

# Transport in Medieval England

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## Abstract

Medieval transport might strike the uninitiated as inherently primitive, but developments in the technology and infrastructure of getting goods and people around in the Middle Ages were constantly occurring. In the case of medieval England, they contributed critically to the commercialization in the country, particularly for the period from 1066 to around 1300. Nor was the story one of gradual and inexorable progress, but one of many twists and turns, as transport adjusted to major shifts in the social and economic environment, particularly when the Black Death struck in the middle of the 14th century. In broad terms, it appears that inland water transport developed quite significantly in the early medieval period (up to, say, 1300), but that land transport gradually improved to the extent that river navigation, while remaining important in certain parts of the country, especially the east, began an overall decline (although coastal shipping continued to be important). A key factor in this was the building of bridges, which were critical in integrating the road network. However, a particularly salient and as yet unexplained paradox was that, as commercial traffic increased, the legal and social framework for the upkeep of road and river transport networks seemingly relaxed, so that enforcement of the maintenance provisions of bridges and roads became more uncertain. Despite this, the excitement for travel continued to grow, for religious and other reasons, and began to be reflected in a growing popularity of maps, from displaying local institutions and communities to depictions of the world and cosmos (the so-called *mappae mundi*). Thus, over recent decades, medieval English transport has become situated more securely within larger social, economic and cultural visions of the period, as documentary, archaeological and iconographic studies with strong transport orientations have become more common and inventive.

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Despite visions of transport and travelling in the Middle Ages as being archaic and backward, relying on movement upon land that seldom went faster than an ambling pace or upon movement on water that was dependent on vagaries of wind and tide or, if on rivers, limited to following the current going downstream or being rowed (and often pulled) slowly upstream, changes in transport mechanics and capabilities were of remarkable importance for the economy and society of the time. This historiographical essay covers key works shaping current knowledge of medieval English transport roughly from 1000 to 1500 CE, where plentiful and varied surviving records have facilitated rigorous enquiry. Crucially, one of the trends in the literature has been to place transport more specifically within larger social and economic issues operating at the time. This has elevated transport from a rather colourful topic, as best encapsulated in the *Canterbury Tales*, to a more serious one that now occupies a central position within visions of how the medieval economy and society developed.

The jollier approach to medieval transport was set very much by J. J. Jusserand in the late 19th century.<sup>1</sup> His *English Wayfaring Life in the Middle Ages* is filled with lively and interesting anecdotes and is admirably comprehensive, and in many ways the breadth of his approach on the topic has never been replicated. The first signal contribution for a

more intense scholarly study of the topic, however, was made around the first World War by C. T. Flower, whose two-volume edition of *Public Works in Mediaeval Law* examined royal court records, providing a very rich selection of legal cases and complaints concerning violations of the various 'public' thoroughfares, land or water, throughout the realm.<sup>2</sup> It was also Flower who neatly encapsulated society's casual attitude to the road network in particular:

It is clear from a very large number of entries [in Ancient Indictments and Coram Rege Rolls] that, with the exception of the drainage ditches at either side, the king's highway made and maintained itself ...<sup>3</sup>

In terms of further highlighting medieval transport's strengths and weaknesses, key works between the two World Wars were contributed by James Field Willard and Frank Stenton. Willard, a noted historian of medieval taxation and governance, produced two very useful articles on medieval English transport, in which a key argument was that the use of horse-hauled carts dominated that by pack-horses or by water.<sup>4</sup> Similarly, the great scholar of Anglo-Saxon England, Sir Frank Stenton, published an important article in 1936, in which he also painted a particularly robust picture of land transport in the Middle Ages:

All the evidence suggests, in fact, that for the ordinary medieval traveller, the waterways of England were never more than an occasional supplement to a road-system which on the whole was sufficient to his needs.<sup>5</sup>

It was only following the second World War, however, that the issue of transport in medieval society, not only in England but elsewhere in Europe, began to assume a greater importance in larger themes concerning the period. In particular, 1962 might be seen as a breakthrough year, as it saw two strongly technophilic interpretations of the Middle Ages by Lynn White, Jr., and Georges Duby, in which transport-oriented innovations figured significantly. White devoted a good part of his book on medieval technology to the development of horse power, citing the revolution that the stirrup and the horse collar allegedly made to both military and agricultural matters.<sup>6</sup> His goal of changing the view of the Middle Ages from technologically moribund to almost hyperactive did not go unchallenged, notably in a vigorous response by Hilton and Sawyer,<sup>7</sup> but his essentially more optimistic view of the technological capabilities of the Middle Ages certainly took root.

