

A cattle panzootic in early fourteenth-century Europe*

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Abstract:

In the early fourteenth century, annals, chronicles, correspondence, petitions, and poems all document severe mortalities of cattle in regions as distant as Mongolia and Iceland. Relevant passages from this literature are collected here and used with manorial accounts from England and Wales to illuminate a European cattle panzootic that spread west from central Europe c.1315, in the context of a widespread subsistence crisis (the Great European Famine), persisting in Ireland until c.1325. The origins, duration and extent of the pestilence are considered and a relatively detailed picture of its epizootiology is drawn. How the panzootic might be retrospectively diagnosed and why a diagnosis should be attempted is also discussed.

It grieves me and my convent that we are not able to help you more generously, for within the last year and a half we have lost more than a thousand oxen, cows and other cattle.¹

Henry of Eastry, Prior of Christ Church, Canterbury, to Edward II, 5 March 1321

During the Great European Famine of 1314–22, which affected much of central, northern and north-western Europe, an acute and infectious disease began to devastate cattle.² Between c.1315

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¹ ‘... quar nous avoms perdu deinz cest an et demy plus qe mil boefs et vaches et alters bestes’. J. B. Sheppard (ed.), *The letter books of the monastery of Christ Church, Canterbury* (3 vols, 1887–89), I, pp. 58–9.

² On the famine see W. C. Jordan, *The Great Famine: Northern Europe in the early fourteenth century* (1996); H. S. Lucas, ‘The Great European Famine of 1315, 1316 and 1317’, *Speculum* 5 (1930); I. Kershaw, ‘The Great Famine and agrarian crisis in England, 1315–22’, *Past*

and Present 59 (1973); M. Desai, ‘The agrarian crisis in medieval England: a Malthusian tragedy or a failure of entitlements?’, *Bull. of Economic Res.* 43 (1991); M. Davis and J. Kisson, ‘The feet of fines, the land market and the English agricultural crisis of 1315 to 1321’, *J. Hist. Geography* 30 (2004) p. 218; B. M. S. Campbell (ed.), *Before the Black Death: studies in the ‘crisis’ of the early fourteenth century* (1991).

and c.1325, the outbreak infected areas as distant as Bohemia and Ireland. As Henry of Eastry indicates, truly massive losses of cattle were incurred and some of Europe's wealthiest landowning establishments were affected. Despite the neglect of pre-modern livestock pestilence by modern historians, outbreaks of infectious disease among domestic bovines were not unknown in classical, medieval or early modern times. There is certainly no shortage of references to cattle pestilences in the annals and chronicles of medieval Europe.³ Written evidence of disease among cattle is particularly abundant in the early fourteenth century. In the first third of that century large mortalities of cattle are reported in areas as far apart as Mongolia and Iceland. Nothing like this is known to have occurred before.⁴

This cattle mortality was by definition a panzootic: a large, trans-boundary outbreak of disease not afflicting humans.⁵ Though its consequences for human populations have yet to be considered in detail, it is highly probable that a sudden and massive mortality of cattle would have had a significant and many-faceted impact on early fourteenth-century European economy and society. With a mortality rate in affected herds averaging around 60 per cent and on occasion reaching 100 per cent, as demonstrated below, this cattle pestilence undoubtedly represented a staggering loss of capital, and of the traction and manure necessary for contemporary agrarian economies. Though losses appear to have been neither universal nor consistent among affected farming operations, it seems most herds were not rapidly repaired. Restocking could take five years, a decade, or more.⁶ Outside of the Low Countries and regions of eastern England horses had not widely replaced oxen as the primary draught animal.⁷ Moreover, the manure of cattle, which was necessary for fertilizer, could be only partially substituted in the immediate wake of the panzootic with sheep dung, legumes, pond muck and other alternative

³ G. Fleming, *Animal Plagues* (1871), pp. 33–122; C. A. Spinage, *Cattle plague: a history* (2003), pp. 81–101.

⁴ With limited knowledge of the temporal and spatial parameters of the pestilence, some scholars have already considered the outbreak 'totally unknown'. R. Britnell, *Britain and Ireland, 1050–1530: economy and society* (2004), p. 492; Jordan, *Great Famine*, p. 39; Desai, 'Agrarian crisis', p. 253. Evidence sufficient enough to articulate in any detail or certainty the extent and impact of earlier pan-European livestock pestilences may not exist. Of course, large panzootics occurred in the eighteenth and nineteenth centuries. Spinage, *Cattle plague*, pp. 103–216 and L. Wilkinson, *Animals and disease: an introduction to the history of comparative medicine* (1992).

⁵ A panzootic is the animal equivalent of a human pandemic, epizootiology is the equivalent of epidemiology, and epizootic is the equivalent of epidemic.

⁶ Restocking may have been particularly difficult in the English environment of heavy taxation and purveyancing. If the panzootic hit major cattle producing regions, the situation would have only been worse. Ultimately, variation in restocking should be expected and would have resulted from differences in purchasing

power, fear of losing cattle again to disease and, importantly, the desire to fully repair herds. While some herds were repaired by the mid- to late 1320s, most it seems were not. B. M. S. Campbell, 'The land' in R. Horrox and W. M. Ormrod (eds), *A social history of England, 1200–1500* (2005), pp. 184–5. Other reasons may also account for slow recoveries, see P. Slavin, 'Between death and survival: Norfolk cattle, c.1280–1370', *Fons Luminis*, 1 (2008), p. 26. A. R. Bridbury's suggestion that animal losses would have been quickly repaired appears to be based on the restocking rates of sheep at Bolton Priory and is, consequently, poorly founded. Sheep reproduce more rapidly than cattle and were significantly cheaper. Moreover, it is still unknown whether sheep were as affected as cattle during the Great European Famine and therefore if sheep were harder or easier to acquire. It must not be forgotten, however, that flocks and herds in the north of England were also subject to Scottish raids during the famine year and that the impact of these raids on livestock numbers is difficult to gauge. 'Before the Black Death', *ECHR* 30 (1977), p. 403, n. 1.

⁷ Of course, the panzootic's impact would have been more marginal in those areas where horses supplied traction.

soil and plant stimulates; and in any case sheep had died in large numbers c.1315.⁸ As the panzootic threatened the ability to cultivate and fertilize, it may have had serious repercussions for human populations. Keeping in mind that the prevalence and impact of the infection varied, the pestilence may have extended the Great European Famine in some regions and contributed – via grain shortages, lost spending power, and malnutrition – to human mortalities and a higher incidence of disease.⁹ In areas of Europe where the panzootic and the heavy precipitation of c.1314–17 coincided, and in which the horse had not widely replaced the ox, grain supplies would have suffered tremendously.

This great outbreak of disease remains largely uninvestigated. Its appearance in England c.1320 has, however, received some attention amongst writers on medieval English agriculture and economy.¹⁰ That the outbreak was panzootic in scale has yet to be argued and detailed assessment of the origins, duration, extent, mortality and diagnosis of the pestilence, as well as its impact on human and other animal populations, is needed. Philip Slavin is preparing a study that will address the outbreak and its effects in England and parts of Wales.¹¹ Based primarily on data collected from unpublished manorial accounts, his study will supplement this paper, which synthesizes data already extracted from manorial accounts and published in various articles and monographs. In addition to this manorial evidence there exists a large body of other written evidence in annals, chronicles, correspondence, petitions, and poems from central, northern and north-western Europe.¹²

⁸ On sheep mortalities in England during the Great European Famine, see Kershaw, 'Great Famine', pp. 14–5, 20–22, 24, 27–32, 46.

⁹ Stocking densities of cattle and horses influence yields far more than those of sheep or swine. Mortalities of plough animals could significantly reduce a harvest, raise prices and cause subsistence crises as well as result in vacant holdings and shortages of tenants. Kershaw, 'Great Famine', p. 42; Desai, 'Agrarian crisis', 246, 256–7; D. Stone, *Decision-making in medieval agriculture* (2005), p. 67. We must not, however, be too deterministic. Cattle mortalities meant good business for those with plough horses to rent or sell. The ability of fourteenth-century farmers to actively absorb crises by effectively managing their operations in response also cannot be dismissed.

¹⁰ This is result of the panzootic being readily apparent in manorial accounts across England as Ian Kershaw emphasized in 1973. Though limited, Kershaw's account of the pestilence is the most thorough to date, 'Great Famine', pp. 14–5, 24–6, 28–9, 32 n. 159, 34, 42, 45. Also see B. M. S. Campbell, *English seigniorial agriculture, 1250–1450* (2000), pp. 23, 167–8, 233, 416–7; C. Dyer, *Making a living in the middle ages: the people of Britain, 850–1520* (2002), pp. 229; id., *Standards of living in the later middle ages: social change in England, c.1200–1500* (1989), pp. 40–1; M. Bailey, 'Peasant welfare in England, 1290–1348', *EcHR* 51 (1998), p. 241; id., *A marginal economy? East Anglian Breckland in the later middle ages*

(1989), p. 201; Stone, *Decision-making*, pp. 46, 54, 66, 72; id. 'Medieval farm management and technological mentalities: Hinderclay before the Black Death', *EcHR* 44 (2001), pp. 629–30; John Langdon, *Horse, oxen and technological innovation: the use of draught animals in English farming from 1066 to 1500* (1986), pp. 164–8; M. Mate, 'High prices in early fourteenth-century England: causes and consequences', *EcHR* 28 (1975), p. 12; S. H. Rigby, 'Introduction: social structure and economic change in fourteenth-century England' in Horrox and Ormrod (eds), *Social history of England*, pp. 14, 18; J. E. T. Rogers, *Six centuries of work and wages* (1903), p. 217; Slavin, 'Death and survival', pp. 15, 36, 40–51.

¹¹ Also see B. M. S. Campbell, 'Nature as historical protagonist: environment and society in pre-industrial England', *EcHR* (forthcoming).

¹² To varying degrees, Lucas, Kershaw and Jordan demonstrated that sources of this nature survive. Lucas, 'Great European Famine'; Kershaw 'Great Famine'; Jordan, *Great Famine*. Before these authors, F. Curschmann presented some textual evidence of the cattle pestilence in his *Hungersnote im Mittelalter* (1900) as did Fleming, *Animal Plagues*. This paper builds upon the work of these scholars. Price indices, constructed primarily from manorial accounts, also exist, though in general prices are not accurate proxies for the pestilence's geographical or temporal dissemination. Nor are they a reliable indicator of the magnitude of losses sustained. Many variables

This paper argues that when used with manorial accounts, non-manorial evidence permits not only the articulation of the contours of the panzootic – the origins, duration and extent of the disease outbreak – but also the panzootic's epizootiology, namely the species it affected, the spatial and temporal contours of its dissemination, its morbidity, and its mortality. The paper argues that consideration of these matters, while providing a fuller appreciation of the pestilence, may provide a basis for a retrospective diagnosis. Several scholars concerned primarily with English mortalities of cattle c.1320 have already attempted to identify the disease.¹³ All existing diagnoses are, however, unsubstantiated. None are rooted in any examination of the epizootiology of the fourteenth-century pestilence let alone the epizootiology of the diseases diagnosed. Unfortunately, many diagnoses of pre-modern outbreaks of disease, like Alexandre Yersin's identification of the Black Death with bubonic plague, have been made on little or no scientific basis and are in need of reappraisal.¹⁴ Such unsupported diagnoses can mar our understanding of the severity and extent of the past pestilence and of the pathogens superimposed onto it. Analysis of both the epizootiology of the early fourteenth-century panzootic and of 'modern' pathogens,¹⁵ indicates that the rinderpest virus – of all pathogens known to modern science – was the most likely cause of the panzootic, as Ian Kershaw suggested in 1973. Though this diagnosis remains speculative, it may provide direction for an interdisciplinary examination of the pestilence's identity and, potentially, a confirmed diagnosis, which in turn could serve to supplement and check what written evidence of all types reveals of the panzootic.

This paper proceeds in three stages. Since it has yet to be established that the cattle mortalities seen in English manorial accounts c.1320 were a part of a pan-European event, or that a panzootic occurred in the early fourteenth century, it is necessary in the first instance to present the literature in which the pestilence appears. The evidence of cattle mortalities between c.1300 and c.1335 from annals, chronicles, correspondence, petitions, and poems in Mongolia, Russia, Bohemia, Germany, Denmark, France, the Low Countries, England, Wales, Scotland, Ireland, and Iceland is put forward.

Note 12 *continued*

affect prices. Price fluctuations in a region may reflect speculation and fear of disease, the effects of large cattle losses in neighboring regions, or totally unrelated phenomena. cf. Jordan *Great European Famine*, p. 204, n. 114. As Mavis Mate pointed out, the price of cattle in England rose markedly in the early fourteenth century, before the panzootic arrived; 'High prices', pp. 1, 7–8. The health of animals sold is also often unknown. Irregularities in cattle, hide and grain imports and exports as well as labour inputs c.1320 may also tell of the pestilence, though these too are affected by a variety of variables. While no veterinary or agricultural treatise is known to mention the panzootic, some early fourteenth-century legislation against the selling of diseased meat survives in England. E. L. Sabine, 'Butchering in mediaeval London', *Speculum* 8 (1933), p. 337. Philip Slavin also finds that medieval masses against livestock disease appear in

greater abundance in English missals during the early fourteenth century.

¹³ For rinderpest, the favourite diagnosis to date, see Kershaw, 'Great Famine', p. 24; for anthrax see M. Lyons, 'Weather, famine, pestilence and plague in Ireland', in E. M. Crawford (ed.), *Famine: the Irish experience, 900–1900. Subsistence crises and famines in Ireland* (1988), p. 43; for foot-and-mouth disease, see A. Grant, 'Animal resources' in G. Astill and A. Grant (eds), *The countryside of medieval England* (1988), p. 154, and Astill and Grant, 'Medieval countryside', in the same volume, p. 216. I am preparing a full review of the diagnosis of the panzootic.

¹⁴ S. K. Cohn, Jun. *The Black Death transformed: disease and culture in early Renaissance Europe* (2003), p. 8.

¹⁵ Pathogens known to modern science, which may also have existed historically.

In the second part of the paper, we discuss how much of this material pertains to one outbreak of infectious disease, and the English outbreak of c.1320 – which is well documented in manorial accounts – is set in its pan-European context. The panzootic's European origins are placed in central Europe c.1315. Consideration is also given to why the pestilence irrupted near the onset of the Great European Famine, how long it may have persisted and how it spread.

