

PHYSIOLOGY AND FOOD: CRISES, DIETARY SHIFTS, AND PHYSICAL HEALTH
IN FOURTEENTH CENTURY EUROPE

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PHYSIOLOGY AND FOOD: CRISES, DIETARY SHIFT, AND PHYSICAL HEALTH IN
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To my father, Douglas Dudley

Thanks for never letting me give up

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ABSTRACT

The first half of the fourteenth century completely altered Europe through a series of disasters, particularly the Great European Famine, the Great Bovine Pestilence, and the Black Death. These alterations included the daily diet and the physical health of the people of northern Europe. One disaster followed another in rapid succession, impacting the food supply and affecting northern European society to its core, quite literally to the very hearts of the survivors. With each new event, trends in eating habits shifted to accommodate the current circumstances. Famines, new food sources, and increased availability of food collided with medicine and magic cures to create new daily diets for the European people. Some of these newfound culinary trends persisted even after the circumstances in which they initially arose. Utilizing contemporary writings, archaeological evidence, and modern famine research, this paper examines these alterations in European diet and how they led to physiological outcomes in the survivors of the early fourteenth century disasters, some of which impacted people decades and even generations later.

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PREFACE

Natural disasters and military crises bring about changes in society and can influence every aspect of life, including physical health. Disasters plagued the early fourteenth century, and in Europe, these events physiologically altered the survivors and their descendants. One vital vehicle for these alterations was the resulting change in dietary trends for the people of fourteenth-century Europe. Food is indispensable for human beings, and consumption constantly shifts in reaction to a diverse range of factors, including expense, availability, social or religious pressures, and new technology. Food is also an important element that affects areas such as population growth, trade, and overall health. As food habits change, so too does physical health, not only for the individual but also for future generations. Studying how the disasters of the early fourteenth century impacted the diet of the people of Europe allows us to better understand the changes in physical health in the fourteenth century and beyond. This in turn helps to inform our knowledge of the health of subsequent generations and to interpret modern events and catastrophes such as our own climate shift, global pandemic, and food crises, as well as the potential political, economic, and physiological outcomes of these situations. Therefore, this project will examine the changes in diet brought about by the early fourteenth-century disasters, and how these changes physiologically affected the European population.

Diet changes in the fourteenth century have been studied in some detail, particularly in the works of Christopher Dyer, who is known for his work in English social history.

His studies of English harvest workers in the fourteenth century, for example, look at one particular level of society and describe their standard of living by examining manorial records, local laws, and accounting ledgers.¹ Works from culinary historians, such as Hannele Klemetilä and Christopher M. Woolgar, document the diets of people in the Middle Ages using manuscripts, records, and surviving recipes, providing a more complex view of the diets of people both before and after the disasters of the early fourteenth century.² Both sources argue that there was no standard diet across Europe in the Middle Ages, and what dietary trends did emerge in areas shifted over time. An examination of dietary changes may be found in the works of historians such as John Aberth, Wolfgang Behringer, and Bruce Campbell, all of whom have written on the catastrophes of the first half of the fourteenth century. These authors identify numerous effects upon farming and food production that arose from these events by looking at agricultural data and records, environmental evidence, and contemporary accounts. Aberth's *From the Brink of the Apocalypse: Confronting Famine, War, Plague, and Death in the Later Middle Ages* discusses the disasters of the early fourteenth century and how these events interacted with one another, including the changes in food supply as a result of these disasters.³ Behringer examines how environmental factors affected

¹ Christopher Dyer, "Changes in Diet in the Late Middle Ages: The Case of the Harvest Workers," *The Agricultural History Review* 36, no 1 (1988): 21–37.

² Hannele Klemetilä, *The Medieval Kitchen: A Social History with Recipes* (London: Reaktion Books, 2012); C.M. Woolgar. *The Cultural History of Food in England, 1200–1500* (New Haven, CT: Yale University Press, 2016).

³ John Aberth, *From the Brink of the Apocalypse: Confronting Famine, War, Plague, and Death in the Later Middle Ages* (New York, NY: Routledge, 2001).

agriculture and the supply of food in his *Cultural History of Climate*, a method followed by Campbell in *The Great Transition*.⁴ These dietary changes as a result of various disasters led to physiological changes and new health implications.

Medieval medicine was heavily influenced by the Classical works of Hippocrates and Galen, particularly the Galenic theory of the four humors. This humoral approach relied on food as a means of balance, and treatments often included changing the diet of the patient. Many contemporary writers, either physicians or individuals with personal experience, discuss these treatments in journals, letters, and published writings.⁵ Diet often helped determine how healthy an individual was based on the medical knowledge of the Middle Ages, as their knowledge stated that different people required different diets based on their age, profession, and even social status. The standard diet of the individual had physical health implications, and graveyard studies, such as those performed by Sharon DeWitte and Philip Slavin, demonstrate the health of populations by examining skeletal remains and assessing the presence of bone markers consistent with various diseases and nutritional outcomes.⁶ These studies allow us to examine and diagnose the physical conditions of those who lived during this time and help to construct

⁴ Wolfgang Behringer, *A Cultural History of Climate* (Cambridge: Polity, 2017); Bruce M.S. Campbell, *The Great Transition: Climate, Disease and Society in the Late-Medieval World* (Cambridge: Cambridge University Press, 2016).

⁵ *The Black Death*, ed. Rosemary Horrox (Manchester: Manchester University Press, 1994); John Aberth, *The Black Death: The Great Mortality of 1348–1350: A Brief History with Documents* (Boston, MA: Bedford/St. Martin's, 2005)

⁶ Sharon DeWitte and Philip Slavin, "Between Famine and Death: England on the Eve of the Black Death—Evidence from Paleoepidemiology and Manorial Accounts," *Journal of Interdisciplinary History*, 44, no. 1 (Summer 2013): 37–60.

a more accurate understanding of the health and nutrition of the people. Graveyard studies also allow us to examine the health of these populations before the disasters of the fourteenth century, during and in between these disasters, and the generations who succeeded them. Modern famine studies are utilized to help interpret medieval findings, as well, which helps to understand past events and their effects on the European population.⁷

The early fourteenth century disasters occurred across Europe, but the largest and most thorough body of research available in English has been focused on England, particularly London and its surrounding areas. This has changed in more recent years, with historians such as Hannah Barker, Tim Soens, and Erik Thoen examining other areas from the Black Sea to Flanders.⁸ Much of the research in other areas is inaccessible due to language barriers which have prevented this research from being used in this study, resulting in an Anglo-centric pool of sources. Nevertheless, this study explores the dietary and physiological changes across the continent where possible. The first chapter will examine the disasters of the first half of the fourteenth century and how each event built off those that came before it. The second chapter will describe the European diet before the fourteenth century and how it changed in the aftermath. Finally, the third

⁷ Yu-yu Chen and Li-An Zhou, “The long-term health and economic consequences of the 1959–1961 famine in China,” *Journal of Health Economics* 26 (2007): 656–81.

⁸ Hannah Barker, “Laying the Corpses to Rest: Grain, Embargoes, and *Yersinia pestis* in the Black Sea, 1346 – 1348.” *Speculum* 96, no. 1 (January 2021): 97–126; Erik Thoen and Tim Soens, “Vegetarians or Carnivores: Standards of Living and Diet in Late Medieval Flanders,” in *Economic and Biological Interactions in Pre-Industrial Europe from the 13th to the 18th Centuries*, 1–33. ed. S. Cavaciocchi (Firenze: Firenze University Press, 2010).

chapter will discuss the physical health of the European people before and during these events, as well as the physiological changes that resulted from the alterations in food security and nutritional outcomes.

CHAPTER ONE

Warfare

The fourteenth century in Europe saw widespread conflict in a multitude of different areas, including in England, Scotland, France, and Ireland. Due to the advances in military technologies and tactics, the entire nature of warfare in the fourteenth century changed. Additionally, the many different sides in these various conflicts employed tactics such as crop burning and cattle raiding. This harmed not only the military personnel, reducing available food for these troops that lived off the land by foraging, but the civilian population, as well. Even in the absence of these food-targeted destruction strategies, the very process of requisitioning and purveyance harmed the general population, for whom the soldiers left very little food or supplies. Many of these military conflicts coincided with periods of famine, and whether by destruction or removal, these periods of warfare exacerbated the existing food crisis and contributed to the overall disastrous nature of the fourteenth century.

The first of these outbreaks of warfare was the Scottish War for Independence, which began at the end of the thirteenth century and carried into the early fourteenth century and saw active engagements across Scotland, the north of England, and in Ireland.⁹ Both the Scottish and the English practiced cattle raiding, while the Scottish commonly burned English fields, particularly in agricultural areas in the north of England, such as

⁹ Phillip Slavin, “Food Security, Safety, and Crises,” in *A Cultural History of Food in the Renaissance. A Cultural History of Food*, vol. 3, ed. K. Abala (London: Bloomsbury Publishing, 2015), 65; Aberth, *Apocalypse*, 61; Philip Slavin, “Warfare and Ecological Destruction in Early Fourteenth-Century British Isles,” *Environmental History* 19 (July 2014): 529.

Northumberland.¹⁰ The English employed these same strategies, as well, plundering and burning towns and fields such as areas in Ireland in 1315.¹¹ In addition to the purposeful destruction of food sources, requisitioning for military supply was detrimental to people on all sides of these conflicts, as the soldiers took whatever food they could find regardless of allegiance and left very little for the civilian populations.¹²

Most governments had a mandate to supply food to their soldiers in exchange for their military service.¹³ This led to the practice of purveyance in many areas, in which the king's sheriffs or specially appointed men collected specified quantities of foodstuffs, which were to be bought from the sheriffs' areas of authority and brought forth for use by the king's armies. Unfortunately, the sheer amount of food collected for the military left very little for the people to live on until payment could be obtained, if that promise was even fulfilled at all.¹⁴ The sheriffs or other purveyors were to render their accounts to the exchequer, who kept track of these goods and the unpaid cost, although the purveyed goods were supposed to come from rents, tax receipts, or income owed towards the king instead of taken on credit.¹⁵ Oftentimes, however, these goods were taken illegally and at

¹⁰ Philip Slavin, "The Great Bovine Pestilence and its economics and environmental consequences in England and Wales," *Economic History Review* 65, no. 4 (2012): 1249; Slavin, "Warfare" 531.

¹¹ Slavin, "Warfare," 532; Aberth, *Apocalypse*, 84–85.

¹² Aberth, *Apocalypse*, 48.

¹³ Aberth, *Apocalypse*, 47.

¹⁴ Aberth, *Apocalypse*, 53.