Duby's two-volume work on the medieval rural economy had a similar technophilic predisposition, but within a more general social and economic context.<sup>8</sup> His view was partly in reaction to a growing popularity at the time for Malthus-inspired models, which saw medieval society constrained by the tensions between population and agricultural resources, especially when exacerbated by environmental degradation and an allegedly weak technological response, as argued most powerfully by Michael Postan.<sup>9</sup> Duby, by contrast, rather than seeing society as being passively trapped by the biological imperative of reproducing itself, emphasized the potential that medieval people had for breaking out of Malthusian restrictions, and he was much more sanguine about the role of entrepreneurs in promoting growth and innovation, particularly through their engagement with the market.<sup>10</sup>

Duby's work initiated the trend to more commercially-oriented interpretations of medieval society. This movement achieved maturation with the work of Peter Spufford, and especially his 1988 *Money and its Use in Medieval Europe*, which advanced the concept of the 'commercial revolution' of the 13th century.<sup>11</sup> For England this idea of a much

more commercialized medieval world was carried forward in the work of Richard Britnell during the early 1990s,<sup>12</sup> while John Langdon and James Masschaele in 2006 indicated how a rapid rise in commercial activity might have been connected to population growth through the agency of family income.<sup>13</sup> This greater emphasis upon commercial activity inevitably spurred a closer examination of transport. This was reflected relatively early on by Albert C. Leighton's book in 1972 on the achievements of early medieval transport, which has been reinforced more recently by Michael McCormick's magisterial examination of the early medieval economy, which has at its core the variety of ways that goods and people made their way around Europe, and especially the Mediterranean, during and after the collapse of the Roman Empire.<sup>14</sup>

But it was when medieval societies entered the age of 'pragmatic literacy' during the 13th and early 14th centuries that much more detailed information about transport was generated, for which England, with its unmatched combination of surviving governmental, legal and manorial records, was particularly well-placed.<sup>15</sup> In pioneering work from the late 1970s, Brian Paul Hindle pieced together royal itineraries from this wealth of bureaucratic material to gain some sense of the extent and usage of the medieval English road system.<sup>16</sup> Hindle's view tended to reinforce Stenton's, where the road system was certainly sufficient to allow considerable travel over it in all weathers, so that the king 'found little difficulty in moving from place to place at any season of the year'.<sup>17</sup>

In the mid-1980s John Langdon investigated the animal-power basis for this hauling and carrying as it existed on English farms from the 11th to the 15th centuries.<sup>18</sup> Generally speaking over this period, and particularly for the 12th and 13th centuries, there was a significant increase in the use of horses as a replacement for oxen both for hauling and for farm work like ploughing and harrowing. All of this seemingly stemmed from the development of the padded horse collar and other associated improvements in horse traction, such as improved wheels designs for the development of lighter and more flexible carts.<sup>19</sup> Although an increase of hauling speed from, say, about 1½–2 to 3–4 miles per hour by transitioning from oxen to horses hardly seems revolutionary by our standards, it nonetheless had the potential of doubling the speed of transport. This may have been particularly important for getting goods to market, and perhaps it is no accident that the expansion of English markets coincided with the increasing use of horses in transport.<sup>20</sup>

A growing concern as research on medieval English transport entered the 1990s was the balance between land and water transport. An important article was published in 1993 by James Masschaele working from purveyance accounts.<sup>21</sup> These accounts, mostly surviving from the half century or so before the Black Death of 1348–9, detailed the procurement of food and other items for the king's military needs. Using them, Masschaele was able to calculate the costs per ton per mile of transporting goods by land and water from where the goods, mainly grain, were bought to the ports where they were shipped to Europe or other parts of Britain. Masschaele concluded that there was a ratio in costs per ton-mile from land transport to river transport to sea transport of roughly 8:4:1.<sup>22</sup> That is, sending goods by land cost twice as much per unit weight per mile than sending it by inland waterways (if available) and eight more times than sending it by coastal shipping (again if available). Certainly the literature suggests that shipping along the coast seems to have become increasingly important, particularly for heavy bulk items like coal, the carriage of which from Tyneside to places like London and Yarmouth started in the early 13th century, but tended to be piecemeal, involving part-cargoes or occasional shiploads, until the last quarter of the 16th century, when specialization in coal carrying became more common.<sup>23</sup>

