
Beyond Urban Hinterlands. Political Ecology, Urban Metabolism and Extended Urbanization in Medieval England

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Drawing on insights from contemporary urban theory, this contribution questions where medieval urbanization took place. It is proposed that urbanization is a process which extends beyond towns and cities, which are merely a representation of a more expansive and transformative process. Through discussion of building stone, grain production, salt extraction, woodland management and mineral exploitation, it is argued that medieval urbanization was generative of political ecological relations which challenge prevailing understandings of the rural/urban divide and re-frame urbanization as a metabolic process. The discussion utilizes contemporary concepts of 'extended urbanization', 'urban metabolism' and 'political ecology' to re-frame perceptions of medieval–urban relations and the notion of urban hinterland.

Where did medieval urbanization take place? The obvious answer is within towns and cities themselves, in the bustling marketplaces, burgess houses and civic buildings. What, though, if we think about urbanization differently, not as the process of creating towns and cities but as a broader process, productive of new forms of life? Towns and cities, as agglomerations of people and resources, are one representation of urbanization. But this agglomeration is not a neutral process: it is a productive one, what Smith (2023) terms 'energized crowding', which is transformative beyond the limits of demarcated urban space (e.g. Brenner & Schmid 2015; Smith 2023, 19).

Medieval urbanization can be understood as a translocal process, meaning that it was comprised of, and generated, sets of localized processes, which played out within and between multiple locales. For example, towns are linked by common forms of governance and similarities in logics of planning and spatial organization (e.g. Lilley 2000; 2009). New analytical approaches recognize how processes of urban agglomeration are about more than the gathering of people in specific spaces, towns and

cities being coagulations of flows of matter; the 'stuff' of urban life (e.g. Arnade *et al.* 2002; Christopherson 2015; 2023; Dahlström 2018; Haase 2018; 2019; Jervis 2016; 2018; Leadbetter 2021). Towns may appear as fixed, stable entities grounded in space. They can be depicted in plan and their form appears unchanged for decades. Yet they are always imperfect representations of an urban ideal, shaped by local factors ranging from topography to administrative geography and individual agency, which require continued care and maintenance to persist. It is this process of attending to the urban which is generative not only of towns and cities, but of a wider urban political ecology of co-dependence, in which urban life shapes, and is shaped by, a wider network of relations (see also Raja & Sindbæk 2020). Such an approach to urbanization requires us to reconfigure our perspectives on scale and the urban 'site' (Joyce 2021). The concept of nested scales: the town (which can itself be divided into smaller units of neighbourhoods and households), situated within a contiguous rural hinterland, re-enforces a false dichotomy between urban and rural life (see e.g. Epstein 1993, 471; Smith 2023) and conceals the

ways in which urbanization results not only in sites of concentration, but in an extensive urban(ized) political ecology into which distant, apparently non-urban, locations are drawn.

This paper explores the potential of frameworks drawn from contemporary urban studies which de-centre the process of urbanization for our understanding of urbanization in medieval England. It introduces two related concepts: urban metabolism and extended urbanization. It is proposed that these provide a means of understanding better the implications of medieval urbanization, by examining its impact on the exploitation of resources and labour. In doing so, it will offer a counterpoint to prevailing perceptions of the urban hinterland which are grounded in a problematic urban:rural dichotomy and focus particularly on the provisioning of urban places, without fully considering the localized residues which urbanization leaves behind.

From urban hinterlands to urban political ecology

Understanding the relationship between town and country has long been a cornerstone of medieval studies. Dyer (1989, 296) draws attention to the dependence of urban communities on the countryside for the 'formidable quantities of food and raw materials' required to sustain them. Hohenberg and Lees (1995, 17) propose that the ability for rural areas to produce surplus is a precondition for urbanization, with the role of towns being to provide a range of 'services' to their region (1995, 27). Urbanization clearly had implications for rural communities and environments, yet debates persist both about the scale of the urban impact on rural production and the extent to which townspeople were able to exert control over the regions and resources upon which they relied.

Within discussions of urban/rural relations 'Hinterland' is a widely used, although often ill-defined, term. It can be broadly understood as a spatially contiguous area around a town, from which it drew its sustenance and over which it exerted some influence (see Galloway 2005; Magnusson 2013). As Dyer (1996) demonstrates for the English midlands, towns typically had a hinterland of 8–12.5 km based on the distance people travelled to the market, but the shapes of these hinterlands were less uniform. Hinterlands are shaped by a range of local variables, including topography, geology, communication routes and political organization, which also influenced the distribution of towns and intermediate markets (see e.g. Laughton & Dyer 1999), a particularly extreme example being the 'dendritic'

hinterlands of Fenland towns in eastern England, which follow the rivers and artificial channels characteristic of this region (Spoerry 2005).

Whether explicitly acknowledged or not, the concept of the hinterland can be traced back to Von Thünen's (1826) hypothetical model of the 'isolated state', in which the city is situated at the heart of an undifferentiated landscape, across which agrarian production, focused on the urban market, occurs in concentric rings determined by transportation costs (Fig. 1). The extent to which medieval rural production was shaped by urban demand in the way imagined by Von Thünen is contested. Masschaele (1997) proposes that by around 1300, England's marketing structure was chiefly shaped to meet the demands of the largest towns, whereas Britnell (2000, 3) argues that this somewhat over-emphasizes the importance of urban demand in relation to that from rural communities and small towns. However, regardless of who was consuming produce, agriculture was essential to supporting urbanization, which, in turn, influenced agrarian practice. London provides an illustrative example. Keene (2012, 267) hypothesizes that although the city of London only required around 10% of the grain produced in its region, urban demand shaped regional agrarian production. Analysis of grain production around London, as well as of the accounts of Cambridge colleges, demonstrates that the underpinning logic of Von Thünen's model has some basis in empirical reality, albeit with contextual nuance, particularly in relation to the intensity of cropping (Campbell *et al.* 1993, 141–2; Galloway *et al.* 1996; Keene 2012; Lee 2003).

While most, if not all, towns in medieval England were primarily served by a local hinterland, complexity is evident in the way that urban demand influenced agrarian regimes, particularly in areas well connected to international ports. Grain was traded from the English midlands, where manors developed specialized intensive cropping regimes to serve urban markets in Scandinavia and the Low Countries (Campbell 2003; Hybel 2002). English wool fuelled the growing urban cloth industries of Flanders and Italy, at least until protectionist measures stimulated English cloth production (Rose 2018). By the fifteenth century, Irish towns were net importers of grain, principally through Bristol and Bridgwater which, in turn, stimulated specialization in pastoral husbandry among Irish farmers (Galloway & Murphy 2023, 625).

In contrast to other areas of Europe, such as Scotland (Oram 2011, 274) and parts of Italy (Curtis 2012; Epstein 1991, 42) and Germany (Galloway

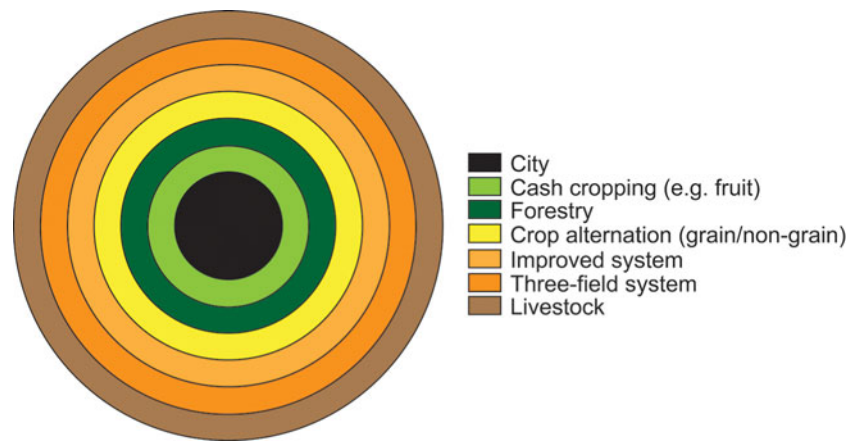


Figure 1. Simplified representation of Von Thiinen's 'isolated state' hinterland model. (Image: author.)

2005, 112), English towns were able to exert only limited direct influence on production within their hinterlands. Towns were typically developed in the context of wider estates, retaining an agrarian base and allowing landowners to maintain rights over the extraction of tolls and revenue, effectively creating integrated systems of rural production and urban processing and marketing (see Dyer 2003, 105–6; Goddard 2011; Hilton 1982). A good example are the multiple towns founded on the estate of the Bishops of Winchester in southern England (Beresford 1959). As a land market developed, town dwellers were increasingly able to acquire rural land and exert direct control over its use (Dimmock 2001). Against these direct relations between towns and wider landscapes can be set the broader influence of urban demand for food, which stimulated the intensification of agriculture, and exploitation of resources such as timber and stone.

