A GREAT DESTRUCTION OF CATTLE: THE IMPACT AND EXTENT OF EPIZOOTIC DISEASE IN EARLY FOURTEENTH-CENTURY NORTHWESTERN EUROPE

by

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A thesis submitted in conformity with the requirements

for the degree of Master of Arts

Graduate Department of the Centre for Medieval Studies

University of Toronto

Your file Votre référence
ISBN: 978-0-494-21336-0
Our file Notre référence
ISBN: 978-0-494-21336-0

MA Thesis Abstract

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2006

The current neglect of infectious livestock disease's impact on pre-industrial human economies is not warranted. Extensive stock mortalities, epizootics, have long afflicted Europe. Using chronicles, annals, manorial accounts, popular literature, letters, government ordinances and price indices, this thesis illustrates the temporal and geographical extent, and examines the agrarian and thus economic fallout of the first quantifiable cattle epizootic in Western history. The phenomenon affected eastern and northwestern Europe between 1318 and 1322. It was the first of its scale in at least four hundred years. The geographical and social variances of the epizootic's impact in Britain and Ireland are detailed here. Considerable time is spent on early fourteenth-century cattle demography, husbandry, and the outbreak's evident epizootiology in order to safely speculate a loss of 60 to 70 percent of Britain and Ireland's cattle. The epizootic extended the Great Famine in Britain and severely disrupted the agrarian production and standards of living of many long after its diminution.

Polybius taught us, over 2000 years ago, that the world is an organic whole, where everything affects everything. Plagues demonstrate that truth –crossing cultures, crossing time, but also joining cultures and time inextricably.

J. Foege, "Plagues: Perceptions of Risk and Social Responses."

CONTENTS

INTRODUCTION

Stock epizootics and human societies

On 12 January 2005, Canada's third case of Bovine Spongiform Encephalopathy (BSE/MAD COW) was isolated in Edmonton, Alberta.[1] The disease, frequently, though perhaps unsuitably, labeled a 'plague,' has made a considerable mark recently on Canada's economy and on that of Western Europe over the past two decades.[2] BSE does not present a risk like that of such highly infectious pathogens as Foot-and-mouth and Rinderpest which too have lately devastated British and African cattle, yet the latest case, the second in ten days in Canada, has brought to light a theme common to all stock epizootics, one which is often highlighted by epizootiologists but ignored by historians: disease in livestock has the potential to impact heavily, though perhaps regionally, on human economies and standards of living.[3] Though

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[1] Bill Graveland, "The Fallout from BSE," *The Toronto Star*, 14 January 2005, sec. A, p. 10. The first Canadian case was discovered in May 2003. See Tonda Maccharles, "Mad Cow Crisis is Getting Worse," *The Toronto Star*, 5 September, sec. A, p. 4.

[2] The term 'plague' has led, in some instances, to some considerable confusion and even anachronism. J. Foege, "Plagues: Perceptions of Risk and Social Responses," in *In Time of Plague: The History and Social Consequences of Lethal Epidemic Disease,* ed. E. Mack (New York: New York University Press, 1991), 11-12; Fisher suggests that Mad Cow is justifiably a plague but he does so only by creating a new definition of plague. He also later states that 'Mad Cow mortality numbers are low by plague standards.' See J. Fisher, "Cattle Plagues Past and Present: The Mystery of Mad Cow Disease," *Journal of Contemporary History* 33 (1998): 215-216. With an incubation period of four to six years and no direct communicability between animals BSE is not a true plague. See R. Lacey, *Mad Cow Disease, The History of BSE in Britain*, (England: Pypsela, 1994), 23. On the nature of BSE and its impact since its first appearance in 1910 see R. Anderson, *et al.* "Transmission dynamics and epidemiology of BSE in British cattle," *Nature* 382 (1996): 778-781; Fisher, "Cattle Plagues," 220-225; Lacey, *Mad Cow Disease,* 3. Between 1988 and 1996 BSE claimed a hundred and sixty thousand British cattle (a very small percent of Britain's total herd).

[3] For the various modes of transmission and infectivity of these diseases see, M. Woolhouse, "Foot-and-mouth disease in the UK: What should we do next time?" *Journal of Applied Microbiology* 94 (2003): 126S-127S; C. Spinage, *Cattle Plague, a History*, (New York: Kluwer Academic/Plenum Publishers, 2003), chap. 3; P. Schnurrwnberger, *et al. Attacking Animal Diseases, Concepts and Strategies for Control and Eradication.* (Ames: Iowa State University Press, 1987), 4. 2 January, 2005 marked Canada's second isolated case. One may suggest that the disease itself is responsible for little death in comparison to that of the

obvious, this is a significant and unappreciated fact. Epizootics indeed deserve to be studied in their own right. The severity of their impact, of course, is shaped by various socioeconomic parameters regarding who actually owns the infected stock, who takes the losses, and how integrated the stock is in the society's economy, diet and way of life.[4] One cannot unquestionably assume that the impact of stock epizootics is static over time.[5] One should also refrain from a deterministic, unicausal approach: Albertan beef and dairy farmers are suffering great economic losses as a result of the recent BSE, losses that will only be alleviated if live US trade is reopened and if government compensation stops falling short of needs.[6] Recent studies show that the great

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'stamping out policies' adopted by modern science (out of ignorance) in the 1860s and blindly continued to this day. J. Fisher, "British Physicians, Medical Science, and the Cattle Plague, 1865-66," *Bulletin of the History of Medicine* 67 (1993): 666-667. Just over a 100 cases of Foot-and-mouth were detected in 2001, yet due to its known infectiveness, and potential high risk, over two million cattle and three million sheep (the disease can afflict sheep) were preemptively slaughtered. Any policy concerning the slaughtering of stock is inconceivable in the medieval era.

[4] In this way the repercussions of epizootics reflect the worth of the afflicted stock in the particular society.

[5] Virologist James Steele in 1962 stated that 'hardship and famine would have indefinitely followed large epizootics in the pre-industrial era.' Yet the precise impact would have undoubtedly been dependant on the socioeconomic environment. As such environments are not static, it follows that the impacts of epizootics are not universally alike. J. Steele, *Animal Disease and Human Health*, (Rome: Food and Agriculture Organization of the United Nations, 1962), 4; for similar statements see, J. Swabe, *Animals, Disease and Human Society: Human-Animal Relations and the Rise of Veterinarian Medicine,* (London: Routledge, 1999), 62; C. Cipolla, *Before the Industrial Revolution: European Society and Economy, 1000-1700,* (New York: Norton, 1993), 83-84; P. Torgerson, "Economic Implications of Zoonotic Infections," in *Modern Perspectives on Zoonoses*, ed. C. Holland (Dublin: Royal Irish Academy, 1997), 133.

[6] At present, the demand and consequently the worth of existing stock have considerably contracted. Cattle farmers across Canada have been affected. Ralph Armstrong, a beef farmer from Collingwood, ON, Canada, reported losses of nearly two thirds. Cattle prior to the first Canadian BSE case were worth roughly .96cents per pound, after the first case and the closure of live trade with the US the worth of stock dropped to .26cents per pound. The federal government has recently guaranteed a price of .70cents per pound for some farmers. But while the government and independent insurance provides some relief the loss will undoubtedly be great. In result of the first closing of the live-cattle market, from July 2003 to January 2005, the Canadian cattle industry lost just over five billion dollars. Susan Delacourt "Second Case of Mad

cattle epizootics of eighteenth-century England, late nineteenth-century Africa, and twentieth-century northern continental Europe have all had unique repercussions, result of unique socioeconomic environments.[7]

Stock epizootics are not modern phenomena. The *Bible*, the *Iliad* and Virgil's *Georgics* all detail large die offs of stock and the record of mass livestock deaths continues, in western sources, throughout the medieval period and into the early-modern and modern eras.[8] This study

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Cow Confirmed in Alberta," *The Toronto Star*, 3 January, sec. A, p. 2; Bill Graveland "The Fallout from BSE," *The Toronto Star*, 14 January, sec. A, p. 10.

[7] Stead's recent article on crises and insurance in eighteenth-century England has uniquely illustrated that tenants, not landlords, were left to take and manage the losses of period's devastating cattle plagues. J. Stead, "Risk and risk management in English agriculture, c. 1750-1850," *Economic History Society* 57 (2004); P. Phoofolo, "Epidemics and Revolutions: Rinderpest in late nineteen-century Southern Africa," *Past and Present* 138 (1993); A. Woods, *A Manufactured Plague? The History of Foot-and-mouth Disease in Britain*, (London: Earthscan, 2004); idem, "The Construction of an Animal Plague: Foot and Mouth Disease in Nineteenth-Century Britain," *Social History of Medicine* 17 (2004). The economic impact of the fourteenth-century cattle epizootics was drastically different than that of nineteenth and twentieth-century epizootics, largely the result of the limited market economy of the former in respect to the latter. Fisher points out that the economic impact of nineteenth-century epizootics stemmed predominantly from European meat market and live cattle trade, J. Fisher, "The Economic Effects of Cattle Disease in Britain and its Containment," *Agricultural History* 54 (1980): 286. Medieval losses largely involved agrarian production, as we shall see in Chapter V.

[8] Epizootics were largely, at least on a grand scale, incurred as result of domestication: "once man becomes the husbandman he alters the normal equilibrium of checks and balances. Mixed herds are segregated into flocks of sheep, herds of cattle and groups of pigs, and each animal's excreted pathogens are available to his fellows of the same species." B. Halpin, *Patterns of Animal Disease*, (London: Bailliere Tindall, 1975), 135. Movements between herds results in devastating exchanges. Stock epizootics, or threat of, appear in the Bible – Exodus 9.2: "Let My people go to worship Me. For if you refuse to let them go, and continue to hold them, then the hand of the Lord will strike your livestock in the fields –the horses, the asses, the cattle, and the sheep– with a very severe pestilence." An epizootic of mules is recorded at the siege of Troy and Virgil records many dying cattle and pigs in a great epizootic. G. Fleming, *Animal Plagues, Their History, Nature, and Prevention*, (London: Chapman and Hall, 1871), 45-52. See J. Adams, *Pelagonius and Latin Veterinary Terminology in the Roman Empire*, (Leiden: Brill, 1995) for literary references to epizootic disease in ancient Rome. Indeed many classical sources mention epizootics. J. Blancou, *History of the Surveillance and Control of Transmissible Animal Diseases,* (Paris: Office International Des Epizooties, 2003), 79. Interestingly, however, Pliny does not. For a survey some classical Roman epizootic occurrences see Fleming, *Animal Plagues,* 30-68.

focuses on the first great wave of cattle epizootics, perhaps the first Western European panzootic, in medieval Europe since the ninth century.[9] It is an important phenomenon that has so far received only minimal scholarly attention. The biological event erupted before the beginning of the great European cattle trade and before the development of livestock quarantines.[10] As such the present study represents an inquiry into the devastation wrought by acute epizootic disease in a scientifically ill-equipped agrarian based society.[11]

Using available manorial records and price data, the present study investigates the first quantifiable epizootic in European history. It is then with some detail that the study asks what impact the epizootics had. As we shall see, the impact was not simple.[12] Though it afflicted areas

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[9] 'Cattle' here refers to calves, heifers, oxen, and bulls. This categorization is the same as that used by Walter of Henley in the last quarter of the thirteenth century. *Walter of Henley's Husbandry together with an anonymous Husbandry, the Seneschaucie, and Robert Grosseteste's Rules,* ed. E. Camand (London: Longmans, Green, and Co. 1890), 23.

[10] Blanchard's study of the origins of the European cattle trade places the rise of extensive cattle trade in the 1470s. Trading prior to that date was minute. I. Blanchard, "The Continental Europe Cattle Trades, 1400-1600," *Economic History Review* 39 (1986): passim. Cattle trade did, however, pick up after the Black Death. See R. Britnell, *The Commercialization of English Society, 1000-1500*, (Cambridge: CUP, 1993), 158. Evidence for large-scale English cattle rearing really picks up around 1400. See Britnell, *The Commercialization of English Society*, 196. Live cattle did not represent by any means an English export or import in the period 1250-1350. B. Campbell, "The Sources of Tradable Surpluses: English Agricultural Exports, 1250-1350," in *Cogs, Cargoes and Commerce: Maritime Bulk Trade in Northern Europe, 1150-1400,* L. Berggren *et al.*, (Toronto: PIMS, 2002), 20. Modern Western quarantine measures were developed in the 1700s. There is evidence, however, that some similar measures of animal quarantine to stop animal disease existed in Ancient Rome (at least in theory, perhaps not practice). See, Steele, *Animal Disease*, 4-5. 'Stamping out' policy, however, developed in the mid 1700s. Steele, *Animal Disease*, 4-7; Schnurrwnberger, *et al.*, *Attacking Animal Diseases,* 23.

[11] Studies of modern epizootics in contrast, as biologist Byerly notes, illustrate society's ability to cope, battle and eventually manage epizootic diseases. T. Byerly, "Ruminant Livestock Research and Development," *Science* 195 (1977): 453.

[12] Astill and Grant briefly commented that the stock losses of the famine had 'simple, direct and mostly immediate effects,' causing, with the crop failures, a drop in food production and a dearth of farming byproducts. G. Astill and A. Grant, "The Medieval Countryside: Efficiency, progress and change," in *The Countryside of Medieval England,* ed. G. Astill and A. Grant (London: Basil Blackwell, 1988), 216. Yet any judgment on the epizootics is complex and dependent on areas still of debate. Cattle were not simply related to agrarian production but to human health, not to mention the health of other domesticated species.

from Bohemia to Iceland at different times between 1319 and the mid 1330s, it is in British and Irish sources that we find the severity and extent of the cattle epizootics best represented. For this reason and because of constraints of time and space, I shall consider the mass cattle mortalities solely in the socioeconomic context of early fourteenth-century Britain and Ireland. The present study thus integrates a little-studied phenomenon into an intensely studied context, late medieval British agriculture, economy and society.

I shall illustrate that the cattle epizootics were of a much greater scale and, consequently, a more significant cause of agrarian disruption than is currently recognized. They represented a major determinant in extending famine conditions in Britain from 1319 to 1322 and in the general reduction of cultivation and inadequate yields of the post famine/pre Black Death years. Concrete understanding of the epizootics' impact requires study of the epizootics effects both in and beyond the Great European Famine –typically accepted as spanning 1315–1322.[13] The epizootics are thus viewed in a period of transition, the early fourteenth-century (around 1290-1347/8), a period preceded by two centuries of demographic and arable growth, succeeded by the Black Death, and marked by severe climatic anomalies, widespread population and arable contraction, war, and economic stagnation.[14]

Epizootics, furthermore, played a significant role beyond initial impact in altering both human and stock demographics, as will be discussed in Chapter V.

[13] While no work has been done specifically on the famine in the Celtic fringe the area seems to have been hit as severely as England. Scotland, Wales and Ireland certainly experienced the full brunt of the famine. A. Carr, "Wales: Economy and Society," in *A Companion to Britain in the Later Middle Ages*, ed. S. Rigby (London: Blackwell, 2003), 126, 133; B. Graham, "Ireland: Economy and Society," in *A Companion to Britain in the Later Middle Ages*, ed. S. Rigby (London: Blackwell, 2003), 151.

[14] For an introduction to the early fourteenth century, a turning point, see B. Harvey, "The crisis of the early fourteenth century," in *Before the Black Death: Studies in the 'Crisis' of the Early Fourteenth Century,* ed. B. Campbell (Manchester and New York: Manchester University Press, 1991). So far taxation and purveyances have been suggested for the likely decline in fertility and heightening of mortality as will be discussed in Chapter V. On the argument for fertility decline and mortality rising see Bailey for a survey, M. Bailey, "Demographic Decline in late medieval England: Some thoughts on recent Research," *Economic History Review* 49 (1996). Though it has been suggested, there is no "unequivocal support" for population reaching totals in 1348 that were greater than that of 1315. R. Smith, "Demographic developments in rural England, 1300-1348: A Survey," in *Before the Black Death: Studies in the 'crisis' of the early fourteenth*

The study consists of five chapters.[15] Chapter I reviews the historiography of early modern and medieval cattle epizootics. Chapter II shows the significance of cattle in agrarian production, subsistence and standards of living in early fourteenth-century Britain and Ireland. Attention here to cattle demographics, herd densities, and geographical and social variances thereof is fundamental in evaluating the epizootics' impact. Chapter III puts forth the historical sources –annals, chronicles, manorial accounts, price indices and government ordinances– for the early fourteenth-century British and Irish cattle epizootics. Chapter IV investigates the symptoms, mortality, and spread of the fourteenth-century epizootics in order to speculate on the active pathogen, while exercising full critical awareness of diseases' ability to evolve and adapt over time. Relatively safe speculation here, with the aid of Dr. Peter Roeder, chief virologist of the Food and Agricultural Organization of the United Nations, allows one to hypothesize further – beyond the sources– the epizootics' likely devastation by linking the epidemiology known to modern veterinary science to knowledge of early fourteenth-century cattle movements, British and Irish husbandry, and cattle demographics. Consideration of cattle health in the early fourteenth century, undoubtedly another factor relevant in the spread of epizootic disease, will

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Century, ed. B. Campbell (Manchester and New York: Manchester University Press, 1991), n. 49; J. Hatcher, "England in the Aftermath of the Black Death," *Past and Present* 144 (1994): 8; and it seems from the study of Z.Razi, *Life, Marriage, and Death in a Medieval Parish: Economy, Society and Demography in Halesowen 1270-1400,* (Cambridge: Cambridge University Press, 1980) that population did not reach levels greater than those of 1322 until 1345. B. Campbell, "Ecology Versus Economics in Late Thirteenth- and Early Fourteenth-Century English Agriculture," in *Agricultural in the Middle Ages, Technology, Practice, and Representation,* ed. D. Sweeney (Philadelphia: University of Pennsylvania Press, 1995), 77, briefly notes the appearance of some cattle plagues in the 1330s. Campbell is the only scholar to yet do so. On socioeconomic uniqueness of this period see J. Munro, "Wage Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, 1300-1500: Did Money Matter?" *Research in Economic History* 21 (2003).

[15] By necessity the coverage of the present study reflects the coverage traditionally followed in modern animal disease control and eradication programs, as summed up by Schnurrenberger *et al.*: "if effective programs are to be developed, we must be aware of all who produce, consume, or otherwise relate to the animal population involved, inasmuch as the needs perceived by each segment will influence the overall susceptibility of any population. In addition, the economic system within which the animals are produced, distributed, and consumed will markedly influence how disease control activities are developed." Schnurrenberger *et al., Attacking Animal Diseases,* 14.

also be presented here. Chapter V looks at the immediate effects of the cattle epizootics in the Great European Famine and discusses their socioeconomic impact beyond the famine years. Referring back to findings of Chapter II, I here discuss the geographical and social dimensions to the epizootic's impact. As a principal factor protracting the famine thus human malnutrition from 1319 to 1322 and beyond, the cattle epizootics are seen as an indirect contributor to the famine's eventual second human pestilence (1321-1322) and subsequent malnutrition and demographic contraction.[16]

In sum, neither were the impacts of each of the disasters associated with the famine altogether similar nor were the cattle losses and the consequent socioeconomic repercussions universal. In some regions and for some social strata, however, the destruction of cattle had undoubtedly devastating socioeconomic effects.

Some prefatory remarks are needed regarding the geographical and temporal limits of the present study, the terminology employed, and the need to distinguish the cattle disease from an epizootic among sheep during 1315-1316. The geographical limits of the present study themselves limit the questions one may pose and effectively answer. The epizootics transcended political and socioeconomic boundaries. As such, only after a study has been made into the actual losses of each of the afflicted regions can one fully conceptualize the pathogen's epidemiology and identity (though the present study should undoubtedly aid in more continental centered studies). Continental sources are used in Chapter IV only to guide the pathogenic identification of the epizootics by temporally and geographically mapping their dissemination. Use of continental sources here, then, is only superficial. Speculation on the severity of epizootics' devastation on the continent will not be given as the devastation is determined by each afflicted area's unique socioeconomic environment. The reader must therefore be warned that outside of the geographical and temporal distribution, the identification of the active pathogen relies solely on British and Irish sources; though, as will be shown, there is little likelihood the disease on the continent was different.

The temporal limits (1319-mid 1330s) are product of the extant record. Several clusters of

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[16] The first pestilence associated with the Great European Famine struck in 1315-1316. W. Jordan, *The Great Famine, Northern Europe in the Early Fourteenth Century*, (New Jersey: Princeton University, 1996), 142-145.

cattle epizootics can be identified in eighth- and ninth-century northern Europe but then not again until the fourteenth century. And from a survey of the sources, witness of epizootics is never so dense throughout the high and late medieval periods as it is in the early fourteenth-century. There are a couple references to epizootics in thirteenth-century sources, but they are so insignificant that little can be deduced from them.[17]

Terminology must also be given note. 'Murrain' and 'cattle plague' are both loaded with diverse and imprecise definitions in historical and scientific literature: historians use murrain to denote a mortality of livestock due to disease, irrespective of the number afflicted.[18] For some historians, murrain directly signifies, on no scientific grounds, the pathogen Rinderpest (which only afflicts ruminants), but for most murrain is a non pathogenic-specific term.[19] Though the

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[17] Fleming records sheep epizootics in 1201, 1225, 1283; see too Jordan, who labels the thirteenth-century epizootics as 'not so general [as those of the fourteenth-century],' Jordan, *Great Famine*, 39. Page notes that on a manor at Baston a herd of twenty-five oxen dropped to nineteen, while the cattle herd at a manor in Langtoft dropped from thirty-six to thirty-two, and the cattle herd at Nomansland fell from sixty-nine to forty-eight in 1257-1258. No losses are found on the scale of those of the 1319-1321 disaster nor are even other losses of the 1257-1258 scale reported in the thirteenth-century. F. Page, *The Estates of Crowland Abbey*, (Cambridge University Press: Cambridge, 1934), 189, 206-209; I. Kershaw, "The Great Famine and Agrarian Crisis in England 1315-1322," *Past and Present* 59 (1973) notes that sheep epizootics were more common, 28. A belief adopted by Spinage, *Cattle Plague,* 91. Matthaei Parisiensis' *Chronica Majora*, records murrains of cattle in 1252, 1254 and 1258. I was unable to find any other supportive evidence. Matthaei Parisiensis, *Chronica Majora*, ed. H. Luard. (London: Longman, 1880), 321, 427, 674. Epizootics, as Kershaw noted, are rarely associated with famine in these thirteenth-century occurrences, as those of the early fourteenth-century are. Kershaw, "Great Famine," 27.

[18] Take for example the work of Ian Blanchard, who uses murrain to confer a minute loss of stock and in isolated cases of death. I. Blanchard, "Population Change, Enclosure, and the Early Tudor Economy," *The Economic History* 23 (1970). For L. Sutcliffe, a murrain appeared at Canterbury when roughly ten out of four hundred and fifteen oxen were lost. L. Sutcliffe,"The Financial Condition of the See of Canterbury, 1279-1292," *Speculum* 10 (1935): 67. Dunlop and Williams, veterinarians, uniquely define murrain as 'an epidemic disease having high mortality and morbidity.' This definition is not found elsewhere. Dunlop and Williams themselves use epizootic and label 'murrain' an odd, historical, and outdated term. R. Dunlop, and D. Williams, *Veterinary Medicine, An Illustrated History,* (St. Loius: Mosby, 1996), 277. Spinage also labels 'murrain' an outdated historical term. Spinage, *Cattle Plague,* 100, passim.

[19] Both Jordan and Kershaw use murrain and Rinderpest interchangeably without justification. Webster's and Oxford Dictionary define murrain as a disease of any domestic animals.

term 'murrain' is contemporary to the epizootics of this study, it was then used without pathogenic specificity and in regard to not only cattle and sheep but swine and undomesticated species, to signify the death of a single animal or entire herd or flock.[20] Historians and scientists differ in their use of 'cattle plague.' Most historians use it in a non pathogen-specific manner, yet some, following the model set by a few scientists, use it as a "modern synonym" of Rinderpest.[21] Thus in using the terms 'murrain' or 'cattle plague' one potentially adopts Rinderpest in the mind of his or her reader as the active agent.