The relationship between river transport and that by land has become a much more contentious issue, however. At the same time that Masschaele was compiling his transport cost data, a vigorous debate broke out between James Frederick Edwards and Brian Paul Hindle on one side and John Langdon on the other concerning how widely the river system was used for substantial goods transport. Edwards and Hindle claimed in 1991, on the basis of a thorough examination of the many printed volumes of administrative documents, covering a period from 1219 to 1441, that the medieval river navigation system was very extensive. As they wrote: 'In the final analysis there were only a few areas [in medieval England and Wales] that were more than 15 miles from navigable water'.<sup>24</sup> In a 1993 response to the Edwards/Hindle article, Langdon – working, like Masschaele, from purveyance accounts – argued that Edwards and Hindle's case was far too simplistic. To him, the availability of rivers for inland navigation was often in conflict with other uses for this water, such as for watermills or fishing nets. Indeed, river navigation only became extensive where commercial interests were sufficiently developed to give such inland water transport some priority; this principally benefited the more commercially developed eastern part of England.<sup>25</sup> Edwards and Hindle made a short response defending their position, but added little to the debate.<sup>26</sup>

In 2000 Evan T. Jones attempted a compromise between Edwards and Hindle's maximalist position concerning medieval English river transport and Langdon's minimalist one.<sup>27</sup> In general, Jones supported Langdon for the later Middle Ages but noted that a more extensive inland water transport system may have existed in earlier times, reflecting more the Edwards/Hindle position. Langdon, in a response to Jones, accepted Jones's position of a transition from a relatively open inland water transport system to a more restricted one later on, and proposed how this may have come about because of the building of watermill dams on many river systems.<sup>28</sup> This vision of a more open river transport system earlier in the Middle Ages has also been investigated further by a major examination of medieval English inland water transport in a volume edited by John Blair in 2007.<sup>29</sup> One of the key findings of this volume was evidence for the building and maintenance of canals as early as the Anglo-Saxon era,<sup>30</sup> an activity which slowed down notably in the later Middle Ages or even went into reverse, as former canals silted up.<sup>31</sup>

This surge of information about medieval inland water transport, including the size of boats and the cargoes they carried,<sup>32</sup> has been accompanied by more localized studies of particular river systems. A key emphasis has been on the Thames, which has over the years benefited from a number of studies, large and small, beginning with, over a larger time frame, Fred S. Thacker's classic work on the Thames published in the early 20th century.<sup>33</sup> For the medieval period, though, a key work was Robert Peberdy's careful 1996 analysis of Thames navigation.<sup>34</sup> Combined with his PhD thesis,<sup>35</sup> it showed why Henley on Thames became so important as a head of river navigation. Inland water transport could go further upstream on the Thames, but it was more difficult because of the increasing frequency of watermills on the river and the fact that the southerly turn of the river at Henley took river navigation in a less convenient direction. As a result, land transport over the Chiltern Hills connecting Henley with its most important westerly destination, Oxford, began to be preferred, except in very wet circumstances when the road became impassible.<sup>36</sup> A number of the boats that regularly plied the Thames have been excavated at London.<sup>37</sup> Called 'shouts', they were of broad-beamed, keeled construction, with a shallow draft to negotiate shoals in the river, a design seemingly borrowed from the Dutch.<sup>38</sup>

Also key here is a small but significant literature emphasizing how accommodations could be made between competing interests on rivers. R. H. C. Davis noted this as early

as 1974 when he made the argument that the increasing construction of watermills on rivers might have helped river navigation rather than impeding it, by providing pools of tranquil water in between mills which vessels could negotiate more easily.<sup>39</sup> At the mills themselves, ‘flashes’ – flows of water created by lifting movable planks of wood in the dam itself – became critical features in reconciling river transport with the existence of mills. Boats would have had a brief but exciting ride if going downstream on the ‘flash’, or could be winched over the flow of water if going upstream.<sup>40</sup> Nonetheless, the many disputes that arose between transporters and mill and fish weir owners demonstrates how fragile such cooperation might be. River navigation competed with other uses of water, whether for milling, for fishing, for cultivating meadows, etc., and often led to complicated legal pleading, as outlined recently in a major work on the historical development of water rights by Joshua Getzler.<sup>41</sup>

In many ways land transport was less complicated. Tracks and paths for communication among villages, hamlets and individual homesteads had clearly been established over the centuries, and the reasonably ubiquitous *via regis*, or ‘king’s road’, indicated that a series of prioritized roads did exist as medieval ‘A’ routes, linking major hubs. Maintenance arrangements concerning these routes, consisting mostly of clearing ditches to allow effective drainage of the road surface, were largely taken for granted as existing ‘from time immemorial’. Indeed, people at the time seem to have been not at all perturbed that the creation and maintenance of the road system existed in such an ad hoc fashion. This has been reflected in the historiography, which, like Flower nearly a century before, continues to stress the casual nature in the creation and maintenance of the medieval road system, as in Alan Cooper’s recent pronouncement on the matter:

The provision of roads across country [in medieval England] was, in an important sense, a matter of doing nothing and, more importantly, making sure no one did anything either...The passing traffic would wear down the plants on and by the route, leaving a path free of obstacles; the simple nature of the traffic meant that it could wade and struggle through even the muckiest conditions.<sup>42</sup>

In a larger sense, this suggests that the degree of investment that medieval people were willing to make in transport was often minimal. But this pessimism would be misplaced. Investment tended to be selective rather than non-existent, and in many ways could be quite impressive. There was perhaps no greater indication of this than in the building of bridges, which greatly enhanced the viability of road transport. A careful study by David Harrison examining the antiquity of bridges shown on late 18th- or early 19th-century county or Ordnance Survey maps, involving 21 rivers, demonstrated that three-quarters of these bridges likely had medieval forebears, a half or more of them probably made of stone by the early 16th century.<sup>43</sup> Harrison further feels that most of these bridges were seemingly in existence before the advent of the Black Death in the mid-14th century.<sup>44</sup> More recently Cooper has also claimed that ‘the great period of the building of bridges at points previously unbridged was between 900 and 1200’.<sup>45</sup> Fords, common in the early medieval period, became increasingly uncommon,<sup>46</sup> while ferries were increasingly restricted to where rivers or estuaries were wide, as on the lower Trent or the Humber, or as river crossings for minor roads not meriting the investment for bridges.<sup>47</sup> In fact, it can be argued that one of the key economic and technological achievements of the Middle Ages was the profusion of new bridges, arguably standing alongside cathedrals and castles, to the degree that, as Nicholas Brooks has argued, bridges were key structures for the establishment of medieval state power.<sup>48</sup>

One of the surprising things about bridges in particular is that they seem very seldom to have been constructed as entrepreneurial ventures, where tolls were levied by the bridge owner for his/her profit, but from the start were seemingly intended for the 'public' good, whether initiated at the state or community level.<sup>49</sup> This more public-oriented or nationally oriented perception of bridges started early, going back as early as the 8th century, as kings like Aethelbald of Mercia saw them as key defensive structures.<sup>50</sup> Cooper, for instance, sees the development of bridge-work (effectively a labour tax on communities or landholders for maintaining bridges) beginning with the 'symbolic borrowing' from Roman and Continental law, even before bridges were built in any number.<sup>51</sup> After the Norman Conquest of 1066, bridge-work gradually became less of a part of national strategy and more dependent upon the communities, mostly towns, where the bridges lay, or, if in the countryside, upon the holders of land adjacent to those bridges. Since those responsible for bridge-work and also road maintenance were often reluctant participants, such duties were frequently neglected, to be countered by often very haphazard reinforcement at the central, regional or local level attempting to keep bridges and roads functioning as they should.<sup>52</sup>

This all hints at a loosely monitored transport system, around which a legal framework of dubious efficiency gradually coalesced. This leaves the current state of knowledge about medieval English as one of contradiction, in that a period of very rapid commercial and population growth, the 'long thirteenth century' (from roughly 1185 to 1315),<sup>53</sup> was also one that saw an increasing conflict and growing informality within the transport system. In short, how was transport able to accommodate rising commercialization, even as effective control over it seemed to be slipping? Is it because transport began to follow more free market, less government regulated norms, with both its strengths and weaknesses, that such an enigma could exist? It is arguably seen in other tangential aspects of the topic, such as the temporary storage of transported goods, where again evidence from purveyance accounts of the early 14th century recently examined by Jordan Claridge and John Langdon suggests that originally family oriented storage facilities were increasingly being used for commercial purposes, helping the process of commercialization overall but also perhaps making such families more susceptible to subsistence crises.<sup>54</sup> As a result of such conundrums, it is increasingly difficult to view early transport in a straightforwardly teleological manner, but one that could simultaneously display both progress or regress, often depending upon the perspective of the scholar examining the issue.

What does this mean for the mentality of transport and travelling? Did people at the time just accept the conditions of road and river without thinking much about it? Some clearly were very concerned about what they and/or their goods might meet on the way from place to place. Military transport and travel was often hemmed in with a concern for security, particularly for money, the transfer of which from various parts of England to the king's treasury in London was routinely accompanied by sizable groups of archers and men-at-arms, while purveyance as a whole in securing the king's supplies must, at times at least, have meant a reasonably heavy traffic on the road for servicing such campaigns.<sup>55</sup> Highway robbery and other dangers of the road were all too common and well-known, although as Timothy Reuter wrote in a European-wide survey of the problem (with many specific English examples) the violence people met on their travels was probably not too different from that they faced normally at home, but its context in strange and unfamiliar places made a deep impression upon them.<sup>56</sup>