We are currently in a position where we are well equipped to understand how estate managers and agriculturalists were able to respond to the demands of urban markets, both local and distant, and to understand that processes of urban and rural development were both intertwined and progressed relative to each other. There remains, however, a tendency to consider these relations through an urban or a rural lens; as rural response to urban demand, or as rural production being a constraint on urban growth, an approach rooted in a dichotomous understanding of the relationship between town and country. This is despite archaeological and historical research increasingly demonstrating the binary relationship between 'rural' and 'urban' in medieval society to be untenable. There is no single form of rural settlement and community (e.g. Rippon 2008), just as towns are highly variable and clear resonances occur between urban and rural

living (Dyer 2002, 226). Small towns sit ambiguously between town and country, being centres of commerce and production, but retaining a strong agrarian base (Dyer 2003). Furthermore, experiences of urban and rural life were intersectional, varying in relation to gender, age and a whole host of other factors. Yet, this binary relationship persists because there are perceptible differences, in general terms, between urban and rural life. Simply dissolving the dichotomy, to talk of medieval 'settlement' erases difference just as much as adherence to homogenizing general categories.

In order to unsettle this dichotomy, and reveal better the role of urbanization as a shaping process for medieval society, an approach is required which draws both its social and ecological implications into focus. One conceptual tool which can be used to achieve this is political ecology. The potential for political ecology within archaeological discourse has been increasingly explored in recent years (see e.g. Fabinyi *et al.* 2014; Forlin *et al.* 2021; Morehart *et al.* 2018; Morrison 2018; Pluskowski 2019; Thompson 2014). In general terms it refers to the productive relations between 'natural' environments and human, 'social', action. Attention to political ecology has been driven by an increasing desire both to collapse disabling dichotomies between anthropogenic and non-anthropogenic actors (as encompassed by the wider turn towards posthuman perspectives in archaeological thought) (e.g. Johnson 2018; Rosenzweig 2018) and to consider more explicitly the role of archaeology in building longer-term histories of the role of human society in environmental change (e.g. Bauer 2018; Catlin & Bolender 2018; Millhauser & Morehart 2018). This attention to more-than-human life allows us to perceive urbanity not as a mode of human existence but as an emergent 'socio-nature' (Morrison 2018), a mixture of the

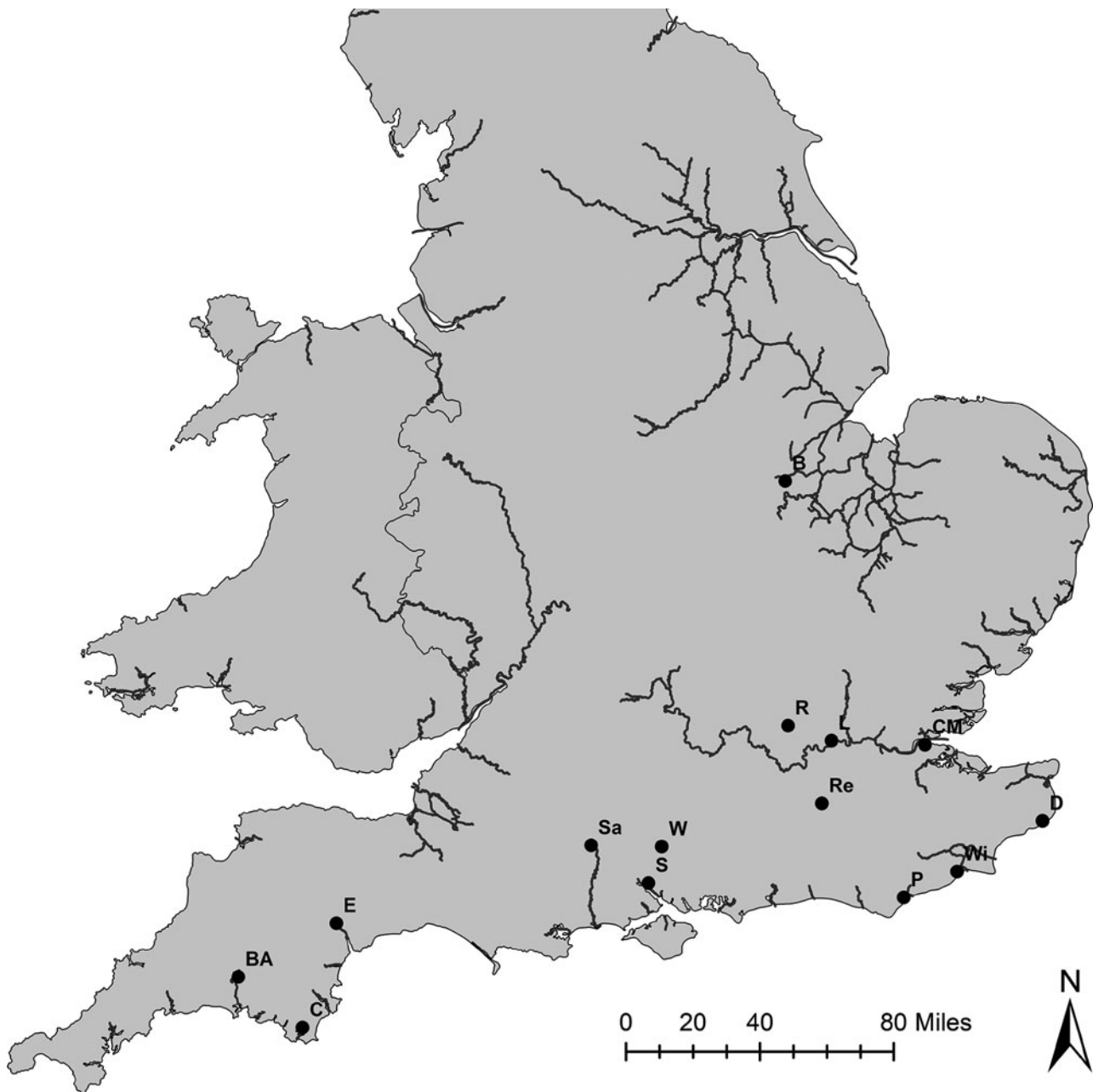


Figure 2. Location of key places referred to in the text: B: Barnack; BA: Bere Alston; C: Charleton; CM: Cooling Marsh; D: Dover; E: Exeter; L: London; P: Pevensey; R: Ruislip; Re: Reigate; S: Southampton; Sa: Salisbury; W: Winchester; Wi: Winchelsea. (Image: author.)

'natural' and 'social' whereby forms of life become urbanized. Therefore, urban life is generative not only of socionatures associated with towns and cities themselves (what we broadly understand as 'the urban environment'), but also causes wider disturbances to ecosystems which are emergent from the interplay between human political action, geology and more-than human life.

When considered through the lens of political ecology, the concentric rings of Von Thünen's model can be understood not only in terms of economic rationality, but as products of ecological transformations, in which the consequences of urban demand reverberate beyond the confines of what we might typically perceive as 'urban life'. For example, around AD 1300 the demesne (manorial)