One should not indiscriminately label a disease without significant study of the evident

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[20] Old English *moreine*; Old French *morine*; Latin *moraine/morina* from *mori*; from Greek maraino Webster's Dictionary (1913 edition). It appears in the late medieval period that 'murrain' was simply a general term to denote death due to disease, regardless of the nature of the disease. G. Astill and A. Grant, "The Medieval Countryside," 216. Astill and Grant state this with certainty, but the validity of the comment may need to be tested. Campbell, however, agrees with them. B. Campbell, *English Seigniorial Agriculture, 1250-1450,* (Cambridge: Cambridge University Press, 2000), 416. For some medieval writers, particularly agricultural writers it seems to represent a specific disease. Any widespread agreement or common usage, of course, was not in place. Trow-Smith noted that the term was even used perhaps to describe every form of death aside from slaughter. R. Trow-Smith, *A History of British Livestock Husbandry to 1700,* (London: Routledge and Kegan Paul, 1957), 129. For an example of the frequency and diversity of usage of the term murrain see, P. Harvey, *Account-Book of Beaulieu Abbey*, (London: Offices of the Royal Historical Society, 1975), 184, passim. Trow-Smith has claimed that 'murrain' occurs "more frequently in mediaeval stock accounts than any other noun." Trow-Smith, *History of British Livestock*, 153.

[21] Rinderpest in High German translates as 'cattle plague' (*hrind*, ox, *pest*, plague), and thus is really an English synonym. Jordan, Neeson, Kershaw, and Mate all use 'cattle plague' to confer 'Rinderpest.' J. Neeson, *Commoners: common right, enclosure and social change in England, 1700-1820,* (Cambridge: Cambridge University Press, 1993), chap. 9; M. Mate, "Agrarian Economy after the Black Death: The manors of Canterbury Cathedral Priory, 1348-1391," *Economic History Review* 37 (1984). Note also the recent work *Cattle Plague: A History* which is solely a history of Rinderpest. The author, Spinage, is a veterinarian. Historian J. Fisher in all of his articles uses Cattle Plague to denote Rinderpest as well, often simply calling it 'the plague' while referring to Foot-and-mouth, Contagious Bovine Pleuropneumonia, and Mad Cow by their respective names. See Fisher, "Economic Effects," 288; idem, "British Physicians," 651. J. Broad deems Rinderpest the "modern name" for cattle plague. J. Broad, "Cattle Plague in Eighteenth-Century England," *The Agricultural History Review* 31 (1983): 104. In the nineteenth century, Rinderpest was often called 'Steppe Murrain.' See, W. Smith, "The Cattle Plague in Norfolk," *Journal of the Statistical Society of London* 31 (1868): 395. For Carlson cattle plague is simply a less accurate term for Rinderpest. L. Carlson, *Cattle: An informal Social History*, (Chicago: Ivan R. Dee, 2001), passim.

epidemiology of the particular phenomenon and appreciation of its biological workings and make-up as understood by today's science. After all, imposing on past historical phenomena the identity of a pathogen known only to nineteenth- and twentieth-century science is potentially anachronistic. Extreme caution must be taken when identifying the pathogens responsible for historical ruin. Consequently, the term 'epizootic' will be employed here. Uniformly accepted and used by veterinarians, virologists, epizootiologists, and throughout scientific literature, it simply describes a mass death of non-human animals without pathogenic labels. It is employed as the exact identification of the pathogen active in the early fourteenth-century epizootics will only come from the pairing of archaezoological and molecular analysis. It is also employed to avoid any future problems of terminology, like that that has recently been brought to light in concerns to the term 'plague' or 'pestilence' – terms often accepted as meaning modern *Yersina pestis*, bubonic plague, without scientific discretion.[22]

Note is also needed of the 1315-1316 sheep epizootic, which some primary sources record together with the cattle epizootics and which the couple secondary discussions have treated with the cattle epizootics. Pathogenic and socioeconomic connections between the cattle and sheep epizootics are almost wholly arbitrary and merely coincidental. By all indications the sheep epizootic of 1315-1316 and the cattle epizootic of 1319-1322 had distinct and different causes and socioeconomic repercussions.[23] As such, the sheep epizootic will receive little

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[22] S. Cohn, "The Black Death: End of a Paradigm," *American Historical Review* 107 (2002); idem, *The Black Death Transformed: Disease and Culture in Early Renaissance Europe,* (London: Arnold, 2003).

[23] No pathogenic connection between the cattle and sheep epizootics can be deciphered. The sheep epizootic erupted with the cool weather and heavy rains of 1315-1316, and spread throughout northern continental Europe and England, but it seems not Wales and Scotland, and definitely not Ireland. Jordan, *Great Famine*, 37-38, 204 n. 114; Kershaw, "Great Famine," passim. This may, however, be result of the Irish annals giving no attention to sheep, focusing solely on cattle. The 1315-1316 sheep epizootic, moreover, had been preceded by sheep epizootics in the late 1270s, '80s and '90s, and was itself the last of the fourteenth century, excusing a couple slight references to sheep diseases on the eve of the Black Death. Fleming, *Animal Plagues*, 96, 97. It is also noteworthy that during the famine only cattle epizootics appeared in Ireland. On sheep disease in Ireland see Trow-Smith, *History of British Livestock*, 130, 154; Jordan, *Great Famine,* 204 n. 114. The earlier sheep epizootics seem to have been brief and isolated. Contemporaries, importantly, knew the pathogen of the thirteenth- and fourteenth-century sheep epizootics, and judging from their

attention here.[24]

One may ask why the early fourteenth-century cattle epizootics have hitherto been almost universally neglected. In short, an anachronistic unawareness of the real role of draft animals in pre-industrial European societies has dominated in modern scholarship. Anthropocentric sources,

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reports it seems the disease was 'the scab' or scabies, a disease highly accentuated by wet, cool weather. Petrus de Crescentiis, writing around 1309, noted, "scabiem pecori caveat; id ex fame et si impluit fieri solet" and the writings of Walter of Henley around 1280 too record the scab. Petrus even provided some cures. See Petrus de Crescentiis, *Ruralia Commoda*, ed. C. Winter Heidelberg (Heidelberg: Universitatas Verlag C. Winter, 1995), vol. 1, chap. 12. Other infectious sheep diseases are also mentioned in the work of Walter of Henley. The unprecedented and unknown cattle epizootics, conversely, commenced in 1319, when excessive rains had been replaced by drought and cold winters. They also continued into the 1330s. And as we shall see in Chapter IV, the most likely disease behind the cattle epizootics is not known to naturally affect sheep. In concerns to socioeconomic impact, sheep, unlike cattle, were of little agrarian use. They were seen as a poor source of manure and were not a dietary staple (though a source of food in times of want). Consequently, only the larger estates that reared them for wool for export trade would have really suffered. Wool was the major part of England's foreign exchange. See W. Childs, "Finance and Trade under Edward II," in *Politics and Crisis in Fourteenth-Century England,* ed. W. Childs (London: Alan and Sutton, 1990), 26-27, 29. Taxes and tolls on wool also formed a principle part of king's income. But even here damage was not too great as restocking sheep was very quick relative to that of cattle, as will be discussed in Chapter V. In short, mass sheep deaths would have devastated the economies of few and done little to disrupt agrarian production or the socioeconomic standing of the general population.

[24] I am not suggesting here that the sheep epizootics are over-all insignificant in comparison to the cattle epizootics, as Lucas seems to do. H. Lucas, "The Great European Famine of 1315, 1316, and 1317," *Speculum* 5 (1930) reprinted in *Essays in Economic History,* ed. E. Carus-Wilson, (London: Routledge, 1962), 377. The impact is merely different. The best (and only serious) discussion on the sheep epizootics is Kershaw, "Great Famine," 20-24, 27-28. Other note on the sheep epizootics can be found in Grant, "Animal Resources," 154-155. It is very interesting to note the sheep epizootics of 1315-1316 seem to coincide with an epizootic among horses at least on several English manors. Kershaw, "Great Famine," 24 n. 116. From annals and chronicles we can chart the epizooty's chronology and geographical dissemination. It immediately becomes apparent that Lucas and Jordan, following Lucas' example, have conflated the dates of cattle and sheep epizootics. Both state that cattle and sheep epizootics hit Europe between 1315-1317. Lucas' study as noted contains several temporal and geographical inaccuracies. Lucas, "Great European Famine," passim; Jordan, *Great Famine*, 37-38. J. Aberth *From the Brink of the Apocalypse: Confronting Famine, War, Plague, and Death in the Later Middle Ages*, (New York: Routledge, 1996) states the sheep epizootics stretched 1313-1317, for which he offers no supportive evidence. See, Aberth, *Brink of the Apocalypse*, 22.

moreover, make for anthropocentric estimations.[25] But taking natural or biological environments into account is beneficial.[26] Humans are part of and exist within an environment and are conditioned not only by human forces but by relative biological fluctuations in that environment. The epizootics studied here represent such a fluctuation.

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[25] Hill pointed out that 'ordinary farm animals have left little mark' from the Middle Ages. R. Hill, "Some Beasts from the Medieval Chronicles," *Folklore* 66 (1995): 216. But as Swabe wrote, "in modern industrial society, where everyday existence often seems completely divorced from the natural world, it is all too easy for we humans to ignore the extent of our dependency on other animals and the role of animals in the past." Swabe, *Animals*, 1. Thus despite little literary evidence we must do our best to incorporate animals and the environment into our awareness of the present and our reconstructions of the past. Environmental history is, as Professor Reilly stated, "undergoing a modern renaissance," having been a subject well known in antiquity. K. Reilly, "Forward," in *Germs, Seeds and Animals, Studies in Ecological History,* ed. A. Crosby, (London: M.E. Sharpe, 1994), vii. Some have labeled the division between the sciences and arts a chasm. See, A. Crosby, "Introduction," in *Germs, Seeds and Animals, Studies in Ecological History,* ed. A. Crosby (London: M.E. Sharpe, 1994), ix. While it may be true that current events influence the forms of history practiced, as Crosby suggests, it should not be assumed that there have not been any significant cattle epizootics or coverage thereof in the twentieth century: Foot-and-mouth took a massive toll in northwestern Europe in 1922-4, 1954, 1967-8, and 2001 alone. See, Woods, "Construction of an Animal Plague."

[26] In the words of Crosby, 'history must too be seen as biology.' Crosby, *Germs,* xiv.

CHAPTER I

Historiography: historians and scientists

Over the last ten years epizootics have increasingly become a part of socioeconomic studies on historical societies.[1] Historians, anthropologists, epizootologists, veterinarians, and virologists have shed light on cattle epizootics from the eighteenth, nineteenth, and twentieth centuries. Fisher, Broad, and Woods in particular have sought to illuminate the social, economic, and political context of these European epizootics, emphasizing that "animal diseases have received much less coverage than human epidemics," that "epizootics can considerably disrupt agricultural production," and that they are thus "a considerable economic and social dynamic."[2] Much can and must be learnt from their studies, particularly as little has been done on medieval occurrences. Their work and theory will be cited throughout. Though the epizootics of antiquity have not being entirely ignored, they have not been examined from a socioeconomic perspective. Scholars have sought solely to uncover the pathogens behind the stock catastrophes recorded in the writings of several Greek and Roman naturalists and poets. No exhaustive study of the socioeconomic impact of cattle epizootics in Europe prior to the eighteenth century has hitherto been undertaken.

What has been done on the cattle epizootics of the present study has been done entirely within the limits of the Great European Famine, which itself has long been neglected despite being central to a school of interpretation and a debate over the later Middle Ages since the 1930s.[3] The famine has been taken as a matter of fact, 'a given,' yet the extent, and geographical

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[1] This fits in general with Ritvo's comment that animals altogether are starting to be more historically appreciated. H. Ritvo, "Animal Planet," *Environmental History* 9 (2003): 2.

[2] Fisher, "Cattle Plagues;" "Economic Effects;" "British Physicians," 651, 668. As Fisher wrote, 'human death is attributed greater concern than that of other animals.' Similar sentiment can be found in Broad, "Cattle Plague," 104; Woods, "Foot-and-mouth," passim.

[3] Since Eileen Power's 1918 "The Effects of the Black Death on Rural Organization" the Black Death has largely been understood as an accelerator of demographic and economic changes in northern Europe that had commenced earlier in the fourteenth century with the Great European Famine. Many historians, and indeed a school of thought, founded in the 1930s and further developed in the '40s, '50s and '60s, by M. M. Postan and his students,

and social particularities of crop devastation, and human and livestock pestilence have been little studied.[4] The famine moreover is largely understood as a period of weather induced dearth.[5] Understanding the magnitude of the cattle pestilence will, like Jordan's study of the crop destruction during the famine, go a long way in proving or disproving Postan's hypothesis concerning whether or not the agrarian problems of the famine period were indeed a point of separation between the long thirteen-century demographic and arable expansion and subsequent stagnation and contraction. It is not the concern here, however, to detail the historiography on the famine and the Postan hypothesis, except in respects central to the present investigation.

Lucas' "The Great European Famine of 1315-1317" of 1930, building from Curschmann's overly general article of 1900, was the first real appreciation of the famine but is

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had stemmed from the idea that the famine was the real point of change in northern European social relations and demography, and thus economies. Kershaw noted this himself. Kershaw, "Great Famine," 4-5. Postan never came out and said it was the famine that brought change but it is well known that that is exactly what he was getting at, Hatcher, "England," 5-6; B. Campbell, "England: Land and People," in *A Companion to Britain in the Later Middle Ages*, ed. S. Rigby (London: Blackwell, 2003), 8. Prior to the work of Power and Postan, the Black Death was viewed as the major catalyst of demographic and economy change in late medieval Europe, following T. Rogers, "England before and after the Black Death," *Fortnightly Review* 3 (1866). See Hatcher, "England," 3-6. The famine today is predominantly accepted as the point of departure from the previous two centuries of economic and demographic growth. Some, however, have asserted that more emphasis must be weighed on warring in the 1290s. See the forthcoming work of B. Campbell, "The Agrarian Problem of the Fourteenth-Century," *Past and Present* 189 (2005), passim; Munro, "Wage Stickiness," passim.

[4] Both of the latter two factors are underrepresented in the scholarly account of the famine. The human pestilences have been marginally noted. For the most part, only their biological nature has been dealt with but without close scrutiny of the sources or scientific discretion.

[5] This academic perception goes back to Lucas and likely exists in general studies of fourteenth-century prior to the 1930s. Two other factors have recently come to light: Bailey and Campbell illuminated the devastating effects of flooding on newly reclaimed marginal lands in northwestern Europe and Pfister *et al.*, utilizing a wide range of paleoscientific proxy data, have shown the exact magnitude and timing to which temperatures actually dropped during the period. See M. Bailey, "*Per impetum maris*: natural disaster and economic decline in eastern England 1275-1350," in *Before the Black Death: Studies in the 'crisis' of the early fourteenth century,* ed. B. Campbell (Manchester and New York: Manchester University Press, 1991); Campbell, "Ecology Versus Economics;" C. Pfister, *et al.*, "Winter Severity in Europe: The Fourteenth Century," *Climatic Change* 34 (1996).

itself not without serious problems and factual inaccuracies.[6] Working entirely from chronicles, Lucas briefly noted on three occasions the presence of epizootics during the famine and suggested that they likely caused prices of meat to rise. The English aspects of Lucas' work were reevaluated in 1973 with Kershaw's study on the famine's impact in England. Kershaw presented a significant advance in terms of epizootics affecting both sheep and cattle.[7] Using English chronicles and the manorial accounts of Bolton Priory he detailed the severity of the epizootics in northern England while emphasizing their likely socioeconomic impact. The continental aspects of Lucas' work were not reevaluated until 1996 with Jordan's *The Great Famine, Northern Europe in the Early Fourteenth Century*. Jordan, however, like Lucas gave minimal attention to the epizootics.[8]

Outside of famine studies, the epizootics have been mentioned in works on late medieval agriculture. Some, in works on late medieval English agrarian history, have briefly noted the epizootics as components of medieval Europe's "darkest days."[9] Others have gone on to stress

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[6] Lucas' work is plagued by unfounded generalizations, regarding the geographical spread of the famine, its likely causes and its likely effects. For example, he claims that the famine afflicted all of Europe, something which Kershaw and Jordan have shown to be fallacious. Lucas, "Great European Famine," 57-58. Lucas reviews the little attention attributed to the famine prior to his own work, Lucas, "Great European Famine," 49-50. Curschmann's work is itself not focused solely on the fourteenth-century famine.

[7] Kershaw, "Great Famine," 13-14, 20-26. Kershaw noted the poor appreciation of the epizootics by Lucas. See Kershaw, "Great Famine," 14. Smith stated Kershaw's study was "wide-ranging," something which is not at all the case geographically speaking. Smith, "Demographic developments," 35. Bridbury precisely noted Kershaw's contribution of a 'pastoral crisis' to our knowledge of the famine. See A. Bridbury, "Before the Black Death," *Economic History Review* 30 (1977): 393.

[8] Lucas mentioned the epizootics three times very generally while Jordan spent roughly three pages out of a hundred and eighty-eight discussing their appearance in some sources; little time was spent on their impact. See Jordan, *Great Famine,* 35-37. Fleming, Lucas, Kershaw, and Jordan's work, despite their flaws all provide some additional primary references from which I build, as will be noted in the citations of Chapter III.

[9] W. Robinson, "Money, Population, and Economic Change in Late Medieval Europe," *The Economic History Review* 12 (1959): 69; C. Dyer, *Making a Living in the Middles Ages: The People of Britain, 850-1520,* (Yale University Press: New Haven, 2002), 229. Campbell stresses that all aspects of the famine need to be revaluated, "the exogenous dimensions of the crisis are ripe for reassessment." Campbell, "England: Land and People," 5, 20, passim.

the need for their actual study, providing some opinion on the epizootic's impact.[10]

As with most past biological phenomena, historical epizootics have largely been examined by various scientists. Virologists, epizootiologists and veterinarians have dabbled in this history of epizootics, largely while considering the origins of their own disciplines.[11] Though little attention has been given directly to medieval occurrences and though little of their work has much historical value, much necessary theory can be learnt from their studies.[12] The works of Wilkinson, Swabe, Williams and Dunlop, Blancou, and Spinage, for example, teach that some pathogenic viruses are less subject to mutation than others; one also recognizes a general agreement amongst scientists that certain pathogens have afflicted stock since domestication.

The early fourteenth-century epizootics have not been viewed in their own right – as both a socioeconomic and biological phenomena. This study aims to supplement the work of Kershaw by including the epizootics' full geographical and temporal scope from analysis of primary sources, while utilizing his work and that of other historians on the period's agriculture to investigate the cattle epizootic's impact.[13] The studies of late medieval manorial accounts, such

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[10] It is clear that there is some disagreement regarding the epizootic's impact. Some suggest the greatness and others the insignificance of this 'exogenous shock:' Kershaw, Jordan, and Campbell suggest its significance while Mate, Astill, and Bridbury suggest its insignificance (as will be noted in Chapter V), only Kershaw, however, has provided any serious discussion. See Kershaw, "Great Famine," 20-26.

[11] Swabe notes that these scientists are simply trying to generate interest in their own profession. Swabe, *Animals,* 12.

[12] Those of the sciences seem to prefer the classical and modern periods– likely for the more readily available translated material. The epizootics of late antiquity of received more attention then those of 500-1700CE. See Dunlop and Williams, *Veterinary Medicine,* passim; Spinage, *Cattle Plague,* 3. For a brief and temporally vague comment on the fourteenth-century epizootics by a veterinarian see L. Wilkinson, *Animals and Disease, an introduction to the history of comparative medicine,* (Cambridge: Cambridge University Press, 1992), 22. Wilkinson simply notes that 'cattle plagues resulted in famine just before the Black Death.' Spinage's discussion of medieval epizootics is largely taken from Kershaw and is still very sketchy and untrustworthy. Spinage, *Cattle Plague,* 83-84, 89-92.

[13] Kershaw's findings at Bolton Priory have been utilized on four occasions in secondary works. His method of investigation, however, has not been extended in Britain or across continental Europe. I. Kershaw, *Bolton Priory: The Economy of a Northern Monastery, 1286-1325,* (Oxford: Oxford University Press, 1973).

as those of Kershaw of Bolton Priory in northern England, Mate of several southeastern English estates, and Raftis of Ramsey Abbey, will in Chapters III, IV and V provide data to calculate cattle losses. And in Chapter IV the work of virologists, epizootiologists and veterinarians will be cautiously exploited to speculate on the active pathogen and to assess the likely impact of the early fourteenth-century cattle destruction.

CHAPTER II

Cattle in early fourteenth-century Britain and Ireland

Before discussing the sources, speculating on the active pathogen and interpreting the epizootic's impact, it is necessary to detail the importance of cattle to the economy and living standards of the early fourteenth-century British and Irish. Here it will become clear why attention to fourteenth-century epizootic cattle disease is warranted. It is critical for Chapters IV and V that not only the uses of cattle be detailed but the geographical variances of these uses; the loss of stock did not have the same effect in every region. Nor can we assume that the socioeconomic impact of the epizootics was similar for each class. Consequently, the uses of cattle on peasant holding through large estate must be given attention. Awareness of cattle demographics, herd densities and, again, geographical variances thereof, all fundamental to Chapter V, will be given as well.

Though not much has been done since Trow-Smith claimed, 'our knowledge of late medieval British cattle is somewhat sketchy,' scholars widely accept that in various ways cattle were critical to socioeconomic standing and the subsistence of the general population of Britain and Ireland in the early fourteenth-century.[1] Cattle were a source of food (milk, cheese, butter, meat), hides (clothes, tools, weapons), bone (weapons, tools), marrow, and various other byproducts. They provided, moreover, transportation, fertilizer and traction.

Livestock are a valuable renewable resource, providing many materials. While cows and bulls, and oxen, fattened at the end of their working life, could command substantial prices at market, beef was not a staple of the general population's diet; a cereal diet predominated throughout Britain and Ireland in all classes.[2] The degree to which cattle were prized for milk and

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[1] Trow-Smith, *History of British Livestock,* 88.

[2] Jordan, *Great Famine,* 36; A. Carr, "Wales," 238; J. Langdon, *Horses, Oxen and Technological Innovation, the Use of Draught Animals in English Farming from 1066 to 1500,* (Cambridge: CUP, 1986), 261. Meat began to play a more central dietary role after the Black Death. C. Dyer, "Changes in Diet in the Late Middle Ages: the Case of Harvest Workers," *Agricultural History Review* 36 (1990): 35. The demand for red meat increased over the late fourteenth and fifteenth centuries. A. Grant, "Animal Resources," in *The Countryside of Medieval England,* ed. G. Astill and A. Grant (London: Basil Blackwell, 1988), 157; Campbell, *English Seigniorial Agriculture,*

cheese, however, has been of some debate. It seems to have been the lower classes who consumed what milk there was.[3] Hides, however, were highly prized; Ireland's export to England in hides appears to have been growing in our period. Yet overall cattle were predominantly geared towards traction, fertilizer and reproduction.

Most important for our period is the use of cattle in agrarian production, as best signified by the fact that fourteenth-century cattle skeletons are found almost always wholly intact.[4] Cattle were after all the predominant engines of medieval production. Considerable debate has, however, surrounded the role of cattle in various forms of late medieval English farming. The key debate surrounds the role of oxen in traction. Attention to this is significant for Chapter V and because working animals always made up at least forty percent (and often very much more) of a peasant farmer's total cattle stock.[5] It should be noted first that the argument over the role of oxen and horses is limited to England. In the early fourteenth-century, cattle clearly dominated traction, not to mention animal husbandry, on the Celtic Fringe, in Ireland, Wales and Scotland.[6]

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[3] Grant, "Animal Resources," 157; Trow-Smith, *History of British Livestock,* 119-120.

[4] Grant, "Animal Resources," 155.

[5] B. Campbell, "Economic Rent and the Intensification of English Agriculture, 1086-1350," in *Medieval Farming and Technology*, ed. B. Campbell (Oxford: Oxford University Press, 1992), 232. "Ploughing was the activity where animals made the greatest difference." V. Smil, *Energy in World History*, (Oxford: Westview, 1994), 38-49.

[6] In Ireland, cereal farming had expanded until around 1300 when it began to contract largely in result of the changing English market demands, to which it was heavily attached. Graham, "Ireland," 151. Cattle rearing had been in place in Ireland for some time. As the *Life of Edward the Second* by the 'so-called Monk of Malmesbury' notes that the Irish "do not cultivate the land but live on their flocks and the milk thereof." *Vita Edwardi Secundi by the Monk of Malmesbury,* ed. N. Denholm-Young. (London: Thomas Nelson and Son, 1807), 282. With livestock the Irish bought corn. Wales relied almost universally on cattle prior to 1350. Sheep only started to form a larger part of the pastoral economy after the Black Death. Carr, "Wales," 131. Carr attests that the only Welsh without a cow were the very most poor. In general, throughout the later medieval period, cattle rearing was being pushed deeper into the fringe and eventually into upland pastures and woodland. Trow-Smith, *History of British Livestock,* 98.