Notwithstanding actual or perceived dangers, medieval people seemed surprisingly ready to travel. Many, of course, made their living by transporting goods in vehicles or

boats, while the station and/or responsibilities of others were also dictated by the need to be itinerant, whether to keep a close eye on farflung estates or because of political obligations (like sheriffs or other Crown officials). Much of the travelling impulse came through pilgrimage, and one can wonder how much this religious imperative directed public interest and concern in transport (and how was it affected by, say, the Reformation). Margaret Wade Labarge in the early 1980s examined these needs or urges to travel on a European scale for (mostly) the high nobility; as she writes of travel for spiritual purposes: '[t]he desire for pilgrimage was obviously strong among the great as among the simple and continued with quite astonishing force until the end of the Middle Ages and beyond ... By the end of the Middle Ages it seems to have had a strong admixture of wanderlust and curiosity as well'.<sup>57</sup>

Much of the attraction for travel at the time was also reflected in the growing medieval fascination with maps and itineraries, as the literature has recognized in a number of major studies.<sup>58</sup> These topographical representations ranged from plans and depictions of monasteries or urban communities, seemingly for legal, administrative or display purposes, to the great medieval evocations of the world and cosmos known as *mappae mundi*.<sup>59</sup> The latter in particular were much more exercises in imagination and perhaps exhortation to pilgrimage than practical aids to transport, and the literature has come increasingly to portray such maps as expressions of Christian prophesy and eschatology or even as displays of secular power.<sup>60</sup> In terms of these larger maps, there was, in England at least, relatively little in the way of the more practical (and quintessentially Mediterranean) portolan charts for determining compass headings for ships departing ports for specific destinations,<sup>61</sup> but the mid-14th-century Gough map, with its main five roads radiating out of London, does begin to show a certain geographical reality, where the artist seems to have a reasonable sense of the main transport arteries.<sup>62</sup>

Besides expanding the number of areas that reflected and impacted medieval transport and communication, one undeniable progress in the study of the topic has been to locate it more securely within its social, economic and legal contexts, partly as more information has been brought to light but also, critically, because a more theoretical richness has been established. One of the finest examples of this was in Campbell, Galloway, Keene and Murphy's 1993 examination of how medieval London secured its grain supply, which drew heavily upon the theories of the 19th-century economist and geographer Johann Heinrich von Thünen and in which transport costs figured substantially.<sup>63</sup> Archaeology, particularly in plotting the distribution of manufactured items from their original site of production, might well add texture to our understanding of how transport facilitated the distribution of these goods, as in Leigh Andrea Symonds's very meticulous 2003 analysis of the distribution of pottery in 10th-century Lincolnshire, from which she argued that the circulation of pottery from its site of production depended more on what was left at this time of the Roman road system than it did on rivers.<sup>64</sup> Whether this works for archaeological evidence later in the medieval period is still to be tested, but her conclusions suggest some interesting complications regarding carriage by road versus river.

Finally, although it is not the remit of this piece, it seems likely that many of the findings revealed in recent research on medieval English transport might well apply elsewhere in Europe at the time and perhaps in pre-industrial societies generally. Being on the margins of Europe, England often seemed a backwater in matters of technology and innovation, as for portolan maps mentioned above.<sup>65</sup> On the other hand, one should perhaps allow for the possibility of a rather impressive exceptionalism, such that one could perhaps ask: despite frequent evidence of robbery and other illegal activities on the road and

a society that increasingly revelled in the stories of Robin Hood, did transporters and travellers in medieval England nevertheless have a sense of a reasonably effective system that gave them confidence in journeying, perhaps to the degree that it gave England at the time a competitive advantage over other cultures, much as confidence in the country's currency allegedly did?<sup>66</sup> Research in medieval transport over coming years should help give us answers to such questions.

### *Acknowledgement*

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### *Short Biographies*

John Langdon, now Professor Emeritus at the University of Alberta (Canada), has written widely on the history of technology in medieval England and its impact upon the economy and society of the time. His two principal publications, *Horses, Oxen and Technological Innovation: The Use of Draught Animals in English Farming from 1066 to 1500* (Cambridge, 1986) and *Mills in the Medieval Economy: England 1300-1540* (Oxford, 2004) both have much to say on the issue of medieval transport, as do a large number of articles and chapters published over the last three decades.

Jordan Claridge has completed his MA at the University of Alberta and is going on to do a PhD on the horse trade in medieval England at the University of East Anglia. In addition to several papers already given at conferences, he has co-authored, with Professor Langdon, 'Storage in medieval England: the evidence from purveyance accounts, 1295-1349', *Economic History Review* (published electronically on Feb. 21, 2011; forthcoming in print).