Lastly, the paper illustrates how manorial and non-manorial evidence may serve to reveal the panzootic's epizootiological properties. Problems of interpreting non-manorial evidence, how manorial accounts complement and confirm other written evidence, and why an understanding of the panzootic's epizootiology may facilitate a retrospective diagnosis of the outbreak are discussed. As the practice of superimposing modern infections onto a pre-modern disease occurrence is far more complicated than is commonly thought, and requires much consideration, the remarks made here regarding the panzootic's identity are tentative. That said, there is more evidence for rinderpest in this panzootic than any other pre-modern European mortality of cattle.¹⁶

I

At present, it seems that the first decades of the early fourteenth century should be regarded as exceptional for evidence of disease among cattle. Equally bountiful bodies of evidence pertaining to a cattle pestilence in earlier centuries or later in the fourteenth or fifteenth century are not currently known.¹⁷ Manorial accounts illuminate pestilential cattle mortalities in England in the account years 1318–19, 1319–20 and 1320–1. In the mid-1320s and '30s they again reveal notable losses of cattle, though not on a scale like that witnessed earlier. Annals, chronicles, correspondence, petitions, and some popular literature illuminate outbreaks of infectious disease among cattle not only in England in these years but in various regions of central, northern and north-western Europe as well as areas east of Europe between c.1300 and c.1335. While less written material may survive from periods of famine, the number of references to disease among cattle rises dramatically in the early fourteenth century, particularly during the Great European Famine and particularly in England. The predominance of England in the following pages should not be interpreted as an indication that the disease was more prevalent in England than elsewhere but simply that the majority of the known evidence is English. Certainly more continental (as well as insular) evidence will come to light yet. The value of the continental literature collected here certainly cannot be down-played, regardless of the fact that it provides far less detail than the English and Welsh manorial accounts. More attention to the dating of the composition of some of the continental texts assembled below is required, but it seems clear that most, including those documenting cattle pestilences c.1300–10, were contemporary or near contemporary. Of course, regardless of how contemporary a text may

¹⁶ See comments on supposed rinderpest outbreaks in the 370s, 590s and 810s in Newfield and Slavin, 'Cattle pestilences in pre-industrial Europe', in preparation.

¹⁷ Fleming, *Animal plagues*, pp. 97–117; Spinage, *Cattle plague*, pp. 84. H. Harrod's work on Heacham (Norfolk),

which begins in 1347, gives no indication of significant mortalities of cattle. 'Some details of a murrain of the fourteenth century, from the court rolls of a Norfolk manor', *Archaeologia* 41 (1867), pp. 1–14.

be, or how straightforward a passage may seem, the interpretation of the material collected here can be quite difficult. Problems in the reading of these texts, regarding for example vague geographical and temporal parameters and indications that the disease affected multiple species, are addressed below.

What follows is more or less a catalogue of textual evidence pertaining to disease in cattle in the early fourteenth century. From this catalogue the origins, duration, extent and epizootiology of the fourteenth-century cattle panzootic will be articulated. The evidence is presented chronologically and two periods can be discerned: one spanning c.1290–c.1310 and concerning central Europe, and areas east; and another spanning c.1315–c.1325 and concerning central, northern and north-western Europe.

Under the year 1298, a set of late medieval annals from central Europe records a 'general pestilence of animals throughout all of Poland'. In the same year a text from the Alsace region of France (Colmar) documents a 'great mortality of oxen'.¹⁸ In 1299, the *Chronicon Elwacense*, from Ellwangen in south-central Germany, writes that 'a pestilence of animals predominated most gravely though all the lands' and in 1300 the *Annales Endorfenses*, from Ensdorf Abbey in Bavaria, states that 'the greatest pestilence of animals and especially of cows arose throughout the whole world'.¹⁹ The disease affecting cattle in these regions may have made its way north, for in 1300 the *Annales Essenbecenses* (Randers, Denmark) notes 'a great indulgence in Rome and a pestilence of cattle' and another text, though possibly not contemporary, records that 'all the cattle in Jutland died'.²⁰ The *Annales Essenbecenses* and an additional northern European text documents a 'pestilence of cattle' in 1308, and the 'greatest pestilence of cattle in Denmark' is found in 1310 in yet another chronicle.²¹ In the same year the central European *Annales Matseenses* (Mattsee, Austria?) writes of a 'great pestilence of humans, cattle and cattle herds'.²²

Further east, *Yuan Shi*, a fourteenth-century collection of Chinese chronicles from the Yuan Dynasty, which ruled China and Mongolia between 1271–9 and the 1360s, records multiple outbreaks of disease among cattle in Mongolia between 1288 and 1331. The Russian chronicle *Lavrent'evskaya Letopis'* also documents a cattle pestilence in 1298 and the Russian *Moskovskii Letopisnii Svod* reports a pestilential mortality of cattle in 1309. Additionally, two Persian authors note that 'all the cattle died' during the reign of Tohtu Khan (1291–1312).²³

¹⁸ Unless otherwise noted, the translations of Latin passages presented here are my own. 'Generalis pestilencia animalium in tota Polonia', in G. H. Pertz (ed.), 'Annales Polonorum', *MGH SS*, XIX (1866), p. 652; 'Mortalitas magna extitit et commestio boum prohibebatur', in id., 'Annales Colmarienses majores A. 1298, 1299' *MGH SS*, XVII (1861), p. 224.

¹⁹ 'pestis animalium per omnes terras gravissime invaluit', in id., 'Chronicon Elwacense edente' *MGH SS*, X (1852), p. 39; 'maxima pestilentia animalium et maxime vaccarum per totum mundum suborta est', in id., 'Annales Endorfenses' *MGH SS*, X (1852), p. 6.

²⁰ 'Indulgentia magna in Roma. Pestilentia pecorum', in E. Jorgensen (ed.), 'Annales Essenbecenses', *Annal-es Danici medii aevi* (1920), p. 148; 'omnia pecora in Gutlandia moriebantur', in J. Langebek (ed.), 'Annales

fratrum minorum Wisbyenses ab An. 67 ad 1525', *Scriptores rerum Danicarum* (9 vols, 1772–1878), I, p. 257.

²¹ 'Pestilentia pecorum', in Jorgensen (ed.) 'Essenbecenses', p. 148; 'pestilentia pecorum', in J. Langebek (ed.), 'Chronologia rerum memorabilium ab anno 1020 usque ad an. 1323', *Scriptores rerum Danicarum*, II, p. 528. These texts may be independent. 'fuit maxima pestilentia pecorum in Dacia', in J. Langebek (ed.), 'Chronicon breve Danicum, 1275–1347' *Scriptores rerum Danicarum*, VI, p. 253.

²² 'Pestilentia hominum et pecorum atque pecudum facta est magna', in G. H. Pertz (ed.), 'Annales Matseenses' *MGH SS*, IX (1851), pp. 825.

²³ Badr ad-Din al-Aini (1361–1451), V. G. Tizengauzen (trans.), *Istoriya Kazakhstana v Arabskikh Istochnikakh* (2005), p. 359; 'Patriarshaia ili Nikonovskaia Letopis'

A short time later, deaths of cattle from disease are found in an incredible array of texts from further west.²⁴ In addition to these sources, many central, northern and north-western European annals and chronicles vaguely report a 'severe pestilence' sometime between 1315 and 1319.²⁵ These texts, which do not specify the species that were infected, have long been thought to refer to outbreaks of disease among malnourished humans. While this may certainly be true, it is not implausible that they refer to deaths of other species, particularly during the famine when cattle and sheep also died en masse. Nevertheless, it is impossible to discern whether any ambiguous *lues*, *pestis*, *pestilentia* or *mortalitas* documented in these years refers to a pestilential mortality of cattle. Consequently, the focus here is on texts that explicitly refer to deaths of cattle or 'animals'.

A text from Bohemia documents a 'pestilence of humans and heavy animals' under the year 1314. 'Heavy animals' presumably refers to cattle, particularly oxen.²⁶ The near-contemporary *Chronicon Regiae Aulae*, written at the Cistercian monastery at Königsaal (Zbraslav) near Prague by Peter of Zittau (c.1275–c.1339), records that in 1316 a pestilence 'killed horses, sheep and oxen, and all the cattle of the field'.²⁷ In the same year a chronicle from central Germany reports that 'there was a great famine and a large pestilence of oxen and cattle'.²⁸ Likewise in 1316 Johannes de Beka, a fourteenth-century clerk of the diocese of Utrecht, writes that a 'mortal pestilence bristled and famine became great, to the extent that many poor – if it's all right to say – were gnawing on the raw corpses of cattle just like dogs'. Though it is unclear if the cattle Beka refers to died from disease, it is unlikely that there would have been an abundance of dead cattle for the poor to eat had cattle not died in large numbers from disease. Beka continues to note that people were reduced to 'consuming the grasses of meadows raw just like oxen', which may imply that the disease did indeed kill cattle and that fields were left relatively bare.²⁹

Note 23 continued

in *Polnoe Sobranie Russkikh Letopisej*, X (1885), p. 171; 'Moskovskij Letopisnyj Svod Kontsa XV Veka' in *Polnoe Sobranie Russkikh Letopisej*, XXV (1949), p. 159; D. Morgan, *The Mongols* (1987), p. 165. I thank Philip Slavin for these references.

²⁴ Note that Irish annals also document cattle mortalities in 1296 (*Annals of Innisfallen*), 1298 (*Annals of Ulster*), 1302 (*Annals of Connacht* and *Loch Cé*) and 1308 (*Annals of Connacht*, *Loch Cé*, and *Annals of Clonmacnoise*). This, however, should not confuse the articulation of a cattle panzootic spreading east-west c.1315–25, as these entries are nearly all attributed to poor weather, not disease, and as notable cattle mortalities do not appear in manorial accounts in these years. Furthermore, the mortalities recorded in 1296 and 1298 may refer to the same mortalities noted in 1302. For references see n. 72.

²⁵ For example, H. Geraud (ed.), *Chronique latine de Guillaume de Nangis de 1113 à 1300 avec les continuations de cette chronique de 1300 à 1368* (1843), p. 22; R. Sprandel (ed.), *Die Weltchronik des Monchs Albert, 1273/77 – 1454/56* (1994), p. 205; G. H. Pertz (ed.), 'Annales

Colbazienses (Pomerania)' *MGH SS*, XIX (1866), p. 717.

²⁶ 'pestilentia hominum et brutorum animalium', in G. H. Pertz (ed.), 'Annales Bohemiae brevissimi a. 1236–1330', *MGH SS*, XVII (1861), p. 720.

²⁷ 'equos, oves, et boves et universa pecora campi necuit pestilentia huius anni', in K. Hofler (ed.), 'Chronicon Regiae Aulae', *Fontes rerum Austriacarum, Scriptores*, VII (1866), p. 379. I have been unable to consult the *Chronicle of Dalimil* (or its mid-fourteenth-century German translation), which may also document livestock disease in early fourteenth-century Bohemia.

²⁸ 'Ita magna fames erat et pestilentia grandis boum et peccorum', in Curschmann, *Hungersnote*, p. 215. The fifteenth-century Polish chronicler and canon at Kraków, Jan Długosz does not document any early fourteenth-century livestock mortality in his voluminous history of medieval Poland. M. Michael (ed.), *The annals of Jan Długosz* (1997).

²⁹ '[E]t valida fames invaluit adeo quod plerique pauperes (si fas est dicere) cadavera pecorum sicuti canes crude corroderent, et gramina pratorum sicuti boves incocte commederent.' H. Bruch (ed.), *Chronographia Johannis de Beke* (1973), p. 279. Beka emphasizes that the

On the other hand, Johannes may have simply meant to stress the severity of the human hunger and grain shortage during the famine. That said, the early fourteenth-century *Annales Egmondani* (Egmond, Netherlands) documents that 'humans and cattle died greatly through famine' after 1315 'had past'.³⁰ Other texts from the Low Countries also indicate that cattle were dying from disease during the Great European Famine, but most specify that a pestilence reached the region after 1316. Following a rather lengthy description of the famine, William of Egmond, who was probably in Bederode (Netherlands) at the time, writes that 'not only was the population in this three year period afflicted with the misery and weariness of this [the famine] but, at the end of it [c.1318], it was oppressed with a mortality of cattle'. He continues, in verse, 'after one thousand three times one hundred, twice eight, and two remaining [1318] had been vexed [lit. 'cooked'] by famine's death, its end grieved at the slaughter of the herds'.³¹ In his *Chronicon*, Edmond of Dwynter (Dinther, Netherlands, c.1375–1448), likewise emphasizes the vastness of the losses. He mentions other details too in his record of the cattle pestilence which he places in 1318, 'so great a mortality thrived among cows that from ten hardly one survived. Therefore, at this time no person dared to consume or chew the flesh of bovines and especially the flesh of cows'.³²

Additionally, the Brabantine priest Lodewijk van Velthem (c.1270–1326) and the sixteenth-century Professor of Theology at Louvain, Johannes Molanus, document pestilences of livestock in the Low Countries during the Great European Famine.³³ In France, an anonymous and fragmented chronicle records a 'great mortality of people and cattle' c.1317.³⁴ The contemporary Jacques de Thérines also mentions a 'failure of animals' in north-central France around the same time together with 'a general sterility of the lands'.³⁵ Little has been uncovered to indicate that disease was widespread in Scandinavian countries. In 1318 a set of near contemporary Danish annals reads of 'great drought and sterility, then a mortality of cattle'.³⁶

Note 29 *continued*

poor were eating forbidden meat. The Old Testament prohibits the consumption of carrion: Exodus 22:30; Deuteronomy 14:19; cf. Edmond of Dwynter and Johannes de Trokelowe below.

³⁰ 'Millenum tricentenum quinum quoque denum / Annum transactum die post verbum caro factum / Quum fame plere pecus et homines periere', in G. H. Pertz (ed.), 'Annales Egmondani', in *MGH SS*, XVI (1859), p. 479. This text appears to be independent of William's work below.

³¹ 'Nec solum hac miseria huiusque taedio populus hoc triennio affligitur sed etiam in fine huius mortalitate pecorum aggravatur. Morte famis cocto M, ter C que, bis octo / Cum reliquis binis; doluit pecorum nece finis', in C. Pijnacker Hordijk (ed.), *Willelmi Capellani in Brederode postea monachi et Procuratoris Egmondensis chronicon* (1904), p. 91.

³² 'Eodem anno Domini MCCCXVIII viguit mortalitas inter vaccas adeo magna, quod de decem vix una permansit. Eapropter tunc temporis populus nullas carnes bovinas, et specialiter carnes vaccines, audebat

comedere aut manducare', in 'Edmundi Dwynteri chronicon' in P. F. de Ram (ed.), *Chronica Nobilissimorum Ducum Lotharingiae et Brabantiae ac Regum Francorum*, II (1856), p. 497.

³³ I have not been able to consult the works of these authors and am uncertain if they wrote of mortalities of cattle or other livestock. Lucas, 'Great European Famine', p. 358 n. 6.

³⁴ In an entry for 1315, 'En celle année, commencèrent moult grant pluyes en France, qui durèrent entour II.ans; et fut moult grant famine et grant mortalite de gens et de bestes', in Martin Bouquet (ed.), 'Fragment d'une chronique anonyme', *Recueil des historiens des Gaules et de la France*, XXI (1869), p. 151 n. 19.

³⁵ N. Valois, 'Un plaidoyer du XIV^e siècle en faveur des Cisterciens', *Bibliothèque de l'école des Chartes* 69 (1908), pp. 365–6. Notably, the contemporary, Gilles Li Muisis of Tournai seems not to have mentioned the pestilence. J.-J. de Smet (ed.), 'Chronica Aegidii Li Muisis' *Corpus chronicorum Flandriae*, II (1841).

