blood, and it is this process that efficiently spreads the infection. Because flea feces can contain bacilli, it is theoretically possible that flea feces could spread infection; however, feces are not likely an effective means of spreading plague.⁷ *Y. pestis* bacteria that are passed through the flea's alimentary canal are less virulent than bacteria that have not done so and are too large to easily cross the skin barrier. Flea feces do contain enough bacteria to cause infection through skin abrasions, and flea feces may be responsible for occasional plague cases. If plague was occasionally spread by flea feces, it could explain infrequent variations in the disease's virulence. Nonetheless, the most common method by which plague is spread, by blocked fleas, insures that only the most virulent *Y. pestis* survive, because only the most virulent bacilli reproduce quickly enough to result in a blocked flea.⁸ This insures that *Y. pestis* remains consistently virulent, unlike other vector borne diseases like the rickettsiose bacteria that produce typhus, which can vary greatly in virulence. This difference helps explain why the last epidemic explosions of plague in London in 1665 and Marseilles in 1720 produced exceptionally high mortality figures.⁹

⁷ Twigg, *Black Death*, 16. The primary route of infection is still directly into the bloodstream via scratching because unlike *Yersinia pseudotuberculosis*, *Y. pestis* is not genetically encoded for protection against destruction by stomach acids.

⁸ Benedictow, *Black Death 1346-1353*, 15, 21.

⁹ The role blocked fleas play in spreading *Y. pestis*, helps to explain why epidemics remained devastating throughout the more than 300 years of the pandemic. The mortality rate for cases of untreated bubonic plague are remarkably similar to those reported over 500 years ago.

Although contemporary *Y. pestis* outbreaks differ from those of the Second Pandemic, the three plague forms known today appear to have been present. The three forms are bubonic, pneumonic, and septicemic; all three are produced by the same bacillus, *Y. pestis*. The bubonic form is considered the most common form in plague outbreaks of the current pandemic. The disease's common name, bubonic plague, takes its name from the buboes, or swellings, that the disease produces in the lymphatic glands. Swelling is most severe in the gland nearest the site of infection, in most cases a bite by an infected flea. Fatal cases of the bubonic form may include abscesses within the lungs. These infections are known as secondary pneumonic plague. When these lung abscesses rupture they allow the bacilli to be coughed up and spread to new victims who are said to have primary pneumonic plague. Because the pneumonic form develops when bacilli are inhaled, the bubonic form periodically transforms into the much more fatal and potentially contagious pneumonic form.¹⁰ The septicemic form develops when the bacilli multiply rapidly in the blood instead of collecting in the lymphatic glands.¹¹ Death can occur within hours of the first symptom.¹²

¹⁰ Jean-Noel Biraben, "Current Medical and Epidemiological Views on Plague," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England* (Derbyshire: Local Population Studies, 1977), 28. There is evidence that weather plays a role in this process. Coughed droplets remain airborne longer when humidity is high and *Y. pestis* remains viable longer when the temperature is cool. Additionally Pollitzer, suggests that travelers infected with the bubonic form who continue with their travels may be more likely to develop secondary lung involvement – this is attributed to continued exertion loosening “infected thrombi from blood-vessels, round the buboes,” thus leading to lung involvement. R. Pollitzer, *Plague* (Geneva: World Health Organization, 1954), 509.

¹¹ Benedictow, *Black Death 1346-1353*, 13. In Bombay 1000 hospitalized patients were tested for *Y. pestis* in their blood, 43 percent had plague bacteria in their

Recent studies into the DNA of *Y. pestis* indicate that it is a recently emerged clone of *Yersinia pseudotuberculosis*, which in most cases produces only a mild illness in humans. According to Achtman and his team, *Y. pestis* is so similar to *Y. pseudotuberculosis* that, except for the historical significance of *Y. pestis* and its impact on human populations, the names could be changed to reflect that they are one species.¹³ Based on mutation chronology, *Y. pestis* is considered by geneticists to be between 1,050 and 20,000 years old. Historic records from the Plague of Justinian (A.D. 542) indicate that it is at least 1,500 years old, but even at the oldest postulated age of 20,000 years, it is a young disease.¹⁴ The relative youth of *Y. pestis* may explain

blood and none of those survived. *Y. pestis* normally builds up in the lymph system, occasionally it multiplies rapidly in the blood rather than in the lymph system in primary septicemia, which can produce death in less than a day. This form seems to have been a little more frequent in the Middle Ages. Because of the speed with which the septicemic plague develops (a person can go from feeling well to being dead within hours), it is the most shocking and thus the most remarkable and remarked upon form of the disease. The low frequency of this and the pneumonic form of the disease (amongst other factors) in the Modern Pandemic, has led some authors to suspect that the plague of the Middle Ages was the result of some disease agent other than *Y. pestis*. See Graham Twigg, Samuel K. Cohn and Susan Scott and Christopher Duncan.

¹² There is yet no clear understanding of why plague sometimes multiplies in the blood rather than in the lymph system but septicemia has recently been linked to the absence of plasminogen activator. Florent Sebbane et al., "Role of the *Yersinia Pestis* Plasminogen Activator in the Incidence of Distinct Septicemic and Bubonic Forms of Flea-Borne Plague," *PNAS* 103, no. 14 (2006): 5526-30.

¹³ Achtman et al., "*Yersinia Pestis*, the Cause of Plague," : 14043. Scientists working at the Max-Planck Institute have yet to determine why mortality rates for the two diseases are so dissimilar, despite studies to examine, specifically, how the small observable changes in the DNA result in mortality changes of such magnitude (14043-14048).

¹⁴ Carl Zimmer, "Genetic Trees Reveal Disease Origins," *Science* 292 (2001): 1093. Many old diseases are known. For example, studies indicate that Hepatitis G

the disease's seemingly erratic mortality rates.¹⁵ It is possible that the infectious level and the mortality rate have not yet reached an evolutionary balance; the disease has not “evolved to an optimum level of virulence.”¹⁶ While it is especially true that in humans *Y. pestis* has not achieved this optimum level of virulence, even in rats its virulence seems to fluctuate wildly.¹⁷

The cycle of human infection by *Yersinia pestis* is complex. Though *Y. pestis* has played a significant role in human history, it is primarily a disease of rodents, and humans are only incidental to the bacillus' life cycle. It cannot be emphasized too much that human epidemics occur as a secondary result of an epizootic, an epidemic within a

may be as old as humans, that it may have speciated as humans did.

¹⁵ Biraben, "Current Medical and Epidemiological Views," 33. Biraben noted that *Yersinia enterocolita* was extremely unstable, which led him to believe it was very new. As it is now known to be the oldest species of *Yersinia*, this suggests that some degree of instability may be a survival technique of *Yersinia* species.

¹⁶ Mark E. J. Woolhouse, Louise H. Taylor, and Daniel T. Haydon, "Population Biology of Multihost Pathogens," *Science* 292, no. 5519 (2001): 1111. Multi-host diseases experience conflicting evolutionary pressures and “the pathogen can be more or less virulent in a second host than the first, and introduction of a second host can lead to an increase or a decrease in virulence in the first host” (1111).

¹⁷ Twigg, *Black Death*, notes that mortality rates in resistance tests for various rats in several cities in India illustrate this principle. In Bombay *R. rattus* was more susceptible than *R. norvegicus* and the susceptibility of both decreased from a high of 12.6% for *R. rattus* in 1952 to a low of 2.2% for *R. norvegicus* in 1956. In Calcutta from 1953-54 the mortality rates were 31.0% for *R. rattus* and 94.7% for *R. norvegicus*. In Madras both species of rat were equally susceptible (24); R. Pollitzer, *Plague* (Geneva: World Health Organization, 1954), 302, reports mortality figures in rats from Madras, a plague-free locality, as 97 to 100 percent.

rodent population.¹⁸ Epidemics only occur when humans are living in close proximity to fleas and to animals more resistant to the disease, in other words, to animals that are capable of surviving an outbreak better than humans do. Thus, any changes that affect the relationships among rats, fleas, and humans can alter human morbidity rates.

Occasional human cases can occur due to accidental contact with fleas from an infected animal, but a full scale epidemic almost by definition requires the full scale die-off of rodents in close contact with humans. *Y. pestis* is endemic within some wild animal populations, typically ground-dwelling rodents, in what is called a sylvatic phase. There are now several permanent reservoirs, inveterate focus areas, where plague exists in a sylvatic phase, spread widely around the world, on all continents except Australia and Europe.¹⁹ Prairie dogs and ground squirrels in the Southwestern U.S. currently are carriers of *Y. pestis*.²⁰ Other, longer term inveterate foci include Central

¹⁸ There is some debate about this point. Ole Benidictow and Gunnar Karlsson have debated the role of rodents in plague in Iceland. Gunnar Karlsson, "Plague without Rats: The Case of Fifteenth-Century Iceland," *Journal of Medieval History* 22, no. 3 (1996), 263-284. Karlsson argues that neither rats nor fleas played any role in plague epidemics of fifteenth century Iceland. Addressing the role of rodents more generally some scholars such as Jean-Noel Biraben have stated that fleas can effectively spread plague from person to person, while others including J. F. D Shrewsbury and William H. McNeil believe it is impossible to have a sustained epidemic without the presence of a rodent reservoir. For a brief portrayal of some of the medieval descriptions that cause modern historians to question *Y. pestis* as the causative agent see Kelly, *Great Mortality*, 295-303, and 22, 299, 303 on pneumonic plague.

¹⁹ H. O. Lancaster, *Expectations of Life: A Study in the Demography, Statistics, and History of World Mortality* (New York: Springer-Verlag, 1990), 98.

²⁰ These foci are presumably the result of the spread of the modern plague from the Port of San Francisco since the plague's arrival in the U.S. in 1900. The term permanent is used but it seems a little strong for a reservoir only a hundred years old.

Asia, Siberia, the Yunnan region, Iran, the Kurdistan plains around the Caspian Sea, Libya, Arabia and East Africa.²¹ Western Europe now has no sylvatic *Y. pestis* focus. During the plague's 300-plus-year infestation of Europe, however, there must have been areas where plague was endemic among rodents, although, it is probable that the primary animals involved in Western Europe were rats cohabiting with humans rather than wild rodents. It seems clear that plague was enzootic among London rats and that some plague outbreaks were caused by epizootics amongst the rats rather than by reintroduction of additional or new *Y. pestis*.²²

Because environmental conditions under ground (e.g., cool and damp) favor the survival of both fleas and *Y. pestis*, fairly resistant burrowing animals that live in large communities are optimum carriers.²³ In order to maintain plague as an endemic disease,

²¹ The expansion of agriculture in the Ukraine may have greatly reduced the area in which plague was enzootic by reducing the area in which the wild host animals could live. See N. P. Mironov, "The Past Existence of Natural Foci of Plague in the Steppes of Southern Europe," *Journal of Microbiology, Epidemiology and Immunology* 29, no. 8 (1958): 1197.

²² Gottfried, *The Black Death*, 9; M. J. Keeling and C. A. Gilligan, "Bubonic Plague: A Metapopulation Model of a Zoonosis," *Proceedings Biological Sciences The Royal Society* 267, no. 1458 (2000): 2219-2230. Keeling and Gilligan's stochastic (statistically random) epidemic model, predicts outbreak patterns of irregularly timed epidemics of varying severity that resemble closely the observed pattern of London epidemic outbreaks. The model assumes many independent but bordering communities of rats.

²³ Chester David Rail, *Plague Ecotoxicology* (Springfield: Charles C. Thomas, 1985), 107. In many regions where plague is enzootic the climate is dry with extremes of heat and cold. In England, burrows or cavities within the walls of houses, would be dryer than the exterior climate. Both fleas and *Y. pestis* may remain dormant within a burrow, which becomes empty during an epizootic; when the burrow is reinhabited the bacilli become reactivated.

its host animals must be fairly resistant to *Y. pestis*, although even resistant species or individuals can be infected if injected with high enough doses of *Y. pestis*.²⁴ Under certain environmental conditions the infection becomes epizootic. Chester Rail has postulated that basic nutrients such as selenium and iron may play a part in this cycle, and thus can affect both the virulence and the human or animal resistance.²⁵ It has also been suggested that iron levels may have played a significant role in varying mortality rates among humans and have been especially important in mortality variations between men and women.²⁶ However, it is not known whether the expected higher level of

²⁴ Ibid., 122-124. Rail calls species moderately resistant to plague, if it takes between 1-1000 mouse LD₅₀ to infect it. Given high enough doses most animals can become infected and infective; Anne Nadakavukaren, *Our Global Environment: A Health Perspective*, 6th ed. (Long Grove, IL: Waveland Press, 2006), 198. LD₅₀ signifies a lethal dose, which is defined as one that will kill 50% of the population of test animals within 14 days.

²⁵ The virulence and growth of the bacilli can be affected by the nutrients in which they are cultured. Rail, *Plague Ecotoxicology*, 128-164; Stephen R. Ell, "Iron in Two Seventeenth-Century Plague Epidemics," *Journal of Interdisciplinary History* 15, no. 3 (1985): 445-457. Ell suggests that because women and infants were iron deficient, and because *Y. pestis* is iron dependent, they were relatively resistant to the plague; Alex Werner and Roy Porter, *London Bodies: The Changing Shape of Londoners from Prehistoric Times to the Present Day* (London: Museum of London, 1998), 66-67, report that evidence from Smithfield cemetery suggests that the very young and elderly were hit hardest. With more study I suspect it will be determined that mortality levels are determined by exposure to rats.

²⁶ Ell, "Iron in Two Seventeenth-Century Plague Epidemics," 445-457. This paper very briefly summarizes several authors' widely varying theories about both gender and age groups that were hit hardest by the plague. Although Ell postulates that iron levels may affect plague mortality levels and that iron deficiencies may have provided women some protection from plague he also states "either that the epidemiology of European plague varied from place to place and time to time or that it is simply not yet susceptible to generalization on the basis of present knowledge" (448).

anemia in women would have been enough to provide them protection. Variations in mortality figures seem erratic and are more likely to have been affected by exposure levels.²⁷

As animals become sick and die, their fleas are driven to seek new hosts. Both fleas and rats (or possibly some other susceptible rodent living in close proximity to humans) are necessary for an epidemic.²⁸ Because rats are so susceptible to *Y. pestis*, several conditions must be met for a protracted and serious outbreak of plague among humans. There must be an enormous rat population, or a reservoir population of some species of wild burrowing animals that occasionally comes in contact with rats or humans, or frequent infusions of plague bacilli. In England there is no evidence that wild animals played a significant role in either spreading the plague or being a reservoir between human outbreaks. Instead, it seems likely that the rats of London served as the plague reservoir. Humans themselves cannot serve as a reservoir for the disease because they are simply too vulnerable. Even in cases of extreme septicemic infection in

²⁷ Platt, *King Death*, 9-10. Platt found that in at least some instances death rates may have been considerably higher among the young and the elderly when compared to mortality rates among young adults; Benedictow, *Black Death 1346-1353*, 350. Benedictow writes that plague mortality is primarily affected by exposure, and I strongly suspect that once more studies have been conducted it will be found that the most important variable affecting the likelihood of contracting plague was the amount of exposure to rats and their fleas.

²⁸ Shrewsbury, *History of Bubonic Plague*, 1. Epidemics in both Manchuria and Madagascar are reported in the absence of rats. In Manchuria the plague was started by Russian outsiders trapping tarvaga, a local marmot and plague carrier, for their pelts. The first case in Manchuria was in October; as a Fall/Winter outbreak the pneumonic form would be expected to be the primary form. See McNeill, *Plagues and Peoples*, 167, 177-9; Twigg, *Black Death*, 22.

humans, it is unlikely there are enough bacilli in human blood to consistently infect fleas.²⁹ In the pneumonic form, human-to-human contagion occurs, but this form occurs almost exclusively in conjunction with the bubonic form. Outside of a host, *Y. pestis* bacilli survive better in a cool, damp environment than they do in a hot, dry one, so the pneumonic form of plague is more easily spread in a cool climate. Therefore, pneumonic plague was probably more prevalent in Europe than in places such as India, Egypt and South Africa, where the plague has been closely observed in modern outbreaks.³⁰ Additionally, *Y. pestis*' temperature preferences suggest that the pneumonic form of the plague was a significant factor in plague epidemics of late fall and winter.³¹ The initial symptoms for these two plague forms are quite dissimilar and yet they were clearly regarded as one disease.³² Evidence from the Modern Pandemic suggests that

²⁹ Rail, *Plague Ecotoxicology*, 20. There is some disagreement about the dangers of human-to-flea contagion. The question seems to be: Do humans have enough resistance to allow the bacillus to build up in sufficient numbers within the blood that fleas would consistently take any in with the blood? See Lancaster, *Expectations of Life: A Study in the Demography, Statistics, and History of World Mortality*, 99; Benedictow, *Black Death 1346-1353*, 14.

³⁰ Biraben, "Current Medical and Epidemiological Views," 30.

³¹ Historians and epidemiologists examine critically the details of any epidemics labeled as plague that occurred outside of the late summer plague. See for example Shrewsbury, *History of Bubonic Plague*, 157; Slack, *Impact of Plague*, 65; Graham Twigg, "Plague in London: Spatial and Temporal Aspects," in *Epidemic Disease in London*, ed. J.A. I. Champion (London: Centre for Metropolitan History, 1993), 22; and Benedictow, *Black Death 1346-1353*, 233-235.

³² Christopher Morris, "Plague in Britain," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England* (Derbyshire: Local Population Studies, 1977), 39. Morris quotes Guy de Chauliac as describing two forms of the disease, the first, clearly the pneumonic, followed by the second which sounds like bubonic. Chauliac also recognized that the pneumonic form was the more

both cool, damp weather and continuous exertion were probably factors in the high level of pneumonic plague described in some of the initial plague descriptions.³³

Some historians have tried to explain the differences in morbidity levels between the Modern Pandemic and the Second Pandemic by arguing that the contagious pneumonic form was much more common, especially in the initial wave of the pandemic. This would help to explain the speed with which plague traveled in the initial wave of the pandemic and the extremely high morbidity rate.³⁴ Although the mortality rates for various forms of untreated plague do not seem to have changed dramatically, the morbidity rate in the Modern Pandemic is much lower.³⁵ Plague is also distinctive because surviving a bout of plague provides immunity for only a limited time.³⁶

contagious. *The Chronicle of Novgorod 1016-1471*, trans. Robert Michell and Nevill Forbes (London: Offices of the Society, 1914) agrees. The Novgorod Chronicle's description of the outbreak of 1352 clearly describes pneumonic plague while the description of the outbreak of 1417 seems to include both bubonic and pneumonic plague. The records from England are less clear but death within three days was noted which sounds like pneumonic plague. Further, John Clyn (*d.* 1349) of Ireland, describes plague as two forms. Benedictow, *Black Death 1346-1353*, 27.

³³ Pollitzer, *Plague*, 509.

³⁴ Slack, *Impact of Plague*, 9, 15; Byrne, *The Black Death*, 26; Kelly, *Great Mortality*, 303.

³⁵ Benedictow, "Morbidity in Historical Plague Epidemics," 404. Benedictow cites figures from the Santander, Spain epidemic of 1596-7 that suggest a survival rate of 12 percent and a morbidity rate of 90 to 95 percent; Pollitzer, *Plague*, 418, reports the fatality rate for untreated bubonic plague is 60 to 90 percent in India and China. Modern morbidity rates have been much lower than those of the earlier pandemic.

³⁶ Biraben, "Current Medical and Epidemiological Views," 29. This information is based on responses to inoculations, from which immunity lasts from

The nature of this disease is important. Because plague is fundamentally a disease of animals, an enzootic, it is not dependent on a dense human population. This is in sharp contrast with some of the crowd diseases that later dominated Western Europe.³⁷ For a smallpox epidemic to continue expanding and progressing, there must be 200,000 people living within a 14 day journey of one another.³⁸ Unlike plague, smallpox is truly contagious in a direct person-to-person manner. Severe influenza epidemics can devastate isolated populations, but in sparsely populated areas highly contagious diseases like new flu mutations typically die out before becoming widespread.³⁹ The fact that plague, unlike smallpox, measles and other highly contagious diseases, did not make it to the New World during the colonial period, despite being prevalent in England during the period of colonization, supports the argument that plague was caused by *Y. pestis*, rather than a disease spread easily from person to person.

months to several years.

³⁷ Crowd diseases developed first in the more densely populated Mideast. It is worth noting that although Russia was relatively underpopulated, like Western Europe, it was linked first by trade and religion with the east, Byzantium, and then it was linked as a Mongol occupied territory.

³⁸ Richard Preston, "The Demon in the Freezer," *The New Yorker*, July 12, 1999, 54.

³⁹ McNeill, *Plagues and Peoples*, 69; Susan Scott and Christopher J. Duncan, *Biology of Plagues: Evidence from Historical Populations* (Cambridge: Cambridge University Press, 2001), 46. Influenza has an infectious period of only two to three days; Paul Hackett, *A Very Remarkable Sickness: Epidemics in the Petit Nord, 1670 to 1846* (Winnipeg: University of Manitoba Press, 2002), 8; John M. Barry, *The Great Influenza: The Epic Story of the Deadliest Plague in History* (New York: Viking, 2004), 95, 102.

Plague produced by *Y. pestis* is distinctly different from these highly contagious crowd diseases Europeans faced. Unlike crowd diseases, plague is not easily spread directly from person-to-person. Rather, plague is a vector-borne disease, primarily of burrowing animals. Its occasional spread to humans is dependent on complex interactions of independent environmental factors that allow large populations of rats, infected with *Y. pestis*, and hosting lots of fleas, to come into contact with people. The complex means by which plague is spread help to explain why it was so difficult for Europeans of the medieval and early modern periods to understand how plague was spread and what they could do to prevent or control it.

3 Plague Epidemics

Three Plague Pandemics

An understanding of the biological complexity of *Yersinia pestis*' infectious cycle can help to explain the diverse patterns of plague epidemics especially, when considered within historical context. Communities and cultures provide different environments within which rats and fleas have varying contact with people. In addition, people from disparate times and places describe their disease experiences differently. Despite these differences, because there is so little information about many of the individual epidemics of the Second Pandemic (1347-1722), researchers often compare data from multiple outbreaks in order to supplement the limited information available from individual outbreaks. Patterns that have been developed by studying plague epidemics of the Modern Pandemic have been supplemented by information garnered from epidemics of the two earlier pandemics: The Plague of Justinian (542) and the Second Pandemic.¹ These generalized conceptualizations of how a plague epidemic can be expected to behave can then be compared with individual epidemics of the earlier two pandemics. These comparisons provide valuable information for determining whether a specific epidemic was or was not plague and they reveal broad patterns of plague behavior. Many epidemics that occurred during the period of the Second

¹ The dates given for the conclusion of these two pandemics varies. The Plague of Justinian is frequently mentioned as having occurred in 542, but there were subsequent epidemics for about 200 years.

Pandemic are now commonly accepted to have been plague; however, an almost equal number of epidemics seem to defy the expectations developed by examining the broad patterns. While many researchers debate whether many individual epidemics were the result of plague, most now accept Shrewsbury's contention that some periods of high mortality that once were assumed to have been plague, were not because they do not match the general pattern of plague outbreaks.²

In addition to the debate about the actual cause of many individual epidemics, a few researchers also contest the definition and causation of the three pandemics, especially the Second Pandemic. Since the late 1970s, several influential researchers, including Samuel K. Cohn, Graham Twigg and Susan Scott, have contested this conclusion. Based largely on the evidence of the Modern Pandemic, they argue that the pattern of the Second Pandemic, especially the initial wave, does not match the expected pattern of *Y. pestis* infection.³

I argue, however, that all three pandemics should be studied to develop an understanding of how plague epidemics behave, and to understand how environmental conditions and human behavior can affect the course of their development. The resultant understanding of plague patterns, however, must include three important caveats. Concrete information from the two early pandemics is severely limited, and the

² Shrewsbury, *History of Bubonic Plague*, 157. One of Shrewsbury's major arguments in this book is that the seasonality of epidemics is the primary clue to determining what disease was involved; See also Slack, *Impact of Plague*, 65.

³ These arguments are presented in greater detail in chapter 5 in the Literature review.

pattern of the Modern Pandemic has been greatly altered by changes in the human environment and human behavior and by the treatment of patients with antibiotics. Thirdly, the Modern Pandemic may still be incomplete because previous pandemics have lasted for several hundred years. Despite the lack of complete information from any one of the three pandemics, the information that does exist can be used to evaluate observed behavior of an epidemic in light of the historically expected patterns. It is important to remember, however, that because plague is a vector-borne disease that requires the presence of both rats and fleas, and is not a disease that is spread simply from person to person, a complicated web of factors influences the epidemic behavior of plague in humans.

The Plague of Justinian: the First Pandemic

The initial pandemic is often referred to as the Plague of Justinian. It first erupted in Constantinople in 542 and continued sporadically for several hundred years. This plague is thought to have been concentrated in the Far East, the Middle East, and the Mediterranean basin, which was the most densely populated area of Europe. It also afflicted North Africa, but little is known about its diffusion farther into Africa. The earliest Chinese records mentioning plague suggest that it did not arrive there until 610, but they strongly suggest that the Plague of Justinian produced high mortalities in China for several centuries.⁴ In Europe, the pandemic is thought to have erupted in sporadic localized epidemics for several hundred years and then it simply faded from the landscape. The extent to which this epidemic spread beyond the Mediterranean basin in

⁴ McNeill, *Plagues and Peoples*, 147-8.

the West is now debated; however, it is widely acknowledged to have been devastating within the confines of its reach, a conclusion which is supported by contemporaneous observers. Procopius of Caesarea (c.500-d.560s) wrote that “the whole human race came near to being annihilated.”⁵

Although chroniclers such as Bede (c.672-735) in England complained of epidemic diseases, historians and epidemiologists argue that neither the human nor the rat populations in Europe could have been dense enough to support a bubonic plague epidemic much beyond the densely populated coastal Mediterranean region.⁶ In the Italian region of Liguria, Paulus Diaconus (720-799) wrote about the epidemic of 566-567, which had occurred one year after a number of signs that had warned of the forthcoming plague: “there began to appear in the groins of men and in other delicate places, a swelling of the glands after the manner of a nut or date” accompanied by a fever, and many people died.⁷ Gregory of Tours (c.538-593) also mentions outbreaks of a disease he referred to as “the pestilence known as the plague of the groin.”⁸ Gregory’s

⁵ Procopius of Caesarea, quoted in Geoffrey Marks and William K. Beatty, *Epidemics* (New York: Charles Scribner's Sons, 1976), 44.

⁶ Shrewsbury, *History of Bubonic Plague*, 19; Twigg, *Black Death*, 38-42; McNeill, *Plagues and Peoples*, 141-3. McNeill reiterates Henri Pirenne’s argument that one of the reasons the center of European civilization shifted from the Mediterranean to more northerly portions of Europe was the intensity of a series of epidemic diseases, not necessarily all actually plague, which ravaged the Mediterranean region. McNeill does admit that disease epidemics were also raging north of the Mediterranean coast line.

⁷ Paulus Diaconus quoted in Marks and Beatty, *Epidemics*, 48-49.

⁸ O. M. Dalton, *The History of the Franks by Gregory of Tours*, trans. O. M. Dalton, vol. II (Oxford: The Clarendon Press, 1927), 119.

description of the plague epidemics that ravaged the region throughout the sixth century not only includes a reference to plague buboes, it also makes note of an interval between the disease's first appearance and its major flare-up.⁹ The epidemics that Gregory reported were in Arles and Marseille in southern France, and in Auvergne in central France at the northern boundary of Gallo-Roman France, which is at the extreme northern edge of the region that would have been susceptible to plague if human population density is a limiting factor. However, DNA from the bacillus responsible for bubonic plague has been isolated from a sixth-century skeleton in Bavaria.¹⁰ This discovery of plague in a relatively sparsely populated region provides some evidence that plague had spread beyond the confines of the Mediterranean basin, and can be taken as evidence that lack of a dense human population is not a limiting factor in the spread of plague. It also suggests that rats had spread throughout Europe by the early medieval period.

Medieval and Early Modern Plague: the Second Pandemic

The Second Pandemic entered Western Europe in 1347 via Messina at the southern end of Sicily. Evidence suggests, however, that even before it began spreading through Western Europe, North Africa, the Middle East, India and China, plague was

⁹ Shrewsbury, *History of Bubonic Plague*, 19. It is interesting to note that Avicenna described mice and other animals that live underground, coming to the surface and behaving as if drunk, as a sign of pestilence. Campbell, *Black Death and Men of Learning*, 35.

¹⁰ Ingrid Wiechmann and Gisela Grupe, "Detection of *Yersinia Pestis* DNA in Two Early Medieval Skeletal Finds from Aschheim (Upper Bavaria, 6th Century A. D.)," *American Journal of Physical Anthropology* 126 (2005): 48-55.

epidemic in the T'ien Shan mountains of central Asia. The Nestorian community there experienced heavy mortalities in 1338-39, as demonstrated by grave markers indicating mass burials.¹¹ Although the point of origin of this pandemic has not yet been pinpointed, it probably was somewhere in the high steppes of central Asia. The burrowing animals of the high alpine regions are excellent hosts for maintaining a plague reservoir because their cool damp burrows provide an ideal environment for *Y. pestis*. Plague is still endemic among animals of the region. Traders almost certainly were central to the disease's diffusion, and because the Nestorians were traders living in the region of Lake Issyk Kul, they might be implicated in the disease's farther spread.¹² However, there is considerable disagreement about whether this is the place of origin of the Second Pandemic.

The two areas competing for the origin point of this pandemic are Central Asia near Lake Issyk Kul (Kyrgyzstan) and Kurdistan around the Caspian Sea, but the former hypothesis has traditionally received more favor.¹³ However, because the *Medievalis Y. pestis* biovar (biological variant) is currently found in Kurdistan, and because Kurdistan is between the posited African point of origin for *Y. pestis* and its points of greatest

¹¹ Michael W. Dols, *The Black Death in the Middle East* (Princeton: Princeton University Press, 1977), 49; McNeill, *Plagues and Peoples*, 175-6.

¹² McNeill, *Plagues and Peoples*, 175-6.

¹³ *Ibid.*, 139. McNeill finds both Kyrgyzstan and Kurdistan equally acceptable, as origin points for the Second Pandemic.

diffusion, this hypothesis also seems to have much to commend it.¹⁴ Significantly, regardless of its exact point of origin, the disease that ravaged Europe in 1348 began in a region where *Y. pestis* is still endemic, which thus supports the idea that *Y. pestis* was the causative agent.

Once the epidemic began, it spread very quickly across Western Europe. In just one year plague spread from the southern Italian peninsula to Northern Britain and into Greece and Eastern Germany. Following its introduction in 1347-1348, plague outbreaks sporadically ravaged Europe for almost 400 years. The last major outbreak in Britain occurred in London in 1665, which was followed by a few scattered and localized minor outbreaks elsewhere in the country. In France, the last major epidemic occurred in Marseilles in 1720; the last major epidemic did not occur in Moscow until 1771; and after a major epidemic in 1778 in Istanbul, plague did not disappear from the Ottoman Empire until the late 1800s, by which time the third plague pandemic had begun.

The Modern Pandemic: the Third

The third or Modern Pandemic is usually described as having begun in 1894 when it appeared in Hong Kong. However, there had been sporadic localized outbreaks

¹⁴ Achtman et al., "*Yersinia Pestis*, the Cause of Plague," 14043-14048, fig 2. Achtman et al. found three biovars of *Y. pestis*: Antiqua, Medievalis, and Orientalis. Based on genetic relationships and the regions in which the three biovars have been found, each is assumed to be the descendant of bacilli which produced one of the three pandemics: Antiqua, found primarily in eastern Africa, is presumed to be a descendant of the bacillus that produced the Plague of Justinian; Medievalis is found in Kurdistan around the Caspian Sea and is assumed to be a descendant of the bacilli which produced the Second Pandemic; and Orientalis is found widely distributed around the world and thus is implicated in the Modern Pandemic.

of plague in the previous 100 years. From Hong Kong, plague spread across most of the rest of the world, although with much reduced severity compared with the medieval epidemics. Even before the discovery of antibiotics, plague reached epidemic proportions only regionally. The reasons for the change in morbidity and mortality rates are not known, but evidence suggests that genetic changes in *Y. pestis* are not the cause because there appears to have been very little change.¹⁵ This lack of change has led some historians and epidemiologists like J. F. D. Shrewsbury, Samuel K. Cohn, Graham Twigg, Susan Scott and Christopher Duncan to speculate that some other disease must have been the cause of the high mortality during the medieval and early modern epidemics. Others, including William McNeill and I, argue that *Y. pestis* was the agent and that changes in the material and social culture are instrumental in reducing the morbidity rates in the Third Pandemic. There have been very few plague victims in Europe during the Modern Pandemic, but there have been serious outbreaks in other parts of the world. Regions as widely dispersed as China, India, Sri Lanka, Java, Madagascar, South Africa, Brazil in South America, and San Francisco in North America experienced plague outbreaks in the current pandemic. None of these epidemics has produced the widespread, heavy mortalities common in the Second Pandemic. Nonetheless, fear that the Modern Pandemic would produce mortalities similar to those of the previous pandemic has driven research on the current one.

During the Modern Pandemic, many attempts have been made to control the spread of plague by preventing the transportation of fleas. During an outbreak in Java,

¹⁵ Benedictow, *Black Death 1346-1353*, 21-22.

travelers and their luggage were inspected for fleas, but, interestingly, these inspections discovered very few fleas.¹⁶ San Francisco experienced a couple of epidemics in the early twentieth century that were focused in the newly arrived and impoverished Asian community. Plague first arrived in San Francisco January 2, 1900, on *The Australia*. Although the ship was searched by quarantine officers and the cargo had been sanitized or fumigated, plague, presumably carried by rats with fleas, made it into San Francisco.¹⁷ Despite an inspection by trained agents who knew what they were looking for, the entry of plague into San Francisco casts doubt on the ability of similar measures, instituted centuries earlier, to be successful.

From San Francisco, *Yersina pestis* spread slowly among native ground dwelling squirrels, so that it is now endemic among them in Arizona, southern Oregon, and northeastern California.¹⁸ Nonetheless, bubonic plague only very rarely affects humans in these regions. The individual cases that do occur are almost always the result of direct contact between a person and an infected animal, the disease presumably having been transmitted by its fleas. This pattern of occasional outbreaks has been typical of the Modern Pandemic, especially in the developed world.

During the Modern Pandemic, plague has maintained a sporadic presence in India. These epidemics have occasionally been severe, killing thousands; however,

¹⁶ Twigg, *Black Death*, 129. In Java, 1829 people including 393 with plague were inspected and only 7 rat fleas were found.

¹⁷ Marilyn Chase, *The Barbury Plague: The Black Death in Victorian San Francisco* (New York: Random House, 2003), 13.

¹⁸ Twigg, *Black Death*, 139, 141-142.

morbidity rates have not entered the double digits and the epidemics have typically remained confined to a city or within a region.¹⁹ Ole J. Benedictow argues that one of the reasons for low morbidity rates in India is that the people have traditionally left their homes when plague breaks out in their vicinity, rather than remaining confined in their houses in close proximity with the rats and fleas that inhabited their houses as was the case in the medieval and early modern epidemics in Europe.²⁰ Although plague epidemics have occurred in Colombo, Sri Lanka, the epidemics in Colombo have been less devastating than those in India. This difference has been explained by the fact that the dominant flea species in Colombo are less effective plague vectors than those on the mainland of India.²¹ Plague has also remained a significant threat in Africa. The island of Madagascar experienced reoccurring bouts of plague from the 1920s through the 1940s, which were extensively studied.²² Plague continues to be a source of concern around the world. In February of 2005, a primarily pneumonic plague epidemic that broke out in the Congo provoked fear and caused people to flee without seeking treatment, raising concerns that the epidemic may spread widely.²³

¹⁹ Cohn, in *Black Death Transformed*, 2, writes “Modern plague in its worse year since the bacillus’ discovery has yet to kill over three percent of an urban population.”

²⁰ Benedictow, "Morbidity in Historical Plague Epidemics," 427-428.

²¹ Twigg, *Black Death*, 115-116.

²² Benedictow, "Morbidity in Historical Plague Epidemics," 430; Benedictow, *Black Death 1346-1353*, 19.

²³ David Lewis, *New Cases of Congo Plague but Appears Contained* [Web] (Reuters, 2005 [cited 11/19/2005 2005]); available from

Despite worldwide outbreaks, only very few people in Great Britain, in several small, localized outbreaks, have been killed during the current pandemic. In 1900, there were 36 human cases in Glasgow and 16 people died, but these cases were confined to only a few houses. Rats were examined but no *Y. pestis* was found. In 1901, five more cases were centered in a rag store, and there were a few cases involving men who worked in two separate flour mills, where each of the men was known to have handled the bodies of dead rats. In this outbreak, *Y. pestis* was found in the trapped and examined rats. In 1907, another case in Glasgow involved a rag store. In the process of attempting to find the source of the disease, many rats were examined for *Y. pestis*; the nearest infected rat was found a mile away.²⁴ These observations suggest that plague had been endemic among the rats for at least six years without infecting any people. In addition, because infected rats were not found in the vicinity of all human cases, human cases were not easily linked to rat cases.

In Suffolk, a plague outbreak began in 1906 but was not recognized as such until 1910. In 1906, eight people became sick and six died after an extremely quick onset of pneumonia. Because influenza was present, these deaths were not attributed to plague until 1910 when additional cases occurred. This little outbreak apparently

http://bepast.org/disease_information/Plague/Plague%20Disease%20Information/2005-02-28_congo_plague_seems_contained.mht; World Health Organization, *Plague in the Democratic Republic of Congo - Update 4* [Web site] (World Health Organization, 3/15/2005 2005 [cited 11/19/2005 2005]); available from http://bepast.org/disease_information/Plague/Plague%20Disease%20Information/2005-03-15%20WHO%20%20Plague%20in%20Congo%20update%204.mht. Oddly enough this outbreak does not seem to have included any bubonic cases.

²⁴ Twigg, *Black Death*, 147-148.

resulted when rats and fleas carrying plague were off-loaded, presumably along with grain shipments.²⁵ These twentieth century English cases were almost exclusively pneumonic and manifested so atypically that bacterial examinations were required to prove the cause of death.²⁶ The extremely limited scope of these few plague outbreaks in twentieth century Britain have led to questions about the veracity of the plague produced high mortality rates reported in medieval Britain.²⁷

Evidence from the modern pandemic suggests that plague is tenacious and is not dependent on humans to maintain its presence in a given locality; clearly it can exist regionally for years without producing human victims. This evidence also suggests that relatively small differences, such as the difference in what species of flea is dominant, as in the Sri Lanka/India example, can have a relatively large impact on the severity of plague outbreaks. An analysis of the different manifestations of various epidemics of the three great pandemics also provides evidence that human behavior can greatly affect the consequences of an epidemic.

²⁵ Ibid., 150, 157.

²⁶ Ibid., 151.

²⁷ The limited scope of twentieth century outbreaks caused many researchers either to question medieval plague mortality figures or the cause of the medieval epidemics. Kelly, *Great Mortality*, 297; Shrewsbury, *History of Bubonic Plague*, 36. Shrewsbury states that except in a few urban centers the aetiology of plague dictates that mortality in 1348 was not much higher than five percent.

British Epidemics

Plague epidemics in Britain roughly follow the pattern of the worldwide pandemic pattern with a few notable exceptions. First, as previously stated, there is little evidence that the first pandemic, the Plague of Justinian, reached Britain. In the absence of clear evidence the debate focuses on the issue of whether Britain, or more specifically England, could have provided the necessary environmental elements for the survival of plague beyond the infection of one or two people. During the period between 450-800, it is unclear whether England was sufficiently densely populated to facilitate the spread of plague, or more importantly to support a population of rats capable of harboring and dispersing plague. Nonetheless, England did experience epidemic diseases during this period even though there is very little written description of them. Bede wrote about high mortalities and sickness, but his description of symptoms does not match very well with plague.²⁸

Britain, like the rest of Western Europe and unlike most of the rest of the world, appears never to have had local foci of plague among native ground dwelling animals. Britain is not home to many species of ground dwelling mammals, although several species of wild mice, voles, ferrets, and rabbits inhabited England during the years of the Second Pandemic. During the initial years of the Modern Pandemic, *Y. pestis* was found in wild rabbits and hares as well as in domesticated cats in Britain, but these species are too susceptible to plague mortality to maintain the disease over time. Additionally, because rabbit fleas are dependent on hormones from pregnant rabbits for

²⁸ Ibid., 13, 20.

their own reproduction, they are extraordinarily unsuited to spreading plague to humans.²⁹

Medieval British Epidemics

Plague arrived in Britain in the spring or summer of 1348. It first arrived at Weymouth, a port in Dorset in southwestern England. In the Gray Friars chronicle, plague is recorded as having arrived on the Feast of St. John the Baptist, June 24. The chronicle states that the “seeds of terrible pestilence” arrived on a ship from Gascony.³⁰ Plague may have been present on the ship indicated by the chronicle, but in order for plague to have become noticeable by June 24, it must have arrived six or seven weeks earlier. The period between when plague first arrives in a location and breaks out in a human epidemic is the time needed for several stages to occur: the first rat infection, followed by a rat epizootic and die off; then fleas leave the dead rats and the blocked fleas begin to infect humans; and finally the human outbreak.

Ole J. Benedictow argues that the plague probably arrived about May 8 from Bordeaux in the Gascony region. Although the dates are speculative, they all fit together. The Bishops of Lincoln and York ordered preventative masses and prayer

²⁹ Twigg, *Black Death*, 152-53, 113. These fleas, *Spilopsyllus cuniculi*, may well be willing to bite humans but they would not effectively maintain plague in the long term.

³⁰ Benedictow, *Black Death 1346-1353*, 128-9. Although Benedictow argues convincingly that plague must have arrived in Weymouth six to seven weeks before the Gray Friars chronicle reports it as having arrived on June 24, he believes that the second ship in port that day, a ship from Bristol, may have been responsible for Bristol being infected so quickly after Weymouth.

gatherings on July 25 and July 28, respectively. The dates of these masses thus allow one month for the news to travel across the country and the decision to be made to schedule for a mass. The timing is further supported by the dates for installing priests into vacancies, assuming an average time lag of about 13 weeks between the death of a priest and the institution of his replacement.³¹ From Weymouth, plague spread along the coast of southern England, traveling fastest along the coastal towns and then more slowly inland. This suggests that it was carried on ships around the coast and then traveled inland along with smaller cargos on barges and in carts. Plague was first recognized in Bristol on August 15, which indicates that it had arrived there several weeks earlier.

Plague spread throughout southern England in 1348, through central England in 1349, and into northern England and Scotland in 1350. The date plague was first recognized in London is uncertain because two dates, Michaelmas, (September 29) and All Saints Day (November 1), have been associated with its introduction.

In Britain, a great deal of the statistical information on the initial epidemics is based on clerical records, principally on the number of priests who were appointed to positions and instituted to benefices, appointed presumably to replace priests who had died of the plague. Since G. G. Coulton's work based on Dr. Lund's lost dissertation, there has been a debate about how representative these figures are of the mortality rates in the general population. This argument has been fueled not only by the high mortality level of priests, given that at least 45 percent of parish priests appear to have died in the

³¹ Ibid., 127, 125.

epidemic, but by how relatively low the mortality figure for Bishops appears in contrast, only 18 percent.³² The idea that general mortality levels in Britain could have approached 45 percent has been resisted.³³ It has been argued that priests, because they were on average older than the population at large and had duties to perform for the ill and dying, putting them at greater risk, had mortality figures that were unrepresentatively high.³⁴ Additionally, Shrewsbury argues that the priests' mortality figures appear higher than they actually were because many priests were appointed to benefices that became empty due to flight rather than mortality.³⁵ A letter by the Bishop of Bath and Wells addressed to his priests says, that "since no priests can be found who are willing, whether out of zeal or devotion to exchange for a stipend, to take pastoral care ... to visit the sick and administer to them the sacraments of the church," when necessary, anyone, even a woman, can hear a last confession.³⁶ This suggests both that the crisis was severe and that priests were fleeing their duty. Scholars have resisted

³² Ibid., 353-56, 343.

³³ Hatcher, *Plague, Population and the English Economy*, 22-25. Hatcher notes that mortality among abbots was 42 percent. Despite providing evidence of mortality rates exceeding 45 percent, Hatcher concludes that the national death-rate was 30 to 45 percent.

³⁴ Ziegler, *The Black Death*, 228, 126-128. Despite accepting relatively high mortality among priests, Ziegler postulates a lower overall mortality rate; Cohn, in *Black Death Transformed*, 45-6, 121, seems to accept reports of high mortality figures among priests and others such as medical practitioners because these reports suggest plague was caused by a highly contagious disease rather than by *Y. pestis*.

³⁵ Shrewsbury, *History of Bubonic Plague*, 55.

³⁶ Bishop of Bath and Wells, January 1349, quoted in Gottfried, *The Black Death*, 62.

accepting priests' high replacement rates as indicative of their mortality rates, let alone as representative of the overall mortality rates, in part because they are so high. Their resistance to accept these figures has been supported by the great variation in the mortality rates of various religious communities.

In contrast, Ole Benedictow argues that the mortality rates reported for priests were probably lower than that for the general population because priests would have been better housed and fed than most other people, and they would have received care from the community as a whole rather than just from their immediate, and probably also ill, family members.³⁷ Additionally, the record of complaints that priests were not as attentive to the needs of their parishioners as they should have been suggests to some scholars that priests' risks of contracting plague were no higher than the population at large.³⁸ From this perspective, it has been argued that mortality figures inferred for the general population from the number of priests instituted may be unrepresentatively low. Benedictow examines this issue in great detail and presents a very convincing argument that basing general mortality rates on the institutions of priests into empty benefices underrepresents the actual mortality.³⁹ He argues that curates and lay workers, whose replacements were not recorded in the Bishop's lists of newly instituted priests, took on the parish tasks that provided the highest risk of exposure to plague. He also points out

³⁷ Benedictow, *Black Death 1346-1353*, 351.

³⁸ G. G. Coulton, *Medieval Panorama: The English Scene from Conquest to Reformation* (New York: Macmillan Company, 1938), 500.

³⁹ Benedictow, *Black Death 1346-1353*, 342-360.

that during the height of the chaos created by plague, many benefices with low stipends probably remained unfilled until after the epidemic. The number of priests instituted remained high through 1350 and then returned to normal. Benedictow also notes that in the absence of antibiotics, the one factor that can improve one's chances of surviving plague is good palliative care.⁴⁰ He argues that parsons, who were desperately needed by their parishioners, were more likely than members of the general public to have received good care. Because of the way plague is spread, it was centered in individual households, with the result that families struck by plague often had no well person available to provide care for the ill.⁴¹

In the initial wave of the Second Pandemic, enough people became ill that the normal means of care-giving by members of the immediate household became interrupted. High morbidity, coupled with fear, exacerbated the death toll. Taking all of these somewhat speculative and contradictory factors into consideration does not allow for an exact estimate of the level of mortality during the initial outbreak, but it does suggest an idea of probable mortality levels. John Hatcher concludes that, "A national

⁴⁰ Ibid., 351. Evidence suggests that one of the reasons for lower mortality levels in affluent western countries during the modern epidemic is better nursing care.

⁴¹ Roger Schofield, "An Anatomy of an Epidemic: Colyton, November 1645 to November 1646," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England* (Derbyshire: Local Population Studies, 1977), 107-108. An examination of deaths at Colyton show that deaths were clustered within families; Shrewsbury, *History of Bubonic Plague*, 8, 47; Cohn, in *Black Death Transformed*, 119, writes that by 1650, officials of Mantua believed that the clustering of deaths within a household was one of the markers of a plague epidemic.

death-rate of below 25 per cent or above 45 per cent would appear most unlikely.”⁴²

However, researchers have more recently begun to accept the priests’ reported mortality level as a minimum mortality level rather than a maximum; Benedictow has even concluded that the mortality rate in England may have exceeded 60 percent.⁴³

Epidemics in Summary

Although the three pandemics vary greatly, they also share many similarities. The first two great pandemics encompassed a large portion of the Old World. In both, mortality rates were so high that at least some people feared that the society they knew would not survive. Although the Modern Pandemic is more widely distributed, mortality levels have never reached a point that has provoked panic except on a very local level. Of course, when cases of plague were identified in Hong Kong, the fear provoked by historical records of the Second Pandemic drove the decision to respond immediately to the outbreak in a proactive and decisive manner. The first two pandemics extended across four centuries, and the duration of Modern Pandemic is unknown, but it has already lasted more than a century. Thus plague contrasts sharply with other epidemics such as that of the highly contagious Spanish flu (1918-20) that quickly spread around the world and then disappeared.

⁴² John Hatcher, "Plague Population and the English Economy 1348-1530," in *British Population History from the Black Death to the Modern Day*, ed. Michael Anderson (Cambridge: Cambridge University Press, 1996), 25.

⁴³ Benedictow, *Black Death 1346-1353*, 383.

The initial wave of the Second Pandemic exhibited a distinctively rapid pattern of movement coupled with high mortality that can be traced on a map. Subsequent outbreaks of the more than 300-year pandemic seemed to pop up sporadically, and they only occasionally produced very high mortality rates. Despite these differences in the way plague was distributed across Europe and variations in how it presented, contemporaneous observers perceived the outbreaks as one disease. The stability of the pathogen itself does not imply a consistent impact either on rat or human populations. Clearly, plague episodes were modulated by many different factors.

4 London

London was an atypical city, by far the largest, most diverse and busiest city in Britain, however, London and its environs can serve as a microcosm of the English plague experience. Many of the individual changes observed in London can be found throughout the rest of England. According to records of the late sixteenth century and the seventeenth century, plague had a nearly constant presence in London, while in other parts of England plague outbreaks were more sporadic. Although plague was virtually always present in London, in most years the disease was of limited significance, both in terms of the numbers of people afflicted and in terms of the affected parishes. London's experience with plague was not unique but it was more condensed and intense than in the rest of England and thus it is a good city in which to examine plague and its cultural impact. Extensive records exist, especially from the last hundred years of the epidemic, and furthermore Londoners were forced by the virtually continual presence of plague to develop methods of coping with the disease.

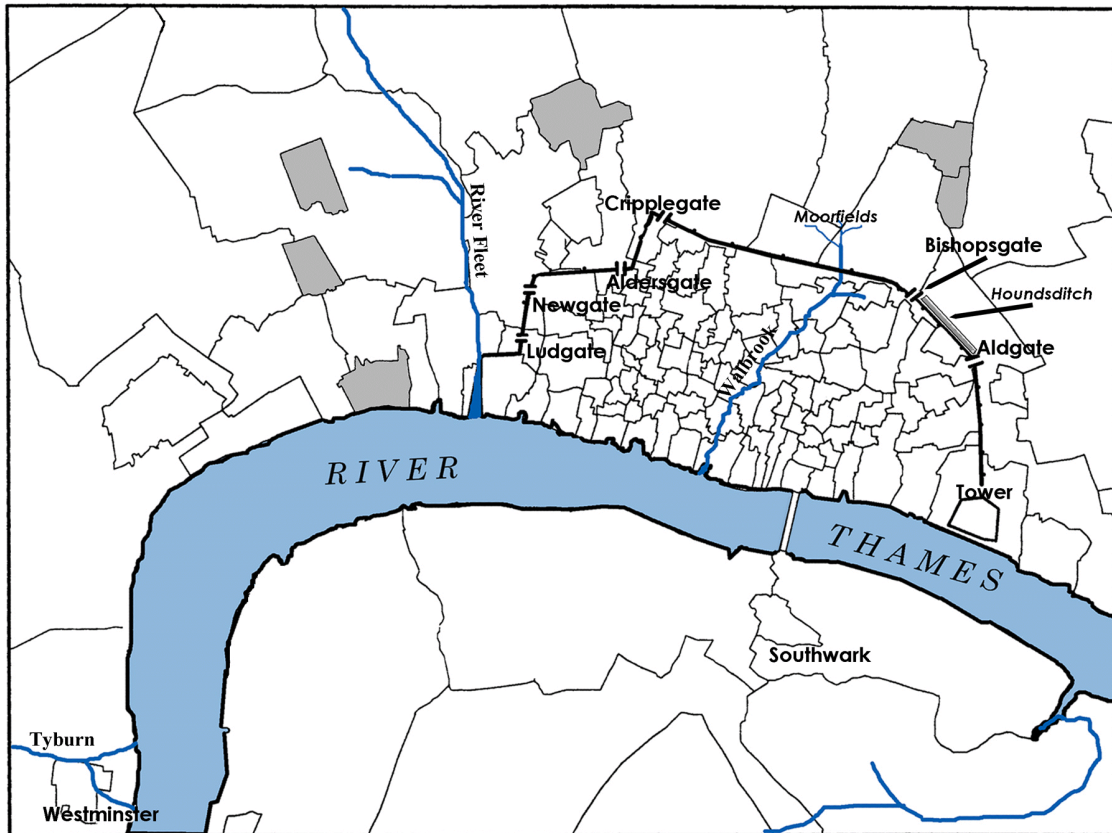
To consider possible mechanisms for the distribution of plague across London, the social and physical geography of the city should be examined. Especially important are city features that may have harbored or facilitated the dispersal of rats or brought rats into close contact with people. Plague is often described as a disease of place.¹ Once an environment is infected with *Y. pestis*, plague becomes endemic. Today plague is present in vast regions across the globe although few people are infected. The

¹ Cohn, *Black Death Transformed*, 27.

infection of place can extend from an individual house or building to the macrocosm of a village or city, for example in India when plague breaks out, villagers leave their homes to camp in the open air and thus avoid the worst of the outbreaks.² During the Second Pandemic, plague's association with specific places is less clear than it has been in India but nonetheless, by the fifteenth century, Londoners knew the best way to avoid the plague was to leave London. It is important to examine the geography of historic London because of changes during intervening years, especially damage caused by the Great Fire in 1666 and extensive development during the intervening 450 years. London, England's principal port city, developed along the River Thames at the site of the London Bridge, first built in Roman times and the only bridge across the Thames for many centuries. London is about 35 miles inland from the ocean, and because the Thames is a large, navigable, tidal river, it provided a safe port for shipping with easy access to an urban population. The majority of London docks were located just slightly east and down river of London Bridge and central London; however, throughout London's formative years it could be raised to allow ships to reach upriver docks and Westminster (see Figure 1).

² Benedictow, "Morbidity in Historical Plague Epidemics," 427; Cohn, *Black Death Transformed*, 27.

Figure 1. Map of London showing rivers, wall, gates, parish boundaries, Westminster and Southwark. Map of parish divisions adapted from Justin Champion.



That London was a significant port city is particularly relevant in a study of plague because as a port city, it was the point of entry for goods from the rest of the world, material that potentially harbored either or both rats and fleas. Thus, it is necessary to consider London's history and its geography to reconstruct the environment where plague thrived. Medieval London was also traversed by the Fleet and the Walbrook rivers as well as by their tributaries. All of these rivers served as waste removal systems and thus were both a source of food for rats and a barrier separating communities of rats from one another. The Fleet River entered the Thames

immediately outside the western Roman wall and east of St. Brides, which was the site of Henry VII's palace of Bridewell. In the medieval period and even into the early modern period, the Fleet was a real river that experienced tidal flow; however, when John Rocque produced his London map in 1746 he labeled it as the Fleet Ditch.³ Centuries earlier, there had been periodic complaints that the Fleet stank or that its flow was blocked by garbage.⁴

The path of the Walbrook is now impossible to see because it flows in conduits 32 feet below street level; however, in the early fifteenth century, the Walbrook was an open river used as a free flowing sewer. After years of only sporadically enforcing rules that forbade latrines that dumped into the Walbrook, in 1383 these latrines were legalized with stipulations that forbade rubbish that blocked the river, and the latrine owners were charged a usage fee to provide for cleaning out the river bed.⁵ When the Walbrook was free flowing, it emptied into the Thames at a place known as the Dowgate. In 1462-3, the Common Council ordered landholders along the Walbrook to cover the stream and close up the latrines that emptied into it; the Walbrook does not

³ *John Rocque's Map of London* (Rootsweb.com, [cited 04/07/2007 2007]); available from http://freepages.genealogy.rootsweb.com/~genmaps/genfiles/COU_files/ENG/LON/Rocque/rocque_index.htm.

⁴ Ernest L. Sabine, "Latrines and Cesspools of Medieval London," *Speculum* 9, no. 3 (1934): 310-11.

⁵ *Ibid.*, 310.

appear on sixteenth century maps.⁶ Nonetheless, the Walbrook served to drain an area known as the Moorsfield, a wet and boggy region just north of the city walls between Cripplegate and Bishopsgate, an area which was often flooded, and was suitable for boating at times, and was the site of ice skating in winter. So presumably, water must have continued to flow in the Walbrook riverbed even after it was covered by construction. In 1511, the mayor ordered dikes to be built so that Moorsfield could be more easily crossed, and the area was eventually filled, raising its elevation about 12 feet; nonetheless, sections of Moorsfield remained undeveloped open fields into the eighteenth century.⁷

London was established in 50 AD and the wall that gave medieval London its distinctive shape was in place by 200 AD. It was a defensive wall, surrounded on the exterior by a moat or wet ditches. On the western side of London, the wall was bordered by the Fleet River, but elsewhere the wall was bordered by moats that had been dug as an additional barrier against attack. Within the city, the wall was bordered by an open space. As London grew, the ditches were often used as dumping grounds for trash, debris and human wastes.⁸ One section of the ditch between Bishop's Gate and Aldgate

⁶ Ibid., 310. Georg Braun and Franz Hogenberg, *Civitates Orbis Terrarum I* (The Jewish National and University Library, 1572 [cited 4/10/2008 2007]); available from http://historic-cities.huji.ac.il/british_isles/london/maps/braun_hogenberg_I_A.html For example, their London Map, shows no indications of the Walbrook and even though The Fleet is depicted, it is not labeled.

⁷ John Richardson, *The Annals of London: A Year-by-Year Record of a Thousand Years of History* (Berkeley: University of California, 2000), 78.

⁸ Sabine, "Latrines and Cesspools of Medieval London," 311-312.

on the east was referred to as Houndsditch because of the stink generated by the garbage and dead dogs tossed into it.⁹ These ditches, where garbage and food wastes collected, might have increased the rat density outside the walls, and thus they might have played a role in changing the plague locus from within London walls to the suburbs without the walls. In addition, the open space within the walls would have served to segregate the urban rats from those outside the walls in the suburbs. Such segregation undoubtedly would help to explain why, in the later London epidemics, plague was focused in the suburbs outside city walls and ditches.

Beyond the wall, the greater London area included the Tyburn River, the main portion of which entered the Thames south of Westminster, while a second branch flowed around Westminster to the north, making Westminster an island.¹⁰ However, by the late sixteenth century, the north channel of the Tyburn appears to have been built

⁹ John Stow, *Stow's Survey of London* (London: Dent, 1956), 116; City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London, Till Further Charitable Provision May Be Had for Places of Receite for the Visited with Infection* (London: Isaac Jaggard, Printer to the Honourable City of London, 1625), np. Laws passed during plague epidemics that required the killing of most urban dogs stipulated that dogs should be buried to a depth of at least four feet in the fields. It is possible the ditch was used to dispose of dogs because it was outside of the city limits and therefore not subject to city regulations. Or, possibly, it was used to dispose of dogs between plague outbreaks.

¹⁰ N. J. Barton, *The Lost Rivers of London: A Study of Their Effects Upon London and Londoners, and the Effects of London and Londoners Upon Them* (London: Leicester University Press, 1965), 31-6. Barton notes that while it is clear that the course of the Tyburn changed between 951 and 1663 because the ground is virtually flat and early maps do not depict the entire region, it is impossible to determine its original course.

over.¹¹ The greater medieval London area also included the city of Southwark, on the south side of the Thames just across the London Bridge. The land west of Southwark was marshy and uninhabitable until it was filled in and built up and as the Thames became channelized.

Although London was never a particularly hilly town, its topography has been leveled out by human activity during the hundreds of years of its existence. Hills were reduced, marshy regions were drained and filled, and Londoners built up the river banks and expanded the city into what had been part of the Thames channel. In general, London's topography slopes toward the banks of the Thames, but the landscape is complicated by slight dips in elevation toward the banks of the Walbrook and the Fleet. As these rivers were built over, passages large enough to allow rats to move along the underground chambers undoubtedly remained. Black rats, *Rattus rattus*, sometimes referred to as ships rats, were the only rats in Britain until the 1700s, when Brown rats, *Rattus norvegicus*, were introduced.¹² Black rats are climbers that today are more likely to be found in rafters rather than along underground rivers or garbage sites; however, little is known about their behavior before they had to share their environment with the bigger, fiercer, ground-dwelling Brown rats.¹³

¹¹ Braun and Hogenberg, *Civitates Orbis Terrarum I* ([cited]).

¹² Shrewsbury, *History of Bubonic Plague*, 9.

¹³ *Ibid.*, 8-9. Shrewsbury discusses the relationship between the bigger, fiercer, more voracious, and shyer ground-dwelling Brown Rat and the smaller, more agile Black Rat. The Brown Rat has come to dominate many places that were previously home only to Black Rats. Now, although the two rats typically live in similar environments, they inhabit different niches within their environments. It is unclear the

London's rats inhabited a city that included large blocks of interconnected houses built from the debris of older buildings a type of construction that would have assured easy access for rats throughout an entire block of houses. These housing blocks were of irregular shapes and sizes, the blocks were penetrated by narrow alleyways and separated by open public streets, which would have served to separate rat populations of one block from another.¹⁴ Although the physical geography of London did not provide humans with the same difficulty that it would have provided rats, the complicated social geography of London certainly affected the way that plague was combated throughout the city. When plague first arrived in England, in 1348 London already had developed distinct patterns of governance that affected its struggle to combat plague. London was granted a charter in the early twelfth century that gave it responsibility for its own governance as well as freedom from the direct control of the monarch, and by 1348, the geopolitical landscape of London was a complex network of interconnecting and overlapping jurisdictions. These produced complexities that can be seen in the multiple levels of reporting and oversight necessary to record plague deaths.¹⁵

Within its walls, London, which comprised just one square mile of land, was composed of 97 parishes. Outside the walls were another 16 parishes that were within

extent to which the Black Rat's niche has been determined by the presence of Brown Rats.

¹⁴ Twigg, *Black Death*, 132-4. Twigg describes studies of rats that demonstrate that not only are rat territories quite small, rats are unlikely to travel across open spaces.

¹⁵ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

the City Liberties and thus under direct control of the corporation of London. London also included areas within City Liberties that became available for city construction when Henry VIII broke up the religious houses. In addition to being divided into parishes, the areas within the jurisdiction of the London Corporation were divided into larger political regions known as wards each of which were headed by an alderman. Parishes oversaw many social services and charity functions for the indigent, including care of plague victims and monitoring plague deaths, while wards managed other governmental functions, including enforcement of plague orders. In addition to the areas under the jurisdiction of the City corporation, metropolitan London included Westminster and Southwark. More importantly in terms of urban management, it also included a growing number of outlying parishes, with growing populations, which were self managed but overseen by the system of justices of the peace that managed the rest of the country. During times of crisis, these outlying regions of greater London received special directives from the Privy Council.