### *Notes*

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<sup>1</sup> J. J. Jusserand, *English Wayfaring Life in the Middle Ages (XIVth Century)*, trans. from the French by Lucy Toulmin Smith (New York: Putnam, 1889).

<sup>2</sup> C. T. Flower (ed.), *Public Works in Mediaeval Law*, 2 vols. (London: Selden Society, 32 and 40, 1915 and 1923).

<sup>3</sup> Flower (ed.), *Public Works in Mediaeval Law*, vol. 2, xvi.

<sup>4</sup> J. F. Willard, 'Inland Transportation in England during the Fourteenth Century', *Speculum*, 1/4 (1926): 361-74;

J. F. Willard, 'The Use of Carts in the Fourteenth Century', *History*, 17/3 (1932): 246-50.

<sup>5</sup> F. M. Stenton, 'The Road System of Medieval England', *English Historical Review*, 7/1 (1939): 20.

<sup>6</sup> L. White, Jr., *Medieval Technology and Social Change* (Oxford: Oxford University Press, 1962), esp. 14-38, 57-69.

<sup>7</sup> R. H. Hilton and P. H. Sawyer, 'Technical Determinism: The Stirrup and the Plough', *Past and Present*, 24 (1963): 90-100.

<sup>8</sup> G. Duby, *L'Économie Rurale et la Vie des Campagnes dans l'Occident Médiéval*, 2 vols. (Paris: Aubier, 1962), appearing in English as *Rural Economy and Country Life in the Medieval West*, trans. Cynthia Postan (London: Edward Arnold, 1968).

<sup>9</sup> M. M. Postan (ed.), 'England', in *The Cambridge Economic History of Europe, Vol. 1, The Agrarian Life of the Middle Ages*, 2nd edn. (Cambridge: Cambridge University Press, 1966; first edition published in 1941), esp. 548-9; idem, *The Medieval Economy and Society* (Harmondsworth: Penguin, 1975), esp. ch. 4.

<sup>10</sup> Duby, *L'Économie*, vol. 1, 261-74.

<sup>11</sup> P. Spufford, *Money and its Use in Medieval Europe* (Cambridge: Cambridge University Press, 1988).

<sup>12</sup> R. H. Britnell, *The Commercialisation of English Society 1000-1500* (Cambridge: Cambridge University Press, 1993); see also R. H. Britnell and B. M. S. Campbell (eds.), *A Commercialising Economy: England 1086 to c. 1300* (Manchester: Manchester University Press, 1995).