³⁶ 'Siccitas magna et sterilitas fuit; tunc pecorum mortalitas', in E. Jørgensen (ed.), 'Annales 1098–1325', *Annales*

In 1318–19, references to pestilential mortalities of cattle begin to appear in a number of English texts. Johannis de Trokelowe (c.1280–c.1330), monk and annalist at St Albans, compiled one of the earliest English records:

In the course of the same year [1319] a great pestilential mortality of cattle grew strong through all of England, as no one had seen before. In this pestilence a miraculous thing occurred whereby both the dogs and birds that were feasting on the bodies of the dead cattle swelled up right away and died of infection. After this, there was no person who presumed to taste bovine flesh lest having been infected he might succumb from the carrion. 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 France was infected with the same disaster.³⁷

The *Flores historiarum*, written by a monk at Westminster, namely Robert of Reading (d. 1325), also provides a contemporary note on the devastation, although the author places the pestilence under 1318, which is possibly an error, as manorial accounts generally indicate that mortalities commenced in England in 1319:³⁸

[S]o great a pestilence of animals invaded the kingdom of the English people and through a quarter of the kingdom the mortality itself suddenly laid low such a countless multitude that, leaving few [animals] in different parts, it inflicted a heavy loss to the rich and want to the poor.³⁹

Another contemporary and independent version of the *Flores*, which was compiled at Tintern in Monmouthshire (Wales), reports the pestilence in 1319:

[T]here was the greatest mortality of animals, that is oxen, cows and other animals, on account of which people had hardly, or no, oxen to cultivate their lands. And therefore there was as great as possible a dearth of horses, with the aforesaid pestilence beginning in

Note 36 *continued*

Danici medii aevi (1920), p. 200. Also, 'siccitas magna et sterilitas fuit, et peccorum mortalitas', in Langebek (ed.), 'Annales Danici ab anno 1131 ad an. 1325', *Scriptores*, IV (1969), p. 284. These texts are probably not independent. Jordan, *Great Famine*, p. 181, suggests livestock also died of disease in Norway and Sweden.

³⁷ '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 praesumeret, 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', in H. Riley (ed.), Trokelowe, *Annales* (1866), pp. 104–5.

³⁸ That said, Campbell has uncovered sizable bovine losses resulting from disease and sales on several Westminster demesnes in the account year of 1318/19. Mortalities may have commenced in England in late 1318. Pers. corresp. 15 Sept. 2008.

³⁹ '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', in H. Luard (ed.), *Flores Historiarum* (1890), pp. 186–7. This source was later copied by John Capgrave. F. Hingeston (ed.), Capgrave, *The chronicle of England* (1858), p. 185. Entries prior to 1306 were prepared in St Albans. The 1318 dating here may be an error on part of the editor of the text. Depending on the condition of the manuscript, dates can be easily confused. See comments below on the Thorney annals.

Scotland, afterwards in England, and finally in the Welsh Marches around the Feast of All Saints [1 November].⁴⁰

The Chronicle of Louth Park Abbey (Lincoln), in an entry that is by all indications contemporaneous, states that in 1320 'a general murrain and plague prevailed among all kinds of horned cattle, throughout all England, and as many say it is believed to have raged throughout all Christendom'. Elsewhere this chronicle seems to attribute losses of oxen to the famine. These losses, which are said to have in part 'ruined the substance of the Abbey', may be understood as a product of the panzootic.⁴¹ The near contemporary *Chronicon Lanercost*, composed partly around Carlisle, provides further details:

At the same time [1319] the pestilence 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, so that men had to plough that year with horses. Nevertheless, men used to eat cattle dying in the aforesaid manner, and, by God's ordinance, suffered no ill consequences. At the same time sea fishes were found dead on the shores in great multitude, whereof neither man nor other animal nor bird did eat.⁴²

Robert de Graystones, writing at Durham in the early fourteenth century, also reports a 'pestilence of oxen' in his account of the Great European Famine.⁴³ Another contemporary, John, vicar of Tynemouth, records in his *Historia aurea* that the cattle pestilence arrived in August 1319 at Berwick with the appearance of Edward II. He states, 'an unheard of pestilence of animals quickly killed almost all the oxen led to the siege'.⁴⁴ To the south, in Cambridgeshire, the *Thorney annals* briefly document the disease in 1320, 'there was the greatest murrain of oxen and animals in England'.⁴⁵ Further to the south, a chronicler known as the Gervase continuator, who was based in Canterbury, writes in 1318 of 'the greatest mortality of animals from the species of cattle in the whole kingdom of England'.⁴⁶ Some distance away, a chronicle written

⁴⁰ 'Eodem anno maxima mortalitas animalium id est bovm et vaccarum et aliorum animalium, fuit, ita quod vix aut nullatenus homines habuerunt boves ad terras eorum colendas. Et ideo quam maxima fuit caristia equorum, mortalitate praedicta incipiente in Scotia, postea in Anglia, postremo vero in marchia Walliae circa festum Omnium Sanctorum', in *Flores historiarum*, p. 343.

⁴¹ 'Item regnavit generalis morina et pestis omnis generis animalium cornutorum domitorum per totam Angliam, et sicut a pluribus refertur, creditur regnasse per universam Christianitatem', in E. Venable (ed.), *Chronicon abbatie de Parco Lude* (1891), pp. 24, 27.

⁴² H. Maxwell (ed.), *Chronicle of Lanercost, 1272-1346* (1913), p. 228.

⁴³ '[P]estilenciam bovm', in James Raine (ed.), *Historiae dunelmensis scriptores tres* (1839), p. 97.

⁴⁴ *id.*, *Scalacronica* (1907), p. 69. Grey wrote in the mid-fourteenth century but is thought to have made

use of earlier sources. 'Ibi enim pestis sive lues animalium prius est audita. Omnes revera fere curruum boves ad obsidionem ducti subito quasi moriebantur', in V. H. Galbraith, 'Extracts from the *Historia aurea* and a French "Brut" (1317-47)', *EHR* 43 (1928), pp. 205, 210. Though this text closely resembles or borrows from the *Polychronicon*, particularly for the years spanning 1307-27, it is 'a compilation of many sources'.

⁴⁵ 'Hoc anno fuit maxima morina in Anglia, boum et animalium', in Faith Wallis's translation in preparation. C. Hart (ed.), *The Thorney annals, 963-1412* (1997), places the panzootic in 1318, which as manorial accounts illustrate is a mistake. Wallis's translation assigns this passage to 1320.

⁴⁶ 'Anno domini millesimo CCCmoXVIIIo maxima mortalitas animalium, de genere bovm in toto regno Anglie' in R. Haines, *King Edward II: Edward of Caernarfon, his life, his reign, and its aftermath, 1284-1330* (2003), p. 402, n. 17.

at the Cistercian abbey in Newenham (Devon) shortly after the events it describes, notes the mortality of cattle:

There was indeed a great famine and pestilence of humans but of the poor especially, and [there was] a great, very large and unheard of mortality among cattle, namely oxen, cows and calves, continuing through many years; indeed everywhere they were walking and standing they were lamenting to those people looking at them, roaring as if in tears because of the harsh pain making them anxious on the inside, and thus suddenly falling down they were dying away from that house [presumably the abbey].

This chronicler continues to claim to have viewed the abbey's accounts, which he states listed 164 cattle as lost during the famine years, probably in large part to disease.⁴⁷ In his *Polychronicon*, Ranulph Higden (c.1280–c.1364) succinctly notes, plausibly after the fact, that 'a pestilence of animals and humans' took place in c.1316–18. The *Chroniques de Sempringham* (Lincs.) reports that 'in the same year [1319] there was a great mortality of cattle in England' while the *Chronica Monasterii de Melsa*, kept by the abbots at Meaux, twice records mortalities of livestock caused by disease. First, Adam, abbot between 1310 and 1339, generally noted in the immediate post-famine years that a 'common murrain of sheep and other animals' had occurred during the famine and that by 1321 'many villages of England were ruined'. In the last entry attributed to his predecessor Robert (abbot between 1286 and 1310), however, a passage concerning Edward II's succession and the famine, obviously added by a later author, states, 'and there was also so great a high price of wheat in the days of [the famine] and so continual a mortality of cattle that it was scarcely seen in past generations'.⁴⁸

Ada Murimuth, writing around 1325 refers to the famine with a simple entry in 1316, 'great mortality and barrenness'.⁴⁹ The near contemporary *Vita et mors Edwardi Secundi* likewise observes the famine only in 1316 and ambiguously notes of 'a most brutal pestilence',⁵⁰ while the *Vita Edwardi II*, which was written in the mid-1320s, recounts, in the same year, 'a severe

⁴⁷ 'Fames enim erat valida et inaudita et mortalitas hominum sed precipue pauperum, et magnas mortalitas armentorum maxima et inaudita, videlicet bovum, vacarum et vitulorum per multos annos durans ubicumque enim ambulabant vel stabant pre vehementi dolore eos interius anxiant quasi lacrimantes rugiendo intuentibus conquerebantur, et ita subito corruentes exspirabant de domo ista.' As far as I am aware neither an edition nor a translation of this chronicle has appeared. A Latin transcription of this passage can be found in Haines, *King Edward II*, pp. 97, 402, n. 18. On the deaths recorded by the chronicler, see J. Hatcher, 'Farming techniques: south-western England', in H. E. Hallam (ed.) *The agrarian history of England and Wales*, II, 1042–1350 (1988), p. 396.

⁴⁸ 'lues animalium et hominum', in J. R. Lumby (ed.) *Polychronicon Ranulphi Higden* (1964), p. 308. Higden's later medieval English translators did not expand on his brief observation, *ibid.*, pp. 307, 309. 'Meisme lan avoit y

graunt pestilence des beastes en Engleterre', in J. Glover (ed.), 'Sepringham continuation', *Le livre de reis de Brittanie e le livre de reis Engleterre* (1865), pp. xv–xvi, 336–337; 'communisque morina bidentium et aliorum animalium', in E. Bond (ed.), *Chronica monasterii de Melsa* (1867), p. 333. Adam's record of the entire famine is positioned under the entry of 1315, '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', in *ibid.*, p. 286.

⁴⁹ 'magna mortalitas et sterilitas', in E. M. Thompson (ed.), *Ada Murimuth continuatio chronicarum Robertus de Averbury de gestis mirabilibus Regis Edwardi Tertii* (1965), p. 24.

⁵⁰ 'saevissima pestis', in W. Stubbs (ed.), 'Vita et mors Edwardi Secundi' *Chronicles of the reigns of Edward I and Edward II*, II (1965), p. 301.

pestilence'. In 1315, a year earlier, the *Vita Edwardi II* states 'sheep commonly died and other animals were killed by a sudden pestilence'. It is unclear whether these passages were meant to refer to the cattle mortality, though the 'sudden pestilence' that the *Vita Edwardi II* records may certainly be an early reference to it.⁵¹ The near-contemporary *Gesta Edwardi de Carnarvan* written by a canon of the Augustinian priory of Bridlington in Yorkshire also only mentions the famine in 1316, but writes of a 'mortality of humans and pestilence of cattle so great and continual, and of a greatness and size not seen by this generation'. Later the *Gesta* mentions great distress 'in the north and throughout England' and that by 1321 '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'. The text further notes that people daily buried the bodies of dead cattle before and after midday, and that animals were buried shortly following their death on account of their stench.⁵² Interestingly, a piece of popular literature, the very near-contemporary *Poem on the evil times of Edward II*, also documents the mortality of cattle:

The cattle all died quickly, and made the land all bare so fast / Came never a wretch into England that made men more aghast / 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.⁵³

Slightly later sources continued to record the pestilence. Composed around 1347, the *Annales de Oseneia* (Osney Abbey, Oxfordshire) briefly notes a 'great pestilence of animals' during the famine, and the *Stoneleigh leger book*, compiled about 1392 from documents contemporary with the years described, records that in 1319 'a pestilence of animals began and lasted for a long time'.⁵⁴ In his *Leycestrensis chronicon*, Henry Knighton, who wrote in the last quarter of the fourteenth century and followed earlier authors, writes that:

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 their lands and daily as many as possible were buried in any cemetery whatsoever; and this pestilence lasted for two years and consequently both from this and from the Scottish enemy a great ruin seized the English people everywhere.⁵⁵

⁵¹ 'dura pestilentia' and 'oues autem communiter perierunt et alia animalia subita peste ceciderunt', in *Vita Edwardi Secundi* (trans. W. R. Childs, 2005), pp. 110–1, 120–1. This is Childs's translation.

⁵² 'Similiter mortalitas hominum et morina armentorum tanta, talis et continua fuit, quanta et quails a seculo non est visa. Nec poterant mortuorum corpora propter foetorem diutius reservari quin ante prandium et post cotidie sunt humata', in 'Gesta Edwardi di Carnarvon auctore Canonico Bridlingtoniensis', in H. Laurd (ed.), *Chronicles of the reigns of Edward I and Edward II*, I (1883), p. 48. 'Plures illarum partium coloni, qui in praediis et possessionibus ovium et armentorum uberius habundabant, jam compelluntur per patrias mendicare', in *Gesta Edwardi*, p. 81. The *Vita et mors, Edwardi Se-*

cundi, also near-contemporary, possesses a similar entry. J. Aberth, *From the brink of the apocalypse* (2000), p. 22, implies that the *Gesta Edwardi* states that people ate dead cattle. I can find no evidence of this.

⁵³ T. Wright (ed.), 'Poem on the evil times of Edward II', in *The political songs of England*, VI (1839), pp. 342–4.

⁵⁴ 'lues magna animalium et hominum maxima', in H. Laurd (ed.), 'Annales de Osneia', *Annales Monastici*, IV (1869), p. 344. 'Eodem anno cepit morina animalium et duravit per longum tempus', in R. H. Hilton (ed.), *Stoneleigh Abbey leger book* (1960), p. 75.

⁵⁵ 'Anno gratiae MCCCXVIII et anno gratiae MCCXIX magna mortalitas hominum, et lues animalium per totum regnum Angliae, adeo quod homines

Further removed, the *Historia Anglicana*, written between 1377–1412 by Thomas Walsingham (d. 1422), another monk at St Albans, generally follows Trokelowe's work but adds a note on the speed with which the infection spread:

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.⁵⁶

In his *Ypodigma Neustriae*, written around 1420, Walsingham also follows Trokelowe but focuses on different elements:

In 1319 there was a pestilence of oxen. They were so lethally infected that dogs and ravens eating from their corpses as if intoxicated with poison, swelled and collapsed in death. For this reason no one dared to eat bovine or cow flesh.⁵⁷

John Capgrave (1393–1464), writing in the mid-fifteenth century, only notes the death of cattle and not the famine, in his *Chronicle of England*. He writes that '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'.⁵⁸ Raphael Holinshed's *Chronicles of England*, written in the sixteenth century, which closely follows Trokelowe's account of the early fourteenth century, also mentions the pestilence and presents a general picture of its dissemination.⁵⁹

As we have seen, the disease is also referred to in correspondence. In addition to the aforementioned letter of Henry of Eastry, in which he complained of losing more than a thousand cattle, there is a letter to the Bishop of Rochester (or his commissary), in which the Prior and Chapter of Christ Church, Canterbury lamented great losses of stock suffered on the manors belonging them. A vast number of oxen (*boves*), bulls (*tauri*) and cows (*vaccae*) and the offspring of cows (*vaccae cum exitu*) are listed. In total, on about 40 manors, 257 oxen, 511 cows, their offspring, as well as several bulls, are said to have died of disease. The Prior and Chapter note that their 'immobile lands and possessions have been made unusually barren' and that

Note 55 *continued*

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', in J. Lumby (ed.), Henrici Knighton, *Leycestrensis chronicon*, II (1965), pp. vii, 412.