During the Second Pandemic, metropolitan London was a region where plague control was directed by two sets of plague orders, Royal and City; further, these orders were enforced and supported by a diverse group of entities. Fortunately for metropolitan London, the Royal plague orders and those issued by the London corporation or the mayor were virtually identical; however, because of the complications of the multiple political subdivisions, it is unclear how the plague orders were applied and it is unlikely that they were applied or enforced evenly within jurisdictions, let alone across

jurisdictional borders.¹⁶ Within the City of London, Aldermen, were responsible for the enforcement of orders. The aldermen were by mandate substantial men who undoubtedly lived on wealthier streets, and who were thus likely to enforce plague control measures more strictly in their own neighborhoods than elsewhere.¹⁷ Properties within the London Liberties were subject to stringent rules of housing construction that were not applied outside City Liberties, although laws enacted during Queen Elizabeth's reign indicate that attempts were made to control construction and subdivision of multi-individual housing in the suburbs.¹⁸

As London grew and developed, old buildings were demolished and the rubble was used in new construction. Early medieval buildings were made of rubble from the

¹⁶ City of London (England) Court of Common Council, *Articles to Be Enquired Of*. The implication of the focus of the final paragraph of this Article on the question of whether the poor were treated more severely than the rich during epidemics suggests a concern that the rules were not applied equally.

¹⁷ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np. The Aldermen and their deputies are required to often visit their wards to insure that these Orders, especially the rules concerning street cleaning, are being observed.

¹⁸ Royal College of Physicians of London, *Certain Necessary Directions, as Well for the Cure of the Plague as for Preventing the Infection: With Many Easie Medicines of Small Charge, Very Profitable to His Maiesties Subiects Set Downe by the Colledge of Physicians by the Kings Maiesties Speciall Command; with Sundry Orders Thought Meet by His Maiestie, and His Privie Councell, to Be Carefully Executed for Prevention of the Plague; Also Certaine Select Statutes Commanded by His Maiestie to Be Put in Execution by All Justices, and Other Officers of the Peace Throughout the Realme; Together with His Maiesties Proclamation for Further Direction Therein, and a Decree in Starre-Chamber, Concerning Buildings and in-Mates*. (London: Robert Barker and the assignes of John Bill, 1636), R3r-S2r. These include a Elizabethan court case, laws and references to earlier laws limiting the subdivision of houses that were reissued by King Charles I.

Roman city, and this rubble from old buildings was reused as buildings were continually torn down and recreated. This continual rebuilding and reconstruction of buildings and sites has given the development of London an organic or almost haphazard organization and created groups of interconnected buildings porous enough for rats to move through them.

London buildings were commonly built side by side, abutting or sharing side walls and facing onto the street; however, buildings were frequently pierced by a narrow open air passage that led into a back space, or courtyard. Kitchens were often located off the courtyard rather than indoors to reduce the risk of fire. Some buildings had cesspits for disposal of garbage and human wastes and these were often placed behind the building or in their undercrofts. Many buildings were subdivided into multiple tenancies so that some tenants' only access to air was from the courtyard. The crowded condition of some of these tenancies was considered to be a risk factor for plague as indicated by comments and complaints, and by orders that forbade the division of houses into multiple tenancies.¹⁹ Despite the rules, as the population of London continued to grow, houses continued to be subdivided, as evidenced by the need to reprint and reemphasize these Elizabethan laws in 1636.²⁰ Among the many causes of plague that Kellwaye mentioned are "shutting a great companie of people into

¹⁹ Ibid., np.

²⁰ Ibid., R3r-np.

a close, narrow or straight roome, as most commonly we see in shippes, cōmon Gayles and in narrow and close lanes and streetes, where many people doe dwell together.”²¹

Many rules concerning the construction of buildings within London, like the buildings themselves, developed over time. The first set of documented rules for buildings was instigated during the period of the first Mayor of London, Henry Fitzailwyn (1189-1211), and include regulations requiring the walls partitioning property lines to be made of stone. Additionally, there were rules governing the thickness of shared walls. In the late twelfth century these walls were mandated to be composed of stone three feet thick, although this later was reduced to two feet.²² In addition, rules drafted around 1200 were intended to reduce the risk of fire within London by prohibiting thatched roofs.²³ Placement and construction methods for cesspits were similarly regulated; they were not allowed closer than two feet from a building’s wall, and after about 1200, all new cesspits were required to be lined with stone whereas earlier pits had often been lined with woven sticks and clay. In the fourteenth and fifteenth centuries, it is probable that the primary use of stone in the construction of ordinary houses was for cesspits and by the fifteenth century many houses had pipes or funnels leading from the privy to the cesspit.²⁴

²¹ Kellwaye, *A Defensative against the Plague*, 2v.

²² John Schofield, *Medieval London Houses* (New Haven: Yale University Press, 1994), 95, 140.

²³ *Ibid.*, 96.

²⁴ *Ibid.*, 86, 140; Sabine, "Latrines and Cesspools of Medieval London," 313-315. Sabine discusses latrine piping dating from as early as 1310.

Despite rules regulating their design and placement, complaints and suits were common, both because the rules were not always obeyed and because the rules and the construction techniques available were not sufficient to prevent occasional problems. Although the foundation walls at property boundaries were mandated to be built of stone, the bulk of buildings were made of timber, lath and plaster, and thus were often in need of repair. By 1610-12 when Ralph Treswell performed a survey of London houses, no houses had four stone walls and only a few had any.²⁵ As London's population grew, the rules that were primarily to address property rights, fire and general construction safety, were augmented with new ordinances created to restrict urban development and thereby to limit population growth. The increasing numbers of day laborers and transients were regarded as a public threat, because they produced the potential for social instability and because they posed a public health threat. The final item in the plague orders first issued during the 1578 epidemic, "the preservation of her subjects who by very disorder, and for lacke of Direction Do in many partes wilfully procure the increase of this general contagion," makes this argument rather subtly.²⁶ London plague orders issued in 1608 make the connection between transients and plague more bluntly: "for as much as nothing is more complained on then the multitude of Roagues and Wandering Beggars, that swarme in every place about the Citie being a

²⁵ John Schofield, "The Construction of Medieval and Tudor Houses in London," *Construction History* 7 (1991): 9.

²⁶ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np.

great cause of the spreading of the infection.”²⁷ The growing number of laborers required an increasing number of low rent accommodations, which were created by dividing houses into multifamily dwellings. These multiple tenancies were seen as a source of urban danger not only because they provided a respite for rogues and vagabonds who disrupted civic functions and tested the limits of parish social services, but also because they were linked to outbreaks of plague.²⁸ The tenements are described as constantly expanding so that a “infinite number being pestered together breeding and nourishing Infection so that the same tendeth to the great imminent danger of the government and safety of this Citie.”²⁹

It is unclear to what extent construction rules were followed. Thatched roofs were easily visible and apparently were replaced as ordered; however, because it is much harder to see foundation walls or to investigate the construction or placement of cesspits within private courtyards, householders may have gotten away with not obeying the laws. Disobedience of some rules, essentially sumptuary rules for housing, can be traced by the records of fines paid and assessed for their infractions. Especially egregious problems, such as a cesspit that had leaked into a neighbor’s house,

²⁷ City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen of the Citie of London, and the Justices of Peace of the Counties of Middlesex and Surrey, by Direction from the Lords of His Maiesties Most Honourable Privie Councell* (Imprinted at London: John VVindet, 1608?), np.

²⁸ Kellwaye, *A Defensative against the Plague*, 2v; Royal College of Physicians of London, *Certain Necessary Directions*, O2v-Q3v, R3r-np.

²⁹ *Ibid.*, np.

occasionally appeared in *Assize de Nuisance* proceedings.³⁰ However, many buildings continued to be subdivided, and evidence of this exists in the plague orders printed in 1636, which include a reprint of Elizabethan material as well as contemporaneous court cases against tenement landlords.³¹ London's population growth of laborers necessitated an increase in tenements, "it was a market response to a social need that the authorities refused to deal with through public policies."³² Despite Queen Elizabeth's laws and those enacted,

since his Majesties most happy Reigne, and ... Orders and Decrees taken in this honourable Court for the restraining and reforming of the multitude of new erected and divided Tenements, and taking in of Inmates, yet nevertheless the same doe so daily increase and multiply in every place in and about this City of London and the Suburbs thereof.³³

Although the presence of large numbers of poor people made the more wealthy people nervous, wealthy people owned properties as investments. Rents could provide significant income, so wealthy landlords broke the law and subdivided houses despite society's concerns about the dangers of overcrowding.³⁴ Further, there was no simple solution to housing London's poor, therefore the law did not require landlords to tear

³⁰ Schofield, *Medieval London Houses*, 59.

³¹ Royal College of Physicians of London, *Certain Necessary Directions*, R3r-np; William C. Baer, "Housing the Poor and Mechanick Class in Seventeenth-Century London," *The London Journal* 25, no. 2 (2000): 21-22.

³² Baer, "Housing the Poor and Mechanick Class," 22.

³³ Royal College of Physicians of London, *Certain Necessary Directions*, np.

³⁴ Baer, "Housing the Poor and Mechanick Class," 30; Royal College of Physicians of London, *Certain Necessary Directions*, R3r-np.

down houses full of people, although city officials saw these tenements as dangerous. Instead regulations enjoined landlords from accepting new tenants, and required them to pay taxes “towards the finding and maintaining of the poore of the Parish in which such Buildings are.”³⁵ In 1529, Henry VIII gave up his palace of Bridewell, located immediately west of the Fleet, due to the stink coming from the river and fear of plague.³⁶ Bridewell palace became a workhouse and thus housed many indigent people in one building in an area that apparently had been threatened by plague even before it became inhabited by the destitute. Some documented reports indicate that in spite of the regulations, some houses had a large number of occupants. For example, in 1603, the Recorder of London noted 800 plague cases in one building that housed 8,000 inhabitants. Although the 10 percent mortality rate for plague in this one building was low compared to the general London mortality rate that approached 25 percent, the sheer number of plague victims within one house was seen as evidence of the dangers of overcrowding.³⁷ Over time, some rules were changed to align with actual practice, like the rule prescribing three-foot-thick foundation walls, which was officially reduced to the two feet width that had become the norm.³⁸ Rules concerning multiple tenancies were amended so that landlords were required to pay taxes to the parish in which the tenement existed, regardless of where the owner lived, to offset the costs of poor

³⁵ Royal College of Physicians of London, *Certain Necessary Directions*, S2v.

³⁶ Slack, *Impact of Plague*, 160.

³⁷ *Ibid.*, 151-152.

³⁸ Schofield, "Construction of Medieval and Tudor Houses," 9.

tenants to the parish.³⁹ Other rules may simply have been ignored, except under egregious conditions. Plague orders that were repeatedly reissued during times of plague always emphasized the need for cleanliness, suggesting that urban cleaning was considered less important in the periods when there were no serious plague outbreaks.⁴⁰

London of the medieval and early modern period had become a complex web of semi-independent but linked environments, creating conditions that facilitated the spread of plague. Rats and humans shared an environment that fostered the development of separated, relatively stable rat colonies. The environment constructed by humans served both to nurture and separate these rat colonies and yet as people moved between these colonies and changed the distribution of food and goods, human behavior served to spread the disease among rat colonies. Further, the divisions that defined the complex social geography of London and which played a dominant role in combating the spread of plague did not necessarily correlate well with the actual distribution of infected houses and plague outbreaks.

London Plague Epidemics

Records from the initial plague outbreak in London are so confused that it is not possible with any certainty to determine the date when plague was first recognized in

³⁹ Royal College of Physicians of London, *Certain Necessary Directions*, R3 - np.

⁴⁰ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, Bii.r, Ci.v, np; City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen*, np.

the city, however, over the course of the pandemic, records for London become increasingly detailed. In addition, London's close proximity to Westminster and Whitehall, the permanent seat of royal and political power, assured London a special place in responding to national problems. Plague Orders issued in 1636, for example, stated that the current plague epidemic was putting the King and his heirs at risk.⁴¹ Royal orders addressing matters of behavior during periods of epidemic plague closely mirrored those issued by London, with a few minor exceptions. In the provinces, which were governed by Royal orders, restrictions on travel and on leaving the confines of a plague infested house were more lenient than those mandated in London. In regions outside London, where houses were widely spaced houses, allowance was made for people living in infested houses to move about, especially in the evening. This freedom allowed people to get necessary supplies in small villages, where there were not enough people to run errands for those confined in quarantined houses and to care for their crops and animals.⁴² One additional difference between the London orders and the Royal orders was that those issued by the Crown mandated that all people known to have been exposed to plague carry white staves, while the London orders mandated red staves.⁴³

⁴¹ Royal College of Physicians of London, *Certain Necessary Directions*, np.

⁴² England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, Bi.v, Item 5.

⁴³ *Ibid.*, Bi.r, Item 7; City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen*, np. In the countryside where people were more likely to carry walking sticks, a white staff would be more readily distinguished from a normal walking stick than would a red one at a distance.

When plague entered London in 1348, the city had a population of approximately 50,000, which was almost certainly twice the population of the second largest city in England.⁴⁴ According to Slack, by 1550, London's population was approximately 85,000, having almost tripled during a period when the population of the country as a whole barely regained its pre-plague population. As London grew, an increasing percentage of the population was living outside the walls and beyond City Liberties. Obviously, this growth increased the pressure to subdivide large houses into multiple tenancies. The London metropolitan population grew to approximately 141,000 in 1600 and it had again tripled to at least 400,000 to 459,000 by the time of the Great Plague in 1665.⁴⁵ These figures are estimates, however, and those made by other researchers vary considerably.

Paul Slack notes that it has "become a truism that there was scarcely a year in the sixteenth and the early seventeenth century" when plague was absent from London. He is skeptical of the mortality figures provided by the London bills of mortality in years when very few deaths were attributed to plague.⁴⁶ Because people wanted to avoid having their houses quarantined if they possibly could, it seems likely, especially in years with few recorded plague deaths, that the number of plague deaths listed would

⁴⁴ Gottfried, *The Black Death*, 59, 64. Bristol, the second largest city in England, had a population of about 10,000 to 12,000 people in 1348; Richard Britnell, "The Black Death in English Towns," *Urban History* 21, no. 2 (1994): 195, postulates that the population of London may have been as high as 100,000 in 1300.

⁴⁵ Slack, *Impact of Plague*, 151.

⁴⁶ *Ibid.*, 28, 145, 147.

have been under rather than over reported. A few scattered human deaths is exactly the pattern of deaths to be expected as the result of occasional human contact with the fleas of infected rats in an environment of many independent but interconnecting rat colonies.⁴⁷ The tenacity of plague epidemics in London over three centuries suggests that plague was enzootic in London's rats during this 300-year period, although historians including Paul Slack and J. D. F. Shrewsbury have assumed that plague was reintroduced before major outbreaks.⁴⁸ That there were years with very few plague deaths reported strongly supports the argument that the epidemics were caused by a disease that was not easily communicable from person to person.

The dynamics of endemic plague are such that infected fleas would regularly give plague to only a small number of people, and only in years of epizootic plague in rats did the disease become epidemic among humans.⁴⁹ These epizootic outbreaks of plague could be triggered by any number of environmental factors, such as the introduction of more *X. cheopis* fleas or the introduction of a new strain of *Y. pestis*. Anything that affected the distribution of *Y. pestis*, and its hosts or the contact they have with humans would effect the distribution of human plague outbreaks. Because black rats are unlikely to travel beyond the confines of the building in which they are born,

⁴⁷ Keeling and Gilligan, "Bubonic Plague: A Metapopulation Model of a Zoonosis," 2219-2230.

⁴⁸ Slack, *Impact of Plague*, 13; Shrewsbury, *History of Bubonic Plague*, 143, 152, 157.

⁴⁹ M. J. Keeling and C. A. Gilligan, "Metapopulation Dynamics of Bubonic Plague," *Nature* 407 (2000): 903.

the housing pattern of London with units of linked buildings separated by streets would have allowed for a large number of independent rat populations that would only occasionally come into contact with one another.

In Tudor and Stuart London, mortality figures were collected at the parish level by way of two different channels. Burials were recorded in parish registers at the time of burial, and these records often mention the cause of death or provide information about the victim's occupation or status. During periods of high mortality, the records are substantially less complete, either because the information was unavailable or because the parishes did not have the personnel to properly record information on the large numbers of burials they were forced to perform. During these periods, there are anecdotal reports of bodies being unceremoniously left at a church for burial with no record of who they were. In the register of St. Botolph Bishopsgate, records from 1563 include notations such as "two corpses" or "three corpses." In 1625, the clerk at St. Saviour Southwark "sometimes found twenty or thirty corpses left at the place of burial."⁵⁰

The second set of official records formed the material printed in the London bills of mortality. These were compiled from the data collected by parish workers, who were referred to as searchers or viewers. By mandate, they were woman of "the best sort as can be got in this kind" to fulfill the position.⁵¹ Despite regulations requiring that

⁵⁰ Slack, *Impact of Plague*, 149.

⁵¹ City of London (England) Court of Common Council, *Orders Heertofore Conceived and Agreed to Bee Published by the Lord Mayor and Aldermen of the Citie of London: And the Justices of Peace of the Counties of Middlesex and Surrey*, by

parishes hire only the best available women, Paul Slack notes that these women have often been referred to as “ignorant and careless searchers” and that their reports have been challenged.⁵² Because the word of poor elderly women was not highly respected, the work of these women has been open to substantial amounts of criticism.⁵³ Slack himself places an emphasis on the searchers’ fallibility and John Graunt (1620-1674) complained of their incompetence. The 1636 and 1665 plague orders specify that supervising physicians should assure themselves that the searchers are doing their jobs competently.⁵⁴ Notwithstanding the complaints, this position, created as a temporary one to provide data for the occasional bills of mortality printed during plague epidemics, became a permanent position when the bills of mortality began to be printed on a regular basis. The people who held the position of searchers, despite being ‘ancient

Direction from the Lords of His Maiesties Most Honourable Privie Councell, and Now Thought Fit to Be Revived, and Againe Published (London: By Isaac Jaggard, 1625), np.

⁵² John Graunt, "Observations Upon the Bills of Mortality," in *The Economic Writings of Sir William Petty Together Observations Upon the Bills of Mortality More Probably by Captain John Graunt*, ed. Charles Henry Hull (New York: Augustus M. Kelley, 1963), 347-348; Slack, *Impact of Plague*, 147.

⁵³ Richelle Munkhoff, "Searchers of the Dead: Authority, Marginality, and the Interpretation of Plague in England, 1574-1665," *Gender and History* 11, no. 1 (1999): 2, 4, 12; Slack, *Impact of Plague*, 149; G. H. Maynadier, ed., *The Works of Daniel Defoe: A Journal of the Plague Year*, vol. 9 (New York: Thomas Y Crowell and Company, 1904), 237. Defoe, however, blames the entire data collection team, not just the searchers.

⁵⁴ Royal College of Physicians of London, *Certain Necessary Directions*, C.v; City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major and Aldermen of the City of London, Concerning the Infection of the Plague* (London: Printed by James Flesher, 1665), A3r-np.

matrons' rather than trained medical practitioners, were the primary sources of statistical data on the causes of death until 1836.⁵⁵

Searchers went to the houses of all reported deaths to investigate the cause of death, and they reported their findings to constables who in turn reported the information to parish clerks. From the individual parish clerks, the data were sent to the Clerk of the Parish clerks where it was compiled to form the Bills of Mortality.⁵⁶

Positions as searchers were given to needy but able bodied parish women, often widows, and in effect were work demanded in return for the charity provided. Plague orders stated that a woman who refused the role of searcher could lose her pension.⁵⁷ There is little doubt that these women were not in a position to withstand pressure applied to classify deaths in the households of the wealthy and powerful as being due to anything other than plague.⁵⁸ However, these women also were required, under penalty of punishment, to report the truth. Item 4 in the plague orders first published in 1578 states:

⁵⁵ Munkhoff, "Searchers of the Dead," 2.

⁵⁶ Munkhoff, "Searchers of the Dead," 4; England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, Bii.v. Item 9 describes how this information should be transferred from Ministers and Curates; City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

⁵⁷ *Ibid.*, np.

⁵⁸ Munkhoff, "Searchers of the Dead," 8, 9, 14. Munkhoff's basic point is that elderly women were chosen as searchers because they had very little personal authority and that although their work was viewed as flawed, the resultant bills of mortality were nonetheless viewed as authoritative.

And in case the said views either through favour or corruption, shall give wrong certificate, or shall refuse to serve being thereto appointed, then to cause them to be punished by imprisonment, in such sort as may serve for a terror to others.⁵⁹

Both the national plague orders and those issued by the Lord Mayor and Alderman addressed concerns that the searchers were inept by requiring that physicians who were ward officials appointed to deal with the plague, and the surgeons who supervised the searchers, assure themselves that the searchers working with them were qualified for their task.⁶⁰

If mortality reports were indeed inaccurate or altered, there is no reason to limit the errors or fabrications as the sole responsibility of the searchers. Householders who had no desire to have their houses shut up had very good reasons to pressure both the searchers and parish authorities not to report deaths as the result of plague. However, reports could have been altered because of pressure applied at one of the many other points in the data collecting process before being printed in the bills. Parish officials with more prestige than searchers had more to gain by underreporting the number of plague deaths in their parish. Indeed, Pepys notes that the clerk of his parish admitted to him that nine people in the parish had died of plague but that he had reported only six

⁵⁹ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np.

⁶⁰ City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, A3r.

plague deaths to the Clerk of clerks.⁶¹ This may suggest that parish clerks in the wealthy parishes were more adroit at misreporting the causes of death.⁶²

As significant as the purposeful under registration of plague deaths may have been, an equally significant reason for the undercount of plague deaths in the bills of mortality is that plague was sometimes difficult to identify. Steven Bradwell's 1625 plague treatise, *A Watch-man for the Pest*, describes the symptoms of plague in terms that would not have made its recognition easy. He says, "As soon the Heart is stricken with putrid vapour, the spirits grow distempered and inflamed. And this distemperature is a feavor (not Proper, but Symptomaticall or Accidentall) and the Feavor is not of one kinde in every one; but diverse."⁶³ He also describes the theoretically more obvious outward signs of the plague:

a secret sinking of the Spirits and Powers of Nature, with a painful wearinesse of the bones, and all without any manifest cause. Then follows great trouble and oppression of the heart, that the partie unquietly rowles up and downe for rest from one place to another sighing often.⁶⁴

⁶¹ Robert Latham and William Matthews, eds., *The Diary of Samuel Pepys*, vol. V 1664 (Berkeley: University of University Press, 1970), 207.

⁶² These kinds of errors in reporting deaths would not affect Slack's assessment of which parishes were least harmed by plague because his figures are based on changes in mortality, not the number of deaths reported as due to plague. Thus, he compares a mean annual number of deaths with the number reported during an epidemic. Crisis mortality rates are determined by the degree to which epidemic mortality exceeded the mean. It would be interesting to compare crisis mortality levels of individual parishes with the figures they reported as being due to plague. Slack, *Impact of Plague*, 81-82.

⁶³ Stephen Bradwell in Munkhoff, "Searchers of the Dead," 11.

⁶⁴ Stephen Bradwell quoted in *Ibid.*, 11.

According to Bradwell, these symptoms were followed by attempting to vomit or vomiting “filthy stuff of various colours” and then by head pain and faintness. It was only after these symptoms of plague were noticed that the most obvious tokens of plague would become apparent, and he further notes that these surest signs are not apparent in all plague cases.⁶⁵ It is clear from this description of plague symptoms that even the most educated people could have trouble differentiating plague from other maladies. Nonetheless, people did distinguish plague from other illnesses, although it also is clear, as John Graunt points out, “that in the Years of Plague, a quarter more dies of that Disease than are set down.”⁶⁶ The use of crisis mortality levels, in which the total number of deaths reported during plague epidemic years is compared with the total number of deaths reported during normal years, allows historians to ignore the problem of underreporting of plague deaths. Even in the twentieth-century, plague cases have been misdiagnosed, or as in the small plague outbreak in twentieth century England, only diagnosed after a bacterial investigation was performed.⁶⁷ Certainly, 400 years ago, it was much more difficult.

⁶⁵ Stephen Bradwell quoted in *Ibid.*, 11-12.

⁶⁶ Graunt, "Observations Upon the Bills of Mortality," 347.

⁶⁷ Twigg, *Black Death*, 149; Charles T. Gregg, *Plague! The Shocking Story of a Dread Disease in America Today* (New York: Charles Scribner's Sons, 1978), 194-228. Gregg presents several cases of plague that occurred in the United States in the mid seventies, several of which were not identified until *Y. pestis* was found after death. He also reports a case of plague, which presented very similarly to medieval cases, with a serious pain in the groin, a bad headache and nausea accompanied by high fever. This case is also interesting because after the patient did not seek medical care for several days the illness became very serious and life threatening.

Evidence suggests that plague was endemic in London for several hundred years although it only sporadically erupted in serious outbreaks; occasional years of substantial mortalities were interspersed between years with only limited mortalities due to plague.⁶⁸ It is clear from the data available from the final 100 years of plague in London that the heaviest mortalities shifted from one parish to another with each epidemic outbreak. Unfortunately, information available from earlier outbreaks does not provide enough detail to determine whether the early outbreaks exhibited similar patterns of movement.

Both biological and environmental factors are responsible for changes in the distribution of parishes most severely hit by plague. Some of the changes in plague distribution likely were due to fluctuations in resistance to plague within different rat populations; however, innumerable environmental changes could also have contributed to these fluctuations, including changes in the built environment and residence patterns.⁶⁹ The human population of London grew dramatically during the 350 years of plague and in the process, the human population density of individual parishes changed. In addition, the relative density of the parishes changed; over time an increasingly large proportion of greater London's population resided in the larger extramural parishes, which lost much of their rural character. Most importantly, distribution of the later

⁶⁸ Slack, *Impact of Plague*, 147.

⁶⁹ Keeling and Gilligan, "Metapopulation Dynamics of Bubonic Plague," 2219–2230; Benedictow, "Morbidity in Historical Plague Epidemics," 422.

outbreaks of plague is unambiguously skewed toward poorer parishes.⁷⁰ Although changes in population may have affected where plague outbreaks appear to have been centered, changes in behavior and living arrangements that were made possible by increasing wealth in London may also have influenced the plague distribution. Much of the existing information on mortality rates prior to 1538, comes only from wills, and since the very poor seldom wrote wills, it is difficult to determine and compare relative mortality rates between rich and poor.⁷¹ Richard Britnell notes that the number of wills enrolled between Michaelmas 1348 and 1349 was 111, while the average number in the previous 20 years had been fewer than three a year.⁷² Although plague was more common among the poor, a fact that was recognized during the entire epidemic period, it struck down wealthy people as well. Simon Kellwaye, writing in 1592, specifically noted that the disease is such that in some “yong and olde, rich and poore, noble and ignoble” the disease cannot be overcome no matter what means are tried.⁷³ Thus, plague outbreaks continued to frighten the wealthy, many of whom fled infected areas when plague outbreaks occurred.

⁷⁰ Slack, *Impact of Plague*, 153.

⁷¹ *Ibid.*, 147 figure 6.2. Although peaks in the numbers of wills registered correlate quite well with purported plague epidemics, when the available burial records are compared with the number of proved wills, it is clear that data from the wills substantially under represents the total deaths.

⁷² Britnell, "The Black Death in English Towns," 201.

⁷³ Kellwaye, *A Defensative against the Plague*, 1r.

During the final 102 years of the plague's residence in London, there were seven notable, severe epidemics, in 1563, 1578, 1593, 1603, 1625, 1636, and 1665. In absolute numbers, the final epidemic was by far the largest, but in terms of the percentage of the population killed, the epidemics of 1563 and 1603 were the most severe. The relative severity of these two outbreaks is difficult to determine, however, not only because so little is known about the base population and mortality of London during this period, but also because bills of mortality only began to be regularly kept in 1600.⁷⁴ Thus, the mortalities of neither of these epidemics can be compared with averaged previous mortalities. After 1603, the records are complete enough that it is possible to compare deaths recorded during plague years with those in more normal years. Brief examinations of existing data on these seven plague episodes, even with the deficiencies in data, can provide an overview of the patterns and suggest the kinds of factors that influenced the distribution and severity of plague outbreaks. These findings provide an important clue as to how plague spread and how the human environment and behavior influenced its spread.

Once an outbreak began, typically it only slowly became distributed throughout the city. Although few parishes completely escaped any of the epidemics, outbreaks took months to spread throughout the city. Often the disease popped up in one house but not adjacent houses, and within London it cannot be shown to have been distributed

⁷⁴ Slack, *Impact of Plague*, 149.

from market places.⁷⁵ Despite high mortalities, the patterns of distribution strongly suggest that they were produced by a disease that was not highly communicable from person to person.

Prior to the mid sixteenth century much of the information about epidemics is gleaned from records of individual parishes, anecdotal reports, and records of proven wills. Information obtained from proven wills shows that there were several periods of high mortality in the first half of the sixteenth century, and all but one of these peaks occurred at times when there was contemporaneous concern about plague. The juxtaposition of increases in proven wills and public discussion of a disease is suggestive, but it does not provide a causal connection between the upswings in proven wills and plague or any other specific disease. The first half of the sixteenth century did see epidemic outbreaks, a number of which almost certainly were plague, along with the English sweat and other diseases such as typhus. It becomes possible to compare the record of registered wills with burial records for the period after 1538.⁷⁶ The data from these two sources correlate fairly well, although there is an increase in burials recorded in 1548 that has no corresponding peak in the record of wills proved.

⁷⁵ Benedictow, "Morbidity in Historical Plague Epidemics," 425; Leslie Bradley, "The Geographical Spread of Plague," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, ed. Local Population Studies (Derbyshire: Local Population Studies, 1977), 131; Paul Slack, "The Local Incidence of Epidemic Disease: The Case of Bristol 1640-1650," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England* (Derbyshire: Local Population Studies, 1977), 56-57; Shrewsbury, *History of Bubonic Plague*, 268.

⁷⁶ Slack, *Impact of Plague*, 147-148.

In the period prior to improved data collection, statistical data are overshadowed by stories of plague and how the fear of plague affected behavior. Plague drove Henry VIII (1509-1547) out of London a number of times as well as causing him to change his travel plans. In 1526, the Venetian ambassador died in London, possibly of plague, and Henry VIII spent the summer away from the city; during an epidemic in 1531 he stayed at Hampton Court. By this period, Shrewsbury claims, contemporaneous observers recognized that plague was more devastating among the poor; however, he is equally emphatic that people were not precise in their use of the term plague and he points out cases where plague was used to refer to an epidemic of what he believes was some other disease.⁷⁷ After epidemics in the late 1540s, London appears to have experienced relatively few plague mortalities until 1563. Although more complete records began to be kept during the later sixteenth century, the bills of mortality that record the major epidemics of 1563 and 1593 exist only as later copies.⁷⁸

In Conclusion

London's history, growth and complex political development affected and were in turn influenced by patterns of plague proliferation. The changes London experienced exemplify the English national plague experience except that in London, unlike other

⁷⁷ Shrewsbury, *History of Bubonic Plague*, 160-2. For example in 1516 the Venetian Ambassador and other contemporary observers called a disease the plague, which Shrewsbury is certain was actually the Sweating Sickness.

⁷⁸ Slack, *Impact of Plague*, 147.

English towns, plague was virtually always present. The continuity of London's plague data allows an investigation of how patterns of plague distribution varied over time.

Seven Epidemics in London's Last 100 years of Plague

Table 1. London Mortality in Seven Epidemics

| Epidemic Years | Plague Deaths | Deaths | % of Deaths reported caused by plague | Population Estimates | Index of relative mortality |
|---|---------------|--------|---------------------------------------|----------------------|-----------------------------|
| City and Liberties | | | | | |
| 1563 | 17,404 | 20,372 | 85 | 85,000 | 24.0 |
| 1563* | 17404 | 23,660 | | 80,000- | |
| 1578 | 3,568 | 7,830 | 46 | 101,000 | 7.8 |
| 1593 | 10,675 | 17,893 | 60 | 125,000 | 14.3 |
| City, Liberties and Nine Out Parishes | | | | | |
| 1603 | 25,045 | 31,861 | 79 | 141,000 | 22.6 |
| 1625 | 26,350 | 41,312 | 64 | 206,000 | 20.1 |
| City, Liberties, Nine Out Parishes, and Seven Distant Parishes | | | | | |
| 1636 | 10,400 | 23,359 | 45 | 313,000 | 7.5 |
| 1665 | 55,797 | 80,696 | 69 | 400,000 - 459,000 | 17.6 |
| City, Liberties, 16 Parishes Without, 12 Outer Parishes and Westminster | | | | | |
| 1665* | 68,598 | 97,306 | | 500,000 | |

Except where marked with an asterisk, the information in this table is based on Paul Slack's figures.⁷⁹ Information marked with an asterisk is from Shrewsbury.⁸⁰ Note that as London grew, the number of parishes included in the bills of mortality increased.

— 1563 —

The outbreak of plague in London in 1563 is the city's earliest relatively well documented plague outbreak. It was also one of the most severe, but because bills of

⁷⁹ Ibid., 151.

⁸⁰ Shrewsbury, *History of Bubonic Plague*, 192, 458-9.

mortality were not regularly kept before 1560 there is no baseline mortality to compare the 1563 epidemic mortality levels against; thus, it is impossible to state categorically that it was the worst of the epidemics (see Table 1). The first recorded plague death of the year was in the parish of St. Michael Cornhill (74) on March 27, yet the first death in St. Andrew Holborn (98), was not recorded until July 23, and the parishes of All Hallows Honey Lane (5) and St. Pancras Soper Lane (88) reported relatively little increase in mortalities.⁸¹ Despite the differences in the dates when parishes registered their first plague deaths and differences in plague intensity, deaths citywide gradually escalated until they reached a peak of more than 1,800 deaths in the first week of October. Deaths then tapered off, more rapidly than they had begun, in the late fall and winter. This is an example of the classic plague epidemic pattern in which plague deaths increase slowly at first and then more rapidly until the height of the flea season, and then rapidly diminish as cold weather reduces the flea population.⁸²

According to Paul Slack, the 1563 plague outbreak is notable because it was the last London epidemic focused in the center parishes within the city walls, rather than in the parishes beyond the walls. During this outbreak, unlike subsequent epidemics,

⁸¹ The numbers following parish names refer to their position in the Bills of Mortality. Parishes within the City liberties are listed alphabetically and then the more distant parishes are listed alphabetically. These numbers can be used to find parishes on the map. See Figure 2.

⁸² Shrewsbury, *History of Bubonic Plague*, 328, 383, presents graphs that represent the typical plague pattern; Twigg, "Plague in London," fig. 3, presents graphs representing mortality from different diseases, 3a) shows the weekly burials from All Hallows on the Wall 1625. It presents a typical plague curve: a gradual build up of deaths with a more rapid decrease.

plague seems to have struck wealthier parishes with the same severity as it struck poor parishes. Moreover, according to Slack's crisis mortality ratios, it appears that the poor parishes, which were located primarily at the periphery of London, along the Thames in the south, and to the northeast just within and beyond the wall, had the lowest mortalities of all the parishes.⁸³ Slack also points out that after 1563, the poorer outlying parishes grew more rapidly than the better established, wealthier parishes within the walls; therefore, in the later epidemics there were many more potential plague victims in poor parishes. He attributes the increasingly high mortality in the poor parishes to an increase in population density that allowed plague to spread quickly and easily. Slack also points out that even in the earliest epidemics the poor may have suffered higher rates of mortality than the wealthy but he emphasizes that after 1563 this distinction in mortality rate is visible not just in individual households but at a parish wide level.⁸⁴

Although there were no unified national plague regulations before 1563, towns across England began enacting regulations to prevent people from leaving infected houses or entering a town from plague infested regions.⁸⁵ Elizabeth I moved to Windsor during the summer of 1563 and forbade all travelers and goods from London from entering Windsor; she built a gallows to back up her threat. In some local areas, other

⁸³ Slack, *Impact of Plague*, 154, 158, 163, 157 fig. 6.7, 154 fig. 6.3.

⁸⁴ *Ibid.*, 158-9. Unfortunately, Slack does not seriously address the possible causes of this shift.

⁸⁵ Shrewsbury, *History of Bubonic Plague*, 200-201.

measures were enacted to attempt to control the spread of plague. In London, houses visited by plague were marked with a blue cross. In St. Margaret Westminster (130), dogs were killed in an attempt to control the spread of plague.⁸⁶ Although a few parishes along the Thames were severely affected, the geographic focus of this plague and later epidemics was no where near the locus of shipping and economic hubs, thus casting doubt on the idea that a major factor in plague outbreaks was the importation of infected rats and their fleas in goods arriving from Amsterdam or other foreign ports.

— 1578 —

Between the epidemic of 1563 and the rise in plague deaths in the late 1570s, plague was sporadically active in a number of London parishes. In 1575, plague deaths were recorded in parishes as diverse and as far apart as St Olave Hart Street (85), St. Martin-in-the-Fields (128), and St. Margaret Westminster (130).⁸⁷ However, Slack notes that 1578 was really the crisis year in an epidemic that began in 1577 and continued until 1583; some parishes were affected by plague in 1577 while some did not become infected for several years.⁸⁸ In 1579, St. Olave Hart Street parish (85) was one of the hardest hit by plague.⁸⁹ The plague epidemic of 1578 was relatively minor in

⁸⁶ Ibid., 189, 194.

⁸⁷ Ibid., 205. The records for St. Olave Hart Street are from the modern calendar year, January to January, while those from St. Martin-in-the-Fields are from the old calendar year that runs March to March. In St. Olave's parish, 32 total deaths were recorded of which 9 were registered as plague, while 51 of 154 deaths were recorded as plague in St Martin in the Fields.

⁸⁸ Slack, *Impact of Plague*, 147.

⁸⁹ Shrewsbury, *History of Bubonic Plague*, 221, 214 Table 6.

terms of the total death toll, but it was unusually protracted, which makes it difficult to determine its effect on crisis mortality levels.

Although it was a relatively minor epidemic, the increasing number of plague deaths provoked public response during the epidemic and it was during this epidemic that the first national English rules were written to deal with plague outbreaks. In 1577, a set of questions was drafted about what had been done during earlier London plague epidemics. The questions asked in this royal inquiry include a request for information on the number of people and houses affected and the number of people who died, as well as information on which parishes were involved. The query also sought information on what measures had been used to segregate the well from the ill, and to assure that infected shops and houses were shut up, as well as to find out what was done to provide for the impoverished. Finally, the questions asked if the Orders had been effectively enforced so that transgressors were suitably punished, and whether the Orders had been equitably applied to poor people and those who were better off.⁹⁰

Despite being a relatively minor outbreak, the appearance of plague in 1577 it provoked official government concern. Since plague was almost always present within London, it is unknown if specific events triggered heightened official response to a few plague deaths.⁹¹ All plays were cancelled from August 1 through Michaelmas, September 29, and the Mayor was chastised for not insuring that infected houses were

⁹⁰ City of London (England) Court of Common Council, *Articles to Be Enquired Of*; See Appendix A for a summary of this document.

⁹¹ Slack, *Impact of Plague*, 206-7.

discovered and shut up. Nonetheless, it was not until November 1, after mortality levels had begun to fall, that concern about plague finally led the Crown to instruct the Mayor “to close all suche innes, taverns, and ale-houses as are knowen to have been infected since Michaelmas laste.”⁹² This suggests that Crown authorities did not think City officials moved more quickly enough enforce the plague orders, which limit access to ale-houses in general and to close any that were the site of infection. The orders even decreed that infected inns must remove their signs for the duration of their quarantine.⁹³

In 1578, the year after the Privy Council’s query was issued about the success of past anti-plague measures, national plague orders were enacted and published. These plague orders, which include 17 points, were printed along with advice from physicians on how to avoid, prevent and treat plague, and they were reprinted virtually verbatim several times over the succeeding decades until plague disappeared from England. These 17 measures provided a broad range of instructions to public officials on how they should combat plague within as well as beyond City Liberties. They included instructions on quarantining houses and providing for their inhabitants, and on how to collect information about the number of deaths caused by plague. They also included instructions on counting the number of infected people. The Orders also required that officials provide a special burial ground for those dead of plague. Measure eight

⁹² Acts of the Privy Council of England in Shrewsbury, *History of Bubonic Plague*, 216

⁹³ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill* Bi.v. See Appendix B for a summary of these plague regulations.

required that inexpensive preventative medicines be generally available during periods of pestilence. Measure 13 placed restrictions on the distribution of goods, such as bedding and clothes, that had belonged to plague victims, and required that these goods be either burnt, or cleansed and aired before being used again. Measure 16 specifies that anyone, especially clergy members who claim that these orders contravene rules of Christian charity, will be restrained from speaking or preaching. The final measure, item 17 states that the contagion flourishes when people are disorderly and thus, the Queen's plague orders, which are an attempt to provide order and direction, will control the disease.⁹⁴

In the years following 1578, the plague epidemic seems to have smouldered along for several years. In 1579, there were a few deaths reported and plague was more or less evenly distributed from January through September. The next resurgence, which lasted only three months, began in August of 1581, and was followed by a period of endemic plague which again flared into an epidemic in August of 1582, which lasted through December of 1582.⁹⁵ Through 1585, plague continued to be endemic, although with low mortality levels, and then it receded in significance until late in 1592.

— 1593 —

After a respite from the last phase of the protracted 1578 epidemic, the first notice of increasing plague deaths appeared August 13, 1592, when plague was

⁹⁴ Ibid., np.

⁹⁵ Shrewsbury, *History of Bubonic Plague*, 216.

described as “dailie increasing in London.”⁹⁶ In September, 1592, the Thame Fair was postponed and in October, the Lord Mayor was instructed to abandon plans for “the ceremonies of his appointment” and to use the money saved by this restraint to care for those whose houses were infected.⁹⁷ Plague deaths continued to be reported throughout the winter of 1592-1593.⁹⁸ In January of 1593, the Mayor restricted public entertainments within London as well as the entire region within seven miles of the city. In January, the Acts of the Privy Council noted that plague was on the upswing, but the first burial labeled as plague in a parish register occurred on April 23, in St. Olave Hart Street Parish (85), which was one of the parishes that suffered most in the previous epidemic.⁹⁹ By May, it was noted in The Calendar of State Papers that “the plague is very hot in London and other places of the realm so that a great mortality is expected this summer.”¹⁰⁰ By June, as the epidemic continued to expand and the death tolls increased, all the public markets in the areas surrounding London were cancelled. London’s mayor wanted to proceed with the Bartholomew Fair because of its economic importance, but his request was rebuked. The Privy Council recommended that his

⁹⁶ Acts of the Privy Counsel in England in *Ibid.*, 222.

⁹⁷ *Ibid.*, 224.

⁹⁸ Although these deaths occurred during winter, rather than the late summer fall classic plague season, Shrewsbury seems to accept them as plague, presumably because the plague deaths of 1593 culminated in the late summer, which is typical of plague epidemics.

⁹⁹ Shrewsbury, *History of Bubonic Plague*, 224, 225. If this evidence is correct, it strongly suggests that the parish records do undercount mortality due to plague.

¹⁰⁰ The Calendar of State Papers in *Ibid.*, 224.

energy would be put to better use making sure that the crosses used to indicate plague infected houses remained on the houses rather than being washed off.¹⁰¹ This admonishment to London's Mayor from the Privy Council indicates that controlling plague in London was viewed as an important step in controlling plague throughout the country.

In addition to preventive medicines and treatments, Kellwaye's Chapter 11, "Teacheth what orders magistrates and rulers of Citties and townes should cause to be observed," makes recommendations on civic controls. It has a similar set of proscriptions to those contained in the plague orders, although they emphasize different aspects of civil responsibility. Kellwaye emphasizes civic involvement that focuses on issues pertaining to cleanliness of both the streets and fiber goods from infected houses, on assuring on the availability of good wholesome food, and removing loose animals from the streets.¹⁰² The plague orders emphasize the need to raise taxes to enable infected houses to be closed and to provide the people within the closed houses with necessities. Kellwaye's eighth suggestion specifies that innkeepers should clean their stables of dung and filth every day because keeping it in the house for a week or two as people normally did, created "such stinking savour and unwholesome smel, as is able to enfect the whole streete where it is," when it is moved.¹⁰³ Kellwaye's advice serves not only to illustrate the perceived connection between bad odors and infections, it also

¹⁰¹ Ibid., 226.

¹⁰² Kellwaye, *A Defensative against the Plague*, 13r-14r.

¹⁰³ Ibid., 14v.

serves to illustrate how noisome was the human environment of London in the late sixteenth century. His description also begs the question, if the smell of moving the dunghills through the street was so dangerous in the street, how hazardous could the stench have been when the dung remained inside the stables? The national Plague Orders place less emphasis on cleaning, but they do acknowledge the need to clean or 'aire' all material goods from infected homes before they are allowed to be used again, either by recovered victims or by others if the plague victims died.

Because the years between the epidemics of 1563 and 1603 seem to have been the period when rich and poor parishes became increasingly distinguished by differences in the intensity of their plague experiences, this 40-year period should be more carefully examined to discover changes that may explain how this distinction came to be exacerbated. Information from a few city center parishes should be examined carefully from the 1550s through 1600 to determine if parishes became increasingly segregated or if there were changes in the human environment that might have effected these changes.

This epidemic peaked in the third week of August, 1593, earlier in the year than many other London plague epidemics. Neither Slack nor Shrewsbury provide quantitative summaries of London's parishes' plague experience during this epidemic. Shrewsbury says the epidemic was most devastating in "new housing-estates" and in slums around the docks, however, a map (Figure 2) made using his own data does not completely support this argument. Creighton reports that the area of the Fleet was most

devastated by the epidemic, but it was the parish of St. Katherine by the Tower seems to have experienced the highest mortalities, with 17 times its normal number of annual deaths.¹⁰⁴

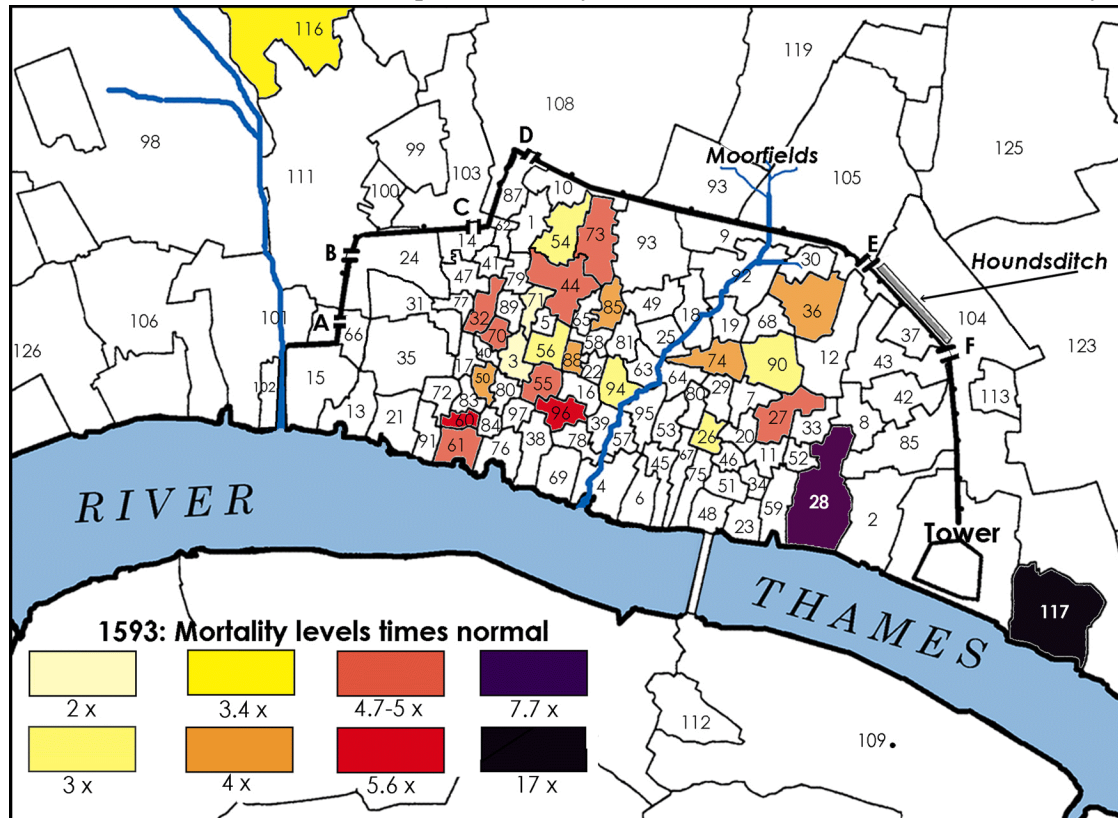
Mapping some of the parishes that had mortality increases of from the high of 17 times normal to two parishes that suffered mortality levels only twice their normal levels shows that serious mortality was spread across the city from east of the Tower walls, to just beyond Westminster in the West. Nonetheless, with the exception of three suburban parishes, these severely hit parishes are clustered centrally in a north-south alignment within London. The cluster of badly hit parishes in 1593 shares some features with the cluster of worst hit parishes in 1563; both clusters are within the walls and west of the Walbrook and both clusters show more overlap with parishes that Paul Slack lists as wealthy, than to those he records as poorest.¹⁰⁵ In one parish, St. Dunstan in the East (28), the effect of the two epidemics was quite different. In 1563, it was one of the least devastated parishes while in 1593, it was the second hardest hit with mortality levels.

¹⁰⁴ Shrewsbury, *History of Bubonic Plague*, 229 The normal base against which deaths of 1593 were compared were the average of deaths in 1590, 1591, 1595 and 1596.

¹⁰⁵ Slack, *Impact of Plague*, 154 fig. 6.3, 157 fig. 6.7 The figures I have used to used to create this map for 1593 are not directly comparable to those in Slack's map because he has the 10 worst hit parishes while I have included more, but because of the data presented in Shrewsbury's book I cannot be completely sure that these were the worst hit parishes. In addition, because Slack does not seem to make any specific reference to St. Katherine by the Tower, nor do his maps extend as far west as St. Katherine's, I assume that Shrewsbury has included a larger metropolitan area.

Figure 2. London Plague 1593

Parish divisions from Justin Champion. Mortality level information from J.D. F. Shrewsbury.



A) Ludgate, B) Newgate C) Aldersgate, D) Cripplegate E) Bishopsgate F) Aldgate

2x All Hallows Bread Street (3), St Mary Magdalen Milk Street (71)**3x** St Peter Cornhill (90), St Martin in the Fields (128), St Mary le Bow Cheapside (56), St Stephen Walbrook (94), St Mary Aldermanbury (54), St Clement Eastcheap (26)**3.4x** St. James Clerkenwell (116)**4x** St Michael Cornhill (74), St Margret Moses (50), St Helen Bishopgate (36) St Olave Hart Street (85), St Pancras Soper Lane (88)**4.7x** St Mary Somerst (61), **5x** St Denis Backchurch (27), St Mary Alder Mary (55), St Vedast (32), St Matthew Friday Street (70), St Lawrence Jewry (44), St Michael Bassishaw (73)**5.6x** St Thomas the Apostle (96), St Mary Mounthaw (60)**7.7x** St Dunstan in the East, **17x** St Katharine by the Tower

Table 2. London Parishes

| | | |
|-------------------------------|----------------------------------|------------------------------|
| 1. St. Alban Wood Street | 45. St Lawrence Pountney | 90. St Peter Cornhill |
| 2. All Hallows Barking | 46. St Leonard Eastcheap | 91. St Peter Paul's Warf |
| 3. All Hallows Bread Street | 47. St Leonard Foster Lane | 92. St Peter the Poor |
| 4. All Hallows the Great | 48. St Magnus | 93. St Stephen Coleman St |
| 5. All Hallows Honey Lane | 49. St Margaret Lothbury | 94. St Stephen Walbrook |
| 6. All Hallows the Less | 50. St Margaret Moses | 95. St Swithin |
| 7. All Hallows Lombard Street | 51. St Margaret New Fish Street | 96. St Thomas the Apostle |
| 8. All Hallows Staining | 52. St Margaret Pattens | 97. Holy Trinity (the Less) |
| 9. All Hallows on the Wall | 53. St Mary Abchurch | 98. St Andrew |
| 10. St. Alphage | 54. St Mary Aldermanbury | 99. St Bartholomew |
| 11. St Andrew Hubbard | 55. St Mary Aldermary | the Great |
| 12. St Andrew Undershaft | 56. St Mary le Bow | 100. St Bartholomew |
| 13. St Andrew by the | 57. St Mary Bothaw | the Less |
| Wardrobe | 58. St Mary Colechurch | 101. St Bride |
| 14. St Anne Aldersgate | 59. St Mary at Hill | 102. Bridewell |
| 15. St Anne Blackfriars | 60. St Mary Mounthaw | 103. St Botolph Aldersgate |
| 16. St. Antholin | 61. St Mary Somerst | 104. St Botolph Aldgate |
| 17. St Augustine by St Paul's | 62. St Mary Staining | 105. St Botolph Bishopsgate |
| 18. St Bartholomew Exchange | 63. St Mary Woolchurch | 106. St Dunstan in the West |
| 19. St. Benet Fink | 64. St Mary Woolnoth | 107. St George Southwark |
| 20. St. Benet Grace Chrucl | 65. St Martin Ironmonger Lane | 108. St Giles Cripplegate |
| 21. St. Benet Paul's Wharf | 66. St Martin Ludgate | 109. St Olave Southwark |
| 22. St. Benet Sherehog | 67. St Martin Orgar | 110. St Saviour Southwark |
| 23. St Botolph Billingsgate | 68. St Martin Outwich | 111. St Sepulchre |
| 24. Christ Church Newgate | 69. St Martin Vintry | 112. St Thomas Southwark |
| Street | 70. St Matthew Friday Street | 113. Holy Trinity Minories |
| 25. St Christopher | 71. St Mary Magdalen Milk | 114. St Giles in the Fields |
| 26. St Clement Eastercheap | Street | 115. Hackney Parish |
| 27. St Dionis Backchurch | 72. St Mary Magdalen Old Fish | 116. St James Clerkenwell |
| 28. St Dunstan in the East | Street | 117. St Katharine by |
| 29. St Edmund Lombard Street | 73. St Michael Bassishaw | the Tower |
| 30. St. Ethelburga | 74. St Michael Cornhill | 118. Lambreth Parish |
| 31. St. Faith | 75. St Michael Crooked Lane | 119. St Leonard Shoreditch |
| 32. St Fosters (St Vedust) | 76. St Michael Queenhithe | 120. St Magaden Bermondsey |
| 33. St Gabriel Fenchurch | 77. St Michael le Querne | 121. St Mary Islington |
| 34. St George Botolph Lane | 78. St Michael Paternoster Royal | 122. St Mary Newington |
| 35. St Gregory by St Paul's | 79. St Michael Wood Street | 123. St Mary White Chape; |
| 36. St Helen | 80. St Mildred Bread Street | 124. Rotherhithe Parish |
| 37. St James Duke's Place | 81. St Mildred Poultry | 125. Stepney Parish |
| 38. St James Garlickhithe | 82. St Nicholas Acon | 126. St Clement Danes |
| 39. St John the Baptist | 83. St Nicholas Cole Abbey | 127. St Paul Convent Garden |
| (Waldbrook) | 84. St Nicholas Olave | 128. St Martin in the Fields |
| 40. St John the Evangelist | 85. St Olave Hart Street | 129. St Mary Savoy |
| 41. St John Zachary | 86. St Olave Old Jewry St | 130. St Margaret Westminster |
| 42. St Katharine Coleman | 87. St Olave Silver Street | |
| 43. St Katharine Cree | 88. St Pancras Soper Lane | |
| 44. St Lawrence Jewry | 89. St Peter Westcheap | |

— 1603 —

Only ten years after London was hit by the epidemic of 1593, it was visited by yet another devastating plague epidemic. 1603 was a traumatic year for London, because it also saw the death of Elizabeth and the entry of her replacement by the Scottish King, James I. In early March, plague was reported in Southwark but following this report, concern about plague was overshadowed first by news of the Queen's death March 24 and then by planning for her funeral, which did not take place till April 28. James I did not arrive in London until May 7.¹⁰⁶ Plague is recorded on the London Bill of Mortality dated the first week of May. This plague epidemic was seen as a bad omen for the reign of the new King and it provided a serious test of his power and administration. It appears that neither London nor the crown issued comprehensive plague orders during this epidemic. In May, the Venetian Secretary in England sent a report home to Venice, stating that plague had killed people in nine parishes, that dread was rising, and that nothing had yet been done to control plague except mark infected houses and kill dogs.¹⁰⁷ Records from St. Margaret Westminster (130), indicate that dog catchers killed 502 dogs. Although St. Margaret Westminster was singled out because of its proximity to the Royal Court, presumably, similar actions were undertaken in

¹⁰⁶ Shrewsbury, *History of Bubonic Plague*, 266. Shrewsbury notes again that the first parish record of a plague death appeared after plague had been listed on the Bills of Mortality. The first parish plague death is dated May 11. This additional example strongly suggests that indeed the parish registrars underreported plague.

¹⁰⁷ Mark S. R. Jenner, "The Great Dog Massacre," in *Fear in Early Modern Europe*, ed. William G. Naphy and Penny Roberts (Manchester: Manchester University Press, 1997), 48.

other parishes. On May 29, all gentlemen who were not needed to run the city or attend the court were ordered out of the city. In July, the St. James Fair and the King's coronation were postponed and finally on August 8, all fairs within a radius of 50 miles of London were cancelled and ultimately the King decided not to enter London until winter.¹⁰⁸ The Venetian Secretary reported that further restrictive edicts were issued in September when it was ordered that no one was to leave London. Not surprisingly, these orders seem to have done nothing to diminish plague within London. The epidemic continued to rage through October and did not substantially abate until December.

Because plague was associated with over crowding and "pestering" people within tenements, another proclamation was issued in September, to limit and control tenements. No new tenants were to be admitted into infected houses "until it shall be thought safe [and] none of the rooms are to be pestered with multitudes of dwellers."¹⁰⁹ The ultimate goal was to reduce the number of tenements within London, so it further stipulated that as tenements were destroyed they were not to be replaced.

The congruence of plague with the death of the sovereign affected contemporaneous perceptions and accounts. Thomas Dekker's account of the epidemic of 1603, entitled *The Wonderful Yeare*, makes it very clear that Queen Elizabeth's death "(like a thunder-clap) was able to kill thousands, it tooke away hearts from millions" and the requisite change of sovereign contributed to the dire consequences of this

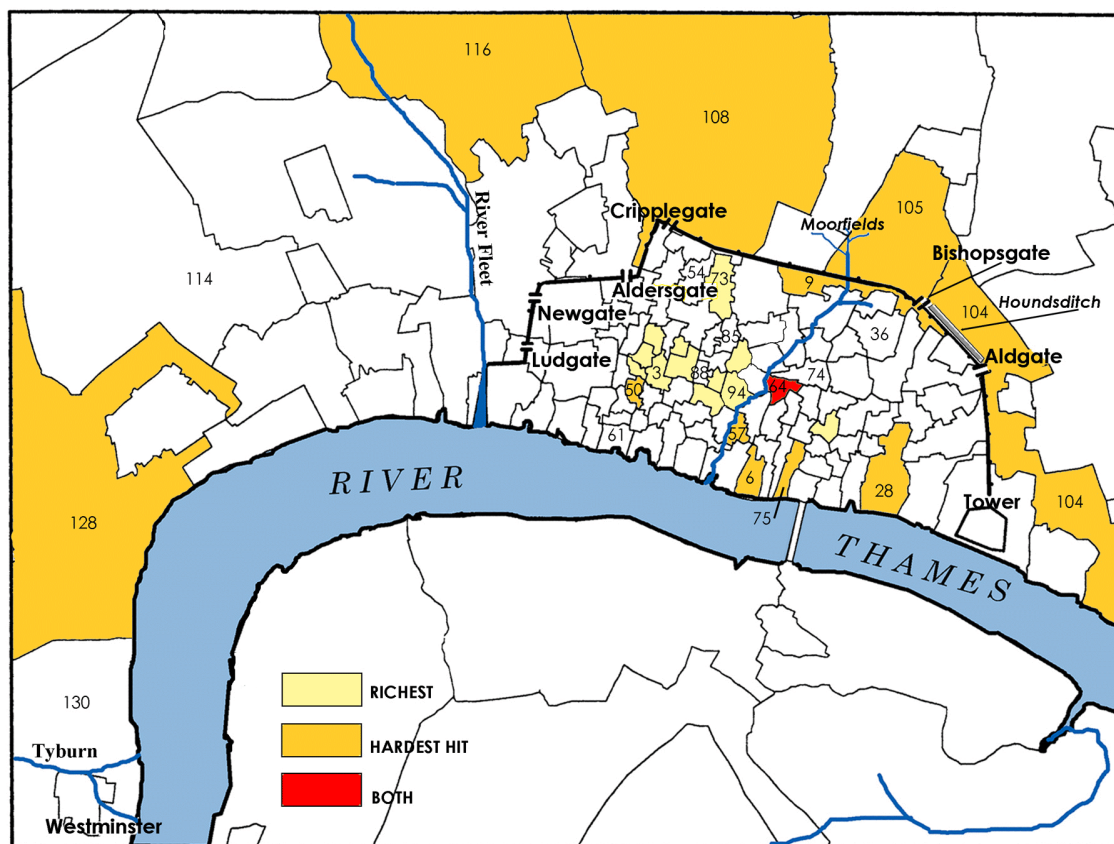
¹⁰⁸ Shrewsbury, *History of Bubonic Plague*, 269, 266.

¹⁰⁹ *Ibid.*, 285.

epidemic, and that equally, this change seems to have handicapped the crown's ability to effectively control the plague outbreak.¹¹⁰

Figure 3 Plague in London 1603

Numbered parishes are those referred to in the text. Richest parish information from Paul Slack, 157.



In this epidemic, the central and richer parishes suffered lower mortality rates than those at the periphery. According to Paul Slack among the ten hardest hit parishes

¹¹⁰ Thomas Dekker, "The Wonderful Year 1603: Wherein Is Shewed the Picture of *London*, Lying Sicke of the Plague," in *In the Plague Pamphlets of Thomas Dekker* (1925), 12. Further, Dekker describes the joy people felt about the new King in terms that suggest people were not preparing for any troubles (23).

were three large parishes just beyond the northern walls, St. Botolph Bishopsgate (105), St. Botolph Aldgate (104), and St. Giles Cripplegate (108), All Hallows on the Wall (9) just inside the walls from St. Botolph Bishopsgate, and three parishes along Themes, St Dunstan in the East (28), St Michael Crooked Lane (75) and All Hallows the Less (6). Unlike in 1593, only three of the worst hit parishes were centrally located, they were St Mary Woolnoth (64), St Mary Bothaw (57), and St Margaret Moses (50).¹¹¹ Additionally, two distant parishes within the Liberties, St. James Clerkenwell (116) and St. Martin in the Fields (128) were particularly hard hit.¹¹² This epidemic seems to have been widely distributed throughout the region around London (see figure 3).

In the years following the epidemic of 1603, plague gradually diminished. By examining records from nine central London parishes – St. Michael Cornhill (74), St. Helen Bishopgate (36), All Hallows Bread Street (3), St. Pancras Soper Lane (88), St. Mary Somerset (61), St. Michael Bassishaw (73), St. Stephen Walbrook (94), St. Olave Hart Street (85) and St. Mary Aldermanbury (54) – it is apparent that the number of reported plague deaths were lower in 1610 than in 1606, and that the percentage of total deaths reported as plague diminished slowly over the period.¹¹³ This pattern of gradual decline in mortality levels differs markedly from mortality patterns displayed during epidemics of highly infectious diseases like smallpox, which burn out quickly as the susceptible people are infected and become resistant to the disease. In 1608, the mayor

¹¹¹ Slack, *Impact of Plague*, 155.

¹¹² Shrewsbury, *History of Bubonic Plague*, 269.