- <sup>13</sup> J. Langdon and J. Masschaele, 'Commercial Activity and Population Growth in Medieval England', *Past and Present*, 190 (2006): 35–81.
- <sup>14</sup> A. C. Leighton, *Transport and Communication in Early Medieval Europe AD 500-1100* (Newton Abbot, Devon: David & Charles, 1972); Michael McCormick, *Origins of the European Economy: Communications and Commerce A.D. 300-900* (Cambridge: Cambridge University Press, 2001).
- <sup>15</sup> For the rise of pragmatic literacy and bureaucratic records generally across a great swathe of the 'old world' during the 13th and early 14th centuries, see R. H. Britnell (ed.), *Pragmatic Literacy East and West, 1200-1330* (Woodbridge: Boydell and Brewer, 1997). For England in particular, see the chapter by Britnell, 'Pragmatic Literacy in Latin Christendom', esp. 12–3, 14.
- <sup>16</sup> B. P. Hindle, 'The Road Network of Medieval England and Wales', *Journal of Historical Geography*, 2/3 (1976): 207–21; idem, 'Seasonal Variations in Travel in Medieval England', *Journal of Transport History*, 4/3 (1978): 170–8; idem, *Medieval Roads* (Aylesbury: Shire Publications, 1982), most recently published as *Medieval Roads and Tracks*, revised edn. (Oxford: Shire Archaeology, 2009).
- <sup>17</sup> Hindle, 'Seasonal Variations', 177.
- <sup>18</sup> J. Langdon, 'Horse Hauling: A Revolution in Vehicle Transport in Twelfth- and Thirteenth England?' *Past and Present*, 103 (1984): 37–66; idem, *Horses, Oxen and Technological Innovation: The Use of Draught Animals in English Farming from 1066 to 1500* (Cambridge: Cambridge University Press, 1986).
- <sup>19</sup> Langdon, *Horses, Oxen*, ch. 1.
- <sup>20</sup> Langdon, 'Horse Hauling', 60–1; idem, *Horses, Oxen*, 272–4, 285–7.
- <sup>21</sup> J. Masschaele, 'Transport Costs in Medieval England', *Economic History Review*, 46/2 (1993): 266–79; in his later book on inland trade in medieval England, Masschaele used purveyance and other data to reconstruct the transport system in the county of Huntingdonshire; J. Masschaele, *Peasants, Merchants and Markets: Inland Trade in Medieval England, 1150-1350* (New York: St. Martin's Press, 1997), ch. 9.
- <sup>22</sup> Masschaele, 'Transport Costs', 273.
- <sup>23</sup> J. Hatcher, *The History of the British Coal Industry, Vol. 1, Before 1700: Towards the Age of Coal* (Oxford: Oxford University Press, 1993), 474–5.
- <sup>24</sup> J. F. Edwards and B. P. Hindle, 'The Transportation System of Medieval England and Wales', *Journal of Historical Geography*, 17/2 (1991): 129.
- <sup>25</sup> J. Langdon, 'Inland Water Transport in Medieval England', *Journal of Historical Geography*, 19/1 (1993): esp. 7–9.
- <sup>26</sup> J. F. Edwards and B. P. Hindle, 'Comment: Inland Water Transportation in Medieval England', *Journal of Historical Geography*, 19/1 (1993): 12–4.
- <sup>27</sup> E. T. Jones, 'River Navigation in Medieval England', *Journal of Historical Geography*, 26/1 (2000): 60–75.
- <sup>28</sup> J. Langdon, 'Inland Water Transport in Medieval England – the View from the Mills: a Response to Jones', *Journal of Historical Geography*, 26/1 (2000): 75–82.
- <sup>29</sup> J. Blair (ed.), *Waterways and Canal-Building in Medieval England* (Oxford: Oxford University Press, 2007).
- <sup>30</sup> J. Bond, 'Canal Construction in the Early Middle Ages: An Introductory Review', in J. Blair (ed.), *Waterways and Canal-Building in Medieval England* (Oxford: Oxford University Press, 2007), 153–206.
- <sup>31</sup> J. Blair (ed.), 'Introduction', in *Waterways and Canal-Building in Medieval England* (Oxford: Oxford University Press, 2007), esp. 5, 12–3.
- <sup>32</sup> J. Langdon, 'The Efficiency of Inland Water Transport in Medieval England', in J. Blair (ed.), *Waterways and Canal-Building in Medieval England* (Oxford: Oxford University Press, 2007), 110–30.
- <sup>33</sup> F. S. Thacker, *The Thames Highway*, 2 vols. (London: published by author, 1914 and 1920; republished by David and Charles, 1968).
- <sup>34</sup> R. B. Peberdy, 'Navigation on the River Thames between London and Oxford in the Late Middle Ages: A Reconsideration', *Oxoniensia*, 61 (1996): 311–40.
- <sup>35</sup> R. B. Peberdy, 'The Economy, Society, and Government of a Small Town in Late Medieval England: A Study of Henley-on-Thames from c. 1300 to c.1540' (unpublished University of Leicester PhD thesis, 1994).
- <sup>36</sup> Langdon, 'Inland Water Transport', 6.
- <sup>37</sup> P. Marsden, *Ships of the Port of London: Twelfth to Seventeenth Centuries AD* (London: English Heritage, 1996).
- <sup>38</sup> Langdon, 'The Efficiency of Inland Water Transport in Medieval England', 115–6.
- <sup>39</sup> R. H. C. Davis, 'The Ford, the River and the City', *Oxoniensia*, 38 (1973): 258–67.
- <sup>40</sup> M. J. T. Lewis, W. N. Slatcher, and P. N. Jarvis, 'Flashlocks on English Waterways: A Survey', *Industrial Archaeology*, 6 (1969): 209–53.
- <sup>41</sup> J. Getzler, *A History of Water Rights at Common Law* (Oxford: Oxford University Press, 2004); for the medieval period, see esp. ch. 2.
- <sup>42</sup> A. Cooper, *Bridges, Law and Power in Medieval England, 700-1400* (Woodbridge, Suffolk: Boydell Press, 2006), 1–2.
- <sup>43</sup> D. Harrison, 'Bridges and Economic Development, 1300–1800', *Economic History Review*, 45/2 (1992): 240–61; idem, *The Bridges of Medieval England: Transport and Society 400-1800* (Oxford: Oxford University Press, 2004).
- <sup>44</sup> Harrison, *Bridges of Medieval England*, 21.
- <sup>45</sup> Cooper, *Bridges, Law and Power*, 15.