⁵⁶ '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 ... Dictabatur etiam, quod tota Gallia per idem tempus eadem peste fuit infecta', in H. Riley (ed.), Walsingham, *Historia Anglicana*, I (1863), pp. 156–7.

⁵⁷ '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', in H. Riley (ed.), Walsingham, *Ypodigma Neustriae* (1876), pp. vii, 252. A similar passage is found in his *Historia Anglicana*, pp. 156–7.

⁵⁸ Capgrave, *Chronicle of England*, p. 185.

⁵⁹ 'In this season, to wit, in the year 1319, a great murreine and death of cattell chanced through the whole realm, spreading from place to place, but speciallie this year it reigned most in the north, where as in the years before it began in the south parts', in Holinshed, *Chronicles of England, Scotland and Ireland*, II (1807), p. 557. Holinshed's work was originally published in London in 1586.

'they do not produce the usual grain for [Christ Church] on account of the pestilence of their animals'. Several thousand sheep are also said to have died of pestilence on the same demesnes. The letter is dated October 1327 yet itself provides no indication of whether the mortalities occurred in the mid-1320s, as R. A. L. Smith presumed, or when the panzootic passed through England c.1319–21. Slavin's consultation of the manorial accounts, though, illustrates that the losses of sheep occurred c.1315 and the losses of cattle c.1320. The bareness and poor yields described were probably – at least in part – a product of the cattle panzootic.⁶⁰ Another letter in the Letter books of Christ Church Canterbury also mentions a 'failure of animals' in 1320.⁶¹

In September 1319, Simon Eye, abbot at Ramsey, wrote to Edward II about a sudden loss of cattle and an inability to plough. He writes, 'since a sudden pestilence has attacked our animals, they are dead in such great number that the air has been infected from the stench of the corpses and there is fear that a pestilence among people is probably coming later'.⁶² In the same year, a letter from St James's Hospital at Westminster complained of 'the mortality of animals and the poverty of their resources'.⁶³ At Bolton Priory (Yorks.), Archbishop Melton in a letter dated 26 October 1320 attributed the losses of cattle in the north of England in part to the 'universal pestilence of plough beasts'.⁶⁴ Several other bits of evidence survive in England. For example, on the estates of the bishop of Winchester, a complaint was issued which frankly states 'almost all the cattle of the area are dead' and a note attached to the 1318–19 manorial roll of Martham (Norfolk) by the bailiff or reeve writes that 'before the rendering of the account, all oxen, cows, older bullocks and heifers, younger bullocks and heifers, as well as calves died, except for three cattle heads, namely six oxen, six cows and one younger bullock'.⁶⁵

Disease appeared next in Wales and Scotland. As discussed below, manorial data illustrate that the pestilence reached south-eastern Wales in 1320. It is clear that it pushed beyond the Welsh Marches, however. In 1320, Edward's subjects in Morganoc pleaded for relief of dues in part 'because of the great pestilence of cattle'. Furthermore, the Bishop of Bangor petitioned the king for relief of dues c.1320 because he was 'impoverished by bad years and now by a murrain of beasts' (probably on his lands in Anglesey and Caernarvonshire), and the bondmen of Penrhosllugwy (Anglesey), who petitioned the king in 1322, also lost a large number of cattle to disease. Dafydd ap Hywel of Anglesey's petition to the king in 1328 regarding losses of cattle in a pestilence may be another reference to the panzootic, though the losses he sustained may have

⁶⁰ 'terrae et possessiones immobiles ipsorum magis solito steriles effectae, fructus sibi non afferunt consuetos, propter pestilenciam animalium suorum', in Sheppard (ed.), *Litterae Cantuarienses*, I (1965), pp. 243–5. R. A. L. Smith, *Canterbury Cathedral Priory* (1943), pp. 125–6, 156. Pers. corresp. with Slavin, 30 Sept. 2008. I am unaware of the total size of Christ Church's herd and whether the tally of dead cows (*vaccae*) here includes offspring.

⁶¹ 'pro defectibus animalium', in the *Letter books of the monastery of Christ Church*, I, pp. 44–5.

⁶² 'ac deinde subita pestilencia in animalia nostra iruente in tanta multitudine mortua sunt quod aer ex

fetore cadaverum infectus sit, et de pestilencia hominum postmodum verisimiliter timeatur', in J. Raftis, *Estates of Ramsey Abbey* (1957), p. 319.

⁶³ Kershaw, 'Great Famine', p. 30.

⁶⁴ 'prater infortunium universale morinae bestiarum, quod aliquamdiu in hoc regno invaluit', in J. Raine (ed.), *Historical studies and letters* (1873), pp. 306–7.

⁶⁵ Kershaw, 'Great Famine', p. 42; 'Ante reddicionem com poti omnes boves, vacce, bovette, juvente, bovin-culi, juvinculi et vituli sunt mortui, preter xiiij capita, videlicet uj boves, uj vacce et i bovinculus', in Slavin, 'Death and survival', p. 41.

occurred in the mid-1320s.⁶⁶ The evidence for Scotland is far more sparse. John of Fordun (d. 1384), in his *Chronica gentis Scotorum*, which was written in the third quarter of the fourteenth century but which made use of earlier texts, states simply that in 1321 'nearly all the animals were extinguished'. Later, Walter Bower (1385–1449) repeated Fordun's record verbatim.⁶⁷ As noted, the Tintern version of the *Flores historiarum* also notes that cattle in Scotland and the Welsh Marches were infected. The author writes that the disease reached the latter around the Feast of All Saints (1 November). Manorial accounts from south-eastern Wales indicate the year would have been 1320.⁶⁸ Since manorial and other written evidence testifies that the pestilence had already reached northern England in 1319, it is quite possible – particularly considering the large number of cattle in Scotland and frequency of livestock raids into northern England – that Scotland was affected initially in late 1319 or early 1320.

Thomas Gray's mid-fourteenth-century *Scalacronica*, which was written while Gray was imprisoned at Edinburgh, implies that a cattle pestilence ('murrain') struck Edward II's army in 1322 and caused it to disband before it reached Newcastle en route to Edinburgh. At least this is what is gathered from Herbert Maxwell's early twentieth-century version of the text. Andy King's recent edition illustrates that 'murrain' may be too specific a term: Gray wrote only of 'famyne' and 'malady'.⁶⁹ John Barbour, in his poem *The Bruce*, written c.1375, writes that English troops found themselves hungry in the north (in Lothian) when unfavourable weather prevented the landing of their supply ships. He states that a 'large company' of them set out to forage 'but they found no cattle'. He continues, 'when the king and those who were of his council saw that they could get no cattle to eat for their host, they turned back to England'. Though Barbour makes no note of disease, and attributes the failure of the English to find cattle to the foresight and strategy of Robert the Bruce, other textual and manorial evidence certainly indicate that cattle may have been relatively few on account of the outbreak of acute disease.⁷⁰

Nor was Ireland exempt. Many Irish annals document disease among cattle in the first half of the 1320s. Though the history of each set of annals is complex and the interrelationships between them often quite intricate, it is clear that the disease affected the country first in 1321 and persisted for about four years. Several of the entries collected here are clearly not independent. In fact, the *Annals of Connacht*, or the lost texts cognate with it, was probably the common source for most of the entries collected below. Entries in the *Annals of Ulster* are similar with those in the *Annals of Connacht* and seem to have been written a little later and to have been paraphrased. The single relevant entry from the *Annals of Innisfallen* may also be a rewording of the 1325 entry in the *Annals of Connacht*. The *Annals of Loch Cé* is lacunose

⁶⁶ F. Seebohm (ed.), *The tribal system in Wales* (1895), p. 27; W. Rees (ed.), *Calendar of ancient petitions relating to Wales* (1975), pp. 255, 499; A. Carr, 'Wales: economy and society', in S. H. Rigby (ed.), *A companion to Britain in the later middle ages* (2003), p. 133; id., *Medieval Anglesey* (1982), pp. 300–2; id., *Medieval Wales* (1995), p. 100; Lucas, 'Great European Famine', p. 355 n. 3.

⁶⁷ 'cuncta fere animalia extinxit', in W. F. Skene (ed.), *Johannis de Fordun, Chronica gentis Scotorum* (1871), p. 349; D. E. R. Watt (ed.), W. Bower, *Scotichronicon* VII

(1996), p. 11.

⁶⁸ Above n. 36; William Rees, *South Wales and the March, 1284–1415: a social and agrarian study* (1924), p. 176 n. 3.

⁶⁹ H. Maxwell (ed.), Thomas Gray, *Scalacronica* (1907), p. 69; A. King (ed.), Thomas Gray, *Scalacronica, 1271–1363* (2005), pp. xlv, 88–9.

⁷⁰ A. A. M. Duncan (ed.), *John Barbour: the Bruce* (1997), pp. 678–81.

over the relevant years and the entries found on CELT (the Corpus of Electronic Texts) and in William Hennessy's edition are taken from the *Annals of Connacht*. Lastly, the *Annals of Clonmacnoise* or *Mageoghagan's book*, an early seventeenth-century translation of an earlier text, also follows the *Annals of Connacht*. Nevertheless, it is certain that the three entries of 1321, 1324 and 1325 in the *Annals of Connacht* were written contemporaneously and in Connacht.

In 1321, the *Annals of Connacht* reports 'a great cattle-plague throughout Ireland, the like of which had never been known before'. Similar entries are found in other texts: the *Annals of Ulster* notes of a 'great cow destruction throughout all Ireland in general'; the *Annals of Loch Cé* writes of 'a great cow-destruction throughout all Erin, the like of which was not known before'; and *Mageoghagan's book* records 'a great murrain of cows throughout all Ireland that the likeness was never seen before'. The disease appears to have lingered on the island for some time. In 1324, the *Annals of Connacht* again documents mortalities of cattle, 'the same cattle-plague was in all Ireland this year. It was called the *Mael Domnaig*'.⁷¹ Similar entries are again found in other texts: the *Annals of Ulster* reports 'the same cow-destruction (namely, the *Maeldornnaigh*) prevailed throughout Ireland'; the *Annals of Loch Cé* writes of 'the same cow-destruction throughout all of Erin in this year; and it was it that was usually called the *Maeldomhnaigh*'; and *Mageoghagan's book* records that 'the murrain of cows continued still in Ireland and was called *Moyle Dawine*'. In 1325, the annals again mention the pestilence. The *Annals of Connacht* succinctly notes 'the cattle plague throughout Ireland still', while the *Annals of Ulster* records 'the same cow-destruction prevailed in Ireland again', the *Annals of Loch Cé* 'the cow-destruction still throughout Erin', and *Mageoghagan's book* 'the murrain of cows continued still'. In the *Annals of Innisfallen*, under the year 1326 (in CELT, 1321), is found 'a great murrain of the cows of Ireland in the above year [1325], and there was a great famine [...] in the same year'. Additionally, in Séamus O'hinnse's collection of Irish annals, one text records that 'in 1321 there was a very hard winter, which distressed men, and killed nearly all animals' and in 1324 in the *Annales Hiberniae* (or *Grace's annals*) from St Mary's Abbey in Dublin, is found 'again there was the common murrain of oxen and of cows in Ireland'. The dating of these last two entries may be in need of revision. The latter appears to have been compiled in the later fourteenth century from earlier sources but to be independent of the other entries listed here.⁷²

⁷¹ One editor translated this as 'devotee of Sunday'. Yet with the help of James Acken, I find the translation a 'pestilence of horned cattle' more suitable.

⁷² It should be noted that the dating of the entries in the Irish annals used in this paper is that provided by CELT, but that CELT's dating of the relevant entries in the *Annals of Ulster* c.1320 is three years too early. The chronology of the *Annals of Ulster* in fact is asynchronous by between one and five years between 1263 and 1378. Based on the similarities of the entries c.1320 in the *Annals of Ulster* with those in the *Annals of Connacht* and others derived from the *Annals of Connacht* or a text related to it, we can conclude, as did the editors of the paper edition of the *Annals of Ulster*, that the entries collected here refer to events in 1321, 1324 and 1325, not

1318, 1321 and 1322. The dating provided in the paper edition of the *Annals of Ulster* certainly fits best with the other annals collected here and what is known of the pestilence's westward progression. Likewise, CELT dates the one relevant entry from the *Annals of Innisfallen* some five years earlier than Seán Mac Airt's paper edition. While the entry likely refers to events in 1325 and not 1320, the *Annals of Innisfallen* is lacunose from 1322 to 1391, indicating that the entry is likely retrospective and derivative. See S. Mac Airt (ed.), *Annals of Innisfallen* (1951), pp. 435, 574. Other cattle mortalities mentioned in this paper documented in the *Annals of Ulster* in 1298 and 1336, and the *Annals of Innisfallen* in 1296, should also be considered too early. The annals can be viewed at CELT, <http://celt.ucc.ie/publishd.html>

In the mid-1320s, disease seems to appear again among English cattle. Manorial accounts from the Breckland region and the Skipton area of West Riding show losses, and Philip Slavin and David Stone, as is discussed below, have uncovered notable cattle mortalities on several demesnes in the mid-'20s. Walsingham, who wrote roughly 90 years later, also records a mortality of 'many animals', both domesticated and wild, in the mid-1320s, though he ascribes these losses to extreme weather.⁷³ In the mid-1330s, cattle mortalities appear again in and beyond England. Knighton records a 'great death of cattle' in 1335 in England and several Icelandic annals document 'a great destruction of cattle' in Iceland in 1336.⁷⁴ David Thloyt from Llyn in Wales also petitioned the king in the mid-1330s and lamented his impoverishment following a 'murrain of cattle'.⁷⁵ In addition, in 1339, the *Annals of Connacht* records 'a great pestilence upon the cattle of Ireland'. As before, similar entries are found in the same year in other Irish annals and the *Annals of Connacht* again appears to be the common, contemporary source. The *Annals of Ulster* reports that a 'great portion of cattle were lost' and the *Annals of Loch Cé* a 'great plague on the cattle'. As all three entries seem to stem from the *Annals of Connacht*, it is not surprising that they all fix roughly the same temporal limits to the mortality: they state that it began a 'fortnight' after the onset of winter and lasted 'until spring' or 'until a part of spring'.⁷⁶

II

Clearly many cattle died from disease in the early fourteenth century. It cannot be assumed, however, that all the mortalities documented across Eurasia in the first four decades of the century were the product of the same infection or that they occurred during a single, uninterrupted outbreak. It is not implausible that multiple waves of disease passed through parts of Europe or that regional outbreaks occurred simultaneously. Close attention to the evidence available is necessary to ensure that what may have been distinct local or national epizootics are not wrongly sewn together to construct a single transnational occurrence of disease. While it is important to highlight what is not known for certain about cattle mortalities and disease in the

Note 72 continued

or see A. M. Freeman (ed.), *Annals of Connacht* (1970); C. Mageoghagan (fl. 1625) and D. Murphy (eds), *Annals of Clonmacnoise* (1896); W. Hennessy and B. Mac Carthy (eds), *Annals of Ulster* (1893); W. Hennessy (ed.), *Annals of Loch Cé* (1965); S. Mac Airt (ed.), *Annals of Innisfallen* (1951); S. Ó hinnse (ed.), *Miscellaneous Irish annals (1114–1437)* (1947). The entry from the annals of St Mary's Abbey ('Item, communis morina boum et vaccarum in Hibernia') is found in J. T. Gilbert (ed.), 'Annales Hibernie', *Cartularies of St Mary's Abbey*, II (1965), pp. cxv, 362. No early fourteenth-century cattle mortalities are documented in the *Annals of the four masters*. My reading of the Irish annals here has benefited greatly from the advice of Dan Mc Carthy. For further comment on the history and chronology of the annals, and the interrelationships between them, see his *The Irish annals:*

their genesis, evolution and history (2008), pp. 6–14, 245, 254–55, 342–44, 349–52, passim; and id., 'The chronological synchronization of the Irish annals' at www.irish-annals.cs.tcd.ie.