¹¹³ *Ibid.*, 295.

and aldermen of London issued plague orders at the direction of the Privy Council. These orders, in addition to mandating that plague-visited houses be shut up and marked, regulated that cloth from these houses be cleaned and aired before being reused and that the streets be cleaned.¹¹⁴ Fleas, though were not linked to plague, were seen as a nuisance. In 1610, six pence was paid for salt to be used to kill fleas in the pews of Westminster. London churchwardens also paid ten pence for an insecticidal powder to put in the Church linens.¹¹⁵ Although these measures could only have been slightly effective, their use demonstrates that people were actively attempting to reduce their contact with fleas and perhaps suggests that fleas were quite abundant. The cumulative effect of these kinds of measures in conjunction with measures that mandated streets cleansing may have been enough to alter the rat and flea population and thus to affect how and where humans experienced plague.

— 1625 —

In the period between 1613 and 1624 London was free of epidemic plague, although it caused sporadic deaths.¹¹⁶ In 1624, at least some London parishes were troubled by a number of different diseases that produced increases in mortality levels.¹¹⁷

¹¹⁴ City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen* ; See Appendix B and D (because the EEBO copy of the 1608 order is partial) for a summary of these plague orders.

¹¹⁵ Shrewsbury, *History of Bubonic Plague*, 304, 306.

¹¹⁶ F. P. Wilson, *The Plague in Shakespeare's London* (Oxford: Oxford University Press, 1963), 122.

¹¹⁷ Shrewsbury, *History of Bubonic Plague*, 316-318.

Records from St. Katharine by the Wall (117), located outside the wall to the east of the Tower of London, suggest that by 1621 mortalities had already risen substantially and remained well above the 100 deaths a year that became typical after the plague epidemic of 1625. During the 1593 epidemic, deaths in St. Katharine by the Wall increased from about 40 a year to more than 650 deaths, while in 1625 the death total was approximately 225, up from a little over 100 deaths in the non-plague year 1620. The increase in the normal death level in St Katharine by the Wall indicates that the population of that parish had increased substantially. Although the London epidemic of 1625 is generally considered one of the most serious plague epidemics St. Katharine by the Wall did not suffer as badly in 1625 as it had in 1593. Even during epidemics, plague was not a universal experience across London.

During this epidemic many of those who could flee did, although their departures may have been delayed by ceremonies necessitated by the King James' death and the arrival of the new Queen. Indeed, the Tuscan resident noted in correspondence that he thought that the real plague mortality figures were being hidden so that people would not flee London.¹¹⁸ Nonetheless, as Reverend Joseph Mead wrote in September,

The want and misery is the greatest here that ever living man knew; no trading at all; the rich are all gone; housekeepers and apprentices of manual trades begging in the streets, and that in such a lamentable manner as will make the strongest heart to yearn.¹¹⁹

¹¹⁸ *Ibid.*, 323.

¹¹⁹ Reverend Joseph Mead in *Ibid.*, 326.

The epidemic of 1625 like that of 1603 occurred in the year of a monarch's death and in both years, affairs of state took precedence over attempts to combat plague. Conduct of state affairs were protracted. James I died March 27, and his funeral was not until May 7. After James I's funeral, additional ceremonies related to the arrival of the new Queen, Henrietta Maria, and the coronation of Charles I, distracted official attention from plague even longer. Visitors and nobility were encouraged to remain in London to participate these ceremonies. Thus during a long period political attention was focused on the required pomp and ceremony, and away increasing plague mortalities. Thus, laws were not enacted to restrict the spread of plague and in April, the number of parishes reporting plague increased from four to ten. By May the increase in plague deaths was making people nervous although it was not until June that plague was widely distributed across London. Despite the increasing mortalities, the Queen was brought to London on June 16. Ultimately as mortalities increased the court left London and King Charles' coronation was substantially postponed until October.

Parliament convened June 18, but in July it adjourned to Oxford. On Saturday July 2 concern about plague prompted the declaration of a public fast accompanied by long religious services. By the end of July, a day of fasting and praying became a weekly event celebrated Wednesdays. These attempts to stop the spread of plague failed and by the end of July, burials in London exceeded 3,500 a week, up from 305 a week in late April. In late August the death toll peaked, at over 5,000 deaths in one week. After this peak weekly death numbers began to decrease and Charles I's coronation was finally held October, after the number of plague deaths had considerably decreased. By

November the death toll was back down to 319 in a week, which was still high according to the Tuscan Resident in London who had written that the average weekly mortality varied 130 to 180.¹²⁰

During the peak of the epidemic, attempts were made to assure that plague was not spread beyond London. Communication with London was heavily restricted. No one was allowed to enter the city, although letters could be sent into London with a payment, which indicates that regulations were not being followed.¹²¹ Boats were not allowed out of the Kingston docks and neither were people were permitted to leave London. To further protect the King and Court, while Charles was at Woodstock, no one from Woodstock was allowed to leave and return upon pain of death. Later, when the King moved to Reading, similar rules were enacted to protect Reading. People living within three miles of Reading were prohibited from receiving goods from London.¹²² Although plague deaths had begun to decline by October, it was not until December 30 that all restrictions were lifted on travel and merchandise moving into and out of London.¹²³

In early October, when the number of deaths had begun to recede, and people began returning to London. Because of fear that plague would rebound with the influx of new potential victims, the government issued prohibitions against people entering

¹²⁰ Ibid., 320-1, 323.

¹²¹ The Tuscan Resident in Ibid., 324.

¹²² Ibid., 324, 330.

¹²³ Ibid., 332-333.

London unless they were residents. Although London was under pressure to control plague, evidence suggests that much of the official national concern about plague was focused on protecting the King and his court from this epidemic. Nonetheless, plague orders issued by both the Crown and the City of London, addressed the broader issue of what should be done in a time of plague. Two different but virtually identical Crown documents were printed; one was printed by John Bill and the other by Bonham Norton and John Bill and both are a reissued version of plague orders set forth by Elizabeth I.¹²⁴

In 1625 previously issued London and Royal orders were revived and reissued. These emphasized the need to identify the ill, to provide for them and to limit their the movements. In addition, the orders restrict the movement of the people such as searchers, care givers or watchmen who were required to be in contact with the ill. The orders clearly state that the ill and those who were exposed to plague-infected people should keep their distance from healthy people. As in the earlier epidemics London officials were under considerable pressure to control the spread of plague. The orders also placed considerable emphasis on keeping the London environment as clean as

¹²⁴ England and Wales James I (1603-1625), *Orders Thought Meet by His Maiestie, and His Privie Councill* ; England and Wales James I (1603-1625), *Orders, Thought Meet by His Majestie, and His Privy Councill, to Bee Executed Throughout the Counties of This Realm, in Such Townes, Villages, and Other Places, as Are, or May Bee Heerafter, Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Advice Set Downe by the Best Learned Physicke within This Realme, Containing Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preservation of His Good Subjects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected* (London: Printed by Bonham Norton and John Bill, 1625).

possible. They mandated that the streets should be cleaned daily and that plague-infected clothing should be well aired before being used again.¹²⁵

The 1625 London plague orders were a much simpler document than those issued by the crown. They are only two-pages albeit very long pages long and look as if they may have been intended to be publicly posted. Nonetheless, despite their shorter length they are very similar in content to those issued by the crown. Both sets emphasized a variety of techniques for arresting the spread of plague. First, information was to be gathered about the location of the plague and then the prescribed measures were to be taken. One of the primary tactics required, was to isolate sick people from the healthy. Doing so necessitated determining what houses were infected and then shutting infected houses up and restricting the liberty of those who dealt with the ill to mingle in society. Both infected houses and potentially infected people, searchers and surgeons, were required to be clearly labeled, thus allowing healthy people to steer clear of them.¹²⁶ The London orders also required streets to be wet down, where wells were available, and swept twice a day, in addition to being raked daily except on Sundays. The London orders also mandated the killing of dogs found roaming the streets. These orders were intended to apply to throughout the City Liberties including a region

¹²⁵ City of London (England) Court of Common Council, *Orders Heertofore Conceived and Agreed to Bee Published by the Lord Mayor and Aldermen*, np. See Appendix E; City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np. See Appendix F.

¹²⁶ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague Within the Citie and Liberties of London* np.

beyond the walls. Nonetheless, at the end of July, John Gore London's mayor assured the Privy Council that the fact that the plague had been more destructive outside the walls than within, was evidence of the efficacy of city measures.¹²⁷ This statement suggests that the plague orders were better enforced and implemented within the walls than in the areas beyond the walls. It is possible that measures mandating cleanliness were effective at controlling the spread of plague, where they were enforced. It also provides some evidence that the growing distinction between plague severity within and without the City Liberties could have been the result of differences in the enforcement of plague orders, rather than merely the result of more people living in the cramped squalid tenements of the suburbs.

Contemporaneous observers not only linked plague with overcrowded conditions, they recognized that it peaked during the heat of the year. In June a commentator wrote:

And that which makes us the more afraid is, that the sickness increaseth so fast, when we have had for a month together the extremest cold weather ever I knew in this season. What are we then to look for when the heats come on, and fruits grow ripe?¹²⁸

The epidemic peaked in late summer, and by late November and early December, when cold weather arrived in London, plague mortalities throughout the greater London area virtually disappeared.

¹²⁷ Shrewsbury, *History of Bubonic Plague*, 322.

¹²⁸ An unnamed correspondent quoted in *Ibid.*, 321.

— 1636 —

Sporadic plague deaths were reported in the years following 1625. In March of 1629 fear of plague increased as “divers houses infected with plague in the parishes of St. Giles-in the Fields [114], St Leonard Shoreditch [119], and St Mary Whitechapel [123]” were reported and so previous plague orders were again reissued.¹²⁹ Following these small epidemics of 1629 and 1630, pressure built to provide London with facilities to treat plague victims. As the number of plague victims rose, Orders were reissued that houses should be cleaned and the streets washed down daily, that no public meetings were to be held and that the shopkeepers should not keep their fruit stores in their house, but only in Thames street warehouses.¹³⁰ Until 1636, however, only very few plague deaths were reported. The first plague death registered within the city was May 5 in the parish of St Peter Cornhill (90) although there had been earlier plague deaths registered in the out parishes, Stepney (125) and St Mary Whitechapel (123) in April and on May 4 a death in Bishopsgate and Aldgate was mentioned.¹³¹ Deaths continued to increase until September when they peaked, and then they gradually declined through December.

¹²⁹ Ibid., 353; England and Wales Charles I (1625-1649), *By the King: A Proclamation Declaring His Majesties Pleasure Touching Orders to Be Observed for Prevention of Dispersing the Plague* (Imprinted at London: Robert Barker, Printer to the Kings most Excellent Maiestie: And the Assignes of John Bill, 1636); Royal College of Physicians of London, *Certain Necessary Directions* ; For summaries of these documents see Appendices J and K.

¹³⁰ Shrewsbury, *History of Bubonic Plague*, 356.

¹³¹ Ibid., 372-373.

In 1636, many parishes on the outskirts of the city again saw increases in reported plague deaths: St Giles in the Fields (114) Giles Cripplegate (108), St Sepulchre (111), St James Clerkenwell (116), St Mary Islington (121), St. Katharine by the Tower, (117) Stepney (125), St Mary Whitechapel (123), St Leonard Shoreditch (119) and Isleworth. Although this epidemic was relatively mild and centered in the suburban parishes Shrewsbury notes that the Privy Council was quite concerned about the extent of the epidemic. The Privy Council again issued complaints to the Mayor that infected houses were not well marked. The Privy Council complained that the crosses and signs marking infected houses were placed so that they were not clearly visible from the street, that many houses appeared to be unguarded and worse that people could be seen sitting outside, in front of infected houses.¹³² The Crown's plague orders issued in 1636 form an extensive publication. Although these orders include a reissue of the 17 regulations on how to control plague published in 1593, they also include several extensive orders for controlling rogues and vagabonds as well as regulations and reprints from court cases involving the division of buildings into tenements. Thus the plague orders of 1636 seem to indicate that maintaining jurisdiction over disorderly behavior was considered central to the control the spread of plague. Emphasis on controlling disorderly behavior may have been a response to the location of plague hot spots or it may have been effected by larger political disturbances.

¹³² Ibid., 375.

During the years between 1636 and 1665, occasional plague outbreaks caused deaths, but none was as serious as the epidemic of 1635-36. London issued expanded plague orders that continued to require street cleaning and fumigating of infected houses by burning various sorts of smelly herbs. These orders differed from earlier ones primarily in that they required houses to be shut up for 28, rather than 40 days after the last resident had contracted plague.¹³³ There were a few outbreaks between 1640 -1647. During the Interregnum, regulations concerning the division of buildings into tenements, and construction of new tenements in London's open spaces were relaxed or at least less-strenuously enforced. After 1647, the number of deaths registered as plague returned to the normal endemic pattern fluctuating between a couple, and less than a few hundred annually, until 1665.

— 1665 —

In 1665 London experienced what is the most famous and most studied, and best documented of all its plague epidemics. Although the first deaths of this final great London epidemic are usually considered to have been those reported in St. Giles in the Fields (114), during the fall of 1664, plague deaths were also registered in Westminster. Nonetheless, plague first reached epidemic proportions in St. Giles in the Fields, and

¹³³ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np. Item 5 requires infected sites to be shut up for 6 weeks after the last victim recovered.

the records of these deaths have come to take precedence.¹³⁴ Plague seems to have begun very slowly in late 1664, as the following contemporaneous report explains:

And being constrained to a house or two, the seeds of it confined themselves to a hard frosty winter of near continuance: it lay sleep from Christmas to the middle of February, and then broke out again in the same parish; and after another long rest til April, put forth the malignant quality again as soon as the warmth of spring gave sufficient force, and the distemper showed itself in the same place. At the beginning it took one here, and another half a mile off; then appeared again where it was first: neither can it be proved that these ever met; especially after houses were shut up.¹³⁵

The records of St. Paul Convent Garden (127) lists the burial on April 12, of Margaret, daughter of John Ponteus as a plague death, followed by another plague death in May. Neither of these was included in the plague deaths listed in the Bills of Mortality. In the last full week in April, two other plague deaths were reported in nearby St. Giles in the Fields. No plague deaths were reported in the next week, but in the first full week of May, several plague deaths were recorded in the Bills of Mortality: three in St. Giles in the Fields and four in close by St. Clement Danes (126). In addition, two other parishes reported one plague death each in the first May: St. Andrew Holborn (98), a parish partially within and without City Liberties, and finally St. Mary Woolchurch (63), located right in the center of London within the wall to report a plague death (see figure 4).¹³⁶

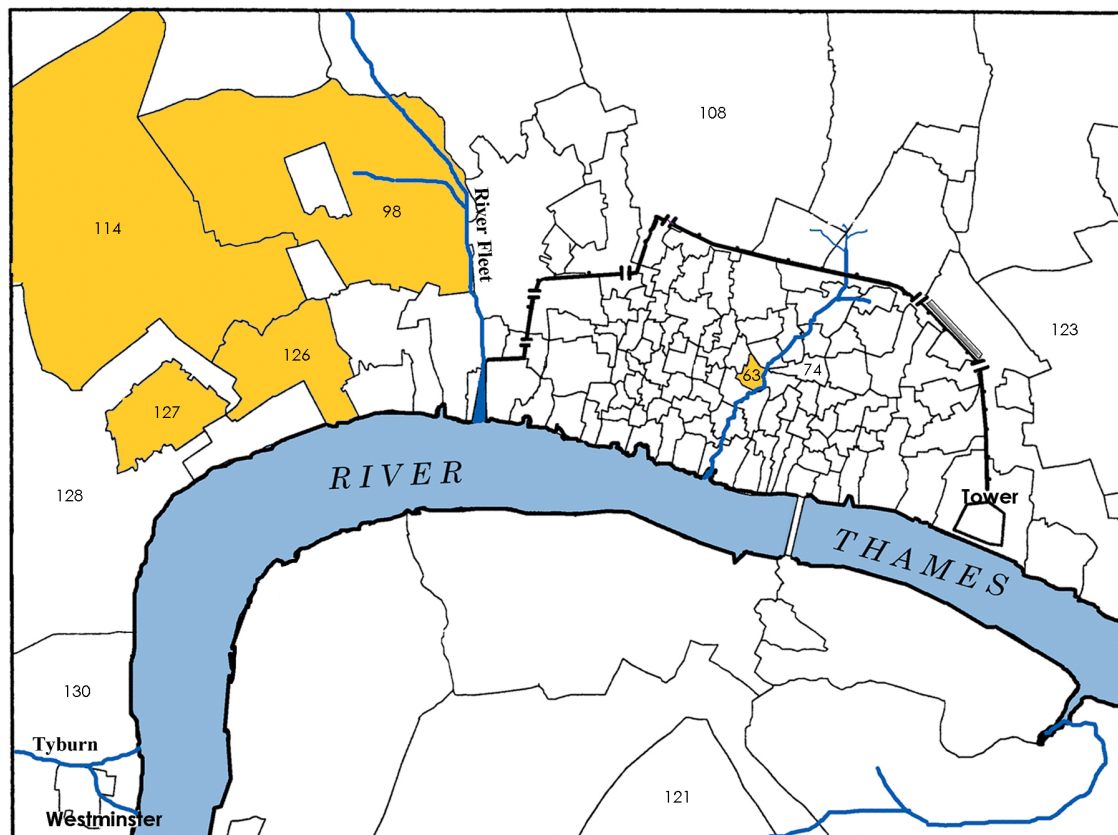
¹³⁴ Walter George Bell, *The Great Plague in London in 1665* (London: John Lane the Bodley Head Ltd, 1979; reprint, 1867- 1942- 1979), 18; Shrewsbury, *History of Bubonic Plague*, 19-20.

¹³⁵ Harvey quoted in Shrewsbury, *History of Bubonic Plague*, 446-7.

¹³⁶ Bell, *Great Plague in London*, 21.

Figure 4. London Plague 1665

Shaded parishes experienced the first plague deaths. Numbered parishes are those mentioned in the text.



Despite these few plague deaths in April, the Privy Council required that houses suspected of infection be inspected, and in May constables were directed to make sure that infected houses were promptly shut up.¹³⁷ Shortly after this the “the justices were authorized by warrant to purchase ground for the erection of pest-houses” and to provide access to the newly constructed pest-houses.¹³⁸ Bell argues that these proactive attempts to battle plague would not have been undertaken if those in charge had not

¹³⁷ Ibid., 23.

¹³⁸ Ibid., 24.

known that there had been more plague deaths than had been reported in the Bills of Mortality.¹³⁹

By May 12, a Privy Council Committee had been appointed to devise a plan to control plague. After considering it for one week, committee members made their first report, which recommended building another pest-house in St. Giles in the Fields, restricting the number of alehouses in infected areas and strictly enforcing the previously enacted laws against ‘inmates’ or lodgers. London’s mayor issued a proclamation requiring Londoners to fulfill their civic duty and clean the streets in front of their houses. Two weeks later, he complained that the streets were dirtier than ever and followed this up by requiring aldermen to inspect their wards and report infractions.¹⁴⁰ Although the requirement that aldermen check their wards was mandated in previous plague orders, it was not stipulated in those printed in 1665, which simply state that the streets are to be cleaned and that the aldermen shall meet at least weekly to discuss the implementation of the orders.¹⁴¹

In an additional attempt to control the spread of plague, efforts were made to restrict travel throughout greater London. A path behind Christ’s Hospital that ran along the old town ditch was closed because plague was associated with the filth there.

¹³⁹ Ibid., 24.

¹⁴⁰ Ibid., 26-7.

¹⁴¹ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np; City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, np.

Magistrates also attempted to restrict access into and out of St. Giles in the Fields by placing guards around the parish.¹⁴² Despite these measures, mortality continued to increase. Until August, the bulk of the deaths occurred in St Giles in the Fields; however, plague deaths were also being reported more widely for example east of the wall in St Mary Whitechapel (123) and even in St Mary Islington (121) on the south side of the Thames. The next to be hit hard by plague was St Giles Cripplegate (108) north of the wall, which had a population one hundred times the population of any single parish within the walls of London.¹⁴³

Variation in the population of parishes makes comparing mortality figures virtually worthless, in terms of determining relative mortality levels. Notwithstanding, parish death figures do provide some clues to the enormous stresses faced by some of the outlying parishes. All the burials and funerals recorded in a parish, were handled by the officials of a single church. Additionally, each parish was largely responsible for financially supporting indigent plague victims, delivering their food and paying for the watchmen who ensured that their closed houses actually remained closed. Thus, the finances and social and physical infrastructure of these parishes with huge mortality figures were severely tested. According to Walter George Bell, in these outlying regions plague spread along main arteries. In St. Giles in the Fields (114), it spread along Dury Lane and Holborn, and in St. Martin in the-Fields (128) it spread along

¹⁴² Bell, *Great Plague in London*, 27-8.

¹⁴³ Moote and Moote, *Great Plague*, 24.

Long Acre.¹⁴⁴ Bell provides no concrete evidence for his statement, that plague spread along the main thoroughfares arteries, rather than more haphazardly, however, because outlying parishes were heavily built up along main arteries it seems logical. In the suburbs the built up areas backed on to much more rural areas, so one would expect a disease carried by commensal rats and fleas to be spread through the interconnected buildings rather than across streets or fields. Within the London's walls, plague distribution may have been more erratic because rat populations were separated by a more complicated pattern of streets and interconnected buildings.

Samuel Pepys (1633-1703) first mentions the epidemic June 7, when he wrote,

This day, much against my will, I did in Drury Lane see two or three houses marked with a red cross upon the doors, and 'Lord have mercy upon us' writ there; which was a sad sight to me, being the first of the kind that, to my remembrance, I ever saw. It put me into an ill conception of myself and my smell, so that I was forced to buy some roll-tobacco to smell to and chew, which took away the apprehension.¹⁴⁵

In mid June, the Barnwell Fair was cancelled, and on June 21 when Pepys was at Cripplegate he saw that people traveling by the coach and wagon load were heading out of town.¹⁴⁶ Nonetheless, even in the first week of July, there were still parishes within the city walls which had yet to report any plague deaths. One of these fortunate parishes, was St. Michael Cornhill (74), despite being one of the central market

¹⁴⁴ Bell, *Great Plague in London*, 21.

¹⁴⁵ Latham and Matthews, eds., *Diary of Samuel Pepys*, 120.

¹⁴⁶ Shrewsbury, *History of Bubonic Plague*, 464; Latham and Matthews, eds., *Diary of Samuel Pepys*, 275.

parishes, at the cross roads of several of the main streets through London.¹⁴⁷ In the epidemic of 1593 it had been one of the parishes hard hit, although in the subsequent epidemics St. Michael Cornhill had also experienced a relatively low level of endemic plague.

It has been generally accepted that the 1665 plague epidemic was introduced to London from Amsterdam because plague had been virtually absent from London, while it had been rampant in Amsterdam. It is possible that plague was introduced from Amsterdam into London either by rats or fleas; however, the pattern of its spread within London, beginning as this epidemic did in a northwestern suburb, suggests that enzootic plague within London became epidemic for a reason other than direct importation from abroad. However, Dr. Thomas Cocke assumes that the plague entered St Giles in the Fields in a bundle of fur from Holland, while Dr. Nathaniel Hodges traced the outbreak of plague to packages of Turkish “bailes of cotton or silk, which is a strange preserver of the Pestilential Steams” imported via Holland.¹⁴⁸ William Boghurst (c.1630 –1685), however, noticed that a few cases of plague had occurred in several of London’s outer parishes over a several year period.¹⁴⁹

It is unlikely that this epidemic was introduced from Amsterdam, not only because plague first broke out far from the port area but also because in 1664 ships

¹⁴⁷ Shrewsbury, *History of Bubonic Plague*, 465; Latham and Matthews, eds., *Diary of Samuel Pepys*, 152.

¹⁴⁸ Moote and Moote, *Great Plague*, 55.

¹⁴⁹ William Boghurst, *Loimographia: An Account of the Great Plague of London in the Year 1665* (London: Shaw and Sons, Fetter Lane, 1979), 26.

from Amsterdam had had restrictions placed on them because of plague. Ships arriving in London from Amsterdam were required to wait 30 days before either people or merchandise were allowed to be unloaded. As plague spread throughout the Netherlands these restrictions were expanded, first to include ships from Rotterdam and then Zeeland, and the restrictions were lengthened to 40 days. According Moote and Moote, when it came to a shipment of horses for King Charles II, the regulations were not followed, and they further suggest that shipments for the King's Navy were not subject to the rules.¹⁵⁰

Only after plague rumbled for several months in the extramural parishes of London was the first plague burial recorded within the walls of London. That first recorded plague death was in centrally located St Mary Woolchurch (63). Defoe claims that this first death within walls of the city was the result of flight from St Giles in the Fields by someone who did not realize that he was already infected.¹⁵¹ This has come to be the accepted explanation for how plague entered the city within the walls.¹⁵²

London's dreaded visitation of 1665 killed more people than any other single London epidemic. At least 68,747 died of plague that year, double the number of people killed in any one of the previous epidemics. Though these official numbers seem huge, many contemporaneous observers and subsequent commentators and historians have

¹⁵⁰ Moote and Moote, *Great Plague*, 51.

¹⁵¹ Maynadier, ed., *A Journal of the Plague Year*, 5. Defoe blames the entry of plague into the City center on a Frenchman who had moved from a plague hotspot.

¹⁵² Moote and Moote, *Great Plague*, 55.

believed that the official reports seriously undercounted deaths.¹⁵³ Nonetheless, the epidemic was well documented by its contemporaries, not only by official record keepers but also by doctors and prominent figures who kept diaries and wrote letters into and out of London, many of which have survived. In addition, despite the fire of 1666 and the subsequent reorganizing of several parishes, many of the parish registers, which were kept amazingly up to date despite the hectic nature of the plague year, survived and have been thoroughly studied. Finally, other factors such as hearth tax records have been combined with plague death records to create a fairly detailed picture of the wealth of each parish and the number of households it contained.

Various people made notes about the weather they associated with this plague epidemic, but the weather patterns they remembered do not always correspond well with the actual weather, however, Bell and Harvey reported that the winter of 1664 was cold and evidence suggests that it was.¹⁵⁴ On the other hand the summer of 1665 seems to have been almost the as warm as 1664 and a little cooler than 1666 which was an abnormally dry year in London.¹⁵⁵ Linking plague to specific weather and climate is

¹⁵³ Bell, *Great Plague in London*, 20, suggests that this number, 68,596 (from the final Bill of Mortality that does not include 152 deaths that occurred after the final week included in the Bill of Mortality year) is fully 30,000 short of a true count of plague deaths.

¹⁵⁴ Shrewsbury, *History of Bubonic Plague*, 446; J.A.I Champion, *London's Dreaded Visitation: The Social Geography of the Great Plague in 1665*, vol. 31, *Historical Geography Research* (London: Royal Holloway, University of London, 1995), 8.

¹⁵⁵ Champion, *London's Dread Visitation*, 8; Stephen Porter, *The Great Plague* (Sutton Publishing Limited, 1999), 90.

difficult because, for example, good harvests may produce more rats, but on the other hand, bad weather would have driven the rats into closer contact with people.

Diaries including those of Pepys and John Evelyn say that many people who could afford to do so fled London as the bills of mortality reported increasing numbers of plague deaths. It has been suggested that one of the reasons that the wealthy suffered dramatically less during the epidemic was that they left London. However, the evidence from their diaries suggests that explanation is too simple. Although Evelyn left London during the Epidemic, he returned, and while Pepys, remained in London throughout most of the epidemic, he visited his wife frequently and spent some time in the country. Pepys moved his wife and most of his household out of London during the height of the plague, yet he frequently traveled to visit her and then returned to London. Despite the large numbers of people who fled London during the 1665 epidemic, the surrounding regions were only sporadically afflicted with plague, which suggests that this flight and visits such as Pepys' did not do much to spread plague. However, while the London epidemic had largely burnt it self out, by March 1666, in the surrounding regions there were plague mortalities reported as late October 1666.¹⁵⁶ It is unclear the extent to which people fleeing London were responsible for the delayed plague outbreaks in the regions surrounding London. What is clear is that despite these lingering plague loci, the disease was not reintroduced back into London.

¹⁵⁶ Ibid., 90.

In Conclusion

The physical and social geography of London was substantially constant throughout London's 300 years of endemic plague, although metropolitan London did experience dramatic growth in population that caused expansion far out into the suburban regions and increased its population density. Nonetheless, plague orders mandated a remarkably consistent set of measures to be used to combat plague. Throughout plague's final 100 years, people were told to clean the streets, clean fabrics and fumigate houses, kill dogs, and keep infected people and those exposed to people with plague segregated from the healthy population. Yet, despite the consistency in the methods recommended for combating plague, the locus of epidemics moved from the from of the central, relatively wealthy parishes, to the relatively poorer suburban parishes, during the final century of plague in London. Despite the observable changes in the focus of plague distribution, its spread from place to place remained erratic. Londoners noticed that although everyone was susceptible to plague, it seemed to be most devastating among the people who were poor and pestered, or crowded, into tenements in back alleys and in the unregulated, squalid housing of the suburbs. Plague regulations attempted to control the poor and thus to control the spread of plague, however, evidence suggests that these orders were more effective within the wealthier parishes inside the City walls.

5 Literature Review and Argument for *Yersinia Pestis*

Chroniclers, physicians and historians have been writing about the plagues of the Second Pandemic since even before the disease reached Europe. For the most part, documents written before 1722, when plague virtually disappeared from Western Europe, focused on methods of controlling, avoiding, preventing and escaping the disease, as well as treating people who had become sick with it. The authors of the earliest treatises also attempted to understand the causes of the disease in the expectation that if the causes were understood, the epidemic could be avoided. Both early and later treatises frequently discussed plague as a significant challenge to basic social order and addressed means of mitigating its impact on society.

Though many contemporaneous plague treatises exist, twentieth and twenty-first century plague researchers face many unsolved questions. Almost every aspect of the epidemic that ravaged Europe from 1347 to 1350 provides a point of contention, as do aspects of subsequent epidemics that sporadically returned throughout Europe for the next 300 or more years. It is generally accepted that the initial epidemic killed between one quarter and one half of the population of Europe.¹ When the smaller secondary epidemics between 1350 and 1361 are considered in conjunction with the initial

¹ Byrne, *The Black Death*, 59, notes that the trend in recent scholarship has been to accept the higher figures in this range; Morris, "Plague in Britain," 41. In this work from 1977, Morris says that the somewhat lower mortality figures, 25 to 35 percent, reported in Philip Ziegler's work seem convincing.

epidemic, the mortality figures mentioned are frequently substantially higher, often sixty percent or even greater.² However, mortality figures mentioned, at least occasionally, range from an estimate as low as five percent by J. F. D. Shrewsbury, to estimates as high as seventy-five percent, at least regionally.³

Researchers' positions are divided between several different viewpoints concerning the level of mortalities and the cause of the medieval and early modern plagues. Although many researchers think medieval descriptions of plague symptoms come close to matching modern descriptions, and the case mortality for the three forms of plague mesh well with the Modern Pandemic, the overall mortality levels during epidemic outbreaks of the Modern Pandemic have been much lower than outbreaks during the Second Pandemic. In general, researchers who accept the historical tradition of the early twentieth century and believe that *Y. pestis* was the causative agent of plague epidemics, and accept moderate mortality figures for the initial wave of the pandemic. On the other hand, researchers who think that plague epidemics were the result of a disease more contagious than bubonic plague tend to be more willing to accept evidence and chroniclers' reports of very high death rates associated with plague epidemics. Thus, because Philip Ziegler, Christopher Morris and Paul Slack believe that *Y. pestis* was the primary causative agent in the plague epidemics, they accept relatively

² Gottfried, *The Black Death*, 133.

³ Shrewsbury, *A History of Bubonic Plague in the British Isles*, 36; Cohn, in *Black Death Transformed*, says "the Black Death killed upwards of three-quarters of urban and village populations"(2); Byrne, *The Black Death*, 59, reports that Naphy and Spicer posit a mortality rate as high as 75 percent over the first century of the plague pandemic.

cautious mortality figures for the initial epidemic of between 30 and 45 percent mortality. J. D. F. Shrewsbury takes an even stronger stance. He argues that the overall mortality was greatly overstated because he believes that *Y. pestis* is incapable of producing the high mortalities that were reported, especially in rural areas. Because Shrewsbury cannot completely discount mortality reports, he attributes some of the mortality to something other than plague, although he credits *Y. pestis* with a greater role in the initial epidemic of 1348-50 than in subsequent epidemics.

Susan Scott and Christopher J. Duncan, on the other hand, accept very high mortality figures, but deny entirely the claim that the initial epidemic was caused by *Y. pestis* and argue instead that these massive mortalities were the result of a form of hemorrhagic fever.⁴ Graham Twigg, unlike Shrewsbury, does not discount a high the overall level of mortality; but rather he attributes the bulk of the mortality to anthrax.⁵ Like Twigg, Samuel K. Cohn accepts high mortality figures, especially for the initial epidemic wave, and like Twigg, he does not believe *Y. pestis* was responsible for the high mortalities; however, unlike Twigg, Cohn does not concern himself with what disease was responsible for plague. Ole J. Benedictow is one of the very few researchers who believes that the Second Pandemic was caused by *Y. pestis* and accepts the idea that it produced very high mortalities.⁶ To sum up, the research on plagues of medieval

⁴ Scott and Duncan, *Biology of Plagues*. This is the primary focus of their argument.

⁵ Twigg, *Black Death*, 200-222.

⁶ Benedictow, *Black Death 1346-1353*. This is a primary focus of his argument, which he supports by examining plague epidemics throughout Europe.

and early modern Europe has led to few points of consensus. The principal point of consensus is that an enormous number of people died in a relatively short period of time, while everything else is a point of contention. Details of precisely how many people died and what diseases caused their deaths are hotly disputed.

Between 1985 and 2005 many works addressing plague, or the epidemic diseases of medieval and early modern Europe have been published. Because these new looks at this old epidemic are being fueled by current events, many of the new examinations of past plagues have focused on their biological nature, including both the microbial causes and disease vectors. Of course, in the past when interest in historic plagues did surface, it also was driven by contemporaneous concerns. The chaos surrounding World War I served to increase interest in the turmoil produced in 1348 by the first wave of the Second Pandemic. Current interest has been fueled by the realization that infectious diseases that were thought to have been conquered have not been. As McNeill noted in the introduction to the 1998 re-release of his book *Plagues and Peoples*, when the book was originally published “in 1976 many doctors believed that infectious diseases had lost their power to affect human lives seriously.”⁷ Alfred W. Crosby in his preface to the new edition of *America’s Forgotten Pandemic*, notes that in 1969 the Surgeon General of the United States declared “that we had left infectious diseases behind in our dust,” but by the late 1980s, it was all too clear that this was a

⁷ William H. McNeill, *Plagues and Peoples* (New York: Anchor Books, 1998), 9.

wholly inaccurate statement.⁸ In light of the many new biological threats, including bird flu, Severe Acute Respiratory Syndrome (SARs) and HIV-AIDs, and the growing concern over new and improved biological weapons, the Surgeon General's statement seems unbelievably naive. Given the rapid changes in perception about the dangers of contagious diseases, it is not surprising that interest in the great historic plague epidemics has grown over the past few decades. Given the impetus of late twentieth century plague research, it is not surprising that most historians have failed to examine the ways in which medieval society may have influenced the course of plague epidemics. This is an oversight this thesis has begun to redress.

After the *Yersinia pestis* bacterium was identified in Hong Kong in 1894, it was generally accepted that the disease it produces, plague, was the epidemic disease that devastated England, most of Europe, and much of Asia in the fourteenth, fifteenth and sixteenth centuries. However, since the mid 1980s, it has become increasingly common to question this theory.⁹ Recently, Cohn has gone so far as to claim that while he cannot suggest what the causative agent of plague was, he is sure it was not *Y. pestis*.¹⁰ Other investigators argue that while *Y. pestis* may have played a role in the epidemics, other diseases must have accounted for a considerable proportion of the high mortality.

⁸ Crosby, *America's Forgotten Pandemic: The Influenza of 1918*, xi.

⁹ The bacillus initially was named *Pasteurella pestis* because it was isolated by Alexandre Yersin of the Pasteur Institute. During a period of intense competition between the Koch and Pasteur institutes, it was later officially renamed *Yersinia pestis* in honor of the scientist who did the work.

¹⁰ Cohn, *Black Death Transformed*, 1.

This upswing in interest in historic plague epidemics is the result of multiple kinds of inquiries into the events of the late twentieth century. Advances in the fields of microbiology and epidemiology have driven much of the recent research on plague. Until recently, researchers who were attempting to investigate epidemics of the Second Pandemic were limited to using information gained from current epidemics and attempting to apply it to the epidemics of the past. Scientists are now making use of new technologies that allow them to directly investigate the genetic materials from the microbes that caused historic epidemics. Genetic examination of humans with resistance to AIDS/HIV provides evidence that an epidemic 680 years ago selected for a genetic mutation, known as CCR5-delta, which now has a ten percent frequency among Northern Europeans.¹¹ Naturally the time frame of the selection for this mutation led researchers to propose that the epidemic disease that swept through Europe in 1347-50 selected for the CCR5-delta mutation. This and other evidence of the impact that diseases of the past might have had on human genetics of the present are providing a definite impetus to determine precisely the nature of the pandemic that swept Europe in 1348 and sporadically throughout subsequent centuries. Plus, interest in *Y. pestis* is being encouraged by its potential as a biological weapon.

Stimulated by new diseases and fueled by new technologies, as well as by the desire to discover the disease that may have selected for the CCR5-delta mutation,

¹¹ O'Brien, *Tears of the Cheetah*, 235, 237. O'Brien admits that there is some evidence suggesting that smallpox might have been the disease that exerted this selective pressure, but notes that this has not been possible to test directly because of the dangers and restrictions placed on smallpox.

researchers have begun to seek DNA evidence that *Yersinia pestis* existed in medieval Europe. Teams including Didier Raoult and Michel Drancourt have identified *Y. pestis* in dental pulp from several medieval and early modern grave sites that have been excavated in France.¹² The bodies selected for examination were chosen from mass graves that were likely to have been created during plague epidemics, for example, the dental pulp examined was from three separate individuals found at Sainte-Damien in Montpellier. Because this cemetery was in use before and after the 1348 plague epidemic, the bodies selected for testing were chosen based on their location within the cemetery. The chosen bodies were located on top of a thirteenth century rubble pile and behind a fourteenth century wall, and, in addition, they were buried without shrouds suggesting they were buried during a mortality crisis.¹³ In addition to these medieval bodies, they tested bodies from cemeteries of the Justinian Pandemic era, as well as bodies that are presumed to have died as the result of epidemics of the early 1700s. The results of these tests indicate that *Y. pestis* was present. However, another team of researchers led by Tom Gilbert examined samples from other medieval bodies, but found no evidence of *Y. pestis* and claim that Drancourt and Raoult's methodology is

¹² Didier Raoult et al., "Molecular Identification by "Suicide Pcr" of *Yersinia Pestis* as the Agent of Medieval Death," *PNAS* 97, no. 23 (2000): 12800-12803; Michel Drancourt et al., "Yersinia Pestis Orientalis in Remains of Ancient Plague Patients," *Emerging Infectious Diseases* 13, no. 2 (2007): 332-333.

¹³ Raoult et al., "Molecular Identification by "Suicide Pcr" of *Yersinia Pestis* as the Agent of Medieval Death," 12800.

faulty.¹⁴ Other researchers simply acknowledge that more than one disease was present during epidemic periods. Although the work is not conclusive, Drancourt and Raoult's results provide more evidence that *Y. pestis* was a factor in the Second Pandemic. Nonetheless, for the foreseeable future, modern scientific analysis of human remains will serve to supplement, but to not replace, a historic analysis of what disease produced historic epidemics.

Scientific research affects the understanding of historic epidemics, and, conversely, historical understanding of diseases has influenced scientific research. The initial development of modern plague research, especially during outbreaks of the late nineteenth century, was influenced as much by an understanding of the past as by contemporary developments. Plague investigators of the late nineteenth and early twentieth century were clearly influenced by their understanding of the earlier epidemics, especially the outbreak in 1348 and the final devastating outbreaks in London and Marseille. When reports of the plague epidemic in Hong Kong reached Europe in the 1890s, Europeans rushed to Hong Kong and invested heavily in solving the mysteries of this modern epidemic because of fear that plague would again invade Europe producing mortalities similar to those of the past.¹⁵ Although prior to the late

¹⁴ M. Thomas P. Gilbert et al., "Absence of *Yersinia Pestis*-Specific DNA in Human Teeth from Five European Excavations of Putative Plague Victims," *Microbiology* 150 (2004): 341-354; Micheal B. Prentice, M. Thomas P. Gilbert, and Alan Cooper, "Was the Black Death Caused by *Yersinia Pestis*?," *The Lancet Infectious Diseases* 4, no. 2 (2004): 72; M. Thomas P. Gilbert et al., "Response to Drancourt and Rauolt," *Microbiology* 150, no. 2 (2004): 264-265.

¹⁵ Cohn, *Black Death Transformed*, 2. Cohn points out as few other plague researchers do, that the understanding of past plague epidemics has directly affected

nineteenth century, the plagues of the late medieval period had not been extensively studied, the devastation caused by later plague epidemics, such as the 1665 Great Plague of London, was well known if only from fictionalized sources such as Defoe's *Journal of the Plague Year*. Researchers knew, or thought they knew, that plague was deadly, terrifying, and extremely contagious, and this affected their investigations.

Of equal importance to the initial investigations into the modern plague epidemic was that plague in Hong Kong came to the attention of Europeans, and that the *Y. pestis* bacterium itself was isolated, less than 20 years after the first microbe responsible for a disease, *Bacillus anthracis*, was isolated and identified. Thus, investigations of plague were influenced by a modern scientific understanding of contagion and how diseases can be expected to pass from person to person. Although researchers working in the field gradually came to realize that plague is not readily communicable from one person to another, this preconception, based on a scientific understanding combined with earlier descriptions of a terrible infectious disease, influenced the initial investigations.

Gradually researchers came to notice and to accept that the epidemiological patterns observed in the modern plague pandemic varied in several critical details from those noted in the public records and described by contemporaneous observers of the

the ability to understand epidemics of the present, that the preconceptions of earlier epidemics influenced the research on the epidemics of the Modern, or Third Pandemic. However, because he firmly believes that the disease that struck medieval Europe was extremely contagious and was not *Y. pestis*, he finds the influence of historic epidemics problematic in a way that I do not because I do not find the evidence for a highly contagious disease convincing.

Second Pandemic. Increasingly, these differences are causing epidemiologists, microbiologists and historians to question the true nature of the epidemics of the medieval and early modern periods. In the second plague pandemic's spread across Europe, the disease spread much faster than it does today, even without the benefit of truly rapid transportation. Nonetheless, mortality rates for the medieval plague and for untreated plague cases in the modern pandemic are quite similar, although the morbidity rates of the two plague pandemics differ by several factors of ten. In addition, symptoms described by observers of the two pandemics vary greatly. The debate over the true nature of the earlier pandemics is heated and includes arguments based on different and conflicting contemporaneous historic descriptions and on knowledge developed during twentieth century research on plague and other diseases. Researchers on both sides of the argument accuse their opponents of being overly subjective in their selection of facts. Cohn argues that the discussion about the problem is made especially complicated because researchers are too biased by their own views to examine the data dispassionately.¹⁶

Many of the arguments about the nature of epidemics of the Second Pandemic revolve around the interpretation and significance of various bits of evidence. It is clear that the Second Pandemic spread across Europe much more rapidly than the Modern Pandemic, but it is less clear what this signifies: either medieval social conditions were very different or the Second Pandemic was the result of a different disease. Another

¹⁶ Ibid., 54.

issue open to various interpretations is what medieval and early modern commentators meant when they described plague as very contagious. Cohn assumes that the early commentators meant something akin to our understanding of contagion, that pestilence was easily spread from one person to another. The evidence of the initial expansion of plague across Europe supports this idea, however, all subsequent outbreaks spread much more erratically. Thus, statements such as Guy de Chauliac's that plague was so contagious that "even by looking at one another people caught it," which were continually reiterated throughout the Second Pandemic can be interpreted as an indication that people found its spread uniquely inexplicable rather than as evidence that plague was especially contagious.¹⁷ Descriptions of plague being spread by the glance of an eye can be taken to mean that plague was very contagious, however, these explanations could instead be taken to indicate that people did not know how plague was spread from one person to another while passing over many in between. Kellwaye describes smallpox, a disease we now understand to be very contagious, as being an heritable disease, passed from mother to baby in menstrual blood, which can occasionally becomes manifest later in life, rather than in childhood.

Neither the argument for, nor the argument against, *Y. pestis* as the primary cause of the devastating epidemics of the late medieval and early modern period is wholly conclusive, but at present the case for *Y. pestis* is more convincing than any other. The material that identifies *Y. pestis* as the primary biological agent responsible

¹⁷ Chauliac quoted in Campbell, *Black Death and Men of Learning*, 3.

for the plague of the medieval and early modern periods includes evidence of both a biological or epidemiological nature and of a cultural or social nature. Until extensive DNA work can be done to positively identify the pathogens that are common to widely disparate mass burials of the epidemics of the medieval and early modern periods, I think that the most convincing evidence that plague was produced by *Y. pestis* is provided by an analysis of societal responses and an ecological understanding of plague. Unfortunately, one of the most telling societal responses to the plague provides only negative evidence. Despite the many years that plague afflicted Europe, there remained a general lack of understanding of how the disease was spread. This suggests that the disease had a complicated etiology and process of transmission, including multiple organic and behavioral components, and that all of these factors played a role. Therefore, it is only by considering all of these factors that the true epidemic patterns can be seen. People faced with the death and destruction caused by plagues had neither the emotional distance, financial wherewithal, scientific understanding, or knowledge to investigate the means by which plague spread.

Some of the early descriptions of how the disease that spread through Europe and across England presented in its victims sound very much like modern clinical descriptions of the disease caused by *Y. pestis*, but some do not. One of the difficulties of arguing that many or a majority of the great mortalities of the late medieval and early modern period were one disease is that during the Second Pandemic, many people including physicians, surgeons and social observers, did not pay attention to or to organize the specifics of disease symptoms and classifications in a modern scientific

format. Thus, historic descriptions of diseases do not correspond well with modern descriptions. While it is true that science, as it is understood in the twenty-first century, was only in its infancy when plague disappeared from England, it is more accurate to say that during the medieval and early modern periods people were not concerned with the same classifications as modern scientists. Within the then-accepted humoral system of understanding disease and the body, it was easy to accept that a disease, whether produced by a miasma or toxin, would manifest differently in people with different humoral compositions. This does not mean, however, that diseases were not differentiated. In 1593, Kellwaye wrote that one of the warnings of an upcoming plague epidemic is “when the small Poxe doth generally abounde both in yong and olde people.”¹⁸ Paul Slack notes two cases, one from the 1580s and one from 1626, in which a disease was described as being similar to plague but not the plague.¹⁹ Kellwaye’s contention that smallpox outbreaks precede or in some way signal the arrival of plague is inexplicable, but his comment does indicate that diseases were differentiated and further it suggests that plague was considered uniquely terrible.

The most often cited early description of plague is one by Boccaccio in the introduction of the *Decameron*.²⁰ However, Guy de Chauliac also describes the two

¹⁸ Kellwaye, *A Defensative against the Plague*, 3v.

¹⁹ Slack, *Impact of Plague*, 64-65.

²⁰ Giovanni Boccaccio, "The Decameron: The Introduction of the Author to the Following Discourses," in *The Decameron Preserved to Posterity by Giovanni Boccaccio and Translated into English Anno 1620*, ed. Edward Hutton (New York: AMS, 1967), 17-37; Guy de Chauliac in Campbell, *Black Death and Men of Learning*, 2-3.

forms of plague, with different symptoms and mortality rates that the disease took. The two forms of the disease they described closely match two of the three forms of plague currently accepted as plague: bubonic and pneumonic. Cohn points out that contemporaneous descriptions of separate plague forms are rare outside of Italy.²¹ However, as it is highly unlikely that the disease that invaded the Italian peninsula in 1347 was not the same disease that spread throughout Europe, in 1348, Cohn's observation should be taken as a demonstration of the variability of reported observations rather than as evidence that northerners were afflicted by a different disease. Boccaccio also reported that the disease began in Florence with a variety of symptoms that were different from those that were reported in East.²² That various observers reported on different symptoms for the first extensive serious epidemic in several hundred years doesn't necessarily indicate the presence of numerous diseases. It is much more likely that these divergent reports are all describing one disease, and that the descriptions vary because of different cultural preconceptions about which symptoms were most significant, possibly coupled with real differences in symptomology due to varying environmental factors. Evidence from subsequent outbreaks is less clear cut because outbreaks occurred sporadically across time and space without any clear evidence if, or how, plague was spread from one location to the next.

²¹ Cohn, *Black Death Transformed*, 85.

²² Boccaccio, "The Decameron: The Introduction of the Author to the Following Discourses," 18. Again, it seems unlikely that the epidemics in these two regions were caused by two different diseases.

That Boccaccio's description of the initial outbreak of the second pandemic in Florence closely matches a modern clinical description is important because this *Y. pestis* epidemic did vary significantly from modern experience of how this disease behaves. In addition to producing much higher morbidity rates, the initial wave of the medieval pandemic traveled across Europe much faster than the modern pandemic has traveled. The first epidemics of the modern pandemic seem to have begun in the Chinese province of Yunnan in the mid 1800s.²³ Over time it has spread more widely than in earlier outbreaks, and has now reached both the Americas and Japan.²⁴ However, although plague has now reached new regions of the world, it traveled considerably more slowly in the early 1900s than it did in the 1300s, despite the existence of the steam engine and the railroad and has spread no faster since the advent of the airplane. Although more widely dispersed, it has produced only localized epidemic outbreaks in both North America and Europe and it has had virtually no impact on England. Plague arrived in San Francisco in 1900. Plague has only very slowly dispersed into the surrounding countryside at the rate of about one mile a year. In contrast, the initial medieval plague epidemic spread at a rate closer to one mile a

²³McNeill, *Plagues and Peoples*, 164. Epidemic plague broke out in the wake of fighting, which brought soldiers into the region who were not acquainted with the necessary precautions for avoiding plague.

²⁴ It is interesting to note that although there were recurrent plague outbreaks in England and plague was endemic in London at the time the English first began colonizing the New World, there is no evidence that it arrived in the New World before the modern pandemic.

day.²⁵ This extreme disparity between the speed of the spread of the modern pandemic that we know was caused by *Y. pestis*, and the speed of the earlier pandemic, has led some historians and epidemiologists to postulate that the epidemics of the late medieval and early modern period must have been caused by some other biological agent. They have not, however, explored environmental factors that may explain differences in dispersal, such as changes in containers or modes of transportation that may have facilitated the movement of rats or fleas. The difference in the speed with which epidemics have spread may be related to environmental changes and changes in the ecology of the hosts and the behavior of the human victims.

The plague of the medieval and early modern periods seem to have occurred in the same three forms that are seen in plague outbreaks today, but the pneumonic and septicemic forms, which have substantially higher fatality rates than the bubonic form, apparently were much more common in the Second Pandemic than today.²⁶ The pneumonic and septicemic forms of plague are dramatic and victims of these forms can die very rapidly. Death from the pneumonic form often takes as little as three days, while in the case of the septicemic form, a person may wake up well and yet be dead before nightfall. Because these forms are so terrifying and remarkable, it is entirely

²⁵ Twigg, *Black Death*, 139. In South America and India plague has spread at a rate of about eight miles a year, while during the initial spread of plague through Europe in 1347-1348, plague spread at a rate of between one and five and a half miles per day.

²⁶ *Ibid.*, 163. Twigg notes that pulmonary complications were frequently mentioned although he does not believe that they were caused by *Y. pestis*; Morris, "Plague in Britain," 39.

possible that deaths caused by these forms were overemphasized in reports in medieval and early modern epidemics. Conversely, these forms of plague may now be under acknowledged since they are now considered rare and thus relatively insignificant, despite the dramatically rapid deaths they produce.²⁷ Additionally, it has been assumed that the virtual absence of pneumonic plague explains the relatively low mortality in the Third or Modern Pandemic. Whether or not the pneumonic form of plague has been underreported, it is clear that during the Modern Pandemic the pneumonic form of plague has not produced the rapidly spreading epidemics or extremely high mortalities of the Second Pandemic.

Pneumonic plague has been a significant factor in the reoccurring plague epidemics in Madagascar, although plague mortality levels there have never reached the levels of the outbreaks in the Second Pandemic. The pneumonic form also played a role in fulminating an epidemic outbreak in Manchuria during the winter of 1910-11. It developed among people who lived in unventilated and crowded conditions and although it was spread as people fled by train, many people who rode in a carriage with pneumonic plague victims did not become ill. The epidemic produced the death of at least 50,000, and was the largest of the Modern Pandemic, but still produced only a population mortality of about .04 percent.²⁸ This suggests that the strenuous effort of flight on foot may have contributed to creating cases of pneumonic plague, especially

²⁷ It is worth noting that the pneumonic deaths of 1901 in Sussex were not diagnosed as pneumonic plague until the epidemic of 1911 caused medical officials to reexamine the causes of the earlier small outbreak.

²⁸ Benedictow, *Black Death 1346-1353*, 29.

secondary pneumonic plague that was more significant in earlier pandemics.²⁹ The pneumonic form erupted during an episode of the bubonic that was rampant among tarabagan hunters who had flocked to Manchuria from both Russia and China to collect skins of these marmots of the Gobi region because of exceptionally high fur prices.³⁰ The hunters lived in extremely crowded unventilated rooms that were frequently at least partially underground, due to the cold conditions in Manchuria. With as many as 40 men living in a room 15 by 15 by 12 feet high, it is not surprising that pneumonic plague became predominant once the men became infected by fleas from the tarabagans they trapped.³¹ As the disease spread, panic spread along with it, and the visiting hunters attempted to flee Manchuria. Infected people who fled the epidemic on foot apparently experienced pneumonic plague at high rates. This suggests that protracted exertion after infection with *Y. pestis* can greatly increase the likelihood that an infected person will develop, and then spread, the pneumonic form of the disease. Because flight was a commonly reported response to plague during the Second Pandemic, the evidence from the Manchurian epidemic provides one possible explanation for how *Y. pestis* could have been spread so quickly during its initial dispersal across Europe in 1347-50. As

²⁹ Gregg, *Plague!*, 212-8. The Ralph Fulp story told by Gregg also suggests that remaining active after contracting plague may result in a much more devastating illness.

³⁰ Twigg, *Black Death*, 165.

³¹ Benedictow, *Black Death 1346-1353*, 29-30; Cohn, *Black Death Transformed*, 22. Local people do not trap these animals, but instead shoot only apparently healthy animals. The tarabagan is the Mongolian marmot, *Marmota sibirica*.

physically stressed people caught plague and fled their homes, their exertions increased their likelihood of developing pneumonic plague, which made them the actual carriers of the disease, independent of rats.

Although the Manchurian epidemic appears relatively insignificant when compared with medieval plagues, it was large compared with other epidemics of the Modern Pandemic. Unfortunately, it is impossible to compare the number of deaths in the Manchurian epidemic with those of the early individual epidemics in the Second Pandemic because the reports of the total number of dead in those epidemics are unreliable; for example, the total numbers of deaths reported for a given town often exceed the number of people who could conceivably have been living there. However, reports from the last century of the Second Pandemic are considerably more reliable. The death tolls in London during several of the last major epidemics were 26,350 in 1625, 10,400 in 1636 and 55,797 in 1665.³² To put the Manchurian epidemic into the perspective of other outbreaks of the Modern Pandemic, the 50,000 deaths in Manchuria occurred over the course of only a few months, while in South America 30,000 deaths were attributed to plague during the period between 1899 -1950.³³ Although outbreaks in densely populated India have produced large death totals, mortality rates due to plague have remained very low. Despite the uniqueness of the

³² See Table 1 page 89. These figures come from Slack, *Impact of Plague*, 150-1.

³³ Myron Echenberg, "Pestis Redux: The Initial Years of the Third Bubonic Plague Pandemic 1894-1901," *Journal of World History* 13, no. 2 (2002):, 432.

Manchurian pneumonic epidemic, it provides evidence that human behavior can have a dramatic effect on plague mortalities.

In *Black Death Transformed*, Cohn argues that the high mortalities of plague epidemics of 1347-8 were not caused by human behavior or culture but were simply the result of the introduction of a new disease to which Europeans had no natural immunity. He argues that in the course of the next 100 years of the pandemic Europeans developed an ability to cope with the disease, which he believes indicates that they had achieved a degree of biological resistance.³⁴ Since evidence to date indicates that individual humans do not develop significant, long term, resistance to plague, Cohn then argues that the Black Death was not the result of *Y. pestis*. The lessening of the large scale impact of plague outbreaks, which Cohn considers a sign of an effective immunological response, could instead indicate that Europeans had developed cultural or behavioral adaptations that made plague epidemics more bearable and less deadly. In addition, it is possible that rats were developing some resistance that resulted in fluctuations in the intensity and frequency of human plague episodes. With their short life spans, rat susceptibility to plague can vary quickly and significantly.³⁵ When fewer rats die, fewer humans would be exposed to *Y. pestis*.

Graham Twigg and J. F. D. Shrewsbury both argue that *Y. pestis* is not capable of producing epidemics with the high mortality rates recorded during medieval and

³⁴ Cohn, *Black Death Transformed*, 3.

³⁵ Twigg, *Black Death*, 24.

early modern plague outbreaks.³⁶ Twigg argues that a likely culprit for these epidemics was anthrax.³⁷ Shrewsbury, on the other hand, contends that although plague was present, it was only a minor component of the epidemics that devastated England for centuries. Shrewsbury bases much of his argument on his belief that most of England beyond London was too thinly populated to support plague epidemics.³⁸ In his view, only epidemics in the densely populated regions of England during the late summer months, which he considers plague months, can be attributed to plague.³⁹ Shrewsbury thus overlooks the fact that *Y. pestis* is dependent on the population density of rats and rat fleas, not on the density of humans. Shrewsbury also contends that people of the medieval and early modern periods referred to all disease outbreaks by the same terms, without differentiating between diseases.

In countering Shrewsbury's primary argument, Ole Benedictow points out that in rural areas where the proportion of rats to humans was higher than in urban areas, human epidemics would be expected to be more severe than in urban areas, an observation that is borne out in the Modern Pandemic.⁴⁰ Cohn points out that during the

³⁶ *Ibid.*, 147-170; Shrewsbury, *History of Bubonic Plague*, 36. In Chapter 2, Shrewsbury explains that the population density throughout much of Britain was not sufficient to allow the high reported mortalities,

³⁷ Twigg, *The Black Death*, 200-222.

³⁸ Shrewsbury, *History of Bubonic Plague*, 23.

³⁹ *Ibid.*, 168-9.

⁴⁰ Benedictow, "Morbidity in Historical Plague Epidemics," 407-424; Benedictow, *Black Death 1346-1353*, 31-4.

Modern Pandemic in India, plague has shown a distinct and limited seasonality. Epidemics during the Second Pandemic in England and other countries of Northern Europe predominantly occurred in late summer and fall but were not limited to these months. Although it is now generally accepted that at least some epidemics in the off season were not primarily the result of plague, it is worth noting that in the cool climate of England plague outbreaks might have been driven not only by the late summer period of prime flea activity, but also by the fact that rats, which are sensitive to cold, would have sought shelter within the interiors of buildings in the winter. Humans also likely spent more time indoors in winter than in summer, almost certainly putting them in close proximity with rats and making transmission from rat to human, via fleas, possible. One key question: how well did fleas survive the cold winter months on their mammalian hosts?

Another explanation that has been proffered for the high morbidity of earlier pandemics is that the high density of human fleas and lice in the past allowed plague to be spread from person to person via parasites. Jean Biraben and Paul Slack contend that the participation of human ectoparasites in the spread of plague distinguished earlier pandemics from the Modern Pandemic.⁴¹ However, Slack also notes that plague's erratic dispersal is very different from the more universal dispersal of typhus, which, suggests that even in the Second Pandemic, rats determined the path of infection.⁴² In

⁴¹ Biraben, "Current Medical and Epidemiological Views," 29-30; Slack, *Impact of Plague*, 314.

⁴² Slack, *Impact of Plague*, 314.

addition, researchers are currently investigating the possibility that lice were instrumental in spreading plague.⁴³ In the Modern Pandemic, there are only three known cases of plague being spread from human to human via a parasite.⁴⁴ It is highly unlikely that plague, spread from person to person via the agency of a parasite, contributed to the high morbidity of the Second Pandemic. It is possible that the layers of infrequently washed clothing commonly worn in the medieval and early modern period, along with bedding that was used until rotten, may have provided fleas an ideal environment very close to both their human and rat hosts. Human fleas are nest fleas and typically live in bedding and only spend time on humans while eating. Rat fleas on the other hand are fur fleas and typically live and eat on their hosts.

Twigg makes his argument against *Y. pestis* and for anthrax as the agent of plague on the basis of several features of the Second Pandemic. As noted previously, the speed at which the disease traveled differs between the two pandemics. Twigg also argues that at the time of the initial outbreak in 1348 the rat population could not have been either large enough or widely distributed enough to have supported a plague

⁴³ L. Houhamdi et al., "Experimental Model to Evaluate the Human Body Louse as a Vector of Plague," *Journal of Infectious Diseases* 1941, no. 11 (2006), 1589-1593.

⁴⁴ Benedictow, "Morbidity in Historical Plague Epidemics," 430; Benedictow, *Black Death 1346-1353*, 16-7. Basically his argument is that humans are so susceptible to plague that they die before there is enough bacteria in the blood to make it likely that a flea feeding on a human host will ingest enough *Y. pestis* to produce a blocked stomach and thus to allow the flea to pass the bacteria on to a new host.

epidemic.⁴⁵ Shrewsbury makes the more common argument that the Black Rat, *Rattus rattus*, colonized England sometime after Bede's lifetime and well before plague arrived in England in 1348. He bases his argument on the development, and use of the terms such as large mice (*mures majores*) and rats in addition to mice, which indicate a familiarity with rats. During the earlier medieval period mice were the targets of complaints about small animals destroying books, eating communion wafers or eating grain, while in later medieval and Early Modern period both rats and mice were condemned as the culprits. In addition, Shrewsbury points out that over time rats came to have a place in literature, page decorations and art. He supports his idea of the growing significance of rats with an illustration of two rats hanging a cat.⁴⁶

Rattus rattus, which probably originated somewhere in tropical Asia, was supplanted by the Brown Rat, *Rattus norvegicus* when it was introduced into England no earlier than 1728.⁴⁷ The Black Rat is substantially smaller and less hardy than the Brown Rat and thus more dependant on humans and more easily confused with mice. It is generally assumed that Black Rats must have been present in large numbers in Europe in 1348 or there would have been no plague, and, further, that Black Rats were brought to Europe by caravans returning from the Crusades. Exactly when this rat was introduced is a matter of some debate, however.

⁴⁵ Because rats have become so widely distributed across the world it has been impossible to conclusively prove their region of origin; however, there is considerable archaeological evidence that there were some rats in Britain since Roman times.

⁴⁶ Shrewsbury, *History of Bubonic Plague*, 12-13.

⁴⁷ *Ibid.*, 9.

