RUBINA RAJA AND SØREN M. SINDBÆK

Urban Networks and High-Definition Narratives

Rethinking the Archaeology of Urbanism

ABSTRACT Becoming urban is widely recognized as one of the great turning points of human societies across history. Urbanism afforded economies of scale, cultural entanglements, and environmental exchanges, leading to social and material complexity, which are at the core of today's civilization. This paper argues that a new approach to urban archaeology may establish a more coherent view of urbanism as a defining expression of complex societies. Emerging applications of isotopic, biomolecular, and geoarchaeological methods are transforming archaeology's ability to read the scale and pace of events and processes in urban stratigraphies. These methods hold the potential to create a 'high-definition' view of the past, integrating scientific techniques with contextual archaeological and historical approaches. Redefining urbanism as a network dynamic, such an approach may unleash new forms of data that are able to significantly test, challenge, and revise narratives of particular urban sites as well as fundamental assumptions about trajectories, dynamics, and causal conditions of urbanism.

KEYWORDS Network dynamics; urbanism; scientific methods; grand narratives; high-definition archaeology.

Funding Details

This research has been funded by the Danish National Research Foundation (DNRF 119).

Introduction

Urbanism has been a transformative dynamic for societies for millennia. The emergence of large permanent agglomerations with a differentiated social constitution (Weber 1922; Wirth 1938) and specialized relations to and beyond a wider society (Pirenne 1927; Christaller 1933; Braudel 1949) marks a salient distinction from other modes of societal integration that may be recognized as a cultural regularity across time and space (cf. Cowgill 2004, 526; Fletcher 2007; Renfrew 2008; Smith 2017). To human societies across history, urbanism has afforded economies of scale, cultural entanglements, and environmental exchanges, leading to social and material complexity.

Cities bring large numbers of people together, along with their material culture. In an archaeological perspective, the complex stratigraphies of urban sites form a uniquely rich archive of this process. Even so, this evidence — arguably the single most data-rich material archive of anthropogenic activity and change in the last six millennia — remains very unevenly explored. Despite the thick and often fine-meshed stratigraphies, which characterize many urban sites, and despite the application of increasingly detailed recording practices, archaeologists often struggle to capture the potential of this data to supply detailed historical knowledge.

This article argues that a new approach to urban archaeology may establish a more coherent view of urbanism as a defining expression of complex societies.

Rubina Raja (rubina.raja@cas.au.dk) is Professor of Classical Archaeology at Aarhus University, Denmark, and centre director of the Danish National Research Foundation's Centre of Excellence for Urban Network Evolutions. She specializes in Mediterranean and Near Eastern Archaeology in a diachronic perspective, often with focus on urban societies. ORCID iD: 0000-0002-1387-874X.

Søren M. Sindbæk (farksms@cas.au.dk) is Professor of Medieval Archaeology at Aarhus University, Denmark, and co-director of the Centre of Urban Network Evolutions. He specializes in Viking and early medieval Europe, with a focus on urbanism and social networks. ORCID iD: 0000-0002-1254-1256.

BREPOLS PUBLISHERS 10.1484/J.JUA.5.121535

Emerging applications of isotopic, biomolecular, and geoarchaeological methods are transforming archaeology's ability to read the scale and pace of events and processes. These methods hold a potential to create a 'high-definition' view of the past, integrating scientific techniques with contextual archaeological and historical approaches. Redefining urbanism as a dynamic of networks at scales ranging from intra-site to extra-regional, such an approach may unleash new forms of data which may enable archaeology to test, challenge, and revise narratives of particular urban sites as well as fundamental assumptions about trajectories, dynamics, and causal conditions of urbanism.

Urban Archaeology: Past, Promise, and Predicament

Few places in the ancient and medieval world have preserved a record of human activities and cultural significance as full as the cultural layers of urban settlements. Unsurprisingly, archaeological fieldwork has taken place at urban sites since archaeology became a discipline (e.g. Schliemann 1874; Stolpe 1876; Petrie and others 1886). However, an actual urban archaeology, defined by an interest in the concept and phenomenon of urbanism, is not recognized until the 1920s. Its emergence is marked by a range of now iconic excavations conducted on a grand scale and aiming to map out street plans and housing conditions and to trace the daily life of commoners, whether in Sumerian Ur, Roman Gerasa, or Viking Hedeby (e.g. Woolley 1930; Kraeling 1938; Jankuhn 1938).