⁷³ Kershaw, 'Great Famine', pp. 32, 43; Bailey, *Marginal economy*, p. 204; Walsingham, *Historia Anglicana*, p. 177. Continental evidence of cattle mortalities in the mid-1320s may yet be discovered.

⁷⁴ Fleming, *Animal plagues*, p. 96; Guðni Jónsson (ed.), *Annalar Íslenzkir* (1948). Jeff Hartman informs me that the *Skálholts annal* and *Gottskalks annal* observe this mortality. Pers. corresp. 10 June 2009.

⁷⁵ *Ancient petitions*, p. 255; Carr, *Anglesey*, p. 302.

⁷⁶ For the Irish annals see n. 72. The entry in the *Annals of Ulster* is again dated three years too early on CELT.

early fourteenth century, this paper argues that a panzootic can be discerned in the literature collected above. It is not only possible to define the general spatial and temporal parameters of the pestilence but also to conclude that the deaths of English and Welsh cattle between the manorial account years of 1318–19 and 1320–1 were a part of a pan-European outbreak of disease.

To begin, it is certain that the cattle mortalities observed in English and Welsh manorial accounts in the years around 1320 were a product of disease. Not only do accounts specify that disease killed cattle (animals were recorded as *in murrina/morina* or *in communi murrina/morina*, in murrain or disease) but the other written evidence, both contemporary and near-contemporary with these manorial accounts, specifies that cattle losses were the result of disease and not, for example, extreme weather. Across Europe texts, correspondence and petitions refer to *pestilentia*, *lues* and *morina*. Equally important, several texts claim that the disease was present over large areas. The *Chronicon Lanercost* states that the pestilence spread from the south to the north in England, the Westminster version of the *Flores historiarum* describes the disease spreading through ‘a quarter’ of the English kingdom and the Tintern version notes that the disease affected much of England, Scotland and the Welsh Marches. Trokelowe asserts that the pestilence infected ‘all’ of England and France, and the Chronicle of Louth Park claims that ‘all’ of England was afflicted and that some thought that ‘all’ of Christendom suffered. Whether or not these texts are precisely correct in their assertions, multiple contemporary chronicles independently stress the greatness of the outbreak and its wide prevalence, implying that the pestilence was indeed a significant event – regardless of the fact that it was a common topos to emphasize the geographical vastness of a pestilence. Moreover, very few of the texts that record the outbreak document any other cattle pestilence, and manorial accounts – which survive in the greatest abundance from 1260 to 1430 – confirm that the outbreak was unique. Both the scale of the mortality and the prevalence of the disease seem to have been unparalleled: in no other account year do cattle seem to have died as they did c.1320. Cattle dying in numbers across much of England, and the abnormal scale of mortality, strongly implies that English cattle were dying from the same disease.

Textual and manorial evidence also clearly indicates that cattle mortalities did not occur simultaneously across Europe. They could not therefore have been directly caused by weather, as they did not coincide with any particular weather pattern, but by an infection gradually spreading geographically. While the initial irruption of the pestilence in England is rather ambiguously documented by several English texts, manorial accounts provide more exact details. Many English texts, such as the Devonshire chronicle, bundle multiple biological and environmental shocks that transpired between 1314 and 1322 into a single passage, under a single year, often early in the famine. (These phenomena are now usually understood as composites of the Great European Famine.) Despite this, the dating of the panzootic’s arrival in England is fairly secure. It is quite probable that the pestilence began initially in Essex, around Easter 1319.⁷⁷ It thereafter spread north and west. Manorial accounts and some of the

⁷⁷ Kershaw followed Trokelowe and placed the arrival of the cattle panzootic in Britain in Essex, at Easter 1319. But this is approximate, as dating pestilences and other disasters precisely to Easter or other religious holidays was not unknown. Manorial accounts substantiate this rough dating. ‘Great Famine’, p. 14, and cf. fn. 38 above.

literature collected above illustrate that the pestilence disseminated north through England and eventually to Scotland, perhaps aided by the baggage of Edward II's army.⁷⁸ The claim of the Tintern version of the *Flores historiarum* that the pestilence began in Scotland and then spread to Wales and England is incorrect. Moreover, John of Fordun only documents an animal mortality in Scotland in 1321, two years after the pathogen's appearance in England, though, as noted, the Scottish borderlands could have been infected in late 1319. While the mass of evidence indicates that the disease began first in south-east England in 1319, the pestilence entering England at multiple points is a possibility that cannot quite yet be discounted altogether.

It is unlikely that a demographically devastating and highly infectious disease of cattle would spontaneously irrupt in south-east England. The infection was, by all indications, new to the England's cattle population. We may possibly be dealing with a 'virgin-soil' outbreak of disease.⁷⁹ Because texts and manorial accounts testify that cattle died rapidly and that cattle of all ages succumbed to the pestilence, it is likely that cattle did not possess any resistance to the infection.⁸⁰ All of this points to the fact that the pestilence was not native to England but was imported, and that it probably persisted until it burnt itself out when all exposed susceptible animals had been infected.

The irruption of the infection in south-east England strongly indicates a continental origin, probably the Low Countries.⁸¹ The cattle mortalities recorded by William of Egmond and Edmund of Dynter and in other texts from the Netherlands are certainly related to the English losses sustained c.1320. While there is at present no way to interpret with precision when or where the pestilence began in the Low Countries, it is improbable that the outbreak originated there, considering the acuteness and communicability of the disease evident in manorial accounts and the literature collected above. Edmund of Dynter's emphasis on the severity of the mortality in the Low Countries also implies that the disease was not already known in the region. In fact, it is very unlikely that the pestilence was native to any part of north-western, northern or central Europe. Though it seems that large international cattle trades had yet to commence, trade in cattle between the various regions of Europe affected by disease in the early fourteenth century was definitely not unknown. It would be counter-intuitive to assume that an infection as acute and contagious as the early fourteenth-century cattle pestilence could exist enzootically in any

⁷⁸ The role of Edward's army, specifically the baggage train, may have in fact been quite minimal, if the infection was as acute as it appears to have been. It is unlikely that animals would have been able to trek long distances after falling sick. The army's cattle may have been exposed to the disease in the North or the infection may have made its way there via other movements of cattle contemporaneously.

⁷⁹ Outbreaks of disease in which 'the populations at risk have had no previous contact with the diseases that strike them and are therefore immunologically almost defenseless'. A. W. Crosby, 'Virgin soil epidemics as a factor in the aboriginal depopulation in America', *William and Mary Quarterly* 33 (1976), p. 289. However, animals

may have simply been unable to develop resistance to the disease and the infection may not have been altogether 'new' to the areas it afflicted.

⁸⁰ The *Poem on the evil times of Edward II*, *Historia aurea*, *Chronicon Lanercost* and the chronicle of Newenham abbey, as well as the abbot of Ramsey, indicate that cattle died quickly (presumably following the appearance of symptoms). The accounts at Thorncroft refer to the pestilence as the 'sudden death'. Kershaw, 'Great Famine', p. 25. Philip Slavin informs me that the accounts of a Kent demesne also refer to the disease as the 'sudden death'.

⁸¹ Newfield and Slavin, 'Cattle pestilences in pre-industrial Europe', in preparation.

region of central, northern or north-western Europe that was connected directly or indirectly via movements of cattle to the rest of Europe, without routinely devastating large numbers of cattle or establishing some balance in domestic bovines and, by doing so, diminishing in virulence.⁸² A wider perspective clearly illuminates a pan-European pestilence beginning in Bohemia c.1315, spreading to Germany, the Low Countries, France and Denmark c.1316–18, to England c.1319, to Scotland c.1319–20, to Wales c.1320, and to Ireland c.1321.

Precise dating of the spread of the pestilence into and through the majority of the regions it affected does not seem possible at this point. It is relatively clear, however, that cattle in central and northern Germany were infected later than cattle in Bohemia, and that cattle in central and northern France, the Low Countries and Denmark fell sick after their German counterparts did. England's bovine stocks clearly began to succumb to the disease after it had spread across the continent but before cattle began to die in Wales, Scotland and Ireland. Without data like that supplied by the English and Welsh manorial accounts, it is possible only to establish this rough chronology of the pestilence's diffusion across Europe. In continental Europe the cattle pestilence occurred closer in time than in England to the myriad natural disasters that struck most of central, northern and north-western Europe after 1314. This makes the task of distinguishing precisely when it arrived in particular regions of mainland Europe all the more difficult, as some continental texts, such as the *Annales Egmundani*, like several English chronicles, bundle multiple phenomena that transpired over several years into a single passage. Like English chroniclers, continental writers often report mortalities of humans, mortalities of cattle, mortalities of sheep, extreme weather and famine in a single passage, which only confuses attempts to establish a precise chronology of the pestilence's progression. Despite the uncertainties, however, a clear east-west trajectory is seen.

This east-west trajectory shows that we are indeed looking at a pan-European outbreak of disease. It is utterly improbable that multiple regional outbreaks, which affected cattle alone, would appear in texts in a sequence of years and follow a general east-west progression, and occur only in areas experiencing famine conditions. Though it is very probable, regardless of the inability of contemporaries to distinguish between multiple pathogens at the molecular level, that the bulk of the disease-related deaths of cattle during the famine era did stem from a single pestilence, it is possible that other diseases, or secondary infections, killed an animal here or there. Some animals represented in continental reports of disease c.1315–17 may have died of starvation. In any event, the evidence strongly indicates that the mass of cattle succumbed to one and the same disease, not a confluence of infections.

⁸² On European trade in cattle prior to the Black Death see, for example, R. Hoffmann, 'Frontier foods for fourteenth-century consumers: culture, economy, ecology', *Environment and History* 7 (2001), pp. 137–8; W. Gijssbers and P. Koolmees, 'Food on foot: long-distance trade in slaughter oxen between Denmark and the Netherlands (fourteenth–eighteenth century)' *Historia Medicinae Veterinariae* 26 (2001), p. 116; L. Bartosiewicz, "'There's something rotten in the state': bad smells in antiquity' *European J. Arch.* 6 (2003), p. 177; E. L. Petersen, 'Production and trade in oxen: 1450–1750', in E. Westermann (ed.), *Internationaler Ochsenhandel (1350–1750)* (1979), p. 137; id., 'Some problems concerning international oxen trade from a Danish view', *ibid.*, pp. 255; F. Glamann (trans. G. French), 'European Trade, 1500–1700' in C. M. Cipolla (ed.), *The Fontana economic history of Europe: the sixteenth and seventeenth centuries* (1974), p. 469; N. Hybel and B. Poulsen, *The Danish resources, c.1000–1500: growth and recession* (2007), pp. 377, 392. On the growth of international cattle trades post 1350, see I. Blanchard, 'The continental European cattle trades, 1400–1600', *ECHR* 39 (1986), pp. 427–60.

The prevalence of the disease in most regions known to have been afflicted is, like the pestilence's temporal parameters, difficult to gauge. Manorial accounts in England and, to a lesser extent, Wales, illustrate that the disease's distribution in those countries but in most infected areas of Europe, it is impossible to articulate with any precision the pestilence's spatial extent. Consideration of trade and transhumance in affected regions as well as cattle population distribution and density may better inform any guesswork. Attention to the disease's communicability and the ability (or inability) of contemporaries to curb its dissemination would also help. It is certainly not impossible that the pestilence was as ubiquitous in most regions of Europe as it was in England. Here Scotland and Denmark are especially interesting cases. Little evidence survives in both countries for the cattle pestilence and whether the infection widely affected either is unknown. However, large cattle populations existed in highland Scotland, south-western Jutland and western Schleswig and live cattle were traded – though not to the same extent as after the Black Death – between Scotland and England on the one hand, and Denmark and the Low Countries on the other. Considering this, and regardless of how sharply the wealth of evidence for the infection in northern England and the Low Countries contrasts with the paucity of evidence for the cattle-based economies of Scotland and Denmark, it is likely that the panzootic attained wide prevalence in much of Scotland and Denmark.⁸³ Likewise, it is quite plausible – on account of the size of its cattle population – that much of Ireland was infected in the early 1320s, although most of the Irish evidence appears to stem from the western province of Connacht.

The duration of the outbreak is likewise unclear in most regions at present. In England manorial accounts indicate that the panzootic subsided in 1321. In Ireland the annals indicate the infection persisted until at least 1325. Judging from the texts collected above, the disease may have continued for between two and three years in the Low Countries. It may have persisted in most regions for two years, though it probably held on longer in countries that, like Ireland, had large populations of cattle. France may have been afflicted until at least 1319, as some English chronicles assert that the pestilence was present in France at the same time as in England.

Cattle mortalities documented in central and northern Europe, and east of Europe c.1300–10, may be interpreted as the initial irruption and European contact of what would become the European panzootic. Considering that the pestilence disseminated rapidly across central, northern and north-western Europe and was possibly virgin-soil, it is highly likely that the pathogen originated to the east. Of course, rather than assuming that the European outbreak resulted from cattle being imported from a region where the infection existed enzootically, there may be another explanation for the disease's apparent irruption east of Europe, which is not visible in the written evidence. While an interpretation of the panzootic's origins should not rest too much on the superimposition of modern knowledge onto the pre-modern past, it may be worth noting that eighteenth- and nineteenth-century European cattle panzootics were also of non-European origin. None of the 'modern' infectious diseases that spread easily if unchecked,

⁸³ Evidence that these regions were affected by the GEF is also comparatively lacking, yet some scholars stress that both suffered the subsistence crisis. For Scotland see Kershaw, 'Great Famine', p. 6, n. 46; Jordan, *Great Famine*, p. 99; C. McNamee, 'William Wallace's invasion of Northern England in 1297', *Northern Hist.* 26 (1990), p. 58. For Denmark see Hybel and Poulsen, *Danish Resources*, pp. 65–8, 113–4, 128–9; N. Hybel, 'Klima, Misvækst og Hungersnød i Danmark, 1311–19', *Historisk Tidsskrift* 97 (1997), p. 40.

causing mass sickness among cattle – such as contagious bovine pleuropneumonia, foot-and-mouth disease and rinderpest – currently exist enzootically in Western Europe. Though it is impossible to be certain, it is not unreasonable to suggest that the mortalities attributed to disease in the first decade of the fourteenth century in annals and chronicles in central and northern Europe were brief and limited (but potentially highly damaging) incursions of a disease into Europe that was present earlier and contemporaneously in regions east of Europe, including Mongolia. It is also possible that the Mongol expansion of the thirteenth century introduced ‘new’, but devastating, cattle diseases to the fringes of Europe, which took time to spread further west. The pathogen of the panzootic may have initially entered Europe c.1300–10 via regular lines of trade and only irrupted into a pan-European outbreak with the onset of vast crop failures, grain shortages, and the famine economies and conflict that they provoked or aggravated.⁸⁴

There is little room here to elaborate this point, yet it is probable that the unusual circumstances of the Great European Famine would have promoted the diffusion of the infection across much of Europe along lines of trade (droving routes and markets), communication, transhumance and baggage trains.⁸⁵ An ‘intolerable shortage of oxen’ noted in Edward II’s price edict of 1315 may have resulted in the importation of continental cattle, and hence the infection, into England. High prices for cattle and meat in England beginning c.1310 imply that demand was significant. As early as 1306 and again in 1307, English exports of grain and ‘beasts’ (presumably cattle) were banned.⁸⁶ The initial years of the grain shortage may have also resulted in higher consumption rates of cattle across much of Europe and, in turn, higher prices. Additionally, the significant (if regional and episodic) floods of the early fourteenth century, and the early famine years in particular, may have denuded cattle numbers in some areas of continental and insular Europe, such as Louth Park.⁸⁷ The grain scarcity c.1314–17 may have also adversely affected the nutritional status and immune function of cattle, and in so doing increased their susceptibility to infection. Wasting may have been common. Certainly all or any of these factors could have caused or intensified shortages of cattle and resulted in the greater traffic and trade of cattle across Europe, which would have facilitated the pathogen’s dissemination if spread between cattle.