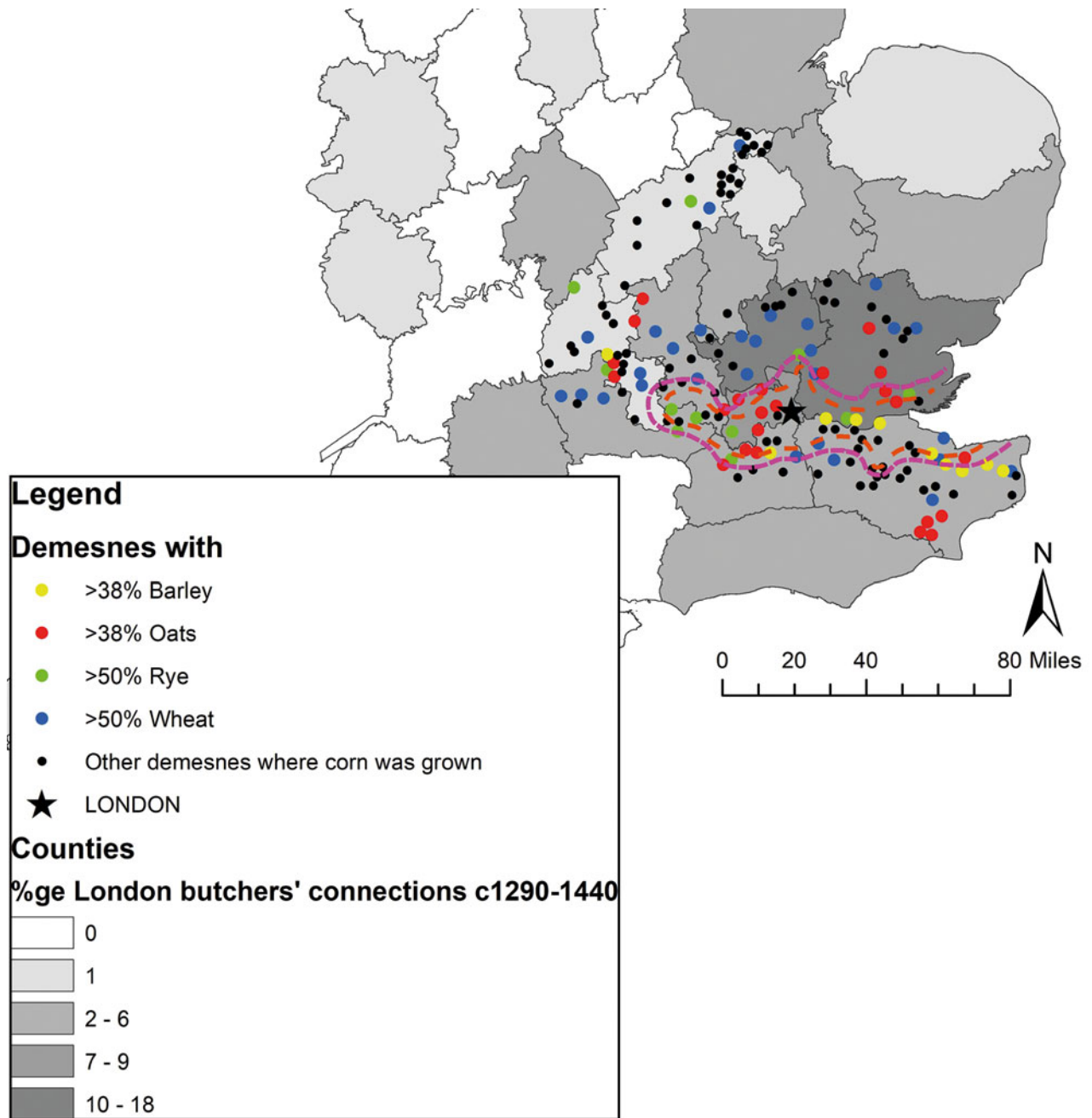


Figure 3. *The supply hinterland of London in the thirteenth–fourteenth centuries. Dots indicate specialization in demesne arable in the area examined by the ‘Feeding the City’ project (note that demesnes specializing in oat production are marked with red dots). Shading shows proportion of London butchers’ contacts per county. Pink line shows faggot supply zone c. 1300, orange line shows faggot supply zone c. 1400. (Drawing: author after Keene 2012 and Galloway et al. 1996.)*

managers at Ruislip (Middlesex), a manor of the Abbey of Bec, to the west of London, made a conscious decision (Figs 2 & 3): whereas nearby manors specialized in the cultivation of barley, rye and, to a lesser extent, wheat—the principal crops for baking

and brewing—Ruislip and several other manors in this region specialized in the production of oats. Oats are a crop typically grown in the more marginal areas of medieval England and therefore the fact that 58 per cent of sown demesne acreage at Ruislip was

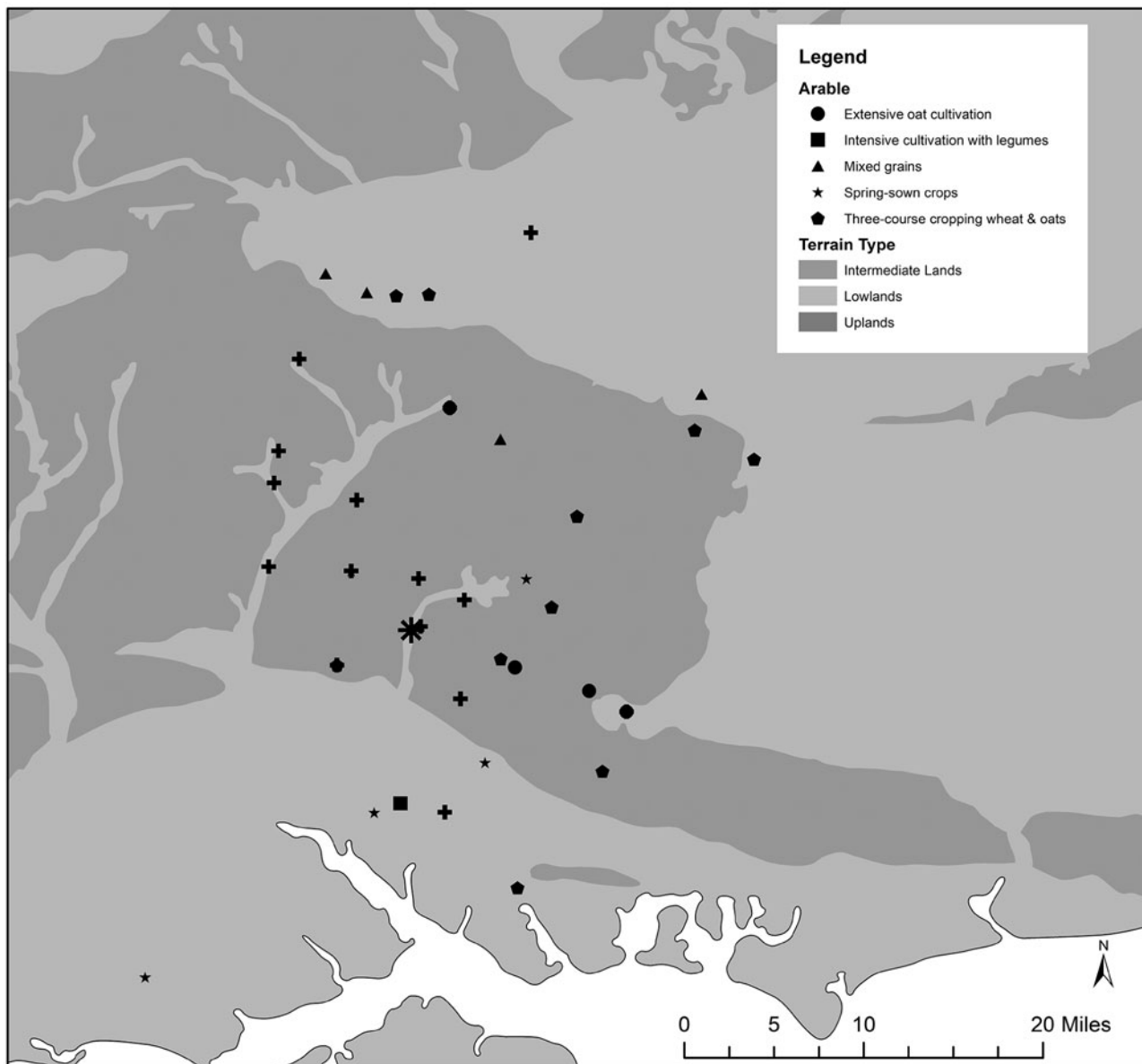


Figure 4. Arable agriculture in the region around Winchester (black asterisk). Crosses indicate places known to have supplied the Winchester market. Cropping regimes relate to the estates of the Bishop of Winchester and Winchester Cathedral Priory. (Drawing: author after Keene 2022 and Hare 2006. Topography layer from The Atlas of Rural Settlement © Stuart Wrathmell, Brian Roberts & Historic England, reproduced in accordance with terms & conditions of use.)

used for their cultivation is both unusual and significant (Campbell *et al.* 1993, 117). Demesne managers were responding to urban demand for oats, principally as feed for the horses which carried supplies of grain and other produce into the city. This cropping regime was intended to support a particular form of urbanized human life and, in doing so these oats become more than rural produce: they were implicated in the emergence of an urbanized political ecology which goes beyond the confines of the urban as

we typically perceive it. Campbell *et al.* (1993, 117) recognize this relationship at Ruislip, when they refer to the specialization in oats as emerging from ‘an interplay between soils and the special market conditions created by the need to satisfy London’s requirement for fodder’. This was an indirect consequence of urbanization; agrarian regimes were determined locally, through the institution of the manor, stimulated by the twin processes of commercialization and urbanization.