¹⁵ Aberth, *Apocalypse*, 47.

much cost to the farmers, who could not afford to take time from cultivating their fields or tending to their harvests in order to collect on their payment.¹⁶ Purveyance, although typically restricted to certain periods and geographic areas, such as England during the Scottish War for Independence, directly interfered with farming. Several documents recount instances in Lincolnshire and Nottinghamshire in 1338 in which purveyors took cattle directly from the fields, where they were actively being used as draught animals.¹⁷ This further harmed peasants and laborers beyond the food sources actively taken for military provision, as it left them without the means to produce more food for themselves.

In addition to purveyance, the campaigns themselves further reduced the amount of food available to the civilian population. The *Annals of Connacht* and *Annals of Loch Cé* tell of wars and the destruction of agricultural fields by fire and plundering during the campaigns in Ireland.¹⁸ The north of England, a largely agricultural area and important producer for the kingdom, suffered immensely. The Scottish intended to starve out their enemy, but theirs was not the only source of destruction, as these food-targeting tactics were employed not just by the Scottish and Irish, but the English, as well. Accounts from the Hundred Years' War describe the decimation of French villages by English raiders who left nothing in the fields and no people to cultivate the vineyards or replant the

¹⁶ Aberth, *Apocalypse*, 53.

¹⁷ Aberth, *Apocalypse*, 51.

¹⁸ *Annals of Loch Cé*, trans. William M. Hennessy (Cork: Corpus of Electronic Texts, 2008): 1315.5, 1336.8; *Annals of Connacht*, ed. Pádraig Bambury (Cork: Corpus of Electronic Texts, 2011):1326.3, 1338.8.

grain.¹⁹ Irish, French, English, and Italian authors such as Estache Dechamps, Hugh de Montgeron, and the archbishop of Canterbury, Simon Islip, noted the preponderance of destroyed homes, ruined harvests, and dearth of food.²⁰ Even their animals, which could be slaughtered and eaten in dire circumstances, did not survive these raids, as pillagers often took them for meat, leaving very few living beasts in their wake.

All sides in the Scottish War for Independence used cattle raiding, both as an attack against enemy food supply and to replenish their own herds. One instance, documented in the *Annals of Connacht*, recounts the pillaging of the kingdom of Moylurg by enemy raiders in order to restock their cattle.²¹ This became necessary as a result not only of the various battles and raids taking place during the war, but also due to the spread of the Great Bovine Pestilence during this time.²² Unbeknownst to the combatants and raiders, these stolen cattle actually served to spread the Bovine Pestilence across Europe, as the infected herds from the raids came into contact with the healthy cattle they were intended to supplement.²³ The *Annals of Loch Cé*, in particular, describes the raiding of cattle while plundering villages in the west of Ireland, and how the victors brought home their spoils or kept them with the army as they continued on their campaigns.²⁴ Military

¹⁹ Aberth, *Apocalypse*, 90–91.

²⁰ *Annals of Connacht* 1318.8; Aberth, *Apocalypse*, 52–53, 86, 88–89.

²¹ *Annals of Connacht*, 1315.13.

²² Slavin, “Warfare.” 536–37.

²³ Slavin, “Warfare.” 537.

²⁴ *Annals of Loch Cé*, 1336.7., 1336.8.

movements also assisted in the spread of these diseases, contributing to cattle deaths, which in turn caused both sides to venture out and raid more cattle to make up for those which had sickened and died. This vicious cycle contributed to the massive rate of bovid death during the Great Bovine Pestilence, discussed later in this chapter.

Many military tactics targeted food supply, especially in agricultural areas. Strategies intended to starve out the enemy oftentimes harmed the civilian populations, and even in the absence of malice, such as in cases of purveyance, warfare tactics contributed to the food crisis. Combined with the ongoing famine in many parts of Europe, and the pestilence which spread across the continent with the aid of military movement, the Europeans of the early fourteenth century experienced a food crisis unlike anything the world had previously experienced. This brought dire consequences not only in the immediate aftermath of the famine but also in later years, when the Black Death began to spread across the continent and claimed the lives of almost half the population of Europe.

Climate Shift

The end of the thirteenth century into the beginning of the fourteenth century saw a shift from a warm climate with mild winters and long summers to a much colder climate with long winters and rainy summers, particularly in northern Europe. The Medieval Warm Period had been ongoing for several centuries prior and had resulted in an expansion of arable land. It also coincided with and allowed for developments in farming technology and efficiency. However, this kind of intensive farming led to several consequences which overlapped with the end of the Medieval Warm Period and the

beginning of what is known today as the Little Ice Age, in which the world climate decreased by about four degrees Fahrenheit. This rapid change resulted in a series of horrible weather patterns, culminating in a phenomenon called the “Dantean Anomaly” of 1315 to 1321.²⁵ This anomaly helped to trigger the Great European Famine, and concurrent weather conditions exacerbated other ongoing crises such as the Great Bovine Pestilence. This climate shift is not only a direct cause of these two disasters, but constituted another disaster in and of itself, inflicting long-lasting damage on Europe and acting as a foundation upon which all the other misfortunes of the early fourteenth century would rest.

The Medieval Warm Period, occurring from roughly the eleventh century to the fourteenth century, preceded the Little Ice Age and coincided with a period of immense population growth in Europe.²⁶ This increase in population required an increase in food production. Technologies such as the wheel plough, horse collar, and three-crop rotation allowed for a rise in crop production while using the same amount of land, while the warmer weather patterns thawed out lands such as Alpine valleys and fjords and allowed them to be cultivated for farming, as well as lengthened growing seasons.²⁷ However, limited land and intensive farming leading to infertile and overworked soil soon caused a plateau in food production and with a still-rising population, a food crisis quickly

²⁵ Martin Bauch, et al, “A prequel to the Dantean Anomaly: the precipitation seesaw and droughts of 1302 to 1307 in Europe,” *Climate of the Past* 16, no. 6 (November 2020), 2343.

²⁶ Behringer, *Climate*, 75.

²⁷ Behringer, *Climate*, 79–80.

followed.²⁸

The Little Ice Age began around the turn of the fourteenth century, and the issues arising from a global cooling became quickly apparent. Unpredictable and destructive weather anomalies—including torrential rain, hailstorms, and droughts—emerged across Europe, and altered seasonal patterns interfered with food production.²⁹ For example, in England, production of wheat, rye, oats, and barley averaged forty percent below normal yields, with similarly low yields in Poland and Scandinavia, as well, but slightly higher yields in the southern Germanic regions.³⁰ In some places, entire ecologies changed, as some plants and animals could no longer survive under these drastically-altered conditions. Certain crops became impossible to cultivate in some areas, such as wine grapes in the Baltic or cereals overall in Iceland.³¹ In several countries, cattle-raising practices changed as well, as the herds died out or the land used for grazing disappeared under snowmelt, excessive mud, or glaciers.³² Game animals also suffered from lack of vegetation, with less to eat and fewer places to hide from those who hunted them with increasing intensity during this time, which furthered the food crisis.³³

Adverse weather devastated farming for years, particularly between 1315 and 1321.

²⁸ Behringer, *Climate*, 102, 104.

²⁹ Bauch et al, “Dantean Anomaly.” 2343–45; Behringer, *Climate*, 102–104.

³⁰ Slavin, “Food Security,” 69.

³¹ Bauch et al, “Dantean Anomaly”; Behringer, *Climate*, 94.

³² Behringer, *Climate*, 95.

³³ Behringer, *Climate*, 95–96.

During this time, anomalies such as unseasonably cold periods and excessive rain, led to a reduction in farmable land, inhibited planting, shortened growing seasons, and destroyed immature crops in their fields.³⁴ As torrential rains continued to fall across Europe, the soil became saturated, especially as snowmelt flooded the land, and this brought about an increased number of animal epidemics.³⁵ This flooding disturbed the earth and brought soil-borne diseases, such as anthrax, to the surface.³⁶ This directly led to a number of sheep murrains and the Great Bovine Pestilence, which contributed to the ongoing food crisis that resulted from the Great European Famine.³⁷

Both crops and animals were destroyed by this climate shift, eliminating multiple sources of food required for the constantly-growing population of Europe. Such a widespread dearth of food halted this growth, a pattern which the economist Thomas Malthus would document centuries later.³⁸ Climate shift halted the previous progress and growth of Europe and provided the basis upon which the later disasters of the early

³⁴ Bauch, “Dantean Anomaly”; Behringer, *Climate*, 101–02.

³⁵ Behringer, *Climate*, 96–97. The cooler climate also led to a change in dress for the human populations, with more layers of thicker clothing, creating an environment in which pests such as fleas and lice thrived. This resulted in the proliferation of human disease and may also have assisted in the spread of *Yersinia pestis* flea across Europe in the late 1340s and early 1350s.

³⁶ Timothy P. Newfield, “Epizootics and the Consumption of Diseased Meat in the Middle Ages,” *Religion and Religious Institutions in the European Economy, 1000–1800*, ed. Francesco Ammannati (Firenze University Press: Firenze, 2012), 636.

³⁷ Behringer, *Climate*, 95.

³⁸ Thomas Malthus, *An Essay on the Principle of Population* (London: St. Paul’s. 1798), 11.

fourteenth century would build. From this climate shift came the Great Bovine Pestilence and the Great European Famine, which resulted in perfect conditions for the massive scale of death and destruction from the Black Death.

The Great European Famine, 1311-1317

Climate shift led to a series of failed harvests and a prolonged shortage of food that had disastrous consequences for all of Europe. Known as the Great European Famine, it resulted in the deaths of about ten to fifteen percent of the entire European population and left the remainder weakened and vulnerable to disease and death from other causes.³⁹ This famine also roughly coincided with the Great Bovine Pestilence, which wiped out a considerable portion of cattle, and will be discussed in more detail below. The effects of warfare added to continent-wide food security concerns.

The severity of the Great European Famine varied by region in any given year, with the southern part of Europe reaching its crisis a few years before the north. In the southern part of Europe, the crop failures occurred roughly between 1311 and 1314 and in a sporadic manner.⁴⁰ Grain exports from the Black Sea region, a primary producer of grain in the Mediterranean, became irregular, disrupting food supply to the Italian city-states and several parts of southern Europe.⁴¹ Surrounding areas, such as Sicily, Naples,

³⁹ Slavin, “Great Bovine Pestilence,” 1239; Aberth, *Apocalypse*, 13.

⁴⁰ Slavin, “Food Security,” 69–70.

⁴¹ Slavin, “Food Security” 76.

North Africa, Genoa, and Flanders relied on this grain for subsistence, such that Caffa (in the Crimea) was singularly responsible for 36% of its total grain supply in the fourteenth century.⁴² Although these areas could rely on other port cities, widespread crop failure made reliable alternative grain sources difficult to locate. In the north, dramatically bad weather combined with longer winters and cloudier conditions to create massive crop failure for several years in a row.⁴³ Torrential rain and hail destroyed what few crops managed to grow in the fields, and the cooling of the climate reduced the viability of the marginal lands.⁴⁴ The years 1315 through 1317 were the most severe famine years for northern Europe.⁴⁵ To make matters worse, the cattle population of Europe dramatically decreased with the onset of the Great Bovine Pestilence, which killed off many of the animals upon which farmers relied in order to work and fertilize their fields and produce food.