Both Benedictow and Twigg refer to archaeological excavations in Britain in which the remains of rats were uncovered.⁴⁸ A few rats have been found in excavations of Roman era sites. Benedictow assumes this archaeological evidence indicates that rats were abundant; however, Twigg does not accept this assumption, arguing instead that the climate of Europe was simply too harsh to have allowed a significant population of Black Rats. He cites evidence from a study of medieval fauna taken from owl pellets recovered from the thirteenth-century level of a Roman ruin at Caerleon. The faunal assemblage examined included a wide variety of animal bones “including the house mouse ... there were no rats.”⁴⁹ If Black Rats were present in England, however, they almost certainly lived in very close contact with their human hosts because of their preference for a warmer environment than England could have provided. The written record is difficult to interpret because people seem to have made little distinction between rats and mice. To further complicate the problem, the nomenclature used for animals and the distinctions made between them by medieval Europeans differ from those made today. Kellwaye, for mentions that weasels along with dogs, cats and pigs could carry plague with them as they moved place to place.⁵⁰ In *Etymologies*, Book 12, 3: 3, Isidore of Seville (7th century CE): “The weasel (*mustella*) is called the "long mouse" from its length (*telum*). Weasels attack snakes and mice. There are two kinds of weasel: a large one that lives in the forest, and another that lives in the houses of

⁴⁸Benedictow, *Black Death 1346-1353*, 22-4; Twigg, *Black Death*, 80-1.

⁴⁹ Twigg, *Black Death*, 81.

⁵⁰ Kellwaye, *A Defensative against the Plague*, 2v.

men.”⁵¹ The descriptions suggest that it is just possible that the weasels Kellwaye referred to were rats, rather than the mustelid now referred to as a weasel.

Twigg also notes that medieval commentators often associated human plague outbreaks with disease outbreaks among domesticated animals.⁵² Murrain, or cattle plague, is an ancient disease mentioned in Exodus. Currently the term murrain usually refers to rinderpest, a disease primarily of cattle that can also attack most other cloven footed animals, including sheep and pigs. Rinderpest is not considered to pose any danger to humans. It is not clear, however, that during the medieval and early modern periods the term murrain indicated a specific disease rather than any significant episode of mortality among domesticated flocks.⁵³ Murrain outbreaks in the early fourteenth century were followed by a second series of murrain outbreaks which lasted from 1346-1389, and these outbreaks were said to have affected not only cattle and sheep but horses, pigs, poultry and wild birds.⁵⁴ Because murrain outbreaks occurred prior to 1348, it is possible to assume that these deaths were unrelated to plague outbreaks, but it is also possible to associate them with the plague, or to attribute plague to the same

⁵¹ David Badke, *Bestiary: Animals in the Middle Ages* [Digitized Images with text and sources] (Badke, David, 4/14/2008 2008 [cited 4/15/2008 2008]); available from <http://bestiary.ca/index.html> <http://bestiary.ca/beasts/beast150.htm>; Latin text available at, http://penelope.uchicago.edu/Thayer/L/Roman/Texts/Isidore/12*.html# 5

⁵² Twigg, *Black Death*, 200-222.

⁵³ Murrain, or steppe murrain, is considered to be the Fifth plague mentioned in Exodus 9: 3-6. It is said to have attacked cattle and other animals in the fields that belonged to the Egyptians.

⁵⁴ Ernest L. Sabine, "Butchering in Medieval London," *Speculum* 8, no. 3 (1933): 337.

agent or to a mutation of it. Kellwaye mentions that one of the signs of an imminent plague outbreak is that “the beasts of the field, we may perceive it, (especially sheep) which will goe mourning with their heades hanging downe towarde the ground, and dyvers of them dying without any manyfest cause knowne unto us.”⁵⁵ Twigg points out that many stories link plague outbreaks to weavers and to shipments of wool and fleece, and for many researchers this connection has been assumed to be the result of fleas shipped in the wool bundles. Like these researchers, Twigg assumes that the murrain, or the high mortality among the domestic animals, was related to the human disease outbreaks.

Twigg, however, also believes that the connection between sick animals and humans was the result of anthrax, which is primarily a disease of sheep but is also communicable to humans and other animals via spores in the sheep’s wool. Because wool and fleece were central to the English economy, their shipments would have been frequent and thus would have inevitably coincided with the outbreak of many plague epidemics. Although co-occurrence does not prove causation, Twigg concludes that anthrax, which is more contagious than plague, is readily spread among cattle and sheep and is not dependent on rats, was much more likely than *Y. pestis* to have been responsible for the epidemics of the medieval and early modern periods. In addition, Twigg finds many of the clinical descriptions from the medieval and early modern plague thoroughly unconvincing as descriptions of *Y. pestis* infection.

⁵⁵ Kellwaye, *A Defensative against the Plague*, 2r.

In coming to his conclusion, however, Twigg does not pay sufficient attention to social and cultural factors, particularly to household and village ecologies, nor does he sufficiently consider cultural changes that occurred between the fourteenth and twentieth centuries. In assessing the differences and similarities between the epidemics of the Second and Modern Pandemic, Twigg overemphasizes what he considers universal biological issues and underestimates cultural changes that cause people to live in different ecological relationships with their environment. People respond to and interpret similar events differently now than in the past, and also to explain events quite differently now than in the fifteenth or seventeenth century. Now that we know that rats are central to the spread of plague, it seems impossible that the English would not have noticed and remarked on the deaths of large numbers of rats had they seen them, especially in an urban setting like London. The primary explanation we have for this medieval oversight was that at that time the connection between rats and plague was unknown and thus rats seem to have gone unnoticed. Twigg cites evidence gathered in Egypt during Modern Pandemic, that shows that rats could die within the walls and never be seen. A few dead rats were found on the floor of the Egyptian house, but when the cesspit shaft was opened 53 additional dead rats were discovered. In addition, because the house stank of decomposing rats and remained infective to test guinea pigs which were loosed in it, the researchers assumed that many more dead rats would have been discovered had the house been demolished.⁵⁶ In a city like London, with many

⁵⁶ Twigg, *Black Death*, 106-7.

levels of construction, including a considerable use of rubble construction and in fill, and where hostelry walls were so flimsy that a thief could commit a burglary by putting his hand through the walls, it seems reasonable to presume that during the Second Pandemic rats could have died unnoticed within the walls of buildings.⁵⁷

There are other reasons that the deaths of small, unimportant rats could have gone unobserved, whereas the deaths of larger domesticated animals on which the economy depended could hardly have gone unnoticed. Many of the London Plague orders, as well as medical treatises issued as early as 1592, emphasize the need for the streets to be kept clean and it is just possible that due to the extra efforts to keep the streets clean during plague epidemics, the bodies of rats were swept away and thus not remarked upon.⁵⁸ Instead of noting the death of small animals, the English seem to have looked to their larger domestic animals for possible connections to epidemics. London plague orders demanded the control of several species of domesticated animals, including swine and cats, tame pigeons, and doves as well as various vermin, but the primary focus of the plague orders regarding animal control was dogs.⁵⁹

⁵⁷ Schofield, "Construction of Medieval and Tudor Houses," 149.

⁵⁸ Kellwaye, *A Defensative against the Plague*, 14v; Journal of the Proceedings of the Court of Common Council xxiii, f129ff September 7, 1592 in Barrett, ed., *Present Remedies against the Plague Etc.*, x; Of course dead rat bodies theoretically should have begun to show up before a human epidemic began and thus before more stringent street cleaning regulations began to be enforced.

⁵⁹ Jenner, "The Great Dog Massacre," 48; The plague orders mention a variety of animals but they always mention dogs; City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen*, np; City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np; Royal College of

Deaths of domesticated animals might have been linked by contemporary observers to human deaths because they actually were causally linked or because coincidentally, or due to environmental reasons, epidemics and murrain outbreaks of unrelated diseases occurred simultaneously. High mortalities among domestic animals could also have become linked to human epidemics because of a tendency among people to see signs, symbols and omens in the world around them or to attempt to logically link events. Many of the signs warning of forthcoming plague, such as those mentioned by Kellwaye and other chroniclers, seem to have been seen as omens or portents rather than logically or causally related events.⁶⁰ Jocelin's diary indicates that he saw plague, as well as other disasters, as messages from God indicating displeasure with human behavior. This practice of linking unrelated events, especially bad or extraordinary ones, makes it very difficult to discern from medieval writings the actual interrelationships that might provide clues to the biological nature of plague.

Nonetheless, there are many stories that link the arrival of plague outbreaks to shipments or arrival of wool and fleece, which had immediately preceded the epidemic.⁶¹ Plague and anthrax, like most other diseases, require a period of incubation, however. If wool shipments were responsible, plague flare ups would not have occurred

Physicians of London, *Certain Necessary Directions*, np; City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, np.

⁶⁰ Jenner, "The Great Dog Massacre," 48.

⁶¹ Leslie Bradley, "The Most Famous of All English Plagues: A Detailed Analysis of the Plague at Eyam, 1655-6," in *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and Century England* (Derbyshire: Local Population Studies, 1977), 64; Slack, *Impact of Plague*, 238.

for at least a few weeks after shipments of fleece or wool had arrived. Thus, the stories that link plague to shipments of wool serve more to demonstrate that medieval English were trying to draw logical inferences about cause and effect in their attempts to explain plague outbreaks. Concern about the threats posed by wool shipments can be seen as extending to concern about the dangers posed by the kind of people who traveled around the country doing odd jobs or delivering goods. However, the greatest concern was expressed for people who were unknown, or who had no fixed addresses and positions. This fear of outsiders or vagabonds is clearly visible in the Elizabethan and Jacobean plague orders concerning rogues and vagabonds, which were reprinted as components of plague orders in 1636. In addition, they include regulations that limited the freedom of vagabonds and beggars, cared for the poor and assisted sailors and soldiers.⁶²

The English plague orders take very little notice of animals apart from a few references to eliminating dogs and other nuisance animals. The orders specify dogs that bark incessantly, or run loose, within London should be killed. They also mandate the control, or death of other animals including, pigs, cats, doves, and rats; however, it is clear that dogs were the primary concern of the issuers.⁶³ Nonetheless, chroniclers also mentioned other animals. Boccaccio's description of the arrival of plague in Florence in 1347 that provides what purports to be his eyewitness account, mentions pigs dying

⁶² Royal College of Physicians of London, *Certain Necessary Directions*, Fr-R3v.

⁶³ Jenner, "The Great Dog Massacre," 48.

instantaneously after rooting around in garbage associated with a plague victim. He also notes that anyone or animal “were it Dogge, Cat or any other” that associates with the clothes or belongings of those who have died of plague, will become contaminated.⁶⁴

Kellwaye mentions a number of animals being associated with plague. Jenner points out that there are records of many environmental abnormalities that were said to have preceded outbreaks of plague. He cites Thomas Lodge (1558-1625) as saying that “any increase of such creatures as are engendered of putrifaction, as wormes ... flies, gnattes, eales, serpants, toades, frogs and such like were warnings of a plague epidemic.”⁶⁵

Kellwaye’s book mentions other signs including a “great store of little frogs, red toades and mise on the earth abounding extraordinarily: or when in sommer we see great store of toades creeping on the earth having long tayles.”⁶⁶ Jenner further points out that these abnormalities were considered omens of a forthcoming event rather than being integrally related by cause and effect. Thus, contemporaneous explanations and descriptions of the behavior of plague epidemics are difficult to integrate with contemporary understanding of *Y. pestis* etiology that emphasizes rats and their fleas.

Although Europeans connected various animals to plague outbreaks, they made virtually no mention of rats in connection to plague epidemics. The absence of comments that connect rats or their deaths to plague outbreaks throughout the entire

⁶⁴ Giovanni Boccaccio, *The Decameron: Preserved to Posterity by Giovanni Boccaccio and Translated into English Anno 1620*, III vols., vol. I (New York: AMS, 1967), 19.

⁶⁵ Jenner, "The Great Dog Massacre," 48.

⁶⁶ Kellwaye, *A Defensative against the Plague*, 2r.

duration of the pandemic is perplexing; neither large numbers of dead rats, nor rats exhibiting uncharacteristic behavior, receive more than a passing note. Mark Jenner concluded that this is because people of the medieval and early modern periods did not have the knowledge base to pay any special attention to rats.⁶⁷ However, Girolamo Fracastoro (c.1478-1553) commented that one of the odd things about syphilis was its ability to spread rapidly while affecting only humans.⁶⁸ This comment suggests the possibility that in Early Modern Europe the death of small unimportant animals, such as rats, might have gone unremarked during a plague epidemic because animals dying in conjunction with humans was considered normal. During the Tudor and Stuart periods, rat catchers are occasionally mentioned in literature, these people were most commonly charged with killing all manner of nuisance animals including cats and dogs, not simply rats, and were also referred to as dog catchers. These exterminators were paid a bounty for killing each of several animals that were seen as potentially damaging, dangerous or annoying.⁶⁹

During the plague epidemics of early modern Europe, dogs seem to have borne the brunt of animal control zeal. From the standpoint of modern epidemiology, this attitude toward them seems misplaced because dogs are quite resistant to plague.

⁶⁷ Jenner, "The Great Dog Massacre," 47.

⁶⁸ Fracastoro, *Fracastor: Syphilis or the French Disease a Poem in Latin Hexameters*.

⁶⁹ Jenner, "The Great Dog Massacre," 49. The term rat-catcher appears once in Shakespeare's oeuvre, in *Romeo and Juliet*: Act 3. Scene I, while the term dog-catcher does not appear once. It is worth noting, however, that the term dog frequently has a negative connotation.

Although cats are fairly susceptible to plague and often come into contact with rats and their fleas both cats and dogs can spread plague to humans.⁷⁰ To explain the aberration in the focus of early modern European plague fears, Jenner suggests that there were multiple reasons that dogs were the primary animal slaughtered to prevent plague, though these were only tangentially linked to any direct fear of dogs' special ability to spread plague. Dog catchers were charged with killing noisy, annoying dogs, especially those that were found roaming the streets. It is possible that loose and hungry dogs were associated with urban filth because they ate garbage in the streets. In early modern Europe, rats do not seem to have been seen as dangerous as either cats or dogs, or as closely linked to plague.

Odd behavior by rats, however, was noted as a precursor to plague outbreaks in the Vedic texts of India.⁷¹ Benedictow argues that one of the reasons morbidity rates in India are so much lower than morbidity levels in the earlier epidemics of Europe is that Indians recognized dead and dying rats as a precursor to plague and they fled infested locations whereas medieval and early modern Europeans did not. Ibn Sina, Avicenna (980-1037), wrote that rats (or a small burrowing mammal) walked around above ground and behaved as if drunk in conjunction with plague epidemics.⁷² Thomas Lodge

⁷⁰ Gregg, *Plague!*, 202, 197-204. Sporadic human cases of bubonic plague in the Southwestern United States are caused when cats bring the infection home, although more of the cases he reported were the result of contact with wild animals.

⁷¹ Benedictow, *Black Death 1346-1353*, 42; Cohn, *Black Death Transformed*, 9. Seventeenth century Indian and Chinese records mention rat die offs.

⁷² Cohn, in *The Black Death Transformed*, 22, notes that several medieval texts mention a variety of animals leaving their holes as a sign of plague.

(c. 1557 – 1625) wrote that when “Rats, Moules, and other creatures (accustomed to live under ground) foresake their holes it is a token of corruption in the same.”⁷³

However, his words so closely mirror those of earlier authors that it is unlikely that he is reporting events he saw, rather than merely repeating phrases from the earlier works. The occasional but nonetheless repeated use of these phrases suggests that rats were seen as an omen of to disease, if not a causative factor, so one would expect that if rats behaving oddly were a generally accepted sign of plague, rat behavior or rat deaths would be more widely reported.

No one now seriously accepts Gabriele de Mussis’s story, which explained that plague was introduced into Messina by soldiers who fled fighting in the Crimea. It is discounted not only because it has been proven that de Mussis was not an eyewitness to the events, but also because it is hard to imagine how any disease could have remained rampant, and infective, without killing sailors who harbored it during a voyage of several months. In addition, this story makes no allowance for incubation periods once the disease was introduced in Messina. The stories linking the wool trade to plague have been less seriously examined, yet they are similarly flawed.

For example, the story that explains how the town of Eyam became infected is still often accepted as reasonable.⁷⁴ According to the story, plague erupted in Eyam immediately after the village tailor, George Vicars, opened a shipment of cloth sent

⁷³ Thomas Lodge quoted in Jenner, "The Great Dog Massacre," 47-48.

⁷⁴ Philip Race, "Some Further Consideration of the Plague in Eyam, 1656/6," *Local Population Studies* 54 (1995): 57; cf Slack, *Impact of Plague*, 346, 25n.

from London. Although it is possible that a disease could have arrived with the cloth, it is not possible that the tailor opened the box and immediately became ill with plague. Philip Race indicates that he finds a permutation of G. R. Batho's version of the story, in which the tailor was infected by the cloth shipment but the onset of the disease was slower, and thus more in line with a modern understanding of disease incubation, a reasonable one.⁷⁵ It is far more likely and simpler, however, that plague entered the Eyam rat population unnoticed at some earlier date, and coincidentally became epidemic when the cloth arrived. These stories of how epidemics began may accurately present the relative time of events, but they do not demonstrate cause and effect. Twigg tends to accept plague stories like these that link trade in wool to plague outbreaks because these such fit his theory that the epidemics were caused by anthrax. Researchers who favor the theory that plague was caused by *Y. pestis* also find the connection between wool trade and plague reassuring, but they explain the relationship by postulating that infected fleas were shipped in bales of wool. Slack finds that "there is ample contemporary reference to particular individuals or bundles of merchandise being responsible for initiating a local outbreak."⁷⁶ I find the evidence less convincing. While contemporary scientific research has not eliminated the possibility that plague was spread in bales of cotton or wool, it has suggested that shipments of grain were more

⁷⁵ Race, "Consideration of the Plague in Eyam," 57.

⁷⁶ Paul Slack, "The Response to Plague in Early Modern England: Public Policies and Their Consequences," in *Famine, Disease and the Social Order in Early Modern Society*, ed. John Walter and Roger Schofield (Cambridge: Cambridge University Press, 1989), 175.

likely to have been responsible for transporting plague.⁷⁷ In addition, contemporaneous observers who associated plague with shipments of cloth did not know about disease incubation periods and therefore did not make allowances for it in their cause and effect calculations. It is likely that they would have connected unrelated events to plague outbreaks.

Scott and Duncan, like Twigg and Shrewsbury, find it difficult to believe that *Y. pestis* could have produced the high mortalities recorded in many of the epidemics attributed to plague, but unlike Shrewsbury, they do find the mortalities reported during the Second Pandemic credible. Although Scott and Duncan esteem the work of Twigg, especially his critiques of the idea that the epidemics were produced by *Y. pestis*, they do not find Twigg's solution convincing.⁷⁸ Instead they have postulated that the medieval and early modern epidemics referred to as pestilence were the result of a variant of hemorrhagic fever, not ebola but something similar to it, presumably something that no longer exists.

Conclusions

This examination of the literature addressing plague pandemics shows that though plague outbreaks have been studied and written about for centuries, a number of questions remain. It is clear that contemporary concerns about epidemics were not succinctly or clearly addressed by contemporaneous observers and plague survivors. It

⁷⁷ Benedictow, *Black Death 1346-1353*, 20-1.

⁷⁸ Scott and Duncan, *Biology of Plagues*, 107, 109, 18.

is equally clear that contemporary historians and microbiologists have not reached a consensus about how to interpret either the information provided by historical treatises or the information provided by contemporary scientific inquiry. DNA analysis has not yet provided conclusive answers. Equally importantly, few contemporary historians have examined both contemporary scientific information and the historical conditions under which plague thrived and spread readily. These conditions include the presence of enormous quantities of garbage and other refuse in and around houses and in streets, construction methods that provided rats habitation within walls and attics.

6 The Medical Context

The plague that swept across Europe in 1348 had a definite influence on two European institutions: the Church and the medical establishment. As the most powerful institution in medieval Europe, the Church did not fare well in the wake of the plague onslaught because plague was perceived first and foremost to be a result of a failure of faith. It was the only institution with the scope to battle the universal threat plague presented, but due to the nature of the threat, the Church inevitably failed. People believed that the Church should have protected them, or at the very least it should have warned them of impending doom, but it provided neither warning nor protection. Medicine and the Church were by no means in opposition, but when the religious community failed to mitigate or control the spread of plague, physicians and surgeons stepped into this vacuum. The failure of the religious community provided physicians and surgeons an opportunity to increase their relative political prestige. The Church attempted to take an active role; through its bishops, the Church called for community prayers and processions, but civic leaders turned to the medical community for assistance in combating the pandemic.

Physicians and surgeons acted individually and in groups, on their own as well as at the request of rulers, and they wrote treatises that provided suggestions for the appropriate responses to the massive catastrophe that was ravaging Europe. These early

treatises indicate that pestilence was seen as an attack on the entire social fabric.¹ As Guy de Chauliac put it, “charity was dead and hope crushed.”² English descriptions of the plague’s arrival emphasize problems such as those created in the economy and high mortalities that left no one to care for the sick or bury the dead.³ Although the medical community did not succeed in preventing plague outbreaks, the concept of public health developed in the wake of plague’s destruction and eventually it became a central aspect of English plague regulations. During the Second Pandemic the medical community strove to understand and control plague using both knowledge gained from texts and personal experience, though they met with little success. The medical treatises written during the first few years of the pandemic were both a reflection of new experiences and the product of the medical tradition.

One of the earliest plague treatises, written by Gentile da Foligno who died of the pestilence in June 1348, directly addresses the necessity for a public response to plague by recommending that the civil authority appoint a committee to meet with physicians in order to “manage public affairs in so far as the safety of the people was involved.”⁴ Foligno’s treatise was only one of several early tracts addressed to civil authorities. In the battle to combat plague, the theme of public service appears

¹ Boccaccio, *The Decameron*, 17-37; Arrizabalaga, "Facing the Black Death," 285.

² Guy de Chauliac, quoted in Campbell, *Black Death and Men of Learning*, 3.

³ Horrox, ed., *The Black Death*, 63-64, 70-73. Horrox included portions from *The Eulogium* and *Historia Roffensis* that mention these issues.

⁴ Campbell, *Black Death and Men of Learning*, 12.

repeatedly. Because the medical establishment did no better than the religious establishment at preventing the spread of plague or at treating patients, members of the medical community quickly came to be criticized and ridiculed for their failings and greed.⁵ Still, medicine as a profession was not repudiated.

In 1348 when plague entered Europe, the medieval medical tradition was well established across most of the continent. The works of al Rāzī, known as Rhazes (864-930), ibn Sina, known as Avicenna (980-1037), and Galen of Pergamon (ca 130-ca 200AD), as well as some portions of the Hippocratic corpus, were widely distributed and known.⁶ Medieval European physicians had no experience with widespread epidemic mortalities, but the medical literature that physicians relied on did include the works of ancient physicians who had witnessed epidemics. Galen, the most revered of the ancient medical writers, had survived the disastrous epidemic at Aquileia in 168, which may have killed one third of the population, and al Rāzī had described and treated smallpox and measles.⁷ Thus, medieval physicians did have a limited conceptual background of widespread devastating diseases, however, their personal experiences suggested that this plague was entirely new and uniquely devastating. Nonetheless,

⁵ Chaucer, "The Canterbury Tales," in *The Riverside Chaucer*, ed. Larry D. Benson (New York: Houghton Mifflin, 1987), 30. Neither the physician nor the clerics, with the exception of the Parson, are treated with much respect. They are all basically self serving and greedy.

⁶ Nancy G. Siraisi, *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (Chicago: The University of Chicago Press, 1990), 12, 14.

⁷ G. E. R. Lloyd, *Greek Science after Aristotle* (New York: WW Norton and Company, 1973), 136.

medieval physicians attempted to understand plague in terms of the fevers commonly addressed in the canonical medical texts.⁸

Medieval medicine was based on a Greco-Arabic tradition and most medical texts were based on a few translations of Greek medical texts. From the fall of Rome in the fifth century until Constantinus Africanus (d. 1087) translated Greek medical texts from Arabic into Latin in the eleventh century, Europeans had few medical works from the classical past.⁹ The works that Constantinus translated became the core of the medieval medical canon, which was gradually enlarged as more works were translated from Arabic into Latin and as new texts were produced using commentaries written on the older works. Throughout the course of the Second Pandemic, the essential medical canon increased substantially. It expanded as more extensive portions of works by Galen, Aristotle and others from the Hippocratic tradition were translated into Latin, new versions of old texts were found, texts were printed in Greek and new, more complete, elegant, and accurate translations of Greek medical manuscripts were produced.¹⁰ The focus of most of this work was rediscovery of lost medical knowledge rather than the addition of new empirical knowledge. Nonetheless, along with the new translations, new botanical works with more naturalistic drawings were printed. In some cases, this may have meant that botanical compounds, or Galenicals, were being formulated more accurately as people came to re-identify various plants. Although the

⁸ Siraisi, *Medieval and Early Renaissance Medicine*, 128.

⁹ *Ibid.*, 6, 14.

¹⁰ *Ibid.*, 190-1.

goal was to rediscover ancient knowledge, the new texts ultimately encouraged challenges to the medical canon because they presented a broader more diverse vision of Greek medical concepts. Although the new translations were better and much more complete than the early ones, some of the early translations remained in use well into the sixteenth century.¹¹ Thus, conflicting ideas about medicine and plague coexisted for centuries.

Despite improvements to the medical canon, the core medical philosophy remained essentially unchanged in the centuries between Constantinus' work at Salerno and the time plague arrived in Europe. According to the humoral medical paradigm, illness, or a lack of health, was caused when the balance of the four humors, black bile (Melancholy), yellow bile (Choleric), blood (Sanguine), and Phlegm (Phlegmatic), were disturbed. Each of the four humors is associated with one of the four elements: earth, fire, air, and water.¹² In turn, individual foods and drugs were each associated with an element and its humor.¹³ Disease was also thought to be the result of miasmas, or corrupted air, which could invade the body via breathing and open pores, and destroy its natural balance. The onslaught of plague initially disrupted this understanding of disease because of plague's rapid spread, which was immediately seen to be contagious. Over the course of the pandemic, however, because plague's means of dispersal

¹¹ Siraisi, *Medieval and Early Renaissance Medicine*, 190.

¹² David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious and Institutional Context, 600 B.C. To A.D 1450* (Chicago: University of Chicago Press, 1992), 116.

¹³ Siraisi, *Medieval and Early Renaissance Medicine*, 145-6.

remained inexplicable, ideas of contagion merged with those of miasma and a general humoral understanding of the body. Thus, medical treatments for plague tended to follow the logic of humoral medical understanding, and the primary emphasis of pharmacology remained to bring the body's four humors into balance.

Theoretically, a humoral understanding of disease suggests that inter-personal differences in disease symptoms are the result of variations in individual humors. However, by 1348, al Rāzī's had distinguished between smallpox and measles and noted that smallpox was most common in the young. Al Rāzī's work makes it clear that even before plague entered Europe, some individual diseases were recognized and distinguished from one another even within a basically humoral understanding of medicine.¹⁴ After plague entered Europe, Europeans understood plague to be a unique and terrible disease, which also suggests that they could conceptualize diseases as distinct entities. Although symptoms were not a primary factor in understanding or describing diseases because they were expected to vary with the complexion of the patient, shortly after the second epidemic Guy de Chauliac described specific symptoms typical of the disease.

When plague first appeared in Europe, many attempts were made to understand how it spread and specifically what part of the body it most affected. Shortly prior to the first wave of the plague pandemic, human dissections had begun to be a feature of some universities' medical curricula, particularly in southern Europe. After plague appeared,

¹⁴ Ibid., 124.

requirements for dissections became more common; universities including Bologna wrote course plans that included annual dissections as part of the curriculum. In the wake of the first plague outbreak at Avignon, the Pope requested the dissection of some plague victims in order to discover the nature of the disease. The results demonstrated that those who died quickly spat blood and had an infected lung. It was only after plague entered Europe that “public officials other than educational authorities” ordered autopsies.¹⁵ Plague probably was a factor in the increase in dissections, which reflects an interest in understanding the physical body better so as to address epidemics such as plague.¹⁶ Nonetheless, this new anatomical knowledge produced very little information to change the understanding or treatment of plague, despite the increase in dissections during the fifteenth and sixteenth centuries, and increased accuracy and detail of anatomical drawings.

During the initial outbreak between 1348 and 1350, physicians wrote a considerable number of tracts addressing the problem of plague. Their treatises demonstrate a shared medical philosophy, yet they also record the beginnings of a debate about the mechanisms by which plague spread. In general, the early treatises addressed three basic issues: the underlying root causes for the plague, how to avoid the plague, and how to treat patients who have plague. Though many plague texts were produced, none of them became central to medical education, which continued to center

¹⁵ Campbell, *Black Death and Men of Learning*, 111.

¹⁶ Katharine Park, "The Criminal and the Sainly Body: Autopsy and Dissection in Renaissance Italy," *Renaissance Quarterly* 47, no. 1 (1994): 127.

on traditional texts and concepts. The most extensive section of the early treatises was devoted to a consideration of the causes of the epidemic and the least attention was devoted to treating plague victims because, as several of the authors note, “the disease almost always has a fatal termination.”¹⁷ In later plague treatises, consideration of the causes of plague became a less significant portion of the whole.

Most of the early medical treatises were composed in southern Europe, where the largest medical schools were located, and none of the surviving treatises written in the first few years of the pandemic was written in England. Several of the later English plague treatises were translations of earlier continental documents. For example, the fifteenth century *A Little Book for the pestilence*, was an English version of Bengt Knutsson’s version of Jean Jacmé’s 1364 treatise.¹⁸ Some of even the earliest tracts were written in the vernacular. This practice became increasingly common after the 1450 invention of the printing press, which made it possible to address the lay public’s desire for health and medical information. The production of a huge number of medical texts targeted to the learned lay person as well as to medical professionals suggests that the medical community saw the problem of treating large numbers of people with plague was too large for university trained physicians to handle on their own. The treatises produced by the expanded interest in medicine and medical inquiry, however, proved of little value in treating victims of plague.

¹⁷ Campbell, *Black Death and Men of Learning*, 36, 29. Only one of the 16 earliest treatises that Campbell analyzed provided advice on curative measures, and recipes.

¹⁸ Horrox, ed., *The Black Death*, 173-182.

Anna Campbell divides the earliest treatises' descriptions of the causes of plague into two groups, "the general and remote and of the particular and near."¹⁹ The category of "general and remote" refers to reasons or causes for the disease's existence while "particular and near" refers to the manner in which the disease enters individual bodies. An example of the latter is that authors addressed ways of avoiding or preventing the corruption of the air and thus infection by plague.

Remote causes included some sort of astrological occurrence that rendered the air putrid and produced pestilence.²⁰ The tract written by the faculty of the University of Paris was the most precise and detailed in its description of exactly how astrological events influenced the spread of plague. "On 20 March, 1345 at one o'clock in the afternoon, occurred an important conjunction of three higher planets in the sign of Aquarius, which with other conjunctions and eclipses is the cause of the pernicious corruption of the surrounding air, as well as a sign of mortality, famine and other causes not connected with the present subject."²¹ The Paris Medical Faculty's explanation was the basis for many tracts produced during the next hundred years. An Italian version described the events as a solar battle that occurred over India and the Great Sea, which produced toxic mists in the atmosphere by sucking up corrupted water, and then explained, more specifically, the actual point of origin and spread of plague. Almost universally, the near causes of plague were understood to be a corruption of the

¹⁹ Campbell, *Black Death and Men of Learning*, 36.

²⁰ *Ibid.*, 37.

²¹ *Ibid.*, 40.

atmosphere; however, there was less consensus regarding the description of corrupted or putrid air.²²

The miasma or putrifaction of the air that was thought to cause plague was often described as a vapor. The authors of the early medical tracts said that this putrifaction could be carried long distances by lightning and winds and they considered winds from the south to be especially dangerous. They also noted that the vapors could escape from enclosed spaces such as ships' holds or storehouses, wells, lakes or ponds, or arise from unburied corpses or other foul smelling material.²³ Thus, fires came to be seen as a means to counteract the vapor by creating smoke, especially by burning sweet smelling herbs, that could counter harmful corruption of the air. Additionally, fires were thought capable of materially altering harmful vapors and preventing the spread of plague. Fire and smoke remained a recommended weapon against plague throughout the entire pandemic. In 1348, Gentile said that fires in the street would combat plague by destroying urban smells and Pope Clement VI was protected by large fires, and as late as 1665 during the Great Plague of London street fires were built in London streets to combat the pestilential corruptions of the air.²⁴ During this last epidemic London street fires met with some resistance because, in addition to being very expensive, critics did not think that the fires could produce enough heat to materially change the

²² *Ibid.*, 41, 48.

²³ *Ibid.*, 48-55.

²⁴ Arrizabalaga, "Facing the Black Death," 275.

bad atmosphere.²⁵ Nonetheless, the use of fire and smoke to combat plague, and even the argument against the fires, suggests that throughout the Second Pandemic, battling atmospheric corruption was an accepted method of fighting plague.

Many early treatises emphasized means of avoiding plague both because physicians and surgeons had no clear idea of how to treat plague and because preventing rather than treating disease was central to the humoral understanding of health. Over time, plague treatises came to include more recipes for medicaments; however, many of the recipes also were recommended for plague prevention. Much of the advice as well as the recipes were repeatedly reissued under new authors. Aside from providing explanations of the causes of plague, the first plague treatises relied on the wisdom from revered authors of the past. Authors admitted that they were dealing with what appeared to be a new phenomenon, if only because it was of a wider scope than any previous epidemic; nonetheless, they attempted to apply old remedies to the new situation. Thus, little of their medical advice seems to be directed specifically at preventing plague. Although the advice was refined and modified, moderation and behaviors developed to combat earlier diseases now presumed to be malaria, continued to be recommended against plague throughout the Second Pandemic.

In the sixteenth century, Simon Kellwaye's treatise illustrates this conservatism. His treatise includes advice to be moderate in eating, drinking and exercise, along with

²⁵ Moote and Moote, *Great Plague*, 217-8 .

advice on what environments are likely to be the most healthy. Kellwaye says that there are three primary methods of avoiding plague. The first is prayer, the second flight and:

The third means consisteth chiefly in three poyntes which are these: Order, Diet, and Physicall helps. For the first you must have a care that your house bee kept cleane and sweete, not suffering any foule + filthy clothes or stinking things to remaine in ... and in sommer season to deck your windowes and strawe your floores with sweete and holsome herbes, floures and leaves as Mintes, Balme, Pennyriall ... and such like, for your windowes, your floores to be strawed with greene Rushes and Mynts, Oken and willow leaves, Pine leaves and such like: your windowes which stand towarde the North and Easte, doe you alwaies keepe open in thedaye time, (if the aire be cleare and that no infected and that no infected and unsavory smell be neere the same) as fogs, doonghils and such like, and every morning before you open either your doors or windowes as also in the evening when you go to bed cause a good fire to be made in your chamber and burn some odoriferous sweet perfume.²⁶

Medicines recommended to prevent plague were formulated primarily in an attempt to bring the four humors into balance and thus to make people less susceptible.²⁷ Many of the same medicines were also recommended for patients already infected by plague, although the plague tracts also emphasized that as soon as plague symptoms became visible, other treatments were needed to eliminate toxic humors. Various forms of purgatives, bleeding, sweating, and emetics were recommended to balance the humors and to rid the body of toxins. In addition, surgical and medical procedures such as poultices were recommended to remove toxins and drain buboes. Recipes for the ingested medications or nostrums could be quite complex, and some

²⁶ Kellwaye, *A Defensative against the Plague*, 3v-3r. Chapter 4 "Sheweth how to prevent the plague."

²⁷ *Ibid.*, 12v-13r; Horrox, ed., *The Black Death*, 104-107.

such as theriac or treacle, included as many as 80 ingredients.²⁸ The sheer volume of ingredients included in many treacles makes the simplicity of the four ingredients of “Diatessaroum triacle,” which was recommended as a “Medicament expulsive” in the medical advice printed along with several of the plague orders, stand out.²⁹ The ingredient lists included with the plague orders are also considerably less extensive than those included in many of Kellwaye’s recipes, which suggests that the authors were doing their best to provide, as required, “sundry good rules and easie medicines without charge to the meaner sort of people.”³⁰ Despite the diversity of ingredients, a few occur repeatedly. Ingredients favored as plague preventatives include rue, figs, walnuts, butter and any number of mostly sweet smelling herbs. Preventative measures included both those that were worn and those that were taken internally; many odoriferous ingredients were used to make various forms of nosegays, which were sniffed to ward off plague and other dangers produced by bad smells. Many of the same ingredients were also burnt to fumigate houses.

²⁸ Mette Stengaard and Poul R. Kruse, "Drug Therapy in the Official Danish Plague Instructions, 1619-1709," *Pharmacy in History* 44, no. 3 (2002): 100. *Theriaca*, a common medical compound was composed of 80 individual substances according to *Dispensatorium Hafniense 1658*. However, Stengaard and Kruse note that the various pharmacopeias do not always list identical ingredients for each of the various medicinal compounds and that ingredient lists changed over time; Campbell, *Black Death and Men of Learning*, 70. Campbell says that theriac is composed of 60 or more ingredients; The OED defines theriac, or treacle, as a medical compound made of many ingredients.

²⁹ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np.

³⁰ *Ibid.*, np.

The logic behind the odor prevention measures is quite simple. It was believed that bad smells carried the danger of disease and illness; that, in effect, the bad smells produced by rot and decay created the miasma, which produced and diffused disease. Thus, smelling bad smells meant that you were being exposed to the miasma and to infection. Given that people had recognized that disease often broke out in the aftermath of battles, amidst the stench of decaying corpses and rotting garbage, this was not an illogical assumption. Thus, using sweet smelling herbs to purify a room or to carry when walking in a potentially plague infected area, were recommended preventative measures. Kellwaye's plague treatise of 1593 provides a list of herbs for clearing a room that includes mint, pennyroyal, lavender, thyme, red roses, as well as numerous recipes, each of which includes a list of several alternative ingredients, for making various sweet smelling concoctions to be worn near the heart.³¹ Carrying nosegays continued to be recommended during the last major plague epidemic in London. Even though he does not seem to put a great deal of faith in the value of these scents to provide protection, Pepys mentions being forced to buy tobacco to chew and sniff when his business forced him to walk near a house marked by a white cross as a plague-infested house.³² In addition, after tobacco was introduced to England, smoking tobacco came to be recommended as a plague preventative.³³ Indeed, as plague came to be associated more closely with the poor, its association with bad smells increased

³¹ Kellwaye, *A Defensative against the Plague*, 3r-8v.

³² Latham and Matthews, eds., *Diary of Samuel Pepys*, 120.

³³ Moote and Moote, *Great Plague*, 106-7.

rather than decreased. It was linked not only with the smell of rot and decay but also with fetid air common in overcrowded housing conditions.

Treatises such as Kellwaye's provided information on how to draw poisons out of the body as well as on diets to prevent plague, based on a traditional medical understanding. Kellwaye emphasizes moderation but also considers the relative heat and moisture values of various foods. His suggestions favor food that is drying, but he also warns against meat, such as goat and water birds, because they are hard to digest. He also suggests avoiding lamb because it is moist and he brings up an interesting argument on the merits of eating fish. Kellwaye notes :

there are some authors which holde opynion that fish is more better to be eaten then flesh in the great fervent heate of the yeére, because they doe make a mold colde bloud int the body than flesh: another reason is because they doe live under water, they are not infected with any contagion of the ayre, as beaste and Byrdes may be and therefore more wholesome but in my iudgement flesh is more wholesome because it doth bréde a more pure and fine Juyce in the body, than any fish whatsoever.³⁴

Although the humoral system remained the dominant explanatory system for human health and disease, treatises written in the vernacular for a non-medical audience reflect a simplification of the humoral system, which was too complicated for non-medical people to master and interpret. Medical advice on plague issued in England, largely for non-medical people, during the last hundred years of the Second Pandemic makes very little reference to the differing medical needs of people with different constitutions or complexions, or to seasonal variations. For example, although

³⁴ Kellwaye, *A Defensative against the Plague*, 12v-12r.

Kellwaye uses a variety of humoral terms, he often divides people into two general categories, employing common terms such as “strong and rusticall” or “daintie, and idle bodies.”³⁵ Medical advice printed in conjunction with the plague orders also includes a few recipes with alternative ingredients for summer and fall as well as recipes targeted to the poor.³⁶ Interestingly, Kellwaye’s advice on smallpox includes a more detailed discussion of how humors affect the course of that disease than his advice on plague contains.³⁷

Many of Kellwaye’s recipes provide dozens of alternative ingredients, and he does not indicate whether any specific combination of ingredients is preferable. Many of the recipes recommended by the College of Physicians, which were printed along with the plague orders, are similar to those included in Kellwaye’s book, although they are simpler. The dissimilarities between their recipes are linked to the goal of the medical advice, printed along with plague orders to provide “sundry good rules and easie medicines, without charge to the meaner sort of people.”³⁸ Despite the simplifications, an examination of recommended ingredients listed in these publications indicates that no single ingredient or method of treatment dominates.

³⁵ Ibid., 5r.

³⁶ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, np, np, Di.v.

³⁷ Kellwaye, *A Defensative against the Plague*, 38r, 40r.

³⁸ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, np.

Throughout the later part of the Second Pandemic, treatises recommend avoiding plague-infected people and places, but the rationale that linked places of foul smells, and fog or dampness, with contagion was still largely based on a humoral and miasmatic understanding of disease. Kellwaye notes that plague can be found in ships' holds as well as in crowded jails and rooms in the back alleyways of cities. The implication is that it is the smells created in these locations that produce plague rather than that plague simply moves from one person to another. In chapter 12, "Doth shewe what you must doe when you goe to visit the sicke," Kellwaye explains what a surgeon or barber who is going to visit the room of a patient ill with plague should do.³⁹ First he recommends that the surgeon should make sure that a large fire is lit in the room with the patient and that some herbs are burnt. Kellwaye also recommends that the medical man should hold a spicy lozenge in his mouth and have an additional sweet-smelling concoction to sniff, and he should not stand between the patient and the fire, because the fire will draw the toxic vapors. In addition, Kellwaye recommends that the surgeon should have someone else expose the patient's arm to the air before the patient is bled so that the dangerous sweat has a chance to evaporate before he approaches the patient.⁴⁰

The implication of Kellwaye's advice seems to be that, whatever the nature of the infectious agent, it is comprised of smell and moisture. Kellwaye's discussion of a

³⁹ Kellwaye, *A Defensative against the Plague*, 14.

⁴⁰ *Ibid.*, 14r-15r.

different disease, smallpox, also demonstrates that the early modern European understanding of disease dispersal and terminology differs from a modern epidemiological understanding. Kellwaye enumerates four levels of causation for smallpox and measles and calls them both diseases “hereditary” and “infectious.”⁴¹ He describes their immediate cause: “the conjunct cause is the menstrall bloud which from the beginning in our Mothers wombes wee received, the which mixing it self with the rest of our blood, doth cause an ebullition of the whole.”⁴² He explains that differences between smallpox and measles are the result of differences in heat and moisture in the blood but he did not see the differences as fundamentally significant because “they are both one in the cure.”⁴³

Frequently European physicians selectively used the work of their predecessors in the way Kellwaye used observations on the difference between smallpox and measles. He begins the chapter, *Warnings of the Plague to Come*, by referring to Avicenna, or ibn Sina, and the way ibn Sina linked seasons and seasonal abnormalities to health and illness.⁴⁴ Kellwaye’s use of ibn Sina illustrates one of the major problems faced when examining plague texts, namely that it is difficult to distinguish between the details the writer is reporting from personal experience and those that the writer copied from earlier materials. Kellwaye does not distinguish between the signs warning of an

⁴¹ Ibid., 40v.

⁴² Ibid., 39r.

⁴³ Ibid. 39v.

⁴⁴ Ibid., 2r.

imminent plague outbreak that were commonly reported in England and those that were reported in the ancient past. Typically, plague treatises incorporated large sections of earlier writings without attribution.

As we have seen, the basic precepts of humoral medicine as defined by Galen dominated medical explanations of plague, which emphasized the variability of symptoms between people as the result of differing humoral balances. Plague, however, came to be seen as being caused by poisonous material around the heart.⁴⁵ Although the diffusion of plague proved impossible for physicians to explain, they understood that it clearly had a different cycle and intensity than the scourges with which they were familiar because it spread very rapidly across the entire continent and killed many people quickly, yet they had no alternative concepts to apply.

The severity of plague epidemics was sometimes blamed on diet. John Lydgate (ca. 1371-1449) wrote "Do not eat meat out of greedines, And abstain from eating fruit."⁴⁶ Writing about a century later, Kellwaye also recommended eating in moderation. Plague was often linked to eating fruit and to extremely bountiful harvests of fruit, which meant that the poor were eating large quantities of fruit. Although eating large amounts of fruit is unlikely to have contributed to high levels of plague among the

⁴⁵ Campbell, *Black Death and Men of Learning*. Campbell quotes Gentile of Foligno describing plague in this manner; Kellwaye, *A Defensative against the Plague*, 1r, 17v.

⁴⁶ John Lydgate, "A Diet and Doctrine for the Pestilence," in *The Black Death*, ed. Joseph P. Byrne (Westport, CT: Greenwood Press, 2004), 162.

poor, it is possible that good harvests could have affected plague patterns by fostering larger than usual numbers of rats.

Throughout the 300 years that plague epidemics ravaged England, the medical profession did not develop a standard treatment protocol. Kellwaye's treatise includes a number of recipes, most of which include a number of possible variations. A recipe for "A Good Glister" calls for one handful of mallows, beets, violets or red fennel, to be combined with one dram of seeds of fennel, anis or coriander. The water boiled with these two ingredients is then to be mixed with another set of ingredients, again with a few choices.⁴⁷ The choice of alternative ingredients in these recipes supports my prior contention that no one set of ingredients had become the standard preventative or treatment for plague. In fact, the Good Glister is specifically mentioned as a preventative that is good in times free of plague as well as during plague visitations. Many plague medicines, like this one, were designed to assist the body's ability to resist disease. Attention was focused on attempting to prevent plague outbreaks or avoiding the disease altogether, rather than on curing the ill.

The discrepancy between early descriptions of plague as contagious, and the long-running debate about whether plague was or was not contagious was the result of several factors. Medical theory of the Middle Ages and the early modern era did not endorse the concept of contagion, and yet plague was consistently described as being spread from person to person and from community to community, especially during the

⁴⁷ Kellwaye, *A Defensative against the Plague*, 8r.

first wave of the Second Pandemic. Despite the consistency produced by reissuing plague tracts repeatedly, various and somewhat divergent ideas were expressed during the course of the Second Pandemic about the essential nature of plague and how it was spread. In part, these inconsistencies originated with differences evident in the initial plague treatises, and in part they were the result of dissonance between theoretical precepts and the observed behavior of plague.

A miasmatic theory of disease could explain plague's extensive diffusion, but as plague spread, it quickly came to be linked to interaction with other people. Gabriel de Mussis' story traced the spread of plague west from Kaffa, and linked the transmission of plague to contact or proximity with dead victims of plague. As a result, sailors who were accused of introducing plague were quickly banished from Italian port cities.⁴⁸ Towns such as Venice and Milan instituted quarantine to prevent the introduction of the disease.

Though the miasma theory principally explains sickness as an alteration or pollution of the air, it does not preclude an explanation somewhat similar to a modern understanding of contagion. The corrupted air came to be seen as being carried from place to place in fabrics or animal fur, so that animals and people were seen as carrying the infectious agents around. During the Second Pandemic the medical establishment gave de facto approval to the concept of contagion by recommending various quarantine measures that would be most efficacious against a contagious agent. However, medical

⁴⁸ Ziegler, *The Black Death*, 15-17.

tradition and the unpredictable and mysterious manner in which plague waxed and waned, and the way it moved, apparently randomly from one site to the next, prevented a rigid acceptance of a fully developed contagion-centered theory of disease spread.⁴⁹

However, there is considerable evidence that especially during the early in the Second Pandemic plague was considered contagious. For example, Giovanni Boccaccio (1313-1375), and Guy de Chauliac (c.1300-1368) referred to plague as highly contagious.⁵⁰ Although most of the earliest English chroniclers emphasized the universality of the great mortality rather than its contagiousness, Geoffrey le Baker (*fl.* 1326–1358) wrote that people believed “that the breath of those who had lived among the dying would be infectious.”⁵¹ Boccaccio, in the introduction to *The Decameron*, describes plague as transferable “from the sick to the sound, in very rare and miraculous manner... The quality of this contagious pestilence ... and catching it one of another, either men or women.”⁵² Later writers such as Simon Kellwaye and Thomas Dekker also described as being spread from person to person.⁵³ English cities attempted to prevent entrance to travelers from plague infected regions, and English plague orders

⁴⁹ Ann G. Carmichael, "Contagion Theory and Contagion Practice in Fifteenth-Century Milan," *Renaissance Quarterly* 44, no. 2 (1991):, 213-256. Carmichael traces

⁵⁰ Boccaccio, *The Decameron*, 19; Guy de Chauliac, quoted in Campbell, *Black Death and Men of Learning*, 3.

⁵¹ Geoffrey le Baker, quoted in Horrox, ed., *The Black Death*, 81.

⁵² Boccaccio, *The Decameron*, 19.

⁵³ Kellwaye, *A Defensative against the Plague*, 1r; Thomas Dekker, "A Rod for Run-Aways. God's Tokens," in *The Plague Pamphlets of Thomas Dekker*, ed. F. P. Wilson (Saint Clair Shores, MI: Scholarly Press 1971, 1925), 145.

from at least the sixteenth century required infected houses to be shut up, with their ill inhabitants and anyone who had been in contact with them locked inside.⁵⁴ Early writers appear to mean that plague spread quickly from person to person, but they did not specify how it spread, for example as a miasma trapped in clothes, or as poisonous humors escaping from the ill. The definition of contagious appears to alter, so that although plague retains its description of being highly “contagious” throughout the Second Pandemic, people’s understanding of what that meant did change. Simon Kellwaye begins his 1593 book with a chapter entitled “What the Plague is,” noting that while there has been considerable disagreement about what causes the plague, most agree that it is a “pernicious and contagious fever.”⁵⁵ Nonetheless, Kellwaye fears transmission via various nasty odors at least as much as being in the presence of a person sick with plague.

Under the impact of syphilis, which struck in the last decade of the fifteenth century, the medical tradition began to change. By 1500, syphilis was generally understood to be a contagious disease spread by sexual contact.⁵⁶ In their efforts to treat syphilis patients, physicians quickly began to expand their repertoire of drugs beyond the relatively harmless, if mostly ineffectual, simples and Galenicals to more dangerous

⁵⁴ Geoffrey le Baker writing before 1356, says “Gloucester denied admission to people from Bristol” quoted in Horrox, ed., *The Black Death*, 91.

⁵⁵ Kellwaye, *A Defensative against the Plague*, 1r.

⁵⁶ Quétel, *History of Syphilis*, 10. The sexual nature of the disease’s spread was mentioned as early as 1495.

concoctions which included heavy metals such as mercury.⁵⁷ Despite limited evidence of mercury's efficacy, it continued to be used to treat syphilis into the twentieth century. Treatments used on patients with syphilis quickly became very aggressive in a way that treatment of plague victims did not. Plague victims typically died quickly, while people with syphilis lived long enough to be treated vigorously. Because plague is an epidemic disease, during outbreaks there simply were not enough doctors to provide patients intensive treatments or detailed individual humoral assessments.

In contrast to syphilis treatments, the medical response to plague remained relatively constant and relatively non-invasive. The initial plague tracts recommend bloodletting only in the initial days of exposure, and both Kellwaye and the physicians' advice accompanying plague orders recommended bloodletting only if the patient was strong enough, and only during the initial day or two of the infection, and even then only if plague sores had not yet appeared.⁵⁸

As late as the 1720s, when Dr. Richard Mead (1630-1699) wrote *Short Discourse Concerning Pestilential Contagion* because plague was ravaging Marseilles,

⁵⁷ Siraisi, *Medieval and Early Renaissance Medicine*, 386; Johannes Fabricius, *Syphilis in Shakespeare's England* (London: Jessica Kingsley Publishers, 1994), 37. Fabricius indicates that the efficacy of mercury may have varied at different stages of the disease; Quetel, *History of Syphilis*, 106, 115, 180. Quetel quotes Sugita as complaining that despite treating thousands of patients, Sugita still did not know enough to improve their chances.

⁵⁸ Kellwaye, *A Defensative against the Plague*, 18v; England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, np; Royal College of Physicians of London, *Certain Necessary Directions*, D3v-D3r.

there was still no consensus as to whether plague was a disease spread by a miasma of the air or by person-to-person contagion, or by some other means.⁵⁹ For example, doctors in Marseilles declared that plague had infected the city and that plague was contagious, while at the same time Marseilles' officials concluded that plague was caused by a variety of different factors including a poor diet, rather than by a contagious disease.⁶⁰ Similar disagreements had taken place in seventeenth century London when the Crown demanded that fairs and trade be curtailed because plague was rife in the city. This disagreement in London, however, was couched not in terms of whether plague was contagious or not, but rather in terms of whether plague was caused by poisoned, or corrupted, food and goods, corrupted air, or humors, which could cling to a person and thus be moved from one place to another.

It is possible that the stories of plague's extreme contagiousness, which developed when it first appeared in 1348, prevented a thorough reappraisal of its actual contagious potential, based on its behavior. Physicians, surgeons and chroniclers observed that the manner of plague's spread was erratic and sporadic, and was not easily linked to person to person contact, and so concluded that plague was, as it had been originally described, especially contagious. Europeans' inability to form a consensus on plague's etiology probably owes more to the complexity of the way in

⁵⁹ Arnold Zuckerman, "Plague and Contagionism in Eighteenth-Century England: The Role of Richard Mead," *Bulletin of the History of Medicine* 78, no. 2 (2004): 274-76.

⁶⁰ *Ibid.*, 277.

which plague, caused by *Y. pestis*, is transmitted than to a failure of the observers and medical practitioners.

Throughout the period of plague epidemics in Europe, doctors and civil authorities frequently collaborated. The titles or subtitles of plague treatises often indicate that they were published for the good of the country. From the first year of the Second Pandemic until as late as the 1720s, when plague was threatening Marseilles, plague treatises were addressed to public authorities. During London's last century of epidemics, Royal plague orders were issued in combination with medical advice and the English government asked Dr. Richard Mead to provide guidelines for controlling the plague in England.

The title page of Kellwaye's 1593 *Defensative Against the Plague* states that it was "published for the love and benefit of his country." Kellwaye's note "to the friendly reader" states that he chose to write in simple English prose rather than in Latin or in elegant stylized verse so that the poor, who were most in need of medical help, could read and understand his advice. He admits that his use of such an unassuming style might make some people question his professionalism; however, Kellwaye says that getting his medical advice to those most in need was more important than his reputation.⁶¹ To make his recipes easier for common people to follow, Kellwaye includes a table showing conversion rates between a Latin measuring system and a less

⁶¹ Kellwaye, *A Defensative against the Plague*, np.

formal measuring system. Despite his concern for the common people, he included a recipe or two written in Latin.

In the early treatises, it was often assumed that a medical professional would be responsible for reading and interpreting as well as implementing medical advice. The instructions provided by Kellwaye seem to suggest that he assumed patients are cared for by around-the-clock attendants with advice from physicians.⁶² While the medical advice included in the plague orders does contain references to “the patient,” the advice is simpler than Kellwaye’s and the plague orders frequently make use of the word “you” and thus seem to be targeted directly at patients.⁶³

Although the advent of plague did not produce dramatically new treatments or a new medical philosophy, it did result in an increased interest in medicine. Self-diagnosis texts had begun to become more common even before the invention of the printing press. Nonetheless, plague greatly increased interest in and the production of medical information. These books were often printed in the vernacular, suggesting that they were of interest to a broader section of the population than elite university educated physicians.⁶⁴

⁶² Ibid., 38v.

⁶³ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, Cii.r. Examples from these pages include “and by the grace of God you shall be safe from the plague” (Cii.v), or “keepe in your mouth and chewe” but on the next page it says “but if the patient” np.

⁶⁴ Gottfried, *The Black Death*, 119; Arrizabalaga, "Facing the Black Death," 271.

When plague first entered Europe, it was immediately seen as both a social and a medical catastrophe, and the medical establishment hastily attempted to assist in the prevention of the disease. Despite little initial success, the medical community remained a partner with government in attempts to prevent and control plague outbreaks. With its active engagement in the fight to control plague, the medical community developed some consensus about what triggered it, how it was spread, and how to treat it, although many of the details remained in dispute. Plague appears to have been consistently described as uniquely contagious and dangerous even though, after the initial wave of the pandemic, epidemics no longer spread like wildfire across vast regions of Europe. Instead of spreading across the continent, subsequent outbreaks erupted sporadically and apparently randomly. The medical community's inability to reach a consensus, or to come to terms with plague and the way it spread, is in itself evidence that plague was caused by *Y. pestis* or another disease with an equally complex mode of transmission.

7 Material Culture, Social Customs and Civic Regulations

During the centuries that plague ravaged Western Europe, society underwent a significant metamorphosis. Transformations in culture and society were both the direct result of changes in population and material wealth and the indirect result of societal accommodations to plague. At the time plague reached England, its society was experiencing stress and pressure due to crop failures and overpopulation, but plague's impact was extensive and far reaching. Additional societal changes arose as a result of efforts to combat plague. Although many cultural changes only became fully developed over the course of the epidemic, some of these shifts began immediately. As a result of the initial epidemic of the Second Pandemic and the population reduction that plague produced, material possessions were divided amongst many fewer people, and, more importantly, land was divided among fewer individuals. Thus, per capita wealth and income increased. This new wealth allowed many changes, but even before these changes were manifest, cultural behaviors changed to combat the plague.

One of the immediate, if temporary changes plague wrought was a change in burial and funeral procedures. Many chroniclers described social norms, especially burials, as having been disturbed by plague. Early English chroniclers noted "that the living were hardly able to bury the dead."¹ The author of *Historia Roffensis* wrote that

¹ The *Anonimale Chronicle* quoted in Horrox, ed., *The Black Death*, 62. Similar comments were made in *The Eulogium* (64), by Thomas Walsingham (66) and by Thomas Burton in the *Maux Abbey Chronicle* (69).

“men and women carried the bodies of their own little ones to church on their shoulders and threw them into mass graves.”² Despite such comments, excavations of mass graves suggest that bodies were neatly laid in the ground, even in the mass burials. The chroniclers’ comments suggest that they were distressed by the whole funerary process. Boccaccio wrote more directly that during the high mortalities, funeral behaviors underwent a considerable change. He noted that funerals became less a matter of public ceremony and display of sorrow and loss, and more a hasty matter of getting the dead into the ground. “Very few would accompany the body to the grave, and they not any of the Neighbours, although it had beene an honourable Citizene, but onely the meanest kinde of people such as were grave-makers, coffin-bearers, or the like that did these services onely for money;” they performed this duty as rapidly as possible.³ Burton, one of the few English writers to mention funerals, wrote that in many places chaplains survived until after they had performed the necessary funerals, and then they too died in great numbers.⁴ Unlike Boccaccio, many of the English chroniclers were monks, which may have given them a different understanding of plague’s effect on civil customs.

Over the course of the plague epidemics, commentators mention the brevity and lack of ceremony invested in funerals during plague epidemics. Most of these descriptions emphasize the lack of solemnity given to funerals, issues such as the ban

² Historia Roffensis quoted in *Ibid.*, 70.

³ Boccaccio, *The Decameron*, 23.

⁴ Horrox, ed., *The Black Death*, 69.

on funeral processions, and the creation of mass graves.⁵ Geoffrey le Baker (*d. c.* 1356) says that in the wake of plague “hardly anyone dared to have anything to do with the sick,” which suggests that funeral gatherings may not have been common.⁶ However, as prints from 1665 make clear, funerals were not held completely without processions of mourners.⁷ Prohibitions on public funeral gatherings and processions is a rational response to contagious disease, but it is unlikely to have had any effect on the spread of a vector-borne disease like plague.

Virtually ignored by most commentators is the one aspect of the change in traditional funeral rights that might have actually reduced plague transmission, namely, a profound change in the more private aspects of death rituals. Prior to the onslaught of plague, people congregated together in the home, or at least at the front door of the deceased, to express their sorrow.⁸ London plague orders from 1592 stipulated that no funeral ceremonies were to be held in the home of the deceased until 28 days have passed since a death in the house.⁹ Indeed, London houses where people had been

⁵ Dekker, "The Wonderful Yeare 1603," 29, 31, 61; Dekker, "A Rod for Run-Awayes. God's Tokens," 144, 146.

⁶ Geoffrey le Baker, quoted in Horrox, ed., *The Black Death*, 81.

⁷ Prints depicting scenes from the 1665 London plague outbreak, which portray various stages of the funeral process can be found in many sources including Bell, *Great Plague in London*, 104; Munkhoff, "Searchers of the Dead," 5, 15; Latham and Matthews, eds., *Diary of Samuel Pepys*, 93v.

⁸ Boccaccio, *The Decameron*, 23.

⁹ Journal of the Proceedings of the Court of Common Council in Barrett, ed., *Present Remedies against the Plague Etc.*, xiii.

infected with plague were ordered to be shut up for from 28 to 40 days, with access granted only to caretakers. The first printed plague orders, which probably date from 1578, state that “if there be any doubt that the masters and owners of the houses infected will not duely observe the directions of shutting up their doors especially in the night then there shall be appointed two or three watchmen.”¹⁰ These guards were authorized to place people who ignored the regulations into the stocks. Plague orders from 1625 specifically stipulated that “at the burial Dinner, or attendance on the Corps, or other solemnitie of any Dying of infection, there shall be no assembly of people in the house where such person shall Die within the time of xxviii after such death.”¹¹ Discontinuing the tradition of friends and family meeting together in the houses of plague victims could have had an appreciable impact on the spread of any infectious disease, particularly a vector-borne disease spread by household vermin, by reducing the number of people exposed to the house and its fleas.

Providing guards to enforce household quarantines did mean incurring expenses, but the changes in funeral rituals cost no money, and seem to have been an almost immediate, painful, adaptation to high mortalities, whereas many other changes recommended to combat plague epidemics were expensive and were only gradually implemented. Although it was almost universally accepted that the material possessions of plague victims, especially clothing and bedding, posed a threat to healthy individuals,

¹⁰ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, Bi.v.

¹¹ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

Carlo Cipolla cites an incident in which two men were caught stealing from the empty houses of plague victims.¹² Such thievery suggests that despite the widely accepted dangers of plague-infected material, poverty and dearth drove people to risky behavior.

In the years before plague arrived, the population of England reached a peak that was not surpassed until late in the fifteenth or early sixteenth century. Although total population figures can only be rough estimates, the evidence that does exist suggests that as late as 1500 the population of Europe had not yet reached the population levels of 1300.¹³ By 1300 people had begun to cultivate very marginal lands, and England's peasants were approaching the maximum level of food production, for the given technology, so that most people were barely at the edge of subsistence.¹⁴ The Great Famine of 1315-25, which killed as many as one tenth of the population, illustrates the precarious character of life for most of England's population in the early 1300s. The plague, however, killed greater numbers. After the first three major plague epidemics,

¹² Carlo M. Cipolla, *Faith, Reason, and the Plague in Seventeenth Century Tuscany*, trans. Muriel Kittel (Ithaca, New York: Cornell University Press, 1979), 20.

¹³ C. Warren Hollister and Judith M. Bennett, *Medieval Europe: A Short History Ninth Edition* (Boston: McGraw Hill, 2002), 331; Marjorie Keniston McIntosh, "Local Responses to the Poor in Late Medieval and Tudor England," *Continuity and Change* 3, no. 2 (1988): 219, notes that there is some argument about when the population expansion began, but she puts the beginning of the growth within the period between 1450 and 1520.

¹⁴ Platt, *King Death*, 14.