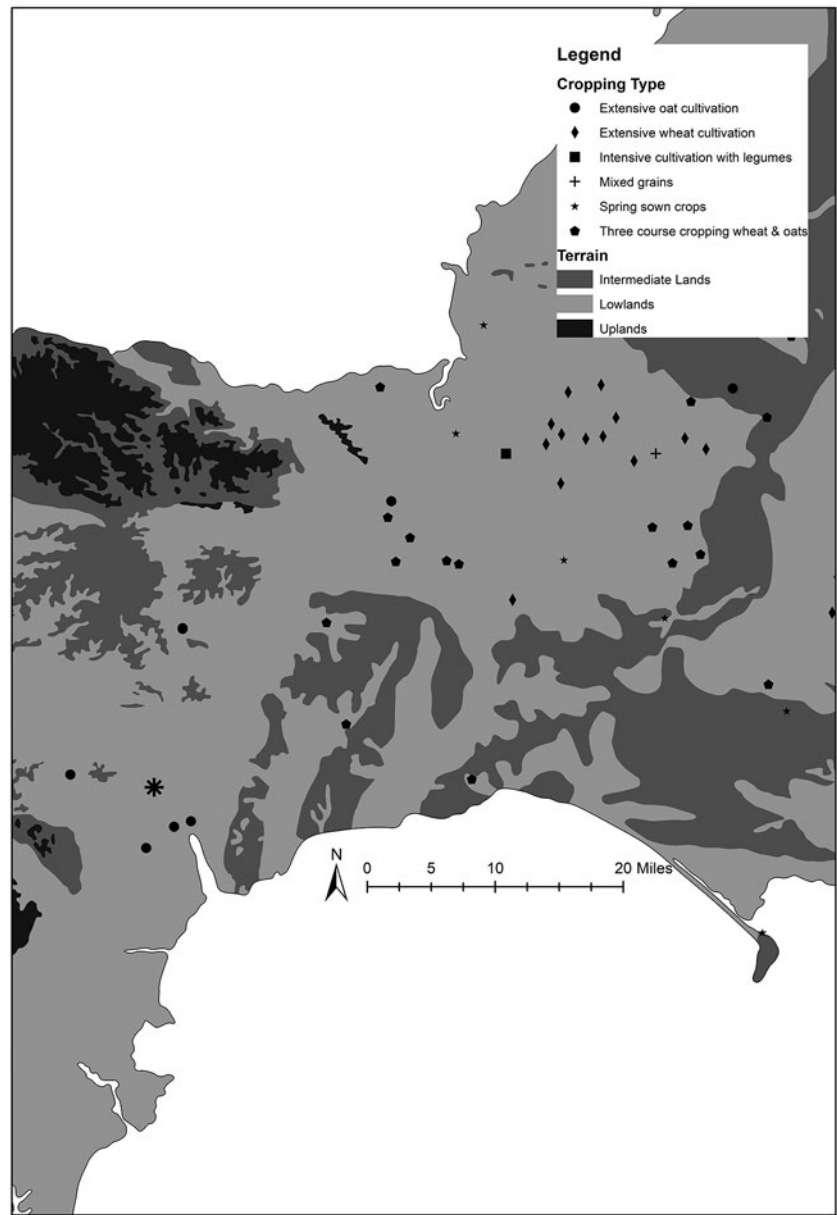


Figure 5. Demesne cropping regimes in the region around Exeter (black asterisk). Note oat production to the west, associated with intensive livestock rearing. (Drawing by author after Campbell 2009. Topography layer from The Atlas of Rural Settlement © Stuart Wrathmell, Brian Roberts & Historic England, reproduced in accordance with terms & conditions of use.)

The example of Ruislip demonstrates the importance of local contexts in understanding the political ecology of medieval urbanization. While archaeobotanical evidence has potential to explore change in agrarian production, as well as the wider ecological changes brought about by agricultural specialization, progress has been hindered by a relative lack both of large archaeobotanical assemblages and of synthesis (Van der Veen *et al.* 2013, 171–2), although some analysis suggests substantive correlation between historical and archaeological data pertaining to agrarian production (Rippon *et al.* 2014). It is, therefore, necessary to turn to historical evidence to demonstrate this point, through contrasts between

agrarian production in the region of two large towns in southern England: Winchester (Hampshire), where surrounding land was largely managed by urban religious institutions (the Cathedral Priory and Bishopric), and Exeter (Devon), where the physical terrain played a strong shaping role in local agrarian patterns. Despite these variations, Von Thünen’s model retains some applicability, with intensive production close to both cities, with more extensive agriculture beyond (Figs 4 & 5). While the urban corporate body was not exercising direct control over agrarian practice around Winchester, much of the supply of produce to the town was managed by an urban institution (Fig. 4). The Bishopric’s

agrarian regime is well understood, characterized by a mix of sheep husbandry on the chalk uplands and the cultivation of grains, particularly wheat and oats (Hare 2006; Keene 2022; Titow 2022). Intensive, market driven, exploitation was enabled by specialized sheep–corn husbandry, in which intensive sheep folding enriched the soil while also providing large quantities of wool which the estate could convert into substantial revenue. Grain largely travelled short distances to Winchester, with some being cultivated within the city walls, and a range of produce was grown in orchards and gardens around the town (Keene 2022, 62–6). While London corn-mongers could indirectly influence ecological relations around the capital (Campbell *et al.* 1993, 81–6), the intensive cultivation of land around Winchester can be understood as the result of a deliberate strategy of resource exploitation by an urban institution.

In contrast, Devon's agrarian economy was largely focused on livestock. Isotopic analysis of animal remains from Exeter demonstrates the majority to have been sourced from the immediate hinterland of the city, with increasing exploitation of the upland pasture of Dartmoor from the twelfth century, when settlement expanded into this comparatively marginal upland area as populations rose (Müldner & Frémondeau 2021, 123). Much grain was sourced from further afield, the neighbouring counties of Somerset and Dorset were important suppliers, and Exeter also had strong commercial links with south Devon. Exeter's grain hinterland likely extended around 30 miles to the south and east (Kowaleski 1995, 30), with areas to the north and west being more pastoral in character, regional specialization determined, in part, by local environmental conditions (Fig. 5). One area supplying Exeter with grain was the fertile lowlands of the Somerset Levels, much of which were under the control of Glastonbury Abbey. Analysis of the grain liveries paid to demesne workers by the Abbey has led Rush (2001) to argue that commercialization of grain production to meet urban demand resulted in a lowering of living standards, as labourers were granted low-quality grains which could not be as profitably disposed of as the higher-value produce reserved for the urban market. In contrast to London, in Exeter the land-based trade was largely out of the hands of the urban oligarchy, whose role was largely constrained to the sphere of imported grain from France, Iberia and eastern England (Kowaleski 1995, 27). These examples show how urbanization shaped non-urban life,

but local distinctiveness was retained; urban influence on rural production was indirect, channelled through commercialization by various actors, as a political ecology of profit shaped not only environments but regimes of labour.

Extending urban political ecology

If political ecology serves to unsettle the dichotomous relationship between town and country, how can it be re-cast without erasing what it is which makes urban and rural discernible, if fuzzily defined, categories? Recognizing that urbanization influenced agrarian practice is a recognition that it is a process which expands beyond the confines of towns; that urbanization, when drawn into relation with specific local contexts, was productive of different forms of life which are not neatly framed by an urban:rural dichotomy.

The extraction of agrarian and non-agrarian resources to meet the needs of urban centres took urban processes beyond towns themselves, demonstrating the power of agglomeration to generate dispersed and widespread socio-economic and ecological consequences (Soja & Kenai 2014, 152). Furthermore, locales of extraction are often spatially dislocated from towns and cities, but are spaces of exploitation intensified by urban growth. As Ashby *et al.* (2015, 696–7) state in relation to Viking towns, 'what is urban about early urban networks is not confined to one site or region, but rather is dispersed in resource and production networks ... its effects were not necessarily confined to circumscribed hinterlands or catchment areas, but may be more appropriately defined and researched as dynamics of mobility focused on certain sites, which catalysed transitions to material and social complexity'.

This insight can be related to an emerging concept within contemporary urban theory, that of 'extended' urbanization (Brenner & Schmid 2015). This is a re-articulation of Lefebvre's (1970, 1) proposition that the modern world has been enveloped by an uneven urban fabric. It is a concept intended to encourage interrogation of the way that urbanization is an ongoing socio-spatial process, which is manifest not only in towns and cities, but also in the distant locales of exploitation upon which they are dependent. Extended urbanization is a stretching of the urban fabric, engulfing the apparently non-urban, and generative of new forms of urbanized life within and beyond the city. This necessitates a shift from approaches which focus on towns and cities as the discrete, concrete, sites of urbanity, towards attending to the ongoing process of urbanization: the

emergence and sustenance of urban life. Doing so, they argue, does not deny the importance of processes and representations of urban agglomeration (towns and cities), but allows us to understand the significance of these agglomerations in the wider socio-economic, ecological and political context of modern capitalism.

Clearly, care must be taken in applying a concept grounded in capitalist modernity to a medieval situation which Hohenberg and Lees (1995, 19) term 'resolutely precapitalistic' and Dyer (2005, 41) argues saw commercialization take place within a feudal system. For Brenner and Schmid, it is flows of capital which are the 'vector' through which the influence of urbanization flows into 'non-urban' areas, as, for example, global companies invest in the extraction of resources from remote regions. For medieval England, it is necessary to identify other vectors, associated with the well-attested processes of industrialization and commercialization characteristic of the period (Britnell 1996). These processes are distinct but related; urbanization provided spaces for commerce and shaped demand, industrialization allowed for the intensification of commodity production and marketing lubricated relationships between communities. Carus-Wilson (1941; 1959) proposed that an 'industrial revolution' took place in the English countryside in the thirteenth century, characterized, for example by the erection of fulling mills to serve the growing cloth industry. Subsequent studies have demonstrated intensification in the extraction of minerals and industrial specialization, existing in varying relationships to agrarian production (e.g. Blanchard 1972; Foard 2001; Hatcher 1974; Sapoznik 2016). Urbanization allowed for the amplification of commercial relationships, which in turn amplified the scale and specialization of industry. This observation is not new; Hilton (1985, 5), for example, argued that the growth of small towns was indicative of both the commercialization and urbanization of the English economy and Wickham (2021, 27) has elucidated the parallel development of urban and rural economies. Rural production was commercialized through the specialization of agrarian regimes, the development of a land market and increasing dependence on waged labour. However, even as elements of urban culture were adapted and adopted by rural communities, public buildings, guilds, the adoption of new house styles and forms of material culture (Giles 2005; Pearson 2005), rurality remained distinct from urbanity (Soens *et al.* 2012). Extended urbanization is a concept which allows us to perceive a stretching of the urban fabric resulting in the emergence of difference

and new forms of life which were variously urbanized (but not necessarily entirely urban).