In excess of ten million acres were being cultivated in England around 1300.[7] Work animals were critical for the ploughing and harrowing done in the autumn and spring, a process often repeated in order to improve successive yields by eliminating weed growth.[8] While scholarly opinion differs whether oxen or horses dominated draught in the late medieval English countryside, the core of the disparity appears to be result of scholars focusing on different developments in different regions at different times. Most contend that oxen continued to predominate in the fourteenth century, as they had previously.[9] However, the studies of Langdon of the late 1980s and the early '90s suggest that the draught role of oxen seems to have been becoming increasingly limited in the high and late medieval periods particularly within the English 'demesne sector and among the peasantry.' He has even stated that horse rearing was 'taking off' in England in the twelfth and thirteenth centuries.[10] With the development of a new collar in the two preceding centuries one plough horse could take on the work of several oxen, particularly in lighter soils.[11] Several scholars, subsequently, have advanced arguments regarding the inability of peasants to feed the number of oxen needed to plough their fields. Horses are, after all, more efficient, ploughing and hauling at much greater speeds then oxen, and are easier

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[7] Campbell, "England," 10.

[8] Idem, *English Seigniorial Agriculture,* 121.

[9] Most thus believe that oxen dominated in the twelfth and thirteenth centuries. In the twelfth century (as in previous centuries) cattle were the principle form of traction throughout Britain, though it is in this century that the spread of horses is understood to have intensified. See Jordan, *Great Famine,* 36. Farmer noted judging from price data, that no significant change occurred in thirteenth-century in regards to the popularity of cattle, cow or oxen; manors continued to invest more in oxen than horses. D. Farmer, "Some Livestock Price Movements in Thirteenth-Century England," *The Economic History Review* 22 (1969): 14. Dyer, *Making a Living*, 120. Trow-Smith noted that the debate over the horse and oxen is 'centuries old' and that there was simply no one right animal for the total population. Trow-Smith, *History of British Livestock,* 93. The first reference to horse ploughing in England stems from King Alfred's *Orosius*. Langdon, *Horses,* 19.

[10] J. Langdon, "Was England a Technological Backwater?" in *Medieval Farming and Technology,* ed. B. Campbell (Oxford: Oxford University Press, 1992), 282.

[11] Jordan, *Great Famine,* 35; Trow-Smith, *History of British Livestock,* 93.

to feed on oats than a team of oxen on a diet of hay and straw.[12] Fillies, moreover, can become good plough horses, while only steers can be made into oxen.[13] While many cattle were fed on grass and also bushes and shrubs, and even on trees themselves, most, particularly in arable areas, were fed hay.[14] Others, however, have stressed that horses were an expensive alternative to oxen, that they involved a considerable amount of capital, that they were suited to few climates and soil consistencies, that they were less stable than oxen, and that they were more liable to 'break down.' Horse hide and meat, furthermore, were then seen to be of little value, unlike the hide and meat of a fattened ox at the end of its working life.[15] There is, regardless, general agreement that horses dominated peasant holdings, which were predominantly geared toward arable farming.[16] Some peasant farms were even entirely horse powered, requiring either legumes or rented cattle for manure.[17] Horses did not, conversely, dominate demesnes and larger estates, which often owned large numbers of cattle.[18] On the demesnes and larger estates of south and

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[12] Mate, "Agricultural Technology in Southeast England, 1348-1530," in *Medieval Farming and Technology,* ed. B. Campbell (Oxford: Oxford University Press, 1992), 270, But the dominance of oxen in the southeast appears to be largely on estates, peasants seem to have preferred the horse as they could not feed a team of oxen. Jordan, *Great Famine,* 35-36. On horses and oats see T. Williamson, *Shaping Medieval Landscapes: Settlement, Society, Environment,* (Bollington: Windgather Press, 2003), 196.

[13] Campbell, "England," 19.

[14] This is apparent from Domesday to the great period of enclosures, Williamson, *Medieval Landscapes,* 54, 173, 196. As noted in Edward II's price fix: 'live saleable fat ox fed on corn' at 24s.' *The Price of Food Under Edward II,* in *Selections from English History*, ed. C. Colby (London: Longmans, Green, and Co., 1899), 93.

[15] Grant, 182. And, as noted, horseflesh was also not eaten.

[16] Oxen, however, are seen to have made up the draught power on several lowland peasant farms, where horses were less favorable. Langdon, *Horses,* 256-257.

[17] Williamson, *Medieval Landscapes,* 196.

[18] See below, Chapter II A. Langdon, *Horses,* 170, 171-172, 241; Williamson, *Medieval Landscapes,* 196. By 1300, however, Campbell argues that horses led most carriages on larger estates. Campbell, "England," 19. On estates owning cattle see Campbell, "England," 6; Carr, "Wales," 134. Langdon notes, however, that there were always "grave inconsistencies" with the general pattern. Yet the general pattern remains highly representative. Many demesnes and richer peasants utilized mixed plough teams. Some richer peasant plough teams were of roughly two

east England, horses did play a noticeable role both in traction and carting.[19]

The richest peasants used oxen and horses in mixed teams, but, undoubtedly, for middle peasants horses were the principle form of traction.[20] Those who could not afford a horse or an ox or two would have made use of cows if they had them; the use of pregnant heifers as draught animals is well attested.[21] The poorest would borrow or rent a beast for a day, for both traction and manure. Here cattle were likely rented, as their manure was prized more than that of any other stock.[22]

Different modes of farming, of course, existed throughout fourteenth-century Britain and Ireland. Cattle were not solely used for traction. Cattle rearing and various forms of mixed farming involving cattle in a none-draught role were widespread. While the former was limited to larger, wealthier estates, the latter is found on large and middle estates, and even among the richer peasantry.[23] In the early fourteenth century, cattle and sheep formed the 'principal species in animal husbandry in many areas in northern Europe;' in late medieval England they

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oxen or one horse, as judged by inventories and lay subsidies. Langdon, *Horses,* 241, 258. Larger cattle herds in northern and southern England (and in general) tended to be kept near sources of water as they require far more water than sheep, pigs or humans. Williamson, *Medieval Landscapes,* 127. Such attention to geographical specific position in relation to potential routes of disease dissemination will be crucial in Chapter IV. It should also be noted that the farther west and north one went in Britain and Ireland the greater the likelihood that cattle subsisted by grazing, and thus neither relied on crops nor competed with humans for food.

[19] In the south and east, in the areas best connected to the continent, horses were more accepted on larger estates. For Langdon, England was, in this sense, technologically backward. Langdon, 170, 171-172, 173 n. 3, 241.

[20] Campbell, "England," 19; Langdon, *Horses,* 166, 255-257, 260, 265. The poorer tended to use horses as they lived separated from their fields in nucleated villages.

[21] Mules and Donkeys were used as well. Grant, "Animal Resources," 156; Campbell, *English Seigniorial Agriculture,* 120.

[22] Mate, "Agrarian Economy of South-east England," 88; Aberth, *Brink of the Apocalypse,* 29.

[23] Trow-Smith, *History of British Livestock,* 103; sheep and pigs predominated on both peasant farms and estates. Campbell, "Sources of Tradable Surpluses," 26; Jordan, *Great Famine,* 55. Sheep were certainly preferred among the peasantry in Norfolk.

represented the most 'intensely exploited animals.'[24] Cattle husbandry was geared towards rearing, meat or dairy; there are few signs, however, of farms being totally devoted to dairy or meat. Cattle rearing dominated, particularly in the northern midlands and on the Celtic fringe.[25] Dairy farming was increasingly widespread in the southeast. Yet as milk yields were very low and cattle did not have the ability to produce milk year round (a modern development) dairy farming was never practiced in isolation.[26]

In the later medieval period, most agree that cattle were the dominant animals used in mixed husbandry, on account of one's need to generate draught stock, yet increasingly cattle were losing dominance to sheep on secular estates.[27] On ecclesiastical estates, conversely, there were some policies of deliberately expanding cattle herds.[28] Whatever the case most agree that cows were by far the most common dominator of each practiced form of mixed husbandry.[29]

Aside from traction, in arable and mixed farming, cattle were fundamental as a supplier of fertilizer. Cattle manure was preferred over that of horse, sheep and swine. Manure was a source of 'scarce nutrients' and a lot of it was needed, as the nitrogen quantity in it was generally low.[30]

In sum, in the early fourteenth-century cattle were vital in farming for traction and

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[24] This was result of the fact that cattle and sheep were the most 'versatile' of stock, yielding the greatest number of products. Grant, "Animal Resources," 161; Jordan, *Great Famine,* 35; Campbell, *English Seigniorial Agriculture,* 103.

[25] Trow-Smith, *History of British Livestock,* 89.

[26] Mate, "Agrarian Economy of South-east England," 86; Grant, "Animal Resources," 156-157.

[27] Trow-Smith, *History of British Livestock,* 98-99.

[28] These policies were seen in England in the hundred and fifty years before the Black Death. Ibid, 98.

[29] On six of the eight forms of the major mixed farming systems in England in use in our period oxen greatly dominated over the horse. Campbell, "Economic Rent," see table 10.1 on 231; Jordan, *Great Famine,* 35. With an abundance of cows one could with a couple bulls breed his own traction.

[30] Smil, *Energy,* 49, 54. Contemporaries were also aware that the manure of stall fed cattle is richer in nutrients than that produced by grazing cattle. Williamson, *Medieval Landscapes,* 66.

manure. It is agreed that they far out numbered horses and that oxen were the "primary" draught stock, except among middle peasantry.[31] Chronicles and manorial accounts of the period seen in Chapter III and V further support this claim.[32] Fundamental in grain production, cattle sustained all society. Byproducts exchanged at market and derived from oxen at life's end and from cattle herds on middle and large estates were also crucial for the subsistence of both rich and poor.

A) General early fourteenth-century cattle demographics

Population density is the most important demographic factor affecting infectious disease.[33] Brief discussion here of the geographical and social variances of cattle demographics and herd densities will be critical in the later interpretation of the epizootic's effects. Statistics of the medieval British cattle population are quite vague. No entire herd population has been calculated for Britain or Ireland prior to 1841.[34] Only demographic snapshots survive in manorial

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[31] Campbell, "Economic Rent," 232-233. In a thorough study, Campbell concluded that throughout our period oxen seem to have outnumbered the horse in England four to one on estates until the Black Death. Campbell, *English Seigniorial Agriculture,* 135. Trow-Smith, using the writings of Walter of Henley (around 1280), fifty years ago came to this conclusion noting that contemporaries preferred oxen as they possessed a 'slower but stronger and more sustained pull, and were cheaper.' Trow-Smith, *History of British Livestock,* 93.

[32] For example, the Lanercost chronicler noted that only in result of the oxen and cow epizootic did people begin to plough with horses; people used them out of pure necessity. *Chronicle of Lanercost* in *English Historical Documents,* vol. 3: *1189-1327*, ed. H. Rothwell (London: Eyre and Spottiswoode, 1975), 240. After the epizootic devastated the Crowland manors some turned to horses, Wellingborough had seven by 1323. Trow-Smith, *History of British Livestock,* 116. Trow-Smith later conversely states that the manor had only six horses. Trow-Smith, *History of British Livestock,* 127.

[33] J. Biggs, "Infectious Animal Disease and Its Control," *Philosophical Transactions of the Royal Society of London* 310 (1985): 261.

[34] Around 2000 Britain's total cattle population was roughly 11,800,00, roughly half of the cattle population of 1865. In 1841 Ireland alone had upwards of 2,320,000 cattle. Fisher, "Cattle Plagues," 216; P. Bourke, "The Agricultural Statistics of the 1841 Census of Ireland: A Critical Review," *Economic History Review* 18 (1961): 382. In 1580 the Thames Valley and Uplands of Oxfordshire, however, possessed thirty-nine and thirty-three herds of only five cattle, respectively. E. Jones, "Agriculture and Economic Growth in England, 1660-1750: Agricultural Change," *Economic History Review* 25 (1965): 6.

records. But from manorial records in Chapter III we see that it is unlikely that any English estate possessed more than Winchester's 1088 oxen in 1319. Though cattle were 'intensely exploited' throughout late medieval Britain and Ireland,[35] we can safely assume, in fact, that large herds were exceptions to the general pattern in England. Most cattle herds would have been of around thirty, with richer peasants possessing around ten, while the very poor, who could not afford a horse, likely possessed one or two, or none (and thus rented).[36]

In northern England, Scotland, Wales and Ireland larger herds had been widespread for some time.[37] Breeding farms, particularly on the Celtic fringe, were quite large. In 1121 we see Maredudd ap Bleddyn paying tribute to Henry I in the form of over ten thousand cattle. Though the number is likely exaggerated, as Trow-Smith notes, it does stem from the fact that vaccaries in Wales were quite substantial.[38] Twenty-eight large vaccaries were identified for 1296, twenty-nine for 1305. These herds on the fringe, owned by English elites, could have easily numbered between two and three thousand.[39] In the southeast and midlands of England cattle rearing was growing by 1300. Horses did continue to dominate in the former and arable farming in the latter, but the general increase in cattle rearing in both areas is quite noticeable.[40]

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[35] Grant, "Animal Resources," 161.

[36] Average demesne lands were of one hundred and fifty acres, which would have required two to three plough teams, with around sixteen oxen. Tenants rarely possessed cattle stocks of any considerable size, though we do see one tenant in 1293 at Billesdon with thirty-three oxen and a cow. This tenant was an oddity. Trow-Smith, *History of British Livestock,* 100, 101; Britnell, *The Commercialization of English Society*, 201. Peasants often had one or two oxen, a sufficient quantity to do their necessary plowing. Grant, "Animal Resources," 156; Campbell, *English Seigniorial Agriculture,* 121.

[37] Dyer, *Making a Living in the Middles Ages*, 25, 118; Campbell, "Sources of Tradable Surpluses" 20.

[38] Particularly around the hills of Rossendale, Pendle, Boulsworth, Pennine as well as many other regions of Wales. Vaccaries along the March were quite large. R. Griffiths, *Boroughs of Medieval Wales*, (Cardiff: University of Wales, 1978), 59, 231.

[39] Britnell, *The Commercialization of English Society*, 114; Trow-Smith, *History of British Livestock,* 94-95.

[40] Dyer, *Making a Living in the Middles Ages*, 25, 118. By the mid 1200s the midlands had become predominately arable, leaving little forage for cattle, causing cattle populations to be

But despite the appearance of a large and growing cattle population around 1300, there is some evidence that England's cattle population was declining immediately prior to the famine, as seen in Edward II's 1315 interference in market prices, his *De Pretio Vicualium*.[41] The price of cattle and most goods had drastically risen in 1305 and remained high throughout our period of study in much of Britain, but peaked during and after the cattle epizootic.[42] In the *De Pretio Vicualium* Edward II attempted to limit the price of oxen and cattle, on account of 'the dearth of both throughout the country.' In 1316 a monk at Malmesbury noted the pre-epizootic dearth of oxen in a comment on the King's price fix.[43] And more generally, Campbell has found in a survey of breeding estates that the English trend of estate-bred replacements was declining throughout the period 1300-1350.[44]

If the human population had begun to be supported by a smaller quantity of stock the health of the stock would have become increasing critical. But regardless of the magnitude of the cattle population decline around 1315, it is clear that cattle played distinctive and key roles in several economic sectors and social strata in the early fourteenth century. It is also clear as seen in Chapter III that significant cattle population existed in 1319. What happened when these essential live resources took sick in large numbers?

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sustained on crops and thus to slightly contract. Livestock did graze on the fallow field and many arable fields were left with boarders for grazing but relied predominantly on crops. Williamson, *Medieval Landscapes,* 61, 66, 125, 177; Dyer, *Making a Living in the Middles Ages*, 126.; Campbell, "Sources of Tradable Surpluses," 20; P. Schofield, "England: Family and Village Community," in *A Companion to Britain in the Later Middle Ages*, ed. S. Rigby (London: Blackwell, 2003), 35. Cattle here were particularly situated around lowland river valleys.

[41] 'We have received a complaint of the archbishops, bishops, earls, barons, and others of the commonalty of our kingdom, presented before us and our council, that these is now a great and intolerable dearth of oxen, cows, sheep, hogs, geese, hens, capons, chickens, pigeons and eggs, to the no small damage and grievance of them and all others living within the said kingdom.' *The Price of Food Under Edward II*, 92-93.

[42] Lucas, without any analysis of prices, contended that meat became extremely scarce. Lucas, "Great European Famine," 355. His claim is unfounded, as noted by Farmer.

[43] *Vita Edwardi Secundi*, 282.

[44] Campbell, *English Seigniorial Agriculture,* 139. This also points to the purchasing of stock from the continent.

CHAPTER III

The sources: chronicles, annals, manorial accounts, price indices

A variety of sources cover the destruction of cattle in the early-fourteenth century. The chronicle and annalistic evidence will be presented first, with some letters and popular literature, and then analyzed. Manorial accounts and price indices will follow. Attention will then be given to the geographical and temporal dimensions of the epizootics.

In 1318 an epizootic disease afflicted Eastern European cattle populations. By 1321 the biological entity had spread across northern Germany, France, Scandinavia and into England, Wales, Scotland, and Ireland.[1] Many chronicles simply note the presence of a great crisis amongst German, French and British oxen and cattle herds; indeed the Louth Park Chronicle thought that cattle disease afflicted all of Christendom.[2] Yet more specific evidence is available. It seems to have appeared first on the continent in Bohemia, then Austria and Luxemburg. Lodewijk van Velthem, Molanus, the *Chronik der Stadt Luxemburg*, and the *Konigsaaler Geschichts-Quellen* all record a great death of continental European cattle.[3] While the rate of survival of materials contemporary to the famine is in general, as Jordan noted, naturally less than that of other periods, the annalistic, chronicle and, of course, manorial evidence of the

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[1] Jordan notes the existence of the cattle epizootics in Scandinavia. Jordan, *Great Famine,* 181.

[2] *Chronicon Abbatie de Parco Lude*, ed. E. Venables, (Linconshire Record Society: Lincolnshire, 1891), 27; Jordan, *Great Famine,* 38.

[3] Lodewijk van Velthem's Voortzetting van den Spiegel Historiael opnieuw uitgegeven door H vander Linden en W. De Vreese, in Corpus Chronicorum Flandriae, vol. 1-2.: Collection des Chroniques Belges, ed. J. Smet (Brussels, 1906), 390; Johannes Molanus, *Historiae Lovaniensium Libri XIV*, in Corpus Chronicorum Flandriae, vol. II: Collection des Chroniques Belges, ed. J. Smet (Brussels, 1861), 865; *Willemi Capellani's Brederode postae Monachi et Procuratoris Egmondensis Chronicon,* in *Werken Uitgegeven door het Historisch Genootschap Gevestigd te Utrecht*, vol. 20, ed. C. Pijnacker (Amsterdam, 1904), 91; *Konigsaaler Geschichts-Quellen (Bohemia)*. In *Fontes Rerum Austriacarum*, Sctiptores, vol. VIII, ed. J. Loserth (Abtheilung I, 1875), 379; Lucas, "Great European Famine," 358 n. 6. *Chronik der Stadt Luxemburg,* ed. F. Lascombes (Luxemburg: Sankt-Paulus-Druckerei, 1963), 150.

epizootic's eruption in Britain and Ireland is much greater than that of the continent.[4]

The inception of the disease in Britain attracted considerable attention both contemporary and near contemporary; the impact also appears to have made a lasting impression as it is repeated in much later sources. Johannis de Trokelowe (around 1280-1330), monk and annalist at St. Albans, compiled the first contemporary record of the event:

> In the course of the same year [1319] a great pestilential mortality of herds grew strong through all of England, as no one had seen before. In this plague a miraculous thing occurred whereby both the dogs and birds that were feasting on the bodies of the dead herds swelled up right away and died of infection. After this, there was no person who presumed to taste cow flesh ...indeed at Easter the plague began at Essex and continued through the whole year. It was also said that at the same time all of Gaul was infected with the same disaster.[5]

The *Flores Historiarum*, compiled by monks at Westminster, also provides a contemporaneous note on the devastation,

> In 1318 a great sickness of animals invaded the kingdom of the English people and suddenly through a quarter of the kingdom that mortality ruined a countless multitude, so that in diverse parts the few remaining animals imported a heavy loss to the rich and want to the poor.[6]

Another copy, perhaps later, simply notes, "that there was the greatest mortality of animals, that

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[4] The MGH *Scriptorum* contained few references to epizootic cattle disease. In concerns to the continent as a whole, it should be again noted that more attention must be given to uncovering such evidence. On the rate of survival of materials see Jordan, 204 n. 108.

[5] "Sub ejusdem anni [1319] curriculo, tam pestifera armentorum mortalitas per totam Angliam invaluit, quantam non ullus se meminit praevidisse. In qua peste hoc evenit mirabile, quod de pecorum mortuo cadaveribus etiam canes et corvi qui vescebantur, in loco intumuerunt, et infecti obierunt. Unde nullus erat hominum, qui carnes bovinas gustare praesumebat, ne forte de moticiniis eorum intoxicatus succumberet. Tempore quidem Paschali in Essexia incepit, et per annum integrum duravit. Dictum est etiam, quod tota Gallia eadem labe per idem tempus extitit coinquinata" Trokelowe, *Annales,* ed. H. Riley (London: Longman, 1866), 104-105.

[6] "In hujus anno [1318] decursu tanta lues animalium regnum invasit Anglorum ac per quatuor regni ipsa mortalitas infinitam multitudinem subito prostravit, ut in diversis partibus pauca relinquens divitibus grave dampnum intulit et pauperibus egestatem" *Flores Historiarum*, ed. H. Luard (London: Longman, 1890), 187. This source was later copied by John Capgrave. J. Capgrave, *Chronicles of England,* ed. F. Hingeston (London: Longman, 1858), 185.

is oxen and cows and other animals."[7] The contemporary *Chronicon Lanercost*, 1315-1323, provides further details:

> At the same time [1319] the plague and murrain of cattle which had lasted through the two preceding years in the southern districts, broke out in the northern districts among oxen and cows, which after a short sickness, generally died; and few animals of that kind were left.[8]

The Thorney Annals also briefly note the disease in Cambridgeshire, "in 1318 there was the greatest murrain of cows in England."[9] An unpublished fragment of a Devonshire chronicle, contemporary to the reign of Edward the II, records "the greatest mortality of animals from the species of cattle in the whole kingdom of England."[10] Another, though likely not contemporary fragment, speaks of the epizootic as well, recording "...a great, very large and unheard of mortality among herds, namely oxen, cows and calves, continuing through many years."[11] The contemporary *Chroniques de Sempringham*, of the Suffolk area, simply notes, "in the same year [1319] there was a great mortality of cattle in England."[12] The *Chronica Monasterii de Melsa*, kept by the abbots at Melsa (west England), records two instances of the epizootic cattle disease.

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[7] "Eodem anno maxima mortalitas animalium id est bovum et vaccarum et aliorum animalium" *Flores Historiarum*, 343.

[8] *Chronicle of Lanercost*, 275.

[9] "Hoc anno [1318] fuit maxima morina in Anglia, boves" *Thorney Annals, 963-1412* ed. C. Hart (London: Edwin Mellen Press, 1997).

[10] "Anno domini millesimo CCCmoXVIIIo maxima mortalitas animalium, de genere boum in toto regno Anglie" Cited in the notes of R. Haines, *King Edward II: Edward of Caernarfon, his life, his reign, and its aftermath, 1284-1330*, (Queen's University Press: Montreal, 2003), 402 n. 17-18.

[11] "...et magnas mortalitas armentorum maxima et inaudita, videlicet bovum, vaccarum et vitulorum per multos annos durans" This source is likely later as it groups all famine related phenomena under one year, 1316, instead of detailing the event year by year as others do. There is no reason to believe that the cattle epizootics occurred as this fragment states in 1316, however. Cited in the notes of Haines, *King Edward II,* 402 n. 17-18.

[12] The text was written in French (though by an Englishman in England), "Meisme lan avoit y graunt pestilence des beastes en Engletere" *Sepringham Continuation,* in *Le Livere de Reis de Brittanie e Le livere de reis Engletere*, ed. J. Glover (London: Longmans, 1865), xv-xvi, 336-337.