England's population in the 1370s is estimated to have been 2.8 million and as late as the 1520s, it was still estimated to be only 2.3 million.¹⁵

Although the initial impact of plague and its high death toll produced a depressed economy, after the shock of the terrible mortality diminished, the decrease in population insured that fewer people lived at the very brink of subsistence.¹⁶ Gradually, as the remaining population began to take advantage of their improved economic status to produce goods, material wealth and possessions increased. It was a slow process but ultimately it produced an increase in material wealth that fostered the development of a merchant class. Eventually this increase in material wealth resulted in more people having the financial wherewithal to destroy potentially infective objects as recommended by the physicians advice published along with the plague orders.

After the plague entered England, most of the marginal lands were quickly returned to pasture and wasteland, and while some manors prospered and quickly returned to preplague tenancy levels, many did not. Colin Platt's research also demonstrates that at least in some regions the size of the average land transaction increased substantially in the 150 years after 1349. Despite laws drafted to control the movement of serfs and free peasants, it appears that tenants gravitated to manors where

¹⁵ Mark Bailey, "Demographic Decline in Late Medieval England: Some Recent Thoughts on Research," *Economic History Review* 49, no. 1 (1996): 1.

¹⁶ Platt, *King Death*, 1; Hatcher, *Plague, Population and the English Economy*, 15, 79, n24.

the combination of good soil, low rent, and low service demands offered the promise of the best returns.¹⁷

Even during the initial outbreak of plague, there is some evidence that plague morbidity and mortality rates were lower among the upper than the lowest classes.¹⁸ At the time of the initial plague outbreak, however, there were a great many more peasant workers than nobles and elite clergy, and further, many landholders lived only slightly better than their peasants. In 1348 there was a relatively small artisan class, compared to that which had developed by 1600, so the impact of wealth on mortality levels cannot be directly compared with data from the later epidemics. Records indicate that only a few of the upper-tier elite were infected or killed by plague during the initial wave of the Second Pandemic. Princess Joan, one of the few royal victims to succumb to plague, died in August 1348, in Bordeaux, on her journey to Castille where she was to marry King Pedro.

The reason wealthy people appear to have been at less risk from plague is unclear, but possibly their large estates allowed them the opportunity for a secluded existence, despite their large household staffs. Alternatively, their lifestyles may have reduced their environmental contact with rats and fleas. Pope Clement VI, resident in Avignon, is reported to have spent much of the first outbreak more or less in isolation and surrounded by hot fires, an uninviting environment for rats.¹⁹ Additionally, and of

¹⁷ Platt, *King Death*, 15-16, 11, 7-8, 42-43.

¹⁸ Benedictow, *Black Death 1346-1353*, 343.

¹⁹ Ziegler, *The Black Death*, 159.

greater statistical significance, evidence from British ecclesiastical clerical records indicate that during the first plague epidemic British bishops had a considerably lower mortality rate than did the regularly beneficed clergy.²⁰

Even so, evidence from plague epidemics prior to 1600, however, does little to suggest that the poor were substantially more susceptible to plague than those who were better off. Monks of Westminster, well off and well fed compared to the population at large, seem to have experienced plague mortalities similar to those recorded among English parish priests, and thus, by extrapolation, similar to mortality rates of the population as a whole.²¹ In the 1600s, however, the data show that poor parishes were suffering higher plague mortalities than wealthier parishes, at least in the larger metropolitan areas. Paul Slack examined mortalities in London as well as Exeter, Bristol and Norwich, and found that this differential applied in all these cities.²² In London, Slack found that the period between the epidemic of 1563 and 1603 marked a distinct change in the epidemic patterns. In the epidemics after 1603, it became evident that the outlying, poor parishes suffered the brunt of plague epidemics, while the central and more affluent parishes were less seriously affected. Although the parishes most heavily struck by plague had varied in each plague outbreak, after 1593 the central London parishes were never again the locus of the highest mortalities in London. Slack

²⁰ Benedictow, *Black Death 1346-1353*, 343.

²¹ Platt, *King Death*, 8. Half of the monks and the Abbot at Westminster died in 1349.

²² Slack, *Impact of Plague*, 136, 154-158, 111-143.

also noted that after 1563 the differentials between parishes most and least devastated by plague increased.²³ During the last 100 years of plague in London, it became evident to contemporaneous observers that the poor were disproportionately affected. In the early sixteenth century, King Henry VIII showed what now seems an undue concern about the threat posed by the English sweating sickness, while he remained relatively unconcerned about the threat of plague.²⁴ His concerns may have reflected the reality that although plague mortalities in general were much higher than those of the English Sweat, he himself was at greater risk of the sweat.

By the end of Queen Elizabeth's reign, Londoners believed that plague was uniquely terrible and universally dangerous, and yet they also knew that plague was a disease especially dangerous for the poor. Initially this differential in morbidity and mortality between rich and poor was linked to bad humors, which collected in small stuffy rooms common with many inhabitants. Over time, several reasons for the differential mortality were considered. Defoe's primary explanation for this phenomenon was based on a theory of contagion. He says that during a plague epidemic, poor people were required by economic necessity to travel on city streets to continue performing their duties and thus were exposed to the infection because economic necessity forced them to engage in risky behavior. Defoe's basic advice for avoiding the plague was to stock up on material necessities and retreat from the world

²³ Ibid., 158 table 6.2.

²⁴ Carolly Erickson, *Great Harry: The Extravagant Life of Henry VIII* (New York: Summit Books, 1980), 149, 212-19.

of daily activity in London.²⁵ In light of our contemporary understanding of plague as a disease carried by the fleas on the backs of rats, the Elizabethan idea that plague lingered in the vapors of overcrowded stale rooms seems quaint, and neither of Defoe's explanations is entirely satisfying.

Nonetheless, there has been very little investigation into what might have produced the change in relative morbidity and mortality between London's rich and poor. First, it is important to note that while London was not by any means an egalitarian environment, neither was it as socially segregated as a contemporary urban environment. The rich and the poor lived in relatively close quarters. Servants and apprentices often lived with their masters, or in quarters provided by their masters, and people typically lived just behind or above the place where they worked. There is some evidence that during the early modern period servants increasingly came to live in separate apartments. Although the rich and poor lived in separate housing, individual city blocks included houses occupied by poor as well as rich; housing was often divided so that poor people lived on the less desirable side of the block.

Parishes were not all equally wealthy as is demonstrated by hearth tax records, but nonetheless, the population of individual parishes included both rich and poor. As the mortality and relative mortality levels of individual parishes shifted, population demographics were changing, but they did not change enough to explain the changes in mortality levels. Nonetheless, the increase in mortality among the poor in conjunction

²⁵ Maynadier, ed., *A Journal of the Plague Year*, 86, 89; George A. Aitken, ed., *Due Preparation for the Plague, as Well for Soul as Body: By Daniel Defoe* (New York: AMS Press, 1974), 49-56.

with a decrease in mortality among the rich suggests that changes in human living styles and behaviors could also have played a significant role in determining morbidity and that some combination of the many societal changes, which occurred during the early modern period, reduced the risk of plague for the more affluent members of society. Many of these changes are well known and often discussed, but not in the context of how they may have affected the distribution of plague, a topic I will now address

Urban Construction

Construction techniques were constantly changing in London across the period of plague visitations; however, these changes were unlikely to have affected the access that rats had into houses and tenements. The urban setting was also dramatically altered by King Henry VIII's transformation of sacred landscape into secular and by the enormous increase in London's population. Between the fourteenth century and the seventeenth century, changes in housing construction were developed to reduce building costs. By the late Tudor period, building materials had become quite expensive within London because most had to be brought in from surrounding regions.²⁶ The dimensions of some of the construction materials became standardized to facilitate prefabrication and some buildings were at least partially prefabricated outside London. This increase in uniformity may have had the result of making building components fit more tightly together, which could have hampered rat movement. However, as new

²⁶ Schofield, *Medieval London Houses*, 141,152.

construction alone would have been affected by these changes, they could have had only a minor effect city wide.

In addition, changes that decreased the cost of construction by producing more uniform components were combined with construction changes that reduced the material requirements for construction. An early example is the use of arches in the undercrofts, or basements, of buildings. Also, as noted in chapter 4, shared foundation walls gradually came to be made two feet rather than three feet wide to reduce expensive stone building within London.²⁷ With increasing costs, stone gradually came to be an insignificant component in the construction of houses. Solid stone walls were replaced by walls made either of brick or with stone exteriors filled with chalk. By 1610, when Ralph Treswell (c1540-1616) surveyed London houses, very few houses had walls of stone and none had four stone walls.²⁸ Additionally, attempts to reduce construction costs were coupled with the addition of visual details. For example, in some late sixteenth century buildings, closely placed studs were employed that were not joined to horizontal beams, and so were merely for visual effect. Such construction techniques may have left gaps for rat movements. Furthermore, interior walls were generally flimsy, “commonly lath and loam finished with a skim of plaster.”²⁹ They were permeable enough that in 1390 a burglary was committed by going through the

²⁷ Schofield, "The Construction of Medieval and Tudor Houses in London," 140.

²⁸ *Ibid.*, 9.

²⁹ *Ibid.*, 18.

wall of an inn.³⁰ Such walls of porous lath, lacking a solid core and with irregularly placed or non-standard studs, would have made movement by climbing rats simple and undetectable.

Over the course of the Second Pandemic, one of the most important changes in London's built environment was that it came to house many more people. As described in chapter 4, London's population increased from about 50,000 in 1348 to about 141,000 in 1600 and then to as many as 459,000 people in 1665. With such an enormous and rapid population increase, housing the population posed a considerable problem. While much of this population increase occurred in the suburbs where house regulations were less stringent, available open space within the city was built upon and existing houses were subdivided into crowded tenements, some of which forced dozens of people to share one cesspit.³¹

Many larger, wealthier households were equipped with rudimentary plumbing, or piping, that connected necessary rooms, or latrines, to cesspits. These pipes or tubes were usually made of wood rather than stone, but in either case their passage through house walls would have provided space for rats to move through, and space into which dead rats could have disappeared. Changes in building construction in London could hardly have affected the number of rats living in human habitations and even twenty-first century urban environments all over the world are rife with rats. In Egypt during an epidemic of the Modern Pandemic, bodies of many dead rats were found on the floor of

³⁰ Ibid.,15-18.

³¹Sabine, "Latrines and Cesspools of Medieval London," 306.

a house of infected people, and even more bodies were found within the structure of it when the house was partially demolished.

Twigg argues that evidence of this sort, as well as that from newly constructed Egyptian houses that became dangerously infected with rats and plague, indicate that changes in construction could have had no impact on the distribution or severity of plague.³² The small plague outbreaks in early twentieth century Britain, however, demonstrate that although plague-infected rats were distributed across a large region, only a few humans became infected.³³ It is possible that while better construction cannot control rats, better construction, especially solid walls, may separate rats from humans just enough to make the transmission of plague from rats to humans much less likely. Even though contemporary cities are rife with rats, humans are rarely exposed to plague even where plague is present because rat control and current construction methods, tend to keep humans and rats separated.

As London grew, its emphasis on markets increased, and its main streets were widened. In addition, to facilitate the movement of wagons and riders, regulations that controlled the height and extent of jetty overhangs were strengthened and enforced. Suburban areas, aside from the main roads into town, did not share London's emphasis on providing open space for traffic and markets, although merchants used the space just outside the gates as informal markets in order to avoid paying London's entrance fees on merchandise. Contemporary experience suggests that rats are likely to congregate

³² Twigg, *Black Death*, 106, 108-109.

³³ *Ibid.*, 147-170.

around granaries and to travel with food shipments, so these markets outside the gates could have played a role in the spread of plague. However, within the walls, London epidemics do not seem to have centered around ports where food stuffs arrived, or around markets. Cornhill (74, 90) parishes suffered extensively in 1563 and 1593, and again in 1625; however, by 1625 other parishes were hit substantially harder than these in the heart of central London.³⁴ In 1665 Samuel Pepys noted that St Michael Cornhill was one of the least devastated parishes. It is possible that widening streets to accommodate market traffic and to allow for market development made market spaces less appealing to rats and kept the rats of individual housing blocks more isolated one from another.

Religion

In the initial wave of the Second Pandemic, pestilence was seen almost universally as a sign of God's displeasure. English chroniclers noted that plague seemed to bring out the worst in people, and the *Historia Roffensis* notes that "those who once had to work now have time for idleness, thieving and other outrages."³⁵ John of Reading notes that although many people died and left all of their worldly goods behind, "all these worldly goods were not enough for those few who remained alive." He also wrote that this new found wealth "wounded the regular clergy very much, but wounded the

³⁴ Shrewsbury, *History of Bubonic Plague*, 193, 223, 227, 268, 317.

³⁵ *Historia Roffensis* quoted in Horrox, ed., *The Black Death*, 70.

mendicants fatally.”³⁶ So even the redistribution and temporary affluence produced by the high death tolls were seen by some as a misfortune.

Plague was described as a punishment meted out on society as a whole, not against individuals, however, and so people publicly and communally attempted to appease God and thus to stop the disease.³⁷ In the early years of the pandemic, religion had played a very active role in the battle to combat plague. On the continent, there were many public religious events, both sanctioned and unsanctioned, such as wild gatherings of flagellants. When plague first arrived in England, the response seems to have been less disorderly, but nonetheless public religious observance was seen as a primary defense against the disease. In the first years of the pandemic, bishops organized processions and large scale masses to be said in an attempt to defend the country against the onslaught of plague. By the seventeenth century, this mind set had changed. Although God’s favor continued to be seen as necessary for health, by the seventeenth century public religious activity was a less significant aspect of society’s battle against the plague than it had been in the early years of the pandemic. During the last century of plague in London, efforts at improving urban sanitation, involving individuals and government working together, had taken on a significantly larger role in combating plague, and public religious expression had become less important.

During the course of the 300 years of plague epidemics in England and London, it is clear that the role of religion and religious activity changed in respect to plague, but

³⁶ John Reading quoted in *Ibid.*, 75.

³⁷ Slack, *Impact of Plague*, 26; Benedictow, *Black Death 1346-1353*, 130.

this does not mean that plague ceased to be seen as a mark of God's disfavor. For example, in 1625 Thomas Dekker (c.1570-1652) wrote that "God will not haue his Strokes hidden: his markes must be seen."³⁸ In other words, it was useless to attempt to dissemble by hiding the true nature of deaths caused by plague, because God's message could not be hidden.³⁹ A generation earlier, Kellwaye included the following statement in the dedication to his patron:

Wherein God hath alreadie drawne his sword against us, and striken some fewe, and except we cause him by our speedie repentance to sheath it, he (no doubt) hath determined to strike us at the quicke, how fearfully the wrath of God consumes, if his indignation be once kindled.⁴⁰

Further, in the introduction to his work, Kellwaye emphatically noted that pestilence "is a just punishment of God layde upon us, for our manyfold sinnes and transgressions against his divine Majestie."⁴¹ In Chapter 4, "Sheweth how to prevent the plague," Kellwaye's first suggestion is to acknowledge one's sins and wickedness to God.⁴²

Despite Dekker's fervor, the reliance on public worship as a means of combating plague had dwindled. In 1625 the House of Commons Journal records a substantial battle among its members concerning establishing a day of fasting as a public religious observance. On June 21, 1625, the House ordered a day of fasting for House members before they took communion as a religious act in response to the

³⁸ Dekker, "A Rod for Run-Awayes. God's Tokens," 151.

³⁹ Munkhoff, "Searchers of the Dead," 8.

⁴⁰ Kellwaye, *A Defensative against the Plague*, A3r.

⁴¹ *Ibid.*, 2v.

⁴² *Ibid.*, 3v.

plague epidemic and three other issues of public concern. One of the arguments posed by opponents of the decree for a public fast was that it should not be broached until the House members' own fast had been accomplished and this point of view won out. The House of Commons ordered a day of fasting only after they had performed their own.⁴³ A majority of the members of the House of Commons felt that they should put their own house in order before urging the country to prayer. In addition, this reticence suggests that they did not think public fasting was likely to produce a direct response from God. Thus in July, churchwardens were finally told to "exhort their parishioners to observe the public fast ... privately in their own homes."⁴⁴ The request that the fast be observed privately at home, rather than publicly in Church, avoids the issue of what churches are appropriate for religious service performed as a civic duty, and it also alleviates concerns any of the house members may have had about contagion during services. After July 20, these fasts were held on successive Wednesdays.⁴⁵ The first of these weekly fasts was celebrated with a public service at Westminster for the King and Lords, which served as a collection point for mandatory donations for the assistance of people devastated by plague. Thus, the fasts took on the characteristics of a social effort

⁴³ *House of Commons Journal* (British History Online, History of Parliament Trust, 1802 [cited 2006]); available from <http://www.british-history.ac.uk/source.asp?pubid=14> June, 21 1625
<http://www.british-history.ac.uk/report.asp?compid=8422&strquery=plague>

⁴⁴ Shrewsbury, *History of Bubonic Plague*, 323. Shrewsbury further notes, however, that the Tuscan Resident said that people spent the day in church praying and singing psalms.

⁴⁵ *Ibid.*, 323.

to help people, rather than a religious observance to exhort help from God. In 1665, special religious observances were again decreed but the public observation was relegated to a monthly fast with prayers.⁴⁶

Although special services to appease God and eliminate plague became less significant, church worship and church services were central to both public and private life in early modern London. Even though church services were not restricted during plague outbreaks, attending worship was not seen as an entirely risk free endeavor.⁴⁷ In 1592, rules stated that nobody who had died of plague was allowed to remain in “any church in the tyme of Comon Prayor, Sermon or Lecture.”⁴⁸ Nonetheless, because church services, held in parish churches, were regarded as local experiences rather than public gatherings, they perhaps were not seen as public and dangerous in the same way that entertainment events were. London churches were primarily local institutions as exemplified by the fact that the parish served as the smallest political division and the distributor of public welfare assistance.

English regulations not only restricted the role of public religious observance, they also limited the possibility of individual charitable, or Christian, visits to the sick.

⁴⁶ Shrewsbury, *History of Bubonic Plague* , 324.

⁴⁷ Ibid., 323. Suggestions that people in plague infected parishes should meet their public fasting duties, privately at home demonstrates Church services were not viewed as entirely safe; D.M Palliser, "Urban Society," in *Fifteenth-Century Attitudes: Perceptions of Society in Late Medieval England*, ed. Rosemary Horrox (Cambridge: Cambridge University Press, 1994), 142.

⁴⁸ Journal of the Proceedings of the Court of Common Council, Sept. 7, 1592 quoted in Barrett, ed., *Present Remedies against the Plague Etc.*, xi-xii.

After 1578, the English government began legislating the separation of people with plague or those who had been exposed to plague from those who were free of the disease. Only authorized people, who tended to be impoverished members of the working class, were allowed into the houses of the sick; thus, the care of the sick became a public rather than a personal religious duty. The Plague Orders of 1578, which were repeatedly reissued, make the shift from private to public care explicit. The regulations spell out the taxes that are to be collected and what sort of people are to be hired to guard the sick, to help the poor and to investigate reports of sick people:

If there be any person, Ecclesiastical or laye, that shall holde and publishe any opinions (as in some places report is made) that it is a wayne thing to forbear to resort to the infected, or that it is not charitable to forbid the same pretending that no person shall dye but at their tyme prefixed, such persons shalbe not onely reprehended, but by order of the Bishop, if they be ecclesiastical, shalbe forbidden to preache, and being laye, shalbe also enjoyned to forbear to utter such dangerous opinions upon payne of imprisonment, which shall be executed if they shall persever in that error. And yet it shall appeare manifestly by these orders, that according to Christian charitie no persons of the meanest Degree shalbe left without succor and reliefe.⁴⁹

That the concept that Christian charity could be best achieved by limiting the freedoms of plague victims remained an integral aspect of the plague orders, although as described in Simon Kellwaye's 1593 treatise *A Defensative against the Plague*, this concept does not seem to meet with his approval. This is one point on which Kellwaye's suggestions vary slightly from officially sanctioned behavior. Chapter 12 of Kellwaye's first treatise addresses what people should do to protect themselves when

⁴⁹ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, np.

they visit the ill, which indicates that he does not believe that plague victims should be totally cut off from all visitors.⁵⁰ Although the visits that Kellwaye describes are medical in nature, they do not appear to fit within the limitations of a visit by searchers or a public surgeon, which the plague regulations prescribe. The care-giving Kellwaye describes requires a virtually 24 hour-a-day commitment. Although some of Kellwaye's medical advice seems useless, and some is potentially dangerous, for example, his insistence on emetics, the continual care that he recommends might have increased the likelihood that patients would survive plague. The relatively good palliative care given to Europeans in outbreaks of plague in India during the Modern Pandemic explains their relatively lower mortality levels.⁵¹ Kellwaye also suggests, as do the plague orders, that people who have been exposed to plague by assisting victims should carry some marker when they walk in the streets so that they can be avoided.

Thus, while religious observances remained central to society in the seventeenth century, public religious observance was no longer seen as an effective means of combating the public menace of plague, even though the disease was still seen as a manifestation of God's displeasure. The locus of plague response passed from the realm of religion to the realm of civil authorities, although the ultimate cause of the scourge was still seen to be in God's control.

⁵⁰ Kellwaye, *A Defensative against the Plague*, 14r- 15v.

⁵¹ Benedictow, *Black Death 1346-1353*, 351.

Public Gatherings

Church services, unlike most other gatherings, were not sharply curtailed during plague outbreaks. Plague orders placed a priority on controlling rowdy gatherings, especially events targeted to the lower classes and activities where people from diverse social milieus might mingle. Pepys mentions being surprised at the social diversity he saw at these public events.⁵² By the late sixteenth century, most normal public gatherings including guild meetings, theater events, and entertainments, as well as Parliament meetings, were canceled or forced to move outside city limits during plague epidemics. The plague orders of 1636 forbid all public feasting “particularly by the Companies of this city” as well as any feasting in any other establishments for public dining. The orders even go so far as to suggest that money saved by this restraint could be “employed for the benefit and relief of the poor visited with infection.”⁵³ Orders specifically prohibited all “Playes, Bearbaitings, Games, Singing of Ballads, Buckler-play or such like” that attract crowds of people.⁵⁴ Pepys’ characterized the audience of cock fights at Shoe Lane, as a “strange variety of people from Parliament man ... to the

⁵² Robert Latham and William Matthews, eds., *The Diary of Samuel Pepys*, vol. 1663 (Berkeley: University of California Press, 1970), 427-8.

⁵³ City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, np.

⁵⁴ City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen*, np; Journal of the Proceedings of the Court of Common Council in Barrett, ed., *Present Remedies against the Plague Etc.*, xii, demonstrate that even the earlier London regulations prohibited profane gatherings during plague times.

poorest prentices, bakers, brewers, butchers, draymen and what not.”⁵⁵ Thus, his description of these audiences as composed of a broad cross section of society may suggest why these events would have been seen as more public and therefore more dangerous than attendance at a local parish church.

Funeral processions, as well as any gathering at the houses of the deceased, were forbidden. For example,

that the buriall of the dead by this visitation bee at most convenient houres, allwayes eyther before Sun-rising, or Sunne-setting, with the privity of the Churchwardens or Constables, and not otherwise and that no neighbours nor Friends be suffered to accompany the Coarse to Church ore enter the house visited.⁵⁶

The orders additionally prohibited a corpse of a person who died of plague to be in a church during “Common-Prayer, Sermon or Lecture.”⁵⁷ So, although the orders do not restrict religious gatherings, they did attempt to reduce the risk of church services by eliminating the possibility that a plague-infected body would be present during the services. While many of the orders require that the authorities, aldermen, and other officials within London meet to arrange for enforcement of the orders, most of them stipulated that these meetings should be convened in areas free of plague. Moreover, the orders also stipulated that only officials living in areas free of plague should attend these meetings. The regulations controlling public gatherings clearly suggest that plague

⁵⁵ Latham and Matthews, eds., *Diary of Samuel Pepys*, 427-8.

⁵⁶ City of London (England) Court of Common Council, *Orders Heertofore Conceived and Agreed to Bee Published by the Lord Mayor and Aldermen*, np.

⁵⁷ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

was seen to spread in some manner from person to person, but they also suggest that disorderly gatherings where strangers met were seen as more dangerous than local gatherings.

Sanitation, Garbage and Cleanliness

Virtually from the first plague epidemics, one of the consistent responses was to order a clean up of the urban environment. Edicts and orders to clean up the City, to removal filth, human waste, and garbage, were issued to combat each of the plague epidemics. These efforts to clean up filth, especially urban filth, seem to have been driven by the general understanding that odors were integrally related to the spread of disease. Thus, anything that reduced odors could be defined as cleaning. Further, people used sweet smelling herbs not merely to avoid experiencing bad smells, but also to block the absorption of foul odors. However, it was not only bad smells but also rot and putrefaction that were linked with disease.⁵⁸ Nevertheless the orders had to be reissued with each plague outbreak, which suggests that in the interim between plague outbreaks, cleanliness regulations were not uniformly followed or enforced. Nonetheless, over the centuries, a demand for improved urban sanitation and the removal of foul smelling substances remained a consistent response to plague epidemics.

⁵⁸ Arrizabalaga, "Facing the Black Death," 255; Kellwaye, *A Defensive against the Plague*, 2v.

In 1349, King Edward III complained to London authorities about the “human feces and other obnoxious filth laying about in the streets and lanes.”⁵⁹ While it is possible that the King’s complaint was part of an ongoing struggle between the crown and city officials about the control of London, or that it provides evidence that basic city services had been disrupted during the chaos of the plague epidemic, it is likely that this complaint indicates that during pestilential times noxious odors were perceived as more dangerous and threatening than in ordinary times. In 1361, during the second plague epidemic, Edward III sent out a writ that demonstrates that by the second major plague outbreak, the King’s concern with the sanitation of London had expanded beyond a concern for human wastes:

Because by the killing of great beasts, from whose putrid blood running down the streets and the bowels cast in the Thames, the air in the city is very much corrupted and infected, hence abominable and most filthy stench proceeds, sickness and many other evils have happened to such as have abode in the said city, or have resorted to it: great dangers are feared to fall out for the time to come, unless remedy be presently made against it. We, willing to prevent such dangers, ordain by consent of the present Parliament that all bulls, oxen, hogs and other gross creatures be killed at either Stratford or Knightsbridge.⁶⁰

Despite the King’s pronouncement, the dumping of both household and commercial wastes, such as those from slaughtering animals and tanning hides, continued to be a problem within London for centuries. Kellwaye also mentions another dangerous, but

⁵⁹ Sabine, "Latrines and Cesspools of Medieval London," 320-321.

⁶⁰ Writ by Edward III quoted in Benedictow, *Black Death 1346-1353*, 4.

usually overlooked waste product: blood. He states “that no Chirurgions, or barbers, which use to let blood, doe cast the same into stréetes or ryvers.”⁶¹

Before 1383 it was not legal to place a latrine so that it dumped into a moat or stream flowing through London, but complaints prior to this date suggest that it had been a common practice. The 1383 legalization of latrines over waterways was accompanied by an annual fee assessed on all who maintained such privies, a fee which was to be used to keep the stream free of debris and blockages, so as to ensure that the human wastes were carried down to the Thames. In addition, the regulations forbade householders to dump other household rubbish into the streams.⁶² Despite these regulations, there were sporadic complaints that debris and human wastes produced blockages so much that the waterways began to stink. These problems occurred not only in the Fleet, but also in the Walbrook and in the moat or ditch abutting the exterior of the London wall. Complaints filed in Assize de Nuissaince and through other venues suggest that fighting filth in London was an ongoing battle.⁶³ In 1462, London prohibited latrines over the Walbrook and the Fleet and ordered that land holders along the Walbrook cover it over to ensure that it could no longer be used for sewage. In 1477, the city extended rules against latrines emptying into the Walbrook to include

⁶¹ Kellwaye, *A Defensative against the Plague*, 14v.

⁶² Sabine, "Latrines and Cesspools of Medieval London," 309-310.

⁶³ Ibid.314. The changing rules about latrines that dumped into city water ways also suggests there was an ongoing battle over sanitation; Sabine, "Butchering in Medieval London," 340, 342, 346-47.

other urban ditches and moats. Nonetheless, the practice of emptying latrines into river ways appears to have continued.⁶⁴

The 1578 plague orders and most subsequent orders issued in response to plague outbreaks placed considerable emphasis on keeping streets clean. The London orders enumerate several cleaning requirements for London citizens. Every householder with a pump or a well was required to pour ten buckets of water down the gutters in the street before six in the morning, and another ten buckets of water down the gutter after eight in the evening. These Orders further enjoin people from pouring water into the gutter in a way that washed material from the gutter into the street. In addition, householders were also required to sweep the mud and filth of the street out of the gutters when they were rinsed out, so that debris did not pile up and block the canals. In the final step of the street cleaning process, scavengers and rakers were required to clean the streets of large debris and piles of garbage every day except Sunday.⁶⁵ Regulations, issued by the Court of Common Council, also required that street pavements should be kept free of “hooles ... wherein any water or filth may stand to encrease corruption or Infeccion.”⁶⁶ While the London orders were very similar to the Royal orders, the Royal orders did not

⁶⁴ Schofield, *Medieval London Houses*, 87. Schofield says that Teswell’s survey conducted in 1612 shows privies right over the fleet.

⁶⁵ Journal of the Proceedings of the Court of Common Council, Sept. 7, 1592 quoted in Barrett, ed., *Present Remedies against the Plague Etc.*, x; City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np, includes a very similar statement about the dangers of holes in the pavement.

⁶⁶ Journal of the Proceedings of the Court of Common Council, Sept. 7, 1592 quoted in Barrett, ed., *Present Remedies against the Plague Etc.*, xii.

address urban issues such as street paving. The proceedings also forbid the accumulation of dunghills outside “of stables, brewhouses or other places.”⁶⁷ Dung piles were forbidden both in streets and in other open spaces, not only in London but in the surrounding suburbs as well, upon pain of imprisonment.

Plague orders issued by London in 1608 emphasized the need for cleanliness during times of plague. They required householders to sweep the street in front of their doors daily, and rakers to remove the resulting debris daily. The orders further stipulated that “the Raker shall give notice of his coming by the blowing of a Horn as heretofore hath been done.”⁶⁸ An additional measure of cleanliness that this order required was that laystalls be removed as far as possible from the city and away from common passages. It also specified that “Nightmen” should not empty a “vault into any Garden near about the City.”⁶⁹ Presumably, although only night workers were singled out under this provision, dumping human waste at any time was not acceptable.

Plague orders also proscribe the selling of unwholesome fish, flesh, musty grain and rotten fruits of any sort. Brewers and tippling-houses were singled out for special attention as the orders specified that their casks should be checked to assure that they are not musty or unwholesome. Additionally, the rules stipulated that tippling houses that allowed disorderly drinking would be “severely looked” into. The regulations also

⁶⁷ Journal of the Proceedings of the Court of Common Council, Sept. 7, 1592 quoted in *Ibid.*, ed., xii.

⁶⁸ City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, B3r.

⁶⁹ *Ibid.*, B3r.

forbid any “Company or person to be suffered to remain or come into any Tavern, Alehouse or Coffee-house to drink after nine of the clock in the Evening.”⁷⁰

Presumably, selling rotten or unwholesome foods and drinks was generally frowned upon, but rules concerning this sort of abuse appear to have been more stringently enforced during plague epidemics.

It was not only the political entities issuing plague orders that indicated that cleanliness was considered an important aspect of combating plague. *Present Remedies against the plague*, published in 1594 and “written by a learned Physition for the health of his country” expresses a similar concern.⁷¹ The author begins with a brief message “To the Reader” that notes that the “infection of the ordinary disease called the Plague or Pestilence” is again on the rise so he has decided to publish advice for dealing with the problem.⁷² His recommendations begin with his advice on cleanliness.

Right necessary and convenient it were, that you keep your houses, streets, yardes, backesides, sinks, and kennels sweet and clean from all dangling puddles, dunghills, and corrupt maynures which ingender stinking sandurs that may be noysome or breed infection.⁷³

⁷⁰ Ibid., np.

⁷¹ *Present Remedies against the plague* in Barrett, ed., *Present Remedies against the Plague Etc.* Barrett includes a facsimile reprint of the 1603 version. It includes the original pagination but none for the full volume. Barrett states that he chose to print a facsimile of the 1603 version that is virtually identical to the extant 1594 version, rather than the earlier one, because that one “is quite unfit for reproduction under the process adopted in this series” (p xvii-xviii).

⁷² *Present Remedies against the plague* in Ibid., A3r.

⁷³ *Present Remedies against the plague* in Ibid., A3v.

Kellwaye also includes cleanliness as an essential aspect of ‘order,’ which he sees as an important aspect of limiting plague outbreaks. The first two of Kellwaye’s “three principall meanes” of preventing plague are first to pray and admit one’s sins, and second to flee plague infected areas.⁷⁴ His third means for avoiding plague consists of three points: “Order, Diet and Physicall helpes.” Under the rubric of ‘Order,’ Kellwaye addresses the importance of cleanliness; however, for Kellwaye, clean seems to have been virtually synonymous with smelling sweet as he refers to keeping the house “cleane and sweete.” In this short section of his treatise, Kellwaye recommends “not suffering any foule t [and] filthy clothes or stincking thinges to remaine in, nor about” your room, and opening the north-facing and east-facing windows in the daytime “if the aire be cleare and that no infected and unsavory” smells are near the window.⁷⁵

London was not the only town concerned with urban cleaning. In Haverfordwest during the epidemic of 1652, public buildings were lime washed in an attempt to disinfect them. This cleaning occurred despite difficulties the town administration was facing to ensure that all the impoverished sick inhabitants were fed. Haverfordwest was experiencing economic hardship because of previous over taxation and because many of the wealthier tax payers had left town due to plague.⁷⁶

⁷⁴ Kellwaye, *A Defensative against the Plague*, 3v.

⁷⁵ *Ibid.*,, 3r.

⁷⁶ John Howells, "Haverfordwest and the Plague, 1652," *The Welsh History Review* 12, no. 3 (1985): 416-7.

Because the idea of cleanliness was inseparable from that of smelling sweet, the process of cleaning a house, especially in the case of cleaning to eliminate plague, frequently included making a fire and burning sweet smelling herbs. Indeed, it is often difficult to tell the extent to which burning sweet smelling herbs was not the primary aspect to cleaning. Since disease was associated with vapors, smog, damp, and even sweat, it may have been that burning a fire, drying the rooms out, and fumigating them with smoke from sweet smelling herbs was considered the most important aspect of cleaning to prevent plague. Nonetheless, the many regulations and complaints about abuses suggests that at least during plague epidemics people made an effort to improve sanitation to combat plague.

Cloth, Clothing, Fibers

From the earliest plague outbreaks, the re-use and distribution of clothing and fibers that had been used by people infected with plague were understood to have been inextricably connected to the spread of plague. Boccaccio noted that people were infected with the disease by many means, including airing clothes for the ill or simply touching the clothes of an ill person. He noted that many people said that the clothes and other possessions of those who died of the contagious pestilence could bring death not only to other people but to animals, including dogs and cats. He also wrote of seeing two pigs die after rooting around the ragged linen and woollen clothes of a plague victim.⁷⁷ Nevertheless, despite the fear of contagion associated with used clothing and

⁷⁷ Boccaccio, *The Decameron*, 19-20.

bedding, because fabric was relatively expensive, it was extensively reused. Plague orders stipulated that items of little value should be burned and that bedding and clothes from plague victims had to be cleaned and well aired before it could be sold. Further, fabrics, bedding, clothing and cushions often formed an important segment of property bequeathed in wills.⁷⁸

London plague orders of 1625 begin by specifying that while a house is under quarantine “no Clothes, linnen or other likething be hanged out or ouer into the streete,” and conclude by describing how houses should be aired after the quarantine is over.⁷⁹ “No clothes or other things about the infected be given or sold, but either destroyed or well and sufficiently purified. On paine of punishment.”⁸⁰ Although Kellwaye’s treatise devotes only a few words to material items that are not medicinal, he mentions that coming into contact with a person who has recently had plague is a common way of contracting the disease but that “for the most part it doth come by receaving into our custody some clothes or such like things that have been used about some infected

⁷⁸ Fredrick J. Furnivall, *50 Earliest English Wills in the Court of Probate London 1387-1439 with Priest of 1454*, vol. 78, *Original Series* (London: Oxford University Press, 1964) Examples of wills include: 4-10, Lady Alice West’s substantial list of bequests begins with bequests of beds and bedding; 93-4, John Barnet bequeathed a few shillings and pence to a couple of churches, his blood red gown to be sold for his soul and gowns to his poor tenants; 91, Isabel Gregory bequeathed her bedding and mattress to different people and also gave people cloth, coats and gowns.

⁷⁹ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

⁸⁰ *Ibid.*, np; Journal of the Proceedings of the Court of Common Council, Sept. 7 1592, quoted in Barrett, ed., *Present Remedies against the Plague Etc.*, ix, xiii includes virtually the same statements.

body.”⁸¹ As previously mentioned, Kellwaye considered removing stinking clothes as a preventative measure against plague.⁸²

The London plague orders issued in 1665, although substantially reworked, begin by referring back to the orders issued “in the first year of the Reign of our late Sovereign King James of happy memory.”⁸³ They include several regulations that demonstrate concern about the dangers posed by fabrics. Under the heading “Airing the Stuff,” these orders require the

sequestration of the goods and stuff of the infected, their Bedding and Apparel, and Hangings of Chambers must be well aired with fire, and such perfumes as are requisite within the infected House, before they be taken again to use: this to be done by the appointment of the Examiner.⁸⁴

These Orders further placed restrictions on vendors of used materials. Under the heading “No infected Stuff to be uttered,” the orders required that “no Brokers of Bedding or old Apparel be permitted to make any outward Shew, or hang forth on their Stalls Shopboards or Windows toward any Street, Lane, Common-way or Passage any old Bedding or Apparel to be sold.”⁸⁵ Further, the regulations stipulated that vendors who removed “any Bedding, Apparel or other Stuff out of any Infected house, within two Months after the infection hath been there shall have their own houses shut up for

⁸¹ Kellwaye, *A Defensative against the Plague*, 2v.

⁸² *Ibid.*, 3r.

⁸³ City of London (England) Court of Aldermen, *Orders Conceived and Published by the Lord Major*, A2r.

⁸⁴ *Ibid.*, B.v.

⁸⁵ *Ibid.*, B2v.

20 days.”⁸⁶ These requirements, coupled with the stories recounted by various observers, strongly suggest that fabrics were considered of special concern.

Royal plague orders issued in 1578, 1592, 1593, 1603, 1608, 1625 and 1629, are virtually identical aside from the introductory materials, which include references to current events. These orders were printed in conjunction with medical advice from “the best learned physicke in the realm.”⁸⁷ Printing the laws pertaining to behavior during plague epidemics along with medical advice suggests that these pamphlets, including the laws, were intended to be of actual benefit to individuals as well as to the overall society. Although the advice from the physicians does focus on medical preventatives and treatments, it also includes brief warnings about issues of sanitation. It opens with information on perfuming houses, which is followed by instructions, under the header “Perfuming of Apparel,” for sanitizing clothes.⁸⁸ The physician recommends that frequently worn clothes should be kept clean and scented, and that as soon as possible after exposure to plague, clothing should be aired. In the final section of the medical advice, under the heading “Infected Clothes,” the learned physician states that contagion is suspected to remain in both woolen and linen, and that the best means of disinfecting clothing is “fire and water.”⁸⁹ The author further recommends that clothing

⁸⁶ Ibid., B2v.

⁸⁷ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np.

⁸⁸ Ibid., Ci.v.

⁸⁹ Ibid., np.

be washed often and aired in the sunshine, whether under cold or warm conditions, and that clothing of little value should be burnt in an effort to control the spread of plague. This advice or its equivalent was repeatedly reiterated over the duration of the pandemic. Over time, more people must have read or heard this advice, and as material wealth increased more people could afford to heed it.

Pepys recounts a story about a man in a house under quarantine who attempted to save the life of his last little child from certain death that he felt would have been its end had it remained locked in their home. In this story, the man passes his naked child through a window into the arms of a waiting friend. The story not only illustrates people's concerns about the dangers of closing people up in infected houses, it also illustrates the special concerns that were attached to cloth and fiber.⁹⁰ It indicates that the baby's clothing was considered to present a greater danger of transmitting plague than did the baby.

During outbreaks of the Modern Pandemic, inspections have been conducted on people and their clothing to see whether fleas were carried along with people or their clothing. The results of these inspections suggest that fleas are not commonly transported in clothing.⁹¹ However, before concluding that it was unlikely that clothing and fabrics transported fleas, and thus plague infections in the past, it is important to consider the condition of fabrics of the past. Cloth was an expensive commodity and was extensively reused. Clothes were not frequently washed, despite the

⁹⁰ Latham and Matthews, eds., *Diary of Samuel Pepys*, 212.

⁹¹ Twigg, *Black Death*, 129.

recommendations of medical authorities, and were worn hard for many years. As fabric, clothing, and household items deteriorated with use, rather than being thrown away, they were simply relegated into the service of a person of lower status.⁹² Under these circumstances, clothing could reasonably be considered a reservoir of an unknown contagious substance. It is also interesting that during a small outbreak in Glasgow between 1900 and 1910, rag collectors were among the few victims.⁹³

Dog Catching

Amongst the behaviors and activities adopted over the course of plague epidemics in early modern England that may have influenced the outcomes of epidemics is the wide-scale destruction of numerous vermin within various cities. Although plague orders recommend the destruction of a number of potentially dangerous animals, the primary animals singled out for destruction were loose and annoying dogs.

In 1563, the orders from the Lord Mayor of London “commanded that no dog be allowed out of any house without a lead on pain of a 3s 4d fine for the owner and death

⁹² Furnivall, *50 Earliest English Wills*, 4-6. Lady Alice West has a long will with many bequests, which begins, after bequeathing her soul to God, with bequests of her best bedding to her son, more bedding to his wife along with other items. Then further into the will she bequeathed Beatrice Wareyn xl Marc a bed suitable for a gentle woman and to Alison Hytoñ a bed suitable for her estate. 41-2, John Rogerysson bequeathed his bedberre to Anneys Tukkyss and his next best to Richard Gery. He also gave a number of other people individual towels and gowns. John Solas bequeathed a new gown to Evenwode while others were bequeathed used gowns.

⁹³ Twigg, *Black Death*, 148.

for the dog.”⁹⁴ The orders in 1592 were even more stringent; the mayor gave the “common huntsman ... special charge to kill every dogg or Bitch, as shall be found loose in any street or lane” or howling or otherwise annoying the neighbors, and these orders include the penalty that any huntsman who is negligent or shows favors and spares dogs will lose “his place and service, and suffer Imprisonment.”⁹⁵ The 1603 plague outbreak similarly produced the slaughtering of many dogs, and in 1636 “Orders for Health” said:

no Hogs, Dogs, or cats or tame pigeons or Conies be suffered to be kept within any part of the City, or any Swine to be, or stray within the Streets or Lanes, but that such Swine be Impounded by the Beadle or any other Officer of the Common Councell, and that the Dogs be killed by the Dog-killers appointed for that purpose.⁹⁶

Orders demanding the killing of dogs were not limited to the city of London. Similar regulations were also occasionally ordered in cities on the continent as well as in parishes surrounding London, including St. Margaret’s in Westminster and St. Martin-in-the-fields. During the epidemic of 1592-1593, St. Martin-in-the-Fields hired a dog catcher to kill the dogs of their parish. During the 1603 plague, the killing of 502 dogs was paid for in St. Margaret Westminster, and in 1625 this parish paid £2 17s 8d

⁹⁴ Jenner, "The Great Dog Massacre," 48.

⁹⁵ Repertory of the Court of Aldermen quoted in *Ibid.*, 48.

⁹⁶ Royal College of Physicians of London, *Certain Necessary Directions*, np

to kill 466 dogs.⁹⁷ Laws that required the death of loose dogs were common in many cities in England, and were also issued in Scotland.⁹⁸

Dogs were slaughtered in years with only minimal plague outbreaks, but the numbers killed were much higher in years of heavy plague mortalities. According to London Chamber accounts for the years from 1584 to 1586, payment was made for the killing of 1,882 dogs, which contrasts dramatically with the number of dogs killed during the summer plague outbreak in 1636 when payment was made for the death of 3,720 dogs. Over the course of the final Great Plague of London, at least 4,380 animals were killed.⁹⁹ It is clear that dogs were seen as dangerous, at least in part because they were disruptive. Regulations specify that both loose dogs and those “within there own doores, making howling or other annoyauce to their neyghbours” were subject to elimination.¹⁰⁰ The author of *Present Remedies* also warns that because dogs “runne

⁹⁷ Jenner, "The Great Dog Massacre," 49; Shrewsbury, *History of Bubonic Plague*, 169.

⁹⁸ Jenner, "The Great Dog Massacre," 49; Cipolla, *Faith, Reason, and the Plague*, 11-12. Cipolla mentions similar laws in Italy.

⁹⁹ Jenner, "The Great Dog Massacre," 48-9; Bell, *Great Plague in London*, 102. The figure of 4,380 that Bell proposes as the number of dogs killed is based on a payment of 2d per dog. Jenner suspects that during the course of the epidemic the price paid per dog might have varied. If this figure is simply based on the money paid, it would seem possible that the payment could also have included payment for the death of other vermin. Jenner's idea that the price paid per animal killed varied is supported by evidence Shrewsbury presents from St. Margaret Westminster. Shrewsbury, *History of Bubonic Plague*, 194, 269, 334. Shrewsbury reports 1d paid per body in 1560 and 1603, and 1½d per body in 1625.

¹⁰⁰ Journal of the Proceedings of the Court of Common Council, Sept. 7, 1592 quoted in Barrett, ed., *Present Remedies against the Plague Etc.*, p xi.

from place to place, and from one house to another,” and get into unclean things in the street, they can bring infection into the house.¹⁰¹ This would seem to indicate both a fear of contagion as well as a fear of dogs’ disruptive behavior. The orders also require the elimination of animals other than dogs within city limits; however, the payment records do not always specify for what animal deaths a dog catcher was being paid. Kellwaye warns that plague can be brought by “dogs, cats, pigs, and weasells which are prone and apt to receive and carrie the infection from place to place.”¹⁰²

Pepys’ Diary entry for August 21, 1665 expresses concern about walking late at night past the isolated Coome farm because he is afraid of dogs, rogues, and plague which have infested the farm. He then notes that it is odd that such an isolated farm was infested with plague, but attributes the contagion to the fact the landholders allowed beggars to sleep in the barn.¹⁰³ Although he does not explicitly connect those fears, mentioning them all in one sentence implies a connection. The entry for August 12, which makes the apparently baseless claim that the Lord Mayor has ordered people inside by nine at night so that “the sick may have liberty to go abroad for ayre,” suggests that Pepys saw a connection between night, disorder and disease.¹⁰⁴ Indeed, traditionally, some noisome and onerous tasks had been relegated to the night hours.

¹⁰¹ Present Remedies against the Plague in *Ibid.*, A3v.

¹⁰² Kellwaye, *A Defensative against the Plague*, 2v.

¹⁰³ Latham and Matthews, eds., *Diary of Samuel Pepys*, 200.

¹⁰⁴ *Ibid.*, 189.

It is difficult to determine exactly what the effect that killing urban vermin might have had on the spread of plague and the distribution of epidemics because the effect that might be expected depends on a number of factors. In order to predict the effect of these attempts to rid London of vermin, it is important to know not only the number of animals killed but also what kinds of animals were being killed, and when. If only dogs were killed, it seems likely that the rat population would have exploded, especially if they were being killed between periods of epidemic plague. Dogs not only hunted rats but also competed with them for urban garbage. Mark Jenner provides evidence that dogs were being killed even during periods of relatively low plague mortality.¹⁰⁵ If the rat population were kept relatively low, killing vermin probably reduced the frequency of epidemics. On the other hand, killing rats primarily during the course of an epidemic might have intensified the human plague experience by driving *Y. pestis* infected fleas to people.¹⁰⁶ Additionally, occasionally individual rat catchers probably would have been infected by coming into direct contact with infected rats and their fleas.

The killing of even very large numbers of rats, on a regular basis, would probably have only a limited affect on the severity of plague outbreaks; however, it might have had an effect on the locus of plague outbreaks. For example, if wealthier house holders controlled rats more effectively than those living in tenements, it is possible that rat control was a factor in the shift of plague loci from the center of town

¹⁰⁵ Jenner, "The Great Dog Massacre," 48-49.

¹⁰⁶ Keeling and Gilligan, "Metapopulation Dynamics of Bubonic Plague," 2229.

to the suburbs. However, without extensive and continual use of poison, it is unlikely that enough rats could be killed to significantly reduce the risk of plague epidemics. During the final century of English plague epidemics, the use of poisons did become more common and it is possible that mortality differentials between various areas in London increased in the seventeenth century because those who could afford to poison rats did.¹⁰⁷ If, on the other hand, the killing of large numbers of rats was triggered by the onset of a plague epidemic, the result could be that fleas potentially already infested by *Y. pestis* were deprived of rat hosts and thus driven to human hosts. In this scenario, it is possible that the killing of large numbers of rats could intensify human mortality levels during an individual plague epidemic. The issue of vermin control is complicated because in early modern England, the exterminators' primary focus was on killing dogs, not rats, and although cats and other vermin also were official targets, it is not possible to tell how many of each animal were killed.

In the 1665 epidemic, plague orders not only mandated that domesticated animals be controlled, they limited Londoners ability to keep domestic animals, such as pigs, pigeons and rabbits along with cats and dogs.¹⁰⁸ In a letter to his clerk, dated July

¹⁰⁷ Kari Konkola, "More Than a Coincidence? The Arrival of Arsenic and the Disappearance of Plague in Early Modern Europe," *The Journal of the History of Medicine and Allied Sciences* 47, no. 2 (1992), 194-197. Konkola notes that the price of arsenic fell dramatically, became of a much higher quality and became widely available by the 1720s.

¹⁰⁸ Porter, *The Great Plague*, 48; Corporation of London, *Orders Conceived and Published by the Lord Major and Aldermen of the City of London, Concerning the Infection of the Plague* (London: Printed by James Flesher, 1665), B3r. This set of orders specifies that hogs, dogs, cats tame pigeons and conies should not be kept within town but it only makes special provisions for dealing with swine and dogs. City

5, 1665, Sir Robert Long (*d.*1673) expressed concern about the plague's effect on both his clerk and his household. Sir Robert instructed the clerk to "take all course you can agaynst the ratts, and take care of the cats: the little ones that will not tirre out may be kept, the great ones must be kild or sent away."¹⁰⁹ Evidence suggests that dog slaughters were instigated at the beginning of plague epidemics. Although issuing orders for the control of loose dogs may have been a normal aspect of urban management, the fact that plague orders repeatedly reissue the mandate to deal with loose dogs suggests that officials associated dogs with plague. However, as Mark S. R. Jenner points out, wandering dogs, like wandering people, were primarily seen as a threat to the proper societal order and only secondarily seen as dangerous because of their potential for spreading plague.¹¹⁰ It is also worth noting that as people fled London and died of plague, it is likely that there were more loose dogs, who thus would pose a greater nuisance than they did during normal periods. In 1603, the Venetian Secretary in England, Giovanni Carlo Scaramelli, wrote in a report home that "no steps have been taken as yet, except to kill the dogs and mark the houses."¹¹¹ This statement suggests

of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np. These orders focus on controlling noisy and troublesome dogs.

¹⁰⁹ Robert Long, "The Mutilated Exchequer Records," *The Gentleman's Magazine* 1840, 606.

¹¹⁰ Jenner, "The Great Dog Massacre," 52-56.

¹¹¹ Giovanni Carlo Scaramelli quoted in *Ibid.*, 48.

that killing dogs during plague epidemic was not simply a response to an increase in wandering dogs.

Flight

From the time when plague first arrived in Europe, flight from the area of plague was a common method of attempting to avoid the pestilence. An aphorism from an early plague tract that had been borrowed from even earlier sources suggested “flee quickly, go far, and stay away a long time,” as the best method for avoiding the plague. The incredibly rapid diffusion of plague across all of Europe can only be explained by the flight of large numbers of people accompanied by rats and/or fleas. Throughout the duration of plague’s residence in England, flight remained a preferred method of evading plague.

Kellwaye’s second means for avoiding contagion by pestilence, after prayer, his first suggestion, was to flee far, the farther the better; he further recommends not returning quickly for “feare of an afterclap.”¹¹² In fact, one of the explanations for an upswing in plague mortality toward the conclusion of the 1665 epidemic was the return of people who had fled during the height of the epidemic.¹¹³ Kellwaye reinforced the validity of the advice to flee by ascribing the advice to both Rondoletius and Valetius. He also points out, however, “yet were it a very uncharitable course that all which are of

¹¹² Kellwaye, *A Defensative against the Plague*, 3v.

¹¹³ Moote and Moote, *Great Plague*, 244-248; Latham and Matthews, eds., *Diary of Samuel Pepys*, 328-29, 335, 340, Pepys notes, both that people were returning to London, and that despite hard frosts, plague mortalities were again on the rise.

abillyte should so doe: for then how should the poore be relieved, and good orders observed.”¹¹⁴ In 1625, Thomas Dekker made this argument even more emphatically. “*To the Run-awaies from London.... you flye to save your selves, and in flight undo others.*”¹¹⁵

The evidence of widespread mortalities during the first epidemic wave suggests that flight was of little use at that time, and yet by the time of the Great Plague of London, flight seems to have been a very successful means of avoiding plague. Throughout Pepys’ descriptions of the rising plague mortalities of July and August are remarks concerning London’s empty streets, and people who are leaving or who have left London for the safety of the countryside.¹¹⁶ He also mentions lines of traffic leaving London by Cripplegate, which clearly suggests that it was the wealthy who were leaving, and that they were leaving in carriages or carts, not by foot. This is important because evidence from the Modern Pandemic suggests that exertion after infection is a contributing factor in producing and spreading pneumonic plague. Additionally, it is clear from Pepys’ Diary that those who could, began to leave London even while the epidemic remained primarily focused in a relatively few of the poorer parishes. Pepys’ Diary, however, also makes it clear that people continued to leave London throughout the epidemic as the intensity of plague increased, and yet the disease does not seem to

¹¹⁴ Kellwaye, *A Defensative against the Plague*, 3v.

¹¹⁵ Dekker, "A Rod for Run-Awayes. God's Tokens," 148.

¹¹⁶ Latham and Matthews, eds., *Diary of Samuel Pepys*, 147, 164, 168, 173, 192.

have followed those who fled into the countryside surrounding London. Eventually, plague did become dispersed in the surrounding regions, which experienced sporadic epidemics through 1666, although they were not as intense as those in London.¹¹⁷

Pepys' own behavior during the plague epidemic provides yet more evidence that plague was seen both as a disease of place and a contagious disease. The evidence he provides also suggests that plague was not very contagious. In June, Pepys sent first his mother and then his wife away from London for their safety. Despite the danger London presented, Pepys continued to live an active life in London; furthermore, he made regular trips down the river to visit his wife in Woolwich. Still, Pepys occasionally mentions that he had come into contact with people who subsequently became ill or died, for example, cabmen and watermen.¹¹⁸ Nonetheless, Pepys seems to have had little concern that he would expose his wife to plague. He did know, however, that other people perceived his journeys to London as a threat; when Pepys visited friends he was "forced to say to say that I lived wholly at Woolwich."¹¹⁹ Like Pepys, John Evelyn sent his wife out of London to escape the threat of plague and also like Pepys, Evelyn visited his wife in her refuge away from the dangers of London.¹²⁰ Neither of these men seem to have been especially careful or concerned about carrying

¹¹⁷ Slack, *Impact of Plague*, 168.

¹¹⁸ Latham and Matthews, eds., *Diary of Samuel Pepys*, 131, 251.

¹¹⁹ *Ibid.*, 161.

¹²⁰ E.S. de Beer, ed., *The Diary of John Evelyn*, vol. III *Kalendarium 1650-1672* (Oxford: The Clarendon Press, 1955), 417-423.

plague to their wives. Admittedly the evidence in Pepys' Diary suggests that well off people had a lower risk of contracting plague than did laborers but it does not seem to be exclusively the result of their flight from London.

The various attempts to control the spread of plague suggest seemingly conflicting views of the manner in which plague was spread, and thus these apparent conflicts might provide information on the early modern understanding of pestilence. A major issue is whether plague spreads person to person or is associated with particular places. Cohn has used the speed with which the Black Death spread across Europe and much of Asia to argue that it, unlike modern bubonic plague which is caused by *Y. pestis*, was not a disease of specific locations.¹²¹ In the investigation of the Modern Pandemic, researchers began with the idea of plague as a contagious disease, whereas people of the afflicted regions clearly interpreted it as a disease of location; eventually researchers came to accept local perceptions that plague is a localized phenomena. During the last 100 years of the Second Pandemic, London was viewed as a central locus of plague so that flight, even flight of only a short distance beyond the city, was seen to be, and in fact was, an excellent precaution.

Public Health: Quarantines and Restrictions on Vagabonds

The policy of attempting to separate the well from the sick was an element of the public response almost from plague's first appearance in Europe. Use of various forms of quarantine, or methods of attempting to segregate plague-infected people from

¹²¹ Cohn, *Black Death Transformed*, 1.

the uninfected, was the one at least quasi-medical action that often had a direct influence on the morbidity and mortality rates of a plague epidemic. The effect produced, however, was not necessarily the desired one of limiting plague induced mortalities. Quarantining people within infected houses may have increased mortality and morbidity rates because sequestering people in infected houses assured their exposure to infected rats and fleas, and also reduced plague victims' access to palliative attention.¹²²

Efforts to segregate the population were practiced on what can be described as micro and macro levels; on the micro level, people from houses known to be infected by plague were restricted to their homes, often forcibly. On the macro level, travel was curtailed, either into or out of an area such as a parish, city or country. Incoming ships often were isolated for a period of up to 40 days in order to demonstrate that the contents, both people and goods, were free of disease. At the macro level, it is possible that quarantines had some positive effect, although it is very difficult to control the movement of rats.¹²³

In Britain, quarantines were not employed with consistency until relatively late into the period of the Second Pandemic. Because the city-states of the Italian peninsula

¹²² Because this method of limiting the spread of plague was not applied in the Modern Pandemic, there are no scientific data on the results of shutting people up in houses known to be inhabited with plague infested rats. It is possible that by keeping the houses with infected rats inhabited, along with requisite heating and food necessary for people, infected rats were encouraged to remain rather than moving on to infect a new household.

¹²³ Slack, *Impact of Plague*, 316. Paul Slack believes the macro quarantines were effective because he believes that plague was always reintroduced.

were densely populated, physically small, relatively well organized, and wealthy, they instituted various forms of quarantines much earlier in the cycle. By 1348, both Milan and Venice were employing quarantine measures with apparently very different degrees of success.¹²⁴ Milan employed a harsh form of segregation that entailed simply shutting up houses where people were known to be sick and strictly controlling access into the city. Venice employed a more selective set of protective measures, including sending infected people to isolated islands and imposing “a general quarantine of up to 40 days ... on all incoming ships.”¹²⁵ Despite Venice’s theoretically effective quarantine measures, it suffered very heavy mortalities. During the first year of the pandemic, the mortality rate in Venice is estimated to have been approximately 60 percent, while the mortality rate in Milan, which employed draconian isolation techniques, had a mortality rate of only about 15 percent, which must have been one of the lowest in Europe.¹²⁶ These examples point out the difficulty in analyzing the effects of civic intervention on individual epidemic outbreaks. Although the records provide us with some information about control, they provide much less information about how successfully they were enforced, and they provide no information about the rat and flea populations or other ecological or social conditions that could affect the transmission of plague.

It was not until 1518 that England began to institute plague regulations, and it was not until 1578 that segregation of people in households with sick people, from

¹²⁴ Gottfried, *The Black Death*, 47-49.

¹²⁵ *Ibid.*, 48.

¹²⁶ *Ibid.*, 49; Ziegler, *The Black Death*, 53-54.

healthy people became the country's official policy. The earliest attempts at controlling the spread of plague were local and their focus was primarily to deny ill people, often defined as strangers, from entering a town or locality. Although Britain was relatively late to employ coordinated quarantine measures, individual cities enacted piecemeal regulations much earlier. For example, in 1349, Gloucester refused entry to travelers from Bristol, which was known to be infested with plague.¹²⁷ Flight away from plague was always a recommended means of avoiding plague and people who could afford to isolate themselves did. Pope Clement VI is reported to have stayed in isolation and later, in England, King Henry VIII moved his household multiple times in an attempt to isolate his entire household from the infection. Elizabeth I left London and instituted draconian measures to assure that no one in her entourage was exposed to anyone from London and thus who might have been exposed to plague.¹²⁸ Those who could isolate themselves from threat of contact with the sick did. People such as searchers, plague surgeons, and grave diggers who, due to their work, were known to have been exposed to plague, were separated from the general population by being required to carry red or white staves to mark themselves as having been exposed to plague.¹²⁹ Additionally these workers who were regularly exposed to plague were expected to walk along the dirty channel side of the street.

¹²⁷ Geoffrey le Baker in Horrox, ed., *The Black Death*, 81; Slack, *Impact of Plague*, 47.

¹²⁸ Shrewsbury, *History of Bubonic Plague*, 162, 190.

¹²⁹ Journal of the Proceedings of the Court of Common Council in Barrett, ed., *Present Remedies against the Plague Etc.*, p x-xi.

In London, the closing and locking up of houses was spelled out in plague orders periodically reissued by the Crown and the London corporation, and reprinted with slight variations at times when the threat of plague resurfaced in London.¹³⁰ The plague orders required that if one person in a house was found to have plague, the house was to be closed with all of its occupants inside, guarded by a day and a night watchman, marked with a cross or an x, and have in large lettering the inscription “Lord have mercy” on the door. The orders also specified that the guards were to provide necessities to the householders.

On the subject of shutting up plague victims within their houses, Kellwaye seems to be considerably at odds with the law, at least as stated within London. Kellwaye says “that when the infection is but in few places” the sick should be restricted to their houses.¹³¹ This statement implicitly suggests that once plague is distributed widely, Kellwaye did not think it necessary to restrict the movements of the sick. It is unclear whether Kellwaye believed that there was no point restricting the ill once plague was widely distributed, or if he was simply addressing the reality that during an intense epidemic, sick people restricted to their houses could not be properly cared for. Nathaniel Lodge also wrote that “many who were lost might have now been alive, had not the tragical mark upon their door drove proper assistance from them.”¹³²

¹³⁰ Appendices A-K, the summaries of plague orders provides an overview of their similarities and differences.

¹³¹ Kellwaye, *A Defensative against the Plague*, 14r.

¹³² Nathaniel Hodges, "From Nathaniel Hodges's *Loimologia: Or an Historical Account of the Plague in London in 1665: With Precautionary Directions against the*

Despite the apparently common belief that restrictions placed on giving assistance to the ill were inflicting greater pain and suffering, a better solution was not found.

Unfortunately, it is unclear how well these quarantine measures were enforced. The Privy Council occasionally sent complaints to the Mayor decrying the City's slack enforcement, which suggests that enforcement was sporadic. The need for the plague orders to mandate guards at the houses, despite subsequent difficulties raising the money to pay them, also suggests that people attempted to avoid the restrictions of household quarantines. Writing in 1722, Defoe, in *A Journal of the Plague Year*, describes people employing a wide variety of tricks to avoid being locked in their houses.¹³³ While we do not know that the stories he reports are true, any more than whether Pepys' story about passing a naked baby to waiting friends is true, these stories provide evidence that people assumed quarantines were breached. Defoe endorses the idea of contagion and strongly recommends that during plague epidemics, healthy people should limit their contact with the outside world. However, he describes quarantines as overly punitive because they locked the well in with the sick, and were virtually useless because people did everything they could to avoid them.