Extended urbanization can be visualized as a series of flows (for example of capital, knowledge or power) emanating from the city, with their entanglement in processes elsewhere being the process of urbanization, or the stretching of the urban fabric. Extended urbanization, therefore, provides a conceptual tool to challenge a dichotomous approach to urban:rural relations. It emphasizes how urbanization is a multi-scalar process, resulting both in agglomerations and dispersed moments of extension, and cannot, therefore, be reduced to the development of towns and cities (Brenner & Schmid 2019). Rather, urbanization can be perceived as a process which transforms, or disturbs, that which lies outside of the urban, which is not a homogeneous 'rural', but a variegated non-urban milieu (Fig. 6). Extended urbanization is not a process of destroying the rural, but of transforming it as it is brought into relation with the urbanization process (Keil 2018, 1592; Merrifield 2018, 1605; Roy 2016). It follows, therefore, that the potential to become urbanized is latent within the non-urban. This potential is what Deleuze (1994, 208–11) terms 'the virtual', an imminent capacity of what the non-urban might become and, by extension, what it can do (see Harris 2021, 54). Equally, the non-urban has the capacity to resist urbanization, while urbanization might surface, or be made 'actual' (that is made observable), in a variety of ways (see also Jervis 2016).

What this means in practice is that it is necessary to move away from a dichotomous approach where urban and rural are defined by what they lack in relation to each other, to understand that both are continually transformed by their relations with each other. They do not exist as opposites, or at either end of a continuum, but rather are separate processes which are entangled within each other by flows of, for example, produce, labour, knowledge and capital (Fig. 6). As the example of agrarian production demonstrates, urbanization is enfolded into the practices and processes which constitute the non-urban milieu, transforming, or urbanizing, the non-urban. Critically, though, rurality still exists; urbanization is a process which alters the 'nature' of both urban and 'non-urban' life (Braidotti 2013, 79), generating not only urbanized life but new forms of rurality (Angelo 2017; Castriota & Tonucci 2018, 521–2; Jazeel 2018, 416; Reddy 2018, 531–3; Roy 2016, 813–14; Simone 2020, 760; Tzaninis *et al.* 2021).

This is not to say, as some have argued in relation to contemporary studies of extended urbanization (e.g. Jazeel 2018; Oswin 2018, 543), that all of

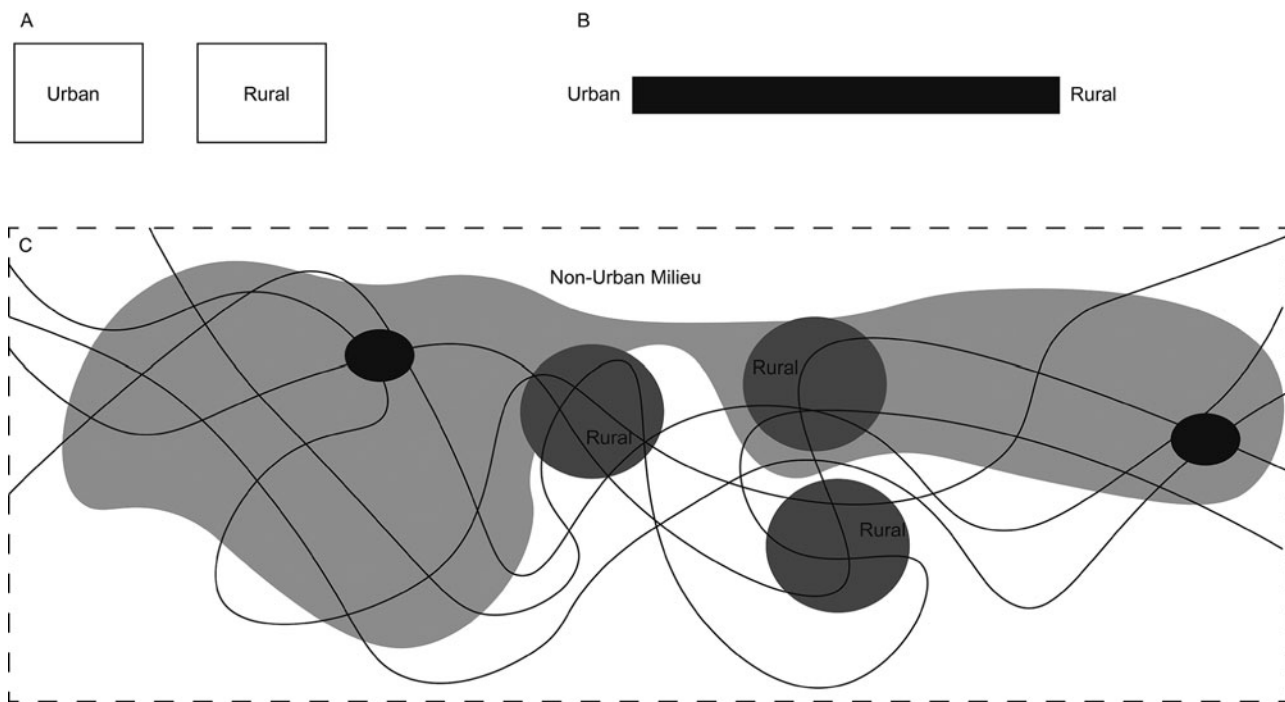


Figure 6. Depictions of models of urban:rural relationship. (A) Urban:rural dichotomy; (B) Urban:rural continuum; (C) The spread of urbanization (grey area) from towns (black circles) across a non-urban milieu, through flows (e.g. of materials, capital, knowledge and power) and the existence of multiple forms of rurality, occurring in varying relation to urbanity. (Image: author.)

the socio-economic and ecological transformations of the Middle Ages are due to urbanization, that urbanization can be reduced solely to a process of capitalist production, or to deny that life in towns gave rise to specifically urban experiences and struggles (see Katz 2021; Peake 2016; Reddy 2018; Ruddick *et al.* 2018, 396). Analyses by Dyer (2005) and Wickham (2021) both demonstrate how processes of commercialization, intrinsically linked with, but distinct from, urbanization, played a significant role in the transformation of the countryside, for example as feudal obligations were met through cash rents, giving rural households greater freedom to engage in the consumption of commodities and invest in land and the infrastructure of production. Rather than reducing change to a single process of urbanization, extended urbanization is a means of understanding that urbanization is more than agglomeration; that the establishment of towns had wide-ranging affect elsewhere, which emerged through its entanglement in other processes. Extended urbanization is not a neutral enfold-ing of people and resources into the urban fabric, but a transformative process which is both mediated through and productive of difference, which defies a straightforward divide between urbanity and rurality

(Cagriota & Tonucci 2018). As Gandy (2004, 373–4) notes, urbanization is a process which can be understood as an ‘interweaving of social and biophysical process’ which produces ‘new forms of urban nature’.

A political ecology of building stone

Extractive industries are elements of extended urbanization which are particularly well suited to archaeological analysis, in terms of understanding both the distribution of materials and the practices of their extraction and processing. One such industry is the supply of building stone. Urban life intensified demand for, and therefore extraction of, stones for a range of purposes, including whetstones for sharpening tools (Jervis 2023) and millstones for the grinding of flour and malt. Whilst stone churches, castles and manor houses were features of rural landscapes, the scale of urban building projects meant that urbanization was an intensifying force in the extraction of lithic resources. As such, stone provides a good example of how urban demand intersected with existing practices of exploitation of rural labour and resources, enfold-ing quarries into the urban fabric.

Archaeological and historical analyses have provided a great deal of information on the, typically local, sources of building stones (see Parsons 2018). Certain particularly sought-after stone, such as Barnack stone from the east midlands, could be transported over longer distances, particularly by riverine and coastal routes (see Alexander 1995). Reigate stone was widely used in London from the twelfth century, likely mined from underground quarries (Tatton-Brown 2001), while flint and chalk were also important elements of domestic buildings in the city (Schofield 1991). Our understanding of the process of quarrying itself is under-developed. While royal and manorial accounts provide some insights into the quantities of stone exploited and the prices that it could attract (e.g. Knoop & Jones 1938; Parsons 2018), the political ecology of quarrying has received less attention. Quarrying generated waste and altered landscapes, potentially limiting the utility of land for settlement or agrarian production, perhaps having hydrological implications, or leading to the development of scrubby landscapes (Jørgensen 2004).