Some modern scholars seem to have envisioned a direct connection between the extreme weather and the livestock pestilences of the Great European Famine.⁸⁸ A strong connection

⁸⁴ Długosz claims that Mongol advances resulted in extreme dearths of draught animals in Hungary in the mid- and late thirteenth century. *Annals*, pp. 184, 228.

⁸⁵ However, it is possible that the infection’s irruption had nothing to do with the Great European Famine or famine-oriented trade in cattle and grain. The infection may have simply entered regular lines of commerce and communication.

⁸⁶ C. W. Colby (ed.), *Selections from the sources of English history* (1899), pp. 92–3; *Calendar of Close Rolls*, 1302–7 (1908), pp. 471, 522; Jordan, *Great Famine*, pp. 57–8, 171–2; Mate, ‘High prices’, pp. 1, 7–8, 10–11; Aberth, *Brink*, p. 22. Export bans on ‘meat’ (among other things)

were also issued in 1317 and 1318; they also signify real shortage pre-panzootic. *Calendar of the Close Rolls*, 1313–18 (1971), pp. 455, 588.

⁸⁷ *Parco Lude*, p. 24. On early fourteenth-century flooding see Jordan, *Great Famine*, pp. 18–9, 24, 99, 136; M. Bailey, ‘*Per impetum maris*: natural disaster and economic decline in eastern England, 1275–1350’ in Campbell (ed.), *Before the Black Death*, pp. 184–208; J. A. Galloway, ‘Storm flooding, coastal defense and land use around the Thames estuary, c.1250–1450’ *J. Medieval Hist.* 35 (2009), pp. 171–88.

⁸⁸ For example, C. Thornton, ‘Introduction’, in D. V. Stern, *A Hertfordshire demesne of Westminster Abbey*:

between weather and the cattle pestilence is, however, hard to substantiate. Of course, pestilences of cattle have occurred without extreme or volatile weather, and while weather may have had much to do with sheep mortalities c.1314–17, it is unlikely that it caused the cattle panzootic per se as the pestilence persisted through several significant and seemingly abrupt changes of weather. Many infections do have specific environmental precursors and are conditioned to some degree by weather as well as the nutritional standing of the susceptible species. Not all, though, respond favorably to multiple variations in temperature and aridity, let alone extreme variations like those of the Great European Famine. It is doubtful that a pathogen would react favorably to a sequence of extreme environmental conditions or require extreme and volatile weather to erupt on a grand scale. Though some disease outbreaks have been thought to respond and closely adhere to El Niño and dust-veil events, the panzootic did not follow any one or particular weather trend as it spread across Europe.⁸⁹ In fact, the multiple extreme weather fluctuations of the famine strongly imply that the infection was not closely associated with weather nor was it vector-borne. An arthropod population would probably not have thrived in the periods of heavy precipitation, drought, heat, and cold that the panzootic spanned. There is also no evidence to indicate that the disease was spread primarily in water. It seems, particularly considering the speed of its dissemination over such a large geographical expanse, that the pestilence was a highly communicable respiratory infection. Weather may have been irrelevant to the infection, though it is certainly possible that famine conditions, that weather generated, facilitated the wide diffusion of the disease. Moreover, it is plausible that the poor yields and food shortages of the Great European Famine negatively influenced the nutritional status of cattle, compromised their immune systems, and heightened both their susceptibility to the infection and mortality rates.

If the pestilence was spread by those susceptible to it and was highly contagious and acute, it might be difficult to interpret cattle mortalities in England in the mid-1320s – and in England, Wales, Ireland and Iceland in the mid-1330s – as extensions or reoccurrences of the panzootic. Mortalities in the mid-'20s and '30s appear at present to be less prominent in manorial accounts than in other written sources. In addition to the evidence of disease among English cattle in the mid-1320s, reviewed earlier, Stone reports a cattle mortality of 54 per cent in the account year of 1327–8 at Hinderclay and Slavin finds losses on several more demesnes. However, herds seem to have fallen by a comparatively small 15 per cent on average in the mid-'20s.⁹⁰ The cattle mortalities c.1325–8 also appear to have been restricted to a few regions of England, though Dafydd ap Hywel's petition of 1328 may indicate that cattle had been dying in Wales in the mid-1320s as well. Nevertheless, it is possible that the panzootic spread back to England

Note 88 continued

profits, productivity and weather (2000), p. xlviii; Campbell, *Seigniorial agriculture*, pp. 23, 417. Mike Baillie likewise seems to seek a direct connection between the Black Death and contemporary climatic deterioration, noting that the 1340s were not 'an arbitrary point in time, when a plague just happened to arrive', in *New light on the Black Death: the cosmic connection* (2006), p. 34. This may be overly reliant on medieval opinion.

As Jordan notes, authors contemporary with the Great European Famine 'describe a situation in which terrible weather ushered in or laid the foundation for livestock pestilences'. *Great Famine*, p. 35.

⁸⁹ For example, R. B. Stothars, 'Volcanic dry fogs, and plague pandemics in Europe and the Middle East', *Climatic Change* 42 (1999), pp. 713–23.

⁹⁰ Stone, 'Farm management', n. 77; Newfield and Slavin, 'Cattle pestilences'.

from Ireland c.1325. It is also possible that the pestilence persisted in wild animals, unnoticed or unrecorded by chroniclers.⁹¹

The cattle mortalities of the mid-1330s are even more difficult to connect with the c.1315–25 panzootic (let alone the losses of the mid-1320s). Stone reports a cattle mortality of 26 per cent in 1333–4 at Hinderclay and, at Wisbech Barton, he notes that more cattle died of disease in 1334–5 than in any other early fourteenth-century account year. Additionally, he observes that 12 per cent of Wisbech's herd died in 1332–3 and 17 per cent in 1333–4. Mavis Mate has also remarked on a pestilence on several demesnes in southern England in the mid-1330s, reducing herds from 54 to five, 25 to three, and 35 to nine.⁹² While more work of this kind is needed, there is little reason at present to link these losses with those c.1320. Moreover, the evidence presently available is too scant to suggest an average herd mortality in the mid-1330s and, in any case, multiple outbreaks of disease cannot be judged to be biologically related on the grounds of mortality alone. Neither do the texts themselves connect the mortalities of the mid-1320s and '30s to the panzootic. The evidence is not even strong enough to state that most deaths c.1335 were the result of disease: annals and chronicles attribute mortalities in the mid-'30s to weather.⁹³ The substantial lapse between the mortalities of the mid-'20s and '30s is also hard to account for.

Ultimately, the written evidence may never prove that the mid-1320s or '30s mortalities were connected with the panzootic. The pathogen may have evolved or adapted, some animals may have developed resistance, or farmers may more regularly separated sick from healthy animals – any of which could have caused lower mortalities, limited the spread of disease, whilst passing undocumented by medieval authors. The dissemination of an infection in the 1320s and '30s may have also been inhibited by the inability of some areas to fully restock after the c.1315–25 panzootic. If herds were repaired slowly, the disease would have presumably spread

⁹¹ Evidence of mortalities in deer parks at this time would be enlightening. If the panzootic was rinderpest, it may also have had something to do with the decline of wisents and urs in north-western Europe before 1400. T. G. Ahrens, 'The present status of the European bison or wisent', *J. Mammalogy* 2 (1921), p. 58; T. Barrett and P. B. Rossiter, 'Rinderpest: the disease and its impact on humans and animals', *Advances in Virus Research* 53 (1999), p. 100; Spinage, *Cattle plague*, p. 81.

⁹² Stone, 'Farm management', n. 77; id., *Decision-making*, pp. 46, 72; M. Mate, 'The impact of war on the economy of Canterbury Cathedral Priory, 1294–1340', *Speculum* 57 (1982), pp. 772, 773; also see her 'The agrarian economy of south-east England before the Black Death: depressed or buoyant?', in Campbell (ed.), *Before the Black Death*, pp. 92–3; B. M. S. Campbell, 'Ecology versus economics in late thirteenth and early fourteenth-century English agriculture', in D. Sweeney (ed.), *Agriculture in the middle ages: technology, practice and representation* (1995), p. 77 also notes pestilential mortalities of cattle and sheep in 1334–35. Mortalities of sheep seem to be quite widespread again in the mid-1330s.

⁹³ Knighton records heavy rain and failing crops in England preceding the cattle deaths in 1335; 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 Icelandic annals attribute the mortalities to 'great' storms of rain as the cause for the cattle mortalities in 1336; and the *Annals of Connacht* and the *Annals of Loch Cé* record much snow, frost and crop failures as the agents of a cattle destruction in 1339. *Mageoghagan's book*, which does not document any mortality of cattle in the 1330s, does note that in 1339 'all the corn of Ireland was destroyed whereupon ensued a general famine'. The high mortalities reported by Stone and Mate suggest that there may have been two principal causes of cattle mortalities c.1335 or possibly that annals and chronicles misattribute the mortalities. Jeff Hartman advises me that the *Skálholts Annal*, the *Annalbrudstykk* of Skálholt, the *Flatöbogens Annal* and Lawman's *Annal* all document cattle mortality in Iceland in 1341 and attribute it to heavy snow and a volcanic eruption. Pers. corresp. 10 June 2009. For the Irish annals see n. 72.

less effectively in the mid-'20s and '30s than it had c.1320. Outbreaks in the mid-'20s and '30s would, consequently, appear quite different than the panzootic, which would complicate attempts to articulate any connection between them and the initial pestilence. The infection may have so afflicted the host's population density c.1320 that a chain of transmission could not be easily maintained later. And while it is unlikely that contemporaries came to control or curb the spread of the disease on a grand scale, more measures may have been undertaken after the initial outbreak that reduced the exposure of cattle to the infection. Needless to say, it is difficult to discern whether the disease behind fourteenth-century panzootic became enzootic for several years or decades in parts of Europe. It is worth noting that in the eighteenth and nineteenth centuries, outbreaks of what are believed to have been contagious bovine pleuropneumonia, foot-and-mouth disease or rinderpest persisted in some regions of central, northern and north-western Europe for a decade or more. If the disease did persist in the fourteenth century or become enzootic and less virulent, it would have attracted far less attention.⁹⁴

To some extent, whether the disease reoccurred or became enzootic and less acute, depends on whether cattle developed immunity to the infection. This is a subject on which little can be known for certain. If primarily young cattle perished in the mortalities documented in the mid-1320s and '30s or if mortality rates were notably lower and the disease was less prevalent in the mid-'20s and '30s than during the panzootic, and, of course, if the mortalities of the mid-'20s and '30s could be attributed to the same disease of the panzootic, more could be said of the acquisition of immunity. Conversely, if the same disease attained high mortality rates during the Great European Famine as well as in the mid-'20s and '30s, and affected cattle of all ages, it could be speculated that immunity was not conferred. High mortalities observed in the same locations during the panzootic and the mid-'20s would signify that animals did not acquire resistance. However, because cattle were often sold in bulk during the panzootic, as is discussed below, slaughtered at a relatively young age, and not infrequently transferred or traded, it is probable that most would not have been exposed to an infection on multiple occasions.⁹⁵ Most cattle on a farm in the mid-'20s may have had no connection to those on that farm c.1320, having been bought at market or brought in from elsewhere. In those instances where cattle were related, if less mortality occurred in the mid-'20s, it could be speculated that immunity was conferred. Though again it would be necessary to prove that the panzootic was related to later occurrences. The evidence is simply not enough to state whether cattle acquired immunity or not. That said, the development (or existence) of some resistance to the infection in European cattle may account for the unequal distribution of evidence for the panzootic across Europe. Fewer reports of disease in central and northern Europe may stem from the disease's relative inability to devastate cattle there. Some animals in these regions may have acquired some resistance to the infection following the outbreaks of the first decade of the fourteenth century.

⁹⁴ More attention to losses of cattle attributed to disease in manorial accounts in the 1320s, '30s and perhaps '40s, however, may provide substance to the idea that the pestilence did linger and continually eat away at herds. Campbell reports that on the Kent manors of Canterbury Cathedral Priory herds fell by 68 per cent from disease and bulk selling between 1318 and 1320;

were increased by 1328 to 91 per cent of their 1318 level but then registered a 14 per cent fall between 1328 and 1329; and, after an almost full recovery, a 26 per cent fall between 1331 and 1332. Pers. corresp. 15 Sept. 2008.

⁹⁵ See comments in Slavin, 'Death and Survival', pp. 37–9.

It is not conclusively known, though, whether mortalities c.1300–10 were a product of the same disease, which spread across Europe five years later. The distribution of known evidence may simply be an artifact of the present state of research or merely reflect the location of interested (and literate) observers.

Generally speaking it would be expected that cattle suffering and or recovering from the acute disease of the panzootic would have exhibited significantly reduced reproductive success. A diminished pool of animals may itself have affected reproduction, but the general deterioration of livestock health would have been most likely to reduce fecundity and, it should be expected, resulted in some milk, meat and perhaps (depending on the disease and contemporary attitudes) hide losses. All of this is in addition to the loss of traction and manure. One may suspect that a disease as acute as the panzootic would have greatly strained animals and in all probability caused wasting and induced abortions.

Thus it seems that the panzootic was highly virulent and possibly virgin-soil, and that it burnt its way through the susceptible population without establishing balance in a host. Though the pestilence seems to have spread primarily between cattle, as contagious bovine pleuropneumonia, foot-and-mouth disease and rinderpest have in the modern era, it cannot presently be discounted that it was also spread by other domesticated or wild animals, the movement of grain, hides, wool or other goods, or on the clothing or footwear of travellers. Additionally, bedding, water, fodder and pasture may have been contaminated following contact with infected animals. At present there is no conclusive evidence to prove that the disease was or was not a recurring phenomena that repeatedly and consistently suppressed cattle populations.