Pepys' Diary, written during the 1665 plague epidemic, recounts several stories that support Defoe's interpretation of behavior and attitudes toward these household quarantines. Pepys' story of a quarantined family that passed their naked child out of

Contagion. John Quincy, M. D. Trans 1720," in *The Historical Sources of Defoe's Journal of the Plague Year*, ed. Watson Nicholson (Boston: The Stratford Co., 1919), 105.

¹³³ Maynadier, ed., *A Journal of the Plague Year*, 56-58, 194-195.

the house so that it would have a chance of survival. This story suggests not only that people considered the quarantines life threatening but also that they were willing to do almost anything to circumvent the restrictions.¹³⁴ If people were willing to go to great lengths to avoid being shut up in their houses, it is very unlikely that these measures were effective controls on plague. As Paul Slack suggests, it is more likely that the macro level quarantines, which prohibited travel and the importation of goods, along with rats and their fleas, from plague infested areas, had an impact on the spread of plague.¹³⁵

In Conclusion

As soon as plague arrived in Europe, people began to battle it with all the weapons at their disposal. Ultimately, these weapons included many regulations. In England, these regulations restricted a wide range of behaviors and can be described as early attempts at public health measures; they demanded that the sick and the healthy be kept separate. People who had been in contact with the sick, or with the material possessions of the ill, were presumed to be ill until they had survived a quarantine period. The weapons in battle against the spread of plague also included a broad array of changes to rules governing social functions and burial customs. The regulations consistently encouraged cleanliness and they even recommended burning potentially

¹³⁴ Latham and Matthews, eds., *Diary of Samuel Pepys*, 212.

¹³⁵ Slack, *Impact of Plague*, 315-316; Paul Slack, "The Disappearance of Plague: An Alternative View," *The Economic History Review* 34, no. 3 (1981): 473-476.

infective materials of little value. Less directly, changes produced by plague such as the population decrease and the corresponding increase in wealth produced changes in the class structure and commercial activities. London's population growth was in part the result of these developments. In addition, although refuse and its stench were undoubtedly a constant problem within London, plague called attention to the problems of garbage and human wastes and thus encouraged regulations to improve the environment. The social changes that resulted from plague and the battle against it affected the subsequent development of plague in ways that still are not fully understood but that must have involved the movement of rats and fleas and their contact with people.

8 Conclusion

To Commande that all those which doe visite and attende the sick, as also all those which have the sicknes on them and doe walke abroad: that they doe carry some thing in their handes therey to be known from other people. And here I must advertise you of one thing more which I had almost forgotten (which is) that when the infection is but in a few places, there to keepe all the people in the houses, not suffering any one of them to goe abroad, and so to provide, that all such necessaries as they shall neéde may beé brought unto them during the time of their visitation: and when it is staide, then to cause all the clothes, bedding and other such thing as were used about the sicke, to be all burnt although at the charge of the rest of the in habitants, you buy them all newe, for feare least the danger which may ensue thereby doe put you to a greater charge and grief: all these foresaide things are most dangerous, and may cause a generall infection, to the destroying of a whole Cittie.¹

The Second Pandemic ravaged England and produced high mortalities for almost 320 years. During the course of the pandemic, epidemics continued to break out sporadically throughout the country, although over time they became less universal and gradually became less frequent. Despite reductions in frequency, individual epidemics continued to produce devastating mortalities; even late in the pandemic, London experienced epidemic plague about every 20 years, although the full extent of plague mortality is still debated. These repeated outbreaks exerted intense pressure on English society, especially in London, and the high mortality and plague's virtually constant presence inexorably changed England. In 1348 when plague first arrived, the English were used to dealing with famine, dearth of material necessities, and high mortality, especially among the very young, but the rapidity and severity of the initial wave of the

¹ Kellwaye, *A Defensative against the Plague*, 14r.

epidemic produced a new level of societal stress. Nonetheless, plague seems to have been a catalyst that both facilitated and quickened social changes that had already begun when plague arrived. Some of these changes, in conjunction with experiences gained from living with plague, improved people's chances of avoiding the disease.

The country-wide, high mortalities of the first waves of the pandemic reduced the English population by about half, and it was not until the early sixteenth century that England's population regained its former numbers. But even while England's population remained low, London continued to grow, and by the seventeenth century, London's population was increasing dramatically. As London grew, its central core experienced some growth in population density, but of necessity the surrounding suburbs became integral components of greater London although they were not within the jurisdiction of the London corporation.

Along with these demographic changes, the pattern of London epidemics changed. In the epidemic of 1563 and presumably in the earlier ones, the heaviest plague mortalities were clustered within London's walls, and wealthy parishes experienced mortalities as high as those in the poor parishes. By the epidemic of 1593, only a few years after London and national plague orders had begun to be printed, this pattern was reversed. Plague mortalities were focused outside the walls and in the poorest parishes. Although the plague orders do not seem to have offered especially innovative counter measures, they regularized and made official concerns and reactions that had been expressed for years. The pattern of changes in mortality distribution during the last 100 years of plague in London suggests that factors in addition to new

regulations affected plague's distribution. Because mortality levels during this period became lower in wealthy parishes, I argue that material wealth as well as changes in behavior were responsible for this transformation. Supporting my contention is the way in which subsequent changes, which have kept humans and rats at a greater distance, have prevented plague from returning to Britain with the ferocity it exhibited during the Second Pandemic.

Notwithstanding the many changes that plague brought, the broad outline of responses to plague and advice for avoiding the disease were remarkably consistent throughout this period. The first plague tracts focused on determining the causes of plague to a degree that was not repeated in later treatises, but they also provided advice and suggestions that continued to be offered throughout the entire pandemic. People were encouraged to flee areas of infection, to avoid low swampy areas, and to close south facing windows. From the first plague outbreaks, clothes, fabric and other objects belonging to plague victims were associated with spreading plague. Thus, cleaning and perfuming or fumigating, and burning fabrics were consistently seen as a means of preventing the spread of plague. Because these materials were so precious, it is likely that the cloth items of plague victims were reused despite the dangers they were thought to present. However, attitudes changed over the course of the pandemic as material wealth increased and as the association of cloth with the spread of plague became firmly fixed in the public consciousness. In England, some of these suggestions became written into law in the late 1500s: houses were quarantined, public gatherings were forbidden during periods of high plague mortality, and infected houses and fabrics

were required to be aired and fumigated before being reused. Despite the apparent consistency in recommended responses to plague, it appears that over the course of the pandemic the effectiveness of these responses improved. This suggests that their implementation changed over time.

The idea that changes in behavior and culture had an impact on plague is predicated on the fact that plague was caused by *Yersinia pestis*. Despite considerable disagreement about what disease actually produced the high mortalities of the Second Pandemic, both direct and circumstantial evidence supports the argument that *Y. pestis* was the causative agent for most of the plague epidemics. Having said that, it is important to acknowledge that the epidemics of the Second Pandemic differ significantly from those of the Modern Pandemic. The first wave of 1347-8, especially, traveled quickly and infected more territory faster than has any plague epidemic since. Additionally, morbidity levels in the Second Pandemic were much higher than any recorded, so far, during the Modern Pandemic. Furthermore, it is curious that Europeans never wrote about large die offs of rats. Notwithstanding these differences, in other respects the disease responsible for the heavy mortalities of the Second Pandemic closely resembles disease known to be produced by *Y. pestis*. Plague came in two forms, one form with a lung component that was extremely fatal and a second form that produced swellings in the lymph nodes. In addition, occasionally people were reported as having been well in the morning but dead by nightfall, or were reported to have died of fear; these descriptions of deaths resemble deaths due to the third or septicemic form of plague.

Most importantly, the complexity of plague's infectious cycle made it very difficult for early modern Europeans to determine its method of dispersal. Because of its dependence on rats and fleas, plague could appear in widely dispersed houses and in people who thought that they had had no contact with plague-infected people. The complexity of plague's dispersal pattern explains why people did not come to a consensus about whether plague was extremely contagious or not.

The remarkable consistency of responses to plague could be used to argue that people simply clung to traditional responses because they did not understand with what they were dealing nor did they know how to respond to the crisis or have any real expectation of improved results. This view is much too simplistic, however. From the first outbreaks, physicians and surgeons used a blend of traditional learning and their own observations to write tracts that attempted to make sense of the disease. Within a broad area of consensus, changes in the tone and emphasis of plague writings indicate that observers, commentators, and the medical community were struggling to understand epidemics and to evaluate the means to combat them in the light of empirically gained knowledge as well as tradition.

Although the traditional Greco-Roman medical understanding of disease did not view illnesses as discrete entities with specific causative agents, but rather as a result of humoral imbalance, the earliest plague tracts describe the epidemic in ways that suggest that it had a single cause. Initially, plague was widely seen as both the result of some sort of terrible miasma-producing event and as a sign of God's displeasure. For the most part, the authors of the medical treatises situated the cause of plague in

astrological and large scale environmental catastrophes that had enveloped the world in miasmatic vapors. After the first wave of the pandemic, as plague appeared sporadically in apparently random locations, plague was seen as the result of all sorts of factors, from the general sinfulness of society to nasty smells, bad foods, and tainted water to an over abundance of fruits, and to miasma. The earliest treatises provided very little advice on how to cure plague, but they did provide an array of suggestions for avoiding it. Although many of their explanations about the causes of plague and its method of dispersal seem fanciful, the doctors were proceeding logically based on their world view.

Although the physicians' earliest plague treatises expressed ideas that were to become the foundation for plague control measures, they provided little information on treating people infected with plague. Initially, plague treatises lacked treatment advice because the physicians and surgeons had no experience dealing with plague and because plague was seen as virtually a death sentence. The medical advice published, along with the plague orders and Kellwaye's manual, clearly show that by the early seventeenth century, doctors assumed that some patients would survive plague and that proper care and attention could effect a cure. The medical community's understanding of plague was relatively consistent, although it was neither uniform nor unchanging. Many of the preventative measures seem to have been based on the theoretically driven university tradition rather than on any experiential or empirical evidence. For example, suggestions included avoiding southerly winds and eating a balancing diet of food low in moist and melancholic food stuffs, but advice was not limited to a strictly humoral

conception that eschewed the idea of human agency in the spread of plague. Medical suggestions for dealing with plague were quickly influenced by experience.

Furthermore, despite the medical theory that varying symptoms were the result of different constitutions, people attempted to differentiate between diseases that were and were not plague. Some advice included in the first treatises, such as Foligno's advice to bleed people heavily, was not repeated in later treatises while less aggressive advice, such as the recommendation to bleed people only before sores became visible, became widely accepted. In general, recommended treatments for plague became less aggressive and more palliative. Although some of Kellwaye's recommended curative measures seem unpleasant or bizarre, and it is hard to believe that anyone would follow all of them, overall they suggest that people believed that intensive care for plague victims improved their chances of survival.

With the arrival of the first epidemic, physicians, surgeons and chroniclers recommended flight as the best means of escaping plague, but modern epidemiology suggests that it was flight that quickly spread the disease across the continent when plague first appeared. As Samuel Pepys' Diary shows, in 1665 flight remained a popular and successful means of avoiding plague. Those who could afford to leave London did. People fled both before and during the height of the epidemic, yet unlike in earlier epidemics, their flight did not spread the plague like wildfire in the regions around London. Why were the results of flight so different in 1348 than in 1665? The causes of this differential are not known, but are probably the result of a number of factors. It is probable that the rats had acquired some resistance so rat colonies were not

wiped out by any stray infected fleas the fleeing humans carried with them. Further, if people cleaned, shook and aired their clothes, as the plague orders recommended, they were less likely to transport fleas to their new locations. In addition, although people continued to leave London after the epidemic was in full swing, because of increased information about where plague victims were people fled earlier in the cycle, before they had become infected. Moreover, people left London riding in carriages and carts rather than on foot.

Despite medical theory, when plague first arrived, people saw it as contagious and attempted to avoid contact with those infected. The earliest chronicles describe the disintegration of society by giving examples of the way in which fear of plague drove people apart. These early chronicles make it clear that from the outset, people accepted the idea that avoiding sick people was an effective means of avoiding plague. Nonetheless, despite the early acceptance of a generalized concept of contagion, it was not until 1578 that quarantine and sequestration regulations became the law of the land in England. These measures were part of a lengthy European tradition which had only minimal success. The regulations had two parts. One was the quarantining of ships from regions known to be infected with plague. To the extent that new plague outbreaks were imported, quarantining ships probably reduced the number of plague outbreaks. However, evidence, such as that the place of origin of the Great 1665 London plague epidemic was in the western suburbs rather than along the docks, suggests that epidemics arose from endemic rat infestations rather than by continually reintroduced by ships. The other element of quarantine regulations was the sequestering of people

and their families within their own homes. This plague counter-measure is unlikely to have reduced plague mortality because it subjected entire households to infected fleas. Additionally, there is some evidence that wealthy people were less likely than the poor to be subject to these regulations, so this counter-measure may have contributed to the altered mortality distribution.

England does not seem to have experienced the extremes of societal breakdown that occurred in Europe. Even during the initial wave of plague, the kind of wild behavior common on the mainland, represented by violent public religious events or ceremonies and attempts to scapegoat minority groups, did not take place. In England, plague seems to have been linked to the idea of chaos. As a result, the control of plague included tactics to restrict social and environmental disorder. People, behavior and disruptive animals were controlled. Vagabonds, foreigners and poor day laborers living in crowded tenements were often treated suspiciously and were accused of spreading plague, although not necessarily on purpose. It is impossible to gauge the effect London's animal control efforts had on plague because this would depend not only on the ratio of cats and dogs to rats killed, but also on when in the epidemic cycle they were killed. Terms used by Kellwaye and seventeenth century Londoners to describe the crowded, dank and airless tenements and back alley ways where plague was thought to flourish are very similar to those used in the earliest plague treatises to describe sources of plague such as closed up wells and caverns. On the other hand, it seems likely that efforts to strictly limit the growth of tenements probably made the conditions

in those that did exist worse, which might have served to increase the plague differential between poor and wealthy parishes.

The role that religion played in combating plague changed substantially over the course of the pandemic. Prayer was always recommended as a personal means of preventing and avoiding plague, but by 1665 public religious observance was no longer an important aspect of the battle against plague. In the fourteenth century, as the first wave of the plague epidemic swept across England, the Bishops of Lincoln and York called for public processions and large public prayers. Later, King Henry VIII also called for large public religious processions but throughout the duration of the Second Pandemic, public religious activities became a less significant aspect of plague control. In part, this change reflects the growing lack of religious uniformity in the country, yet it is notable that parish churches were central to local plague control efforts. It is likely that this change in the role of the church in responding to plague also reflects a changed understanding of the role of the natural world in respect to plague. Parish officers collected and distributed money for poor relief, chose the searchers, and maintained death records, which were an integral aspect of plague control. Over the course of the pandemic, people came to believe that human agency could affect the course of epidemics.

Because of the association of bad smells with disease, urban filth was associated with disease even during the initial plague outbreak; thus, cleaning London was a significant feature of battling plague. In response to the epidemic of 1349, King Edward ordered London streets cleaned of the human filth that was littering them, and during

the second epidemic in 1361, he ordered animal butchering to take place outside the walls of London.

Most of the plague regulations and counter-measures taken during the last one hundred years of plague in London were not innovative, although they did tie the control of disruptive behaviors, vagabonds and indigent people and providing money for the care of the destitute together in new ways. The plague orders merely codified and published recommendations made when plague first arrived. Nonetheless, recorded decreases in plague mortalities within central London, especially in the wealthier parishes, provides evidence that people who followed the orders reduced their chances of falling victim to plague. Though they did not understand disease as a discrete entity, nor did they conceive of plague as spread by rats and fleas, people changed their behavior in a way that affected plague distribution. Londoners' responses to plague, which included flight along with fumigation and cleaning of the town, their fabrics and their residences seems to have altered the environment enough to increase the distance between people and rats and their fleas. The result was reduced incidence of plague in those areas of London where the rules were enforced and where people had the resources to observe them.

References

- Achtman, Mark, Kerstin Zurth, Giovanna Morelli, Gabriela Torrea, Annie Guiyoule, and Elisabeth Carniel. "Yersinia Pestis, the Cause of Plague, Is a Recently Emerged Clone of Yersinia Pseudotuberculosis." *PNAS* 96, no. 24 (1999): 14043-14048.
- Aitken, George A., ed. *Due Preparation for the Plague, as Well for Soul as Body: By Daniel Defoe*. New York: AMS Press, 1974.
- Arrizabalaga, Jon. "Facing the Black Death: Perceptions and Reactions of University Medical Practitioners." In *Practical Medicine from Salerno to the Black Death*, edited by Luis Garcia-Ballester, Roger French, Jon Arrizabalaga and Andrew Cunningham, 237-288. Cambridge: Cambridge University Press, 1994.
- Arrizabalaga, Jon, John Henderson, and Roger French. *The Great Pox: The French Disease in Renaissance Europe*. New Haven and London: Yale University Press, 1997.
- Badke, David. *Bestiary: Animals in the Middle Ages* [Digitized Images with text and sources]. Badke, David, 4/14/2008 2008 [cited 4/15/2008 2008]. Available from <http://bestiary.ca/index.html>.
- Baer, William C. "Housing the Poor and Mechanick Class in Seventeenth-Century London." *The London Journal* 25, no. 2 (2000): 13-39.
- Bailey, Mark. "Demographic Decline in Late Medieval England: Some Recent Thoughts on Research." *Economic History Review* 49, no. 1 (1996): 1-19.
- Barkai, Ron. "Jewish Treatises on the Black Death (1350-1500): A Preliminary Study*." In *Medicine from the Black Death to the French Disease*, edited by Roger French, 6-25. Aldershot: Ashgate Publishing Company, 1998.
- Barrett, W. P., ed. *Present Remedies against the Plague Etc*. Edited by The Shakespeare Association, *Shakespear Association Facsimiles*. Oxford: Oxford University Press, 1933.
- Barry, John M. *The Great Influenza: The Epic Story of the Deadliest Plague in History*. New York: Viking, 2004.
- Barton, N. J. *The Lost Rivers of London: A Study of Their Effects Upon London and Londoners, and the Effects of London and Londoners Upon Them*. London: Leicester University Press, 1965.
- Bell, Walter George. *The Great Plague in London in 1665*. London: John Lane the Bodlley Head Ltd, 1979. Reprint, 1867- 1942- 1979.
- Benedictow, Ole J. *The Black Death 1346-1353: The Complete History*. Woodbridge, UK: The Boydell Press, 2004.
- . "Morbidity in Historical Plague Epidemics." *Population Studies* 41, no. 3 (1987): 401-431.

- Biraben, Jean-Noel. "Current Medical and Epidemiological Views on Plague." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, 25-36. Derbyshire: Local Population Studies, 1977.
- Boccaccio, Giovanni. *The Decameron: Preserved to Posterity by Giovanni Boccaccio and Translated into English Anno 1620*. III vols. Vol. I. New York: AMS, 1967.
- . "The Decameron: The Introduction of the Author to the Following Discourses." In *The Decameron Preserved to Posterity by Giovanni Boccaccio and Translated into English Anno 1620*, edited by Edward Hutton, 17-37. New York: AMS, 1967.
- Boghurst, William. *Loimographia: An Account of the Great Plague of London in the Year 1665*. London: Shaw and Sons, Fetter Lane, 1979.
- Bradley, Leslie. "The Geographical Spread of Plague." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, edited by Local Population Studies, 127-132. Derbyshire: Local Population Studies, 1977.
- . "The Most Famous of All English Plagues: A Detailed Analysis of the Plague at Eyam, 1655-6." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and Century England*, 63-94. Derbyshire: Local Population Studies, 1977.
- Braun, Georg , and Franz Hogenberg. *Civitates Orbis Terrarum I The Jewish National and University Library, 1572* [cited 4/10/2008 2007]. Available from http://historic-cities.huji.ac.il/british_isles/london/maps/braun_hogenberg_I_A.html.
- Britnell, Richard. "The Black Death in English Towns." *Urban History* 21, no. 2 (1994): 195-210.
- Byrne, Joseph P. *The Black Death*. Edited by Jane Chance, *Greenwood Guides to Historic Events of the Medieval World*. Westport, CT: Greenwood Press, 2004.
- Campbell, Anna Montgomery. *The Black Death and Men of Learning*. New York: AMS Press, 1966.
- Carmichael, Ann G. "Contagion Theory and Contagion Practice in Fifteenth-Century Milan." *Renaissance Quarterly* 44, no. 2 (1991): 213-256.
- Centers for Disease Control and Prevention. *Navajo Medical Traditions and Hps* [Web Site]. Centers for Disease Control and Prevention, 2004 [cited November 12, 2005 2005]. Available from <http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/navajo.htm>.
- Champion, J.A.I. *London's Dreaded Visitation: The Social Geography of the Great Plague in 1665*. Vol. 31, *Historical Geography Research*. London: Royal Holloway, University of London, 1995.
- Chase, Marilyn. *The Barbury Plague: The Black Death in Victorian San Francisco*. New York: Random House, 2003.
- Chaucer. "The Canterbury Tales." In *The Riverside Chaucer*, edited by Larry D. Benson, FIND. New York: Houghton Mifflin, 1987.

- Cheng-Mayer, Cecilia, Deborah Seto, Masatoshi Tateno, and Jay A. Levy. "Biologic Features of Hiv-1 That Correlate with Virulence in the Host." *Science* 240, no. 4848 (1988): 80-82.
- The Chronicle of Novgorod 1016-1471*. Translated by Robert Michell and Nevill Forbes. London: Offices of the Society, 1914.
- Cipolla, Carlo M. *Faith, Reason, and the Plague in Seventeenth Century Tuscany*. Translated by Muriel Kittel. Ithaca, New York: Cornell University Press, 1979.
- City of London (England) Court of Aldermen. *Orders Conceived and Published by the Lord Major and Aldermen of the City of London, Concerning the Infection of the Plague*. London: Printed by James Flesher, 1665.
- . *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London, Till Further Charitable Provision May Be Had for Places of Receite for the Visited with Infection*. London: Isaac Jaggard, Printer to the Honourable City of London, 1625.
- City of London (England) Court of Common Council. *Articles to Be Enquired of, What Orders Haue Bene Put in Execution, for the Restreinyng of the Infected of the Plague, within the Citie of London and Liberties Thereof*. London: J. Day, 1577.
- . *Orders Heertofore Conceived and Agreed to Bee Published by the Lord Mayor and Aldermen of the Citie of London: And the Justices of Peace of the Counties of Middlesex and Surrey, by Direction from the Lords of His Maiesties Most Honourable Privie Councell, and Now Thought Fit to Be Revived, and Againe Published*. London: By Isaac Jaggard, 1625.
- City of London (England) Lord Mayor. *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen of the Citie of London, and the Justices of Peace of the Counties of Middlesex and Surrey, by Direction from the Lords of His Maiesties Most Honourable Privie Councell*. Imprinted at London: John VVindet, 1608?
- Cohen, Jon. "Receptor Mutations Help Slow Disease Progression." *Science* 273, no. 5283 (1996): 1797-1798.
- Cohn, Jr., Samuel K. *The Black Death Transformed: Disease and Culture in Early Renaissance Europe*. London: Arnold, 2002.
- Corporation of London. *Orders Conceived and Published by the Lord Major and Aldermen of the City of London, Concerning the Infection of the Plague*. London: Printed by James Flesher, 1665.
- Coulton, G. G. *The Black Death*. New York: Robert M McBride and Company, 1929.
- . *Medieval Panorama: The English Scene from Conquest to Reformation*. New York: Macmillan Company, 1938.
- Crosby, Alfred W., Jr. *America's Forgotten Pandemic: The Influenza of 1918*. New Edition ed. Cambridge: Cambridge University Press, 2003.
- Dalton, O. M. *The History of the Franks by Gregory of Tours*. Translated by O. M. Dalton. Vol. II. Oxford: The Clarendon Press, 1927.
- de Beer, E.S., ed. *The Diary of John Evelyn*. Vol. III Kalendarium 1650-1672. Oxford: The Clarendon Press, 1955.

- de Paolo, Charles. *Epidemic Disease and Human Understanding: A Historical Analysis of Scientific and Other Writings*. Jefferson, NC: McFarland and Company, 2006.
- Dekker, Thomas. "A Rod for Run-Awayes. God's Tokens." In *The Plague Pamphlets of Thomas Dekker*, edited by F. P. Wilson, 137-171. Saint Clair Shores, MI: Scholarly Press 1971, 1925.
- . "The Wonderful Yeare 1603: Wherein Is Shewed the Picture of London, Lying Sicke of the Plague." In *In the Plague Pamphlets of Thomas Dekker*, 1925.
- Dols, Michael W. *The Black Death in the Middle East*. Princeton: Princeton University Press, 1977.
- Drancourt, Michel, Michel Signoli, La Vu Dang, Bruno Bizot, Veronique Roux, Stefan Tzortzis, and Didier Raoult. "Yersinia Pestis Orientalis in Remains of Ancient Plague Patients." *Emerging Infectious Diseases* 13, no. 2 (2007): 332-333.
- Echenberg, Myron. "Pestis Redux: The Initial Years of the Third Bubonic Plague Pandemic 1894-1901." *Journal of World History* 13, no. 2 (2002): 429-449.
- Ell, Stephen R. "Iron in Two Seventeenth-Century Plague Epidemics." *Journal of Interdisciplinary History* 15, no. 3 (1985): 445-457.
- England and Wales Charles I (1625-1649). *By the King: A Proclamation Declaring His Majesties Pleasure Touching Orders to Be Observed for Prevention of Dispersing the Plague*. Imprinted at London: Robert Barker, Printer to the Kings most Excellent Maiestie: And the Assignes of John Bill, 1636.
- England and Wales Elizabeth I (1558-1603). *Orders, Thought Meete by Her Maiestie, and Her Priuie Councill, to Be Executed Throughout the Counties of This Realme, in Such Townes, Uillages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Aduise Set Downe Vpon Her Maiesties Exprese Commaundement, by the Best Learned in Physicke within This Realme, Contayning Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preseruatiō of Her Good Subiects from the Plague before Infection, as for the Curing and Ordring of Them after They Shall Be Infected*. London: Christopher Barker, 1578(?).
- England and Wales James I (1603-1625). *Orders Thought Meet by His Maiestie, and His Privie Councill: To Be Executed Throughout the Counties of This Realme, in Such Townes, Villages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Aduice Set Downe by the Best Learned in Physicke within This Realme, Containing Sundrie Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preseruatiō of His Good Subiects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected*. London: Printed by Iohn Bill, 1625.
- . *Orders, Thought Meet by His Majestie, and His Privy Councill, to Bee Executed Throughout the Counties of This Realm, in Such Townes, Villages, and Other Places, as Are, or May Bee Heerafter, Infected with the Plague, for*

- the Stay of Further Increase of the Same: Also, an Advice Set Downe by the Best Learned Physicke within This Realme, Containing Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preservation of His Good Subjects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected.* London: Printed by Bonham Norton and John Bill, 1625.
- Erickson, Carolly. *Great Harry: The Extravagant Life of Henry VIII.* New York: Summit Books, 1980.
- Fabricius, Johannes. *Syphilis in Shakespeare's England.* London: Jessica Kingsley Publishers, 1994.
- Fracastoro, Girolamo. *Fracastor: Syphilis or the French Disease a Poem in Latin Hexameters.* Translated by Heneage Wynne-Finch. London: William Heinmann Medical Books, 1935.
- Furnivall, Fredrick J. *50 Earliest English Wills in the Court of Probate London 1387-1439 with Priest of 1454.* Vol. 78, *Original Series.* London: Oxford University Press, 1964.
- Galvani, Alison P., and Montgomery Slatkin. "Evaluating Plague and Smallpox as Historical Selective Pressures for the Ccr5- Δ 32 Hiv Resistance Allele." *PNAS* 100, no. 25 (2003): 1576-1579.
- Gilbert, M. Thomas P., Jon Cuccui, William White, Niels Lynnerup, Richard V. Titball, Alan Cooper, and Micheal B. Prentice. "Absence of Yersinia Pestis-Specific DNA in Human Teeth from Five European Excavations of Putative Plague Victims." *Microbiology* 150 (2004): 341-354.
- . "Response to Drancourt and Rauolt." *Microbiology* 150, no. 2 (2004): 264-265.
- Gottfried, Robert S. *The Black Death: Natural and Human Disaster in Medieval Europe.* New York: The Free Press, 1983.
- Graunt, John. "Observations Upon the Bills of Mortality." In *The Economic Writings of Sir William Petty Together Observations Upon the Bills of Mortality More Probably by Captain John Graunt*, edited by Charles Henry Hull, 330-. New York: Augustus M. Kelley, 1963.
- Gregg, Charles T. *Plague! The Shocking Story of a Dread Disease in America Today.* New York: Charles Scribner's Sons, 1978.
- Hackett, Paul. *A Very Remarkable Sickness: Epidemics in the Petit Nord, 1670 to 1846.* Winnipeg: University of Manitoba Press, 2002.
- Harper, David R., and Andrea S. Meyer. *Of Mice, Men, and Microbes: Hantavirus.* San Diego: Academic Press, 1999.
- Hatcher, John. "Plague Population and the English Economy 1348-1530." In *British Population History from the Black Death to the Modern Day*, edited by Michael Anderson, 15-93. Cambridge: Cambridge University Press, 1996.
- . *Plague, Population and the English Economy 1348-1530.* Cambridge: The Economic History Society, 1977.

- Hodges, Nathaniel. "From Nathaniel Hodges's Loimologia: Or an Historical Account of the Plague in London in 1665: With Precautionary Directions against the Contagion. John Quincy, M. D. Trans 1720." In *The Historical Sources of Defoe's Journal of the Plague Year*, edited by Watson Nicholson, 101-115. Boston: The Stratford Co., 1919.
- Hollister, C. Warren, and Judith M. Bennett. *Medieval Europe: A Short History Ninth Edition*. Boston: McGraw Hill, 2002.
- Horrox, Rosemary, ed. *The Black Death*. Manchester: Manchester University Press, 1994.
- Houhamdi, L., H. Lepidi, Michel Drancourt, and Didier Raoult. "Experimental Model to Evaluate the Human Body Louse as a Vector of Plague." *Journal of Infectious Diseases* 1941, no. 11 (2006): 1589-96.
- House of Commons Journal* British History Online, History of Parliament Trust, 1802 [cited 2006]. Available from <http://www.british-history.ac.uk/source.asp?pubid=14>.
- Howells, John. "Haverfordwest and the Plague, 1652." *The Welsh History Review* 12, no. 3 (1985): 411-419.
- Jenner, Mark S. R. "The Great Dog Massacre." In *Fear in Early Modern Europe*, edited by William G. Naphy and Penny Roberts, 44-61. Manchester: Manchester University Press, 1997.
- John Rocque's Map of London* Rootsweb.com, [cited 04/07/2007 2007]. Available from http://freepages.genealogy.rootsweb.com/~genmaps/genfiles/COU_files/ENG/LON/Rocque/rocque_index.htm.
- Karlsson, Gunnar. "Plague without Rats: The Case of Fifteenth-Century Iceland." *Journal of Medieval History* 22, no. 3 (1996): 263-284.
- Keeling, M. J., and C. A. Gilligan. "Bubonic Plague: A Metapopulation Model of a Zoonosis." *Proceedings Biological Sciences The Royal Society* 267, no. 1458 (2000): 2219-2230.
- . "Metapopulation Dynamics of Bubonic Plague." *Nature* 407 (2000): 903-905.
- Keen, Maurice. *English Society in the Later Middle Ages 1348-1500*. London: Penguin Books, 1990.
- Kellwaye, Simon. *A Defensative against the Plague: Contayning Two Partes or Treatises: The First, Shewing the Meanes How to Preserve Us from the Dangerous Contagion Thereof: The Second, How to Cure Those That Are Infected Therewith. Whereunto Is Annexed a Short Treatise of the Small Poxe: Shewing How to Governe and Helpe Those That Are Infected Therewith*. London: John Windet, 1593.
- Kelly, John. *The Great Mortality: An Intimate History of the Black Death, the Most Devastating Plague of All Time*. 1st ed. ed. New York: Harper Perennial, 2006.
- Konkola, Kari. "More Than a Coincidence? The Arrival of Arsenic and the Disappearance of Plague in Early Modern Europe." *The Journal of the History of Medicine and Allied Sciences* 47, no. 2 (1992): 186-209.

- Lancaster, H. O. *Expectations of Life: A Study in the Demography, Statistics, and History of World Mortality*. New York: Springer-Verlag, 1990.
- Latham, Robert, and William Matthews, eds. *The Diary of Samuel Pepys*. Vol. V 1664. Berkley: University of University Press, 1970.
- , eds. *The Diary of Samuel Pepys*. Vol. 1663. Berkley: University of California Press, 1970.
- Leoniceno, Nicolo. "Concerning the Epidemic Which the Italians Call the French Disease but the French Call Neapolitan." In *Classic Descriptions of Disease: With Biographical Sketches of the Authors*, edited by Ralph H. Major, 15-17. Springfield, IL: Charles C Thomas, 1939/1497.
- Leroy, Eric M., Brice Kumulungui, Xavier Pourrut, Pierre Rouquet, Alexandre Hassanin, Philippe Yaba, Andre Delicat, Janusz T. Paweska, Jean-Paul Gonzalez, and Robert Swanepoel. "Fruit Bats as Reservoirs of Ebola Virus." *Nature* 438, no. 1 (2005): 575-576.
- Lewis, David. *New Cases of Congo Plague but Appears Contained* [Web]. Reuters, 2005 [cited 11/19/2005 2005]. Available from http://bepast.org/disease_information/Plague/Plague%20Disease%20Information/2005-02-28_congo_plague_seems_contained.mht.
- Lindberg, David C. *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious and Institutional Context, 600 B.C. To A.D 1450*. Chicago: University of Chicago Press, 1992.
- Lloyd, G. E. R. *Greek Science after Aristotle*. New York: WW Norton and Company, 1973.
- Long, Robert. "The Mutilated Exchequer Records." *The Gentleman's Magazine* 1840, 601-605.
- Lucotte, Gerard. "Frequencies of 32 Base Pair Deletion of the (Δ 32) Allele of the Hiv-1 Co-Receptor Gene in the Caucasians: A Comparative Analysis." *Infection, genetics, and Evolution: Journal of Molecular Epidemiology and Evolutionary Genetics in Infectious Diseases* 1, no. 3 (2002): 201-205.
- Lydgate, John. "A Diet and Doctrine for the Pestilence." In *The Black Death*, edited by Joseph P. Byrne, 162-166. Westport, CT: Greenwood Press, 2004.
- Marks, Geoffrey, and William K. Beatty. *Epidemics*. New York: Charles Scribner's Sons, 1976.
- Mayer, Robert. "The Reception of a *Journal of the Plague Year* and the Nexus of Fiction and History in the Novel." *English Literary History* 57, no. 3 (1990): 529-555.
- Maynadier, G. H., ed. *The Works of Daniel Defoe: A Journal of the Plague Year*. Vol. 9. New York: Thomas Y Crowell and Company, 1904.
- McIntosh, Marjorie Keniston. "Local Responses to the Poor in Late Medieval and Tudor England." *Continuity and Change* 3, no. 2 (1988): 209-245.
- McNeill, William H. *Plagues and Peoples*. Garden City: Anchor Press, 1976.
- . *Plagues and Peoples*. New York: Anchor Books, 1998.

- Mironov, N. P. "The Past Existence of Natural Foci of Plague in the Steppes of Southern Europe." *Journal of Microbiology, Epidemiology and Immunology* 29, no. 8 (1958): 1193-1198.
- Moote, A. Lloyd, and Dorothy C. Moote. *The Great Plague: The Story of London's Most Deadly Year*. Baltimore: Johns Hopkins University Press, 2004.
- Morris, Christopher. "Plague in Britain." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, 37-47. Derbyshire: Local Population Studies, 1977.
- Munkhoff, Richelle. "Searchers of the Dead: Authority, Marginality, and the Interpretation of Plague in England, 1574-1665." *Gender and History* 11, no. 1 (1999): 1-29.
- Nadakavukaren, Anne. *Our Global Environment: A Health Perspective*. 6th ed. Long Grove, IL: Waveland Press, 2006.
- O'Brien, Stephen J. *Tears of the Cheetah: And Other Tales from the Genetic Frontier*. New York: St Martin's Press, 2003.
- Organization, World Health. *Plague in the Democratic Republic of Congo - Update 4* [Web site]. World Health Organization, 3/15/2005 2005 [cited 11/19/2005 2005]. Available from http://bepast.org/disease_information/Plague/Plague%20Disease%20Information/2005-03-15%20WHO%20%20Plague%20in%20Congo%20update%204.mht.
- Palliser, D.M. "Urban Society." In *Fifteenth-Century Attitudes: Perceptions of Society in Late Medieval England*, edited by Rosemary Horrox, 132-168. Cambridge: Cambridge University Press, 1994.
- Park, Katharine. "The Criminal and the Saintly Body: Autopsy and Dissection in Renaissance Italy." *Renaissance Quarterly* 47, no. 1 (1994): 1-33.
- Platt, Colin. *King Death: The Black Death and Its Aftermath in Late-Medieval England*. Toronto: University of Toronto Press, 1996.
- Pollitzer, R. *Plague*. Geneva: World Health Organization, 1954.
- . "A Review of Recent Literature on Plague." *Bulletin of the World Health Organization* 23, no. 2-3 (1960): 313-400.
- Porter, Roy. *The Enlightenment*. Edited by Richard Overy. Second ed, *Studies in European History*. New York: Palgrave, 2001.
- . *The Greatest Benefit to Mankind*. New York: W.W. Norton and Company, 1997.
- Porter, Stephen. *The Great Plague*: Sutton Publishing Limited, 1999.
- Prentice, Micheal B., M. Thomas P. Gilbert, and Alan Cooper. "Was the Black Death Caused by *Yersinia Pestis*?" *The Lancet Infectious Diseases* 4, no. 2 (2004): 72.
- Preston, Richard. "The Demon in the Freezer." *The New Yorker*, July 12, 1999, 44-61.
- Quetel, Claude. *History of Syphilis*. Baltimore: The Johns Hopkins University Press, 1990.
- Race, Philip. "Some Further Consideration of the Plague in Eyam, 1656/6." *Local Population Studies* 54 (1995): 56-65.
- Rail, Chester David. *Plague Ecotoxicology*. Springfield: Charles C. Thomas, 1985.

- Raoult, Didier, Gerard Aboudharam, Eric Crubezy, Georges Larrouy, Bertrand Ludes, and Michel Drancourt. "Molecular Identification by "Suicide Pcr" of *Yersinia Pestis* as the Agent of Medieval Death." *PNAS* 97, no. 23 (2000): 12800-12803.
- Richardson, John. *The Annals of London: A Year-by-Year Record of a Thousand Years of History*. Berkeley: University of California, 2000.
- Royal College of Physicians of London. *Certain Necessary Directions, as Well for the Cure of the Plague as for Preventing the Infection: With Many Easie Medicines of Small Charge, Very Profitable to His Maiesties Subiects Set Downe by the Colledge of Physicians by the Kings Maiesties Speciall Command; with Sundry Orders Thought Meet by His Maiestie, and His Privie Councell, to Be Carefully Executed for Prevention of the Plague; Also Certain Select Statutes Comanded by His Maiestie to Be Put in Execution by All Justices, and Other Officers of the Peace Throughout the Realme; Together with His Maiesties Proclamation for Further Direction Therein, and a Decree in Starre-Chamber, Concerning Buildings and in-Mates*. London: Robert Barker and the assignes of John Bill, 1636.
- Russell, Paul A. "Syphilis, God's Scourge or Nature's Vengeance? The German Printed Response to a Public Problem in the Early Sixteenth Century." *Archive for Reformation History* 80 (1989): 286-307.
- Sabine, Ernest L. "Butchering in Medieval London." *Speculum* 8, no. 3 (1933): 335-353.
- . "Latrines and Cesspools of Medieval London." *Speculum* 9, no. 3 (1934): 303-321.
- Schofield, John. "The Construction of Medieval and Tudor Houses in London." *Construction History* 7 (1991): 3-28.
- . *Medieval London Houses*. New Haven: Yale University Press, 1994.
- Schofield, Roger. "An Anatomy of an Epidemic: Colyton, November 1645 to November 1646." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, 95-126. Derbyshire: Local Population Studies, 1977.
- Scott, Susan, and Christopher J. Duncan. *Biology of Plagues: Evidence from Historical Populations*. Cambridge: Cambridge University Press, 2001.
- Sebbane, Florent, Clayton O. Jarrett, Donald Gardner, Daniel Long, and B. Joseph Hinnebusch. "Role of the *Yersinia Pestis* Plasminogen Activator in the Incidence of Distinct Septicemic and Bubonic Forms of Flea-Borne Plague." *PNAS* 103, no. 14 (2006): 5526-5530.
- Shrewsbury, J. F.D. *A History of Bubonic Plague in the British Isles*. Cambridge: Cambridge University Press, 1970.
- Siraisi, Nancy G. *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice*. Chicago: The University of Chicago Press, 1990.
- Slack, Paul. "The Disappearance of Plague: An Alternative View." *The Economic History Review* 34, no. 3 (1981): 469-476.

- . *The Impact of Plague in Tudor and Stuart England*. London: Routledge & Kegan Paul, 1995.
- . "The Local Incidence of Epidemic Disease: The Case of Bristol 1640-1650." In *The Plague Reconsidered: A New Look at Its Origins and Effects in 16th and 17th Century England*, 49-62. Derbyshire: Local Population Studies, 1977.
- . "The Response to Plague in Early Modern England: Public Policies and Their Consequences." In *Famine, Disease and the Social Order in Early Modern Society*, edited by John Walter and Roger Schofield, 167-187. Cambridge: Cambridge University Press, 1989.
- Stengaard, Mette, and Poul R. Kruse. "Drug Therapy in the Official Danish Plague Instructions, 1619-1709." *Pharmacy in History* 44, no. 3 (2002): 95-104.
- Stow, John. *Stow's Survey of London*. London: Dent, 1956.
- Sullivan, Robert. *Rats: Observations on the History and Habitat of the City's Most Unwanted Inhabitants*. New York: Bloomsbury, 2004.
- Thorndike, Lynn. *A History of Magic and Experimental Science*. Vol. 1. New York: Macmillan Company, 1941.
- Twigg, Graham. *The Black Death: A Biological Reappraisal*. New York: Schocken Books, 1985.
- . "Plague in London: Spatial and Temporal Aspects." In *Epidemic Disease in London*, edited by J.A. I. Champion, 1-17. London: Centre for Metropolitan History, 1993.
- Voltaire. *Voltaire: Letters on England*. Translated by Loenard Tancock. London: Penguin Books, 1980.
- Von Hutton, Ulrich. "De Morbo Gallico." In *Classic Descriptions of Disease: With Biographical Sketches of the Authors*, edited by Ralph H. Major, 34-41. Springfield, IL: Charles C Thomas, 1939/1519.
- Walters, Mark Jerome. *Six Modern Plagues and How We Are Causing Them*. Washington: Island Press/Shearwater Books, 2003.
- Werner, Alex, and Roy Porter. *London Bodies: The Changing Shape of Londoners from Prehistoric Times to the Present Day*. London: Museum of London, 1998.
- Wiechmann, Ingrid, and Gisela Grupe. "Detection of *Yersinia Pestis* DNA in Two Early Medieval Skeletal Finds from Aschheim (Upper Bavaria, 6th Century A. D.)." *American Journal of Physical Anthropology* 126 (2005): 48-55.
- Willson, F. P. *The Plague in Shakespeare's London*. Oxford: Oxford University Press, 1963.
- Wilson, F. P. *The Plague in Shakespeare's London*. Oxford: Oxford University Press, 1963.
- Woolhouse, Mark E. J., Louise H. Taylor, and Daniel T. Haydon. "Population Biology of Multihost Pathogens." *Science* 292, no. 5519 (2001): 1109-1112.
- Ziegler, Philip. *The Black Death*. New York: Harper Torchbooks, 1969.
- Zimmer, Carl. "Genetic Trees Reveal Disease Origins." *Science* 292 (2001): 1090-1093.

Zuckerman, Arnold. "Plague and Contagionism in Eighteenth-Century England: The Role of Richard Mead." *Bulletin of the History of Medicine* 78, no. 2 (2004): 273-308.

APPENDICES

Author Note: These appendices are my paraphrases and summaries combined with a small amount of critical comment on plague orders printed in London between 1577 and 1665 and Simon Kellwaye's book on plague and smallpox.

A—1577: STC (2nd ed.) 16707.1, Early English books Microfilm roll #1881:7

Articles to Be Enquired Of, What Orders Have Bene Put in Execution, for the Restreinyng of the Infected of the Plague, Within the Citie of London and Liberties Thereof. City of London (England) Court of Common Council: Printed by J. Day, 1577.

This very short one page plague document is the earliest one that I have, but its title makes it clear that there was a tradition of official responses to plague. This document is only six paragraphs long, each of which asks questions about specific plague prevention issues.

The first of them seeks information as to the weekly numbers of people who died of the plague, and who the people were that were infected as well as what houses were infected, since the first of August within London and its liberties. The second paragraph asks for the names of the people who died who were the masters and owners of the houses in which they died as well as the names of the parishes in which the said houses were located.

The third paragraph asks what measures were taken for the retrieving infected people dwelling in the said houses from the company of others not infected and whether their doors and shops were shut up and for how long they had been shut up. The fourth asks what provisions were taken for the relief of the poor during the time of the plague while they were restrained from going abroad by the orders. The fifth asks whether there were any breaches of the said orders, and if there were by whom, and whether the offenders were duly punished for transgressing the Orders.

The final paragraph asks if there has been any partiality either in restraining the poor more than the rich upon infection, or in sparing the rich who transgress the beneficial measures taken to stay the infection, or if the poorer sort were more severely punished. And the order concludes with the phrase “God Save the Queen.”

B—1578(?): STC (2nd ed.) 9187.9, Early English books Microfilm roll #1752:34

Orders Thought Meete by Her Majesty and Her Privie Counsell to Be Executed Through out the Counties of this Realme and in Such Townes, Villages and Other Places as Are, or May Be Hereafter Infect with Plague for the Stay of Further Increase in the Same. England and Wales Elizabeth I (1558-1603): Printed by Christopher Barker 1578(?).

These orders were printed along with medical advice under the even longer title of *Also an advise set down upon her maiesties express commaundement, by the best learned in Physicke within this Realm contayning sundry good rules and easy medicines without charge to the meaner sort of people, as well for the preservation of her good subjects from the plague before infection as for the curing and ordering them after they shall be infected.* This set of plague regulations have been tentatively dated to 1578, presumably because of textual factors as well as because of the plague outbreaks which began in 1577 and became more serious in 1578. Many of the subsequent plague orders, including those issued by the city of London as well as those issued by the crown and the privy counsel follow this model: laws followed by medical advice. Indeed several of the following plague orders are virtually identical in terms of their content.

The first of these laws or regulations requires that all the justices in all the counties, including within the liberties of London, shall meet together in a place that is free of plague and that the justices should share ideas and plans on how the laws that follow should be executed. This rule further mandates that justices should not be expected to attend if they live in an area of plague infection and that after the meeting, the justices should assure that public services are maintained across regions. The second regulation requires that the first order of business be that the justices ascertain where plague is at the time of the meeting, how many towns and how many market towns are affected, and that they make an assessment of the wealth of the people in order to determine that they are able to provide relief to the poor who are constrained in their houses due to plague.

The third regulation requires that if the justices think it necessary, they should levy some sort of general taxation, either on the city as a whole, or on individual wealthy people. It suggests that the tax should be collected monthly as long as the plague continues and that the taxes should be used to see that these orders are enacted. In order to reduce the spread of plague, this regulation further provides that if a town cannot contribute enough to pay the required charges, the tax should be expanded beyond the town, even into a neighboring shire with assistance of the justices of the other shire.

Item number four spells out the duty and rules for appointing viewers who were parish workers appointed by the curate with the assistance of three to four important

men (pdf 3). The viewers were to inspect all bodies and certify the cause of death to the minister and church wardens, and their pay was to be increased when the town or parish was infected. Additionally, punishment is authorized for those who refuse this position when appointed and for viewers who make inaccurate death reports due either to corruption or favoritism. Item five concerns the rules for quarantining houses where plague is known to be, either because it was reported by a viewer or through some other means. This rule states that houses are to be closed up for six weeks; however, the regulation offers concessions in the case of widely separated houses. The regulation gives, as an example, farmers who need to continue caring for their fields and animals, as long as they avoid the company of other humans and wear some mark of plague on their “uppermost garments” or carry a white rod when they go abroad (pdf4). This rule also contains a provision to guard the houses, especially at night, of people who might not obey the regulation to remain confined. This rule also mandates that infected houses be marked for the duration of the quarantine period. It stipulates that alehouses take down their signs in addition to being marked as infected.

Regulation six requires that honest people be appointed to collect money to support the poor during “the time of their restraint” (pdf 4). Rule number seven requires that towns appoint people to provide for those who are “restrained” within their houses. People with means are required to pay for their own maintenance while the poor are to be kept at public expense. This rule also stipulates that the people appointed to

provision the sick not attend public gatherings, and that they mark their clothes to signal that they have been exposed to plague.

Item 8 requires that preservatives be made available for those who might otherwise have difficulty getting them. It specifies that recipes using low cost, readily available ingredients be printed and posted in market places and churches.

Item number 9 stipulates that ministers, wardens and curates shall produce a weekly written report noting the number of people who were “infected and did not die” as well as a count of the number of people who died, along with the cause of their death (pdf 5). This information is to be submitted to the justices, and the records are to be maintained by “the Clerke of the peace” or the equivalent. Rule ten requires that people who die of plague be buried after sunset and yet in daylight in a place apart. Additionally, this rule requires curates to perform their required duties but to maintain their distance from both the deceased and the people accompanying the body.

Item 11 demands that justices from all over the county meet every 21 days in order to inform the privy council of the extent of plague in the country and to assure them that the laws concerning plague are being enforced. Item 12 further requires that the justices in a hundred, if plague is present there, along with justices in adjoining areas, meet weekly to take account of the status of the disease and the execution of the orders. It specifies that if they find that laws are not being enforced properly, they can report this to the general assembly to request assistance.

Item 13 begins with the statement that handling the clothes and bedding and “other stufte as has bene worne and occupied by the infected of this disease, during the

time of their disease” is the fastest way to spread plague. Because these materials pose such a threat to health, justices shall order that clothes and other things belonging to people who were sick, regardless of whether they died or recovered, are either burnt, cleaned with fire, or well aired in a manner prescribed by physicians. The regulations also provide that there should be money collected to recompense those who are too poor to replace the clothes and bedding if it is deemed appropriate to burn them.

Item 14 gives the justices the authority to create additional regulations to control the spread of plague and to punish those who do not obey the orders. Item 15 provides for supplementing the justices in order to assure that the laws are enforced, if not enough justices attend the meeting (pdf 6). Number 16 provides that ecclesiastical and even lay people who publicly state that the rules demanding the isolation of the ill are not charitable will be apprehended and forbidden to preach upon threat of punishment. This item concludes with the statement that these orders, by their attempts to assure that “no persons of the meaner degree” will be without help and support, manifestly uphold Christian charity (pdf 6). The final item, number 17, states that the justices will take great care to protect her Majesties subjects who may “by very disorder, and for lacke of direction due in many partes willfully procure the increase of this general contagion” (pdf 6).

The initial section of laws is followed by “An Advise set down upon her Maiesties express commandment by the best learned in Physicke within this realm, conteyning sundry good rules and easie medicines, without charge to the meaner sort of people, as well for the preservation of her good subjects from the plague before

infection, as for the curing and ordering of them after they shall be infected.” The first page of this section, (pdf 7), providing instructions for correcting the air within houses that will serve as a plague preventative measure, begins immediately below the extremely long title.

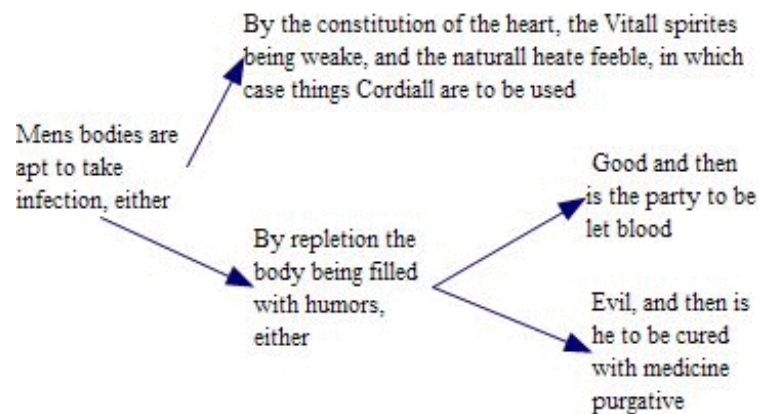
The instructions include burning some sweet smelling herb, rosemary, bay leaves, frankincense, lavender and sage or birch or juniper in a chafing dish or pan so that the smoke can be wafted around the house. Instructions are also included for vinegar based air freshener, which is made by adding a little rose water along with rosemary branches to strong vinegar in a basin, and then adding heat. The instructions advise heating flint stones until they are burning hot, dropping them into the vinegar mixture, and then letting the fumes be carried from place to place. The instructions for clearing the air in houses are followed by the header “Perfuming of Apparel” (pdf 8). The clothes that people wear often should be very clean and should be perfumed often, either with burned red sandalwood or juniper.

The instructions include a special caution for those who come into contact with people who are infected. These people should change their clothes and air out their exposed clothes as soon as they get home. The next section gives preventative measures, first those to be used in the open air, especially in the presence of crowds, and then things to be taken internally. For external use, it suggests holding something sweet smelling in the hands or wrapped in the corner of a handkerchief. It also recommends a sponge dipped in vinegar and rose water or vinegar that had been boiled with wormwood or rue (herb-grace).

This advice is followed by a section on “inward medicine.” The first recipe is simple; take some rue or wormwood, or some of both, and put it into a container of a usual drink. Tightly close the container and let it steep overnight. Drink some in the morning. The instructions then continue on to advise eating sorrel sauce with morning bread during summer plagues and to use bayberry juice with bread in the fall.

On page Ci.r (pdf 9) is a figure (Figure 1) that provides a simple assessment method for determining what kind of preventive treatments are appropriate.

Figure 1. Preventative Treatments



Following this are instructions for a number of recipes for preservative cordials. The first recipe for Mithridates medicine provides an example of the measurements and instructions. Take one hundred washed and non-wormy figs or cleanly shelled walnuts, leaves of green rue (*Ruta graveolens*) the weight of 2 shillings, and the weight of three pence of common salt. Cut the figs into pieces and mash them and the walnuts with a mortar until they are in very small pieces, then add the rue. Stamp and stir the rue into

the rest of the mixture and then, finally, add the salt and further stamp the mixture together until it becomes one substance. Of this substance take a morsel the size of two or three figs for breakfast; for children, half this dosage is sufficient. The dosages can easily be adjusted up or down – by taking a greater or lesser quantity of the simples according to the proper proportion.

This is followed by “A well Approved Medicine to preserve” (pdf 9). This recipe calls for the weight of 3 French crowns or 22 pence of each of the following items, “the finest cleare Aloes you can buy, in a colour like to a liver” (pdf 9), cinnamon and myrrh, and, it calls for half an ounce of cloves, mace, lignum aloes, mastick, and Bole Orientall. The instructions note that all of the ingredients can be easily found in any good apothecary shop except for Bole Orientall used instead of Bole Armenus, which is plentiful in a couple of apothecary shops including the Queen’s apothecary Master Rich and Master Morgans.

The instructions call for all the ingredients to be mixed together and beaten into a fine powder. This powder is to be taken in the morning in white wine diluted with water. This recipe is followed by eight briefer recipes for preventative medicines, including the instruction to take six sorrel leaves and soak them in water and vinegar and then eat them at breakfast. Next are recipes “for women with childe, or such as be delicate and tender, and cannot [get] away with taking of medicines” (pdf 9). Make toast from white or second bread as you think good, and sprinkle it with a little good wine vinegar, made with rose leaves, or if that is not available, any good common or used vinegar, spread the toast with butter and sprinkle with a little cinnamon; eat this

for breakfast. Poor people who cannot get vinegar or cinnamon can eat just bread and butter, as butter is a defense against plague and “all manner of poysons” (pdf 10).

The instructions then continue by noting that when forced to go to a place where there are infected people, it is good to chew the roots of angelica, gentian, or valerian. The final preventative advice is labeled “another preservative for the poore” (pdf 10). Take a handful of rue and an equal amount of wormwood and bruise them a little and put them into a pot of tin or earth, cover them with vinegar, and close the pot up. Then when you fear infection dip a sponge into the vinegar, which you can carry with you, and smell it. Alternately the sponge can be put into a ball with holes made of ivory or juniper, which can be carried and smelled. The sponge should be renewed daily.

The next section is titled “to be used after infection taken” (pdf 10). This begins with a statement that because plague is more a matter of poison than of humors, treatment of plague should involve sweating the patient and taking cordials that protect the heart. The first of these treatments is a suppository made of boiled honey and a little salt. This is followed by “an excellent Medicine made with out charges” (pdf 10). This medicine consists of powdered husked bayberries, a spoonful of which should be taken in a drink, ale, beer or wine drunk before bed. It will produce a sweat.

“An other sovereign remedie, that is a stilled water” follows in a section concerning medicines “to be used after infection taken” (pdf 10). This medicine includes ash bark, a pound of walnuts, scabious, vervain, petimorel, howfleck, and saffron. The instructions say to gently boil these ingredients in vinegar and then put them in a closed jar and leave the jar on the embers overnight. The instructions suggest

giving the medicine to a well bundled patient in bed in order to provoke sweating and they further suggest that the medicine can be made in the summer when green walnuts are available, and stored for later use.

This is followed by three brief numbered sections: 1. Bloodletting, 2. Medicine purgative and 3. Medicament expulsive (pdf 11). In the section on bloodletting, the instructions say that if the patient is full of humors he should be bled from the right arm on the first day if there is no sore. Section 2 provides two purgative options, one for the poor and one for the rich: for the poor it suggests aloes in apple pappe (the soft down of an apple); for the rich, pills of rufus. These two treatments should only be used if no sores are present; then, after the patient has been bled and purged, he should be given cordials to protect his heart. The third section begins by stating that the poison is best expelled by an ale posset. Two recipes are given, one for winter and one for summer; both versions included “Diatessaroum triacle” (treacle, made of 4 parts). In summer it is suggested that sorrel, bugloss, and borage be added to the ale while in winter the instructions call for the addition of fennel and marigolds. After taking this drink, the patient should lie down quietly and sweat for one and a half hours to one full hour if the patient is strong. It further states that people who are not full of humors do not need either blood letting or purging but should make use of cordials that produce sweating.

These suggestions are followed by “What is to be done when there is any swelling in any part” (pdf 11). “Then by these three means the poyson be expelled outward by Botches, carbuncles or markes, called Gods markes, according as nature doth expell, so must the further procedings be, providing still, that they continue still in

the use of the cordiall and moderate sweating now and then” while the sores are healing (pdf 11). The sores must be handled with great discretion by a surgeon.

The next section is titled “Medicines to be used in ordinarie dyet” (pdf 12). This section begins with the cautious statement that “it is thought that the powder of harts horne hath a special prerogative, to be used al the time of their sickness in their broths and supping” (pdf 12). Again the ingredients for summer and winter broths differ. In summer, sorrel, borage and bugloss are to be used while in winter betony (*Stachys Betonica*) and scabious or morsus diaboli.² If these do not serve, aleberry can be made of ale boiled with nutmeg, clove, or a caudle, a thin gruel made with wine or ale along with mace and sanders (sandalwood).

The next section, which is entitled “Outward medicines to be applied to the Sore,” is composed of a series of recipes (pdf 12). “Another excellent medicine to ripen and bring out the sores” contains the instructions to make a medicinal poultice (pdf 13). The ingredients required are: one cut up onion, three ounces of butter, the weight of 12 pence of leaven, one handful of Mallows, if possible one handful of Scabious, and the weight of 20 pence of garlic and cloves. The ingredients are to be boiled in enough water to make a poultice, which should be placed while warm on the sore. This is followed by another poultice recipe. Take two handfuls of Valerian, three roots of Danewort (Dwarf Elder, *Sambucus Ebulus*), a handful of smallage (celery or parsley) or lovage if you can get it. Put these ingredients along with a few bread crumbs in butter

² While some of the botanical terms used in these publications can be found in the Oxford English Dictionary, and some seem to have disappeared with little trace, others can most easily be found in contemporaneous botanical manuals.

and water and form it into a poultice. Use the poultice while it is warm by placing it on sores. This poultice recipe is followed by another similar one, which is followed by “A general medicine for all sorts of people taken by the plague to be had without cost” (pdf 13). These instructions describe the making of a drink. Take an ounce of butterbur (*Petasites hybridus*), also known as pestilent-wort, a quarter of an ounce of valerian root, and a handful of sorrel. Boil the ingredients in a quart to a pint of water and then strain it and add to spoonfuls of vinegar and two ounces of sugar and boil again until well mixed. A bit of his brew should be drunk while it is as hot as the patient can take it. If the patient throws it up, he should drink the same amount again. He should sweat and he will find this a big help.

This recipe is followed by advice on how long people should avoid crowds after they have been infected by plague (pdf 13). The sick are instructed to remain apart from the well until their sores have stopped running and they are completely healthy. It notes that the return to health is quicker for people of sanguine and choleric complexions than for those of melancholic or phlegmatic, and it further recommends that such people should not converse with sound people for a month. The final brief section is titled “Infected clothes” (pdf 13). The best way to eliminate the contagion, which is thought to remain in cloth of both wool and linen, is to use fire and water. Clothes should be washed and aired often, both in frosts and sunshine. Clothes of little value should be burned.

The copy of the document from which the pdfs for the EEBO database includes three pages that were originally blank, but which now are covered with illegible handwriting.

This document served as a model for many of the subsequent plague orders issued by both the crown and the city of London.

C—1593: STC (2nd ed.) 9200.3, Early English Books, Microfilm roll #1775:41

Orders, Thought Meete by Her Majestie, and Her Privie Counsell: To Be Executed Throughout the Counties of This Realme, in Such Townes, Villages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same : Also, an Advise Set Downe Upon Her Majesties Expresse Commaundement, by the Best Learned in Physicke within This Realme, Containing Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, As well for the Preservation of Her Good Subjects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected . Elizabeth I, Sovereign England and Wales. Imprinted at London: By the deputies of Christopher Barker, 1593.

The first two images included in this portable document format (pdf) version of this are not the first pages of the original document listed in the Early English Books online database. The title page appears to be in German and indicates that the document was published in 1609. The second page appears to be an English translation of page 3, which is also in German. These pages include three articles addressing the treatment of the English citizens under the Spanish Inquisition. The third pdf page begins in the middle of the third plague regulation and continues with the fourth article. The remaining document is virtually identical to the Plague Orders issued in 1578.

Although this is virtually identical the plague orders printed some 15 years earlier, the type face is different as is some of the orthography. In the earlier document

“on” is written using “ō.” For example, in the earlier document, cinnamon is spelled as cinamō in “A well approved medicine to preserve,” but the word becomes cinimon in the later document; and the spelling of contagion in the final entry of the order changes from cōtagion to contagion in the later document.

In the seventeenth section of the “Orders to be observed,” the word doe in the earlier document becomes do, but there are no other changes in section seventeen. There are many other minor typographical or spelling differences between the two documents. In the earlier version of the recipe for Mithridates Medicine (mithridate), two forms of the word ‘the’ are used; for example, “Take of good Figges not wormeaten, cleane washed, of walnuts y kernels cleane picked, of either of them an hundred, of the leaves of greene Rue....”³ In this 1593 version as well as in later versions of these orders, all “thes “are spelled out (pdf 6). The spelling in the earlier version is considerably less consistent than in this and later versions, nonetheless it remains inconsistent.