The transportation of stone, as well as other bulk commodities such as grain, to serve urban markets made use of river routes and necessitated the construction of artificial channels. Quarries were typically established close to landing places (Gardiner 2008, 90–93). Transportation was not a neutral flow but was implicated in the emergence of urbanized political ecologies. Access to water-borne transportation afforded economic specialization and its resultant ecological consequences, linking rural producers to larger, sometimes international, markets. Flows of stone and other bulk commodities to attend to the needs of urban consumers were constitutive of new environments, not only in places of extraction or cultivation, but also in relation to the logistics of transportation. The ecological consequences of intensified agriculture and deforestation could include the silting of river routes, while infrastructure such as mills and fish weirs could block routes and alter the flow of rivers (Blair 2008, 255–6). Channels were altered and excavated to afford transportation (Blair 2008, 265–71), literally scarring the land to facilitate the connectivity of urban centres and creating new hydrological regimes.

Whereas structural stone had wide demand, urban life gave rise to a more specific demand for roofing materials. From the early thirteenth century, the use of flammable roofing materials had been banned in London (Keily 2010, 26), and similar concerns likely constrained their use elsewhere. This

regulation increased demand for roofing stone, intensifying existing relations of extraction and transportation. Slate from south Devon was traded along the south coast and used as a roofing material both for higher-status buildings (Born 1988; Holden 1965; 1989; Jope & Dunning 1954; Salzmänn 1913, 82; 1952, 233–4) and in towns. It was, for example, widely used as a roofing material in the large towns of Exeter (Allan 1984, 300–302; 2021, 284), Southampton (Platt & Coleman-Smith 1975, 311–14) and Winchester (Keene 1990, 320). Previously published distribution maps (Holden 1965; 1989) show its use in coastal ports such as Pevensey, Dover and Winchelsea, a pattern borne out by the mapping of new finds from subsequent development-led excavations (Fig. 7). These slates were used in London, although here ceramic roof tiles dominated (Keene 1983, 143; Keily 2010, 31). The quantity of slates required is vividly demonstrated by the fact that the port of Southampton assigned a customable value of ¼d per 1000 slates (Studer 1911, 15) and the port's brokerage books record small quantities being transported overland to the towns of Winchester and Salisbury in the fifteenth century (Hare 2015, 165–6). In the movement of slate, we see an intensification of existing exploitation.

Despite this intensification of flow, the impact of quarrying on the landscape of south Devon appears fairly limited. Generalizing from the manor of Stoke Fleming, Fox (1975) proposes that quarrying had only a localized and fairly minor impact, being a feature of manors with access to rivers or the coast. Quarrying did, however, create further economic potential for landowners. Recognition of slate as an economic resource drew uncultivated land into productive use. For example, at Charleton the quarries are situated in the southern part of the parish which, during the medieval period, was heathland or scrub (Turner 2015). In 1439, the Earl of Warwick held quarries here, for which a custom was paid on every thousand stones, worth 20 shillings over a two-year period (Born 1988, 53). As such, it was not urban authorities but local landowners and tenants who were exploiting these resources and intensifying extraction, showing how urbanization could act upon localized articulations of power and capital accumulation.

Urban life made material demands for its persistence. A supply of building stone was necessary both for mediating urban relations of power through displays of wealth and permanence, as well as mitigating against the potential fire hazard inherent in a tightly packed settlement. Sketching flows of stone provides a window into the

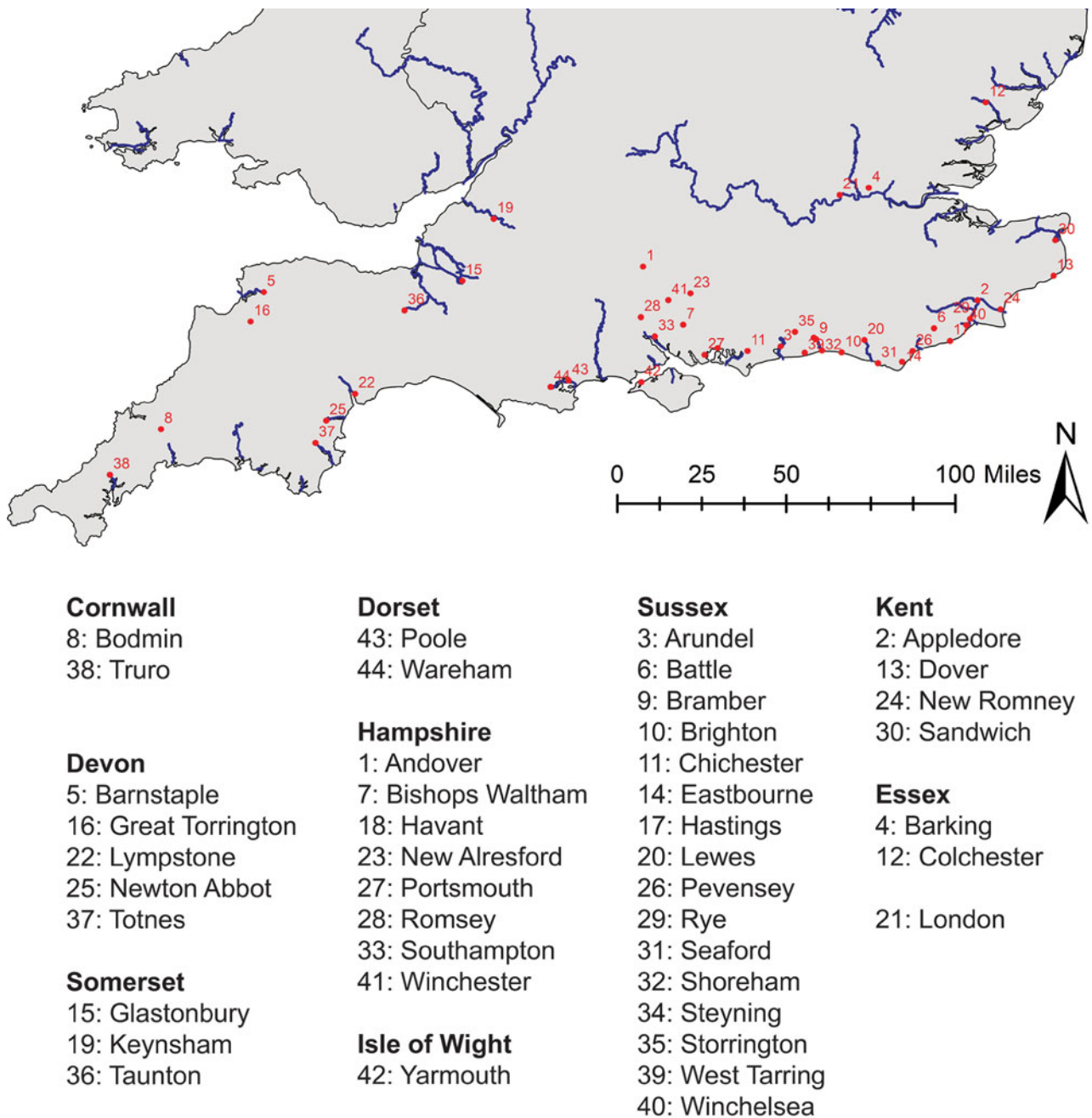


Figure 7. Distribution of west country roofing slates (source marked by star) from excavated urban contexts in southern England. (Image: author.)

consequences of these demands, both in terms of how the intensification of quarrying created localized disturbances of landscapes as they became a resource through which dynamics of power and wealth creation could be articulated, but also how its transportation could contribute to the shaping of socio-natures around river systems. From this

perspective, those undertaking the quarrying and shipment of stone were urban actors, even though they were operating away from centres of agglomeration; it was through their labour that distant resources were exploited by urban communities and the emergence of forms of urbanized life were mediated.

Extending urbanization through metabolic relations

Extended urbanization draws attention to the way that urban life is dependent upon spatially dispersed relations, which have implications for distant and seemingly 'non-urban' landscapes and regimes of labour. The example of roofing slate shows how this is true of medieval England, but also how the power to intensify production and profit from this exploitation was retained beyond urban centres. Extended urbanization is therefore a process best understood in terms of political ecology. This is a critical distinction between extended urbanization as a process in medieval England and the concept as defined in relation to contemporary processes. Whereas Brenner and Katsikis (2020) stand the exploitation of distant landscapes, a defining trait of modern, capitalist, urbanization, in contrast to the pre-capitalist urban 'hinterland', a more confined zone of exploitation, these concepts must co-exist within an understanding of medieval urbanization. It can be empirically demonstrated that towns both had a shaping influence on their immediate regions, but also made demands on more distant resources, with transformative consequences for livelihoods and landscapes.