III

In addition to setting the English and Welsh cattle mortalities of c.1320 in their wider context and illuminating a pan-European pestilence, the literature reviewed here reveals the contours of the panzootic's epizootiology. Attention to this provides both a fuller appreciation of the phenomenon itself and the basis on which to advance a retrospective diagnosis. If confirmed via palaeomicrobiological analyses, a diagnosis could significantly enhance our understanding of the outbreak. A confirmed diagnosis may help articulate a past pestilence's modes of transmission, communicability and virulence, as well as identify the species the disease could have infected. It can help us understand whether the disease was less likely to spread in particular climates or environments, whether it was more or less likely to afflict the malnourished more severely and whether those susceptible to the disease could develop resistance. If one takes account of the density, distribution and movement of the susceptible population and the extent to which the spread of the disease could be controlled, a confirmed diagnosis could also provide some idea of the prevalence of the pestilence in any affected region, regardless of how scant the sources.

Though they rarely do, diagnoses of pre-modern pestilences should begin with a full assessment of the written sources. Everything that can be known about the past disease or outbreak needs to be laid out. Thorough consideration of modern diseases should follow. Naturally, a diagnosis of a pre-modern pestilence based on an analysis of written evidence is only as good as the comparisons that can be made between the pre-modern disease (or outbreak) and a 'modern' disease (or outbreak). Diagnoses advanced without regard for the

properties of the past pestilence or the pathogens diagnosed can gravely mislead interpretations of the scale and impact of that past pestilence as well as, potentially, the science of the pathogens superimposed onto it. Doubt about the identification of the Black Death and subsequent waves of 'plague' as bubonic plague stems from the diagnosis of *Yersinia pestis* being forced onto the outbreak without much or any consideration of the medieval sources. At its root, the diagnosis is unsubstantiated. So, to advance a diagnosis on the basis of written evidence, it is necessary to establish some degree of similarity between a pre-modern pestilence and a 'modern' disease.⁹⁶ This is so for three reasons: a retrospective diagnosis is the superimposition of a 'modern' pathogen onto a pre-modern phenomenon; knowledge of 'modern' pathogens is based on modern occurrences and studies of disease; and there is rarely any hard evidence – DNA or RNA – that a 'modern' pathogen capable of causing large outbreaks of disease existed, in a similar form, at the time of the past pestilence. While the symptoms of a past disease or the epizootiology of a past outbreak can be compared to the symptoms of a 'modern' disease and epizootiology of a modern outbreak, only the epizootiology of the fourteenth-century panzootic can be grasped. Symptoms are not reported in the vast majority of the known literature and the one symptom that is reported cannot be confirmed.⁹⁷ That said, several epizootiological properties can be discerned, some of which have already been touched upon. These include the general geographical and temporal parameters of the pestilence, its modes of transmission, the species it affected, its morbidity, its mortality rates in herds, and the rate of mortality in individuals. The relevance of nutrition and whether animals developed resistance are also pertinent but, as discussed, difficult to ascertain.

As we have already seen, however, the use of the written evidence collected here is not clear-cut. When the snippets of annals and chronicles presented above are considered in the context of the works from which they were extracted, problems regarding their interpretation arise. In fact, though the texts permit the general spatial and temporal parameters of the pestilence to be observed, it is only when non-manorial and manorial evidence is considered in tandem that most epizootiological properties can be confirmed. A good grasp of the species the disease affected as well as the infection's morbidity and mortality can be had only when both non-manorial and manorial evidence is considered. Manorial accounts not only help to verify that the pestilence was panzootic in scale, but they provide a means to test the claims of other sources.

The majority of the non-manorial evidence states that the pestilence affected cattle alone. Nonetheless, three issues must be addressed. First, though texts such as the *Annales Matseenses*, *Gesta Edwardi de Carnarvan*, *Chronicon Lanercost*, and especially the *Chronicon Regiae Aulae*,

⁹⁶ For more on diagnosing (and a pessimistic view of its possibilities) see J. Arrizabalaga, 'Medical causes of death in pre-industrial Europe: some historiographical considerations', *J. Hist. of Medicine* 54 (1999); id., 'Problematizing retrospective diagnosis in the history of disease', *Asclepio* 54 (2002); A. Cunningham, 'Identifying disease in the past: cutting the Gordian knot', *Asclepio* 54 (2002).

⁹⁷ The infrequency with which symptoms are reported

has more to do with textual precedent and how medieval authors recorded cattle pestilences than the infection being asymptomatic. Medieval writers very rarely describe disease symptoms in non-human animals. The Devonshire chronicler's note that a 'harsh pain' made cattle 'anxious on the inside' may be telling of a stomach, intestinal or digestive issue. On the other hand, this detail may have been borrowed or adapted from an earlier source or invented for literary flair.

suggest that several species died of or during the pestilence, these sources do not necessarily tell of a disease that afflicted several species or of a zoonose (a disease that afflicts humans and other animals). Medieval authors commonly wrote of pestilential mortalities of multiple species that may have occurred concurrently, at different points in the same year, or not at all, in a single entry. A miasmatic conception of contagion could have also nourished the idea that contemporaneous or near-contemporaneous deaths of different species were the result of the same cause. Furthermore, medieval Europeans could not deduce with much assurance whether multiple species had died of the same disease or, for example, if all the cattle that died in a region succumbed to a single infection.

Second, it needs to be emphasized that relatively few references to outbreaks of disease among horses, sheep, pigs or other domesticated or undomesticated animals are found in medieval annals and chronicles. Of course, this does not mean that pestilential mortalities of non-bovine livestock did not occur – manorial accounts clearly illustrate they did. Mortalities of non-bovine livestock were simply not considered as noteworthy.⁹⁸ Medieval accounts of non-human pestilences may be cattle-centric because cattle generally carried greater agrarian and economic significance in the pre-industrial period (this perhaps explains why the ox is often singled out as the animal affected in pestilences of cattle) and mass mortalities of them were more likely to entail dramatic repercussions. Moreover, classical authors, so often a source of inspiration for medieval writers, mentioned cattle more in their texts than any other domesticated animal.⁹⁹ The point is, a ‘pestilence of cattle’ documented in medieval annals or chronicles cannot with absolute certainty be accepted as evidence that other animals did not die too; cattle may have deserved most comment. ‘Modern’ infections that spread widely among cattle, causing significant mortality, primarily or only affect cattle. This may assure some that pestilences of cattle documented in medieval texts also primarily or only afflicted cattle. Ultimately, only the manorial evidence confirms that the early fourteenth-century panzootic devastated cattle alone.¹⁰⁰ However, undomesticated animals may have also been susceptible and, in other stock, the pathogen may have caused a milder reaction. Lastly, the ‘other animals’ or ‘animals’ referred to in several chronicles such as the *Flores historiarum*, *Chronica monasterii de Melsa*, and the *Vita Edwardi II* can be translated as ‘other cattle’ or ‘cattle’. John Langdon has noted that *animalia* may, in a medieval context, often refer to non-draught or even young cattle, as in Domesday Book.¹⁰¹ While manorial accounts do not employ this terminology, by illuminating only extensive mortalities of cattle c.1320, they illustrate that the ‘animals’ seen in several texts can safely be understood as ‘cattle’, particularly during the panzootic of c.1315–25. What remains unclear is whether the flesh of cattle that died in the pestilence was contaminated

⁹⁸ There are exceptions, for example C. Gillmor, ‘The 791 equine epidemic and its impact on Charlemagne’s army’, *J. Medieval Military Hist.* 3 (2005), pp. 23–45. Manorial accounts give us the opportunity to test the assertion that texts do not regularly observe non-bovine livestock pestilences. For example, no medieval chronicler appears to have mentioned the mortality of geese recently uncovered by Philip Slavin in manorial accounts from several English counties c.1320.

⁹⁹ M. MacKinnon, *Production and consumption of animals in Roman Italy: integrating the zooarchaeological and textual evidence* (2004), p. 86.

¹⁰⁰ As Kershaw noted: ‘Great Famine’, pp. 14, 24; id., *Bolton Priory: the economy of a northern monastery, 1286–1325* (1973), p. 98.

¹⁰¹ Langdon, *Horses, oxen and technological innovation*, p. 294.

and whether birds, dogs and humans who scavenged on cattle carcasses fell sick or even died, as Beka, Trokelowe, Dynter, and some English legislation against the selling of diseased meat indicate. Whether the disease appeared first in another species in the fourteenth century and jumped to cattle is likewise uncertain.

The panzootic's general spatial and temporal parameters in Europe have already been discussed. More work with manorial accounts will allow us to discern with greater precision where and when the pestilence spread in England and parts of Wales. At present, the contours of the pestilence's dissemination on the continent are still quite vague. Across Europe authors generally gave no specific geographical parameters to the outbreak, though some, like the Irish annals, vaguely report that the pestilence affected an entire region or country. It can rarely be known with any certainty, moreover, if the disease persisted precisely where a text was composed. Closer attention to the area with which a text is primarily concerned with may shine some light on the spatial parameters of the pestilence in several regions. This sort of consideration is particularly needed where manorial accounts do not exist: in Bohemia, Germany, Denmark, France, the Low Countries, Scotland and Ireland. It is quite plausible that the infection widely afflicted many of these poorly documented regions. Attention to the extent of the outbreak in England, made apparent via manorial data, emphasizes this point. Figure 1 clearly illustrates that the disease did not skim England but permeated herds throughout most of the country. It is also likely that much of Wales was affected. Manorial evidence places the pestilence in the south and south-east of that country, and petitions, in the north-west. Blank areas on the map, rather than representing regions spared by the pestilence, show where manorial accounts c.1320 do not survive or where modern scholars have not yet looked in them for cattle mortalities. It is quite possible that many of the blank areas will be filled in when manorial accounts are searched.

The ubiquity of the pestilence demonstrated by this map is evidence of its communicability and morbidity. Indeed, it is fortunate that the panzootic occurred when manorial accounts were kept. The accounts allow us, for the first time in western history, to check claims found in medieval annals and chronicles about the universality of an outbreak of disease among cattle. The manorial evidence, as depicted on the map, demonstrates unquestionably that the fourteenth-century pestilence attained wide prevalence in England. The disease, therefore, must have been highly contagious and so probably spread just as ubiquitously across central, northern and north-western Europe where detailed evidence is not available. Further, if many cattle died, many fell sick, and if herd mortalities could reach 100 per cent as manorial accounts suggest, the disease was undoubtedly very communicable. The ability of the disease to spread from Bohemia to Ireland in roughly five years, infect much of England within one year, and spread rapidly north and west in England against the flow of the cattle trade from pastoral to mixed and arable regions, further demonstrates its contagiousness.

Non-manorial evidence is again very ambiguous about mortality. Other than the indications that cattle died quickly, little trustworthy information about mortality can be gleaned from the textual evidence. Remarks that the pestilence and mortality were 'great' or 'unheard of', or that 'all' the cattle of a given region were infected are vague, and when they are set in the greater context of medieval annals and chronicles, they are found to be simple and common qualifiers that can offer no credible insight into the magnitude of an event. Rarely were medieval disease



FIGURE 1. Locations affected by the panzootic c.1320.
The maps show most of the affected locations mentioned in this paper.

Key to Figure 1:

1 Aberdeen (Aberdeenshire)	22 Gravesend (Kent)	43 Nostell (Yorks.)
2 Aldenham (Herts.)	23 Hemsby (Norfolk)	44 Penrhosllugwy (Anglesey)
3 Ashford (Kent)	24 Hendon (Middx)	45 Plumstead (Norfolk)
4 Bangor (Caerns.)	25 Hexham (Northumberland)	46 Rimpton (Somt)
5 Berwick (Northumberland)	26 Hinderclay (Norfolk)	47 St Albans (Herts.)
6 Beddingham (Sussex)	27 Hindringham (Norfolk)	48 Sempringham (Lincs.)
7 Birdbrook (Essex)	28 Horsley (Suffolk)	49 Sheen (Surrey)
8 Bolton (Priory) (Yorks.)	29 Houghton (Cambs.)	50 Stevenage (Herts.)
9 Bourton on the Hill (Glos.)	30 Isleworth (Middx)	51 Stoneleigh (Warks)
10 Bridlington (Yorks.)	31 Kelvedon (Essex)	52 Teddington (Middx)
11 Broughton (Cambs.)	32 Kinsbourne (Herts.)	53 Thorncroft (Surrey)
12 Byfleet (Surrey)	33 Lanercost (Cumberland)	54 Thornham (Norfolk)
13 Cheddington (Bucks.)	34 Llangwm (Monmouthshire)	55 Thorny (Cambs.)
14 Canterbury (Kent)	35 Llantissant (Monmouthshire)	56 Todenham (Glos.)
15 Clipstone (Notts.)	36 Louth Park (Lincs.)	57 Turweston (Bucks.)
16 Culham (Oxon)	37 Marley (Sussex)	58 Tutbury (Staffs.)
17 Cuxham (Oxon)	38 Martham (Norfolk)	59 Upwood (Cambs.)
18 Eaton (Norfolk)	39 Meaux (Yorks.)	60 West Wycombe (Bucks.)
19 Ely (Cambs.)	40 Morgonac (Glamorgan)	61 Wheathampstead (Herts.)
20 Feering (Essex)	41 Newcastle (Northumberland)	62 Winchester (Hants.)
21 Gateley (Norfolk)	42 Newenham (Devon)	63 Wisbech (Cambs.)

episodes said to be 'mild', 'moderate', or 'on a familiar scale'. To be sure, a chronicler's claim that a pestilence was 'great' or 'unheard of' has more to do with textual paradigms than material world events. Because such phrases were commonly employed in the relation of disease outbreaks does not, however, mean that the pestilence they qualify was not demographically significant or that most of the susceptible animals in an afflicted region did not perish. Manorial accounts clearly indicate that the early fourteenth-century cattle pestilence was huge. Manorial data already published, together with some of the literature gathered above, as well as forthcoming work by Slavin, not only show that cattle of all ages (and uses) died but that herds affected by the panzootic exhibited an average mortality of around 60 per cent.¹⁰² Bulk, 'panic' sales often accompanied the mortality and further diminished herds. Though many animals sold in these sales may have been sick, not all should be regarded as proxy deaths. More work with manorial accounts may illustrate that losses on some demesnes stemmed chiefly from panic sales, not infectious disease. It would not be surprising if many animals were offloaded pre-emptively or soon after the disease's appearance in a region, as the sicker an animal was, the less it was worth. Nevertheless, across the country, substantial mortalities were the rule.¹⁰³

¹⁰² W. C. Jordan, *Europe in the high middle ages* (2001), p. 293, suggests that herds were often reduced by more than 90 per cent, while Aberth, *Brink*, p. 22, states that English losses ranged between 20 and 70 per cent. Meanwhile H. F. Diaz *et al.*, 'Climate and human health linkages on multiple timescales', in P. D. Jones *et al.* (eds), *History and climate: memories of the future?* (2001), p. 275, make the unevicenced claim that over half of

Europe's oxen died.