- <sup>46</sup> Harrison, *Bridges of Medieval England*, 30–5; Harrison, 'Bridges and Economic Development', 245–6.
- <sup>47</sup> Harrison, 'Bridges and Economic Development', 245.
- <sup>48</sup> N. Brooks (ed.), 'European Medieval Bridges: A Window onto Changing Concepts of State Power', in *Communities and Warfare 700-1400* (London: Hambledon Press, 2000), 1–31; originally published in the *Journal of the Haskins Society*, 7 (1997 for 1995): 11–29.
- <sup>49</sup> Cooper, *Bridges, Law and Power*, 118–9.
- <sup>50</sup> R. Abels, *Lordship and Military Obligation in Anglo-Saxon England* (Berkeley: University of California Press, 1988), 52–3.
- <sup>51</sup> Cooper, *Bridges, Law and Power*, 149.
- <sup>52</sup> As well outlined in Cooper, *Bridges, Law and Power*, chs. 3 and 4.
- <sup>53</sup> See especially Langdon and Masschaele, 'Commercial Activity and Population Growth'.
- <sup>54</sup> J. Claridge and J. Langdon, 'Storage in Medieval England: The Evidence from Purveyance Accounts, 1295–1349', *Economic History Review* (published electronically on Feb. 21, 2011; forthcoming in print).
- <sup>55</sup> Michael Prestwich, *Armies and Warfare in the Middle Ages: The English Experience* (New Haven: Yale University Press, 1996), esp. ch. 10 ('The Logistics of War'). There is yet no specific work on the 'armoured-car' type of transport for transfers of money in medieval England (that the authors know of at least), but the purveyance accounts have many examples interspersed throughout them, as for example the £1,618 6s. of coins sent from Bristol to London in 1299 on two carts, accompanied by eight mounted men-at-arms, twenty crossbowmen and four bowmen: The National Archives (Kew, London) E101 559/1.
- <sup>56</sup> Timothy Reuter, 'The Insecurity of Travel in the Early and High Middle Ages: Criminals, Victims and their Medieval and Modern Observers', in Janet Nelson (ed.), *Medieval Politics and Modern Mentalities* (Cambridge: Cambridge University Press, 2006), 71.
- <sup>57</sup> M. W. Labarge, *Medieval Travellers: The Rich and the Restless* (London: Hamish Hamilton, 1982), 95.
- <sup>58</sup> For example, J. B. Harley and David Woodward (eds.), *The History of Cartography, Vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago: University of Chicago Press, 1987); Evelyn Edson, *Mapping Time and Space: How Medieval Mapmakers Viewed their World* (London: British Library, 1999); Daniel Birkholz, *The King's Two Maps: Cartography and Culture in Thirteenth-Century England* (New York: Routledge, 2004); P. D. A. Harvey (ed.), *The Hereford World Map: Medieval World Maps and their Context* (London: British Library, 2006); Daniel K. Connolly, *The Maps of Matthew Paris: Medieval Journeys through Space, Time and Liturgy* (Woodbridge: Boydell Press, 2009).
- <sup>59</sup> For this range, see, for instance, P. D. A. Harvey, 'Local and Regional Cartography in Medieval Europe', and David Woodward, 'Medieval Mappaemundi', both in Harley and Woodward (eds.), *History of Cartography*, I, 464–502 and 286–370 respectively.
- <sup>60</sup> See, for example, Connolly, *Maps of Matthew Paris*, esp. chs. 4–6.
- <sup>61</sup> Tony Campbell, 'Portolan Charts from the Late Thirteenth Century to 1500', in Harley and Woodward (eds.), *History of Cartography*, I, 371–463 (for the British Isles, see 407–9).
- <sup>62</sup> For a detailed description of the roads shown on the Gough map, see Stenton, 'Road System'.
- <sup>63</sup> B. M. S. Campbell, J. A. Galloway, D. Keene, and M. Murphy, *A Medieval Capital and its Grain Supply: Agrarian Production and Distribution in the London Region c. 1300* (Historical Geography Research Series, no. 30, 1993), esp. 60–3.
- <sup>64</sup> L. A. Symonds, *Landscape and Social Practice: The Production and Consumption of Pottery in 10th Century Lincolnshire* (Oxford: BAR British Series 345, 2003), esp. 128–35.
- <sup>65</sup> See also John Langdon, 'Was England a Technological Backwater in the Middle Ages?' in Grenville Astill and John Langdon (eds.), *Medieval Farming and Technology: The Impact of Agricultural Change in Northwest Europe* (Leiden: Brill, 1997), 275–91.
- <sup>66</sup> For example, R. H. Britnell, *Britain and Ireland 1050-1530* (Oxford: Oxford University Press, 2004), 253–5.

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