The famine disrupted trade across Europe as normal food exportation became impossible.⁴⁶ The scarcity drove up the prices of what few crops remained, and even the wealthy found it difficult to obtain grain, as grain prices in England alone rose from an average of 12 pence per bushel in 1314–1315 to 24 pence per bushel in 1316–1317.⁴⁷

⁴² Barker, “Laying the Corpses to Rest,” 104.

⁴³ Aberth, *Apocalypse*, 33.

⁴⁴ Slavin, “Great Bovine Pestilence,” 1239.

⁴⁵ Aberth, *Apocalypse*, 13.

⁴⁶ Slavin, “Food Security,” 76.

⁴⁷ Aberth, *Apocalypse*, 20–21, 25.

Oftentimes, when people managed to obtain this grain, they hoarded it, further contributing to scarcity and high prices.⁴⁸ King Edward II had to issue an official writ in 1315 and again in 1317, fixing grain prices and attempting to encourage hoarders to sell their supplies of grain.⁴⁹ Some tried to ameliorate the loss of grain by resorting to alternate food sources, including hay and cattle feed.⁵⁰ According to some contemporary sources, people took to consuming dead animals, eating them raw by the side of the road like wild animals, as described in texts such as the *Chronicon de Lanercost* from northwestern England.⁵¹ Although some accounts may exaggerate the frequency and savagery of these incidents, carrion eating certainly took place. The occurrence of dead animals in the fields was common, due to the Great Bovine Pestilence that coincided with the famine. Some places, such as churches and wealthy manors, managed to distribute food to those in need through the worst of the famine, and many people moved from the countryside to the cities to find food. Officials from Norwich Cathedral Priory increased the number of bread loaves distributed during these famine years, particularly to prisoners incarcerated at Norwich Castle.⁵² It was this kind of charity that sustained individuals, particularly those of the lower classes, during these years.

An estimated 10 to 15% of the entire European population died during the years of

⁴⁸ Slavin, "Food Security," 76.

⁴⁹ Slavin, "Food Security," 70.

⁵⁰ Slavin, "Great Bovine Pestilence," 1246.

⁵¹ Newfield, "Epizootics," 619.

⁵² Slavin, "Food Security," 79.

the Great European Famine, and those who remained found themselves severely weakened.⁵³ Crops began to grow again, the bovine population eventually recovered, and food prices and trade slowly returned to a relatively normal state.⁵⁴ The consequences of the famine, however, could not be so easily restored. The nutritional deficit from the famine resulted in diminished immune systems all over Europe, as discussed in later chapters.⁵⁵ The deficiencies led to physical health changes that even impacted future generations. As people continued to flock to cities for refuge from the famine, the population density in these areas increased, as did the potential for the spread of disease. With compromised immune systems and very few public health regulations in place, the European stage was perfectly set for further final disasters.

The Great Bovine Pestilence, 1315-1321

Life in the Middle Ages relied heavily upon animals for food, labor, and warfare. Europeans used horses and oxen for farming and transportation, while cows, sheep, pigs, and goats provided food for many people in various ways.⁵⁶ In the early fourteenth century, the Great Bovine Pestilence struck at roughly the same time as the Great

⁵³ Slavin, "Food Security," 73.

⁵⁴ Slavin, "Bovine Pestilence," 1256.

⁵⁵ Slavin, "Food Security," 73.

⁵⁶ George Comet, "Technology and Agricultural Expansion in the Middle Ages: The Example of France North of the Loire," in *Medieval Farming and Technology: The Impact of Agricultural Change in Northwest Europe*, ed. Grenville Astill and John Langdon (Leiden: Brill, 1997), 11, 15.

European Famine, which further contributed to the high death toll. To make matters worse, the pestilence spread to some of the human population, as well, whether due to proximity or by eating the diseased meat.⁵⁷ Taken altogether, these complications would ultimately serve to compound the high death rate seen during the Black Death from 1348 to 1351.

The Great Bovine Pestilence was a fatal, highly contagious disease that swept through Europe from the Far East, appearing first in central Europe in 1315 and racing through the continent, reaching Denmark in 1318, Britain in 1319, and finally arriving in Ireland in 1321.⁵⁸ A myriad of factors contributed to the gravity of its impacts, including the climate shift that led to the release of dormant pockets of disease buried in the earth. This pestilence primarily struck cows and oxen, although another murrain occurred around this time that devastated the sheep population.⁵⁹ Herds across Europe fell ill and died, and mass cattle deaths have been recorded in manorial accounts and contemporary histories such as the *Annals of Connacht* and *Loch Cé*.⁶⁰ The pestilence is now thought to be either rinderpest, anthrax, or a similar affliction, and it impacted the bovid population with varying rates of mortality.⁶¹ As noted, the disease affected different areas of Europe at

⁵⁷ Newfield, “Epizootics,” 639.

⁵⁸ Slavin, “Great Bovine Pestilence,” 1240.

⁵⁹ Slavin, “Food Security,” 71.

⁶⁰ *Annals of Connacht*, 1321.5, 1324.4; *Annals of Loch Cé*, 1321.4.

⁶¹ Newfield, “Epizootics,” 636; Slavin, “Great Bovine Pestilence,” 1240, 1243–44.

different times.⁶² A study carried out on manors in England and Wales demonstrates the virulent and random nature of the pestilence, citing instances where nearly all cattle were spared in one manor while almost all were lost in another.⁶³ This “pattern” seems consistent in other areas of Europe, as well.⁶⁴

With this massive yet uneven loss of livestock, people tried a variety of ways to assuage the situation, including blessing, culling, or quarantining sick animals, or selling off diseased animals when nothing else worked.⁶⁵ None of their strategies led to any improvement, and the selling of the affected cattle actually served to further spread the pestilence to other herds.⁶⁶ The depopulation of bovids occurred rapidly, and it took many years to recover. For example, England and Wales lost roughly 62% of their bovine population, including 55% of their oxen, between 1319 and 1320, while recovery took decades. By 1332, England managed to replenish its oxen population to 80% of pre-murrain population, but this relatively rapid repopulation meant less focus on dairy and beef cattle, which would not reach pre-pestilence levels until roughly 1348, when the Black Death arrived in Europe.⁶⁷ This led to many negative consequences, particularly

⁶² *Annals of Connacht*, 1321.5.

⁶³ Slavin, “Great Bovine Pestilence,” 1242–44.

⁶⁴ Slavin, “Food Security,” 71–72.

⁶⁵ Newfield, “Epizootics,” 634–635; Slavin, “Great Bovine Pestilence,” 1242.

⁶⁶ Slavin, “Great Bovine Pestilence,” 1248.

⁶⁷ Slavin, “Food Security,” 71; DeWitte and Slavin, “Between Famine and Death,” 51–52.

with regards to food supply and nutrition, some of which may have aggravated the effects of the Black Death.⁶⁸ This meant hardship for much of the European human population for many years, even after the pestilence has passed.

Both horses and oxen were widely used as draft animals in medieval agriculture.⁶⁹ With the emergence of the Great Bovine Pestilence, many oxen died, which led to a sharp decrease in productivity with the loss of animals to work the land. Coinciding with the Great European Famine, this served to exacerbate the already-critical lack of available food. Crop failure led to the decreased availability of feed for animals and worsened the cattle death rate due to starvation which, in turn, furthered the starvation of humans who relied on these animals for dairy and for agricultural production.⁷⁰ The loss of the meat itself had less of an impact, as only the wealthy ate meat regularly, and in most areas, they tended to favor mutton or pork over beef.⁷¹ The loss of dairy, however, proved devastating to all levels of society, particularly the lower classes such as laborers and peasants.

With the huge loss of food and a famine raging across Europe, the people turned to alternative food sources to survive. This included the meat from the cattle that were dying

⁶⁸ Slavin, "Great Bovine Pestilence," 1239, 1249, 1255.

⁶⁹ Slavin, "Great Bovine Pestilence," 1250.

⁷⁰ Newfield, "Epizootics," 621; Slavin, "Great Bovine Pestilence," 1239, 1245.

⁷¹ Christopher Dyer, *Standards of Living in the Later Middle Ages: Social Change in England c. 1200–1520* (Cambridge: Cambridge University Press, 1989), 58.

en masse around them.⁷² According to Johannes de Beka, a fourteenth-century clerk from Utrecht, “the food shortage became great, to the extent that most poor people (if it is all right to say) were gnawing on the raw corpses of cattle just like dogs.”⁷³ Some sources exaggerated the prevalence of this practice of eating carrion during famine years, but several, like the example given, proved to be correct, as demonstrated by Timothy P. Newfield’s literature analysis. Instances of carrion eating remained isolated to famine years for the most part, and typically proliferated only among the lower socio-economic strata; it certainly occurred, yet did not bring any real relief.⁷⁴ Particularly, it had the potential to spread the same or a variant of the same disease to which the animal itself succumbed, and several accounts record that those who ate the diseased animals fell sick and often died themselves.⁷⁵ This added yet another source of death during an already tragic period in European history.⁷⁶

The Great Bovine Pestilence impacted every level of society across Europe and contributed to the series of events which resulted in the massive loss of life in the first half of the fourteenth century. With the lack of cattle, it became harder to work the already failing fields and removed yet another vital food source for the Europeans. This lack of food led to nutritional deficiencies that resulted in compromised immune health

⁷² Newfield, “Epizootics,” 620.

⁷³ Johannes de Beka as quoted in Newfield, “Epizootics,” 619.

⁷⁴ Newfield, “Epizootics,” 620.

⁷⁵ Newfield, “Epizootics,” 621.

⁷⁶ Aberth, *Apocalypse*, 113.

and altered physiological prospects for the surviving people of Europe in the latter half of the fourteenth century.

Black Death, 1347–1353

Europe had not seen a wide-spread outbreak of the bubonic plague since the Justinianic Plague in the sixth century. The European population in the late 1340s was well-acquainted with death and disease, but they could not prepare for the massive epidemic that would affect the entire continent. Although there would be subsequent outbreaks of the Black Death, none of them would compare to the level of death and destruction of the first outbreak in Europe between 1347 and 1353. The plague spread along trade routes, using the growing human population of the Middle Ages to disseminate across all of Europe, from Italy to Ireland. By the time the epidemic had run its course, somewhere between 30 and 60 percent of the entire population of Europe had perished.⁷⁷ This population loss, as well as the disease itself, impacted food production, trade, and supply. It also changed the overall diet of the remaining working population of Europe, as will be discussed in later chapters. The Black Death was the apex of the disasters of the fourteenth century.