¹⁰³ It is quite probable, however, that more cattle (not necessarily a higher percentage but simply more animals) would have died in England had the disease irrputed there c.1315. The initial harvest failures of the Great European Famine may have forced the sale and slaughter of many animals. Some cattle may also have succumbed to conditions related to malnutrition or even the consumption

Kershaw reports that between the account years of 1318–19 and 1320–1, the size of ox herds at Bolton Priory (Yorks.) fell from 139 to 53 (62 per cent) and other cattle from 225 to 31 (86 per cent). Some of these losses stemmed from raiding by the Scots, though most seem to have been caused by disease. Mark Bailey reports similar declines on several Breckland demesnes. In many counties, disease stripped demesnes of cattle. At Skipton (Yorks.) at least 13 out of 26 oxen died (50 per cent) and a ‘severe shortage of stock’ is reported at Tutbury (Staffs.) c.1320. The demesne herds of Ramsey Abbey were also greatly reduced. Because of disease, Broughton’s herd fell from 54 to six (89 per cent), Upwood’s 47 to two (96 per cent), and Houghton’s from 65 to nine (86 per cent). Beddingham reported 21 losses out of a herd of 29 (72 per cent). Byfleet lost 13 of 18 cattle (72 per cent).¹⁰⁴ Ely was also devastated, as were several estates in Norfolk. Campbell reports that the cattle population of 12 Norfolk and Suffolk demesnes was exactly halved between Michaelmas 1319 and 1320, but from all causes, not just disease.¹⁰⁵

In the account year of 1320–1 several demesnes of Merton College, Oxford, were likewise devastated. In Cheddington (Bucks.), the number of oxen was reduced from fourteen to four (71 per cent) while the cow herd fell from nine to three (67 per cent). At Thorncroft (Surrey), losses were less severe. Both bulls, seven out of the 15 oxen, four of the 13 cows, and four of the nine calves died (44 per cent). Even more cattle survived at Cuxham (Oxon). Here the number of oxen dropped from 13 to nine (30 per cent) and cows from nine to five (44 per cent). Three calves and a bull were also lost. In Wales, Llangwm’s ox herd fell from 33 to 26 (21 per cent).¹⁰⁶

The total ox herd of the estates of Winchester in 1319–20, despite ‘considerable purchases’ having been made in the same accounting year, fell from 1088 head to just under 500. On four Crowland demesnes Kershaw reports that the number of oxen was lower than ever before. Stone observes that animal numbers at Wisbech were severely depleted from the pestilence and at Hinderclay 80 per cent of cows and 55 per cent of oxen died in the account year 1319–20.¹⁰⁷ Derek Stern reports a significant mortality of cattle at Kinsbourne and Campbell finds a decline of 58 per cent between the account years of 1318–19 and 1320–1 on the twelve Westminster demesnes of Ashford, Aldenham, Birdbrook, Bourton on the Hill, Feering, Hendon, Kelvedon, Kinsbourne, Stevenage, Todenham, Turweston, and Wheathampstead.¹⁰⁸

Slavin finds a mortality of all 24 of Gravesend’s cattle, and other 100 per cent mortalities at both West Wycombe and Culham. He also notes of an 83 per cent decline in the cattle herd

Note 103 *continued*

of rotten or toxic fodder. Had the infection made its way to Bolton Priory in 1314, for example, the number of dead would have greatly exceeded the losses sustained c.1320. Kershaw, *Bolton Priory*, pp. 14, 16–7, 97–8.

¹⁰⁴ Ibid., 96–8; id., ‘Great Famine’, pp. 25–6, n. 159; J. A. Tuck, ‘The northern borderlands’, in E. Miller (ed.), *The agrarian history of England and Wales*, III, 1348–1500 (1991), p. 35; Bailey, *Marginal economy*, pp. 201. These may be the same mortalities Bailey refers to in *Medieval Suffolk: an economic and social history, 1200–1500* (2007), p. 88; M. Coleman, *Downham-in-the-Isle: a study of an ecclesiastical manor in the thirteenth and fourteenth centuries* (1984), pp. 94, 130; Campbell, *English seigniorial*

agriculture, pp. 167–8; S. Wright, ‘Barton Blount: climatic or economic change?’, *Medieval Arch.* 20 (1976), p. 149; Jordan, *Great Famine*, 38; Raftis, *Ramsey Abbey*, pp. 137–40, 240, 319; Mate, ‘Agrarian economy’, p. 86.

¹⁰⁵ See also Slavin, ‘Death and survival’, p. 41–3. The demesnes Campbell refers to here are Eaton, Gateley, Hemsby, Hinderclay, Hindolveston, Hindringham, Martham, Monks Granges, Plumsted, Sedgeford, Taverham, and Thornham. Pers. corresp. 15 Sept. 2008.

¹⁰⁶ Kershaw, ‘Great Famine’, pp. 24–7.

¹⁰⁷ Stone, *Decision-making*, p. 72; id., ‘Farm management’, n. 73, n. 77.

¹⁰⁸ Stern, *Hertfordshire demesne*, pp. 145, 175; pers. corresp. with Campbell, 15 Sept. 2008.

at Horsley. At Martham, Slavin reports a 72 per cent mortality, and at Hemsby, Hindringham and Plumstead mortalities between 50 and 60 per cent. At Eaton, Gateley, Monks' Grange and Thornham he reports losses around 50 per cent. J. A. Tuck also finds a 100 per cent mortality of oxen and dairy cattle at Hexham, and Clipstone and Sheen are known to have lost over 60 per cent of their cattle. The former had 186 cattle in 1316–17 and sixty-four in 1320, thirty-two of which were described as currently *morbosi*, 'diseased'. A 77 per cent loss occurred at Teddington and Kershaw presumes that the herd at Isleworth was badly affected.¹⁰⁹ At Crawley four oxen remained in 1321, the smallest number between at least 1208 and 1449.¹¹⁰

Mate remarked of a sizable cattle mortality at Canterbury Cathedral Priory over the account year of 1319–20 and Campbell has advised me that cattle units on the Kent manors of the Priory fell by 68 per cent from disease and bulk sales between 1318 and 1320, which is not surprising given the correspondence discussed above.¹¹¹ It is clear that 38 of 43 oxen and cattle died (88 per cent) at Eastry and that at Ebony six out of 22 cattle died, while 13 were sold 'because they were in danger of death'.¹¹² Though he makes no note of the size of these herds before or after the pestilence, Colm McNamee observes that Nostell Priory lost 59 oxen and over 400 cows and calves to the pestilence, and that six oxen were lost at Ponteland. Further south, Eleanor Searle reports significant losses of around two thirds at Marley near Battle.¹¹³ As noted, a south-western chronicler claims that the Newenham abbey lost 164 head of cattle, though perhaps not all to disease. Christopher Thornton's analysis of the account rolls at Rimpton likewise demonstrates serious cattle mortalities in the south-west between 1319 and 1321 and Kershaw notes of a general complaint of a 'lack of animals' in Devon and Cornwall in 1322, which is undoubtedly an indirect reference to the presence of the pestilence there c.1320.¹¹⁴ Sizeable losses may have also occurred at Southampton and in the Forest of Rossendale, Lancashire.¹¹⁵ Though more circumstantial, the de Lacy earls in Blackburnshire are known to have possessed over 2400 cattle c.1300 and only 415 in 1324.¹¹⁶

Some demesnes clearly fared much better than others. At Llantissent a 13 per cent mortality is observed, at Gnatingdon only 28 per cent of the herd perished, and some demesnes in, for example, Dorset, Essex, Hertfordshire, Norfolk and Yorkshire escaped the pestilence altogether.¹¹⁷ Nevertheless, losses due to disease in affected demesne herds were generally

¹⁰⁹ Slavin, in preparation; id., 'Death and survival', pp. 41–3; Tuck, 'Borderlands', p. 35; Kershaw, 'Great Famine', pp. 25, 42.

¹¹⁰ N. S. B. Gras, *The economic and social history of an English village (Crawley, Hampshire), A.D. 909–1928* (1930), p. 384.

¹¹¹ Mate, 'Impact of War', p. 771.

¹¹² Mate, 'High prices', p. 12.

¹¹³ C. McNamee, *The wars of the Bruces: Scotland, England and Ireland, 1306–1328* (1997), pp. 107–8; E. Searle, *Lordship and community: Battle Abbey and its banlieu* (1974), p. 285, n. 38.

¹¹⁴ C. Thornton, 'Efficiency in medieval livestock farming: the fertility and mortality of herds and flocks at Rimpton, Somerset, 1208–1349' in P. R. Coss and S. D. Lloyd (eds), *Thirteenth-century England*, IV (1992),

p. 33; Kershaw, 'Great Famine', p. 42.

¹¹⁵ Fleming, *Animal plagues*, p. 93, states that J. E. Thorold Rogers observed a cattle mortality at Southampton in his *A history of agriculture and prices in England* (7 vols, 1866–1902), II, 1259–1400. However, I find no evidence of such an observation in volume I or II of this work. Fleming may have read too much into Roger's price indices. G. H. Tupling notes that a large number of cattle died from murrain in Rossendale but does not provide any specific dates, though he implies the early fourteenth century. *The economic history of Rossendale* (1927), pp. 26–7.

¹¹⁶ McNamee, *Wars of the Bruces*, pp. 107–8.

¹¹⁷ Slavin, in preparation; Slavin, 'Death and Survival', pp. 41–3.

quite significant. A larger sample of manorial data may slightly change the estimated herd mortality of 60 per cent, but much more research is needed to deduce an average mortality of all demesne herds, affected and unaffected, throughout England. Variation in herd mortality also warrants further study. It is possible that physical isolation caused by differences in cattle density, distribution and movement may have accounted for why some animals and whole herds escaped. The prolonged concentration of animals indoors during cold periods or around sources of water and food in areas afflicted by drought and scarcity could also conceivably account for some of the variation seen in mortality. The mortality rate in an individual animal would have been, like the mortality rate of an infected herd, quite high. However, though 60 per cent of cattle in afflicted herds may have been lost on average, the mortality rate in an individual animal exposed to the disease would have been closer to 100 per cent. It cannot be assumed that 40 per cent of a herd recovered if 60 per cent perished, as it is impossible to tell how many animals in any infected herd were in fact infected. There is also no evidence to indicate that sick cattle got better.

Regardless of some uncertainties and tentative conclusions a relatively clear picture of the panzootic's epizootiology can be drawn. This allows us to compare the early fourteenth-century pestilence with 'modern' diseases of cattle and establish some degree of affinity between them, possibly providing the grounds for a diagnosis. This process is more complex and controversial than can be demonstrated here. While the strengths, weaknesses and motivations of the diagnosis require further thought, a preliminary inquiry indicates that of all 'modern' diseases of cattle, the most likely diagnosis is rinderpest. Indeed, there is a striking similarity between the epizootiology of the early fourteenth-century panzootic and the epizootiology of what are commonly thought to be outbreaks of rinderpest in the eighteenth and nineteenth centuries.

The rinderpest virus is thought to have originated in Asia around the Caspian Basin, but is currently believed to be confined to the Greater Horn of Africa. It is a severely acute and contagious disease of bovines. The virus, a member of the morbillivirus genus that includes measles, canine distemper and *peste des petits ruminants*, can cause mortality rates in excess of 90 per cent in virgin populations though strains range in virulence. The infection is primarily spread by direct contact between healthy and infected cattle, specifically via virus-rich aerosol droplets and secretions. Most modern outbreaks have occurred following the introduction of live, but sick cattle into healthy populations. Additionally, indirect transmission may occur following contact with infected bedding, water, fodder, blood, tears, semen, waste and other excretions. Following an incubation period of three and nine days, in acute strains like those seen among virgin populations, infected animals experience fever, restlessness, depression, anorexia, shallow and rapid breathing, and plentiful nasal secretions and salivation. Cattle begin to drink excessively and eventually exhibit profuse and uncontrolled diarrhea. They become reluctant to move, dehydrated, emaciated and the pregnant commonly abort. Animals that recover acquire life-long immunity. Peracute variants of the virus can cause death within two days of the appearance of fever (before the onset of diarrhea), while mild variants are characterized by low mortality.¹¹⁸

¹¹⁸ T. Barrett *et al.*, *Rinderpest and peste des petits ruminants: virus plagues of large and small ruminants* (2006).

IV

This paper has identified a cattle panzootic erupting in Bohemia c.1315 and spreading westward across Europe to Ireland by 1321. It has sought to discern the origins, spread, and duration of the outbreak, as well as several of its epizootiological properties. Much about this pestilence, however, remains uncertain. Many of the aspects touched upon here require further research, from the chronology of its dissemination on the continent to its relation to cattle mortalities in the first decade of the fourteenth century and in the mid-1320s and '30s. The timing of the panzootic is of particular interest. Much of central, northern and north-western Europe suffered a remarkable number of major catastrophes in the first half of the fourteenth century. In a period of 35 years, these regions witnessed a massive subsistence crisis, the Great European Famine of 1314–22, pronounced mortalities of humans and sheep c.1314–17, the deterioration of climate and the onset of the Little Ice Age, and the Black Death of 1346–52, which, like the panzootic, diffused rapidly across Europe and caused vast mortality. Whether or not it was simply an unfortunate coincidence that a great plague of cattle erupted in this period may never be determined.¹¹⁹ The rinderpest diagnosis advanced here, it should also be stressed, remains merely a suggestion. This identification needs to be explored further and confirmed via interdisciplinary studies. While foot-and-mouth disease, as we know it, could not have so decimated cattle, other 'modern' infections, such as contagious bovine pleuropneumonia, should not yet be discounted.

In demonstrating the contours of the outbreak and drawing attention to the wealth of written evidence available for its reconstruction, it is hoped that scholars in the archaeological and biological sciences will take up interest in its diagnosis. A retrospective diagnosis, like the one suggested here, may provide direction for a palaeomicrobiological study of the panzootic's identity. Certainly we need laboratory analyses of the pathological causes of pre-modern disease outbreaks among all animals, not just humans. Though virulent infections that kill quickly are likely to affect soft tissues only and not leave observable stigmata on the skeleton, bacterial or viral DNA or RNA can be extracted from material remains.¹²⁰ It is hoped too that in commenting on the panzootic's temporal and spatial parameters, duration and epizootiology, the paper has set the stage for the examination of its impact. While there is a dearth of detailed evidence across much of Europe, a significant body of data survives in England and parts of Wales, allowing the consequences of the pestilence for human populations and economies to be examined in some detail. Several of the English texts discussed here, such as the *Flores Historiarum*, *Chronicon Lanercost* and *Gesta Edwardi II*, also observe some of pestilence's effects, though in rather basic terms. Consideration of the English experience will provide some idea of how the panzootic impacted other areas of Europe and how pre-modern Europeans

¹¹⁹ For further comment, see Campbell, 'Nature as historical protagonist'.

¹²⁰ Many complications, however, must be overcome both when extracting viral or bacterial DNA or RNA from bones and when attempting biomolecular detection of 'modern' pathogens in pre-modern remains. Threats of contamination and false positives are real. Even if

the disease did affect the skeleton, interpreting and diagnosing lesions is not a simple exercise. T. Waldron, *Palaeopathology* (2008), pp. 21–23, 83–4; C. Roberts and K. Manchester, *The archaeology of disease* (2005), pp. 167, 179–81, 220; S. Hummel, *Ancient DNA typing: methods, strategies and applications* (2003).

could be affected by and respond to large and sudden losses of draught animals. More generally, historians need to pay more attention to the written evidence available for medieval and early modern outbreaks of disease among livestock. Though the well-being of livestock had great ramifications for human populations and economies, the temporal and geographical parameters of most pre-modern livestock pestilences have yet to be identified. There is much work to be done in the field of medieval and early modern livestock health, of which this study of the early fourteenth-century panzootic is but a start.