Although some of the spelling has been updated in this version, other information that might have benefitted from an update was not altered. For example, in the earlier edition of these instructions, the information included, as part of the recipe for a well approved medicine (pdf 6), which immediately follows that for Mithridates Medicine, mentions that all the ingredients except Bole Oriental, which this recipe calls for instead of Bolus Armenus (bole armoniak or armeniac), could be found in any good

³ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councill*, np.

apothecary shop. The recipe further specifies that Bolus Armenus could be found in two specific London apothecary shops: Master Riches the Queen's apothecary and in Morgan's shop in Cheapside. In this version, printed an estimated fifteen years after the other, it might be expected that the information would have been amended because the places where Bole Oriental was available or the names or owners of the shops might have changed. Moreover, given that the Oxford English Dictionary does not include the term Bole Oriental, it is likely that it wasn't a common term or wasn't commonly used. Since the goal of the medical material accompanying the plague orders was to give instructions for "easy medicine of little cost" so that all people could be protected from plague, it would seem logical for the later edition to provide an alternative ingredient.

The first portion of this document contains seventeen numbered items that spell out the actions that should be taken to combat and lessen the damages of plague. However, the first three are missing from the pdf version of this document. I do not know if this combination of two unrelated documents occurred during the digitizing process or earlier, but the pages of the two documents are similar but not identical in size and shape. The three regulations missing from this copy are presumably virtually identical to Plague Orders issued in 1578. The remaining portion of this document is virtually identical to the earlier version with aside from the previously mentioned sections.

D—1608: STC (2nd ed.) 16723.5, Early English Books, Microfilm Roll #1820:11

Orders conceived and agreed to be published, by the Lord Mayor and Aldermen of the Citie of London, and the Justices of Peace of the Counties of Middlesex and Surrey, by

direction from the Lords of his Majesties most Honourable privie Councell City of London (England) Lord Mayor: Printed by John Windet, printer to the honourable citie of London, 1608(?).

The original document appears to have been four pages; however, this copy preserved in the Early English Books Online (EBBO) database, includes images of only three separate pages. Top and bottom edges in this document are damaged. A later document also preserved in the EBBO database, which is coincidentally also partial, includes the sections that are missing from this document.

In the first year of his majesty's most happy reign in England, an act was written to ensure the provision of care for the poor, and controlling those infected with plague. This act gave authority to justices of the peace, mayors, bailiffs and other officials to appoint and swear in examiners, searchers, watchmen, nurse-keepers and grave diggers to serve in times of infection. In addition, this statute provided them with the power to devise additional directions for dealing with the sickness. In order to help avoid and prevent the spread the plague, at that time widely spread throughout the city and suburbs, the orders indicate that the following officers should be appointed and the rules which follow be observed.

First, the alderman, his deputy, the common ward counsel, and justices of the peace are directed to appoint two or more respectable people to serve as examiners in each parish, who are each to serve for at least two months. If any people so appointed refuse to serve, they will be imprisoned until they conform.

The examiners will be sworn in by the justice of the peace or the alderman to determine which houses and what people are infected by plague in each parish. They

should also attempt to determine what other diseases are causing people to be sick. When they are unsure what disease is affecting someone, they should restrict access to the person, as if it were plague, until it is clear which disease is involved. When the examiners find someone “sicke of the infection,” they should tell the constable so the house can be shut up (pdf1). If the constable does not act to shut the house up, the examiners should inform the alderman or the justices of the peace.

Every infected house will be appointed two watchmen: one for the day and one for the night. The day guard is to watch the house from six in the morning until ten at night, and the night guard is to work from ten at night until six in the morning. These watchmen are not only to guard the house and to assure that no one goes in or out of the house, they are also to render other services as the inhabitants require. When a watchman is sent away on an errand, he is to lock up the house and carry the key.

This is followed by the missing page.

The second available page begins: no clothes, bedding, or garments are to be removed from an infected house. The criers and carriers of bedding and used clothing for sale or to pawn are to be retrained. No brokers of bedding or used clothing are permitted to display any of these items in stalls, shop-boards or in windows facing any street, lane or other common way, upon pain of imprisonment. Anyone who buys bedding or other stuff from a house within two months of the plague having been there will have his house shut up as infected for at least 28 days.

If any infected person manages, by dint of a negligent watchman or by any other means, to move from an infected place to some other place, the parish from which he

escaped will at their expense see to it that the ill person is returned, by night. The house to which the ill person was moved is to be shut up for 28 days. In addition, the people who helped in the escape are to be punished by “the direction of the Alderman of the Warde, and the Justices of the Peace respectively” (pdf 2).

All infected houses are to be marked by a one foot long red cross placed in the middle of the door where it can be easily seen. Additionally, the usual printed words “Lord have mercy upon us” shall be posted directly above the cross. These signs of infection are to remain on the door until the house can be lawfully opened.

The constables shall see to it that every shut up house will be attended by watchmen who are to assist the residents of the house by providing them with necessities, at the expense of the residents if they are able to pay, or at common expense if they cannot afford to care for themselves.

No searchers, surgeons, keepers or grave diggers are to walk through the streets without carrying a three foot red wand in a manner that keeps the wand plainly visible. They are not to enter any house other than their own, unless it is one they have been requested to visit in the line of duty. They are expected to avoid company especially after they have recently been in the presence of people infected with plague.

It is also ordered that weekly taxes be collected in parishes visited by plague. Within the city, tax collection is to be handled by the ward alderman; otherwise the tax collection is to be handled by justices from adjoining regions who have authority to punish those who refuse to pay.

The following rules come under the heading of keeping the streets sweet. First, it is important that all householders have the street in front of their houses cleaned every day, and see to it that it is swept every day. The sweepings and filth from the houses are to be carried away daily by the rakers. The rakers are to provide notice of their coming by blowing horns as has been done in the past. Laystalls are to be moved as far out of the city as possible and away from common passages. In addition, the rules forbid night men and everybody else to empty vaults into any garden near the city.

Special care is to be taken that no stinking fish or unwholesome meat, bad grain or rotten fruits of any sort should be within the city (pdf 3). Brewers and alehouses should be checked for unhealthy or musty casks.

No dogs, cats, conies or tame pigeons should be kept within the city, and dogs will be killed by dog killers appointed for the purpose. No more should any pigs be allowed to wander loose on the streets. Any swine found loose will be impounded by a beadle or other officer, and its owner will be punished according to an act of common council. The dogs will be killed by an appointed dog-killer

The final rules of the Order are included under the section heading entitled Orders concerning loose Persons and idle Assemblies. The first of these rules concerns wanderers. It states that, in as much as nothing is more complained about than the numerous vagabonds and wandering beggars who travel about the city and spread the plague, despite all previous laws made to control them, it is now ordered that constables and other officials who are concerned should take special care that no wandering beggars are allowed in the streets of this city, upon pain of severe punishment.

The next rule states that all plays, bear baitings, ballad singing, buckler play, or other such games and amusements that produce crowds of people are utterly forbidden and any people who ignore this order are to be severely punished by any alderman or justice of the peace. This is followed by a rule pertaining to drinking and alehouses. Disorderly drinking in alehouses, cellars and taverns is to be severely examined as a common sin of this time and a means of spreading the plague. Where any are found to offend, the penalty of the statute is to be applied severely.

In order to assure the execution of these orders, and incorporating any additional instructions that may be considered useful, it is agreed that the justices of the city and the adjoining counties should meet once every ten days. They should meet either at Sessions House outside Newgate or at some other convenient place to confer about how the orders should be applied.

Any person who neglects their required duty or who willingly offends against any article contained in these orders will be severely punished by imprisonment or otherwise as the law requires.

God Save the King

E—1625: STC (2nd ed.) 16729.3, Early English Books Microfilm Roll #1881:10

Orders Heretofore Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen of the Citie of London, and the Justices of Peace of the Counties of Middlesex and Surrey, by Direction from the Lords of His Majesties Most Honourable Privie Councill and Again Published. City of London (England) Court of Common Council: Printed by Isaac Jaggard, 1625.

This document is a reissue of Orders published in 1608. It appears to be identical to the earlier document. Like the earlier document, the document that EEBO used to make pdfs, for the online document data base is missing a page, luckily, it is missing a different page than is missing from the 1608? document. I will summarize only the portion of this document that was not included in the earlier version, the second page. The first page of both documents concludes with rules concerning watchmen. In this document, the rules concerning watchmen are followed by rules labeled surgeons, as well as a number of rules dealing with infected people and houses, which are missing from the copy of the earlier document.

The page begins with a section tagged “Chirurgions,” which begins by stating that care should be taken to appoint respectable honest women searchers, the best that can be found, for every parish (pdf 2). These women are to investigate and then make an honest report to the best of their ability about the causes of death of the people they are called to investigate. Because in the past there has been great concern about the veracity of their reports, it is therefore ordered that three capable and discreet surgeons be appointed, in addition to those selected to work in the pest-houses, and each of these six will have a quarter for his responsibility.⁴ Within their area of responsibility, the surgeons will join the searchers in viewing bodies. In addition, the surgeons will respond to those who request them, or go to see sick people who are reported to them by the examiners in order to determine the disease responsible for their sickness.

⁴ The six is not explained. It suggests that three doctors were appointed to work in pesthouses.

Because the surgeons are only to be allowed to treat plague victims, and victims of no other diseases, the surgeons are to be paid 12 pence for each body searched. This fee is “to be paid out of goods of the party searched, if he be able” and otherwise the fee is to come from the parish (pdf 2).

The section concerning the role of surgeons is followed by “Orders concerning Infected Houses, and Persons sicke of the Plague” (pdf 2). The first of these requires that the master of the house notifies the examiner of health within two hours of anyone within the household complaining of a purple botch or swelling in any part of the body. The second rule relating to the shutting up of houses, states that as soon as anyone is determined by an examiner, surgeon, or searcher to be sick of the plague he will be sequestered within the house in which he was found. The house should be shut up for a full month whether or not the plague victim lives or dies.

The next rule relates to the airing of goods. Materials from the houses of the infected, including bedding, clothes, and hangings, must be aired with the use of fire and perfumes requisite in the house before these materials can again be used. This airing is to be by an appointment of the examiner. This is followed by another rule, addressing the shutting up of infected houses, which states that if any unauthorized person visits an infected person or house, the house in which he lives should be shut up for some days, the length to be set by the examiners.

The orders then proceed to address the issue of keeping those infected or exposed to plague shut up. The rules state that no one is to be moved from the house where he fell sick, unless it is to a pesthouse or to another house owned by the sick

person and occupied by his servants. In addition, when a sick person is moved from one parish to another, the second parish must be given assurance that the sick person will not require any assistance from the parish. The transfer from one house to another must be done at night. Anyone who has two houses can move either the ill or the well to the second house so that one house is occupied by healthy people, and one by the sick. Once the sound and sick have been separated, people may not be transferred back and forth again. The house occupied by the healthy should be shut for one week to give the infection time to appear in any of those who had appeared healthy. The requirement to close up the healthy house for a short quarantine is interesting because it demonstrates that although stories like the infection of Eyam gave credence to instantaneous infection, it was generally understood that a period of time passed between exposure and signs of infection.

The rules on closing houses are followed by regulations for the burial of the dead. Those who die of this infection are to be buried at convenient times, before sunrise or after sunset, and the burial should be performed in the privacy of churchwardens or constables. No neighbors or friends are allowed to accompany the corpse {coarse} to church, or to enter the house of the dead upon pain of having his house shut up or being imprisoned.

From this point the rules appear to be identical to those previously described from 1608, except that this document appears to be missing the final page of the Orders.

F—1625: STC (2nd ed.) 16729.1, Early English Books Microfilm Roll #1881:08

Orders to be used in the time of the infection of the Plague within the Citie and Liberties of London, till further charitable provision may be had for places of receite for the visited with infection. City of London (England) Court of Aldermen: Isaac Jaggard, Printer to the Honourable City of London, 1625.

These London Orders are only two pages long, but the pages have relatively small margins and the lines of type are very closely set.

Each Alderman should convene the deputy, all the Church-wardens, constables, parish clerks, sextons, and beadles of his ward to charge them with discovering which houses in each parish and precinct are infected. Every constable is to notify in writing the alderman, or deputy alderman, of his ward what houses are infected. In turn, the aldermen should forward this information to the appropriate parish surveyors. Any house where people become sick or die of the plague is to be judged infected, as shall any house from which a sick person was removed if another person falls sick in the same house.

Every inhabitant of an infected house, master, mistress and everyone else, must remain in the house and all the doors and windows of the house and shop or lower portions of the building shut up for 28 days after the last death or the last sores are fully recovered. During this period when the house is shut up, no clothing, linen or other material shall be hung out over the street.

No one is allowed out of a closed up house except one person (and met sundry at sundry times) appointed by parish surveyors to provision the household with necessities. While out of the house, this person must carry, in a manner plainly visible,

a red wand at least three feet in length, which is to be provided by the parish. These potentially infected people should walk on the channel side of the street and should avoid coming close to other people, and they must avoid crowds on pain of imprisonment without bail.

Provision is made that the owner of a house and his dependants are allowed to leave the city and its liberties during the 28 days for another of his or her houses in the country or in another part of the city, without being shut up in such an infected house. Everybody who leaves must refrain from returning to the city and its liberties, or from moving from the other house within the city during the 28 days, or he shall be imprisoned. The liberality of these rules, which seem to allow considerable freedom of movement suggest an acknowledgment of two separate difficulties. The first difficulty being that during this severe epidemic not all parishes had the resources to provision quarantined houses and the second that it was impossible to maintain the same restrictions on the wealthy, those with two houses, as on the poor.

The church wardens and constables of each precinct should have women as needed to provision and care for the sick of the precinct. This care will be paid for by the sick householders if they are able, and if not, the expense will be borne by the parish. Once the women begin providing this service, they must carry red wands, walk on the channel side of streets and avoid crowds.

Those who have pumps and wells shall draw at least ten buckets of water that should be poured down the channel before six in the morning and again after eight in the evening. In addition, each of the households should sweep the streets in the morning

and evening so that material is swept to edge of the channel. The streets may be wetted to control dust and the mud and filth of the channel should be raked out onto the street so that the water can flow cleanly down the channel. Rakers and scavengers are to clean the streets and remove the debris swept up by the householders everyday except Sunday. To assure themselves that these precautions are being taken, aldermen or their deputies should frequently visit their wards.

The sexton or the clerk of every parish should make sure that the door of every infected house is clearly labeled in a manner that is plainly visible to passers by with the phrase “Lord have mercy upon us” (pdf 1) The constable of the precinct and the beadle of the ward should check everyday to see that the words remain posted, and are not “blotted or defaced” for the full 28 days that the house is to be shut. If the paper with the words is defaced or removed with the householder’s consent, the paper is to be replaced and the household shut up for 28 days from the time the sign was defaced. People defacing or removing these signs will be imprisoned.

In every parish “two sober ancient women” should be appointed and sworn in as viewers of the bodies of the dead (pdf 2). After these women have seen the bodies, they must report the death or infection to the constable of the precinct in which the death occurred, so that a true report of deaths can be reported to the alderman or his deputy and to the parish clerk and to the Clark of the parish clerks. If the viewers, constables, or clerks fail in their duties, they risk imprisonment as previously stated. In addition, any woman so sworn who due to corruption or for some other reason provides a false report shall be pilloried “and beare corporall paine by the judgement of the Lord Mayor

and Court of Aldermen” (pdf 2). When these women walk in the streets they should walk along the channel (gutter), carry red wands, and avoid assemblies as well as contact with other potentially infectious people. Women, or others appointed to plague service, who refuse to serve or fail to serve shall be refused a pension from the parish or hospital.

The Lord Mayor will issue a proclamation stating that nobody is allowed to keep dogs unless they are kept in the house and not allowed to run free on the streets. Even dogs kept within houses are not permitted if they make noise and annoy the neighbors. The common huntsman will be given special charge to kill all dogs found loose on the streets within the city and surrounding suburbs. The huntsman is to be paid two pence by the City Chamberlain. The dogs are to be buried at least four feet deep in the fields. If the huntsman shirks this task or shows favor and does not kill dogs, he will lose his position and be imprisoned. If the alderman gets complaints about a noisy dog, the owner will be called before the ward and the dog will be killed.

No dead body shall be allowed to remain in the church or be buried during common prayer, sermon or lecture. No children will be allowed near a corpse, coffin or grave or in the church or churchyard at the time of a burial. All graves should be at least six feet deep. In addition there will be no burial dinners, gatherings or other solemnities at the home of a plague victim within 28 days of the death. Within these 28 days, no person is to be admitted to such an infected house except the people that reside within at the time of the infection, or those appointed by the surveyors to provide needed aid to

the residents. If anyone is admitted to the house, it is to remain shut up for another 28 days.

Care should be taken to assure that all holes in street pavements in which water or filth can stand, and thus increase corruption and the infection, are filled in. Anyone who goes out with a running plague sore is to be imprisoned for 28 days, and at the pleasure of the mayor and the alderman's court may suffer additional corporal punishment. No stable, alehouse or other place shall be allowed to maintain dunghills in streets or other open places within the city or suburbs on pain of the offender suffering imprisonment until the mess is cleaned up. Additionally, offenders must be bound never to commit the offense again.

Profane spectacles like plays, fencing and other assemblies and calls to the same shall be restrained within city liberties. In addition, the Honorable Counsel shall be politely requested to forbid such gatherings in the counties around London.

In every parish, two or more, as needed, prosperous and discrete citizens shall be appointed to be the surveyors. The surveyors, selected monthly, are responsible for checking daily to ensure that the plague orders are observed. The surveyors, clerks, beadles, and sextons are to be sworn in before the aldermen to faithfully do their service. If any appointed person refuses to take the position or does not fulfill their duty, the alderman should remand them to the ward forthwith where they will remain until discharged by the court of the Lord Mayor and aldermen.

The College of Physicians will be consulted so that some physicians and surgeons can be appointed to care for infected people. The physicians and surgeons so

appointed will care for no other patients except those infected by the plague. For their work and advice, these appointed medical workers will be paid by the patients who are able and by the parish for their care of patients who are too poor to provide for themselves.

Anyone who through guile or cunning circumvents the letter or the intent of these orders shall receive twice the punishment as someone who openly disobeys the orders. Householders of infected houses are instructed to air out their houses and the items within during the 28 days the house is shut up. No clothes or other things from or near the infected people are to be given away or sold; instead they should either be destroyed or completely purified upon pain of punishment at the discretion of the Lord Mayor and Aldermen.

God save the King

G—1625: STC (2nd ed.) 9245.4, Early English Books, Microfilm roll #1775:44

Orders Thought Meet By His Majestie, AND his Privie Councell, to be executed throughout the Counties of the Realme in such Townes, Villages and other places, as are or may be hereafter infected with the Plague for the stay of further increase of the same. Also, An Advice set downe by the best learned in Physicke within this Realme, containing sundry good Rules and easy Medicines, without charge to the meaner sort of people. England and Wales James I (1603-1625), London: Printed by Bonham Norton and John Bill, 1625.

This reissued version of the “Orders Thought Meet...” that were previously issued in 1578, 1593 and 1608? begins with a brief introductory statement on behalf of his Majesty stating that while measures have been taken to control the spread of plague within London, it is time to reintroduce measures beneficial for the control of plague

throughout the country, “where his MAJESTIE is sorie to understand that the Contagion is also in many places dispersed” (pdf 3). Consequently, having knowledge of the orders and medical advice published, the King is pleased to reissue them for the benefit of the current situation. Justices of the Peace and others involved in enforcing laws are directed to see that the following orders are properly executed. This statement makes overt what can be assumed by the reprinting of the orders and medical advice; the rules covering public and private behavior during plague outbreaks were seen to be effective.

The material following this introductory section is virtually identical to the orders published earlier, although there are a few alterations. The information following the instructions for “A well approved Medicine to preserve” was slightly altered. The recipe still calls for Bole Orientall, rather than the better known Bole Armoniac and the informational section at the conclusion of the recipe still mentions that all of the ingredients used, with the exception of Bole Oriental, can be easily found in any good apothecary shop; however, it no longer contains any mention of the Queen’s apothecary shops nor indeed does it mention any specific apothecary shops where Bole Oriental could be found.

In a very brief section, specifically targeted to pregnant women and other people who cannot tolerate strong medicines, this manual, like the earlier versions, points out that plain bread and butter, which because of its low cost is also suitable for the poor, can be eaten for breakfast as a part of a healthy diet because butter is a “preservative against all manner of poysons” (pdf9). Like the previous Royal documents the recipes

in this document, feature rue as a common and important ingredient in many of the recipes.

H—1625:STC (2nd ed.) 9244.3, Early English Books, Microfilm roll #1752:37

Orders, Thought Meet by His Majestie, and His Privy Councell, to Bee Executed Throughout the Counties of This Realm, in Such Townes, Villages, and Other Places, as Are, or May Bee Heerafter, Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Advice Set Downe by the Best Learned Physicke within This Realme, Containing Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preservation of His Good Subjects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Be Infected. Edited by King of England James I, 1566-1625 and England and Wales. Privy Council, *Advice Set Down by the Best Learned Physick within This Realm.* England and Wales James I (1603-1625). London, Printed by Bonham Norton and John Bill, 1625.

Aside from a few changes in typography and spelling, for example, Privy Councell rather than Privie Councell, this document printed by Bonham Norton and John Bill appears to be identical to document to the document printed by John Bill alone with the microfilm reel number 1775:44.

I—1629: STC (2nd ed.) 9250.3, Early English Books Microfilm roll #1752:39

Orders Thought Meet by His Maiestie, and His Privie Councell, to Bee Executed Throughout the Counties of This Realme, in Such Townes, Villages, and Other Places, as Are, or May Be Hereafter Infected with the Plague, for the Stay of Further Increase of the Same: Also, an Advice Set Downe by the Best Learned in Physicke within This Realme, Contayning Sundry Good Rules and Easie Medicines, without Charge to the Meaner Sort of People, as Well for the Preservation of His Good Subiects from the Plague before Infection, as for the Curing and Ordering of Them after They Shall Bee Infected. Edited by King of England Charles I, 1600-1649 and England and Wales. Privy Council, *Advice Set Down by the Best Learned in Physick within This Realme.* Charles I, Sovereign England and Wales. London: Robert Barker and John Bill, 1629.

At Whitehall, March 15, 1629, those present were L. Keeper, L. Treasure, L. President, L. Privy Seale, L. Chamberlin, E. of Suffolke, E. of Salisbury, E. of Kellie, L. Visc. Dorchester, L. Visc. Wentworth, Mr. Vice-Chamberlin and Mr. Secretary Coke.

This book begins with a statement that the board has been told that the ‘infection’ has begun to spread throughout several parishes located close to London, so that it will pose a serious danger, if it is not controlled. Therefore, it has been decided to “reprint the Booke of Orders” describing the previously devised means of combating plague and to again enforce those orders (pdf 3). This introductory statement is followed by the identical statement made on behalf of the King as was used in the version printed four years earlier.

This introductory section is followed by 17 items that repeat, virtually identically, the statutes as previously published. The section of advice provided by the physicians is also substantially the same as that printed in the earlier versions. In the recipes specifically targeted to the poor, this manual, like the earlier versions, still claims that butter is a “preservative against all manner of poisons” (pdf11).

J—1636: STC (2nd ed.) 9063, Early English Books Microfilm roll #1877:29

By the King: A Proclamation Declaring His Majesties Pleasure Touching Orders to Be Observed for Prevention of Dispersing the Plague. Edited by King of England Charles I, 1600-1649, *Proclamation Declaring His Majesties Pleasure Touching Orders to Be Observed for Prevention of Dispersing the Plague.* England and Wales Charles I (1625-1649), London: Printed by Robert Barker, Printer to the Kings most Excellent Majestie: And the Assignes of John Bill, 1636.

This is a one page document. It states that the King has learned that plague has begun to break out in areas near London as well as in other parts of the kingdom, so the

King, with the advice of his privy counsel, is demonstrating his provident and princely concern for the common good of his subjects by reissuing the many “good Rules, Preservatives and Directions against the Infection” which were used during the last plague outbreak (pdf1). These reissued orders along with some additions will, with the blessing of God, serve to prevent the plague from increasing and further dispersing throughout the land.

Therefore, justices of the peace from all counties including those from within the liberties as well as all mayors, sheriffs, bailiffs, constables, borough heads and other of the King’s officers and ministers, who may be concerned for the care of his subjects, should inform themselves of the King’s will on this issue. All of the officials, wherever the infection may be, shall take the utmost care to ensure that these orders are observed. To this end, his majesty orders that the justices of the peace, in infected areas and those from areas adjacent to infected areas, meet in a safe place to discuss and determine how the orders could be effectively enacted to limit the increase and spread of plague. In addition the officials are directed to discuss how best to care for those that become infected. Occasionally these official should also take notice of how well and completely the orders and directions are actually enacted. Additionally these officials are to insure that those who disobey the orders are punished.

His majesty further declares that any officials, or other people, regardless of their “degree, quality or condition,” who are found remiss or negligent in enforcing and enacting these rules should expect punishment according to the law (pdf 1).

“Given at Our Palace of Westminster, the two and twentieth day of April in the twelfth yeere of Our Reigne” (pdf1).

K—1636: STC (2nd ed.) 16769, Early English Books Microfilm roll #844:22

Certain Necessary Directions, as Well for the Cure of the Plague as for Preventing the Infection: With Many Easie Medicines of Small Charge, Very Profitable to His Maiesties Subiects Set Downe by the Colledge of Physicians by the Kings Maiesties Speciall Command; with Sundry Orders Thought Meet by His Maiestie, and His Priuie Councell, to Be Carefully Executed for Preuention of the Plague; Also Certaine Select Statutes Comanded by His Maiestie to Be Put in Execution by All Iustices, and Other Officers of the Peace Throughout the Realme; Together with His Maiesties Proclamation for Further Direction Therein, and a Decree in Starre-Chamber, Concerning Buildings and in-Mates. Royal College of Physicians of London:Printed by Robert Barker and the Assignes of John Bill, 1636.

This book begins with a note to the Justices of the Peace. It states that a lack of laws, in addition to an excessive number of laws, or a lack of knowledge of the laws, can create problems. Then in a more pointed comment to the justices, the document states that magistrates who know only a few laws but enforce them are better than those who know many but do not enforce them. This book is intended to ensure that the most important laws are known so that they can be enforced as his Majesty requires.

This is followed by a list of the book's contents: 1.) Advice from the college of Physicians, 2.) Health orders, 3.) Statement of the need to speed the process of assisting the poor and settling vagabonds, 4.) An Act for poor relief, 5.) An Act for relief of soldiers and mariners, 6.) An Act for punishing rogues, vagabonds and sturdy beggars, 7.) An Act for the relief of those infected with plague, 8.) Star Chamber decree against inmates and new buildings.

At Whitehall, on April 22, 1636:

The Middlesex and Surrey justices of the peace were ordered to meet to determine the taxes needed to build pest-houses or other habitations in which to house infected people and to provide them with necessities. They are also mandated to levy and collect the taxes they deemed necessary. The justices are also ordered to meet with the Lord Mayor and the Aldermen of London to create orders additional to those already printed, for preventing the increase of infection, and then to print them forthwith. The document authorizes the justices to create new orders to further these goals. In addition, church wardens, constables and overseers of the poor of each parish are required to get books with the plague orders. Physicians of London are enjoined to update previous books of instructions on how to avoid and prevent the plague.

This section is followed by a note to the King from the Royal College of Physicians stating that they have examined former books of advice and made such changes as they deem necessary in their updated version, which they are now presenting. The note to the King is followed by their advice.

The first section of the physicians' advice is labeled "Doctors, Apothecaries and Chirurgions." In it the city is enjoined to hire some doctors to "apply themselves to the cure of the infected" (pdf7). Each of the doctors should be supplied with two apothecaries and three surgeons. This expense is warranted to control the spread of plague and so that no people will die without assistance. "While none take particular to resist it, as in Paris, Venice and Padua and many other cities" (pdf8). If doctors or surgeons die while in the employ of the city, their widows should be given their pensions for the duration of their lives.

It is necessary to protect against the dangers of men and goods from infected foreign places. First, it is important to assure that neither men nor goods from places suspected to be infected be allowed in unless they have a certificate of health or are held in quarantine for forty days, as is done in Italy, until it is clear that they are healthy or not harboring the plague. Second, two places of entertainment should be provided, one for the sound and one for the sick.

Previously established orders for the control of plague should be revived. The statutes against beggars, plays, bowling alleys, inmates, tippling houses, rules against selling bad meat or fish, should be revived and strictly enforced. Additionally, scavengers and individual house holders should take care that the streets and individual houses are kept clean, as cleanliness will do much to control the spread of disease.

Dogs, cats, conies and tame pigeons around town will be destroyed or kept sparingly so that no offence will come to them. No pigs will be allowed to roam the streets freely within the town as they often do. Pigs should not be kept in town. It would also be desirable if all slaughter houses were located beyond city liberties. Additionally, the holding of funerals in church vaults should be reconsidered, as should the minimum depth for graves (pdf 8).

Because everybody likes their freedom, it is feared that no one will admit that a member of their household is suspected of being infected with plague; thus, overseers, with the aid of doctors and surgeons, must determine the truth of reports and not rely exclusively on the words of the women searchers alone (pdf 9).

When it is discovered that a household has been infected, measures should be taken to protect the healthy as well as to cure the sick. No sick person should be moved from one house to another without permission from the overseer, nor should the sound travel from an infected house without approval. Infected houses should be closed for 40 days after the final patient has recovered. These houses should be watched over by men more trustworthy than typical warders.

When visited by plague, the masters of many households along with their families flee to the country before there are any deaths in their city houses. This flight allows the spread of plague; to counter this, no man should flee unless it is to an uninhabited house, near enough that the journey can be made in one day. Moreover, those that flee before they are infected by the plague should not travel unless they have a certificate from the overseer of their parish stating that they are free from plague and thus are free to travel. No infected person should be sneaked out of a house. An infected person can be moved from one house to another only with the permission of the overseers of both parishes. The next paragraph consists of largely illegible notes to the effect that the better sort of people are less likely to be willingly constrained by such rules and that the physicians will need to keep the overseers informed.

The overseers must be notified when and in which house anyone dies of plague. Those dead of plague should be buried privately at night, but not without the services of a minister, clerk, bearers and constable or overseers. No one shall visit the house of the houses visited with plague except those permitted, upon pain of being themselves shut up. The exterior of the doors of infected houses should be clearly marked and they

should remain closed for 40 days. There should be no tolling or ringing of bells at these private plague burials (pdf10/verso C2).

No clothing or household items should be removed or sold from an infected house until six months after the infection ended in the house. Brokers and criers of apparel should be restrained.

The following section addresses the subject of preventative measures that should be taken (pdf10/C2). The first suggestion is that fires should be lit in the streets in order to correct the infectious air. Good fires should be kept lit around infected houses. In addition, ordnances will occasionally be fired. People should place dried rosemary, juniper, or frankincense on a chafing dish and inhale the smoke. Fires made in pans, so that they can be moved around a room rather than in the fireplace, can more successfully improve the quality of the air.

Vinegar can also be used to clear the air; place some strong vinegar in a basin; add a little rosewater, ten branches of rosemary, and heat the mixture with five or six hot flint stones. The basin should be carried about the house to let the fumes travel throughout the house. The house should be frequently perfumed with rue, angelica, gentian, zedoary, setwell, juniper berries or wood burnt or timbers, or else soaked in vinegar and then burnt. Houses can also be perfumed with lime slaked in vinegar, burnt tar, rosen, frankincense, or turpentine; these can also be used in churches before prayer.

Clothing should also be perfumed. Frequently worn clothing should be kept clean as well as perfumed with burnt Virginia cedar or juniper. After coming in contact with a sick person, “shift themselves” and air their clothes in the open air (pdf 11/verso

C3) . When people travel around they should carry substances around in their hands to sniff. It is also a good idea to chew protective substances while walking in the streets. It is not good to be over-fearful nor is it good to be over presumptuous or bold. This piece of advice is followed by instructions for making various pomanders and things to hold and sniff, including one designated for the richer sort, which includes a large number of ingredients including: citron pills, angelica seeds, zedoary, red rose leaves, yellow sandalwood and galliae moschatae, among others.

The instructions for pomanders are followed by medicines to be taken internally (pdf 12). This section begins with a warning not to “go fasting forth,” but instead to eat the things they can afford that resist putrefaction. The authors suggest eating garlic, a clove or three, with butter depending on the strength of the body. “Some may eat fasting” (first thing before anything else) the fig and rue electuary whose recipe follows (pdf 12). Other things to eat include London treacle followed an hour later by bread and butter with rue or sage, or in the heat of the summer, sorrel. During summer plagues, it is good to eat sorrel with morning bread while in the fall it is best to take barberries/bayberries.

A beneficial drink can be made by steeping rue, wormword or sage in a drink which can be drunk with their morning food. The manual then proceeds to give recipes for cordials. The first is made from 24 each of figs and walnuts and a handful of salt mashed and mixed well together. In the earliest version of this recipe, the instructions called for 100 of either figs or walnuts rather than 24 of each. The instructions suggest eating 16 to 18 pence weight of this mixture every morning. The next recipe also begins

with figs, walnuts and rue but it includes a number of other ingredients including juniper and Bole Ammoniac and London treacle. It is recommended for eating at breakfast time as well as in the evening for people who have spent much time out and about.

This is followed by instructions for a medicine “for women with child, children, and such as cannot take bitter things” (pdf 13/verso D). In earlier versions this section was labeled “For women with childe, or such as be delicate and tender, and cannot away with taking of medicines.”⁵ The ingredient list includes ten items including Bole Armoniack, yellow or white sandalwood, and shavings of hart’s horn and no rue. Rue is said to have a bitter taste and is not recommended for consumption by pregnant women. This recipe is followed by one labeled for the richer sort. The ingredients for this include: shavings of hart’s horn and pearl, true terra sigillata, citron pills, red, white and yellow sandalwood, bezoar stone and white sugar candy among a number of other ingredients. It suggests that this medicine should be taken twice a day, in the morning and at about five p.m., or an hour before supper. This medicine can be made into lozenges or electuaries. All of this advice and more can be had from physicians. In addition, Bezoar water and distilled London treacle water (*aqua theriacalis stillatitia*) are very useful taken alone or combined with other antidotes.

London treacle can be usefully used both as a preventative measure against “the sickness” and as a curative agent (pdf 13/D). Men should take about two drams while

⁵ England and Wales Elizabeth I (1558-1603), *Orders, Thought Meete by Her Majestie, and Her Privie Councell*, Cii.r.

those with weaker bodies, including children, should take less, mixed with cardus or dragon water. This suggestion is followed by recipes for medicinal treatments. The recipe that immediately follows the suggestions about London treacle calls for Bole Orientall as one of the ingredients. The specific kind of treatment is not necessarily indicated nor is it clear, at a glance, where one recipe ends and the next begins. The first of these recipes is complex, with many ingredients and several steps necessary to produce it, and is recommended to be taken twice a week. It is followed by a couple of considerably shorter recipes and then by a longer selection of substances or treatments that are beneficial in combating plague. For example, Diatessaroum treacle made of only four ingredients is inexpensive and easy to find, “likewise a piece of arras roote kept in the mouth as men passe in the street” (pdf 14/D2). The physicians also recommend sorrel that has been steeped in water and vinegar, setwall, angelica root, cinnamon, myrrh and rattlesnake root.

The subsequent section of the physicians’ advice addresses purgative medicines (pdf 14/D2). It begins by stating that purging the body is a good preventative measure especially when the purgatives used are materials that resist purification, for example the pills, the recipe for which follows. The main ingredients of the recipe include aloes, myrrh and saffron. It also uses ammoniacum and some lemon juice or white wine vinegar. Depending how much purging the body needs, a pill or two can be taken in the morning or more can be taken before eating in the evening. If the patient is constipated, these pills should be augmented by a honey based suppository. For the poor, the physicians recommended aloes in the skin (pappe) of an apple, while the rich can use

ruffus pills available in any apothecary shop. People who live in infected houses or need to care for the infected may wish to have issues made in their left arm or right leg or both, depending on the advice of their physician. This is followed by advice on bloodletting. The recommendation is that patients that are full of blood and strong should be bled, but that a doctor's advice should be consulted to determine the vein to be bled, and the amount to be drained. These two treatments should be applied on the first day the patient feels ill, but only if no sore is visible. If a sore is visible, neither remedy should be used.

This is followed by a very brief section, which provides several means for inducing patients to vomit, one of which includes a spoonful of radish juice. It is followed by more general medicines that were seen to help the body expel plague poisons. The primary method for ridding the body of poison was seen to be sweating. The ingredients suggested as useful for producing a sweat include fennel, marigolds, sorrel, bugloss, and borage, mixed with London treacle. These suggestions are followed by more recipes with instructions on how to use them to treat and cure the plague including alternate recipe variations for weak bodies. The document suggests warm posset drinks should be given liberally and provides several recipes for these possets, all of which are said to promote sweating. It instructs that while the possets can be given liberally, cold drinks should be avoided. Although the instructions typically suggest giving the possets in small quantities such as a few spoonfuls to a couple of ounces mixed with some kind of flavored water, giving these possets might have helped to prevent dehydration.

After providing several recipes for creating possets, the document provides instructions for summer possets including a suggestion to poke a hole in an egg and empty it of white and yolk, and then to refill the egg with the weight of two French crowns of saffron and roast it in the embers until it becomes yellow (pdf 17). The instructions then indicate that the egg shell and saffron should be ground with a mortar and pestle along with a half spoonful of mustard seeds. The instructions then indicate that at the first suspicion that you are infected, you should take the weight of one French crown of the powder and mix it in ten spoonfuls of posset ale, which should be drunk warm. This recipe is followed by a number more for both possets and pills intended to provoke sweating. Many of these recipes and instructions differ less from those presented by Kellwaye because of the choice of ingredients than because they are addressed to the infected person rather than to the care giver, although they are interspersed with instructions addressed to a care giver.

This section on internal medicines is concluded with some general concerns and observations. The physicians state that patients should be sweat for two or three hours if he has strength, and that the patient should not sleep until the sweat is over. Once the sweating is over, they suggest that the patient should be wiped with clean linen and allowed to rinse his mouth out with water and warm vinegar, which can also be used to wash the patient's face and hands. After these things have been done, the patient can be given some chicken or mutton broth made with rosemary, thyme, sorrel, succory and marigolds. Alternately, the patient can be given watery gruel made with rosemary, winter-savory, or thyme panado (bread pulp boiled in water) seasoned with berry juice

or wood sorrel juice (pdf 18). The instructions suggest drinking beer warmed with toast or water boiled with caraway seeds, cardus seeds supplemented with bread crusts. After the patient eats, he may be allowed to sleep. The patient's mouth should be frequently moistened with water and vinegar.

If the patient throws up his medicine, the medicine should be given again or he should be given vinegar of squills (bulb of sea onion or related root), or drymel of squills with a posset drink, and then you can proceed as before. This advice is followed by instructions for external medicine (pdf 18/ E2). Vesicatory ointment applied to the arms, inside of thighs, or lower calves, extracts the poison. "Swellings under the ears, armpits or in the groines, they must always be drawn forth and ripened, and broke with all speed" (pdf 18/ E2). The physicians note that the tumors and to an even greater degree the carbuncles and blaines require the care of an expert surgeon, and then they provide some alternatives so as not to bankrupt poor people. The first is to pull the tail feathers off of a cock, hen, pigeon, or chicken and then, while holding its beak, press the rump against the sore until the bird dies. These instructions differ from those provided by Kellwaye in that they do not stress that this procedure should be repeated with fresh birds until one does not die, and because the physicians at least address the problem of the bird's sharp beak.

These instructions for pulling the poisons out of the body are followed by methods for breaking the tumor, the first of which closely resembles one given by Kellwaye. The instructions require hollowing out an onion, stuffing it, roasting it in the embers, and then placing it on the sore. The physicians do not require the onion to be

mashed or sieved as Kellwaye did and they recommend repeating the process several times and leaving the onion on the sore for several hours. They then provide recipes for several other poultices that feature herbs or vegetables that have been heated in embers, and for one of these poultices they specify that it should be burnt after it is removed from the sore.

Once the sore is broken, the authors suggest that it can be drawn and encouraged to heal by applying a mixture of egg yolk, honey of roses, turpentine, a little flour and London treacle. To treat a carbuncle they suggest applying an actual or potential cautery and surrounding, but not covering, the carbuncle with a mixture of “Bole Armoniack” or terra sigillata, vinegar and egg white (pdf 19). This is followed by several pages of additional recipes for medicines to be used in a similar fashion, although they are made of different materials and most are placed over as well as around the sores. One of the recipes also includes a disclaimer that sores really need the care of a surgeon. The final recipe provides a suggestion for people who cannot get the herbs. It suggests using bread hot out of the oven for the basis of the poultice. This concludes the advice from physicians (pdf 21).

The next section of the book is the “Orders thought meet by his Majesty and his Privie councill to be executed throughout the Counties of the Realme...” (pdf 21; pdf 22 is an image of the same page from the original). This section is introduced by the king’s statement of concern that is dated “At the Court at Hăpton Court this 30 of July 1603” (pdf 23). It is a copy of the statement that was published in 1625 although that

version did not include the lines with the date and place.⁶ In the EEBO database copy of this document, pdf 23 verso F2, is not quite complete, a small portion of the left side is missing. The 17 items that compose the orders are virtually identical to those printed in 1625. The primary difference between the two versions is that this later version makes use of less capitalization within the text.

In this book, these national Orders are followed by Orders directed at London, “Orders conceived agreed to bee published by the Lord Mayor and Alderman of the Citie of London, and the Justices of Peace of the counties of Middlesex and Surrey, by direction from the Lords of his Majesties most Honorable Privy Councell” (pdf 29). This section begins with a reminder of the acts published in 1603 including the positions necessary to combat plague, including, searchers, examiners and ‘buriers,’ which the orders authorized. It also reminds the reader that the statute expressly authorizes the creation of new rules and directives as they seem necessary.

These regulations are, if not identical to those published earlier, substantially similar to many of the earlier regulations. Some of the regulations seem to include the wording from more than one previous document, while in other cases new clauses seem to have been developed. In the section “Orders concerning infected houses and persons sicke of the Plague” there is a short section labeled “sequestration of the sicke,” which is virtually identical to a regulations published earlier except this stipulates that the sick person will be sequestered that same night; additionally, the duration of the quarantine

⁶ England and Wales James I (1603-1625), *Orders, Thought Meet by His Majestie, and His Privy Councell*, A2r-A3v.

is here referred to as a month rather than as 28 days. In the next section, “airing of stuffe,” bed chamber hangings have been added to the list of materials that must be aired before they are removed from an infected house.

The general rules for the burial of the plague dead remain the same; they should be buried without mourners at a convenient time before sunrise or after sunset, but the rather odd specifications about restricting the access of children that are part of the London Orders of 1625 are not included in this version of the regulation.⁷

The section labeled “no infected stuffe to be uttered” is, however, identical to the 1608 version, with the exception of a number of spelling discrepancies (pdf 32).⁸ In fact the remainder of this chapter is virtually identical to the earlier document except for spelling alterations. The bulk of the spelling differences suggest an alteration in favor of a spelling that has become standard so that words like city, be, and dog are spelled city, be and dog in this 1636 edition rather than citie, bee and dogge as they had previously been spelled. Nonetheless, this document contains a number of new discrepancies and errors. For example, while in some cases bee has been altered to be, in other cases be seems to have become the preferred form of the word in headers while bee is used in the body of the text, which in some cases is a direct reversal of how the spellings had previously been used. In other cases the type setters seem to have added spelling errors;

⁷ City of London (England) Court of Aldermen, *Orders to Be Used in the Time of the Infection of the Plague within the Citie and Liberties of London*, np.

⁸ City of London (England) Lord Mayor, *Orders Conceived and Agreed to Be Published, by the Lord Mayor and Aldermen*, np.

for example the word carriers that was used in the earlier versions of this document has become caries in this version of the document.

The rules for London Orders are followed by “A Proclamation for quickening the Lawes made for the relief of the poore, and the suppressing, punishing and settling of the sturdy Rouges and Vagabonds, by the King” (pdf 36). Many good laws were written to provide assistance to the poor and to punish and settle sturdy vagabonds and rogues during the reign of Queen Elizabeth and our dear late King. If these laws were properly and continuously implemented they would provide order. It is apparent from the “visible danger of the pestilence” that unless by God’s grace or by these provident, prudent, royal endeavors, more stringent rules are necessary (pdf 37).

The King then notes that on the advice of his privy counsel he is issuing this proclamation in order to ask all of his “loving subjects,” regardless of where they are, to use care and diligence in putting the plague orders into effect and to avoid spreading the plague (pdf 37). He also requests that the laws to control rogues and vagabonds as well as those to provide assistance to the truly needy be obeyed.

The King first demands that in the cities of London and Westminster and in their surrounding suburbs and adjacent regions, as well as more generally throughout the realm, every effort be made to control and punish rogues and vagabonds found on the streets and highways. Vagabonds should be apprehended whether they travel under the guise of soldiers, mariners, glass men, pot men, peddlers, petty chapmen (merchant), or simply poor people if they are found begging or wandering. The King further commands that all constables and other officials diligently punish all such

vagabonds regardless of where they are found. In addition he recommends that care is taken that no one travels with forged passes. Such rogues and vagabonds should be caught and punished and then sent home as was spelled out in a previous proclamation. If vagrants beg at the doors of the houses of the healthy, they should be apprehended and taken to a constable. Householders should refrain from supporting or offering encouragement to vagrants “to continue their wicked course of life” (pdf 38).

The justices of the peace throughout the kingdom should attempt to assure that the provost marshals, high constables and others diligently search for, apprehend and punish vagabonds. In addition the king requires that justices in adjoining areas to get together at least once a month to hear how effective regional constables, high and petty and other officials, have been at dealing with the problem of vagabonds and at following the king’s orders pertaining to vagabonds. Those found to be negligent should be severely punished.

The King then notes that he hereby enjoins all officials as well as all his loving subjects to insure that all houses, and other places visited by plague, are shut-up and kept shut up. Additionally, he orders that a guard should be kept over buildings housing the ill, so that people cannot leave plague infected houses. The king also commands that all his judges of Assize make special enquiries into any deficits of the justices of the peace, such as not attending meetings or not punishing constables that they know to be remiss in their duty, and that they report any justices of the peace who are found lacking to the King or his privy counsel so that they can be appropriately punished.

The King commands all Judges of Assize, mayors, sheriffs, justices of the peace, constables, borough heads, ministers and the rest of his subjects to carefully observe each and every rule and perform their duty or they will be in serious danger (pdf 39).

The King notes that he has recently ordered that books be printed containing previously issued statutes ordering the provision of charity for the poor, and soldiers and mariners, the punishment of vagabonds, and providing for order, as well as newly issued regulations concerning health. He further states that it is important that all of his subjects know and observe these regulations so that they do not endanger themselves by failing to observe them. Therefore it is necessary to give notice so that the King's loving subjects cannot pretend ignorance. Further anyone found remiss or negligent in their execution of the laws will be punished as the laws provide or by royal prerogative.

“Given at Court at White-hall the three and twentieth day of April, in the sixt yeere of Our Reigne of England, Scotland, France and Ireland.

God Save the King” (pdf 40; pdf 41 is a copy of the same two pages from the original)

In this book, King Charles' proclamation is followed by a reprinted version of laws enacted for relief of the poor during the xliii (43rd) year of Queen Elizabeth I's reign. With the authority of this parliament, it is required that church wardens along with “foure, three, or two substantial householders” who having been appointed within the month following Easter shall be called overseers of the poor (pdf 42). They will put to work children whose parents do not keep them in order; they will also put sound

adults to work who have no means of support. The overseers will also see to it that those who are infirm and are unable to work are provided with relief to the extent the parish is able to afford. The overseers, unless prevented by sickness or for some other reasons, will meet monthly in the parish church. At the end of their year long term of service, within four days of the new overseers being appointed, outgoing overseers will provide an honest and complete accounting of the year's expenses. This accounting should include money owed but not paid, material stock in hand as well as that in the hand of the poor for work. The outgoing overseers are required to hand over any money on hand to the church wardens and newly appointed overseers.

If the justices of the peace perceive that the parish is unable to support the poor of the parish, the justices are empowered to collect taxes from any other parish from within the hundred in which the impoverished parish is located. At their general quarter sessions, the justices shall assess taxes and they are authorized to collect taxes from those who refuse to pay. They are authorized to seize and sell the offender's goods, and two justices are authorized to commit the offender to jail. The justices are also authorized to send to jail anyone who refuses to work at their appointed tasks including churchwardens and overseers who refuse to provide an accounting of the funds.

Churchwardens or overseers, with the assent of any two justices, can commit children to apprenticeships until they come of age or marry. In addition, at quarter sessions they are authorized with the approval of local Lords to arrange for the construction and funding of necessary buildings to house the poor and indigent. Despite a previously enacted Act to the contrary, they are also authorized to place inmates or

more than one family into a house. Houses or cottages so used cannot be returned to normal usage, but must continue to be used to house the destitute.

If anybody has a complaint about the taxes that have been levied against them by the churchwardens, their complaint can be considered at a regular quarter sessions meeting. The decisions made by a majority of justices are binding (pdf 45).

It is further enacted that parents, grandparents, or children of those unable to work, who are healthy and physically able to work, should provide for those who are unable to work. Additionally, it is enacted that the mayors, bailiffs and the other head officers of each and every town, city and incorporated area in the realm shall have the same authority to execute and apply the measures of this act. Each alderman within the city of London has the same responsibility and authority within his ward, as is granted by this act to one or two justices within other counties of the realm. In parishes that extend across the borders of counties or lie within and without the liberties of a city or town, officials from these various entities only have authority within the boundaries of their respective offices. Nevertheless, the churchwardens and overseers will provide evidence that they have done their duty throughout the entire parish before both a city official and before the justices of the peace (pdf46/L2).

It is also ordered that if any place does not nominate overseers as this act stipulates, all of the officials including, justices of the peace in the county where the nomination fails to occur as well as all mayors, aldermen and head officers, will be fined five pounds for each such default, to be used to aid the poor of the parish. All of

the penalties and fines collected by the authority of this act are to be used to provide relief to the poor of the same parish.

Justices of the peace from every county and incorporated area shall at their yearly sessions meeting following Easter set a weekly tax on every parish of not less than a half pence and not more than six pence. The parishioners of each parish can make arrangements of how this sum is to be collected, or alternately the payments can be arranged by the churchwardens and petty constables of the parish or justices of the peace (pdf 47). If anyone refuses to pay their portion of this tax, their goods can be seized and sold and the money in excess of their taxes due returned to them, or, lacking goods, they can be placed in prison. At yearly meetings the justices of the peace shall determine how much money will be quarterly sent out of the parish to support prisoners of the King's Bench, as well as how much is to be spent for county alms houses and hospitals. The money for the King's Bench will be collected quarterly by treasurers, chosen from among those who were taxed at least five pounds on lands or ten pounds on goods. These treasurers are to serve year long terms and to provide a full accounting of their collections and disbursements at the end of their year of service at the quarterly sessions immediately following Easter. Churchwardens or their administrators who do not give the treasurers the required funds will be fined.

Any surplus money which remains in the coffers of any county is to be distributed to the hospitals of that county as well as to those who have sustained losses due to fire, flooding, the ocean or other casualties as the majority of the justices of the peace deem appropriate.

If any one appointed treasurer refuses to serve or refuses to distribute relief funds, the justices of the peace or the justices of Assize are authorized to fine him three pounds.

This act shall take effect following the feast of next Easter. Thus it is enacted that the statute shall remain in effect until next Easter. This document then provides a plan for assisting the poor on an Island in the county of Essex that has no parish to serve as the organizer for public assistance.

If any action or suit is brought against an officer for causing distress or selling his goods the officer may use this Act to explain his actions. At a trial the whole matter can be explained by both parties. The page of the document included in the EEBO pdf 51 is smudged and very difficult to read. The act ends by noting this act lasts only until the next session of parliament.

The act for poor relief is followed by “An Acte for the Necessary relief of Soldiers and Mariners,” which like the previous act was issued in xliiii (39th) of Elizabeth I’s reign (pdf 51). This act begins by saying despite the previous Acts to assist soldiers and mariners made during the Queen’s reign, another is needed to extend and explain the previous acts. The earlier acts shall remain in effect until the next feast of Easter when they are to be discontinued. It has been found more important than was previously thought to provide assistance to soldiers who have lost limbs or become disabled defending her majesty’s state. The number of these soldiers is so much greater because the number of “honourable-defensive” wars has increased (pdf 52/verso). The

soldiers and mariners need to be rewarded for their efforts so that others are encouraged to perform similar tasks.

Every parish in the realm is to be assessed money to assist invalided soldiers and mariners. No parish is to be taxed more than ten pence or less than two towards this end. If anyone refuses to pay this tax, goods can be taken forcibly by the churchwardens or constables. The sums collected are to be paid to the high constable of their division ten days before the quarter sessions. The money is then to be handed over to a treasurer who was elected by the justices of the peace, who in turn delivers the money. If churchwardens or other officials fail to turn over this money along with a proper accounting, the money will be collected in goods or fined.

Any soldiers or mariners who have lost limbs or are otherwise maimed, or who return to the country so damaged, should return to the county from which they were pressed into service if they are able to travel, to request assistance from the treasurer there. If he was not pressed into service, he should return to the county of his birth or where he lived when he joined the service. If he is unable to travel, the treasurer in the county where he has landed or arrived should send a request, under the seal of the general of the camp, to some supervising officer or ships captain, for verification of his service and wounds. Then the soldier or mariner can be given provisional assistance until the next quarter sessions when he will be granted relief for as long as this act is in effect. Nonetheless, justices of the peace have the right to alter or revoke the pensions of soldiers or sailors if they see fit.

Because many wounded soldiers and mariners arrive in ports far from the county from which they are to receive their pensions, and equally distant from the muster master, it is enacted that once the men have an unapproved certificate, they can be granted a pass and assistance to see them on their way, on a direct course, to the appropriate county. To track these compensations, treasurers should keep a record of the compensation paid out as well as a record of to whom it was paid and a record of the certificate used to get the assistance. In addition, the muster master should keep a record of all such certificates granted along with a synopsis of the certificate.

Treasurers who refuse to accept or honor a certificate should write the reason they rejected it on the back of the certificate. Treasurers who refuse to honor the spirit of this act and refuse to provide assistance without good cause can be fined at the discretion of the justices of the peace. Any soldiers or mariners found begging, anywhere in the realm, after the next feast of Easter, forfeit their right to their certificate and pension and shall be considered a common vagabond or rogue.

At the end of every quarter, surplus money remaining in county coffers is to be distributed by the justices of the peace among charitable uses and for punishing rogues and beggars (pdf 56). County justices of the peace do not have authority within urban incorporated areas, which have their own justices of the peace and other officials to enforce the act. If these urban justices do not enforce this act, they are liable to be fined. All fines assessed against any treasurer or other official for any reason mentioned in this act are to be used for the assistance of invalided soldiers and sailors and all surplus funds are to be used for the assistance of the poor and punishment of rogues, although

the justices may decide to reserve surplus to be used as more soldiers and sailors in need return for assistance. It is intended that all of the money collected by this act be used to assist these returning invalided sailors and soldiers.

It is also enacted that pensions promised under the previous two acts providing assistance to these wounded men are to be honored under the provisions of the new act. Of course pensions granted under the previous acts, like pensions authorized under this act, can be reduced or revoked. Also, taxes levied under the former act but not yet collected by next Easter when this act goes into effect are still due to paid.

If this act does not provide enough money to support the injured soldiers and mariners living within the city of London, the mayor and aldermen have the legal right to increase the tax rate to a level reasonable to provide assistance for these men as long as the sums collected do not exceed three shillings per week per parish.

This act is to exist until the next parliament session and no longer.

The act to provide assistance for mariners and soldiers is followed by yet another act from Queen Elizabeth's reign "An Act for punishment of Rogues, Vagabonds and sturdy beggers," which dates from the 39th year of her reign (pdf 58).

The first dictate of this act is that all previous acts concerning the establishment of houses of correction and the control of rogues are to be superseded by the this act when it goes into effect next Easter. With this act it becomes lawful for local authorities, acting at a meeting of the justice's quarter session, to order the construction of houses of correction within their jurisdiction, as well as to raise money to maintain these facilities and to control and punish rogues.

It is also further ordered that people who go about calling themselves scholars, sea faring men who pretend to have lost their ship or goods at sea, as well as all idle people who go about the country begging or using subtle crafts or unlawful games, fortune tellers, fencers, actors of common interludes and minstrels, except those who serve honorable patrons, jugglers, tinkers, peddlers who are able bodied but refuse to work for reasonable wages, people who wander around begging and pretending to have losses due to fire or other disaster, shall be deemed rogues, vagabonds and beggars and shall receive the punishment this act decrees (pdf 59). After this act takes effect next Easter, any person declared to be a rogue, vagabond or beggar shall be stripped naked from the waist up and whipped until bloody. Then if he is known, he will be sent by a direct route to the parish of his birth; if the parish of his birth is not known he is to be returned to the last parish where he was known to live where he will be set to labor, as any good subject should do, for a year.

After the whipping, a note will be written stating the date that this person, male or female, has been punished according to this act and providing information about where this person is required to go and the time frame for the journey (pdf 60). If the person does not travel to the required destination within the given time frame, he or she is liable to be whipped again. If the vagabond does not know his place of birth or where he last dwelt for a full year, he is to be put in a house of correction in the last town he passed through without receiving punishment. He should remain there until he can do useful work, or if he is unable to work until he can be placed in an almshouse.

If any of the arrested rogues appears to be dangerous “to the inferiour sort of people where they shall be taken” (pdf 60) or will not be reformed, it is legal for the justices of the peace to order the rogue to be taken to a house of correction or jail and to remain there until the next quarter sessions meeting when, if it is considered necessary and with the consent of additional government officials, they can be consigned to be shipped across the sea, or ordered to serve in the galleys. If such a banished person returns to this realm without permission he is to be considered a felon and as such is liable to a death penalty, to be administered in the county he is apprehended.

It is also enacted that if officials in any town, village or parish are negligent in their duty to punish rogues and vagabonds, they are to be fined ten shillings for each case in which they fail to act. If any person disrupts the execution of this law punishing rogues or sturdy beggars or providing relief to the poor, they will be fined five pounds for each such offense and bound to better behavior in the future.

In addition, it is enacted that no person in charge of a ship traveling from the Isle of Man, Ireland or Scotland shall assist a rogue, vagabond or anyone likely to attempt to live by begging, to enter the realm of England or Wales (pdf 62). For each count of bringing such a person into the realm, they will be fined 20 shillings to be used to support the poor of the county. Any person found begging from the Isle of Man, Scotland or Ireland is to be punished and then returned to the county where they first entered England or Wales and from there they are to be returned at public expense to their point of origin.

It is further enacted that no diseased person shall travel to the city of Bath or Buxton in order to seek relief in the baths unless he promises not to beg and has received a pass from two justices of the peace in his county of origin. People traveling to Bath must have the means to finance their travel in both directions and their stay in the area of the baths. If they do not abide by the stipulations of their travel pass, they are to be treated as rogues and vagabonds. The residents of Bath and Buxton are not responsible for assisting such travelers.

Again, as in the previous acts, it is pointed out that county justices do not have authority within city liberties or incorporated areas. Instead, within these city areas city officials and justices of the peace are responsible for the enforcement of this act.

This act does not apply to poor people who are in Saint Thomas hospital, within the borough of Southwark. Instead, the city of London, the mayor and its citizens have the responsibility for governing this hospital. This act does not in anyway interfere with the authority of John Dutton of Dutton or his heirs. Further, all funds raised by this act shall be used to build or maintain houses of correction and for the assistance of the poor. Seizing offenders' goods for sale is made lawful by this act. Justices of the peace have authority to make decisions concerning questions that arise from the enforcement of this act. The Lord Chancellor by virtue of the Seal of England has authority to make enquiries into the enforcement of this act and into the use of money collected as a result of this act.

In November of the 18th year of the Queen's reign, the Lord Chancellor has authority to punish and fine any person found guilty of misusing money collected for the construction and maintenance of houses of correction (pdf 64).

Any sailor that really does suffer a shipwreck and survives without the means to support himself on his journey home and who has a testimonial and certificate of passage from justices of the peace in the region of his landfall, shall have the right to seek assistance on his journey home as long as he meets the time stipulations included in the certificate of passage. This statute does not apply to children under the age of seven nor to glass men who do not beg and who travel throughout the country under the auspices of the justices of the peace.

This act shall be proclaimed at the next quarter sessions and at the quarter sessions in each county as well as in market towns as the justices of the peace decide and again the act is to remain in effect until the first meeting of the next parliament.

The Elizabethan act for the control and regulation of vagabonds is followed by an act for the control of rogues from the first year of King James' reign. This section of the book is entitled "Certaine branches of the Statute made in the first yeere of the Reigne of King James concerning Rogues, Vagabonds, and sturdy Beggers" (pdf 65). This act begins by referring to the problems and questions that had arisen about the letter of the previous act.

Therefore it is enacted that no authority is given to any baron or other higher lord to assist anyone to escape the consequences of this act without receiving punishment under this statute. The previous act provided freedom to well behaved

traveling glass men; however, this provision has been abused by “many notorious Rogues and Vagabonds” (pdf 66). Therefore, beginning two months after the end of this session of parliament, anybody traveling the country selling glass shall be deemed a rogue and a vagabond and treated as the previous statute described.

In addition the previous statute was flawed in that an incorrigible rogue can be sent home or banished from the realm but can continue to roam in places where he is not known; therefore, as this act takes effect, banished rogues are to be branded on the left shoulder with a large R so that it will be possible to easily identify repeat offenders. As under the previous act, repeat offenders are to be considered felons.

This act is followed by “An Act for the charitable relief and ordering of persons infected with the Plague,” which was issued in the first year of Jacobean rule (pdf 67). It begins by getting right to the point, noting that many cities, towns and other incorporated areas that are hit by plague cannot afford to care for the poor sick people. These are people who must be cared for in order to prevent them from wandering and thus infecting others, as well as to care for those who simply cannot provide for themselves and those who are restricted to their homes by a magistrate’s order.

Therefore, in incorporated areas mayors and other officials may from time to time, as the need arises, establish reasonable taxes on each and every inhabitant, all houses and tenements and lands within the liberties of the incorporated area in order to provide assistance to the infected people, or people living in infected houses. Also from time to time they may take goods from those who refuse to pay this tax. If the person

has no goods and refuses to pay, he is to be jailed until he pays the taxes and any arrearages due.

If the inhabitants of such an incorporated area find themselves unable to provide sufficient assistance, the mayor should provide a certificate of this to the justices of the peace in the surrounding area so that the larger region, within five miles of the city or town, can be taxed to provide support for the sick in the incorporated area.

If infection strikes any city, town, or other incorporated, privileged area, or small hamlet or village which has no justices of the peace, then it is lawful for any two county justices to tax the residents of the county in order to provide assistance for the infected poor. Where there are justices of the peace, then any two mayors, bailiffs or other officials as well as justices of the peace can levy the taxes to provide for the sick. The tax should be reviewed at the following judicial session.

Constables and other officers who are responsible for collecting these tax moneys but willfully neglect their jobs shall forfeit ten shillings every time they shirk their responsibility. If any person ordered to remain in their house disobeys this directive and leaves his house it is lawful to use violence to keep him within the house. If the person restricted to their house is injured as a result of his attempt to escape, the watchman or guard should not be held liable. If a sick person with an uncovered sore goes into the company of others he is to be judged a felon and so to suffer the punishment of death. If on the other hand there is no visible sore, he should suffer the punishment authorized for vagabonds in a statute enacted in the 39th year of Lady Queen Elizabeth's reign.