Gabriele de Mussi, a lawyer from Piacenza described several symptoms of the

⁷⁷ There is some debate over the exact percentage of the European population that succumbed to the Black Death. An agreed minimum of 30% of the population died, but the upper limits are still disputed. The upper estimate of 60% mortality rate in Europe is not universally accepted, but there are strong arguments for this number, and thus it is included as the upper limit for the mortality estimates in this study. For more information, see John Aberth's *From the Brink of the Apocalypse*.

plague—including boils, fevers, stabbing sensations, headaches, and restless sleep that couldn't be roused—in his *Historia de Morbo*.⁷⁸ Writers across Europe recorded similar symptoms, the signs of the great pestilence that would later be known as the Black Death. This most common form of plague, the bubonic plague, came from Mongolia, where the bacteria was endemic in small burrowing rodents called tarbagans.⁷⁹ This arrived in Italy through a combination of warfare and trading relations and, as the plague continued to spread, it mutated into an even more virulent strain, the pneumonic plague, which entered the lungs and caused its victims to cough up blood.⁸⁰ The mortality rate for this particular strain approached 100%. A third and lesser-known strain, called septicemic plague, appears occasionally in narratives, and seems to have entered into the bloodstream and killed its victims in a matter of hours.⁸¹ Not only did this strain have a total mortality rate, but the speed at which it overcame its victims left very few witnesses to catalogue its existence, despite—or perhaps, partly because of—the care of their doctors.

Medieval doctors found themselves at a loss for an effective cure. In an effort to balance the humors (discussed in later chapters), doctors resorted to bleeding but, without knowledge of germs and sterilization, this weakened patients and led to further

⁷⁸ Gabriele de Mussis, “*Historia de Morbo*,” in Horrox, *The Black Death*, 24–25.

⁷⁹ Aberth, *Apocalypse*, 120.

⁸⁰ Aberth, *Apocalypse*, 111–12.

⁸¹ Aberth, *Apocalypse*, 112.

infections.⁸² Unable to treat the source and prevent the plague, most physicians merely attempted to manage the symptoms of the disease. Doctors and healers prescribed anything they could think of, from concoctions of crushed emeralds to a theriac (tonic) of blended herbs, from poultices of figs and onions to even drinking one's own urine.⁸³ Needless to say, none of these "remedies" could cure their patients. Some doctors believed the plague was spread through miasma, or bad air, an idea which helped in the later development of the famous masks used by plague doctors in later outbreaks.⁸⁴ Fear of infectious miasma influenced food restrictions and prescriptions made by doctors in the late 1340s and early 1350s.

Attempts to treat the Black Death had a direct impact on dietary advice, with suggestions ranging from gorging to starving to purging and avoiding certain foods to excessively consuming others. Some physicians prescribed specialized diets based on class or specific symptoms. They based these diets on the Galenic theory of humors and the idea that the upper classes, already full of hot fumes from the hot and heavy food they normally consumed, would be less susceptible to the plague.⁸⁵ The lack of effective treatment in the 1300s resulted in a massive death rate, although the mortality rate of each

⁸² Abu Jafar Ahmad Ibn Khatima, *Description and Remedy for Escaping the Plague*, quoted in John Aberth, "The Medical Response to the Black Death," *World History Encyclopedia* Vol 21 (2011), 812; Aberth, "Medical Response," 812–13.

⁸³ Aberth, *Apocalypse*, 115–16.

⁸⁴ Aberth, *Apocalypse*, 115–16.

⁸⁵ Karl Sudhoff, "Pestschriften aus den ersten 150 Jahren nach der Epidemie des 'schwarzen Todes' 1348" in Horrox, *The Black Death*, 179.

individual region seems to have been curiously inconsistent.⁸⁶

The Black Death's first port of call, Italy, saw high mortality rates. In Florence, between 45-75% of the population died before the plague moved on.⁸⁷ Venice lost 60% of its population to the plague, and many of those who remained fled the city to escape death, unaware that they only served to further the spread of the horrible pestilence.⁸⁸ Some areas went virtually unaffected, like most of Finland and Iceland.⁸⁹ Other areas experienced mortality rates of over 75%.⁹⁰ The Black Death raged most violently and took the heaviest toll among heavy-populated areas such as cities, and among lower socioeconomic categories, as well as those who had been most severely affected by the famine and cattle pestilence that preceded the Black Death. This is seen in cemetery studies done in London which discovered that those who lived during the years of the Great European Famine were more likely to die during the bubonic plague than individuals who were born after the Famine.⁹¹

The aftermath of the earlier disasters of the fourteenth century exacerbated the outcomes of the Black Death. Warfare and trade aided in the transmission of the disease,

⁸⁶ Aberth, *Apocalypse*, 124–27.

⁸⁷ Richard S. Gottfried, *The Black Death: Natural and Human Disaster in Medieval Europe* (New York City, NY: Free Press, 1985), 46.

⁸⁸ Gottfried, *The Black Death*, 48.

⁸⁹ Aberth, *Apocalypse*, 120.

⁹⁰ Aberth *Apocalypse*, 125, 127.

⁹¹ DeWitte and Slavin, “Between Famine and Death,” 45–46.

especially in the earlier years. Through ongoing conflicts such as those in England, France, Scotland, and Ireland, army movements allowed for the spread of the disease to other areas.⁹² It also travelled along existing trade routes, as merchants from various countries interacted with one another and brought the bacterium home with them. The Venetians even began to set up quarantines and searched trading vessels in an attempt to stop the disease, but initially to no avail.⁹³ The Great Bovine Pestilence, although it had mostly run its course, complicated matters further as the preponderance of diseased meat in the marketplace after the widespread cattle death spread zoonotic disease.⁹⁴ Carrion eating, as well, caused illnesses which contributed to the death toll and the panic of the people.⁹⁵ The Great European Famine, although long since passed, also played its part by leaving behind a relatively frail population that would be more susceptible to subsequent illness.⁹⁶

The sum of these outcomes was greater than its individual parts. The early fourteenth century set the stage for changes in European society, particularly with regards to approaches to diet and physical health. These changes, however, also included positive outcomes, as more opportunities for social mobility, food security, and potentially improved health prospects were a direct result of the decrease in population.

⁹² Slavin, "Warfare," 537.

⁹³ Gottfried, *Black Death*, 48.

⁹⁴ Newfield, "Epizootics," 626.

⁹⁵ Newfield, "Epizootics," 621.

⁹⁶ Slavin, "Food Security," 73.

Chapter Two

Defining Class and Diet

European diet in the late thirteenth to early fourteenth centuries depended upon not only social class, but also region, seasonal availability, religious food restrictions, and market access. Those who belonged to the wealthier social classes could afford better quality and variety of foods, and in some places, sumptuary laws restricted consumption of certain foods to elites. However, at the beginning of the turbulent fourteenth century, factors such as famine, warfare, and animal deaths impacted the food supply for all social classes across Europe. These disasters changed the existing food trends, as people's normal fare became increasingly scarce, and they resorted to new sources of food to survive. In the aftermath of the Black Death, the population decrease led to dramatically altered social prospects, making it easier for the poorer classes in particular to access, among many other things, better quantities and qualities of food. This shift in the average diet among these groups carried into the fifteenth century and beyond.

In order to understand the significance of these changes, however, one must understand the baseline diet that existed before the disasters of the fourteenth century. In discussions of culinary history, it is vital to note that dietary trends varied greatly, and medieval Europe in the early fourteenth century was not a single food culture, as it contained a multitude of various people groups, each with their own traditions and habits. There are, however, general trends that may be carefully applied, particularly along social divisions. For the sake of simplicity and for the purposes of this study, these divisions will be separated into two categories: upper and lower classes. The upper, wealthier

classes consist of nobility, those in church leadership and institutions, and merchants. These groups had access to a wider range of foodstuffs and more international exposure and had more money to afford a greater variety in their diet. Those belonging to this class tended to share similar diets across Europe, as elites travelled extensively and therefore tended to incorporate the culinary trends of the places they visited.⁹⁷ These upper classes were also more learned, and therefore had more access to information and knowledge about foreign dishes, as well as the resources to acquire rare ingredients. The lower, poorer classes will refer to the general population, including peasants, serfs, and paid laborers, who had limited access to large varieties of food.

Upon the tables of the wealthy sat the foods that one often imagines when thinking of food in medieval Europe. Beef, steaks, pork, sausages, mutton, fowl, wild game, and fish of all sorts, depending upon the season, emerged from their kitchens, especially for royalty and the exceptionally rich.⁹⁸ The upper-class diet consisted principally of meat—which served as the main source of protein for this population—and dishes often contained more than one type of meat in a single dish. Cooks frequently prepared these multi-meat dishes with several different methods. They used grinding, baking, roasting, boiling, and frying in endless combinations, almost always cooking the same meat in at least two different ways, such as frying then boiling. The multiple methods of preparation for the same dish led to a level of food loss which only the rich could afford.⁹⁹ Wheat

⁹⁷ Klemettilä, *Medieval Kitchen*, 28.

⁹⁸ Dyer, *Standards*, 58; Klemettilä, *Medieval Kitchen*, 23.

⁹⁹ Klemettilä, *Medieval Kitchen*, 23.

served as their primary grain. Europeans saw bread as a staple in every household, but only the upper classes ate wheat bread as both an economic and a social privilege.¹⁰⁰ Their wealth allowed them access to a wide variety of foods which would be otherwise unavailable and set their diet apart from that of the lower classes. Upper-class households consumed some vegetables, fruits, and grains primarily as side dishes, but their main meals contained much more meat and animal protein.¹⁰¹ Although it certainly occurred, sources about vegetable consumption in upper-class households are scarce, as they likely obtained these vegetables from personal or manorial gardens, which would not have been included in household accounts, and therefore the true volume of their vegetable consumption remains uncertain.¹⁰² Elites typically consumed alcoholic beverages, such as beer in England, the Netherlands, and the German and Nordic regions, or wine in France, Spain, and Flanders.¹⁰³ These wine regions also exported extensively throughout Europe, and wine-drinking in the “beer regions” of Europe also indicated wealth and status, as a sign that they could afford these commodities. Other common elements of the upper-class diet included berries, nuts, eggs, pastries, candied fruits, confections, and dairy products,

¹⁰⁰ Dyer, *Standards*, 57.

¹⁰¹ James A. Galloway and Margaret Murphy, “Feeding the City: Medieval London and its Agrarian Hinterland,” *The London Journal* 16, no. 1 (1991), 3; Klemettilä, *Medieval Kitchen*, 51.

¹⁰² J.C. Drummond and Anne Wilbraham, *The Englishman’s Food: Five Centuries of English Diet* (London: Pimlico, 1991), 20.