First, Adam, abbot between 1310 and 1339, generally noted in the immediate post famine years that "murrain of sheep and other animals,"[13] had occurred during the famine and that by 1322 "many villages of England were ruined," while the following is recorded under the last entry of his predecessor Robert (abbot between 1286-1310), in a passage concerning Edward II's succession and the famine, obviously added by a later author, "and there was also so great a high price of wheat in the days of it [the famine] and so continual a mortality of cattle that it was scarcely seen in past generations."[14]

The near contemporary *Gesta Edwardi de Carnarvan* records great distress 'in the north and throughout England'; with a lack of stock by 1322, "many farmers of those parts, who were rich quite copiously in estates and holdings of sheep and cattle, are now forced to beg through the lands."[15] The Louth Park Chronicle put forth the general complaint that in the immediate years after the epizootic "the losses of oxen and other necessities" had caused the ruin of a Lincolnshire Cistercian house.[16] And the popular, near contemporary *Poem on the Evil Times of Edward II* did not neglect the arrival of the epizootics either,

> Came there another sorrow that spread over all the land,
> A winter that was stronger than a thousand that came before [1317-1318],
> To bind all the many men in mourning and in care,

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[13] "...morina bidentium et aliorum animalium" *Chronica Monasterii de Melsa,* ed E. Bond (London: Longmans, 1867), 333.

[14] "...plures villae Angliae comburebantur" Later, under Robert's entry, " ...tanta etiam in diebus ejus caristia tritici, tamque continua mortalitas armenti, quanta aretro seaculis vix visa fuit" Ibid, 286.

[15] "Plures illarum partium coloni, qui in praediis et possessionibus ovium et armentorum uberius habundabant, jam compelluntur per patrieas mendicare" *Gesta Edwardi di Carnarvon Auctore Canonico Bridlingtoniensi,* in *Chronicles of the Reigns of Edward I and Edward II,* vol. 1, ed. H. Laurd (London: Rolls Series, 1883), 81. Interestingly for 1315 this source records a great unheard of murrain amongst sheep and cattle, indicating that the source was certainly not contemporary, as no other source records a epizootic of cattle that early. "Similiter mortalitas hominum et morina armentorum tanta, talis et continua fuit, quanta et quails a seculo non est visa" *Gesta Edwardi,* 48. The *Vita et Mors, Edwardi Secundi*, also near contemporary, possesses a similar entry. *Vita et Mors, Edwardi Secundi,* in *Chronicles of Edward I and Edward II*, vol. II, ed. W. Stubbs (London: Kraus, 1965.), lix, 301.

[16] *Parco Lude*, 24.

> The cattle all died quickly, and made the land all bare, so fast,
> Came never a wretch into England that made men more aghast.

The effects of the epizootic are later acknowledged,

> And though that mortality was stopped of beasts that bear horns,
> God sent on earth another dearth of corn,
> That spread over all England both north and south,
> And made simple poor men hungry in their mouth.[17]

The record continues, Henry Knighton's *Leycestrensis Chronicon*, written in the early to mid 1330s, following Trokelowe and others unknown, writes:

> In the year 1318 and 1319 there was a great mortality of humans and pestilence of animals through the kingdom of England, to such a degree that the remaining humans did not have the where with all to cultivate or sow there lands...and this pestilence lasted for two years. Thus from these things and from the Scottish enemy a great ruin seized the English people everywhere.[18]

The *Bridlington Chronicle*, and the *Eulogium Historiarum* briefly note the devastation but are slightly later sources, making use of contemporary sources. Composed around 1347, the *Annales de Oseneia* (Oxfordshire) also briefly note a "great pestilence of animals" during the famine.[19] The *Historia Anglicana*, written between 1377-1412 by Thomas Walsingham, another

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[17] *Poem on the Evil Times of Edward II, in The Political Songs of England*, vol. 6, ed. T. Wright (London: Camden Society, 1839), 342-344; Aberth, *Brink of the Apocalypse,* 22-23; Kershaw, "Great Famine," 14.

[18] Henrici Knighton, *Leycestrensis Chronicon*, vol. 1-2. ed. J. Lumby (London: Kraus, 1965), see introduction, specifically, vol. 2 vii. "Anno gratiae MCCCXVIII et anno gratiae MCCCXIX magna mortalitas hominum, et lues animalium per totum regnum Angliae, adeo quod homines remanentes non habebant unde terras suas colere nec seminare, et cotitide quam plurimi in quolibet cimiterio fodebantur; et duravit haec pestis per biennium, et sic undique magna desolatio tam ex hiis quam ex Scotis hostibus Anglos apprehendit" Henrici Knighton, *Leycestrensis Chronicon*, 412.

[19] For the Bridlington Chronicle see Aberth, *Brink of the Apocalypse,* 22; *Euglogium Historiarum: Chronicon ab orbe condito usque ad annum domini MCCCLXVI*, ed. F. Haydon (London: Longman, Green, Co., 1863), iii-xiv, 195-196. This sources uses the work of Geoffrey le Baker of Swinbroke, which is now severely fragmented. Swinbroke's work stems from Edward II's reign. More note will be given on the *Euglogium* in Chapter V. "Anno Domini MCCCXXI mortalitas hominum facta est talis quails ante nusquam visa est; certum est illam

monk at St. Albans, follows Trokelowe's work and others no longer extant, and presents Trokelowe's most likely scenario, adding a note on the velocity of the disease's dissemination, which will be discussed in Chapter IV:

> In 1319 there was an unheard of pestilence of animals, there is doubt from where it began but it did arise in England; it began around the time of Easter in Essex and spread quickly through the whole island, lasting for the entire year and infecting almost all the cattle of that region. It is also said that all of France was infected at the same time with the same pestilence.[20]

In his *Ypodigma Neustrilae*, written around 1420, Walsingham provided some different details,

> In 1319 there was a pestilence of cows. The cows were so lethally infected that dogs and ravens eating from there corpses as if intoxicated with poison, swelled and collapsed in death. For this reason no one dared to eat the cattle or calf flesh.[21]

John Capgrave of Norfolk, writing around 1417, notes only the cattle epizootic, not the famine, in his *Chronicle of England.* He records, "in that same year [1319] there was a great moreyn of bestis which began in Estsex and aftir it spred thorw the lond. It reigned most in oxen."[22] The much later work of Holinshed, which in concerns to the famine and the epizootics ultimately follows Trokelowe, also mentions the epizootic and a general picture of its dissemination.[23]

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fuisse in regionibus propinquis ad Angliam in omni parte, creditur tamen fuisse per totum mundum et maxime propter defectum victualium" *Annales de Oseneia, in Annales Monastici,* vol. IV, ed. H. Laurd (London: Longmans, 1869), 344.

[20] T. Walsingham, *Historia Anglicana*, vol. 1-3. ed. H. Riley (London: Longmans, 1863), vol. 1252. "Eodem anno [1319] inaudita pestis animalium, dubium unde nata, succrevit in Anglia; quae circa tempus Paschale incept in Estsexia, et diffusa est in brevi per totam insulam, durans per totum annum et inficiens pene cuncta pecora regionis. Dictabat etiam, quod tota Gallia per idem tempus eadem peste fuit infecta" Walsingham, *Historia Anglicana*, 156-157.

[21] "Hoc anno [1319], fuit pestis boum, qui tam letifere fuerunt infecti, ut canes, de cadaveribus eorum comedentes, et corvi, quasi toxicati veneno, intumescerent, et mortui caderent. Quamobrem nemo fuit ausus comedere carnes bovinas aut vaccinas" Walsingham, *Ypodigma Neustrlae*, ed. H. Riley (London: Longmans, 1876), vii, 252.

[22] *Capgrave's Chronicle of England.*

[23] "In this season, to wit, in the yeare 1319, a great murreine and death of cattell chanced through the whole realm, spreading from place to place, but speciallie this yeare it reigned most in the north, where as in the years before it began in the south parts" Holinshed *Chronicles of England, Scotland and Ireland,* vol. II. (New York: AMS Press Inc., 1807), 557. Holinshed's work was

Some contemporary letters also survive. They will be used here only when inherent biases and factual inaccuracies are not evident to provide geographic and temporal specificities. One dated October 26, 1320 by Archbishop of Melton, described the severity of the losses at Bolton Priory in the north due to the 'universal epizootic of plow beasts.'[24] Yet it is clear the epizootic had made its way to the Scottish border in 1319. The contemporary *Historia Aurea* records its sudden presence among a great number of oxen that were recently led from somewhere south to the siege of Berwick, which is known to have taken place in summer of that year, "for there a pestilence or sickness of animals was heard of first. In fact almost all of the oxen chariots led to the siege suddenly as it were died."[25] Priest John Fordun, likely at Aberdeen, contemporaneously or near contemporaneously recorded the epizootic very briefly under his record of 1321-1322, "nearly all the cattle died."[26] By 1320-1321, it seems, that the oxen and cattle herds of Wales were also gravely devastated.[27] In 1320 in Morganoc, Wales we see some of Edward's subjects pleading for relief of dues "because of the great epizootic of beasts and the great dearness since in all the country we have nothing now to live on."[28]

Yet only in 1321 did the disease arrive in Ireland, as briefly recorded by several annals. The Annals of Ulster then report a "great cow destruction throughout all Ireland in general" and the Annals of Clomacnoise "a great murrain of cows throughout all Ireland that the likeness was

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originally published in London in 1586.

[24] *Historical Papers and Letters*, ed. J. Raine (London: Longman, 1873), 306-307.

[25] "Ibi enim pestis sive lues animalium prius est audita. Omnes revera fere, curruum boves ad obsidionem ducti subito quasi moriebantur" *Annales Monasterii de Bermundeseia: 1042-1432, i*n *Annales Monastici,* vol. III. ed. H. Laurd (London: Longmans, 1866), xxxvii-xxxviii, 470-471. This source was compiled from sources unknown in early 1400s; for a near contemporary source see, V. Galbraith, "Extracts from the *Historia Aurea* and a French 'Brut' (1317-1347)." *English Historical Review* 210 (1970).

[26] His work is contained under the title of his continuator, W. Bower, *Scotichronicon*, vol. 7, book XIV, ed. D. Derwatt (Aberdeen: Aberdeen University Press, 1990), 11.

[27] Carr, "Wales," 133; A. Carr , *Medieval Anglesey,* (Llangefni: Anglesey Antiquarian Society, 1982).

[28] Calendar of Chancery Warrants Preserved in the Record Office, I (1244-1326) in Lucas, "Great European Famine," 355 n. 3.

never seen before;" the Annals of Connacht similarly note "a great cattle-plague throughout all Ireland, the like of which had never been known before;" and the Annals of Loch Ce, "a great cow-destruction throughout all Erinn, the like of which was not known before."[29] A fragmented annals also records: "in 1321 there was a very hard winter, which distressed men, and killed nearly all animals."[30] The disease seems to have persisted for consecutive years in Ireland, unlike other areas: in 1324 the Annals of Ulster record: "the same cow-destruction, namely the *Mael Domnaigh*,[31] prevailed throughout Ireland" and in 1325 the Annals of Ulster record: "that same cow-destruction prevailed in Ireland yet again." The Annals of Clonmacnoise note, for 1324: "the murrain of cows continued still in Ireland and was called *Moyle Dawine*," in 1325 these annals simply note "the murren [murrain] of cowes continued still." Those of Connacht record "the same cattle-plague was in all Ireland this year, it was called the *Mael Domnaig*" for 1324 and for 1325, "the cattle plague throughout Ireland still." The Annals of Loch Ce only record "the same cow-destruction in all Erinn, in this year, and it was it that was usually called the *Mael Domhnaigh*" for 1324.[32] Another fragmented annals from a Dublin abbey records, under 1324, "again there was the common murrain of oxen and of cows in Ireland."[33] The Annals of Innisfallen, whose record is missing 1319-1325, notes, for 1326, "a great Murrain of cows of Ireland in the above year, and there was great famine in the same year."[34]

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[29] *Annals of Clonmacnoise*, ed. D. Murphy (Dublin: Dublin University Press, 1896); *Annals of Connaught*, ed. A. Freeman (Dublin: Dublin Institute for Advance Studies, 1970); *Annals of Ulster*, ed. B. MacCarty (Dublin: The Queen's Printing Offices, 1893); *Annals of Loch Ce*, ed. W. Hennessy (London: Kraus Ltd., 1965).

[30] *Miscellaneous Irish Annals (1114-1437)*, ed. S. O'Hinnse (Dublin: Dublin Institute for Advance Studies, 1947).

[31] One editor translated this as 'devotee of Sunday.' Yet with the help of James Acken I find the translation, a 'plague of horned cattle' more suitable.

[32] *Annals of Loch Ce*.

[33] "Item, communis morina boum et vaccarum in Hibernia" *Annales Hibernie,* in *Chartularies of St. Mary's Abbey,* vol. 2, ed. J. Gilbert (London: Kraus, 1965), 362. Compilation of the annals stems likely from the later fourteenth century. See, *Annales Hibernie,* cxv.

[34] *Annals of Innisfallen*, ed. S. MacAirt (Dublin: Institute for Advance Studies, 1951); The *Vita Edwardi Secundi* does mention the sheep epizootics of 1316, however. *Vita Edwardi Secundi,* 282.

The dating offered of the various chronicles and annals of Britain and Ireland must be handled carefully. The view presented in the *Flores* that the epizootic started in the north of Britain and worked its way south is certainly wrong, as Trokelowe, a contemporary, the account years of several manorial records, and Fordun's record, also contemporary, indicate.[35] The specification of the *Eulogium Historiarum*, though only near contemporary, that the disease had run its course first in the south before it did so in the north is certainly correct.[36] One will have noticed that various English chronicles vary in the dating of the epizootic's first appearance, some noting 1318 and others 1319. While no universal dating system was in place and as controversy surrounds the dating of the year of individual texts, we can be certain the 1319 was the year when the epizootic first hit England, for, as we shall see, it is for the manorial account year of 1319-1320 that the epizootic disease first appears on record. Kershaw follows Trokelowe and most contemporary records placing the arrival of the cattle epizootics in Britain at Essex, precisely at Easter, 1319.[37] And Kershaw concluded that it was probably imported from the continent.[38] This is most certainly correct. And that the disease was in at least southern Scotland by the end of 1319 is confirmed by the same means, as was seen above. In 1320 the disease continued to rage throughout the north as the letter from Bolton Priory indicates.[39] In 1321 the disease was still seen in Scotland, as Fordun reports, and then in Ireland, as the Irish Annals relate.[40] Though it is agreed that the Irish Annals dated their years from the start of January,[41] it

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[35] *Flores Historiarum*, 186-187.

[36] *Eulogium Historiarum*. This was copied later by Capgrave, as indicated above.

[37] The proper temporal dating is often incorrectly cited. Kershaw, however, does present the most plausible dating of first epizootic.

[38] Kershaw, "Great Famine," 14.

[39] *Historical Papers and Letters*, ed. J. Raine (London: Longman, 1873), 307. The letter complains of the 'universal epizootic.'

[40] Bower, *Scotichronicon*, 1,010; see all of the Irish Chronicles.

[41] *Annals of Loch Ce*, liii. The Irish annals used the skeleton of *Annals of Tighernach* to the time of the four masters (before our period), adding additional information gleaned from local monasteries for our period. At the temporal departure from the *Annals of Tighernach*, differences are distinguished in all of the annals, as is clear here. *Annals of Loch Ce*, xl-xlii.

remains unclear precisely when the epizootic arrived in Ireland in 1321 and how it was then disseminated.

The geographical scope of the chronicle and annalistic evidence is also somewhat ambiguous, as is any indication given to the extent of mortality. Most entries refer to whole countries of interest and speak of universal deaths. While the site of composition for most contemporary texts is relatively certain, we cannot definitively conclude that the epizootic was active in those precise locations. Nor can we simply accept a conclusion of universal mortality. The mortality of herds will be dealt with below, but with respect to geographical dimensions we can generally conclude that the disease was on the continent first,[42] then in England in 1319, probably spreading from southeast to northwest, Scotland later the same year, Wales in 1320, and Ireland 1321.[43] Surviving manorial accounts will now substantiate these specifics.

The studies of several English manorial accounts that cover the famine years illuminate both the extent of the devastation wrought by the cattle disaster and the temporal and geographical parameters of its dissemination. Indeed, the manorial accounts substantiate the annalistic and chronicle evidence. The accounting years of 1319-1320 and 1320-1321 reveal great losses of stock in areas all over England.[44] From these records and annalistic evidence we can infer that similar devastation occurred on the fringe. While we cannot assume that all deaths resulted from epizootic disease we can infer the vast majority did, as mortality patterns were in those years wholly abnormal (see table I). The mortality of herds presented here in table I will be fundamental to the arguments of Chapters IV and V.

Oxen herds at Bolton Priory fell from 139 to 39 and cattle fell from 225 to 31 in 1319. Though subject to Scottish raids and forced to make some sales, the aggregate decline in Bolton herds in the accounting years of 1319-1320 and 1320-1321 is unprecedented and must be result of the epizootic. The number of oxen fell from 200 to 53 and cattle from 450 to 31 in a two-year

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[42] As based on the abovementioned continental sources and readings of Lucas, "Great European Famine," passim.

[43] The precise dating for Wales is difficult to discern but the epizootic seems to have arrived in 1320.

[44] For reasons expressed in Chapter IV, it is clear that similar numbers will be found in future studies of manorial accounts.

period.[45] Bailey reports similar declines at several Breckland manors.[46] Ely too was devastated by cattle epizootics, as were several estates in Norfolk.[47] The manors at Tutbuty and in Derbyshire also reported "severe shortage of stock" in 1319.[48]

On the manors of Ramsey Abbey herds were greatly reduced. At Broughton the herd went from fifty-four to six, at Upwood from forty-seven to two, and at Houghton from sixty-five to nine.[49] The estate at Beddingham reported twenty-one losses in a herd of twenty-nine.[50] Another abbey in the south lost thirteen of eighteen cattle.[51] And as Raftis noted, in September of 1319 the abbot complained that 'a sudden pestilence destroyed his herds and continues to rage in the area.'[52]

In 1320-21 several manors belonging to Merton Collage Oxford were devastated: at Cheddington the oxen herd was reduced from fourteen to four while the cow herd fell from nine to three. At Thorncroft the losses were not as bad yet the "sudden death" was brought to seven of the fifteen oxen, both of the bulls, four of thirteen cows, and four of nine calves. At Cuxham losses were also less severe, oxen dropped from thirteen to nine and cows nine to five, as well as the three calves and a bull dying. Further west, the manor of Langwm's oxen herd fell from thirty-three to twenty-six.[53]

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[45] Kershaw, "Great Famine," 25-26; idem, *Bolton Priory*, 96, 98.

[46] M Bailey, *A Marginal Economy? East Anglian Breckland in the Later Middle Ages,* (Cambridge: Cambridge University Press, 1989), 201.

[47] M. Colemann, *Downham-in-the-Isle: A Study of an Ecclesiastical Manor in the Thirteenth and Fourteenth Centuries,* (Suffolk: Woodbridge,1984), 94, 130; Campbell, *English Seigniorial Agriculture,* 167-168.

[48] S. Wright, "Barton Blount: Climatic or Economic Change?" *Medieval Archaeology* 20 (1976): 149; Jordan, *Great Famine,* 38.

[49] J. Raftis, *Estates of Ramsey Abbey*, (Toronto: University of Toronto Press, 1957), 137.

[50] Mate, "Agrarian Economy of South-east England," 86.

[51] Ibid, 86.

[52] Raftis, *The Estates of Ramsey Abbey*, 137-140, 319; Kershaw, "Great Famine," 24.

[53] Kershaw, "Great Famine," 24-27.

In the south, total oxen herd of estates of Winchester in 1319-1320, despite making "considerable purchases" in the same accounting year, fell from 1088 head to just under five-hundred.[54] Most of these deaths are rightly attributable to epizootic disease. At Crowley little evidence survives but it is clear that only four oxen remained in 1321, the lowest number in its records, which survive in an uninterrupted series from 1208 to 1449. And on four Crowland manors the number of oxen is lower than ever before recorded.[55]

Table I. The known mortality of various English herds from the 1319-1322 epizootic

Location	Pre 1319-1322 epizootic herd Size	Cattle lost	Percentage of herd lost
Broughton	54	48	89%
Upwood	47	45	96%
Houghton	65	56	86%
Beddingham	29	21	72%
Cheddington	23	16	70%
Thorncroft	39	17	56%
Cuxham	26	12	46%
Langwm*	33	7	21%
Winchester estate total	1088	608	56%
Bolton Priory	750	666	89%

Average loss with * = 68 percent

Average loss without * = 73 percent

* An anomaly.

Undoubtedly herds were not always kept together, as will be discussed in Chapter IV. Some animals were consequently spared, causing irregularities in the mortality percentages. That there could be a pathogenic explanation for the mortality percentage variances is highly unlikely, as will be discussed in Chapter IV.

The great mortality of stock is clearly represented in table I. An average loss of 68 to 73 percent is quite substantial; such a percentage was likely, for reasons discussed in Chapter IV, common throughout England. The variances of herd mortalities evident in table I, however, will

[54] J. Titow, *English Rural Society, 1200-1350,* (London: Routledge, 1969); Kershaw, "Great Famine," 25.

[55] Kershaw surveyed Page's early work. Ibid, 28.

be further dealt with in Chapter IV.

Intensified cattle mortality did not stop in 1322. A second epizootic appears after that of 1319-1322 in 1324 and 1325 in Ireland, as noted above. It then appears in southern England in 1325-1327. Though less documented than the first epizootic, a fact likely the result of the already low numbers of stock as result of the previous epizootic, the second epizootic took its toll in the areas not clearly known to be afflicted by the first epizootic: in the account year of 1326-1327 Christ Church, Canterbury, reported losses of 257 oxen, and 511 cows.[56] In a letter from October 1327 the Archbishop of Canterbury complains of great losses of stock, both *boves* and *vaccae*, and provides a catalogue of the losses for each estate. On the twenty-five listed estates, hundreds of oxen and cattle are reported lost due to *morina*, murrain, numbers that comply with the surviving manorial records of the 1319-1322 epizootic.[57] From this fact we can infer that the second epizootic was of the same disease as the first. Manors in the Skipton area of West Riding and in Breckland also indicate similar losses.[58] And in the mid 1320s the abbot of Westminster complained that St. James hospital was not sustainable "on account of the mortality of animals and the poverty of their resources."[59]

Little attention in manorial studies has been given to stock quantities after the great famine and before the Black Death. As such, little can now be said regarding the second English epizootic of 1325-1327. The chronicles of the period offer little; only Walsingham (who wrote roughly ninety years after the fact) records 'a great mass of cattle dying of thirst' for the mid 1320s.[60] The second epizootic appears not to have afflicted the continent or northern Britain. At

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[56] R. Smith, *Canterbury Cathedral Priory*, (Cambridge University Press: Cambridge, 1943), 126-125.

[57] *Literae Cantuarienses*, vol. 1, ed. J. Sheppard (London: Kraus, 1965), 243-245. All of these cattle loses seem unrelated to the severe flooding Christ Church suffered in 1324-1325. M. McKisack, *The Fourteenth Century, 1307-1399,* (Oxford: Clarendon Press, 1959), 329.

[58] Kershaw, "Great Famine," 43; Bailey, *A Marginal Economy?*, 204.

[59] Cited by Kershaw, "Great Famine," 30 n. 147.

[60] That a mass of cattle would die of thirst is highly unlikely. Disease undoubtedly would have played a role. Fleming, *Animal Plagues,* 95; M. Livi-Bacci, *Population and Nutrition: An Essay on European Demographic History,* (Cambridge: Cambridge University Press, 1990), chap. 2.

present it is safe only to say that it swept Ireland and southern England. It is clear however that these were not the last of the early fourteenth-century epizootics. A third period of mass cattle losses appears in the mid 1330s. In 1335 Henry Knighton records a 'great death of cattle.'[61] Then in 1336 the Annals of Ulster report that a 'great portion of cattle were lost.'[62] Then interestingly, Iceland's *Annalar Islenzkir* also report 'a great destruction of cattle' for 1336.[63] The Annals of Connaught also record "a great plague upon the cattle of Ireland" for 1339.[64] This, however, may have been meant for 1336 as the passage continues with the exact temporal limitations used by the Annals of Ulster for the cattle destruction, "from winter until spring had commenced."