No sentence of felony shall extend to corruption of blood, forfeiture of goods, lands or other materials.

It is further enacted that justices of the peace, mayors and other officials have the authority to appoint searchers, watchmen, examiners, buriers, and keepers. This act is to continue no longer than until the next session of parliament. No mayor or other non-university official shall attempt to enforce this act within Oxford or Cambridge University, or the colleges of Eaton or Exeter, neither shall they attempt to enforce this act within Cathedral Churches. Instead, vice chancellors, provosts, bishops or deans shall have responsibility, within their respective domains, for enforcing the measures of this act.

The final section of this book includes cases brought to the Star Chamber, *Camera Stellata* (pdf 71). The first case is against Rice Griffin who unlawfully built a tenement in Middlesex on Hoglane that he divided into several rooms, which were inhabited by poor tenants who lived on the charity of other parishioners. The other case is against John Scrips, who likewise subdivided a tenement in Shoreditch into 17 tenancies inhabited by base people. These acts are contrary to the Queen's proclamation of 1580, in the 22, year of her reign, declaring such types of buildings forbidden. In addition, the prosecuting attorney pointed out that since the original act forbidding such divisions, many decrees have been issued forbidding this kind of buildings because they attract the poor, beggarly, and evilly disposed people who are much too common within London. These people hinder the proper operation of London Officials. Therefore her highness's attorney prays that Griffin and Rice will be punished. Especially considering

the growing threat that these buildings, subdivided against the Queen's decree and the mayors' concern, create. These buildings are located in regions that are overburdened with poor and wretched people who are not capable of paying the costs of sustaining the area.

Therefore, by general assent, the people hearing the case against Scrips and Griffin agree that both men should be sent to Fleet prison and pay a fine of twenty pounds apiece. However, they cannot agree to demolishing or reconstructing all houses in London or within three miles of London that are so divided because of the cost to the parishes to re-house these poor people. The court orders that all such indigent people who live in such buildings that have been subdivided contrary to the Queen's will and who survive by begging within three miles of London. Unfortunately the rest of pdf 73 is basically illegible. It appears to address the issue of rents.

These buildings and their inhabitants have put a great deal of stress on the parishes in which they exist (pdf 74). It is therefore ordered that the owners of these buildings, regardless of where they dwell, will pay a reasonable tax to the parish in which the building exists for the assistance of the poor of the parish. It is further decreed that as the inhabitants of these houses leave or die and the houses become empty, the houses should be demolished. Any landlords that disregard this decree are to be ordered before the Star Chamber. "This decree was afterward read in the Court of Starre-Chamber the 29 of November 1609 and then confirmed and straitly commanded by all the Lords present to be duly put in execution."

The case against Griffin and Scrips is followed by an argument against the many subdivided buildings being created within and around London and is brought before the Star Chamber in the seventh year of Jacobean reign (1610). Sir Henry Montague pointed out that there have been many decrees and proclamations condemning the subdivision of houses and yet nevertheless these buildings are continually on the increase within London and in the suburbs so that enormous numbers of people are “pestered together breeding and nourishing infection.” Thus these houses and the people in them pose a danger to the city, the King, and his family as well as to the other Lords residing within London. Therefore it is to be desired that Queen Elizabeth’s decree proscribing erecting or dividing buildings into multiple tenancies be reissued (pdf 76). In care and consideration of the city, foreseeing the dangers that rapidly increase because of neglect of the enforcement of previous acts, it is ordered the act made the twentieth day of October in the fortieth year of Her Majesty’s reign will be more strictly enforced. His Majesty’s counsel as well as London’s mayor, aldermen and justices of the peace are each and every one of them responsible to see to the strict observance of the act. All offenders are to be brought before this court and severely punished.

Appendix L: 1665 Microfilm roll number 724:18

Orders Conceived and Published by the Lord Major and Aldermen of the City of London, Concerning the Infection of the Plague. London: Printed by James Flesher, 1665.

The Orders produced by the City of London differ immensely from those produced by the Sovereign and Privy Counsel or the Advice produced by Simon Kellwaye in the tone of their introductory sections. Kellwaye and the Royal orders begin with flowery introductions, those produced by London have virtually no introductory material.

This version of the London orders requests readers to remember back to 1603, “the first year of the reign of the late Sovereign King James of happy memory” when statutes were issued to control the spread of plague, to appoint searchers, guards and other needed laborers to deal with the sick and the dead, and to provide “charitable relief” to the infected poor, and then goes on to say it is again time to deal with these matters (pdf 2).

First it states that examiners should be appointed in every parish. These examiners are to be appointed by Ward Aldermen and deputies and counsels. It specifies that they should be of good standing and that when appointed they must serve for at least two months. In addition it stipulates that anyone who refuses to serve will be imprisoned until they agree to serve. The examiners are to be sworn to the aldermen to learn what houses in their parish have been infected, what people are ill and of which diseases. If there is doubt about what disease is involved, the examiners are enjoined to restrict the ill person until it is clear of what disease they are suffering. If it is decided the person has “the Infection” the examiner must inform the constable to shut the house up, and in cases where the constable proves to be remiss in his duty, to notify the Alderman of the Ward (pdf 2).

To every infected house two watchmen will be appointed: one for the day and the other for the night. They are not to allow anyone in or out of the house they are required to watch. The watchmen are also to provide other services for the people locked within the infected house. When running errands, the watchman should lock the house up and take the key with him. The day shift is from six am until ten pm.

For each parish two women searchers shall be appointed. The searchers chosen should be “of honest reputation, and of the best sort as can be got in this be got in this kind” (pdf 2). The searchers will be sworn to dutifully search and to make a true report to the best of their knowledge if the bodies they are sent to search died of the infection. The physicians appointed to treat plague victims should meet with the searchers working in the parishes for which they are responsible, to ensure that the searchers are qualified for their employment. The physicians should charge the searchers if they seem remiss in their duties.

In order to provide assistance to the searchers and because in the past there has been considerable misreporting of deaths due to “the Disease,” discrete and able surgeons, in addition to those already appointed to pest-houses, will be appointed to serve sections of London (pdf 4). Each surgeon will serve in one quarter. The surgeons will go with the searchers to view bodies so that disease reports shall be accurate.

In addition the surgeons will investigate what disease is involved in cases where they have been called, and in cases that are referred to them by parish examiners. Because these city appointed surgeons are only allowed to treat patients with “the Disease,” they are to be paid 12 pence for each searched body. This fee is to be paid

from the material possessions of the searched body; if it is unavailable the parish will pay the fee.

If a nurse-keeper leaves the house of her deceased patient before 28 days have passed since the death, the house to which she has moved will be shut up until the 28 days have fully elapsed.

The rules for nurse keepers are followed by a break for a new section: “Orders, concerning, infected Houses, and persons sick of the Plague” (pdf 4). If any person in a house complains of a botch, purple` swelling, or falls dangerously ill in a way manner that cannot be clearly identified as some other disease, the master of the house must notify the health examiner within two hours of the signs of disease.

As soon as anyone is found by a surgeon, examiner or searcher, to have plague, he will be sequestered (pdf 4). Even if the person does not die, the house will be shut up for a month and the other residents should take preservatives. Not only the house and people are to be sequestered, the goods, bedding, clothing and hangings within the infected house should be fully aired before they are again used. The airing is to be done by an appointee of the examiner (pdf 5). Although it is not specified, it would seem likely that this only becomes necessary if all members of the household die.

If anybody visits a person known to be ill with the plague, the house that they inhabit will be shut up some number of days to be determined at the discretion of the examiners. No sick person shall move from one house to another, with the exception of moving into a pest-house, unless it is into another of his own houses. He will also need to assure the authorities in the new parish that they will not become financially

responsible for his householders. The move from one house to another must be done at night; in addition it stipulates that if a person has two houses he may make a move in order to separate the sound from the ill; however, he may not later decide to have the well return to the sick or the reverse. After the separation, the sound healthy people must remain shut-up for a week in order to allow previously unseen signs of disease to appear.

Those who die of this disease during an epidemic will be buried during a convenient time: before sunrise or after sunset, “with the privy of the Churchwardens or Constables and not otherwise” (pdf 5). No neighbors or friends are allowed to enter the house or to accompany the body to the church. This is followed by a statement to the effect that the body may not be in the church during prayer or services and that no children are allowed near a plague corpse, and that the grave must be six feet deep; the order uses virtually the same language as the 1625 London plague orders, but is unlike those used in 1636 when children were not mentioned. Further, all public gatherings at any burials during the plague are forbidden (pdf 6).

No clothes, bedding or other stuff is allowed to be removed from an infected house. Selling used bedding is to be utterly prohibited. Brokers and sellers of used bedding and clothing are forbidden to display any of these used items in stalls or in windows facing any street, lane, or common-way upon threat of imprisonment. If a broker or anyone else buys bedding, clothing or other stuff within two months of the infection’s visit, his house will be shut up as infected for at least 28 days (pdf 6).

If an ill person is moved from an infected house to any other place, the parish which he left, upon receiving notice of his flight, will at their expense have the person brought back during the night to his point of origin. The house to which the ill person was taken will be shut up for 28 days and the parties who helped in his escape will be punished, the punishment to be determined at the discretion of the Ward Alderman.

Each and every house visited by the plague is to be marked with a red cross in the middle of the door where it can easily be seen. In addition the printed words "Lord have mercy upon us" must be posted close to the cross (pdf 6). The sign and cross are to remain on the door until the house is legally opened. The constables are to see that each infected house is shut up and watched over by a guard. The guard will also provide necessities to the inhabitants at their own expense if they can pay and otherwise at common expense. Houses are to remain shut up for four weeks after the last patient has recovered.

Care must be taken to assure that searchers, surgeons, nurse-keepers and buriers do not walk in the streets without openly carrying a three foot red wand. In addition these people should not visit any house except their own and the houses to which they are sent. They should also abstain from the company of others especially when they have recently been in the presence of infected people.

When many people live in one and the same house and someone in the house becomes infected, no one from the house is allowed to remove themselves without a certificate from the parish health examiners. If anyone leaves without a certificate their new abode will be shut up as if it were infected (pdf 7).

If hackney coaches are used to carry infected people to the pest-house, they may not return to common usage of carrying healthy people until five or six days have elapsed and the coach has been well aired.

The next sections of the order are listed under the subheading of “Orders for cleaning and keeping of the Streets sweet” (pdf 7). Because it is thought important to keep the streets clean, it is ordered that each householder keep the street swept daily. The daily house sweepings will be removed by the rakers, who will provide notice of their arrival by blowing a horn as has previously been done.

Laystalls are to be removed as far as possible out of the city and out of common passages. Neither nightmen nor anyone else is permitted to empty a vault in any garden within or near the city.

Special care should be taken to assure that no “stinking fish, or unwholesome flesh or musty corn” or rotten fruits of any kind are sold anywhere in the city. Breweries and tippling-houses should be inspected for unwholesome and musty casks. No hogs, cats, dogs, tame pigeons or conies will be allowed within the city. If a pig strays into a street or lane, it will be impounded by a beadle or other official and its owner will be punished according to the act of common counsel. Dogs will be killed by dog-killers appointed for the purpose (pdf 7).

The final sections follow the heading “Orders concerning loose Persons and idle Assemblies.” Since nothing is more complained about in relation to the spread of plague than “Rogues and wandering Beggars that swarm in every place about the City,” constables and others who are responsible for such matters will assure that no traveling

beggars are allowed within this city “upon the penalty provided by the Law to be duly and severely executed upon them” (pdf 8).

Plays, bear-baiting, games, ballad singing, sword and buckler play and all other similar attractions and reasons for public assemblies are prohibited. Anyone who encourages such gatherings is to be severely punished by the alderman of the ward in which the gathering occurs. In addition, public feasts, particularly those hosted by the companies of the city are forbidden, as are dinners at taverns and alehouses until further notice. The money saved by this frugality should be used to benefit the poor who have been visited by the plague.

Disorderly drinking in taverns, coffee houses and cellars is to be investigated “as the common Sin of this time” (pdf 8). No person or group shall enter or remain in these establishments for the purpose of drinking after nine p.m., “according to the ancient Law and custome of this city” any who do will be punished according to the prescribed penalties.

In order to better execute these Orders, and any other rules deemed necessary, the aldermen, their deputies, and common counsel men shall meet weekly, or oftener as needed, in a convenient place that is free of the plague, in order to determine the best way to enforce the rules. No one who lives in or near an infected house should attend meetings while their infection status is doubtful. These men may put into execution any other Orders that they determine would be helpful to protect his majesties subjects from infection.

The End.

M—1593, Kellwaye

A Defensative Against the Plague: Contayning Two Partes or Treatises: the First, Shewing the Meanes How to Preserve Us from the Dangerous Contagion Thereof: the Second, How to Cure Those That Are Infected Therewith. Whereunto Is Annexed a Short Treatise of the Small Poxe: Shewing How to Governe and Helpe Those That Are Infected Therewith, by Simon Kellwaye. London: John Windet, 1593.

On the title page of this publication, just below the title and a note of authorship, “Published for the love and benefit of his Countrie Simon Kellwaye Gentleman,” is a quote from Ecclesiastes Chapter: 38 “God has created meddesens of the earth, and he that is wise will not contemne them” (pdf 1).

This document is substantially longer than most of the plague orders and its language differs considerably. Kellwaye makes a number of references to the great medical writers of the past and although he claims to be using plain English, a number of the words he uses do not appear in the complete Oxford English Dictionary. Some of these words may be simple idiosyncrasies, some seem to be Latinate forms, Kellwaye’s spelling is not very standard so his words are not easily found in dictionaries. The recipes Kellwaye included in this book use many different formatting styles and employ several different measurement systems, as if he included recipes he acquired from a number of sources without editing.

Kellwaye’s book begins with a dedicatory statement to the “Right Honorable Robert Devorax, Earl of Essex and Ewe, Vicount of Hereforde, Lord Ferrer of Chartley, Borchet, Louayne, Master of the Queens Majesties Horse, Knight of the Garter and one of her Majesties Honorable privy counsell, your Honors dutiful and loving servant Simon Kellwaye, wisheth a long and happie life with encrease of honor and virtue.”

The dedication begins with praise for Plato and a paraphrase of Plato's argument that men are born to serve their country. The dedication continues in this vein, decrying the "declining dotage of the world" in which most people seek only to better themselves. He points out that in this time of dangerous sickness there is a grave need for help and wisdom. Kellwaye says that he has written and published this "for the benefit of all people that lift to read it, and put into practise, a treatise contayning a method to preserve us from the Plague, as also how to order, governe and cure those that are infected therewith: Collected out of the authorities of the most excellents, both former and later writers and for the greatest part thereof observed, and tried by my own experience." (pdf 3/A3) Further, Kellwaye states that this document dedicated to his lordship is the public result of his work and that it reflects the honor of his patron. The dedication is followed by a statement "To the frendly Reader" in which he comments again on the devastation wrought by the plague and apologizes for the simplicity of his writing style, which he has chosen for the benefit the unlearned who need access to information that can help them combat the plague. Kellwaye concludes by asking readers to forgive his mistakes and wishing them well from his house in 1593. (I do not think this statement indicates that the poor are more likely to be struck by plague but merely that they are unable to pay for assistance from a physician.)

The next section is a testimonial for Simon Kellwaye from George Baker. In this two page testimonial Baker praises Kellwaye, the author, and also devotes a considerable number of words to castigating the ungrateful. He states that this book is just one of the many ways in which Kellwaye has tried to help both poor and rich

people. This is followed by the final introductory section, a brief note by the author that includes a table that shows the conversion from Latin measures into a more common form, as well as an additional apology and corrections for three printers' errors that made it to the final printed version.

The main body of the text begins with the very brief Chapter 1, Cap. 1, (pdf 7/B), "What the plague is", that is completely contained on page B. Kellwaye says that while physicians of the past were unsure of the essential cause of the plague they were sure that "it is a pernicious and contagious feaver," which proceeds from "adusted {dry, burnt} and melancholic blood." This is evident from the heat of the fevers patients feel. First it assaults the heart and then it paralyzes the vital spirits. Its outward manifestations are carbuncles and botches and its malignancy is such that "both in yong and olde, rich an poore, and noble and ignoble" despite the best treatment available, some will be conquered by death.

In Chapter 2, "Cause of the plague," (pdf 7/B) Kellwaye points out that, as many authors before him have noted, there are many causes for the plague. These causes range from extreme heat and drought to very heavy rains. He also notes that plague can be caused "by great store of rotten and stinking bodies, both men and beasts, lying upon the face of the earth unburied," and that in times of war the rotting bodies can contaminate the air and affect crops and water. Plague also

may come from stinking doonghills, filthie and standing pooles of water, and unsavery smelles which are neere the places we dwell, or by thrusting a great companie of people into a close narrow, or straight roome, as most commonly we see in shippes, cōmon Gayles [common jails], and in narrow and close lanes and streetes, where many people doe dwell together, and the places not orderly kept cleane and sweet.

He also notes, however, that in our time plague is most commonly spread by associating with people who are sick or who have been in the company of sick people;

but for the most part it doth come by receaving into our custody some clothes or such like things that have bene used about some infected body, wherein the infection may lye hidden a long time: as hath bene too oftē experimented with repentance too late in many places” (pdf 8/ B2v).

He also notes that plague is spread by dogs, cats and weasels and that, however it is spread, it is God’s punishment of sin. [The link Kellwaye makes between weasels and plague takes on significance in light of my argument that house weasels may really be rats.](#) In this document Kellwaye promises to show the best ways to avoid and treat the plague. He further notes that he provides information on the warning signs of an impending plague in order to give readers a chance to pray and repent.

In Chapter 3, “Warninges of the plagues to come,” Kellwaye presents a list of various signs that can serve to warn people of plagues to come (pdf 8/2). The chapter begins with a reference to Avicennia’s remarks about weather related signs and omens including altered seasons, cold, cloudy and dry springs and extreme daily temperature variations as well as fiery impressions in the sky, changes in water levels, streams that appear or disappear, or well water that becomes fouled mysteriously. Kellwaye also notes that animals can serve as warnings, hordes of toads or frogs, especially at harvest time, of various colors and appearances, for example with spots or tails, great numbers of red toads, myse, gnats, spiders or moths, or vegetation devoured by caterpillars. Kellwaye also states that the animals of the fields can provide warnings of approaching plague. Animals, especially sheep, walk with their heads lowered and many of them die for no known reason. In addition, he notes another sign that signals approaching plague

is children gathering together and “faine some one of their company to be dead amongst them” and then solemnize the burial mournfully (pdf 9/ 3v). He concludes by saying that an increase in smallpox among both young and old signals an oncoming plague.

In chapter 4, “Sheweth how to prevent the plague,” Kellwaye states that there are three basic methods of avoiding the plague: admit sins and repent, flee far from the source of infection, and the third, which relates to personal health, is composed of three elements, order, diet, and physical assistance (pdf 9/ 3v). For Kellwaye, fleeing the plague poses a serious problem, as only the wealthier people can afford to leave; this leaves the poorer and more disorderly behind to face the infection without the control and financial assistance of better members of society. He does recommend that children, who are especially susceptible to the contagion, should be sent away from infected locations. Under the rubric of order, the examples that Kellwaye gives are that houses should be kept clean and sweet smelling and that in summer the floors should be strewn with fresh greens and the windows should be decked with sweet smelling herbs. The herbs and flowers he mentions are: mint, marjoram balme, pennyroyal, lavender, thyme, red roses, carnations, and ‘Gellefloures.’ In the morning, before opening windows or doors and at night before going to bed, a fire should be lit and strong smelling herbs should be burned to freshen the air. Kellwaye suggests the use of the following herbs, which he says should kept on hand: juniper, frankincense, bay leaves, rosemary, marjoram, and lavender. Clothing should be aired in the herb smoke. North and East facing windows should be kept open during the day if there are no foul odors or illness in those directions.

Kellway then proceeds to the meat of his advice by providing a recipe for a good perfume for use in summer, followed by one for use in winter. For use in summer, he suggests rose water and vinegar, six spoons of either, mixed with the weight of 2 pence of the rinds of sour citrons and lemons or bay leaves, and some camphor the weight of 3 pence (pdf 9/ B3r). For use in winter, one handful of Red roses, marjoram, or myrtles, one dram (the weight of 7 pence) of callamint, juniper berries, ladanum, gum benzoin (Benjamin), or frankincense. The ingredients for either recipe should be dried and mixed together; additionally, the ingredients for the winter perfume need to be coarsely ground. The material for summer perfume should “be put altogether in a perfuming panne” or a pewter dish on coals, while the winter material is tossed directly onto the coals (pdf 10/4v).

Chapter 5 (pdf 10/4v) continues smoothly from this point by stating that after the house is perfumed, but before going out, you should take a cordial, several recipes follow, then wash your face and hands with clean water augmented with vinegar. Finally, Kellway suggests eating a breakfast of bread and butter. Kellway also recommends poached eggs with a little vinegar in winter, and suggests that melancholic, and plethoric people should drink a little wormwood wine because it acts as a purgative in the melancholic and in the phlegmatic it acts to resist putrefaction. This advice is followed by three recipes for good preservatives. Kellway’s recipes differ from those printed in conjunction with the plague orders, in that Kellway’s require a slightly larger number of ingredients and use a wider array of ingredients, including some compound ones. Most of the recipes include several alternative

ingredients and Kellwaye uses several different systems of measurement including formal weights, drams, scruples and ounces, in addition to weights that reference coinage. However, once the medicine is compounded, Kellwaye often describes the dosage in relation to the weight of coins. In addition, Kellwaye's recipes make less use of rue than do those printed with the plague Orders.

Following three recipes, Kellwaye provides a list of beneficial foods. In winter he suggests a drink of Rhenish or white wine in the morning following the medicine. In the heat of summer he suggests drinking sorrel water in spring he recommends scabious or cardus benedictus water. The materials he recommends are treacle of Andromachus, valetius, and bezoar stone. He further states that he cannot say enough good things about Dioscordium, which not only resists infection but also works to expel poisons, to be followed by Rhenish or white wine. For strong or rustic people, "such as are daylie labourers," Kellwaye follows Galen's recommendation of garlic eaten in the morning with salt, and garlic along with a beer, which he called poor man's treacle (pdf 11/5). Kellwaye, however, says it should not be taken by sanguine, dainty or idle people because it will overheat the body, cause headaches, and inflame the body.

In Chapter 6, Kellwaye points out that once all previously mentioned precautions have been taken, additional measures need to be taken to protect the heart. He recommends wearing a sweet bag or quilt containing powder over the heart as well as carrying a "sweete pomander nodule or nosegay" filled with ingredients to comfort the heart, lists ingredients for which follow. The ingredients for the first of these are crystal arsenic Diamargaritum frigidum, and Diambrae, (a stomachic and cordial

containing ambergris, musk, and other aromatics) (pdf12/6v). The ingredients for the second pomander are Florentine iris (Irios), lemon grass (Calamous aromat) or sipeera-tree (ciperus); storax, calambac calam, or root of angelica, cloves or mace; dried red roses; wild thyme/pellamountayne (pellemountaine), penirial (pennyroyal), callamint, or elder flowers; nutmeg, cinnamon, or yellow sandalwood; nard Nardi Italicae; and amber grease or muske. These are followed by another four recipes for nosegays. Each of the recipes is different although many of the ingredients do overlap from one recipe to the next.

In Chapter 7 (pdf14/8v) these recipes are followed by the statement that because there is no “greater enimie to the health of our bodies then costivnes (constipation), both in the time of plague and otherwise, I have here set downe howe and by what meanes you many keepe your selfe solyble” (pdf 14/8v). The suppository recipe is followed by one for a glister and then a recipe for a raisin laxative and one for “A good Oyntment to keep on Sollible.” These are followed by a recipe for “Good pills to keep one Sollible and doe also resist the pestilence” (pdf 15/9v-9r). This recipe calls for one ounce of alloes, cicatrine, three drams of chosen myrrh, a dram and a half of saffron, six grains of amber grease and enough citron syrup to make the mixture stick together. The instructions say to grind individually the Aloe, myrrh and saffron into fine powder and then to mix them all together with the syrup. It does not specify to add the amber grease. Kellwaye says that Rhazes recommended a dram, or two scruples, of this medicine every day. Kellwaye also notes that “Galen, Avicen and all ancient writers in Physicke” believed that alloes not only provided comfort but purged the stomach of raw

and choleric humors, and in addition purged and opened the veins called ‘diserayse’ and resisting putrefaction (pdf 15/9r). Myrrh resists putrefaction even in the stomach and saffron not only comforts the heart, it has the added benefit of helping to carry any medicine with it to the heart. Kellwaye concludes that “these pilles will purge all superfluous humors in the stomach and all principall members: and preserveth the blood from corruption.”

Chapter 8 (pdf 16/10v) begins with Kellwaye’s statement “that the infection doth often times lye hidden within us without any manifest signe or knowledge” so it is important that in the summer, those of a sanguine nature remove six to eight ounces of blood from the basillica vein of the right arm. Avicennia noted that this is a good way to avoid danger. Kellwaye, however, recommends that “full and plethoricke bodies” should be purged every seven or eight days, while “leane and spare bodies” should only be purged every 14 days, with a gentle purgative, recipes for which follow (pdf16/10v). Kellwaye notes that Rondoletius indicates that it is not only the contagious and poisonous air breathed that causes the disease but the interaction of the contagion with the “superfluous humors in our bodies” that causes the disease. This comment is followed by several recipes for purgatives. After providing several recipes, Kellwaye provides another recipe, specifically for women who do not have their natural courses, who “are most prone to receive and take the infection,” which is not only a purgative but also protects against the plague (pdf 17/11r). The ingredients for this include aloes cicatrine; gentian root, aristolchia rotunda, dittander, or saffron; and garden mathder root or ‘mitridat.’

In full and plethoric people, Kellwaye states that nothing makes one safer than to create an artificial issue in either the arm or the leg because he had never known a person who had had a running ulcer or an issue to contract plague. Kellwaye maintains that both Palmarius and Forelsus agree with his observations, although he notes that some ignorant people claim that in order to maintain the health benefits the issue must be maintained. Kellwaye states that in his experience people who have had issues ten or sixteen years earlier remained healthy.

In Chapter 9 (pdf 18/12v) “What diet we ought to keepe,” Kellwaye begins by citing advice from Hippocrates that not only is an excess of food and drink very unhealthy, but so also is extreme hunger and thirst. Additionally, meat should be easy to digest and of a drying nature such as: cocks, capons, hens, pullets, partridges, pheasants, quails, pigeons, kid, veal, mutton, and birds of the mountains; however, meats such as beef, pork, venison, hare and goat should be avoided, as should water birds like swans and ducks because they are hard to digest. Lamb should be avoided because it is moist. Kellwaye discusses the relative benefits of fish, noting that some feel that fish, because they live underwater, are uncorrupted by airborne contagion, but Kellwaye says that he believes that flesh is more wholesome. He notes that bread should be made of good pure wheat, neither too fresh nor stale, and he advises avoiding rye. Kellwaye recommends drinking beer or ale although he notes that a couple of glasses of claret with dinner are acceptable. This information is followed by a list of ingredients for pottage (pdf 18/12r). The list is divided into ingredients for summer and those for winter and is followed, as if in one continuous list, by ingredients for salads. This list,

which is largely composed of herbs, is followed by a shorter but more detailed list of the sorts of foods that should be eaten or avoided.

Kellwaye's list says capers preserved in vinegar and then eaten with oil and vinegar are recommended, as are olives. Lemon citron and orange juices make the best sauces, along with sorrel juice and vinegar. On the other hand, all fresh fruits except those with a sour taste should be avoided. He mentions pomegranates, red and sour cherries, 'dammaske,' prunes, pippins, walnuts, quinces, and pears as being very good to eat after dinner. He states that all 'pulse,' beans and peas are to be avoided "because they encrease winde and make raw humors and ill Juice in the body." He also recommends avoiding garlic, onions, leeks, peppers, mustard, rocket because they heat the body, overheat the blood and make fumes rise to the head. In addition, he counsels avoiding cheese and milk, milk because it corrupts the stomach and cheese because it creates "gross and thick humors" (pdf 19/13v).

In, Chapter 10, "Sheweth what exercise and order is to be kept" (pdf 19/13v), Kellwaye warns against all strenuous exercises, which provoke sweating. As examples of exercises to avoid he mentions: tennis, dancing, leaping, football, running and hurling. These exercises are to be avoided because they overheat the body and open the pores and thus allow absorption of more infected air. He also recommends against the use of hot houses, which he thinks are very dangerous. On the other hand he does recommend moderate exercise. Kellwaye states that people should avoid going out until the sun has cleaned and cleared the air and advises that people should definitely avoid going out into fog and mist, as they are dangerous. If it is necessary to go out early, it is

important to consume preventative medicine before going out and to take along a pomander to smell while out. Kellwaye also advises avoiding the heat of the day as well as the late evening when the unwholesome fogs come out of the ground and he advises walking in the open air on dry ground. Kellwaye also points out that it is best to avoid any place that is infected with plague.

“The Venus combats moderately, but none at all were better the best time to use them is three or foure houres after supper, before you sleepe and then rest upon them” (pdf 19/13r). Kellwaye also notes that it is best to avoid anger, fear and pensiveness as these attitudes make it more likely that one will get infected. In contrast Kellwaye seems to recommend pleasant recreation spent with agreeable people, talking or listening to music, or reading a good book as these make one less prone to infection. He discourages against sleeping at noon especially in the winter but allows that the elderly may take a nap of a half an hour to an hour after dinner. “Watch not long in the evenings but two or three houres after supper is a good time to take your rest” (pdf 19/13r).

Chapter 11, “Teacheth what orders magistrates and rulers of Citties and townes should cause to be observed” (pdf 19/13r), contains a list of 10 numbered ordinances and a few unnumbered ones that should be enacted to prevent plague. Dung hills should be forbidden near cities. Streets should be kept clean and sweet and all the filth should be swept away every day. In addition, in hot weather streets should be washed down with cold water, especially in infected areas. In areas where the plague has entered, fires should be lit in the streets in both the morning and evening. If frankincense or pitch is

burned in the fires, they will be more effective. Dogs, cats and pigs should not be allowed to roam the streets because they can carry the infection. “Command that the excrements and filthy things which are voyed from the infected places, be not cast into the streetes or ryvers which are dayly in use to make drinke, or dress meate” (pdf20/14v). Surgeons or barbers who bleed patients should not throw the blood into rivers or streets. His rule number seven states “that no vautes or previes, be then emptied, for it is a most dangerous thing”(pdf20/14v). Inn keepers should clean their stables every day and dump the contents outside of the city because keeping the filth in their houses for a week or two produces unwholesome smells. No hemp or flax should be kept in water near a city or town because doing so produces infectious smells. Assure that good, wholesome corn and victuals are sold in the markets and to assure that there is no lack of good food because nothing increases plague more than a scarcity of food. Require that all those who are sick or who are in contact with the sick carry something that marks them as infected.

At this point Kellwaye interrupts his list to include advice he says he had almost forgotten. He suggests that when plague is in a limited number of places, people with plague should be required to remain in their homes and that their food and other necessities should be delivered during their infection. After the plague is gone “all the clothes, bedding and other such things as were used about the sicke” should be burnt (pdf20/14r). Then all these items should be replaced. Kellwaye notes that even if this cost is borne by the other inhabitants, the cost of replacing these items will be cheaper than the cost and grief of a general infection.

In chapter 12, “Doth shew what you must doe when you goe to visit the sicke,” Kellwaye begins by stating that you should order a large fire to be lit and have perfume burnt in the middle of the room before you enter (pdf20/14v). In addition, you should take preventative medicine and perfume your clothes and “wet your temples, ears, nose and mouth with Rose water and Vinegar” (pdf 20-1/14v-15). Put a piece of angelica root, the rind of a lemon or a clove, prepared as Kellwaye previously described, into your mouth and carry a pomander. When in the sick room it is important not to stand between the patient and the fire because the fire will attract all the vapors. He also suggests that people who visit infected people in order to bleed them should have the sick person’s attendant expose the arm or leg from which the patient will be bled, to allow the dangerous and infectious sweat to evaporate, before approaching the patient. After being with a sick person and before entering the company of healthy people, it is important to stand in front of a good fire and to turn and expose and air all the clothes worn in the presence of the ill person. Kellwaye then comments that he has now as briefly as possible written all the methods that he has used and that he has known others to use to avoid “this contagious and dangerous disease” (pdf 21/15v). He states that for most people these instructions should provide adequate protection, although he further notes that people who are under the protection of a physician should take the advice of their physician especially on matters pertaining to purgation and bloodletting because treatments should vary due to the variety and levels of the humors in each individual. Kellwaye notes, however, that there is no point in his explaining all the options because

they would be tedious and of no benefit to common people who are the main audience for this treatise.

In chapter 13, “Sheweth the signes of infection,” Kellwaye discusses signs that are very serious and those that are less so (pdf 21/15r). Kellwaye begins by noting that the symptoms of plague are diverse. Initially there is often a sudden weakness although sometimes it begins “with a gnawing and byting in the mouth of the stomach” (pdf 21/15r). The pulse grows weak and there is a heaviness that surrounds the heart and a shortness of breath. This is followed by “vomiting, or at least the desire to vomit,” a headache and unquenchable thirst and is accompanied by a strong desire to sleep as well as “an astonishment of the minde and vitall spirites” (pdf 21/15r). Most patients also experience extreme pain in some part of their body, often near the where the botch is, or where it will form, and many patients experience fever.

It is a good sign “when the botch or carbuncle” is red surrounded by yellow and erupts at the beginning of the sickness. This good sign is followed by a long list of ‘evil signs’ (pdf 22/16v). If the botch starts out blackish, or the flesh within an open blotch is blue or puss comes out, these are all bad signs. If the botch is hard and does not suppurate, but instead suddenly releases the material back into the body, it is a sign of imminent death, as is the case if the broken botch is bluish or is surrounded by a rainbow of colors. Another sign of death is when the carbuncle suddenly dries up and the skin appears blue, or if the skin has green or black spots and various other colors, along with dead or living worms, and is oozing vile bloody matter with a terrible stink. Other bad symptoms include when the patient feels hot internally and yet appears

outwardly cold or “the eyes staring or weeping, the face terrible, the sayde extcrements, or brin [tears?] passing away and the partie not knowing thereof”(pdf 22/16v). It is also a very bad sign if on the fourth or fifth day the patient is frenzied or is bleeding from the nose, or is vomiting or wants to vomit but does not, experiences extreme heart pain and fullness, and is without any strength.

Other infallible signs of death include when the patient feels well but is really very sick, has deeply sunken eyes filled with tears, and thinks that every thing smells foul, has blue finger nails and thick noisy breathing which is accompanied by a cold sweat on the face and breast, “and turning and playing with the clothes, the pulse creeping or clearly to bee felte, and grevius unto him to speake” (pdf 22/16r).

Because plague is unpredictable, some people die before any of these signs are noticed and still others exhibit some of these symptoms and still survive, he says. Also, there are too many signs of plague to mention them all, but these are the primary ones.

Thus Kellwaye concludes the first treatise which addresses the issue of how to avoid infection. The second treatise covers methods for curing people who become infected. Kellwaye begins Chapter 1, Treatise Two (pdf 23/17v) by stating that when someone is “infected with this contagious disease” it is important to act quickly to limit the disease’s damage to the heart (pdf 23/17v). If nothing is done within 24 hours, there is little that can be done to enhance the body’s natural defenses. He notes that nature is often seen to be worn out from attempting to expel the venomous matter of this disease and emphasizes that the natural defenses can use all the help that they can get and that with help they can defeat this disease. Kellwaye states that there are four steps

necessary for curing this disease, blood letting, cordials, sweating and purging; however, because these topics have been written about by both ancient and contemporaneous writers, he will cover them only briefly, by discussing his observations of treatments.

Kellway begins by discussing treatments for strong plethoric sanguine bodies, with headaches, a strong pulse and large visible veins; at the first sign of disease these people should be bled from the side of the body from which the disease originates. They should not, however, be bled if the signs are visible, or if the patient has “fliche” or “laske” during the initial stages of the disease; in these cases other means must be found to help nature combat the disease. If the flux continues into the second day, a purgative may be given because as “Hippocrates [wrote] in his first booke,” watching how nature acts can teach us how to act (pdf 23/17r).

If a carbuncle appears under the chin on the neck, blood should be drawn from both veins under the chin, cupping should be applied next to the sore, and chickens or hens’ rumps should be applied to the botch. The chickens should be plucked so that their skin will touch the botch and they are to remain on the botch about a half hour, until they die, and be continually replaced as long as they continue to die.⁹ Following this experience, the blotch should be treated with medicines, recipes for which will be given in later chapters.

⁹ Lynn Thorndike, *A History of Magic and Experimental Science*, vol. 1 (New York: Macmillan Company, 1941), 754, cites Constantinus as recommending a very similar treatment to cure mad dog bites. Constantinus recommends placing a live chicken on the site of the bite, which cures the person and kills the chicken.

If the patient has pains in his groin (greynd) or stomach he should be bled from the Bateola, or Saphena, vein of the foot on the same side of the body as the pain. Kellwaye recommends drawing no more than six to eight ounces. To reinforce his argument, he cites Avicennia's belief that blood is the treasure of nature, although he points out that the actual amount to be drawn is affected by the patient's strength.

After this advice Kellwaye proceeds to describe treatment for "weake, spare, and cachochimious" people who must be given cordials and sweated but must not be bled because, as Galen taught, it will only endanger them. Additionally, he points out that when blood is drawn it must be done in the first six to eight hours and that bloodletting cannot be done once the sore has begun suppuration. Kellwaye also argues that the blood must be drawn from the side of the body in which the sore appears, in order to avoid drawing bad blood into the healthy side of the body. Regardless of what the patient says, the healthy side of the body can be determined by measuring the pulse; it will be weaker on the side that needs to be bled.

In some patients the best way to help nature is to apply cupping glasses (ventoses), near the part of the body about which the patient complains. Once the venomous matter has been attracted, chickens can be applied as was previously described. Kellwaye then describes specifically where the ventoses should be applied based upon where the patient is experiencing pain. After cleansing the body using phlebotomy or by applying ventoses, the patient must be given a cordial within an hour or two. Kellwaye then provides several recipes to "expell the plague and provoke a sweat" (pdf 25/19v). The first of these has an exceptionally long list of ingredients

although in many cases Kellwaye provides a number of alternate ingredients including: leaves of gold or silver; citron rinds, red corell, zedior roots, bone of a stag's hart, or shaving of ebory; and most confusing of all, "Fine Pearle, and been of both sorts" one scruple of either (pdf 25/19v). The second recipe has fewer ingredients, including neither gold nor unicorn horn; nonetheless, both recipes have similar instructions. The ingredients are to be made into a powder and then mixed into sorrel, scabios, or cardus water along with lemon or sour citron syrup and served warm.

These recipes are followed by one for "A good Opiat to expel venom and provoke sweat" (pdf 25/19r). This recipe again provides many alternative ingredients. The instructions for making the opiat are followed by "Another excellent good means to expell the venom, and procure sweat", that has a more limited ingredient list, however, both of them include compounds that may individually have many ingredients (pdf 26/20v). Use some "Vennes triacle or Andromachus treacle" to stuff into the center of a large white hollowed out onion, along with some aqua vite, and then close up the hole in the onion (pdf 26/20r).¹⁰ Roll the onion in hot ashes until it is soft and then press the onion through a cloth. Give the juice to the patient and apply the solid remainder to the sore.

Kellwaye then says that if the patient throws up after taking one of these cordials, he should be given an additional quantity of the cordial equal to the amount

¹⁰ According to the Oxford English Dictionary (OED) Venice and Andromachus treacle are synonymous.

that was thrown up. Continue this process until the patient keeps the medicine down and sweats; if the patient never holds down the cordial there is little chance of recovery.

The instructions and advice on this cordial are followed by “An excellent good water against the plague, and divers other diseases, which is to be made in May or June” (pdf 26/20). The described water includes a number of herbs steeped in white wine, vinegar and rose water that Kellwaye recommends taking in the morning, at breakfast. He also notes that it can be used with any of the aforementioned cordials and is very useful in warding off the disease.

Chapter 2 is titled “Sheweth what is to be done after taking of the Cordial”(pdf27/ 21v). Kellwaye recommends that after taking one of the cordials the patient should walk about his room some and then be put to bed naked in order to sweat. Kellwaye specifies that the patient must not be allowed to sleep during the day because during sleep the vital spirits are drawn in, causing the venom to be held near the heart. He also recommends that if the sore is near the heart, the area between the sore and the heart should be treated with treacle or an ointment for which he provides a recipe, while the sore is treated with a chicken. Then Kellwaye recommends applying a warming plaster (Epithemating)to the heart and he provides several recipes for epithem (epithemats), which should be rubbed over the heart while warm. Then the heart should be covered with a cloth bag holding a variety of herbs and medicines.

Kellwaye then provides two recipes for juleps, “which will both comferte the hart and quench thirst” (pdf 29/23v). These recipes are followed by a recipe for a treatment to use on the patient’s temples and heart if he grows faint or swoons.

Kellway also suggests that the patient occasionally be given sips of a good comforting broth. If the patient does not begin to recover, he should be given more of the cordial and, after sweating, even more of the cordial. Any means should be used to make the sore disappear; if it does not go away it should be brought to suppuration and opened with an incision or caustic. The day after the patient sweats, he may be allowed a couple hours of sleep in the afternoon as well as broth flavored with some of the same herbs used in medicines. Then Kellway provides another recipe for a water to quench thirst and protect the heart. This one includes two ounces of water of scabios, borrag or sorrel and one ounce of syrup of lemons, sour citrons or sorrel juice. Kellway says to mix the ingredients together but he gives no information on whether it should be diluted.

At night the patient may be allowed to sleep three or four hours. On the third or fourth day, Kellway allows that the patient should be purged, but he recommends not using a strong scamniat purgative, because the patient can be easily over weakened as this disease makes the body subject to fluxes. Kellway provides several recipes for purgatives for both strong and weak bodies. The purgative recipes are relatively complex although the numbers of ingredients are not exceptionally great; the recipes require boiling, steeping, straining and then mixing in new ingredients. The purgative recipes are followed by instructions for making cordials to be taken after purging. If the patient is plethoric and full of bad humors, he should be purged again the next day.

Chapter 3, "Sheweth what Simptoms often chance and how to help them' (pdf 33/ 27v), provides recipes, the first for a concoction intended to fight off light

headedness brought on by lack of sleep. The list of ingredients, which seems to be written largely using a Latinate form, which is frequently abbreviated, includes *Horedei mund, Amigd dul depilatum, Sem. 4, Frigid, Ma, Mund, Aqua font q 5, fiat decoetio,*” *decoei col, Syr de limonbus, de papa, Sacchari perlati* (pdf 33/ 27v). These ingredients are to be boiled together and then a few spoonfuls drunk. Then Kellwaye provides information for making an ointment to put on the temples that relieves pain and encourages sleep.

Next, Kellwaye suggests that patients who rave and rage can be treated with a scruple of burnt hart’s horn mixed with an ounce of syrup of violets and one of lemon syrup. Kellwaye next recommends treating the patient with a *sacculus*, a bag filled with medicine, placed on the head. Kellwaye follows the treatment for raving by providing instructions for a gargle treatment for mouth sores, which he says accompany this contagious disease because of the heat the disease produces. Kellwaye’s next advice concerns excessive vomiting that continues after the first day or so. The cordials and sweating that drive the poisons out of the body should cause an end to the vomiting. Kellwaye says it is a bad sign if they do not; nonetheless, he provides a method he has used to control vomiting.

The first of these treatments is “A good bagge for the stomacke” (pdf 34/28v) a linen bag large enough to cover the stomach filled with a mixture of four herbs selected from a long list of potential ingredients. The herbs should be ground into a coarse powder and put into the bag. (pdf 35/29v). Then dissolve one ounce of mithridate in ten spoonfuls of rose water or vinegar; heat this mixture. Soak the bag in two parts water

and one part wine, white or claret, which have been heated on embers. Then rub rose water or vinegar on the patient's stomach, and cover it with the warm wet bag for half an hour. Kellwaye says the patient should then be dried off and rubbed with an ointment that he gives instructions for making. It includes an equal amount of kemicall oil of rosemary or sage and vinegar and mitridat.

Kellwaye next proceeds to address the problem of hiccapping. The medicine for this includes dill seed and purslane, *Portulaca oleracea*, or white poppy seeds, which are then placed in a bag and soaked in the patient's drink. This medicine will not only help get rid of hiccups, it will also inhibit vomiting. Kellwaye then proceeds to provide medicine to stop and prevent flux. The process begins by giving the poor patient a purgative that will get rid of "those slymie humors," which are the cause of the flux (pdf 35/29r). The primary ingredient for this medicine is water that has been infused for 12 hours and then strained of rhubarb, cinnamon, aquarom, endive and borage and to which an ounce of syrup of rose laxative has been added. Kellwaye recommends drinking it warm and says to avoid meat, drink and sleep for three hours. Once this treatment has worked, he recommends following it with a medicine to be taken orally, and then suggests a treatment to be rubbed over the region of the heart. If none of this stops the flux, Kellwaye provides instructions for yet another treatment to be given the following morning, which he claims to "have founde excellent goode for the stopping of any flixe whatsoever" (pdf 36/30v).

Kellwaye then proceeds to tell readers that they must understand that if diarrhea starts with the beginning of the disease and is not followed by observable botches,

carbuncles or spots, then they must let nature take its course and only assist it with cordials and “epithemations” rubbed in the vicinity of the heart. However, if the patient becomes weak due to the ongoing diarrhea, other more active methods can be attempted to end the diarrhea after the third day of the illness. If, on the other hand, diarrhea begins after a botch or a carbuncle appears, it is a bad sign indicating that the poisons are being drawn inward.

Chapter, 4 “Sheweth the general cure of a botch when he appeares outwardly,” begins by suggesting the use of the cordial described in Chapter 2 followed by an onion based rub, the instructions for which follow, and which Kellwaye refers to as a “maturative” (pdf 36/30r). The instructions are to roast an onion in ashes and then to mash it along with mustard seeds or, lacking those, with some treacle. Apply this paste warm to the sore, and renew the application twice daily, and in three or four days at the outside, the sore will suppurate. These instructions are followed by another similar set and then a third set, with a longer list of ingredients, to be used where there is no inflammation. When the sore is at the point of suppuration, it should be opened at the lowest point by incision or better yet by a caustic. If no matter flows out, a chicken should be applied to the sore as previously described and a digestive, a mixture of egg yolk, clear turpentine, clarified honey and mithridate or treacle, should be placed inside the sore until it is well digested so that “white and thick matter” comes out of the sore (pdf 37/31v). When this happens, the sore is to be treated with yet another digestive “cataplasme” and when it is completely digested, the sore should be “mundified” with one of several mundificants including unguetum biridum. Then, when the sore is fully

mundified, Kellwaye recommends feathering on “Arceus” liniment and finally the sore should be covered by a “diaculum” or “rellebackeron” plaster (pdf 37/31r).

Chapter 5, “Sheweth how to bring the botch out, that lieth deep within the body or flesh” (pdf37/31r), begins with Kellwaye pointing out that it is necessary to consider that some carbuncles or botches may form within the body and may remain hidden because nature was not strong enough to push them out toward the surface of the body. These unseen carbuncles can be easily recognized by the intense pain they create. If they do not move to the surface after the previously described treatments, it is necessary to use any and all means to “bring it to the outward partes” (pdf 38/32v). These measures include those previously described, such as cordials to protect the heart. Additionally, if there is no great pain on the body’s surface, Kellwaye recommends applying a cupping glass with scarification directly above the pain for 15 minutes to an hour and then, as previously described, applying a chicken, hen, or pigeon, followed by a plaster as well as a cupping glass every sixth hour until the poisons have been drawn to the surface. Once the poisons have been brought to the surface, the cupping should be stopped and a maturative should be applied. Kellwaye provides three recipes for maturatives from which to choose.

Following these recipes Kellwaye provides a recipe for an irritating ointment, a vesicatory, to be used when the patient has too much pain to allow the application of a cupping glass. This treatment will raise blisters, which should be opened and drained, and when the sore has formed an abscess (impostimated), it should be treated as previously described.

Kellwaye follows these instructions with advice about how to treat botches that remain hard after they have matured (pdf 39/33v). Kellwaye says that after treating them with an epithem, these sores must be opened to prevent the poison from moving inward or the sore becoming gangrenous. In addition the patient should be given a cordial, and the skin between the sore and the heart should be rubbed with a defensative described in Chapter 2.

Kellwaye provides a recipe for a hot epithemation liquid in which to soak wool fabric and then to place the hot fabric over the sore, and to then repeat the process when the wrap cools down and, finally, to open the sore as previously described and treat it by applying chickens or hens. If chickens or hens are not available, “a Whelp or a Pigeon cloven asunder by the back” should be applied warm to the sore (pdf 39/33r). This treatment should be renewed as often as necessary and then the sore should be treated by a digestive and then covered with a plaster until it is fully digested, after which the sore should be treated as Kellwaye previously described.

In chapter 6 “Sheweth what is to be done, when the botch strikes in again”(pdf 40/34v). Kellwaye addresses plague sores that appear and then disappear again. Kellwaye notes that this is a very bad sign. The patient should be treated with cordials to expel the poison. In addition the soles of the patient’s feet should be treated with a poultice and his heart should be treated with an epithemation from Chapter 2. The patient should also be made to sweat and should be gently purged. If, after taking these measures, there is no success, there is little hope; nonetheless, Kellwaye points out that Petrus Forestus recommends that you should give the patient a glister and then, within

two hours drawing blood, from the same side of the body as the pain. The sore should then be treated with an unguent, and two hours later the patient should be given a cordial and sweated.

Chapter 7, “Sheweth how to draw a botch from one place to another, and so to discuss him without breaking” (pdf 40/ 34r), Kellwaye suggests beginning by applying a cupping glass to the lower edge of the sore, on the side that you want it brought to, and then apply another glass as close as you can to the first. Follow this with a third glass and let them stay on the skin 15 more minutes. Do this three or four times, although the first glass nearest to the sore should be left alone. Finally, all the glasses can be removed and the final glass can be replaced with a vesicatory, a biting irritating ointment, which should remain in place 12 hours. Then the blister should be opened and an ivy or cole (mustard family) leaf should be placed on the spot and it should be covered with a plaster. The dressing should be changed twice a day and the blister should be kept running as long as possible. Eventually it will heal up as do other ulcers. The blister should be treated with an epithemation rub, the recipe for which follows. Once the blister has been opened, the botch should be treated with the cataplasme whose recipe follows. In three or four days the botch should be resolved, but if it is not, both should be brought to suppuration by the means previously discussed.

Chapter 8, “Sheweth how to knowe a carbunkle or blayne as also the cure of the same,” begins with Kellwaye’s description of how carbuncles and blaines look in their initial stages (pdf 41/35r). He says that both sores begin with a small pustule or wheal, or occasionally they form from a collection of pustules together. They begin painfully

with a prickling and burning. These blaines and carbuncles appear to be full and yet when opened little comes out, and they will form a hard crust or a scar as if they had been burnt with an iron or caustic. They are often accompanied by heaviness.

In some patients, the disease begins with no visible pustules, but instead it exhibits as a hard black crust or scar; in still other cases there is no visible sign, and instead the patient has difficulty breathing, and coughs and spits as if the sore were in the lungs. It can also appear in the liver or spleen, in which case the patient will suffer pain and pricking on the same side of the body. If it occurs in the bladder or kidneys, the patient will have trouble, or experience pain, while urinating. If it occurs in the brain, the patient will experience delirium, but regardless of how the patient experiences these sores, the patient will have a fever and experience other signs described in the first treatise. Kellwaye reiterates some of these signs and gives instructions for curing carbuncles (pdf 42/36v).

First Kellwaye points out that all the treatments that are universally used to combat diseases, including bloodletting, purging, and applying epithemations and sweating, should be used to treat the carbuncles in the same order previously described in the treatment of botches. In addition, the air of the house should be rectified by straining it with vine or willow leaves or roses and sprinkling the floor with rosewater and vinegar and having the patient frequently sniff a cloth soaked in rose water. Of course, everything should be done to bring the carbuncle to suppuration. To this end, Kellwaye provides a recipe for “A Maturative Cataplasme” of mashed fat figs and mustard seeds and just enough oil of lily to make a stiff poultice(pdf 42/36v). This

poultice should be left on and the application renewed until the scab is soft, at which point a mixture of egg yolk and unsalted butter should be applied and left on, until the scab falls off. When it has fallen off, apply the mundificative of turpentine, syrup of red roses and honey of roses, for three days; then apply a different mundificative with ingredients that include turpentine, honey of roses, smallage juice and barley flour. Once the sore has been completely mundified, apply an unguent.

Occasionally you will find that a small pustule may appear without any adjoining swelling or hardness. In order to treat it, you must bring the hardness to the surface. Kellway provides the recipe for a cataplasm to be used for this purpose, which includes lily roots and onions or sour lemons boiled until the water is consumed, and to which mustard seed, pigeon dung, or white soap (sope); snails without shells; mitridate or treacle; and egg yolks have been added. Then this mixture should be applied twice a day until it raises and suppurates, when a maturative should be applied; and then the previously described treatments should be used in the appropriate order. At this point Kellway notes that he prefers the use of poultices to plasters because the former do not block the pores and thus allow the poisonous humors to escape.

Kellway next describes how to deal with carbuncles that are accompanied with pain and inflammation. He recommends covering the sore with a bag made of clean linen and full of medicinal ingredients that have been boiled. The bag should be partially wrung out and applied warm to the sore. When the first bag becomes cold it should be replaced by a second warm one. This procedure should be done when the dressing is changed, at least twice a day. Kellway follows this advice with a recipe for

the dressing, which should be changed at least twice a day or before it becomes dry and stiff. These treatments should continue until the pain and inflammation are gone, at which point it becomes important to cause the sore to suppurate. Kellwaye recommends using the previously described cataplasm to which some lily oil and sweet butter have been added, or another cataplasme, whose recipe follows in his treatise. When the sore has suppured, the instructions provided earlier in this chapter for getting the scab to fall off should be followed.

Kellwaye points out other dangers that occasionally present in the development of the botch or carbuncle, which, he then says, there is no point in describing in detail because inexpert people would not be able to perform the required treatments. If you experience any of these events Kellwaye recommends that you consult a learned physician or experienced surgeon; this is the end of Kellwaye's second treatise.

A short treatise of the small pockes, shewing the means how to governe and cure those which are infected therewith. Chapter 1 is titled "Sheweth what the small pockes and measeles are and whereof it preceedeth" (pdf 44/ 38r). Kellwaye notes that it sometimes happens that people who are infected with plague, and survive, then experience smallpox or measles while they are weak after the plague. In addition to following plague, it has been observed by Salius, and other writers noted, that smallpox and measles outbreaks serve as warnings and signs of a forthcoming plague epidemic. Thus Kellwaye feels justified in attaching a smallpox treatise to the previous two on plague.

Kellway states that there is no need for him to describe “this” disease because most people know the process of adulterated blood as Avicenna and others witnessed. It always begins with a fever that is followed by the development of small red pustules all over the body. The pustules do not erupt suddenly but instead (pdf44/38r) intermittently in some cases, depending on “the state and quality of the bodie infected.” In some bodies the pustules continue to increase and grow larger and develop thick matter within them. These are called variola in Latin and small pox in English.

Kellway writes that some writers insist on a difference between variola and exanthemata because they note that many variola pustules suddenly run “into a clear bladder as if had bene scalled” while the other pustules do not; however, according to Kellway, the important point is that in both cases the cure is the same.

The next section is entitled “What the measeles or males are” (pdf 45/39v), which Kellway begins by citing Avicenna as having said that measles begin with swelling and many little pimples that can be felt but not seen, and which neither develop to the point of maturation nor ulcerate in the same way that pox pustules do. In addition, measles do not attack the eyes nor do they leave deformity in their wake. Also the pustules of measles develop more slowly than do those of small pox. Nonetheless they both require the same cure and are both the result of choleric and melancholic blood.

Kellway begins his discussion of the causes of pox and measles by citing Valetius as saying that the primary cause is the introduction of a putrefied or corrupt quality into the air that causes an ebullition of our blood, although the immediate

antecedent is meats that become corrupt in the stomach. Kellwaye's examples of this phenomenon are what happens when fish and milk are eaten together or the result of neglecting to have blood drawn when one had been accustomed to having it done yearly. While the conjunct cause is the mother's menstrual blood that became mixed "with the rest of our blood" (pdf45/39r), it thus produces an adulteration of the whole while we were in the womb.

The efficient cause is the natural heat which becomes disquieted by the presence of the menstrual matter mixing in the blood. This produces an unnatural heat, which serves to separate the menstrual matter from the blood. Because this matter offends nature, the body then attempts to push the toxins out of the body through the pores. If the matter is hot and wet, the result is the pox; if it is subtle and dry, the result is the measles.

Kellwaye notes, however, that Mercurales, to whom he refers as an "excellent writer in phisicke" does not believe that this disease is caused by menstrual blood, but rather that it is caused by "some secret and unknown corruption or defiled quality of the ayre," which causes an ebullition, heating, of the blood that produces the disease (pdf 45/39r). He now believes that it is a hereditary disease because few escape it; eventually, most people have gotten the disease by the time they are old.

Kellwaye notes that the debate over this issue is heated and that there are good arguments on both sides. As a consequence, Kellwaye decides to leave the argument to others, but nonetheless he does present his own views on the matter. Kellwaye believes that it is the result of the conflict between the pure humors and the excrements from all

four humors of the body that produces unnatural heat and ebullition of the blood. Although Kellwaye appears to confirm that he sees measles and small pox as two diseases, he also says that they both almost always begin with a fever and should be considered among those diseases labeled Epidemia. The grammatical forms he uses make it difficult to be sure that he is talking about two diseases, as he uses, for example, the pronoun “it” to refer to them, or says “this disease” (pdf 46/40v). Kellwaye cites Fracatorius as pointing out that “this disease is very contagious and infectious” and this fact is clearly demonstrated by experience (pdf 46/40v). Kellwaye notes that there are two special reasons that demonstrate the disease is infectious. It is the result of an over heating of the blood which can be spread as the vapor from one body travels to another. In addition, it is a heritable disease which can be seen because many people who come near to a sick person, especially those that are related by blood, also become sick.

Chapter 2, “Sheweth to know the signes, when one is infected, as also the good and ill signes in the disease” (pdf 46/40v), starts with a description of the disease symptoms. It starts with a hot fever which is sometimes accompanied with delirium. The disease produces serious back pain, a stuffy and runny nose, red runny eyes, a sore hoarse throat, and dry mouth accompanied with spitting up phlegm, and a red face. It also produces difficulty breathing, a heavy and pricking sensation throughout the body, as well as shaking in the hands and feet.

Positive signs that indicate that the disease will not be especially serious include: when the pocks appear quickly and start out red and become white and quickly mature, or if the patient breathes easily, is eased of the pain and the fever. It is unclear

from the description if all the signs are required to indicate a positive outcome or if any one of the signs is enough to suggest a positive outcome.

The negative signs indicating a potentially serious outcome include: when the pocks are slow to develop or to produce external evidence of their presence, or erupt and then retreat back into the body or alternately if the pocks are black, bluish and greenish in color. Additionally, it is a bad sign if the patient has difficulty breathing. It has also been shown to be a bad sign if the patient has diarrhea, lask, or when pocks grow double within each other, or when they grow into each other and form one large blister and then suddenly collapse and form a hard dry scab as if the skin had been burnt with a hot iron.

Kellwaye then provides the two causes that Avicennia says produce death in people with the disease, and these are swelling in throat, called Angina, that prevents the flow of air, or the presence of flux or laske that drains the body of vitality so that the disease becomes worse and death of the patient results.

Kellwaye then addresses the means of determining from which of the humors the disease originates. If the disease comes from blood or the sanguine humor, they appear red and there is considerable pain throughout the body as well as a considerable fever. If they are the result of cholera they will be yellowish, red and/or clear, and the patient will experience pricking pain all over the body. If they originate from phlegm, they will appear whitish and scaly, and if the cause is excessive melancholy, they will appear black and be accompanied by a pricking pain.

In Chapter 3, “Sheweth the means to cure pockes or measles,” Kellwaye addresses the two primary means of curing small pox and measles (pdf46/40r). The first of the two methods is to assist nature to drive the disease to the exterior of the body from the interior. The second element is to preserve the body, both the interior and exterior, from the ravages of the disease.

In order to draw the disease out of the body, blood should be drawn on the first, second, or third day from the patient’s basilic vein of the right arm if he is strong enough and is more than 14 years old (pdf 47/41v).¹¹ (This vein was thought to be in direct connection to the liver. OED) Children and those with weak constitutions should be bled from “inferiour parts” such “as the thighs, hams, buttocks and hemeroydal veyens,” or alternately ventoses can be applied, with or without scarification, to loins, buttocks or hams. These can be applied before or after pustules appear. Kellwaye does caution that in the case of small children it is best to apply blood suckers because ventoses are hard to apply. He goes further and states that in small children he believes it is better to leave matters to nature, unless the body does not seem to be attempting to expel the disease. If nature is pushing to expel the disease, Kellwaye recommends assisting it by keeping the body heated. He suggests wrapping the patient in soft linen and then in “a scarlet, stammel or red cloth” and then dressing him in reasonable clothes, helping him avoid anger, and keeping him quiet and out of the open air and bright light.

¹¹ OED, this vein was thought to be in direct connection to the liver.

Kellway recommends giving the patient a glister if necessary, and gives a recipe and instructions for making and treating the patient with a glister. This glister is made with two handfuls of barley and one handful of violet leaves that are boiled in three pints of water until the half of the water has been boiled away. The mixture should be strained to produce 12 ounces of the decoction. Kellway then says to add three ounces of oil of violets and one ounce of either red sugar or butter, although Kellway then notes that the strength of the medicine can be altered to suit the temperament of the patient. If the patient is very feverish, an ounce of cassia should be added to the decoction. Kellway specifies that when the patient expels the glister, he should be rubbed with a warm cloth, which helps the body to expel noxious matter. If the patient then experiences fever, the fever should be encouraged to the extent that the patient can stand it without becoming faint by dressing him in warm clothes. Additionally, the patient should not be allowed to sleep, or at least allowed very little sleep, until the pustules, pox or measles appear.

Kellway also points out that when the pustules do appear, care must be taken that the ears, eyes, nostrils, throat, and lungs are protected from damage. He then provides a recipe including rose or plantain water and sumac for protecting the eyes. Once the ingredients have been boiled or infused over night, they should be mixed with half a spoonful of "oyle" made from egg white. Then, cloth dipped in this mixture should be placed on each eye and kept over the eyes until the pustules are fully erupted. The cloths should be kept moist by wetting them in the mixture. If the patient experiences dry eyes and severe eye pain, Kellway provides two recipes for liquids to

be dropped into the eyes; to protect the ears, Kellwaye suggests using drops of rose oil before the patient sweats; to protect the nostrils he suggests making the patient smell rose vinegar or else vinegar boiled with red roses and sandalwood; to protect the throat Kellwaye recommends that the patient suck on a white sugar candy; and to protect the lungs he recommends frequently giving the patient small amounts of quince syrup or rose conserves. To quench the patient's thirst, he should be given barley water mixed with licorice along with citrus, pennyroyal, or currant (rybe) juice as the patient prefers. Kellwaye also provides many dietary recommendations, and especially recommends foods that have cooling properties.