¹⁰³ Klemettilä, *Medieval Kitchen*, 127–130.

although the latter did not appear as frequently as in the households of the lower class.¹⁰⁴ These culinary trends even extended to the clergy, a population typically restricted to a pescatarian, vegetarian, or subsistence diet. Exceptions and extra allowances such as extra meat or eggs could be made, such as for the unwell or the elderly, even in some religious orders which strictly adhered to these religious dietary prescriptions.¹⁰⁵ Still, many monasteries accepted donations of food, typically from wealthy patrons, or cultivated their garden crops or raised animals or fish to supplement their daily food allowances to such an extent that one historian, Barbara Harvey, refers to the monastic diet as “a special version of aristocratic diet.”¹⁰⁶

The lower classes ate a much more restricted diet. Although bread remained a staple of these households, as well, theirs typically consisted of rye or barley, cheaper grains that could be obtained more easily.¹⁰⁷ Vegetables and grains took the place of meat in terms of importance, and these vegetables also typically came from personal gardens.¹⁰⁸ Hunting occasionally occurred, but these hunting opportunities varied widely based on geography and the laws of the land. Exotic spices from the Far East were an expensive

¹⁰⁴ Klemettilä, *Medieval Kitchen*, 109, 113.

¹⁰⁵ Sharon N. DeWitte et al., “Medieval Monastic Mortality: Hazard Analysis of Mortality Differences Between Monastic and Nonmonastic Cemeteries in Europe” *American Journal of Physical Anthropology* 152 (2013): 322–23; Klemettilä, *Medieval Kitchen*, 64.

¹⁰⁶ Quoted in Thoen and Soens, “Vegetarians,” 490.

¹⁰⁷ Dyer, *Standards*, 56–57.

¹⁰⁸ Klemettilä, *Medieval Kitchen*, 23, 71; Dyer, *Standards*, 156–157; Slavin, “Food Security,” 66.

commodity that only the rich could afford; lower-class seasonings may have included inexpensive and pre-made spice blends bought from the local market, or for the poorest of this category, solely onions and garlic, which they could grow themselves.¹⁰⁹ Those in the lower classes did not live completely without meat, but they did consume only a limited quantity and variety, usually only pork or bacon, chicken, and some fish.¹¹⁰ In contrast to the upper classes, these would be prepared only one way, typically boiling, in order to prevent food loss or waste.¹¹¹ Christopher Dyer, an English social historian, has produced several case studies on English harvest workers—who came from every level of this lower class category—and these studies show that they often ate very well in conjunction with their jobs during the harvest, which included consuming more meat and ale than others of this class category.¹¹² One of his studies on harvest workers in southern and eastern England discusses the food allowances for labor, particularly in Sedgeford and the surrounding area, where more complete documents on these matters survive. These employers paid their workers with both coin and food, and although manorial accounts do not list the food allowances by individual, the overall figures suggest that the food allowances went not only to the workers, but their families and dependents, as well.¹¹³ Accounts include among the food allowances meat and fish, and Dyer poses the

¹⁰⁹ Klemettilä, *Medieval Kitchen*, 91–92.

¹¹⁰ Klemettilä, *Medieval Kitchen*, 23, 71; Dyer, *Standards*, 156–157.

¹¹¹ Klemettilä, *Medieval Kitchen*, 23.

¹¹² Dyer, “Changes in Diet,” 22.

¹¹³ Dyer, “Changes in Diet,” 24–25.

likelihood of the inclusion of vegetables from the manor gardens, which would not be noted in household ledgers. The quantity and quality of these food allowances from the manor houses where the harvesters worked allowed them and their families a better diet and much more variety than the average members of the lower class. However, Dyer does note that these changes often occurred only during times during which they could be hired, while the rest of the time, their diet remained consistent with the rest of the lower-class population.¹¹⁴ Their improvement in diet, Dyer points out, came as a result of working for individuals who could afford to eat well and gave their workers a share of this quality food in exchange for their hard labor. As for drinking, beer commonly occurred in the houses of the lower classes, but a vital part of the medieval lower-class diet was dairy.¹¹⁵ Although cheese and butter were very popular among all social classes of the time, milk was consumed daily by members of these lower-class households, as water often could not be safely consumed, especially in towns and cities. The source of this dairy consumption varied by region, coming from sheep and goats in the south, and cows in the north, a distinction that had an enormous impact during the Great Bovine Pestilence.¹¹⁶ Other supplements to the lower-class diet included nuts, fruit, and berries that could be foraged, eggs, and garden herbs.¹¹⁷ Towns and urban areas afforded more variety than those living in rural areas, but the general patterns of consumption remained

¹¹⁴ Dyer, “Changes in Diet,” 23.

¹¹⁵ DeWitte and Slavin, “Between Famine and Death,” 51.

¹¹⁶ Klemettilä, *Medieval Kitchen*, 103.

¹¹⁷ Slavin, “Food Security,” 78.

similar.¹¹⁸

Religious prohibitions impacted dietary patterns across social divides, as the Church played a vital societal role during the late Middle Ages. Certain days of the week had their own dietary restrictions, while some periods, such as Lent, demanded temporary changes in consumption.¹¹⁹ Fasting seasons varied throughout the Middle Ages, particularly with regards to meat consumption, such that in the late Middle Ages, 140 out of 365 days were dedicated to fasting, requiring Christians to adhere to a diet of mostly fish and vegetables.¹²⁰ The Church banned meat consumption on many of these holy days, and cooks had to employ culinary alternatives during these times, including substituting porpoise or beaver tail instead of meat when feasts coincided with fasting periods.¹²¹ With the frequency of religious holidays and fasting periods, these substitutions were a common element of the European upper-class diet, although most lower-class individuals simply abstained from the prohibited food for the duration. For many, fish often served as a substitute for meat during periods of fasting as an alternative approved by the Catholic Church, since fish were associated with repentance due to its cold, wet nature that protected humans from excess, according to humoral medicine.¹²²

¹¹⁸ Klemettilä, *Medieval Kitchen*, 22.

¹¹⁹ Klemettilä, *Medieval Kitchen*, 29.

¹²⁰ Klemettilä, *Medieval Kitchen*, 29–30.

¹²¹ Klemettilä, *Medieval Kitchen*, 20. Animals such as beaver and porpoise were oftentimes not considered mammals due to their aquatic nature, and therefore the Church deemed them appropriate to eat during times when consuming meat was prohibited.

¹²² Klemettilä, *Medieval Kitchen*, 77.

Because of these substitutions, the European population was used to the concepts of subsistence and abstinence, even in times of plenty.

Disasters

One of the fundamental ways that the disasters of the early fourteenth century impacted diet was by affecting food supply via interruptions in trade and trade routes. The Great European Famine caused a severe decline in the availability of many crops across Europe, particularly grains and especially wheat. Grain harvests in the Mediterranean yielded sporadic levels of produce, while the northern part of the continent suffered severe continual failures, leading to a decrease in product to sell in the international market. The Great Bovine Pestilence further contributed to this dearth, but also heavily impacted animal husbandry. During the Black Death, disease spread far and wide along trade routes, where the disease interacted with vast numbers of people. Traders became prime transmitters of this pestilence, as they interacted with countless people on their travels. Many ports, such as Caffa, remained open during the plague years, although some attempted to put in place embargoes and quarantine measures. Although the Northern Italian city-states became the first in Europe to establish quarantines, *lazarettos* (“pest houses”), and other public health measures, very few of these were fully adopted until the fifteenth century.¹²³

During the worst of the famine years, desperate individuals resorted to tactics such as

¹²³ Ann G. Carmichael, *Plague and the Poor in Renaissance Florence* (Cambridge: Cambridge University Press, 2014), 3.

carrion eating, alternative food sources, and begging or hoarding in order to survive. Attempting to combat starvation, people began to eat food meant for animals, such as grass and hay, and when those disappeared, they consumed things such as fungi, pinecones, cats, dogs, and even pigeon dung.¹²⁴ A few of the most desperate even began eating dead animals they found by the side of the road. An entry in the *Chronicon de Lanercost* states “...after a short sickness [cattle] generally died as if suddenly and few animals of that species were left...people ate cattle dying of disease in the aforementioned manner...”¹²⁵ A study by Timothy Newfield examined contemporary writings and found that while many sources may exaggerate the extent of carrion eating during the years of severe food crisis, enough evidence in chronicles such as the *Annals of Connacht* and *Magdeburger Schoppenchronik* exists to confirm that it did indeed occur.¹²⁶ People also tried begging in order to obtain food, sometimes from churches or manors, and sometimes out on the streets. Manorial accounts indicate instances of grain distribution by English lords, and the Cistercian Abbey of Aduard in the modern-day Netherlands established a soup kitchen in 1315 to provide some relief during the Great European Famine.¹²⁷ Some hospitals, too, attempted to help their communities, although these institutions also suffered heavily during these food crises. Occasionally, abuses of these charitable institutions occurred, evoking intense fury from others. One story, although a

¹²⁴ Slavin, “Food Security,” 78.

¹²⁵ *Chronicon de Lanercost* in Newfield, “Epizootics,” 619.

¹²⁶ Newfield, “Epizootics,” 619–639.

¹²⁷ Slavin, “Food Security,” 79.

few decades before the Famine, recounts the activities of a schoolteacher who hoarded the bits of grain and bread that he begged from others.¹²⁸ He died one night, locked alone in his home, while toasting his hoarded food. It took weeks to discover the body, and the spoiled food infuriated the people of the town. What was worse, they discovered that this man owned multiple properties in another town, and he had been a wealthy man begging for food that ultimately went to waste. His former pupils became so enraged at this that they tied his corpse to a horse and dragged it through the streets. In a time of famine and desperation, this food waste was deemed unacceptable, especially when it involved taking advantage of charity at the expense of the poor who were truly starving.

As the Bovine Pestilence raged across Europe and decimated the cattle population, animal husbandry suffered immensely, and many people lost their most significant source of protein and a large portion of their caloric intake. Additionally, Philip Slavin notes in one study that the haste to replenish oxen populations, which would be vital in the continuation of farming, slowed the restoration of the dairy and beef cattle stocks in the aftermath of the Bovine Pestilence, prolonging this dairy shortage and continuing to deprive the population of a vital food source.¹²⁹ In a joint study by Slavin and Sharon DeWitte, manorial records revealed that the dairy cattle populations in England were barely 85% of their pre-pestilence levels in 1332, and did not attain full recovery until the

¹²⁸ William Chester Jordan, *The Great Famine: Northern Europe in the early Fourteenth Century* (Princeton, NJ: Princeton University Press, 1997), 3.