It is important to note that each of these later entries described great cattle destructions within the context of weather anomalies. Knighton records heavy rain and failing crops in England preceding the cattle deaths in 1335, similarly the Annals of Ulster record 'a great plague of snow and of frost' and 'the ruin of grass and corn-fields' as the catalyst of cattle deaths in Ireland in 1336. The *Annalar Islenzkir* recount 'a great storm of rain' as the cause for the cattle losses in 1336 and, lastly, the Annals of Connaught record much snow, frost and crop failures as the agents of cattle destruction in 1339. We can rightly assume, however, that only through the medium of nutrition, result of harvest failure, would weather itself have caused a great destruction of cattle, as will be discussed below.[65] It is more likely that disease was responsible here for mass deaths of malnourished cattle. The 1319-1322 epizootic erupted in malnourished herds as did that of 1324-1327, and so it seems the epizootic of the mid 1330s. As conditions for

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[61] Fleming, *Animal Plagues,* 96.

[62] *Annals of Ulster*; Fleming, *Animal Plagues,* 96.

[63] *Annalar Islenzkir*, ed. G. Jonsson (Islendingasagnautgofan: Haukadalsutgafan, 1948). Translation provided by Fleming, *Animal Plagues,* 96.

[64] Fleming, *Animal Plagues,* 97.

[65] Inclement weather can of course account for the death of some livestock but is not likely to have accounted for a 'great destruction' of cattle. Cattle can drown yet epizootic disease is more conceivably accountable particularly since we know that it was contemporaneously lingering in the British Isles and Iceland. More discussion on this is presented in Chapters IV and V.

crop failures are reported in the 1330s and as mass deaths do not occur as result of starvation,[66] the epizootics of the 1330s, by all indications, were result of epizootic disease. This is supported in Chapter IV. The temporal progression of these cattle loses from England to Ireland to Iceland further supports the identification of an epizootic. The geographical dimensions of the epizootic of the 1330s, however, are impossible to determine at present.[67] Their presence on the continent will only be discerned with further research. The reappearance of cattle disease in Britain may be explained by the lingering of cattle epizootics in the dense yet remote cattle populations of Ireland. Alternatively, the disease may have found a temporary reservoir in wild animals. Potentially small and unrecorded outbreaks could have occurred between 1321 and 1324, keeping the strain active, and accounting for the transmission to southern England in 1325.[68] A similar situation may have allowed for the epizootics of the 1330s.

After chronicles, annals, a few letters, and manorial accounts, additional, though indirect, source material remains: price indices and contemporary agricultural treatises. Price indices do not all that clearly illuminate the cattle or sheep epizootics, and one scholar has already warned against their use to identify stock disease. Price movements are determined by variables other than the actual available quantity of the product; they are not a "simple surrogate" for the identification of disease.[69] And although the price of livestock, stock products, and grains rose after 1305 in England due to depreciation of the currency and the 'large influx of foreign silver into the coined sterling,' peaks do appear outside years of monetary interest, as Trokelowe complained the price of many products sky rocketed during the famine.[70] Yet as we already know when epizootic disease was prevalent, a glance to the available price data may prove

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[66] Livi-Bacci, *Population and Nutrition,* chap. 2.

[67] The inability of some areas to restock from the 1319-1322 and 1325-1327 epizootics may have limited the spread of the epizootic of the 1330s.

[68] The importing of epizootic disease from Ireland to England may have been result of the growing significance of Irish hides in England.

[69] Jordan, *Great Famine,* 204 n. 114, 205 n. 121.

[70] Trokelowe complains that even horse meat prices soared, Trokelowe, *Annales*, 89, 92, 94; Kershaw, "Great Famine," 6, 9; Jordan, *Great Famine,* 204 n. 114.

enlightening. Rogers and Farmer have studied the live, meat, cheese, and milk prices of cows and oxen in our period.[71] Farmer, covering the period from 1208 to 1325 and using largely the indices of Winchester but also those of many other areas of southeast and central England, finds the period of 1319-1322 to match the highest prices of live cow or oxen in his entire period of study.[72] The average price level of live oxen throughout his period sits around 11s, and 8-9s for cows. In 1309, 1315, 1316, 1321, 1322, and 1323, however, the price of live oxen went over 17s, and in 1317, 1321, 1322, and 1323 cows also hit maxima.[73] The decade 1315-1325 represents by great measure the highest national price levels for oxen and cows in Farmer's period.[74] Farmer further notes that cow and ox prices rose only slightly when the famine struck but, not knowing that the cattle epizootics occurred at the famine's end, makes no comment for the slight but sudden price rise in cattle prices at the end of the famine.[75] 1321-1323 mark the only years when both the prices of cows and oxen peaked. The commonality here indicates that the same dynamic affected both, which, by all indications, was epizootic disease. Cheese prices are their highest in Farmer's period of study during and in the immediate wake of the Great European Famine: the peak years were 1315, 1319, 1320, 1324, 1325 (where his study stops).[76] Farmer attributes the general rise of product and livestock prices in the early fourteenth century to inflation.[77] While in

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[71] A great wealth of work exists on late medieval northern grain prices. For a survey see Hatcher, "England," passim. Farmer's work is seen by most to be superior to Rogers.

[72] Farmer, "Livestock," 1-5. The thirteenth century was marked by a serious of debasements causing rising prices to fall rapidly on several occasions. Yet this was unlikely to have any great effect on our scale of price indices. Farmer, "Livestock," 12. His work covers South Hampshire, the North Downs, the Upper Thames, Wiltshire, Somerset, the Lower Thames and London, the Cotswolds, the Chilterns, Kent, the Severn Valley, Essex, Norfolk, Suffolk, Cambridge, and the East Midlands.

[73] Ibid, cf. 2 and 3. 1309, 1315, and 1316 represented nothing peculiar in concerns to cattle prices.

[74] Ibid, 11.

[75] Ibid, 14. Farmer considers a variety of factors exerting influence on price fluctuations but does not acknowledge the presence of parasitic disease. Ibid, 16.

[76] Ibid, 5.

[77] Ibid, 16. Prices rise after 1310 but peak in 1319, 1320, 1321 and 1322.

general this may be the case seeing how the post 1305 period altogether appears to be a new period in the history of prices, the sudden price increase in a variety of cattle and cattle byproducts fits very nicely with sudden appearance of epizootic disease.

Cattle prices for Scotland, though extremely patchy and not representative of the entire kingdom, indicate similar movements. Gemmill and Mayhew have identified prices in 1311 for a single live cow as 5s. The next price is for 1328 and stands at 10s, the next, 1334 stands at 9s, then 1336, 7s, then 1337, 5.5s.[78] Prices for oxen are seemingly less volatile. In 1306 one live ox went for roughly 10s, in 1328, 14s. The price then fell to around 9s in the early 1330s, to spike again in 1335, hitting 13.3s.[79] Though precise price hikes are not discernable, it is clear that prices of both cows and oxen rose over our period of concern in Scotland.

The extent of the epizootics, in particular the first of 1319-1322, is readily clear. Yet one might hope to find more relevant information on this occurrence or epizootic disease in general in veterinary material. The body of extant veterinary material for the medieval West, however, is quite small relative to that of antiquity and the Renaissance. No relevant medieval agricultural or veterinary material survives that was composed after cattle epizootics in the fourteenth-century.[80] While Fitzherbert talks at length on epizootic disease in his Tudor period treatise, which will be discussed below, Walter of Henley speaks only of the sheep rot in his late thirteenth-century *Husbandry*.[81] The agricultural *Rules* of Robert Grosseteste of the mid thirteenth-century, the

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[78] E. Gemmill, and N. Mayhew, *Changing Values in Medieval Scotland: A Study of Prices, Money, Weights and Measures*, (Cambridge: Cambridge University Press, 1995), 251.

[79] Gemmill and Mayhew, *Changing Values,* 259.

[80] This is surprising since society relied on animals and, consequently, animal health. Adams in his study of Roman veterinary practices commented "if horses, mules and donkeys were to the economy of the Roman Empire what motor vehicles are to modern economies, then it would seem to follow that the ancient horse doctor was an important in his time as the motor mechanic is today." Adams, *Pelagonius*, 1.

[81] This supports the view that epizootic sheep disease needs to be treated in a different temporal period than that of cattle. *Walter of Henley's Husbandry*, in *Walter of Henley's Husbandry together with an anonymous Husbandry, the Seneschaucie, and Robert Grosseteste's Rules,* ed. Camand (London: Longmans, Green, and Co. 1890). Camand suggests Walter wrote between 1275 and 1280.

anonymous *Seneschal* of no later than 1307, and a surviving anonymous husbandry around 1300-1310 all, like Walter's work, detail the common practices of contemporary husbandry and the agricultural structure of English estates but make no mention of cattle disease.[82] Petru de Crescentiis' *Ruralia Commoda*, around 1309, speaks of isolated cases of sheep, swine, and cattle sickness and even offers cures but mentions nothing of epizootic disease.[83] General cattle illness does not seem to have been a common threat prior to 1319 as the abovementioned chronicles illustrate. In all cases it seems the outbreak of disease on the continent in 1318 and in Britain 1319 was truly of unheard communicability and acuteness; it was most surely, like the human pestilences of the famine, as Trokelowe noted, something for which no contemporary had a cure.[84]

It will be vital to consider these points in Chapter IV. But it is important to note here, that not all estates or manors, for which there are secondary studies, record disaster amongst their cattle and oxen herds.[85] Thus, in Chapter IV, we must ask what factors conditioned the

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[82] *Rules of Robert Grosseteste*, in *Walter of Henley's Husbandry together with an anonymous Husbandry, the Seneschaucie, and Robert Grosseteste's Rules,* ed. E. Camand (London: Longmans, Green, and Co. 1890. p 121-150.); *Husbandry*, in *Walter of Henley's Husbandry together with an anonymous Husbandry, the Seneschaucie, and Robert Grosseteste's Rules,* ed. E. Camand (London: Longmans, Green, and Co. 1890.), xli; *Seneschal,* in *Walter of Henley's Husbandry together with an anonymous Husbandry, the Seneschaucie, and Robert Grosseteste's Rules,* ed. E. Camand (London: Longmans, Green, and Co. 1890), xix.

[83] Petrus de Crescentiis, vol. 1, chap. 13; vol. 3, chap. 66 and 73. See the discussion given to sheep epizootics in the introduction.

[84] "Nec potuit in hac pestilential contra praedictos morbos prudential physicorum, prout antiquitus solebat, aliquod congruum in arte sua reperire remedium" Trokelowe, *Annales,* 92. No knowledge of the epizootic cattle diseases is apparent in the extant record. If a 'cure' was known it was obviously not successful. Moreover, the ability to effectively and efficiently spread knowledge of a cure once the disease erupted did not exist.

[85] Whether a decline of stock is reported but not in connection to disease remains to be seen. *Moraine* does appear though in regards to the death of single animals in several years in several published account books. For example see, Harvey, *A Medieval Oxfordshire Village.* Though some estates do not seem to be adversely struck, very few experienced periods of growth in the famine and post famine period. Kershaw, "Great Famine," 35. Though we should not argue from silence, it is noteworthy that the *Annals of the Four Masters* and the *Vita Edwardi Secundi* note no instance of epizootic cattle disease. *Annals of the Kingdom of Ireland by the Four Masters*, ed. J. O'Donovon (Dublin: Hodges, Smith, and Co., 1851). That the *Vita Edwardi Secundi* would

pathogen's dissemination and in so doing consider trade, husbandry, and cattle population densities; to simply assume that all areas were devastated, or, conversely, that the abovementioned cases were isolated, would be naïve.

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make no note of the murrain is exceptional as it details the earlier dearth, storms, and sheep murrain of 1315-1316. *Vita Edwardi Secundi*, 238-269. It should also be noted that the *Annales Londonienses*, which records the famine and human pestilence of 1316 and is a popular source for the famine, is missing entries for the period stretching 1317-1327.

CHAPTER IV

Speculation on the active pathogen

Historians have often without any scientific discretion or appreciation for epidemiological criteria superimposed onto historical epidemics diseases isolated and classified only by nineteenth- and twentieth-century science.[1] They do not recognize that diseases have the ability to mutate significantly over time, changing modes of dissemination and symptoms. The ability of most, moreover, to exist in all climates and environments is profoundly limited. It is thus a mistake to suggest uncritically that a certain disease prevailed without acknowledgment of its biology and epidemiology.[2] Such uninformed labeling of an epidemic or epizootic only mars our understanding of the past. Historians can contextualize an event and read relevant sources while scientists can discuss the epidemiology, adaptability, and evolution of particular diseases. In any study of historical epidemics or epizootics it should be understood that it is most fruitful to combine both disciplines as best as one can and to be prepared to engage informed criticism from both sides.[3]

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[1] The most notorious example concerns the Black Death which was labeled, without any consideration of the historical sources, bubonic plague, *Yersina pestis*, only a few years after *Y. pestis* was first isolated and classified by Alexandre Yersin in Hong Kong in 1894. Historians have for over a century grappled with the epidemiological inconsistencies between the sources of the Black Death and bubonic plague as known to modern science. See Cohn, *The Black Death Transformed*, chap. 1.

[2] Strathokopolous has very recently suggested the opposite, arguing that it is better for the historian to stick to what he knows best and, in short, to attach whatever pathogen he or she wishes to an historical epidemic. D. Stathakopoulos, *Famine and Pestilence in the Late Roman and Early Byzantine Empire: A Systematic Survey of Subsistence Crises and Epidemics,* (London: Ashgate, 2004), 6-8. This of course only confuses the past and assumes a great deal in concerns to the historically active pathogen's mortality, morbidity (the rate of infection, or the rate of the appearance of symptoms, among a population), modes of transmission, and thus impact.

[3] It is significant to note that erroneous disagreements have resulted in historians using a small number of scientific and medical field manuals in their studies, to explain the epidemiology of various diseases. One must consult and bring awareness to a variety of manuals and keep in mind that differences between them result from the fact that no disease

Here I shall catalog the suggestions and in some cases labels applied to the early fourteenth-century epizootics by a few historians, in order to provide as concrete an identification as possible. This will be done with considerable aid of epizootiological studies and discussions with Dr. Roeder, chief virologist for the UN's Food and Agriculture Organization. The secure identification and isolation of the likely pathogen allows one to apply its epidemiology, in our case, namely its communicability and mortality patterns, onto the host demographics, distribution, and potential modes of dissemination at the time in question.[4] One must not selectively cut and paste particularities of a disease's epizootiology –again known only to modern science– onto a historical epizootic but rather test how accurately the epizootiology of an historical event as evident in the extant sources fits one by one the epizootiology of diseases known to modern science. Due to the nature of the sources, no fit will be complete, yet most pathogens can be eliminated from consideration. One may also suppose that a disease active in the past may not have been active since the advent of modern science.[5] Yet while new diseases (such as BSE) seem to crop up with changes to husbandry, human and animal populations, and food production, the natural diminution of diseases without human intervention, drastic changes to stock populations, or the incurring of immunity, is rare.[6] And while it is fallacious to assume that all diseases known today existed in the same state in the past, as transmission and symptoms change, it is known that the structures of some pathogens undergo significantly less change than others, as will be discussed below. In this manner ancient records of epizootics are particularity useful: if solid evidence exists for a pathogen in early-modern and Roman Europe it is then most

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is static in symptom or dissemination.

[4] Suggestions and labels of modern historians of late medieval epizootics have not in any way been scientifically explored or tested.

[5] An argument of D. Davis sometime ago; "nearly all writers assume that these pestilences that are in existence at the present time, and hence in their studies have attempted to identify the disease with one of our modern plagues" D. Davis, "The Human-Animal Diseases," *The Scientific Monthly* 39 (1934): 63-64.

[6] Polio and small pox, for example, were only eradicated by human agency. Similarly, Rinderpest no longer afflicts western European cattle due to inoculations.

probably that the disease may have continued to afflict animals throughout the medieval period. Though Trow-Smith noted that "very little is known of the diseases of cattle in the medieval period," significant advancements are possible via careful and interdisciplinary methodology.[7]

We must first isolate the few epizootiological facts evident in the sources. While sources tell little of the pathogen's symptoms and aetiology we are not entirely helpless: relatively safe identifications can sometimes be made based on environmental and demographic information. First, the mortality: great masses of cattle died and they died quickly; the sources do not in one instance indicate that cattle or oxen fell sick and then recovered, though they do clearly indicate that no entire herd was lost. And if we take specifics of the chronicle evidence seriously, we may add that death resulted after a short period of sickness as the *Evil Times of Edward II* and the *Chronicon Lanercost* indicate.[8]

Second, the afflicted species: it is important to note that only cattle perished in this epizootic and that swine, horses, other ruminants (sheep, goats), and humans were not affected.[9] Third, speed: the spread of the panzootic was quick, reaching Ireland from central Europe in a

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[7] Much more has was said about the virtues of animals than their maladies. J. Salisbury, *The Beast Within, Animals in the Middle Ages,* (New York: Routledge, 1994), 94, passim. Swabe, like Trow-Smith, points out that very little was written of livestock disease during the Middle Ages. Swabe, *Animals,* 62. In fact, little comment exists on the aetiology of most pre-industrial epizootics. Swabe, *Animals,* 62. Wilkinson also has stated, "there are few dependable records for animal diseases and deaths before the nineteenth century." See, Wilkinson, *Animals and Diseases,* 377; the famous epizootiologist Moule, moreover, stated, "for those concerned with the history of epizootics, interpreting the nature of the disease is made difficult by the brevity of the descriptions." See Blancou, *Transmissible Animal Diseases,* 331. The extant sources alone do not provide adequate details to definitively isolate a particular pathogen, as is perhaps not surprising to the medievalist. But that little material survives regarding medieval cattle disease should not lead one to believe that cattle epidemics were purely 'local' in nature, as Trow-Smith concluded. Trow-Smith, *History of British Livestock,* 129-130. See also, A. Lucas, *Cattle in Ancient Ireland,* (Ireland: Boethius Press, 1989), 38.

[8] See Chapter III.

[9] Jordan states that the outbreaks affected 'basically' cattle and oxen in 1319-1321. We can be sure, however, that no other species was affected; Jordan misread Kershaw who makes the point quite clear. Kershaw, "Great Famine," 14.

period of roughly three years and southern Scotland from southern England in less than year.[10] The disease was also highly communicable. Total mortality of herds reached nearly one hundred percent in some cases, as seen in Chapter III. Fourth, the area afflicted: the disease restricted itself to temperate Europe, an area then experiencing a period of frequent heavy rains (1314/5-1316) followed by a cooling in climate and drought (1317-1319), immediately afterwards.[11] The epizootics thus appeared in areas experiencing significant weather anomalies and were limited to the area earlier affected by crop failures and human famine. They can thus be assumed to have occurred in herds undoubtedly suffering some degree of malnutrition (particularly in those areas discussed in Chapter II where cattle competed with humans for crops. In these areas humans, of course, ate before stock). The epizootic did not spread to southern Europe,[12] an area at this time free of famine. Fifth, its dissemination: the pestilence spread westward and did not erupt contemporaneously at different locations. This of course implies a further, sixth, point: as noted all along, the pestilence was epizootic and not enzootic; the disease flared up in a region, ran its course and disappeared for the remainder of the fourteenth-century, at least from northern England and Scotland. The reappearance of epizootic disease in southern England and Ireland on several occasions is a complicated matter to be dealt with later.

As far as epizootiology goes, this is virtually all we have; neither archaeozoologists nor microbiologists have, to my knowledge attempted to isolate epizootic pathogens in pre-industrial Europe.[13] However, present-day veterinary science knows only four epizootic diseases afflicting

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[10] The epizootics speed was also noted by the *Poem of the Evil Times of Edward II*, 342-344. The distance from Berwick to London is three hundred kilometers. J. Maddicott, *Thomas of Lancaster, 1307-1322,* (Oxford: Oxford University Press, 1970), 163.

[11] Jordan, *Great Famine,* 7-24.

[12] From a survey of Spanish and Italian chronicles it can be said that the epizootic disease indeed did not appear in southern Europe, as Kershaw and Jordan pointed out. Kershaw, "Great Famine," 10-12; Jordan, *Great Famine,* 34-35.

[13] It is theoretically possible, however, to isolate the active pathogen of the fourteenth-century epizootic, particularly with the new developments in the last decade in microbiology. See, Swabe, *Animals,* 62; J. Baker, and D. Brothwell, *Animal Diseases in Archaeology*, (London: Academic Press, 1980), 173-175. Attempts have likely not been made as epizootics have received little scholarly attention. With such investigations much more could be done with the

cattle and oxen: Foot-and-mouth, Anthrax, Contagious Bovine Pleuropneumonia and Rinderpest.[14] Though, as Fisher reminds us, 'the certainty of science is often an illusion,' we can effectively eliminate the first three of the four options.[15] Whether the remaining, Rinderpest, is applicable will be questioned on microbiological grounds with the aid of Dr. Roeder.

Foot-and-mouth disease (FMD)

Recognized by most virologists as the most contagious known animal disease, FMD possesses a morbidity rate close to a hundred percent.[16] In late nineteenth-century Britain heavy quarantines and protectionist measures against imports effectively eliminated the threat of Rinderpest and Contagious Bovine Pleuropneumonia but did little to stop FMD.[17] Grant and Astill have suggested that it was active in the late medieval epizootics.[18] But despite being more communicable then the others, Foot-and-mouth disease can be effectively ruled out of the fourteenth-century situation on very solid grounds of mortality and incidence. As Abigail Woods has recently illustrated, FMD rarely kills even in malnourished animals but rather results in

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medieval epizootics. Work has, however, recently begun under historian Michael McCormick and microbiologist Michael Drancourt to isolate the pathogen responsible for the sixth- and seventh-century Justinianic Pandemic. See, M. McCormick, "Complexity, chronology and context in the early medieval economy," *Early Medieval Europe* 12 (2003): 307-310, n. 4. There has been some focus on chronic animal diseases in medieval livestock. See Baker and Brothwell, *Animal Diseases,* 1-10.

[14] Fisher, "Economic Effects," 278. It should perhaps be noted again that BSE could in no way be responsible as it is not highly infectious or communicable. Moreover, see INTRODUCTION n. 2, 3.

[15] Large developments are an ever constant in the sciences. 'Rules,' however, are frequently augmented, contracted and discarded. Fisher, "Cattle Plagues," 225.

[16] Steele, *Animal Disease*, 18. FMD has been the most difficult epizootic cattle disease to control since the advent of quarantine policies, stamping out procedures, and medical science.

[17] Fisher, "Economic Effects," 284-285, 291-293; Halpin, *Patterns*, 61; B. Balassa, *Bibliography of Foot-And-Mouth Disease in Man, 1695-1965*, (New York: US Department of Agriculture, 1966).

[18] Astill and Grant, "Medieval Counrtyside," 216. Grant applies FMD to the fourteenth-century sheep and cattle epizootics. Grant, "Animal Resources," 154.

prolonged sickness, debilitation, termination of milk production, frequent abortion, and eventual recovery.[19] Its great socioeconomic impact is not the result of widespread mortality but prolonged production disruption. Second, FMD outbreaks usually occur at the same time in cattle, sheep and often swine.[20] Neither condition prevailed in early fourteenth-century Britain. Furthermore, the disease is now considered to be a phenomenon of early modern origin.[21]

Anthrax

Usually the first cattle disease to spring to mind, Lucas, Jordan and Lyons have connected anthrax to the 1319-1322 epizootic.[22] Anthrax, however, is mainly a disease of swine. If present on a 'wide scale,' however, the disease can also effectively infect and kill, cattle, sheep, horses, and humans.[23] A bacterial zoonose, the disease is spread through ingestion or via skin abrasions. It can survive for considerable lengths of time in soils and has a mortality rate of over ninety-five percent.[24] Due to the rather low morbidity rate of anthrax, and to the temporal disjunction between sheep, human and cattle pestilences during the early fourteenth century, the disease does not seem a likely cause of the early fourteenth-century cattle epizootics.[25]

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[19] Abigail Woods, *A Manufactured Plague?*; idem, "The Construction of an Animal Plague;" Steele, *Animal Disease*, 18-19. In 2001 ten million animals (mostly healthy) were preemptively culled due to Britain's dated 'stamping out' policies. Woods, *A Manufactured Plague?,* 140. Whether or not the disease would have been fatal in less closely managed and nourished medieval stock remains to be seen.

[20] Steele, *Animal Disease*, 19. The 1967 and 2001 FMD epizootics started in swine and later flourished in cattle and sheep. Woods, *A Manufactured Plague?,* 108, 131.

[21] See Blancou, *Transmissible Animal Diseases,* 53, 73, who believes Foot-and-Mouth is first seen in Girolamo Francastoro description of an epizootic of 1546 in Italy.