Extended urbanization offers a framework for mapping the 'explosion' of urbanized life beyond towns and cities, while political ecology offers an approach to understanding the intersection between the social and environmental implications of this process. A final concept, that of urban metabolism, provides a tool to understand how the flows emanating from and towards towns were both transformed by, and acted to transform, urban life (Fig. 8). While originating in the work of Marx, the concept of urban metabolism was first defined by Wolman (1965) in relation to the supply of water to US cities. He perceived an urban ecosystem through which energy flows were transformed and excreted as waste (including 'solid' waste, carbon and sewage). Urban survival is, therefore, predicated on the maintenance of energy flows and the treatment of the emergent waste, and necessarily draws the city into relations beyond itself. A metabolic approach is therefore focused on understanding the volume, intensity and entanglements of the flows of matter which underpin the emergence and sustenance of urban life. Whereas network approaches have convincingly demonstrated the importance of connectivity to urban growth (e.g. Hohenberg & Lees 1995, 59–69; Raja & Sindbæk 2020, 181–2), a metabolic perspective, when combined with a concept of extended

urbanization, pushes beyond conventional approaches to the hinterland and connectivity by understanding the flows as transformative beyond towns and cities, as taking urbanization elsewhere (Brenner & Katsikis 2020, 25–6). The concept has been an important influence on contemporary urban design, driving considerations of circular economies and urban sustainability. It has been employed in the examination of power relations and inequalities within and beyond the city (in which hinterlands remain subordinate to the dominant city), the organization of territories and urban supply chains, the empirical accounting of flows and the ecological economics of urban systems, with its exact meaning varying across disciplines (see reviews by Bahers *et al.* 2022; Dinarès 2014; Zhang 2013; Zhang *et al.* 2015).

Contemporary approaches to urban metabolism are primarily concerned with understanding the city as an 'organism' which consumes resources and excretes waste. By understanding urbanization as a process which extends beyond the city, we can extend our understanding of these metabolic processes to the extraction, processing and production of those resources consumed by urban life. We have already seen, for example, how the supply of food to towns had a transformative impact on regional political ecologies through the adoption of intensive agrarian regimes. Another substance essential to sustaining urban life was salt, used for the preservation of meat and fish. Urbanization, and the associated intensification of coastal fishing, was a key driver of the growth of coastal salt production (Bridbury 1955). The association between urban markets and remote coastal saltmarsh is well illustrated by an excavated saltern mound on the Hoo Estuary at the mouth of the River Thames (Boothroyd 2013). The mound is part of a group situated some 2 km from the nearest permanent settlement, occupying a windswept, isolated location on Cooling Marsh. Such mounds are typical features of coastal saltmarsh landscapes and represent the remains of salt extraction. Pottery associated with this excavated mound dates from the fourteenth–fifteenth centuries and comprises sherds from the Surrey/Hampshire border to the west of London, the Saintonge region of southwest France and the Low Countries, as well as more local centres. Other finds include whetstones of Norwegian schist, imported through east coast ports, likely in association with stockfish (see Jervis 2023).

We can think about the transformations around salt in a number of ways. It was essential to the preservation of meat and fish, transforming fresh

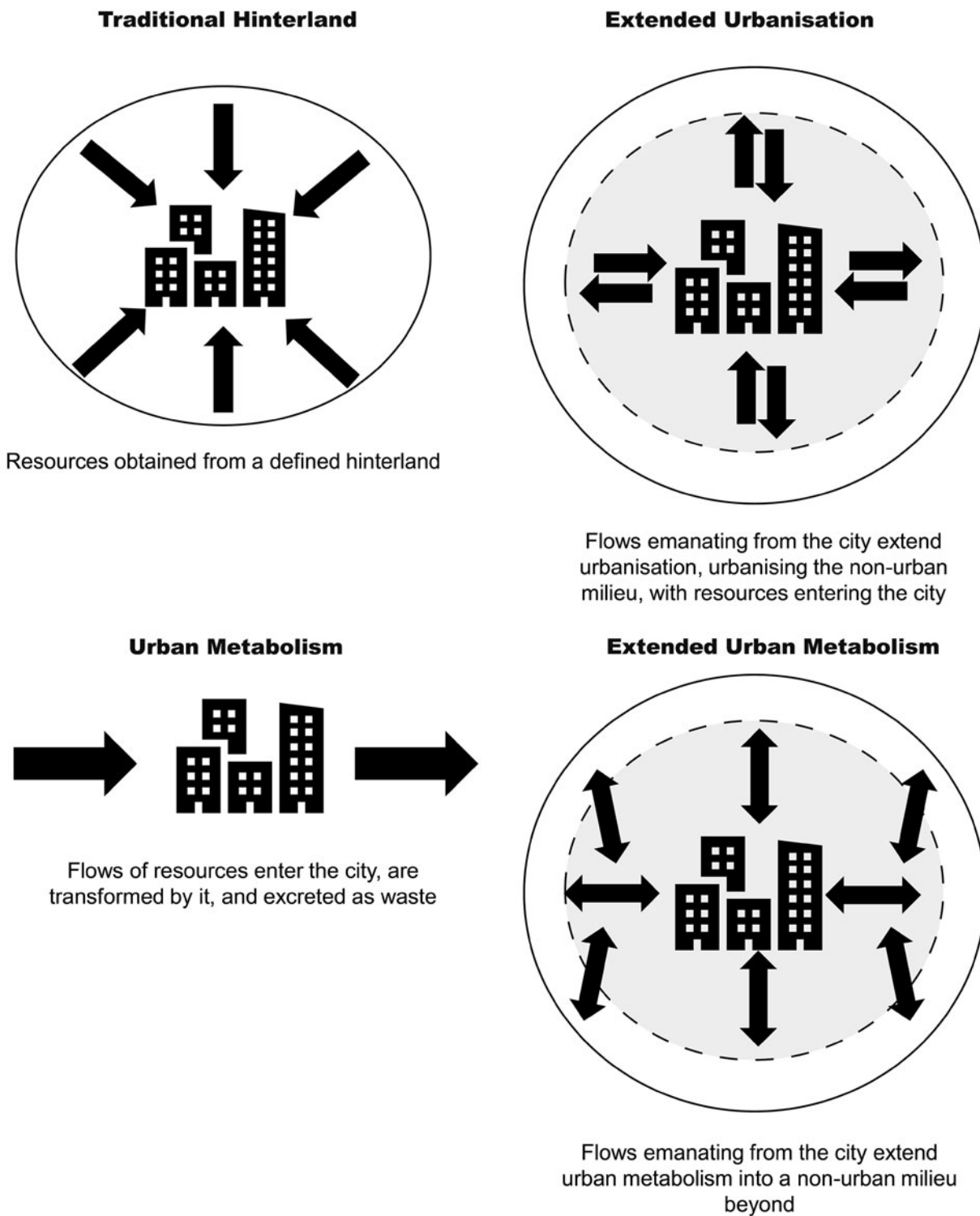


Figure 8. *Simplistic depictions of relations between cities and regions. The traditional hinterland model shows a city obtaining resources from a defined hinterland. Extended urbanization shows the flow of resources into the city from an area urbanized by flows from it. Urban metabolism shows resources being input into the city and excreted as waste. Extended urban metabolism depicts how flows extend out of the city and become entangled in metabolic processes within and beyond the extent of urbanization. (Image: author.)*

produce into an 'energy source' which could be managed in relation to the seasonality of livestock and the rhythm of the market (Woolgar 2016, 72–3). Salt allowed households to become reliant on the market for certain foodstuffs, affording non-agrarian ways of life to emerge in towns and for rural producers to specialize agrarian production. The process of extracting salt was also a transformative one, requiring the creation of brine from salt-impregnated sand, which then had to be boiled off (Historic England 2018). This evaporation process required fuel to be brought to saltmarsh areas and created large quantities of waste, dumps of which form saltern mounds such as that excavated at Cooling Marsh. In microcosm this demonstrates how urban life was both enabled by and placed demands on materials and substances, brought about their transformation, generated waste and altered landscapes. Whereas it is well established that urban demand led to the intensification of salt extraction, a metabolic approach opens the potential to understand the implications of the transformation of salt and its transformational capacities for ways of life and environments, as well as its intersections with other metabolic processes. Understanding these connections and implications better offers fruitful avenues for further enquiry.