¹²⁹ Slavin, “Food Security,” 71–72.

onset of the Black Death.¹³⁰ They found that the combined output from sheep, goats, and cattle before the Pestilence amounted to roughly 1.43 million dairy units, which fell to about 727,000 units in 1320.¹³¹ They also found that no alternative protein source arose to take the place of this dairy loss, leading to pronounced malnutrition, as evidenced in skeletal markers such as cribra orbitalia and porotic hyperostosis (lesions on the orbital roofs and cranial vault bones, respectively), and linear enamel hypoplasia (horizontal striations on affected tooth enamel from infection or malnutrition).¹³² Facing starvation, the people needed to find a new source of food, and they turned to the dead cattle around them. According to studies performed by Timothy Newfield, carrion eating does not appear to have been a common occurrence, except in years of particularly severe food scarcity, such as during this Great Bovine Pestilence, as well as in previous instances of food insecurity, such as in Paris in 1252 and Ireland in 1224.¹³³ Contemporary chronicles such as the *Magdeburger Schöppenchronik* and the writings of Johannes de Beka of Utrecht document the consumption of “raw corpses of cattle” during the worst famine years.¹³⁴ Although some sources exaggerate for their own motives, other sources show that consumption of bad meat became a real issue for authorities and some attempted to

¹³⁰ DeWitte and Slavin, “Between Famine and Death,” 49–51.

¹³¹ DeWitte and Slavin, “Between Famine and Death,” 51–52.

¹³² DeWitte and Slavin, “Between Famine and Death,” 41.

¹³³ Matthew of Paris, *Chronica majora*, and the *Annals of Connacht* quoted in Newfield, “Epizootics,” 624, 626.

¹³⁴ Newfield, “Epizootics,” 619.

profit from the situation. Laws had to be passed in order to prevent the sale of diseased or unclean meat, such as a general prohibition in England in 1320 and passages included in legislation passed in Pistoia in 1348, to attempt to curb the spread of the plague.¹³⁵

During the Black Death, farming suffered yet again, with the loss of the working population to cultivate the fields and collect the harvest. In addition, contemporary writers even note that cattle, left to their own devices without people to care for them during the worst years of the plague, roamed the empty fields, destroying the farmland which had been abandoned.¹³⁶ Slavin notes in a study on food security in the early fourteenth century that crop failure due to inclement weather also occurred during these years, although not to the extent of the Great European Famine. Low crop yields and bad weather were reported in 1349–1351, particularly in Languedoc and extensive areas across England.¹³⁷ Despite this overall production decrease, the concurrent population decrease reduced the demand for food, and a general surplus emerged immediately following the Black Death.¹³⁸ The remaining 30–50% of the European population inherited the wealth left behind by those who succumbed to the plague, and with this increased wealth came new opportunities for social mobility, especially with the newly-available food supply for the lower classes. Workers could demand more from their

¹³⁵ Newfield, “Epizootics,” 627; *Ordinances against the spread of plague*, Pistoia 1348, quoted in Horrox, *The Black Death*, 198–99, 201.

¹³⁶ Giovanni Boccaccio, “Decameron,” in Horrox, *The Black Death* 33.

¹³⁷ Slavin, “Food Security,” 64.

¹³⁸ Slavin, “Food Security,” 72–73.

employers in exchange for service, and this usually included an increased food allowance, particularly of meat, wheat bread, and ale.¹³⁹ Dyer's London harvest-worker case study revealed how the laborer's diet changed to reflect that of a higher social class not only because of the increased availability of better-quality food but also as a means for laborers to demonstrate their own increased social mobility. Consumption of fish, cereals, and milk products decreased among these harvest workers, replaced by varieties of meat including beef and pork.¹⁴⁰ The altered fare of these workers echoed in other institutions, such as hospitals. Two Flemish hospitals in Bruges and Lille operating through this period saw a decrease in other cereal purchases corresponding with an increase in wheat purchases immediately following the Black Death.¹⁴¹ From the first quarter of the fourteenth century into the fifteenth century, these hospital records also show a negative correlation between cereal purchase and meat consumption, in which a decrease in cereals directly corresponded to an increase in meat consumption. These hospital records show an increased expenditure for meat in the fourteenth century which cannot be explained by increased meat prices.¹⁴²

Other changes in consumption are seen in the agricultural data, particularly the growing patterns in fields surrounding London in the latter half of the fourteenth century. Despite the stark reduction in population, the ratio of wheat to barley and millet did not

¹³⁹ Dyer, "Changes in Diet," 36.

¹⁴⁰ Dyer, "Changes in Diet," 35–37.

¹⁴¹ Thoen and Soens, "Vegetarians or Carnivores," 493–94.

¹⁴² Thoen and Soens, "Vegetarians or Carnivores," 494–96.

diminish significantly, suggesting an increased demand in the former as compared to the latter.¹⁴³ Trends show barley and millet—formerly the grains of the lower classes—were used for animal feed and brewing, while wheat became more readily available and much cheaper, increasing access and affordability for the lower classes.¹⁴⁴ This increased usage as animal feed points to larger herd sizes, suggesting more meat production and active animal husbandry. Meat consumption rose, taking on more importance after the Black Death. Lower-class diets, especially the laborers', incorporated more beef and mutton, adding to and sometimes decreasing the demand for the bacon and fowl of previous decades.¹⁴⁵ These meats replaced grains and cereals as the central part of the lower-class diet in many places, particularly in the urban areas. A study of food and fuel transportation trends in London during the late medieval period finds that in the aftermath of the Black Death, grain importation decreased with an overall shrinkage of the grain market, while demand for meat increased, strengthening or creating inter-county commercial relations as the meat market expanded.¹⁴⁶ Manorial evidence in England shows that sown demesne acreage declined by 20–25% in the fourteenth century, whereas animal numbers and densities increased by 50–70%. Even within the demand for

¹⁴³ James A. Galloway, "London's Grain Supply: Changes in Production, Distribution, and Consumption during the Fourteenth Century," *Franco-British Studies*, 20 (1996): 9.

¹⁴⁴ Galloway, "London's Grain Supply," 9–10.

¹⁴⁵ Drummond and Wilbraham, *The Englishman's Food*, 48–49, 51.

¹⁴⁶ James A. Galloway, "Metropolitan food and fuel supply in medieval England: regional and international contexts," in *Food Supply, Demand and Trade: Aspects of the Economic Relationship between Town and Countryside (Middle Ages – 19th Century)*. ed. P. van Cruyningen and E. Thoen (Turnhout: Brepols, 2013), 13.

grains, ratios of different cereals shifted, with barley increasing from 13% of land sown in 1300 to 23% in the late fourteenth century.¹⁴⁷ Rural areas retained much of their pre-plague meat consumption habits, and beef consumption appears to have remained relatively uncommon. In these areas, the focus became raising cattle for the meat market—rather than for local consumption—as the demand in urban areas increased.¹⁴⁸ Examples from Flanders after 1350 show that this animal husbandry became an increasingly profitable market centered on the urban markets, and was fed by an international cattle trade with areas such as Poland, Hungary, and the Balkans.¹⁴⁹ In the aftermath of the disasters of the early fourteenth century, general consumption patterns shifted, particularly for the lower-class individuals, who came to experience more nutritional agency due to a smaller population and the sudden heavy demand for their services. As their labor became indispensable, many workers began negotiating for better quality of food and wages, although as Dyer notes in his case study of harvest workers in Sedgeford, the food allowances actually decreased in favor of payment in coin.¹⁵⁰ This led to laws enacted in the later fourteenth century to fix wages, for example the Statute of Laborers in England, which regulated wages and contracts of workers in an attempt to prevent these individuals from leveraging their newfound value in order to

¹⁴⁷ Galloway, “London’s Grain Supply,” 10–12.

¹⁴⁸ Thoen and Soens, “Vegetarians or Carnivores,” 483–84.

¹⁴⁹ Thoen and Soens, “Vegetarians or Carnivores,” 484–85.

¹⁵⁰ Dyer, “Changes in Diet” 26–27.

demand and receive “excessive” pay for their work.¹⁵¹ Despite these legal barriers, most workers managed to obtain these improvements, which led to a higher quality of life, not only in the immediate sense, but with long-lasting impacts, as well. These dietary changes persisted for many years and led to physiological changes which altered health outcomes for individuals and their descendants for decades to come.

¹⁵¹ Dyer, “Changes in Diet,” 22.

CHAPTER THREE

Physicians in the Middle Ages based their medical knowledge on the philosophies of Classical figures such as Galen and Hippocrates, particularly the theory of the four humors and their effects on the body. Medieval medicine revolved around humoral balance, with the idea that any sort of illness derived from an imbalance in one of the four humors, and treatments revolved around restoring this equilibrium. Oftentimes, doctors used food as a method of this restoration process and frequently prescribed individualized diets to patients to help them recover. Different people had different dietary requirements, based on factors such as age, gender, season, region, and even social status. Physicians took all of these factors under consideration when making diagnoses and prescriptions or treatment plans, all based on Galenic medicine. Unfortunately, not only could physicians not provide helpful medical care during the disasters of the early fourteenth century, but their treatments often left their patients in worse shape than before they sought help, contributing to the high death rates throughout the plague years. Modern scientific research gives insight into the physiological condition of medieval Europe's population during this time, and how food, medicine, and physical wellbeing interacted during the disasters of the fourteenth century

Galenic medicine, the basis of medieval medical knowledge, stated that the body contained four fluids—blood, phlegm, black bile or melancholy, and yellow bile or choler, which when perfectly balanced led to a perfectly healthy individual.¹⁵² Each humor corresponded to certain qualities; hot and moist blood, hot and dry choler, cold

¹⁵² Aberth, *The Black Death*, 39.

and moist phlegm, and cold and dry melancholy.¹⁵³ A multitude of factors influenced the balance of a person's humors. For example, the seasons influenced the natural production of different humors; blood in the spring, cholera in summer, melancholy in autumn, and phlegm in winter.¹⁵⁴ Humors could also be affected by what a person consumed. For example, warm wine was used to treat melancholy diseases, as the warm, moist wine could counteract the cold, dry melancholy.¹⁵⁵ The age of the patient mattered, as well, since children could exhibit phlegmatic tendencies more easily than adults, and thus physicians advised against giving young children much fish, a cold and moist food.¹⁵⁶ Children, however, could benefit from eating between meals, a practice which adults were advised against for fear of overindulgence and abusing their digestive processes. Texts from across the late Middle Ages, such as the *Kalender of Shepherdes* (France, 1491), were devoted to describing appropriate diet and lifestyle in the different seasons in order to maintain the proper humoral balance. When the individual's humors became unbalanced, he experienced illness and thus, balancing humors was central to medicine. Doctors strove to counterbalance upset humors by prescribing treatments of opposite qualities, such as a cooling treatment for a diagnosis of excess blood, which caused an

¹⁵³ Faye M. Getz, *Healing and Society in Medieval England: A Middle English Translation of the Pharmaceutical Writings of Gilbertus Anglicus* (Madison, WI: University of Wisconsin Press, 1991) xxxiii.

¹⁵⁴ Klemettilä, *Medieval Kitchen*, 32.

¹⁵⁵ Getz, *Healing*, xxxvi.