[22] Jordan, *Great Famine,* 35-38; Lucas, "Great European Famine," 59; M. Lyons, "Weather, Famine, Pestilence and Plague in Ireland, 900-1500," in *Famine the Irish Experience 900-1900: Subsistence Crises and Famines in Ireland,* ed. E. Crawford (Edinburgh: Edinburgh University Press, 1989), 43, 63-64.

[23] Domesticated birds, however, are not infectable. K. Hartment, *et al. Zoonoses, Infectious Diseases Transmissible from Animals to Humans,* 3rd edition. (London: AMS Press, 2003), 173.

[24] Hartment, *Zoonoses,* 174.

Contagious Bovine Pleuropneumonia (CBPP)

CBPP, an acute respiratory illness, has yet to be proposed as the agent active in the fourteenth-century epizootics. Its neglect is perhaps warranted as it fits poorly. Though greatly affected by malnutrition, the disease is more common in southern than northern Europe (though some outbreaks in England and Scandinavian have occurred) and possesses a mortality rate that rarely exceeds seventy percent. Compared to Rinderpest the impact of CBPP in modern Europe has been small. In the greatest English outbreak, in 1860, two hundred thousand cattle are reported to have died from the disease.[26] Morbidity rates reach close to those of FMD in pastured herds. The virus can spread over a kilometer in a suitable cool dry climate. And of domesticated European stock, only cattle are affected.[27] Yet by all indications the disease is a recent phenomenon dating from the nineteenth-century. No record of it exists in antiquity.[28]

Rinderpest

Without any reference to epidemiological criteria, Kershaw stated that the early

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[25] Anthrax has been haphazardly suggested by Twigg as the pathogen behind the Black Death. See G. Twigg, *The Black Death*: *A Biological Reappraisal,* (London: Batsford Academic and Educational, 1984), 218.

[26] Blancou, *Transmissible Animal Diseases,* 133, 155.

[27] D. Majok, *Recognizing Contagious Bovine Pleuropneumonia*, (Rome: FAO, UN, 2003), 2-10; Schnurrenberger *et al.*, *Attacking Animal Diseases,* 40-41; Blancou, *Transmissible Animal Diseases,* 155.

[28] See Blancou, *Transmissible Animal Diseases,* 155. Blancou has uniquely stated that CBPP possesses 'an unclear presence in antiquity.' Most have denied its existence prior to the nineteenth-century. In a greater study the latter concept may be reworked. Blancou has, in fact, though with little discussion, stated that the earliest undenieable record of CBPP stems from Fitzherbert's *Boke of Husbandry* of 1523 and Agostino Gallo's *Treatise on Agriculture* of 1550. Blancou, *Transmissible Animal Diseases,* 133, 155-156.

fourteenth-century outbreak was probably Rinderpest.[29] Jordan, Campbell and Davis and Kissock have since followed his lead.[30] Though they all accepted Rinderpest on the basis of no scientific evidence, there may be some validity in their claims.

Rinderpest is a famous disease, a frequent pestilence of eighteenth and nineteenth-century north Western Europe, when it claimed hundreds of millions of cattle.[31] The UN and World Organization for Animal Health both list the pathogen as one of the two most devastating known to today's science, as a severely dangerous 'transboundary malady.'[32] Combating it gave rise to the legislative and administrative constructs of today's western concepts of animal disease control, to modern medical animal science, as well as 'significantly improving the image of the veterinarian profession.'[33] It is not surprising that the disease has received much medical attention and as such that some have naively suggested its prevalence in the early fourteenth century. Yet what is known of Rinderpest does match each of the criteria identifiable in the

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[29] Kershaw, "The Great Famine," 24.

[30] Jordan stated that the "best work" indicates Rinderpest, citing Kershaw. Kershaw, however, spent no time qualifying his selection of Rinderpest. Jordan first preferred Rinderpest over anthrax, following Kershaw, but then later left the door open to other diseases 'flourishing with it' and then, yet later, went so far as to state that anthrax "probably aggravated" the disease of the epizootic in Ireland. Jordan, *Great Famine,* 36, 38-39; Jordan, *Europe in the High Middle Ages,* (London: Penguin, 2001), 293. Jordan's statements were then accepted by Spinage, *Cattle Plague,* 92. Campbell also followed Kershaw and Jordan's lead, labeling the late medieval cattle epizootics Rinderpest. Campbell, *English Seigniorial Agriculture,* 23, 417. Davis and Kissock then followed Jordan. Davis and Kissock, "The feet of fines, the land market and the English agricultural crisis of 1315 to 1322," *Journal of Historical Geography* 30 (2004): 218.

[31] Schnurrenberger *et al.*, *Attacking Animal Diseases,* 23; Fisher, "Cattle Plagues," 215; Fisher, "Economic Effects," 280. Its ravages did not cease in Europe until the 1880s. Over two hundred million cattle died in western Europe between 1711 and 1769 alone.

[32] Obi, *Preparation of Rinderpest,* 1-3; www.oie.int/eng/maladies /en_classification.htm#ListA

[33] Fisher, "British Physicians," 651-652, 666-668; Fisher, "Economic Effects," *passim*; Schnurrenberger *et al.*, *Attacking Animal Diseases,* 22-24; W. Campbell, "Quarantine Measures as Trade Barriers," *Annals of the American Academy of Political and Social Science* 141 (1929): 30; Steele, *Animal Disease*, 16-17; Swabe, *Animals,* 84; Dunlop and Williams, *Veterinary Medicine,* 277; Wilkinson, *Animals and Diseases,* 37.

extant sources for the early fourteenth-century epizootic. Enzootically rooted on the Russian steppes, Rinderpest is a highly acute and infectious virus of cattle, with a mortality rate capable of reaching a hundred percent.[34] Those few that survive are known to possess lifelong immunity.[35] It is a highly communicable disease spreading quickly through herds if kept within contact. In the modern and even early modern eras it frequently spread west through Europe to the British Isles.[36] The theory advanced by Fisher and Broad, that 'climate, altitude, cleanness have all proved "irrelevant" in the modern outbreaks' is erroneous.[37] While individuals from the eighteenth to the twentieth centuries have reported the disease prevalence following cold winters, droughts, or periods of excessive rains, it seems the likely association between climatic and weather anomalies lies in harvest yields, forage productivity, and the available feed for stock, and thus nutrition. Crop failures and outbreaks now frequently appear in such a sequence. [38] And it does seem that more acute Rinderpest epizootics would follow in the wake of colder

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[34] On the dominance of cattle as the afflicted species see, Spinage, *Cattle Plague,* 11-12. Sheep and goats are very much less susceptible as are pigs. Obi, *Preparation of Rinderpest,* 5-6; Spinage, *Cattle Plague,* 32; Smith, "Cattle Plague," 395. Other ruminants, such as buffalo and antelope, have been infected in the wild. Steele, *Animal Disease*, 16. In one respect, one may see the sheep epizootic of 1315-1316 as result of Rinderpest. Rinderpest is known to possess 'host preferences' attacking one species then, after running its course through all susceptables, another species. Anderson, *et al.*, *Diagnosis of Rinderpest,* 5-6. Though sheep have not been the prime target in the well-documented Rinderpest outbreaks of post 1700, they have proven susceptible in lavatory experiments. On the effects of the disease in its enzootic zone see, Anderson *et al.*, *Diagnosis of Rinderpest,* 6-7; Spinage, *Cattle Plague,* 23, 39. Rinderpest's enzootic focus has been known for some time. It is perhaps not significant that no sign of Rinderpest is detectable in the *Chronicle of Novgorod* or the *Nikonian Chronicle*, as an outbreak would not appear in the enzootic zone, as latter western outbreaks and modern science attest. On the the exceedingly high mortlity rate of Rinderpest in virgin populations see Broad, "Cattle Plague," 104; Schnurrenberger *et al.*, *Attacking Animal Diseases,* 22-23.

[35] T. Obi, *et al.*, *Manual on the Preparation of Rinderpest Contingency Plans.*,(FAO Animal Health Manual, 1999), 5-6.

[36] See Spinage, *Cattle Plague,* chap. 6-9; Broad, "Cattle Plague," 104-107.

[37] Fisher, "British Physicians," 667; Broad, "Cattle Plague," 104-105.

[38] Spinage, *Cattle Plague,* 19-20, 92.

temperatures.[39] Nutritional standing clearly influences the pathogen. And while the disease affects all ages in virgin populations, a more acute disease reaction and rapid infection course is felt in malnourished virgin populations.[40]

Further support for the potential presence of Rinderpest in medieval Europe lies in its demonstrable antiquity. There is wide consensus in the epizootiology and veterinary community that Anthrax and Rinderpest are both ancient maladies.[41] Many epizootiologists and veterinarians have read Virgil's account in *Georgics* of the mass death of thousands of pigs as anthrax[42] and the writings of various ancients describing the mass death of cattle as indicators of Rinderpest.[43] Sufficient descriptions further allow us to identify Rinderpest in China around the turn of the first

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[39] Ibid, 19.

[40] Anderson, *et al.*, *Diagnosis of Rinderpest,* 7.

[41] The evidence for FMD is unclear in antiquity while that for anthrax and Rinderpest is quite concrete. For Rinderpest see, Wilkinson, *Animals and Diseases,* 209, 377; Spinage, *Cattle Plague,* 3-4, 43; Blancou, *Transmissible Animal Diseases,* 79-80; Steele, *Animal Disease*, 16, 18; *et al.*, *Diagnosis of Rinderpest,* 3. For Anthrax see, Twigg, *The Black Death,* 201, 214; Fleming, 43, 50; Blancou, *Transmissible Animal Diseases,* 80, 86-87; Dunlop and Williams, *Veterinary Medicine,* 377. The notion that Rinderpest and anthrax are ancient maladies is perhaps questionably founded as epizootiologists are not likely capable of analyzing the historical sources in their original language. Moreover, all of the abovementioned works were published prior to the understanding that disease's historical mutation is inevitable to at least minute extents. Watts notes the recentness of this discovery, "in recent years, one of the most disturbing findings of medical scientists is that disease types are not constant over time." S. Watts, *Disease and Medicine in World History*, (London: Routledge, 2003), 6-8. FMD is understood to have first appeared in the early 1500s. Blancou, *Transmissible Animal Diseases,* 53, 73.

[42] See for example Wilkinson, *Animals and Diseases,* 377; Blancou, *Transmissible Animal Diseases,* 80, 86-87; Davis, 64. Others have labeled the epizootics in the Iliad as Anthrax. Biggs, 266; Dunlop and Williams, *Veterinary Medicine,* 380.

[43] Dunlop and Williams, *Veterinary Medicine,* 208-209, 377; Blancou, *Transmissible Animal Diseases,* 161, 184; Spinage, *Cattle Plague,* 3; Smith, "Cattle Plague," 396. Epizootiologist Blancou has gone so far to state, Rinderpest is "certainly one of the epizootic diseases for which the most historical information exists." Blancou, *Transmissible Animal Diseases,* 161. For a few scientists, however, Fitzerbert's account of a cattle epizootic in 1534 seems to me to be the first undeniable account of Rinderpest. M. Fitzherbert, *The Book of Husbandry*, ed. W. Skeat (London: English Dialect Society, 1882), 53-54.

millenium and in the mid-twelfth century. Thus, with all this in mind, together with the fact that the structure of the virus has undergone almost no changes since its isolation, as Roeder writes, 'it is not difficult to place Rinderpest in fourteenth-century northern Europe.'[44]

With this and with all the epizootiological criteria met,[45] a discussion of Rinderpest's modes of transmission and mortality patterns is critical in order to safely speculate on the early fourteenth-century cattle deaths not diagnosed in the extant sources. Knowledge of Rinderpest's epizootiology together with herd densities and potential modes of dissemination, to be discussed below, and cattle demographics, discussed in Chapter III, will together allow such speculation.

After initial exposure, Rinderpest requires roughly three to nine days to incubate, though the virus starts to be shed two days after exposure and continues to be shed until death. Transmission occurs usually over short distances but can travel over a hundred meters, or more, in conditions of minimal sunlight and humidity, 'like a fire's smoke.'[46] A respiratory sickness spread via water droplets in breath, the disease is said to be one of the 'fastest traveling plagues' known, second only to FMD.[47] The start of Rinderpest infection in a new area, however, is almost always result of contact with a sick, live animal, although shed viruses have even been carried on the back of sheep.[48] It goes without saying that the sickness is spread most effectively if the stock is kept at some point indoors. Yet it is effectively spread through contact with nasal

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[44] Roeder in private electronic-mail correspondence, 24 January, 2005; Spinage, *Cattle Plague,* 49. There is some idea amongst historians of European epizootics that Rinderpest was unknown in western Europe in the later Middle Ages. The same individuals, however, assume that cattle epizootics were altogether unknown to late medieval Europe. For example, see Smith, "Cattle Plague," 39. The appearance of Rinderpest in previous English and continental epizootics of the eighth and ninth centuries, is also potentially feasible vis-à-vis the use of the Old English *scitte*, the "shit," to describe many of epizootic occurrences. Roberts, *et al. A Thesaurus of Old English.* (London: King's College, 1995), 04.02.05.01.01.

[45] As outlined above at the beginning of Chapter IV.

[46] Obu, *Preparation of Rinderpest,* 5-6; Anderson *et al.*, *Diagnosis of Rinderpest,* 7; Spinage, *Cattle Plague,* 15-19; Halpin, *Patterns,* 61.

[47] Blancou, *Transmissible Animal Diseases,* 161.

[48] Anderson *et al., Diagnosis of Rinderpest,* 7; Woolhouse, "Foot-and-mouth disease," 126S.

and ocular discharge, salvia, urine, faeces, vaginal excretions and semen.[49] Fodder, sources of water and pastureland are thus frequently contaminated. The latter can remain infective for up to forty-eight hours if shaded, six if not.[50] It can survive in carcasses for up to seven days if kept below four degrees centigrade and undried hides much longer and cannot survive outside of an animal if humidity reaches above sixty percent.[51]

Marked by hemorrhaging, necrosis, fever, erosion of lower intestine and nasal tracts, severe and debilitating diarrhea, and nasal and ocular discharge, cattle usually succumb to Rinderpest between six and twelve days; in peracute strains, or amongst virgin populations like the cattle of this study, death is quick, resulting within a two-day period.[52] Post mortem, cattle are soiled, fetid, dehydrated and emaciated, with sunken eyes, and, often, but not always pock marked skin.[53] Meat and hides are then rendered useless.

While it thus seems probable that Rinderpest is the responsible pathogen in early fourteenth-century Britain, remaining epidemiological questions concern the relationship between the cattle and human pestilences. First, was the disease indirectly responsible for the human pestilences: was there a connection between diseased meat and the human pestilences? There is no historical precedent for widespread, pan European epidemics resulting from diseased meat. Meat consumption among the poor, the part of society affected by the human pestilence as indicated in the sources, moreover, was also likely very low and regional at best. Second, was the cattle disease also directly responsible for the human pestilences, was it zoonotic? Again, there is no historical example of such a wide scale zoonotic outbreak. Anthrax, the most lethal zoonose

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[49] Halpin, *Patterns,* 135; Obi, *Preparation of Rinderpest,* 6; Anderson *et al., Diagnosis of Rinderpest,* 7.

[50] Obi, *Preparation of Rinderpest,* 6; Spinage, *Cattle Plague,* 5.

[51] Others attest that the disease can survive in meat for up to nine days if kept cool. Spinage, *Cattle Plague,* 13-14; Broad, "Cattle Plague," 104; Anderson *et al., Diagnosis of Rinderpest,* 7.

[52] F. Saue, "Protection of Cattle Against Rinderpest with Vaccina Virus Recombinants Expressing HA or F Gene," *Science* 242 (1992): *passim*; Broad, "Cattle Plague," 104. Some breeds of cattle exhibit different symptoms. Obi, *Preparation of Rinderpest,* 5, 7.

[53] Anderson *et al., Diagnosis of Rinderpest,* 19.

known to present day science (and the only zoonose of the four known epizootic possibilities), does not, as we have seen, fit the sources.[54] Thus the only connection that can be made between the cattle and human pestilences lies in the realm of nutrition.

There is then also the question of the extent to which the cattle epizootics were related in some manner to weather or climate beyond the fact that the anomalies of destroyed crops and promoted malnourishment. Jordan hints that weather is related, even going so far to suggest that weather was a principle cause of the epizooty.[55] Campbell too would like to see a relation between the climatic and biological phenomena of the early fourteenth century.[56] However, weather is only indirectly related to epizootic cattle diseases via the medium of disrupted crops, subsequent disruption of food supply, and malnourishment; some sheep diseases as noted above, however, are directly result of weather.[57] One cannot get around the importation of the infection into Britain and Ireland (and northwestern Europe altogether). There could be an indirect relationship regarding the reason for the importation itself and climatic phenomena, for as we

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[54] No zoonose is infective on an epidemic scale. See, Torgerson, "Economic Implications," 134. It is commonly written in secondary studies that human epidemics and stock epizootics were result of the same pathogen, likely as they are frequently documented together in primary sources. Modern studies have, like medieval Europeans, failed to see the connection between the two in nutrition. When it comes to biological phenomenon, in particular, we must not unquestionably accept the scenario presented in our primary sources. It is worth note that Albertus Magnus, in *De Animalibus*, was concerned with the transmission of animal diseases to humans, unaware of the medium of nutrition. Wilkinson, *Animals and Diseases,* 18. Arnaldo de Vilanova (1240-1311) wrote that human plagues never affected animals and vice versa. Spinage, *Cattle Plague,* 36. Davis notes the common appearance of animal and human epidemics in ancient and medieval sources but fails to see the most probable connection in the medium of nutrition. Davis, "Human-Animal Diseases," 64.

[55] Caroline Moseley, "Medievalist Jordan 'Really Loves Archives,'" *Princeton Weekly Bulletin,* 31 March, 1997. www.princeton.edu/pr/pwb/97/0331/0331-jordan; Jordan, *Great Famine,* 35-39.

[56] Campbell, *English Seigniorial Agriculture,* 23.

[57] Strathkopolous notes that there are indeed two types of epizootics those climate induced and those disease induced. He fails to recognize though that there are no epizootic cattle diseases which fit with the first category. Strathkopolous, *Famine and Pestilence,* 162. Haines suggests that the epizootics were result simply of starvation. Starvation, however, can only indirectly be related. Haines, *King Edward II,* 97.

have seen it appears England was already suffering a shortage of oxen by 1315, before the famines and before the epizootics.

Now, having considered contemporary cattle populations and distribution, I shall investigate a) possible modes of dissemination and b) cattle health, in order to assess, while assuming the epizootic to be Rinderpest, c) its impact beyond the sources.

A) Potential modes of dissemination

Beyond demographics and distribution, tracing movements of cattle is another problem. Population movement is seen as the second most important factor in epizootic outbreaks.[58] How might the early fourteenth-century epizootic have been spread? To uncover the impact in the herds of hitherto studied estates and among the poor it is essential to map likely lines of dissemination.

Roger Cooter has very recently argued that the association of war and epidemic disease should not be understood as a given, and that the popular theory is historically little founded.[59] Indeed, to assume that the dissemination of the 1319-1330s epizootics was on the back of war would be misleading. War undoubtedly facilitated in the epizooty's dissemination, particularly in the movement of cattle to the Scottish border, as the epizootic erupted in Scotland before it did in Wales and Ireland. Regular movements of stock, however, elsewhere would have likely been the channels leading to most herds' ruin. One might think that pre-industrial cattle herds were relatively isolated, but a considerable amount of movement of livestock was normal; the epizootic reached Scotland in less than six months from Essex, and Wales and Ireland in less then two years. Transportation to slaughter, pasture, or market must be considered. Contact with other animals and herds, either directly or indirectly via a single animal, was certainly likely.

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[58] Biggs, "Infectious Animal Disease," 261.

[59] For a detailed discussion of the relevant historiography see R. Cooter, "Of War and Epidemics: Unnatural Couplings, Problematic Conceptions," *The Journal of the Society for the Social History of Medicine* 16 (2003). For the widely held belief that war brought on historical epizootics see Wilkinson, *Animals and Diseases,* passim; Dunlop and Williams, *Veterinary Medicine,* passim.

Blanchard has studied the pan European cattle trade from 1400-1800, and in so doing pointed out that large-scale European trade in livestock was not common prior to 1470.[60] Rural trade, nonetheless, was widespread. And though it was not long distance it was likely frequent enough to disseminate disease throughout much of the countryside.

Records of large sales for some English manors exist and provide a glimpse of what we may expect in the early 1300s. In 1265 the bishop of Winchester sold four hundred and twenty-four cows, a sale deemed 'large' by Farmer.[61] In 1225 another bishop at Winchester bought fifty-five oxen, and in 1319-1320 the Winchester estates as a whole bought a hundred and eleven oxen, and yet another hundred and seventy in 1320-1321.[62] In each instance cattle traveled over thirty kilometers. And in 1277, Edward I took four hundred and sixty-nine cows and three bulls from Llewelyn Bren.[63] It is also known that people commonly traveled distances of over thirty miles within Britain to purchase cattle and oxen. A manor at Feering bought oxen at Bury St. Edmunds, the manor at Tidenham bought at Cardiff, and so on.[64]

As we have read, Rinderpest can spread in a variety of ways. And indeed, the velocity of the 1319-1322 epizootic's dissemination indicates that disease was spread in a variety of ways. The likelihood, though, that the disease was disseminated via contaminated hides and wool is unlikely as those goods predominantly moved from Britain to the continent.[65] That it could have been carried on the back of sheep, is perhaps more likely, since many movements probably marked the immediate post sheep epizootic period, as many farmers were restocking by whatever

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[60] Blanchard, "Continental Europe Cattle Trades, 1400-1600," 460.

[61] Farmer, "Livestock," 11.

[62] Ibid, 11; Kershaw, "Great Famine," 26.

[63] Trow-Smith, *History of British Livestock,* 103. Farmer finds that fewer manors likely bought cows, aside from those purchases for slaughter, in the period stretching 1208 to 1325 than previous eras. The selling of livestock for manors, however, was economically insignificant relative to the selling of grain. Farmer, 6, 14.

[64] Ibid, 11.

[65] Campbell, "Sources of Tradable Surpluses," 10, 23, passim.

means possible.[66] It is likely that the infection initially reached Britain and Ireland via the importation of infected foreign cattle, to satisfy the British demand for traction indicated in Chapter II. But from where? The importing and exporting of livestock seems to have been of little concern prior to around 1470.[67] That any late medieval economy would have been able to generate enough cattle to satisfy its own demand, however, is unlikely.[68] There is evidence, for Denmark exporting cattle in the thirteenth and fourteenth centuries and this may be the source of infection.[69] Though if Denmark was breeding its own export –it is well attested that cattle rearing was widespread in Denmark, dominant over horse breeding which had started to decline in the thirteenth century–[70] there is little reason to think that it imported infected animals. It is, however, clear the Danes were importing various goods and perhaps even some cattle from areas around the Baltic, an area subject to enzootic Rinderpest until the widespread vaccinations of the twentieth century. Outside of this possibility, the epizootic of 1319-1322 may have been originally introduced into Western Europe and later Britain and Ireland via the movements of seized or plundered cattle. In any case, identifying the precise source will be reliant on a study of the epizootic on the continent.

Transfer of the epizootic disease from England to Ireland and Ireland to England may also

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[66] Sheep flocks were partly restored via reproduction, but many were bought at market. This point will be touched on in Chapter V.

[67] We may conclude that the disease must have been imported via at least one infected live ox or cow, as the dearth of cattle in the early 1310s implies that imports were necessary. If the dearth of cattle was as severe on the continent as in Britain it would further imply that cattle were being imported from elsewhere such as the Steppes of Asia. Generally, however, England's trade interests were not related to livestock imports. Livestock importing from the continent would have occurred only in emergencies. Childs, "Finance and Trade," 33; Campbell, "The Sources of Tradable Surpluses," 20.

[68] Compare this with Campbell's estimation on the stock needed to produce two working oxen a year. Campbell, *English Seigniorial Agriculture*, 135-139.

[69] B. Poulsen, "The Widening of Import Trade and Consumption around 1200AD: a Danish Perspective," in *Cogs, Cargoes, and Commerce*, ed. *et al.*, L. Berggen (Toronto: PIMS, 2002), 32-34.