Salt production was one of many industries which placed demands on highly managed medieval woodlands. Like salt, wood was subject to metabolic processes itself; its conversion into energy provided heat and light, but also enabled other transformations associated with urbanization. Analysis of the supply of firewood to London shows how regions around the city specialized in its production (Fig. 3). In terms of political ecology, we can perceive of an urban footprint extending well beyond the city itself, enfolding the non-urban into processes of urban emergence and sustenance. While Galloway *et al.* (1996, 468) conclude that the region around London had sufficient wood resources to meet the needs of the city, regional and some extra-regional demand and limitations on transportation routes restricted the core zone of supply, with specialization in wood production shaping the environment of this region. An international market existed for a range of wood products. In the fourteenth century firewood, timber, lathes and bark (used for tanning) were exported from the Weald of Kent and Sussex (Pelham 1928), a heavily forested and highly managed area, while timber was imported into western Europe from the Baltic. However, studies of woodland management have found it difficult to elucidate the impact of urban demand from a general

commodification of woodland resources (e.g. Keyser 2009; Witney 1990), emphasizing how our understanding of resource management cannot be reduced solely to the urban gaze. Urban life necessitated the management of woodlands far beyond urban centres, with access to sea and river routes over which timber could be floated, as well as the local environment (Charrudas & Deligne 2019). Woodland management did not only intersect with urbanization; wood was required by rural communities and for a range of industrial activities, some of the products of which were implicated in urban life, creating potential for conflict and making woodland a locale through which local political and economic power could be negotiated and imposed. Wood was essential to urban life and intensive and specialized woodland management created distinctive urbanized woodland political ecologies.

The examples of salt and woodland management demonstrate how attending to extended moments of urbanization sheds light not only on the flows of resources drawn into urban centres, but on the consequences of their management, cultivation and extraction. These flows can be perceived as metabolic relations, as flows of energy which sustain urban life, which leave residues of their exploitation as waste (such as saltern mounds), pollution, environmental degradation and the emergence of new urbanized ecologies (such as managed woodlands) which may be spatially disconnected from towns themselves. It is, perhaps, in the extraction of mineral resources that these residues are most visible. Following Arboleda (2016, 107) we might consider how the exploitation of landscapes for resource procurement has intensified the possibilities of communities who had previously been isolated from urban life to encounter urbanity. Extraction did not just necessitate the establishment of specific infrastructure, but also brought about new processes of urban growth. In medieval central Europe, mining towns developed in association with the intensification of silver and lead mining (Cembrzyński 2017). These varied in form, some being relatively organic and short-lived developments, others being developed in a more top-down manner. These towns typically developed in areas which were not densely settled, bringing with them new connective infrastructure and commodity flows, but also created a range of ecological impacts, from de-forestation for the erection of buildings and mine infrastructure, as well as for fuel, to erosion, air and water pollution (Cembrzyński 2019; Romhányi *et al.* 2020; Vadas 2021). As such, they provide a clear example of how the process of urbanization extended the

political ecology of urban life beyond the larger towns and cities from which the demand for these resources emanated. In England, the development of the town at Bere Alston (Devon) provides a similar example (Claughton & Smart 2010, 119–23). Here the local lord promoted urbanization in response to the intensification of mining operations by the crown. The town was therefore indirectly promoted by the intensification of silver extraction, associated with the process of commercialization, being both a moment of urban agglomeration and extended urbanization; it was the result of the stretching of the urban fabric into this non-urban area, and an amplification of the urbanization process, which placed new demands on local resources to sustain a new town.

These landscapes of extraction can be mapped back to the ways that urban life created demand for new types of object, including those which could be used as means of social expression such as pewterware (e.g. French 2021, 140–44; Goldberg 2008). Initially used within the church, from around the turn of the fourteenth century pewter began to appear among the possessions of wealthy households, with its use increasing through the fifteenth century (Hatcher & Barker 1974, 34–5; Homer 1991; Jervis *et al.* 2023, 103–13), mirroring trends in consumption perceptible elsewhere in northwest Europe (Hatcher and Barker 1974, 34–5). The production of pewterware was a largely urban enterprise, London initially being dominant in England, with industries developing in several provincial towns by the fifteenth century (Hatcher & Barker 1974, 74). The flows of lead and tin coming into London were affective in demanding new regimes of regulation and spatial practices, seen in the production of guild ordinances (Barker & Hatcher 1974, 38–9) and the concentration of pewterers and other specialist metalworkers around Cheapside (Keene 1996, 97, 99). The expanding taste for pewter intensified the demand for Cornish tin, and a substantial increase in output is perceptible through the fourteenth century (Hatcher & Barker 1974, 41).

Urban demand for tin necessitated the development of new infrastructure and regulation for its extraction. Tin streaming works and mills for ore processing became features of remote landscapes in southwestern England. Some were owned by landlords, others were capital investments by urban merchants or local households, with investment of capital in industrial production varying situationally (Casson & Casson 2024; Gerrard 2000, 38–9). Hatcher (1974, 56–7) proposes a strong demarcation between capital and labour, with tanners being a mix of full-

and part-time labour, some working for a wage and others for a share of their product. The marketing of tin was regulated through the stannary towns, where duty was paid on smelted tin. Urbanization then gave rise to localized articulations of proto-capitalist relations around extraction and established new geographies of extraction and regulation. A focus on tin reveals the localized, situated surfacing of proto-capitalist relations. This is a process of economic development which is localized and ‘patchy’ (Tsing 2015, 5; see also Jervis 2022). This intensification had a transformative impact not only on social relations but on ecology, with tin working leading to erosion and the silting of watercourses, disrupting the operation of infrastructural networks as well as scarring the landscape and taking productive land out of cultivation (Newman 2006, 138–41). In this way the stretching of urban fabric through the emergence of landscapes of extraction and their associated process of disturbance (see Tsing 2015, 151–2) created new political ecologies of intensification.

Thinking through the twin concepts of extended urbanization and urban metabolism brings us to a realization that towns and cities persist through attending to the demands of their inhabitants and environments, a process which reverberates beyond these settlements. As coagulations of flows, ongoing processes of urban agglomeration were transformative, disrupting environments and regimes of labour, generating new human–environment relations, creating exploitative ecologies of co-dependence, in which forms of life were transformed by, and trapped into, a dependence on urban life. In short, they were urbanized.

Conclusion: the value of extending medieval urbanization

The study of urban:rural relationships remains a critical element of medieval history and archaeology. Here it is proposed that the introduction of new concepts can provide opportunities to examine these relationships in new and productive ways. While the concept of the ‘hinterland’ has been shown to have empirical validity, it also has limitations. Firstly, it predicates a dichotomous relationship between town and country, which has been demonstrated to be increasingly untenable for the period. Secondly, it emphasizes the importance of local resources to towns, but is ill equipped to reveal how more distant resources were exploited by urban consumers. Thirdly, it does not provide a

means of understanding the transformative potential of urban life beyond towns and cities.

In order to address these issues, three concepts have been introduced. While it has long been acknowledged that rural producers developed strategies to respond to urban demand, a concept of *political ecology* draws into focus the integrated social and ecological implications of sustaining urban life. These include the implications of cropping regimes for ecosystems, the commodification of labour and the intensification of existing processes of resource exploitation. *Extended urbanization* provides a concept which calls into question an urban:rural divide by drawing into focus the productive entanglements between urbanization and a non-urban milieu. Drawing upon posthuman approaches to difference, it is proposed that seeing urban and rural as distinct but entangled processes can offer a means to consider both the implications of urbanization beyond urban centres and to understand how it intersects with other processes. Finally, the concept of *urban metabolism* allows these two concepts to be further explored through specifically focusing on processes of exploitation as transformational. Together these concepts pose new questions for archaeologists and historians exploring the urban past; rather than simply asking how towns and cities were provisioned, or how rural producers adapted to urban demand, we can ask what the implications of urbanization were, how its consequences were distributed and experienced beyond urban centres, and how this relates to traditional questions of regional socio-economic development. These concepts move us from a position where flows of resources are understood in relatively neutral terms to these flows being productive of new urbanities and ruralities, and is particularly well suited to an archaeological focus on the materials themselves.

In developing an extended urbanization of the medieval period, it becomes clear that while concepts drawn from contemporary urban studies have analytical potential, they must be used with care, attending to the specific historical contexts with which we are dealing. A great deal of work has been undertaken to reveal the complexity and diversity of both urban and rural life in the Middle Ages, and the application of new concepts must enhance this, rather than cause us to retreat to abstract, generalizing models which homogenize past experiences. Furthermore, an interdisciplinary approach is essential. Archaeology is well suited to understanding extractive landscapes and the flow of materials such as stone, but historical records provide a level of detail on agrarian production which far exceeds

the available archaeological evidence. Both sources present only a partial picture and therefore developing an approach to urban metabolism for the medieval period must be sensitive to this. Whereas many contemporary approaches to urban metabolism focus on the quantification of flows of resources into cities and the waste and residues generated by them, such an approach is less well suited to archaeological enquiry where we can obtain only a partial understanding of the resource flows constitutive of urban life. Even so, as a means of thinking through the consequences of urbanization, the approach has value in terms of framing enquiry not in terms of tracing the origins of urban provisions, but in understanding the consequences of their extraction and exploitation. The value of the conceptual approach outlined here is in challenging an urban:rural dichotomy by revealing the uneven and transformative implications of urbanization, rather than tracing a neutral flow of resources from countryside to market.

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Open Data Statement

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