¹⁵⁶ Klemettilä, *Medieval Kitchen*, 35.

excess of heat and moisture.¹⁵⁷ Physicians also recommended specialized diets for their patients due to the humoral properties of different foods.¹⁵⁸ Because of this, cooks often possessed considerable knowledge of the humoral properties of food, so that they could balance the meals that they prepared for their employers. Maître Chiquart, the royal chef to Amadeus VIII, Duke of Savoy, wrote a cookbook titled *Du fait de cuisine* (1420) which included not only recipes but also details on the natural humoral properties of ingredients and how to prepare them safely.¹⁵⁹

Because of the perceived humoral properties of food, cooks either combined foods with counterbalancing ingredients or cooked them by means of opposite qualities. For example, beef, considered very dry, would be best prepared boiled or braised, while pork, a moist food, was best roasted, which dried and heated the meat.¹⁶⁰ Many cookbooks and even medical writings of the time explained these properties, such as the *Regimen sanitatis*, written around 1330 by the Milanese physician Maino de Maineri. One important method of balancing a meal was to include sauces of opposite qualities from the main component of the dish, and some upper-class households in places like France and England even employed designated staff for creating individual sauces. For example, the French employed *l'écuyer tranchant* to select the appropriate sauce for each dish,

¹⁵⁷ Getz, *Healing*, xxxiv–xxxv.

¹⁵⁸ Getz, *Healing*, xxxvi.; Klemettilä, *Medieval Kitchen*, 35.

¹⁵⁹ Klemettilä, *Medieval Kitchen*, 190.

¹⁶⁰ Klemettilä, *Medieval Kitchen*, 38.

while the English delegated this job to the carvers.¹⁶¹ The lower classes also employed these humor-balancing sauces, although in less extravagant forms than those of the upper classes. Some recipes for condiments were as simple as salt mixed with an acidic liquid such as grape juice or vinegar.¹⁶² These sauces and condiments were intended to have the opposite humoral properties of the main dish to balance out the meal, thereby preventing these foods from upsetting the diner's humors. At this time, however, popular medical thought believed lower-class members of society, such as peasants and serfs, had different dietary and humoral requirements than those of the upper class, such as noblemen. It was believed that the unrefined lower-class stomachs could not handle rich or heavily-seasoned foods, and that their restricted diet of mostly cereals and vegetables was adequate for maintaining optimal health, especially given their hard labor and active lifestyle.¹⁶³ Meanwhile, the rich required finer foods for their more refined constitutions and sedentary lifestyle. Their nutrition requirements were much less than that of the working classes, and "delicate" foods such as pheasants, venison, and hare were considered much more suitable for their dietary needs.

Although this system of humors and differentiating diet based on various factors worked rather well by medieval standards, modern medical research and archaeological findings reveal that these "balancing" meals did not result in as healthy a population as medieval physicians and cooks believed. Instead, this humoral approach led to an

¹⁶¹ Klemettilä, *Medieval Kitchen*, 87.

¹⁶² Klemettilä, *Medieval Kitchen*, 88.

¹⁶³ Klemettilä, *Medieval Kitchen*, 35.

insufficient iron and protein intake, particularly among women.¹⁶⁴ Case studies such as Christopher Dyer's work on the lives of London harvest workers shows that, although their diets shifted seasonally to more varied and better-quality foodstuffs, their diets remained much like that of the rest of their social population, and therefore we may conclude that their health may have also largely resembled other members of this lower class.¹⁶⁵ The upper class, as well, would have experienced health issues at the hands of their supposedly well-suited diets, although they made efforts to maintain good health through varied diets and attempts to avoid excess.¹⁶⁶ Their intake of fatty animal proteins combined with a relatively sedentary lifestyle was thought to be healthy under the humoral theory. However, numerous accounts and depictions of sanguine and heavy-set nobility appear to exhibit symptoms that we now consider indicators of heart conditions.¹⁶⁷ For example, a comparative study of monastic versus non-monastic graveyards uncovered evidence of diffuse idiopathic skeletal hyperostosis—a condition associated with obesity and diabetes—in individuals who partook of these rich diets during their lifetimes.¹⁶⁸ These conditions were in part due to the lack of exercise in conjunction with these lavish diets. This, therefore, was the state of medicine and diet at

¹⁶⁴ Vern Bullough and Cameron Campbell, "Female Longevity and Diet in the Middle Ages," *Speculum* 55, no. 2 (April 1980): 320–21.

¹⁶⁵ Dyer, "Changes in Diet," 23.

¹⁶⁶ Klemettilä, *Medieval Kitchen*, 32.

¹⁶⁷ DeWitte et al., "Medieval Monastic Mortality," 323.

¹⁶⁸ DeWitte et al., "Medieval Monastic Mortality," 323.

the beginning of the fourteenth century.

The Great European Famine and the Great Bovine Pestilence heavily impacted food supply and brought about physiological consequences. For all who experienced these events, severe malnutrition led to either starvation or susceptibility to other diseases which resulted in fatality. For example, studies by DeWitte and Slavin demonstrate a severe restriction of dairy availability, particularly in the northern parts of Europe, which brought a sharp reduction in caloric intake, as this dairy provided roughly 10–15% of the lower-class caloric intake in England and Wales, specifically.¹⁶⁹ These archaeological studies reveal that calcium and calorie deficiencies from the lack of dairy continued until roughly 1332, and returned again from 1339 until the relative restoration of cattle numbers just before the Black Death. These health issues brought about by the Great Bovine Pestilence, as well as overall malnutrition from the Great Famine, led to negative developmental consequences, particularly in children and infants with regards to the development of their bones, teeth, muscles, and hearts, as seen in the remains of these individuals from cemetery studies in London.¹⁷⁰ These nutritional deficiencies were compounded by the crop failures and food scarcity of the Great European Famine. Although comparatively very few casualties can be attributed to outright starvation, this malnutrition impacted individuals' immune systems, weakening them by depriving them

¹⁶⁹ DeWitte and Slavin, “Between Famine and Death,” 51, 53–54.

¹⁷⁰ DeWitte and Slavin, “Between Famine and Death,” 55–56.

of sufficient nutrients.¹⁷¹ Examinations of archaeological findings in the East Smithfield cemetery in London confirm increased occurrences of frailty and potential metabolic disorders in individuals who survived the Great European Famine.¹⁷² This led to previously non-fatal diseases completely devastating people, as their bodies failed to fight off germs and infections. One study of a London cemetery reveals the presence of bone lesions caused by infections, likely a result of decreased protein consumption during famine.¹⁷³ This protein malnutrition increased individuals' susceptibility to infection, and later death, as compared to those with sufficient protein intake and an absence of infection-caused bone lesions, which indicates healthier individuals. In addition to deaths related to malnutrition, carrion-eating proved detrimental, occasionally leading to disease or death in the people eating these carcasses for survival, as documented in writings such as those of Walter of Henley and the *Annals of Connacht*.¹⁷⁴

During the Black Death, bloodletting and leeching, although considered effective medical practices, resulted in spreading disease and causing infections.¹⁷⁵ People tried religious piety, fumigations, astrology, sweating, and even various animal cures as

¹⁷¹ Brittany S. Walter et al., "Assessment of nutritional stress in famine burials using stable isotope analysis," *American Journal of Physical Anthropology* 172 (2020): 222–23.

¹⁷² DeWitte and Slavin, "Between Famine and Death," 46.

¹⁷³ Walter et al., "Assessment of nutritional stress," 222.

¹⁷⁴ Norman Cantor, *In the Wake of the Plague: The Black Death & The World It Made* (New York, NY: Free Press, 2001), 16–17; Newfield, "Epizootics," 621, 639.

¹⁷⁵ Aberth, "Medical Response," 813-14.

solutions to the plague, but none of them seemed to work.¹⁷⁶ Doctors used food in tandem with their typical treatments in an attempt to cure people of the plague. These cures varied greatly depending upon the prescribing physician, ranging from intentional starving to moderate drinking to consuming all manners of food and non-food items. For example, the Catalan physician and professor Jacme d'Agramont suggested that patients "eat and drink as little as possible."¹⁷⁷ In contrast, Gentile da Foligno, a doctor who taught and practiced throughout the Italian city-states, recommended that men eat and drink quality food and wine in appropriate quantities, while he suggested poor men to consume leeks and scallions in considerable quantities, cooked in whatever manner they so chose.¹⁷⁸ Many doctors, including d'Agramont and da Foligno, prescribed tonics such as theriac (a cure-all concoction) to dissolve in wine or ale and take before meals.¹⁷⁹ Writing after the initial outbreak of bubonic plague, John of Burgundy's medical treatise in 1365 includes lists of ingredients for remedies and suggestions on how to adjust one's diet to rid oneself of the plague, such as eating cold food in the summer and eating less in

¹⁷⁶ Aberth, "Medical Response," 811. Common reactions to the plague included hyperreligiosity and searching for astrological explanations. Sympathetic medicine was common in the Middle Ages, and the lines between medicine and magic were oftentimes blurred. Such cures were widely used to counter the plague, despite the suspicions of Church authorities.

¹⁷⁷ Jacme d'Agramont, "Regimen of Protection against Epidemics" (April 24, 1348), quoted in Aberth, *The Black Death*, 52.

¹⁷⁸ Gentile da Foligno, "Short Casebook" 1348, in Aberth, *The Black Death*, 48–49.

¹⁷⁹ Cantor, *In the Wake*, 175.

the winter, basing his arguments on humoral theory and Galenic medicine.¹⁸⁰ Bengt Knutsson's medical treatise (Stockholm, mid-fifteenth century) detailed cures for the plague, including eating "a little rue and one or two filbert nuts" or "bread or toast sopped in vinegar" first thing in the morning, as well as to "savour sour things," thought to stop the flow of humors and prevent the entrance of "venom" into the body.¹⁸¹ During the Black Death, however, many people ignored professional advice, which typically resulted in more harm than help, and began to self-medicate, although still using food as a method of treatment. Some took to excessive drinking and eating, thinking to stop miasma—which many thought to be the cause of the Black Death—from entering the body.¹⁸² This miasma was thought to have been caused by the alignment of the planets or released from the earth during one of the many earthquakes that occurred in the early fourteenth century.¹⁸³ Many people believed that excessive eating and drinking would cause the body to generate so much heat of its own that there could be no room for this miasma to enter a person, thereby keeping them safe and healthy. Interestingly, based on the perceived differences in health requirements and humoral balance, the idea emerged that the poor died in greater numbers because they did not "generate heats or fumes inside

¹⁸⁰ John of Burgundy, in Horrox, *The Black Death*, 185–193.

¹⁸¹ Bengt Knutsson, in Horrox, *The Black Death*, 177.

¹⁸² Boccaccio, *Decameron*, Vol 1. trans. John Payne (Berkeley, CA: University of California Press, 1982), 10–11.