[70] Ibid; Poulsen, "Widening of Import," 121-124.

have been via trade in stock or seized cattle. Ireland carried out considerable overseas trade with Britain and the continent by 1300, in a variety of goods.[71] The importation of infected cattle is likely. With such mortality rates as those recorded in manorial accounts and known to be associated with Rinderpest, immunity is a small factor, but those who survive are known to possess lifelong protection, thus probably explaining why the second epizootic of around 1326 was confined to southern England, and manors that were spared the initial epizootic.[72] This second English epizootic, which by all indications passed from Ireland to England, seems not to have been passed to the continent, since England was, as will be shown later, only importing cattle in the period following the initial 1319 epizootic.[73] The general reoccurrence of epizootic cattle disease in some areas of Britain in 1324-25 and the mid 1330s could thus simply be understood as a typical cycle of Rinderpest mortality patterns, passing back and forth between regions until the susceptible species is extinguished or until the line of contact burns out.[74]

Trow-Smith noted fifty years ago that medieval fairs and markets for livestock had been ignored.[75] This is still the case. But it is now well established, as Trow-Smith predicted, that the vast majority of cattle herds were not isolated. Few herds remained static;[76] herds along lines of communication, near markets, or part of large estates, definitely established 'new blood.' Trade in livestock is known to have taken place not within central town markets, where generally only

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[71] Graham, 156. As the *Life of Edward the Second* by the 'so-called Monk of Malmesbury' notes, the Irish sold livestock for corn on the English towns along the coast of the Irish Sea. *Vita Edwardi Secundi,* 282.

[72] Obi, *Preparation of Rinderpest,* 5-6; Anderson *et al., Diagnosis of Rinderpest,* 4.

[73] There is no record of an epizootic on the continent in 1325 that I know of. Moreover, Rinderpest seems to be the only disease capable of claiming the percentage of stock lost in the second epizootic (as noted out in Chapter III). Moreover, if the disease was spread around via undried hides it would have afflicted the continent as well, as Ireland was shipping hides both to Britain and northern continental Europe.

[74] Schnurrenberger *et al., Attacking Animal Diseases,* 24.

[75] Trow-Smith, *History of British Livestock,* 106.

[76] Ibid, 109-110.

products were sold, but in separate predominantly more rural sites outside of larger towns; trade in stock was not done weekly at every market but likely at the provincial town markets.[77] Britnell found markets were not statistically near big estates but in the country among smaller farmers and peasants. Big estates would, however, sell at these rural markets. Trade in cattle within Britain and Ireland was not generally of short distances.[78] Most of the supply came from the far north and west. The Irish sold their cattle along the coast of Ireland and the Welsh would sell cattle at English garrisons or, more regularly, bring cattle to English livestock markets.[79] From these markets cattle would disseminate over the country.

Though trading of cattle was not predominantly a peasant phenomenon, the potential for disseminating the infection among peasant stock appears high. There were a variety of factors for a disease to spread. The communicability inherent in the speed of the early fourteenth-century epizootic and the fact that cattle were traded in rural areas would have assured that most estate and peasant herds were afflicted.[80]

B) Factors further conditioning cattle demographics and mortality patterns

In investigating the spread of epizootic disease, particularity Rinderpest as its mortality rate is conditioned by nutritional standing, it is essential to judge the health of the afflicted stock. Immunological resistance to the 1319 epizootic would have been minimal without previous exposure and as nutrition, which is so essential in resistance, was then severely impeded by four years of poor yields and climatic anomalies (recurring heavy rains, long cold winters and later

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[77] Britnell, *Commercialization of English Society*, 85, 86. R. Britnell, "The Proliferation of Markets," *Economic History Review* 34 (1981): 217. Only 15 percent of markets were near large estates.

[78] Britnell, *Commercialization of English Society*, 113, 201. Long distance trade within Britain was growing throughout the hundred and fifty year period prior to the Black Death. Britnell, "Proliferation of Markets," 213.

[79] Britnell, *Commericalization of English Society*, 113. Live cattle did not represent by any means an export or import from England in the period 1250-1350.

[80] Trow-Smith, *History of British Livestock,* 106.

droughts) that in turn shortened the growing period of fodder as well as the growing period and nutritional quality of grasses and herbage.[81] Severe crop failures began in 1315 in northwestern Europe and lasted to 1317.[82] The yields of 1318-1322 were also quite poor. The weather also impeded herbage growth. But while heavy rains and drought greatly retard most herbage growth, colder weather, like that of the year immediately prior to the epizootic, stunts growth of potential fodder and grasses and forces animals to use more energy to maintain body temperature. Thus animals both use greater energy and consume less in cool periods. Halpin has shown too that even within a period of twenty-four hours significant ability of resistance may be lost.[83]

By all indication the malnourishment of stock was widespread during the famine. Trokelowe noted "not only were humans hurt by the ruining of food but cattle died from the ruining and putrefaction of herbage."[84] Walsingham went further to state that insufficient feed even remained for pigs.[85] Not only would herbage growth have been impeded but fodder

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[81] Steele, *Animal Disease*, 34. Dendrochronological data has clearly shown an extended period of climatic 'abnormality' between 1315-1353. Campbell, "England," 9, 11. This period of cooler seasons may have retarded the growth of grasses and herbage.

[82] It is generally believed by most that the yields of 1317 were not as poor as the previous three yields. Dyer, *Making a Living in the Middle Ages* ,229.

[83] Halpin, *Patterns*, 70.

[84] "...et non solum homines ex ciborum corruptione laedebantur, sed pecora ex herbarum putrefactione corruptione cadebant." This may be result not of fact but of the prevalent miasma concept of contagion. Trokelowe, *Annales*, 196; Walsingham relates a similar story, concerning the lack of fodder and cattle and oxen rotting for lack of food: "et non solum hominess ex ciborum corruptione laedebatur, sed pecora ex herbarum putrfactione corrupta..." Walsingham, *Historia Anglicana*, 147.

[85] "Porci nutriri nequibant." Ibid, 145. Pigs can subsist on a great variety of materials, 'acorns, fungi, slugs, grubs, worms, carcasses of other animals.' To say that there was insufficient feed is

resources quickly exhausted, as humans were consuming all crops, even those rotting in fields, as Jordan pointed out.[86] And as cattle generally did compete with humans for crops, particularly in arable areas, they would have suffered noticeable malnutrition.[87] Competition for meadows too would have intensified with crop failure. Moreover, as Trow-Smith noted, there was typically no access to winter grazing in England, forcing cattle to subsist on rationed fodder.[88] Such great dependance on fodder would have been disastrous in the midlands and in the south and east of England during the famine where cattle generally subsisted on crops. In the north and west of Britain cattle predominantly grazed. Malnourishment was thus not likely limited to grazing stock and humans, though it was not liable to have been as pronounced in herds that grazed as in herds that subsisted on crops.[89]

While all pre-industrial stock already existed at nutritional levels far below those expected in today's developed countries, it is clear the cattle herds of the early fourteenth century were considerably furthered malnourished immediately prior to the epizootic. Here then it becomes clear that the effects of prolonged dearth and disease on human societies and economies are essential in investigating the effects of prolonged dearth and disease on stock. The repercussions on cattle of successive crop failures and disease, though little considered in modern estimations of human history, are considerable in a pre-industrial economy.

C) The loss of stock beyond the sources

Surviving chronicles and annals refer to a great destruction of herds throughout England, Scotland, Wales and Ireland. A picture of universal death is presented. But to what degree was

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perhaps sensational. Jordan, *Great Famine,* 55.

[86] Ibid, 37.

[87] See Chapter II and III.

[88] Trow-Smith, *History of British Livestock,* 115.

[89] Protein qualities in wet season grasses ranges between twenty to seventy percent, in other seasons the protein rarely exceeds twenty percent and is often below two percent. Byerly, "Ruminant Livestock," 452.

this the case? Of the herds covered in manorial accounts we have seen not one totally devastated by the epizootic. But we can be sure the epizootic, whether Rinderpest or not, brought losses to areas where manorial accounts have yet to be studied since all the sources indicate great communicability. It is well known that Rinderpest is spread "almost invariably between herds and to new areas by the movement of infected animals."[90] Thus, would the lines of trade have conditioned the areas affected? Rinderpest in modern outbreaks has often decimated large herds, while smaller herds and even individual animals are infected via markets and incidental contact.[91] The speed at which the disease traveled and the fact that a peracute infection likely took place, as the population was by all indications malnourished, may explain why not all cattle in a herd were devastated, as the pathogen's course was simply too quick; some may have been simply missed. Weakened immune systems often lead to more acute mortality rates and rapid periods of sickness.[92] Lowered nutrition accentuates the acuteness of an epizootic pathogen, heightening mortality rates and shortening the period sickness.[93] It is perhaps more likely, however, that some animals were simply separated whether in shelter and/or at pasture, whether by the agency of the farmer or by chance. For as we have seen in Chapter III, herd mortality varied greatly. But that a pathogen would have exhibited such varied total herd mortality is highly unlikely. No pathogenic precedent or modern example exists for a pathogen so variously afflicting herds kept in one mass. Anthropocentric forces were thus likely responsible for the uniqueness of herd mortalities.

On a larger scale, any extinguishing in fourteenth-century Europe of epizootic pathogens

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[90] Obi, *Preparation of Rinderpest,* 5. Rinderpest has been deemed the second most contagious disease, behind FMD. Spinage, *Cattle Plague,* 3. Only stringent quarantine measures and stamping out policies have worked effectively against Rinderpest. Obi, *Preparation of Rinderpest,* 14-19.

[91] Ibid, 6-7.

[92] M. Scott, "The Impact of Infection and Disease on Animal Populations: Implications for Conservation Biology," *Conservation Biology* 2 (1988): 40-41.

[93] Halpin has also shown that though malnourishment heightens the disease's acuteness, a well balance diet can only very rarely ward off an epizootic pathogen altogether. See Halpin, *Patterns*, 131-133.

would have been by chance if not impossible.[94] The only significant human factor capable of limiting the disease's spread in the early fourteenth-century was a restriction on animal movement.[95] Such action would have certainly required considerable communication capabilities not then in place. Human quarantines were not in place until after the Black Death. Measures of animal containment and quarantine, however, whether trade embargoes or mass slaughters were not effectively established in northwestern Europe until three decades after the great panzootic of 1865.[96] Moreover, fourteenth-century farmers were unlikely to see the benefits of preemptive slaughtering (whether to save meat, by killing the animal before infection, or stock, by limiting the pathogen's dissemination) or in external or internal trade limits, both which would potentially save capital, as the benefits were not personal (as market integration was minimal) and as an inadequate understanding of disease transmission prevailed.[97] Late medieval Europeans had no reason to stop any cattle imports or domestic cattle movements prior to the epizootics, as there was no recent precedent; evidently little was learned from the preceding sheep epizootic. The arrival of the disease and its subsequent dissemination in early fourteenth-century Britain, moreover, were likely too quick to prevent; surely no one would have thought to blame Edward II for inaction as the English blamed their government in 1866 and surely Edward's government was not capable of limiting the pathogen's spread. In the 1320s and 1330s, there is even some

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[94] Epizootic disease in late medieval Europe would have been, as Astill and Grant wrote, 'difficult to counteract.' Astill and Grant, "Medieval Counrtyside," 216.

[95] Restrictions on cattle movement acted as the prime force limiting the spread of infectious agents until the quarantine measures and stamping out policies were introduced in the 1700s. Biggs, "Infectious Animal Disease," 267; Fisher, "Economic Effects," 293.

[96] Fisher, "Economic Effects," 293. Only the panzootic of 1865 encouraged developments in farmers' perceptions of dealing with cattle imports and foreign disease.

[97] On the aforementioned manors at Oxford, however, those cows and oxen that went untouched were sold in fear of the loss of the stock due to disease. Kershaw, "Great Famine," 25. This area was then, however, near areas affected by the epizootic.

[98] On morbidity rates in small and large herds see Scott, "Impact of Infection," 40; Biggs, "Infectious Animal Disease," 261. The losses at Westminster seen in Chapter III were most certainly not typical of the vaccaries in the north and west of Britain, as the herds of Westminster were not kept in a single mass.

sign, as will be noted later, that individuals continued to import cattle to replace the stock lost in the first epizootic. In sum, any limiting of the disease's impact would have been result of isolation, whether of total herds or individual animals from routes of dissemination and infected cattle or of parts of total herds from infected animals due to anthropocentric forces.

It is along the rural routes of trade that the epizootics were likely spread, infecting smaller herds, but being most pronounced in greater herds where its high communicability and the density of stock allowed it to do considerable damage. Peasants' stock, partially isolated from lines of trade and other species, were not likely spared, as they were often kept in village herds in common field and other areas. Infection may have occurred also while being driven to market or slaughter. Though morbidity and thus mortality rates were likely higher among larger herds (the greater the herd the greater the transmission rate), smaller herds or individual animals were still susceptible.[98] Ultimately, however, more studies of the animal mortalities in manorial accounts must be carried out before any definitive judgment can be made concerning which areas were affected and thus what peasant stock was likely afflicted. Yet knowing the mortality rates of those areas already covered, the potential modes of dissemination and infectivity of the likely agent, we can safely assume that mortalities were great throughout Britain and Ireland and that few cattle were spared. A loss of 60 to 80 percent of Britain and Ireland's total stock is likely. The effects of this great mortality now need to be weighed.

CHAPTER V

The impact of cattle epizootics during and beyond the Great European Famine

Agriculture was the 'very foundation' of medieval Britain and Ireland's economy; it gave food to country and urban dwellers, and was the source of work for roughly 75 to 80 percent of the population.[1] Loss of stock certainly did affect the rich and the poor as the *Flores* relates,[2] but in what manner? Was the loss of a similar magnitude? The 1319-1322 epizootics hit at the "very root" of agrarian production immediately after a four-year period of unprecedented crop failures, famine, human and sheep pestilence, and human malnourishment.[3] For most, the additional cattle losses severely complicated any chance of recovery. Here it will be essential to look at the variety of losses potentially incurred and the forces that most certainly intensified losses, malnourishment of stock and inability to restock. Income was greatly impeded on those farms where cattle represented draught, manure, meat, hide or milk. Above all the epizootic represented a great loss of capital, renewable capital. And certainly, income and capital loss had a direct impact on the health of the human population. The impact of the early fourteenth-century epizootics, however, was not universal; all were not affected in the same manner.

1319-1322 marked a sudden collapse in available traction power and the predominant source of manure. Some relief in concerns to fertilizer may have been found on those estates which had had managed to restock sheep after the 1316 sheep epizootic or which sowed vetches. But the loss of traction and manure undoubtedly affected most areas, greatly compounding and undoubtedly extending the already existing famine. Any chance of recovery from the previous four years of poor harvests and famine was widely reduced.

With the loss of traction and carting, harvests, not to mention a key food reserve, were

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[1] Similar to that of modern central Africa. Torgerson, "Economic Implications," 142. Campbell, "England," 3; Robinson, "Money," 69. Cattle also to some extent supplied many people working in manufacturing with needed raw materials.

[2] *Flores Historiarum*, 187.

[3] Kershaw, "Great Famine," 24.

lost.[4] It is unlikely that people would have consumed the flesh of the diseased beasts, as they would have been subject to rapid putrefaction and marked with lesions.[5] As Trokelowe and later Walsingham record, "there was no human who dared to eat cattle flesh because the pestilence was strong in its flesh." Walsingham further noted that since dogs and crows died after eating the flesh of diseased oxen humans did not dare to take part.[6] John of Fordun, however, refers to many Scots eating the 'flesh of horses and unclean cattle' during the famine.[7] In the 1320s selling diseased meat was for the first time banned in London, whether bans were effectively enforced or not is not clearly known. Some convictions under the ban, however, are evident in the London Letter Books. Though whether the meat was actually of disease cattle or simply rotten is of course not discernable, yet Sabine directly linked the emergence of the ban to the cattle epizootics.[8] With majority of cattle dying or dead, harvests failing or failed, and having already suffered for four years it is perhaps not surprising that numerous sources report cannibalism, an act that would have actually been quite nutritious with noticeable and quick positive effects.[9] The

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[4] Jordan states that the epizootic greatly reduced the ability to mow meadows and dry field crops. Neither, however, greatly involved stock. The mowing of meadows was done with the scythe and the drying of field crops did not rely on draft animals. Jordan's discussion of the epizootics' effects is also marred by his conflating of the dates of both the sheep and cattle epizootics. Jordan, *Great Famine,* 37. Kershaw had also already pointed this out. Kershaw, "Great Famine," 14.

[5] As is the case with Rinderpest. Obi, *Preparation of Rinderpest,* passim.

[6] Walsingham, *Historia Anglicana*, 157; Walsingham, *Ipodigma Neustriae*, 252; Trokelowe, *Annales,* 93-94.

[7] Aberth, *Brink of the Apocalypse*, 13.

[8] E. Sabine, "Butchering in Medieval London," *Speculum* 8 (1933): 337-339.

[9] Something most scholars take as exaggeration. See for example, Dyer, *Making a Living in the Middles Ages,* 231. Cannibalism has, however, been known in many modern incidents of despair. The act is repoted throughout Britain causing McKisack to note, "for once charges of cannibalism were not confined to the Irish." M. McKisack, *The Fourteenth Century,* 49. Others note that medieval and early modern records regarding the inability of the living to bury properly the dead, due to the great number of the latter, are unbelievable. Yet in the influenza epidemic of 1918-1919, many American, Canadian and Asian cities could not bury their dead and resorted to large pits. The concept is not unbelievable. In regards to the nutritional benefits of cannibalism

eating of dogs and wild birds is also mentioned.[10] Most small farmers needed to grow their own food for subsistence, whether they also sold goods and bought food or consumed their own.[11] With grain prices rising sharply in 1319, 1320 and 1321,[12] and lords selling what surplus they had for great profits, many may have had to resort to desperate measures. Not surprising is it then that we hear of peasants eating their seed corn for the next year or their surviving stock.[13]

Cattle were capital, whether belonging to a single peasant or a large breeding estate this was true. Those who bred their own traction lost most of their present draught animals and their means of producing more. Whether pastoral, mixed, or arable, the mode of farming conditioned the number of losses; if pastoral a farmer lost his capital directly and his ability to sell, dairy, meat, and hide; if arable a farmer lost capital indirectly through the inability to produce normal yields, together with the ability to sell stock and regenerate draught. The mixed farmer was able to make up for some of the losses if an ox could be found or if some horses were kept. The arable farmer would have to replace a small number of cattle to resume previous agricultural activity, while the pastoral would have to regenerate a herd, undoubtedly the most costly option. In each situation a farmer's production of foodstuffs and money was disrupted; living standards inevitably fell.[14]

On top of the likely earlier dearth of cattle the tolls of epizootic disease undoubtedly extended the famine. This is worth some consideration. Lucas dated the famine to 1315-1317, while Kershaw extended the dating to 1315-1322, a concept picked up later by Jordan. Lucas

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see A. Vayda, "On the Nutritional Value of Cannibalism," *American Anthropologist* 72 (1970): 1462-1463. 'Irregular people-eating' is nutritious, as represented in the New Zealand Maoris, 'particularly when foodstuffs are scarce.' The additional protein would alleviate malnourishment.

[10] For example, *Annales de Bermundeseia*, 470.

[11] Britnell, "Proliferation of Markets," 217.

[12] Dyer, *Making a Living in the Middles Ages*, 229. Wheat prices then fell after the early 1320s, whether or not supply began to exceed demand is not known. Maddicott, *Thomas of Lancaster,* 313. Though peasants did not have to buy grain, it was likely not easily acquired during a famine.

[13] Astill and Grant, "Medieval Counrtyside," 216.

[14] Farmer, "Livestock," 6.

study was continental in focus, while Kershaw's was centered on England. Jordan in turn assessed all of northern Europe. Lucas has been chastised for his shorter temporal limits but with a survey of the primary material it becomes clear that though all of northern Europe was experiencing adverse weather anomalies in 1319-1322, Britain and Ireland alone then experienced the cattle epizootics, starvation and famine. It is also in Britain and Ireland alone that the second human pestilence of the famine, that of 1321-1322, ran its course taking the old, young and sick.[15] The first pestilence of the famine (1315-1316) afflicted all northern Europe in the wake of heavy rains, a cooling temperature, the first of the famine's catastrophically poor harvests, and the sheep epizootic.[16] The second outbreak thus appears only in the areas of northwestern Europe known to have been severely afflicted by cattle epizootics, the only areas marked by sharply rising grain prices after 1319, and the only areas where famine appears to have been prolonged. While work remains to be done on the epizootic's impact on the continent, it does initially seem clear that the impact was greater in Britain. As the second epidemic followed the cattle epizootic by a year it seems clear that the latter was a, if not the, key determinant in prolonging the famine, and consequently human malnutrition and mortality in Britain and Ireland.[17] As the *Evil Times of Edward II* relates following the mortality of cattle, 'God sent on

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[15] A survey of the thirty-one tomes of the MGH *Scriptorum* turned up very little incidence of cattle disease and no incidence of dearth, famine or a second human pestilence around 1319-1322. The second pestilence of the famine is recorded in numerous British sources, however, and noted briefly by Raftis and Postan. *Poem on the Evil Times of Edward II*, 342-344; Aberth, *Brink of the Apocalypse*, 22-23; Kershaw, "Great Famine," 14. The *Eulogium Historiarum*, most likely a copy of Geoffrey le Baker of Swinbroke's work, which survives in a very fragmented state, records the second human pestilence during the famine. "Anno Domini MCCCXXI mortalitas hominum facta est talis quails ante nusquam visa est; certum est illam fuisse in regionibus propinquis ad Angliam in omni parte, creditur tamen fuisse per totum mundum et maxime propter defectum victualium" Though he does not specify death from pestilence it is clear from other sources. *Euglogium Historiarum,* 195-196.

[16] Pestilence appears at numerous instances. No attempt has been made to chart the various outbreaks' geographical spread or chronology. It is a subject worth much more inquiry. Even Sweden was affected by the human pestilence in 1316. Lucas, "Great European Famine," 358 n. l, 367. Court rolls, however, do not indicate heriots for the very poor, who would have likely made up the majority of those affected.

[17] This is how it appears too in *Poem on the Evil Times of Edward II*, 342-344. Several

earth another dearth of corn.'[18] The many chronicles included in Chapter III, moreover, report starvation in the wake of the cattle deaths. Regardless, Kershaw's claim that drought prolonged the famine cannot be accepted since drought conditions were not limited to Britain and Ireland but prevailed on the continent where famine conditions did not then exist.[19] Whether the epidemics would have caused any form of 'manpower shortage' or not is not now discernable. But the appearance of the epidemics with an extension of the famine does indicate a malnourished population. But what of the epizootics' impact on stock nutrition and restocking?

A) Additional effects of malnourishment on cattle after the epizootic

As epizootic disease is adversely related to not only human health but animal health, it follows that the effects of malnourished animals should be recognized. As seen above the nutrition of most cattle throughout Britain and Ireland was affected during the famine.[20] This effect conditioned all productive qualities of animal populations. Food intake directly influences the development and strength of the stock, thus affecting traction and draught ability, and the

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diseases, principally typhus and dysentery, are known to appear in areas of northwestern Europe afflicted by famine in latter historical periods. Livi-Bacci, *Population and Nutrition,* chap. 2; J. Post, "The Impact of Climate on Political, Social and Economic: A Comment," *Journal of Interdisciplinary History* 10 (1980): passim.

[18] *Poem on the Evil Times of Edward II,* 342-344; Aberth, *Brink of the Apocalypse*, 22-23; Kershaw, "Great Famine," 14.

[19] Kershaw, "Great Famine," 15. In general studies of late medieval society and economy the famine is still understood, though Kershaw is often the cited source, as spanning 1315-1317. See, for example, Haines, *King Edward II,* 97; G. Phillips, *Aymer de Valence, Earl of Pembroke,* (Oxford: Clarendon Press, 1972), 289; Maddicott's *Thomas of Lancaster* is the only work that separates the famine into two periods: 1315-1317 and 1319-1322. Maddicott also puts the cattle epizootic in 1322, not 1319-1322. Childs rightly sees the famine spreading 1315-1322 in Britain. Childs, "Finance and Trade," 19.

[20] The epizootic itself can be understood as further lowering nutritional standing of those animals dependant on crops as a sufficient number of animals may not have survived to maintain regular production needs. Market integration was, moreover, limited, and farms predominantly produced their own feed. It should not be thought that less animals could subsist as they required lesser amounts feed, for a fixed number was needed to generate crops.

quality and quantity of the byproducts: meat, milk, leather, etc.[21] Physical output, of course, is related to energy input; bountiful hay or a lush meadow was thus essential to a healthy and productive plowing ox.[22] Both the lack of feed and the presence of disease did, however, possess unique repercussions in cattle populations.