¹⁸³ Aberth, "Medical Response," 811.

themselves as the rich do” from hot and heavy foods.¹⁸⁴ We know this today to be untrue, and attribute the greater mortality rate instead to differences in baseline health and living conditions. A comparative study by DeWitte and Wood between London and Danish cemeteries demonstrates a trend of selectivity in the victims of the Black Death, in that frail individuals appeared more frequently among the victims more often than healthier individuals. Additionally, the lower classes appeared more often among the frailer populations than the upper classes due to insufficiencies in their diet.¹⁸⁵

Modern-day examinations of graveyard samples from the late Middle Ages show a difference in the physical health of some populations before the disasters of the early-fourteenth century compared with those populations after the disasters, although not all of these differences were positive. For example, in England, cemetery studies show a tendency for post-famine and Black Death individuals to exhibit fewer signs of poor health than those that died during the first half of the fourteenth century.¹⁸⁶ This of course can be attributed to the data that shows high mortality rates among frail individuals, and combined with the increased access to food in the wake of the Black Death (especially in England), a stronger population emerged that was more capable of surviving than those who succumbed to illness or disease. However, modern-day famine research performed after events such as the 1959–1961 Chinese Famine shows that women who survive food

¹⁸⁴ Sudhoff, *Pestschriften*, in Horrox, *The Black Death*, 179.

¹⁸⁵ Sharon N. DeWitte and James W. Wood, “Selectivity of Black Death mortality with respect to preexisting health,” *PNAS* 105, no. 5 (5 February 2008); 1438–49.

¹⁸⁶ DeWitte and Slavin, “Between Famine and Death,” 44–45.

scarcity or famine tend to be more likely to have reproductive problems such as trouble conceiving, spontaneous abortions, and breast-feeding issues.¹⁸⁷ Some of these issues may explain the reduction in population even after the end of the Black Death, with the European population reaching its lowest point in the second half of the fourteenth century as outbreaks of bubonic plague occurred intermittently.¹⁸⁸ Even after their birth, the children born to survivors of the Great European Famine experienced malnutrition through lack of sufficient breast-feeding, as their nutritional status relied heavily upon that of their mothers. Studies from fourteenth century cemeteries such as the East Smithfield cemetery discovered cranial abnormalities, bone structure malformations, and diminished adult stature in individuals dated as fetuses, newborns, or children during the Great European Famine and Bovine Pestilence.¹⁸⁹ In many areas, particularly in England, individuals who survived these trying years suffered from lack of protein, calcium, and vitamin B12, as confirmed by high rates of malformations due to calcium deficiencies found in skeletons from this period.¹⁹⁰

The successive generations of Europeans inherited physiological states from their parents who survived the early fourteenth century disasters, and from the adjusted diets of some of the lower-class population. Despite the initial health deficiencies of immediate generations, later generations are seen to be on average more resilient than those who

¹⁸⁷ Chen and Zhou, “Long-Term Health,” 660–61.

¹⁸⁸ DeWitte, “Mortality Risk,” 6; Dyer, “Changes,” 36.

¹⁸⁹ DeWitte and Slavin, “Between Famine and Death,” 40-41.

¹⁹⁰ DeWitte and Slavin, “Between Famine and Death,” 54, 56–57.

came before and tended to be in better general health than the average person at the beginning of the fourteenth century.¹⁹¹ Comparison studies done on pre- versus post-Black Death populations show that Europeans lived longer lives after the first outbreak of plague, in part due to their diet.¹⁹² Evidence taken from late medieval graveyard samples confirms this increased longevity and the presence of stress markers due to improvements in health and diet, as well as fewer vitamin deficiencies leading to malformations and unhealthy bone lesions.¹⁹³ This positive change for health through diet may have also helped to protect future generations from subsequent outbreaks of bubonic plague, as well as decreased death rates across all age groups after the mid-1300s.¹⁹⁴ However, modern-day studies on famine victims and their descendants show a higher tendency towards metabolic disorders such as diabetes and obesity and cardiovascular diseases.¹⁹⁵ With the increase in fatty animal protein in the average laborer's diet after the Black Death, this may potentially have led to health concerns such as heart disease.¹⁹⁶ The more recently observed trends towards obesity in the wake of famine or food scarcity may not

¹⁹¹ DeWitte and Slavin, "Between Famine and Death," 43, 45.

¹⁹² DeWitte, "Mortality Risk and Survival in the Aftermath of the Medieval Black Death," *PLoS ONE* 9, no. 5 (2014): 1, 4.

¹⁹³ Sharon DeWitte, "Health in Post-Black Death London (1350–1538): Age Patterns of Periosteal New Bone Formations in a Post-Epidemic Population," *American Journal of Physical Anthropology* 155, no. 2 (October 2014): 260–267.

¹⁹⁴ DeWitte, "Mortality Risk," 4.

¹⁹⁵ Chen and Zhou, "Long Term Consequences," 660–61.

¹⁹⁶ Dyer, "Changes in Diet," 36.

have been as pronounced in the medieval European population, as many of those who survived the worst of this famine died in one of the many disasters that followed.¹⁹⁷

¹⁹⁷ DeWitte and Slavin, “Between Famine and Death,” 43, 45.

CONCLUSION

The disasters of the early fourteenth century had a symbiotic relationship with each other, leading to a food crisis the likes of which the continent had never experienced. Climate change led to crop failure and the emergence of new pathogens, as well as the worsening of pre-existing ones, which in turn led to the Great Bovine Pestilence and the Great European Famine. These events directly affected the food supply by impacting farming and meat production. Warfare across Europe further reduced the amount of food available to the general population, leading to mass starvation across the continent. The resulting malnutrition and disease weakened the population of Europe, which contributed to the high mortality rate during the Black Death. This, in turn, led to new dietary and health prospects for the survivors. These new prospects also led, whether directly or indirectly, to changes across daily life, not just in the dietary realm but the social, economic, and political realms, as well.

Social status determined consumption patterns in the Middle Ages, with the lower classes consuming a limited variety of primarily vegetables and grains while the upper classes could afford not only large quantities of meat and finer foods, but also a greater variety of these foods. This wealth of resources alleviated the impacts of many of the disasters of the fourteenth century for the elites, and even allowed them to perform charity for the lower classes, who suffered heavily from these events. However, the Black Death reached across social classes in its mortality, although it affected frail and unhealthy individuals the most. The result was a drastic reduction in the population of

Europe, and this allowed for access to more and better food, improving nutrition and health among the lower classes.

The medical knowledge of the Middle Ages was based on the Galenic theory of the four humors, which could be affected by diet and the humoral properties of food. Therefore, physicians prescribed carefully-devised diets for their patients, and enforced the segregated diets of the upper- versus lower-class individuals with their dietary recommendations. This caused many nutritional deficiencies in the lower classes, and health problems such as obesity among members of the upper class. Nevertheless, this medical approach underlined the fundamental relationship between diet and health. This was further emphasized by the widespread malnutrition caused by the food crises in the earlier fourteenth century, the poorer outcomes for the malnourished during the Black Death, and the improved dietary prospects for the survivors, which resulted in not only greater health, but greater overall prosperity.

The labor shortage in the aftermath of the Black Death also allowed peasants and laborers to make more demands of their landlords and employers, not only for better food and wages but also for the elimination of some of the restrictions on their freedom and dues owed to their lords.¹⁹⁸ This gave them unprecedented power and led to new social mobility for the lower classes. This would give rise to the yeoman, the class of wealthy and prosperous peasants, which would replace the serfdom in the fifteenth century. The landlords, forced to make compromises in the immediate aftermath of the Black Death

¹⁹⁸ Cantor, *In the Wake*, 202–03.

due to the labor shortage, never intended these changes to be permanent.¹⁹⁹ These concessions given to the serfs immediately after the Black Death generated much-needed income for the landowners, who were willing to give in to some demands for the time being. They soon realized how much their power over these peasants had diminished, and quickly began attempting to reassert control through methods such as the reimplementing of dues, but the power of the peasants had grown greatly in a short amount of time. The decline of the serfs and resulting rise of the yeoman destabilized the feudal relationships of medieval Europe and altered social prospects among Europe's population, and standards of living for many individuals noticeably increased as a result.²⁰⁰

Women, in particular, experienced higher levels of agency than ever before, as their prevalence in the labor force increased in response to the labor shortage. Their newfound prominence in production and industry gave them freedom and power of their own, beyond that which they had experienced before the crises of the early fourteenth century.²⁰¹ By the mid-fifteenth century, women primarily ran the brewing industry, and working-class women in the domestic wool-weaving industry started becoming craftsmen for the textile industry. This allowed them an increasingly important position in society

¹⁹⁹ Juliet Barker, *1381: The Year of the Peasants' Revolt*, (Cambridge: Belknap Press, 2014), 57–58.

²⁰⁰ Horrox, *The Black Death*, 243.

²⁰¹ Cantor, *In the Wake*, 203.

and production, giving them more independence and social mobility than women prior to the fourteenth century.

These disasters also had broader implications for areas such as politics and economics. In the wake of these early fourteenth century disasters, Europe experienced an economic downturn and a population shortage which resulted in a dearth of laborers, leading to a financial crisis in the aftermath of the physical catastrophes the continent had just experienced.²⁰² This population shortage also meant a shortage in soldiers for kingdoms such as France and England which were still in the midst of the Hundred Years' War. This made warfare much more difficult and expensive, as the cost for military personnel increased.²⁰³ The changes that occurred after Black Death—such as the newfound social mobility of serfs and laborers that came with the ability to make demands of their employers—led to social and political uprisings, such as the Jacquerie in France in 1358 and the Peasants' Revolt in 1381 in England.²⁰⁴ Occurrences such as these demonstrate the far-reaching consequences of disasters and change and how these events impact every realm of life, not just the health of the individual survivor, but the everyday functioning of the world in which they and their descendants lived.

Disasters lead to change, and these changes lead to consequences that affect entire populations. The disasters of the first half of the fourteenth century built upon each other,

²⁰² Philip Ziegler, *The Black Death* (London: Collins, 1969), 225, 236–37, 245.

²⁰³ Cantor, *In the Wake*, 213–14.

²⁰⁴ Ziegler, *The Black Death*, 233; David Green, *The Hundred Years' War: A People's History*, (New Haven: Yale University Press, 2014), 43–44; Barker, *1381*, ix–x.

impacting the diet and subsequent health of the people of Europe, which led to long-lasting nutritional alterations for many individuals. Modern scientific scholarship of recent catastrophes demonstrates our need to understand the influence of more distant disasters on diet and nutrition, even when those disasters did not directly affect food supplies. Recognizing the complex interactions between disaster and diet during past events will allow us to respond to the long-term, intergenerational effects that may emerge from the current climate instability and the COVID-19 pandemic.

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