Effects of famine

Lack of fodder may have malnourished oxen on arable estates, while severe drought conditions and climatic anomalies may have limited growth of meadow grasses and herbage for herds. Prolonged malnourishment both delays and stunts growth in cattle, which severely affects the development of muscles in particular.[23] If malnutrition occurs early in life, a fact likely if the mother's milk production is weakened due to malnourishment, rehabilitation is very minimal and chances of mortality high.[24] Reproduction may also be limited with malnourishment causing high sterility among bulls and the high likelihood of malnourished heifers aborting.[25] As Trow-Smith wrote some time ago, a malnourished bull could indeed spoil the breed rates of the entire herd.[26] With malnourishment, furthermore, milk production is greatly reduced, as is, obviously, the ability to fatten.[27]

Effects of disease

Disease generally results (in the stock which survive), as one epizootiologist has stated, in

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[21] Byerly, "Ruminant Livestock," 453.

[22] Campbell, *English Seigniorial Agriculture,* 120.

[23] R. McCanee and E. Widdowson, "Nutrition and Growth," *Proceedings of the Royal Society of London* 156 (1962): 327-328.

[24] McCanee and Widdowson, "Nutrition and Growth," 327; E. McCollum, "Nutrition and Husbandry," *Annals of the Academy of Political and Social Sciences* 117 (1925): 263.

[25] E. McCollum, "Nutrition and Husbandry," 261; Trow-Smith, *History of British Livestock,* 129; Cipolla believes that bulls were often sterile due to food shortage. Cipolla, *Industrial Revolution,* 84.

[26] Cf. Trow-Smith, *History of British Livestock,* 124-125.

[27] McCollum, "Nutrition and Husbandry," 262-263; Byerly, "Ruminant Livestock," 455.

'decreased food conversion rations, decreased milk production, decline in fertility, abortion, and premature mortality.'[28] It has been recently detected, moreover, that a considerable amount of stress develops in animals that are in herds afflicted by sickness, and among those who are sick, provoking some malnutrition and lowering resistance to invading pathogens.[29]

Following four years of famine and an epizootic, many animals, those untouched and particularly those few which survived the disease, were likely weak, sterile and of limited draught value. This nutritional impact, moreover, would have then had a profound effect on restocking rates.

The cattle epizootics greatest impact on post famine/pre Black Death years in Britain and Ireland came with the inability of most to restock. Inability to restock represented the major impediment to generating income, repairing losses and thus restocking. It was a dangerous cyclical pattern. Furthermore, even if a farmer did not generate his own stock but bought at market and possessed the ability to do so in the early 1320s, one must remember that the epizootic hit both cattle consumers and producers. The inability to immediately restock weighed on the economies of rich and poor, and was by all indication nearly universal. If fields were untilled, crops unharvested, and if there was a lack of stock in the husbandman's pasture, little could be fruitful. In 1320 the abbot of Ramsey complained that following the cattle losses of 1319 his manors had no ability to till the lands.[30] The *Flores* also note that with the loss of oxen and cows there was a great difficulty finding draft animals.[31] In 1322 we read a letter from Archbishop Melton regarding the great losses incurred, the inability of many to plow their fields, and the consequent lack of sufficient resources to sustain the people in the area of Galtres.[32] Cattle could not easily be replaced, even if someone had great resources. Cipolla noted that

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[28] Torgerson, "Economic Implications," 135.

[29] Scott, "Infection and Disease," 40-41.

[30] Raftis, *Ramsey Abbey,* 137-140, 319.

[31] "Ita quod vix aut nullatenus homines habuerunt boves ad terras eorum colendas" *Flores Historiarum*, 343.

[32] *Historical Papers and Letters*, 322-323.

supply was always lower than demand for cattle in pre-industrial Europe.[33] Demand, of course, would have far outweighed supply if the latter was largely wiped out by epizootic disease.

Jordan suggested the recovery would be fairly quick "wherever stewards and peasant proprietors found the funds to invest in restocking."[34] Yet what funds were to be found? Kershaw rightly noted that it was the loss of cattle herds "that made it so hard for men to recover."[35] But who among these people was affected in the long term; who was unable to restock throughout the post famine/pre Black Death years? Some estates had made partial recovery by the 1330s, such as that of Christchurch, which had lost hundreds of cattle, and some lay estates in Beddingham.[36] Others, such as the manors at Oxford, restocked their losses within two to three years. Byfleet in Surrey also managed to restock there thirteen lost cattle by the mid 1320s.[37] But was this the norm? Mate briefly noted that 'all the evidence indicates that peasant flocks and herds recovered quickly.'[38] Astill noted that the recovery was likely quick throughout England as it was at Bolton Priory.[39] And Bridbury contended in a footnote, in his "Before the Black Death," that stock losses would have been easily regenerated and contended thus that harvest losses would not have been pronounced as a result of the cattle epizootics.[40] All three of these scholars, however, based their claim directly on the restocking rates of sheep at Kershaw's Bolton Priory.[41] This is very

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[33] Cipolla, *Industrial Revolution,* 84.

[34] Jordan, *Great Famine,* 38. Jordan later stated that restocking could take a considerable amount of time even over twenty years.

[35] Kershaw, "Great Famine," 29.

[36] Mate, "Agrarian Economy of South-east England," 86.

[37] For Oxford see Kershaw, "Great Famine," 35; for Byfleet see Mate, "Agrarian Economy of South-east England," 86.

[38] Ibid, 87.

[39] Astill and Grant, "Medieval Countryside," 216-217.

[40] Bridbury, "Before the Black Death," 403 n. 1.

[41] The sheep epizootic erupted in 1315-1316 and only by 1322 were stocks close to 1314 levels. Using evidence from the north is also risky as raids were common. Any concept of general population curves must take the impact of raids into account, yet the precise losses of raids are

problematic. Mate even later stated the economic information in her area for the 1330s is 'spotty;'[42] that accounts of even larger estates are few and that "one cannot be certain;"[43] that in the early 1320s pastoral farming was abandoned suddenly in some areas of the southeast;[44] and that the evidence of 1340s indicates that fewer 'beasts' were being kept than earlier.[45] Sheep reproduce at a much great speed than cattle, and are significantly cheaper.[46] Sheep too are more resilient to crop failures, as they may graze and forage more effectively, maintaining normal nutritional standings more easily. Their nutritional requirements were and are, moreover, considerably lower than those of cattle.[47] Cattle also do not recover naturally at a rate comparable to sheep, particularly if malnourished, as cattle undeniably were, as we have seen in Chapters III B and IV A. Beyond this, Bolton Priory, though suffering some raiding, was much closer to sheep rearing areas than more southern and eastern estates. In sum, it is not surprising that some herds in Norwich took almost thirty years to rebuild,[48] that Raftis found that it took twenty years for the manors of Ramsey Abbey to restore their losses,[49] that complaints of reduced cultivation were directly related to a lack of oxen in the *Nonae Rolls* of 1340-1341,[50] and that we hear

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rarely quantifiable. For example, less sheep may have been abducted prior to the sheep epizootics then after. Kershaw, "Great Famine," 27; Bridbury, "Before the Black Death,"403 n.1; Mate, "Agrarian Economy of South-east England," 85.

[42] Mate, "The Agrarian Economy of South-east England," 108.

[43] Ibid, 87.

[44] M. Mate, "Agrarian Economy after the Black Death: The Manors of Canterbury Cathedral Priory, 1348-91," *The Economic History Review* 37 (1984): 344.

[45] Particularly in Kent. Mate, "Agrarian Economy of South-east England," 108.

[46] Farmer, "Livestock," passim.

[47] 'Sheep could survive even on the barest lands, while cattle required lusher grass growth.' Williamson, 125. Sheep will consume considerable grass if available. Grant, "Animal Resources," 156. Also see Campbell, "Economic Rent," 233.

[48] Campbell, *English Seigniorial Agriculture,* 176-168.

[49] Raftis, *Ramsey Abbey,* 137-140, 319.

[50] Campbell, *English Seigniorial Agriculture,* 23 n. 122.

complaints from Campsall, that there was no profit in growing certain crops as there was such a shortage of animals.[51] Restocking for the most part was arduous and slow. Only on those estates fortunate to suffer few losses made relatively swift recovery, particularly those of the southeast as Bailey indirectly indicates.[52]

The resources a farmer needed to efficiently regenerate their own stock would have been attainable for very few following the epizootic. All draught stock had a finite number of working years; the lives of cows and bulls were also generally limited.[53] A farmer thus needed to maintain a sufficient quantity of breeding stock to maintain the herd and in arable farming a sufficient number of draught animals. Working stock usually made up less than half of an estate's total stock as much of the remainder was given to generating replacements.[54] Campbell pointed out that effective breeding was more easily and probably done only on larger estates, which could call on the resources of connected farms.[55] Campbell calculates that a typical demesne with sixteen to eighteen plough animals would have on average required three replacement draught animals a year. He further calculates that as both oxen and horses took three years to reach maturity, 'at least nine immature beasts would have been needed to reach the needed requirement of three animals a year.' Thus in order to generate two replacement oxen a year a farmer would need to 'one bull, four cows, and nine immatures, some of which would become replacement

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[51] Kershaw, "Great Famine," 32-33.

[52] The data available for the Breckland manors, which Bailey presents, however, is very incomplete not allowing for temporally specific analysis. Bailey, *A Marginal Economy?*, 201-202.

[53] Campbell, *English Seigniorial Agriculture,* 135; Langdon, *Horses*. Langdon found that oxen and plough horses likely had a working life of roughly five years.

[54] Campbell states the ratio between working and immature stock was relatively 'balanced.' Campbell, "Economic Rent, 232; idem, *English Seigniorial Agriculture,* 143. Here Campbell found that in an area given primarily to dairy cattle the amount of replacement stock was less than that in arable farming areas.

[55] In so doing Campbell provided limits to Trow-Smith's belief that calving percentages were extraordinarily high in late medieval England. Trow-Smith, *History of British Livestock,* 117; Campbell, *English Seigniorial Agriculture,* 135.

cows.'[56] This is of course an ideal situation, one not present in our period.[57]

Could horses have supplied the traction vacuum? Farmer indicates that the prices of most livestock did shoot up dramatically in 1319-1321,[58] yet there would have hardly been enough available horses or collars to make up for the losses of oxen and cattle even if horses could operate at greater speeds. The *Flores* even indicate that there was, following the cattle epizootic, a dearth of horses.[59] And while Langdon insists that the cattle epizootic sealed the deal for some estates concerning the shift from ox to horse that many had started already in the early 1310s, it is clear that in the southeast, midlands, northern England and on the Celtic Fringe, the horse did not triumph.[60] Regardless, a surplus of horses was not simply 'standing by.' The spending power of most farmers, again, was severely limited.

The purchase of oxen after an outbreak of disease, Langdon suggests, may have been seen as risky.[61] Yet poor restocking rates were predominantly the result not of this (as we have seen the horse did not take over and some estates managed to buy what cattle they could) or of the inability of herds to regeneration, but of the prevailing economic environment. Because the price of an ox dropped to around 8s and the price of cattle had dropped to 9s in some areas by 1325, Mate states that a farmer could return to cattle if they wished.[62] Who, however, could afford this?

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[56] Ibid, 135.

[57] Between 1250 and 1450, only about twenty-five percent of replacement stock were bred on the demesne. The market made up most of the rest. Ibid, 139. The British market supply in our period had also, of course, severely shrunk.

[58] Farmer, "Livestock," 5.

[59] *Chronicon de Lanercost*, 240. Kershaw does note that the only years horses appear in use at Bolton Priory are in 1320 and 1321. Horses were also put to use on some Winchester and Oxford manors in these years. The estates of Winchester bought a total of 140 horses in 1320-1321, though they did also buy some oxen from an unknown source. Kershaw, "Great Famine," 26.

[60] Langdon, *Horses,* 164-165. M. Mate, "Agricultural Technology in Southeast England, 1348-1530," in *Medieval Farming and Technology,* ed. B. Campbell (Oxford: Oxford University Press, 1992), 258.

[61] Langdon, *Horses*, 166.

[62] Mate, "Agrarian Economy of South-east England," 87.

The early fourteenth-century was not only a period of unprecedented agrarian disruption but of taxation and strict purveyance. Many chronicles complain of the king's severe taxes and purveyances and the 1975 works of Miller and Maddicott, illustrating the desperate measures to which the king was forced, verify the chronicles' concern.[63] The King's plundering of much of the country's wealth via aggressive purveyances stripped from the poor much of what was left after the famine. One million and fifty-five thousand pounds were collected from the English laity between 1290 and 1340.[64] During the famine demands had been too strict. The king, moreover, frequently seized stock from rich and poor, and lords often confiscated plough animals from tenants.[65] In 1316 the king demanded twelve thousand quarters of corn and malt, and seven thousand pounds in produce.[66] Taxes remained constantly high though the 1320s and 1330s.[67] Periodic seizures of crops and stock also remained frequent during the post famine/pre Black Death era and England's problems with Scotland and France from the 1290s to the 1340s exacerbated these issues further.[68]

Both heavy taxation and the famine have been suggested as rationale for the new and widespread vacancies, and Britain's general socioeconomic deterioration after the famine. Kershaw, himself, suggested that both famine and economic forces brought decay.[69] Yet it seems the epizootics of 1319-1322, 1324-1327 and the mid 1330s, not the famine are to blame with

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[63] Kershaw, "Great Famine," 30; *Parco Lude*, 24. For example, the chronicler of Louth Park recorded the King's officers as plundering what remained of the countryside.

[64] Edward I had left Edward II a debt of over two hundred thousand pounds. Edward II not surprisingly continued a policy of heavy taxation. M. Ormrod, "The Crown and the English Economy, 1290-1340," in *Before the Black Death*, ed. B. Campbell (Manchester and New York: Manchester University Press, 1991), 152.

[65] Campbell, *English Seigniorial Agriculture,* 135, 417.

[66] Kershaw, "Great Famine," 47.

[67] Some areas were exempted, such as those afflicted by war in the north. Ormrod, "Crown and English Economy," 155-156.

[68] Ibid, 174-176.

[69] Kershaw, "Great Famine," 45-51.

taxation for slow recovery in the post famine years. The severity of the 1319-1322 epizootic has been illustrated but more attention must be paid to the second epizootic of 1324-1327, which was limited to Ireland and southern England, and the third epizootic of the mid 1330s, which seems to have afflicted Ireland, Scotland, and northern England. The destruction of cattle in the south of England between 1325 and 1327 and in the north and west areas of Britain in the mid 1330s was swift and extensive, as noted in Chapter III. Rinderpest was likely active in both outbreaks, as argued in Chapter IV. Some indication of the greater effects of these epizootics survives. The *Annales Paulini* recorded a great dearth and want of foodstuffs for southern England in 1326.[70] The presence of several additional dearths, famines and famine epidemics in Ireland in throughout the 1320s and '30s also indicates a severely malnourished and devastated population.[71] John Fordun noted widespread starvation for 1338 and 1339, result not of war but of want of a dearth of provisions.[72] While little more can be said of the second and third epizootics' potential effects, it should be noted that heavy taxation had been present since the

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[70] *Annales Paulini,* in *Chronicles of the Reigns of Edward I and Edward II,* vol. I, ed. H. Luard (London: Rolls Series, 1883), 312-313.

[71] In 1328 we hear of a 'great scarcity of food,' famine, drought and wide spread crop failures in Ireland. *Annals of Loch Ce*, 607. For example, the fragmented annals from a Dublin abbey notes a severe famine in 1330 and a famine 'gaining strength' in 1331. *Annales Hibernie*, 373-375. Compilation of the annals stems, however, from the later fourteenth century. See, cxv. For further evidence of famine in Ireland in the 1320s and '30s see Chapter III. Epidemics were also not confined to the famine era. There was an epidemics of 'slaeden' in 1324-26. Fleming, *Animal Plagues,* 94. The *Annals of Loch Ce* report another human epidemic in 1327 'throughout all Erin,' which 'took rich and poor,' listing several individuals of stature. *Annals of Loch Ce*, 607. This epidemic is named 'galar-brec:' 'speckled disease,' and was perhaps smallpox. More attention to this should be given in a larger study. In 1328 the same source records another epidemic, which took old and young. This epidemic is named 'slaedan' and is said to have brought death two to three days after sickness first appeared. The epidemics here likely relate to nutrition, as they claimed old and young. Livi-Bacci, *Population and Nutrition,* chap. 2. In the early 1330s the *Annals of Loch Ce*, 607-609, report that all fruit was destroyed and that corn grew 'whitish and empty.' Drought, thunderstorms and rainstorms are reported. Famine may result from either if severe, particularly if there was already a shortage of draught animals and capital.

[72] The frantic stealing of oxen (presumably those not sick) is also mentioned. *Scotichronicon*, 127, 143, 149.

1290s and as such was not a new force to be reckoned with in the post famine/pre Black Death period, a period marked by greater socioeconomic desperation in Britain than the period stretching 1290-1314. The fallout from epizootic disease, however, was new in the post famine/pre Black Death period and as such should be seen as the leading cause of the prevalent socioeconomic conditions. At the very least the second and third epizootics further retarded the ability of those in the afflicted areas to restock. Vacancies increased throughout Britain and Ireland throughout the quarter century following the famine. On all fronts, the record signifies a desperate peasantry abandoning their land, whether for lack of food or work. Dropping rents, the increasing fragmentation of holdings, the domination of very-small units of land among the peasantry and the numerous complaints of a lack of tenants also indicate a devastated population.[73] Land was likely widely parceled off for foodstuffs and goods.[74]

Restocking rates and heavy taxation did not make recovery easy for many after the epizootics. Revenues of larger and middle estates declined in the 1330s, a period when, as Bridbury illustrated, the king started to look to larger manors and estates for taxes due to the poverty of lower orders.[75] Yet lordship in some areas remained strong and continued to 'siphon off' any arising peasant wealth.[76] The English population does not appear to have recovered from famine losses.[77] By 1330, Mate argues, a trend of high mortality and low fertility had taken hold, a response likely to declining living standards that were in turn the result of poor yields and

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[73] Kershaw, "Great Famine," 36; Davis and Kissock, "The feet of fines," passim. Beyond this Titow reported that southern England had "outstandingly bad" harvests in 1339, 1343, 1346. R. Frank, "The "Hungry Gap," Crop Failure and Famine: The Fourteenth-Century Agricultural Crisis and *Piers Plowman*," in *Agriculture in the Middle Ages*, ed. D. Sweeny (Philadelphia: University of Pennsylvania Press, 1995), 230. Flooding also may have caused some considerable set backs, particularly in the southeast. In 1334 Capgrave notes that much stock died of flooding in the southeast. See Fleming, *Animal Plagues,* 96.

[74] Langdon, *Horses,* 72.

[75] Revenues fell throughout the 1330s. Mate, "Agrarian Economy of South-east England," 107. Prior to that date smaller enterprises were targeted. Bridbury, "Before the Black Death," 407.

[76] Mate, "Agrarian Economy of South-east England," 107.

[77] Campbell, "England," 8; Mate, "Agrarian Economy of South-east England," 108.

ultimately of cattle disease, purveyances and taxation.[79] By the 1340s thousands of acres were abandoned.[78] The number of records concerning the foundation of markets, furthermore, in the quarter century 1325-1350 is drastically lower than that of 1300-1325 throughout the country. Britnell suggests that this was due to contracting population and/or economic resources. The reduction of markets in the 1325-1350 period further illuminates the increasing poverty of the peasantry immediately after the famine, as markets were predominantly rurally located and operated.[80]

Beyond this, one must remember that in the north additional losses of stock on both sides of the Scottish border resulted from frequent raiding throughout the famine period, though perhaps not altogether great or universal. Yet the Bishop of Carlisle, writing to Pope John XXII, complained of his stock being raided in 1318.[81] And in 1320 we read a letter from Bolton Priory in the north complaining of the both the universal epizootic and the Scots plundering plow animals.[82] Henry Knighton, furthermore, as we saw in Chapter III, also wrote that 'Scottish raids compounded the effects of the murrain.' But regardless, as Kershaw concluded, the devastation of the cattle epizootics in the north was likely greater and more universal then that caused by raids.[83]

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[79] Populations typically respond to declining living standards by marrying later and thus having fewer children. Mate, "Agrarian Economy of South-east England," 108-109.

[78] Campbell, *English Seigniorial Agriculture,* 390.

[80] Britnell, "Proliferation of Markets," 210, 212-213, 218.

[81] *Historical Papers and Letters*, 282-283.

[82] Ibid, 307.

[83] Kershaw, "Great Famine," 45.

CONCLUSION

A limited but devastating impact

The post famine/pre Black Death years were marked by arable and demographic decay. The cattle epizootics were certainly close to the heart of this matter. It is clear that of the factors comprising the Great European Famine, aversive weather anomalies, the sheep epizootic of 1315-1316, the cattle epizootic of 1319-1322, and two human epidemics, the second of which was likely the indirect result of the cattle epizootic, that the cattle epizootic made the greatest impact beyond the famine period. Comparatively, its impact was geographically and temporally vast, affecting most in Britain and Ireland, the peasantry, and middle and large estates, long after its appearance. Were the probable pathogen Rinderpest, its acute communicability and easy routes of dissemination would have left few herds unharmed. Undoubtedly, the loss of stock was for many beyond repair in an environment of heavy taxation, strict purveyances and reoccurring epizootics. And undoubtedly, the loss of stock throughout Britain and Ireland extended the period of want for many.[1] The geographical and social variances of early fourteenth-century livestock exploitation demonstrated in Chapter II clearly illustrate that while most suffered in some manner from the cattle epizootics, the peasants on the fringe and in the midlands, and the richer and poorest peasants in western and northern England would have suffered the worst. Due to taxation, strict purveyances, and famine conditions forcing some to sell their stock, however, much of England's peasantry, who used cattle for traction, may have already been stripped of their of beast(s) prior to 1319.[2] Middle estates suffered with slow restocking rates, particularly in the Midlands, and in the west and north. For the smaller farmer with smaller sums the loss of stock was a great burden, as with the declining availability of cattle, prices rose precisely when a

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[1] In a greater study one must seek to uncover whether human mortalities, increased vacancies and retraction of cultivation, were greatest in areas heavily affected by epizootic cattle disease. More attention must also be given to the extent and dissemination of the human mortalities. Kershaw, "Great Famine," 50. He does hint a connection between Cattle epizootics and vacancies. Ibid, 45.

[2] Mate noted that following the famine smallholders were left "poverty-stricken, landless, homeless, and starving." Mate, "Agrarian Economy of South-east England," 79.

farmer was ill-equipped to meet them. For large estates and the breeding herds on the fringe where the number of losses was greater and more likely to be nearly universal, the epizootics represented a catastrophic loss of capital. On those elite farms apart of larger networks capital loss was also great yet as we have seen restocking not as troublesome.[3]

Reassessment of what has been thought important about the past brings new evidence to light.[4] Epizootics need to be considered; we cannot neglect their impact, particularly in estimations of agrarian dependant societies. In explaining early fourteenth-century socioeconomic deterioration some have suggested that agrarian factors should be given less attention than economic and political pressures.[5] But as we have seen, agrarian factors do not collectively deserve a secondary role. Recovery from famine may have been quick, as some have stated, but recovery from the cattle epizootics certainly was not. Taxation took its toll on the rich and poor, but with great reductions to crops and capital what could they pay? While Kershaw clearly recognized the impact of stock epizootics during the famine, the toll of the epizootics, particularly those of cattle, continued to plague agricultural production and economies long beyond the famine. Epizootic cattle disease should be without a doubt understood as a prime agrarian determinant in the early fourteenth-century British and Irish decline. The 'destruction of cattle' was by no means a short, simple event. Cattle were fundamental to most agrarian activities in early fourteenth-century Britain and Ireland. With awareness of this and of the vast annalistic and chronicle evidence, and of the quantifiable statistics present in manorial accounts, it is clear that the destruction of cattle was great both in terms of death and in terms of its socioeconomic impact. It irreversibly changed the lives of many up to the great disruption of the mid fourteenth century.

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[3] Moreover, many possessed 'networks' from which they could access and borrow animals from herds unaffected. Ibid, 79, 86.

[4] Historical research "advances both by the discovery of new primary sources and by people now conceiving and pursuing new kinds of questions about the past. " R. Hoffmann, "Environmental Change and the culture of the common carp in medieval Europe," *Guelph Ichthyology Reviews* 3 (1995): 58-59.

[5] Campbell points this out but does not agree with the overly simple allocation of agrarian factors to minor roles. Campbell, "England," 5.

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