In archaeological research history, the emphasis of these excavations marks a striking contrast to the focus on formal architecture, sanctuaries, and art, which had characterized most field projects until the First World War. They were synthesized in a new materially centred view of human history, epitomized in V. Gordon Childe's works, in which the emergence of urbanism marked a revolutionary change in social (pre-)history (Childe 1936; 1950). These developments arose in tandem with the emergence of similar interests in history and social science (Weber 1922; Pirenne 1927). It may be argued that the shift expresses an intellectual movement away from an idealistic view of human development to one exploring the ontology of social phenomena as autonomous realities, arguably reflecting the growth of twentieth-century mass society and the experience of the World War and subsequent revolutions.

Over the course of the twentieth century, the archaeology of urbanism proliferated to regions around the world.[1] A growing focus on ecology and consumption, and hence a growing attention to deposits in addition to features, increasingly revealed the data potential of urban sites. Beginning in the 1960s with the advent of New Archaeology, a shift of interest from origins to process, as well as the increasing application of quantitative methods, led to the adoption of refined stratigraphic recording methods which were pioneered in urban contexts (Harris 1979). This yielded indispensable methodological improvements, yet the exponentially expanding datasets it produced have also eventually constrained the impact of urban archaeology on the level of synthesis. Amidst vast archives of ecofacts, sherds, and other materials, as well as layers and features, it has been difficult to achieve integration and comparison beyond broad-brush interpretation to identify the actual human practices to which the data might relate.

From the 1990s, the reaction against quantification and generalization associated with post-processual approaches impeded a response to these challenges, instead directing focus to singular contexts, such as the occasional sealed floor layer or intentional deposits (e.g. Skre 2011). On a methodological level, such work has contributed to an understanding as to how assemblages are structured by events and contingencies. Yet, it has also contributed to a further fragmentation which has limited the contribution of urban archaeology to higher-level debates. Urban archaeology thus often continues to struggle to demonstrate how the huge datasets may contribute to the knowledge of social practice and historical events and processes. There is a need to push forward forms of research that may more convincingly engage the complexities of the evidence without losing sight of synthesis and comparison.

High-Definition Archaeology

In recent research, a number of newly developed techniques point to new responses to these challenges. They offer a means for archaeology to refine the precision of time, the character of excavated contexts, and the networks traced by materials found therein. When taken together, they have been argued to mark one of the most salient changes in archaeological research practice in a generation (Kristiansen 2014). For urban archaeology, they offer new potential for bridging the gap between specific, often

1 Cf. surveys in Clarke and Simms 1985; Hansen 2000; Smith 2003; Marcus and Sabloff 2008.

Figure 11.1. High-definition archaeology in action in Ribe. The use of new methods from the natural sciences with contextual cultural studies rooted in the Humanities calls for new combinations of fieldwork practices, which enables methods of dating, characterizing contexts, and provenancing materials to be integrated. Complex urban stratigraphies represent a prime target for these developments. Photo by the Museum of Southwest Jutland.

highly data-rich, contexts and historically meaningful developments.

Firstly, the character of contexts is now increasingly clarified through the application of soil geochemistry, micromorphology, and environmental evidence including microbiological remains (e.g. Canti and Huisman 2015; Wouters and others 2017). Soil science has proven its ability to reveal aspects of practice, such as seasonality and frequency of occupation, and to provide complementary information to the artefactual evidence regarding the use of space; this enables a new assessment of the social context of finds and features. Recent progress in ICP-MS methods has made analysis of up to fifty elements per sample reliable and cost-efficient. A multi-element approach by which urban deposits can be mapped at a high spatial resolution has the potential to chart both natural processes, such as dust inputs, soil erosion/deposition, as well as anthropogenic inputs of e.g. food processing and manufacturing more firmly than previous methods (e.g. Davidson and others 2007; Nielsen and Kristiansen 2014).

Secondly, the precise characterization of context may greatly enhance the reconstruction of time. Surprisingly often, urban histories are still defined by the punctuations of assumed correlation with recorded political or military acts or by natural or human destruction phases, which serve tacitly as chronological anchors for the archaeological record. Existing data is often inadequate to challenge established, historical paradigms.[2] Epigraphic evidence or dendrochronology have sometimes provided highly exact anchor points for local chronologies; however, such opportunities occur only sporadically. For accurately sequenced contexts, as many urban deposits are, it is now possible to construct high-precision chronologies through increasingly sophisticated statistical modelling of radiocarbon dating (e.g. Bayliss 2009, 123; Olsen and others 2011; Darvill and others 2012) and other fast-developing

2 Lichtenberger and Raja 2015 for an attempt at such an interpretation.

methods such as optically stimulated luminescence (Alexanderson and Murray 2012). Complex urban stratigraphies represent a prime target for developing tightly dated sequences based on Bayesian statistical modelling and a comparison of multiple materials. Analytical integration of the results increasingly cross-fertilizes the understanding of existing records and of wider historical settings, including social and institutional history.

Thirdly, the connectivity of material associations is increasingly traced through the application of compositional, isotopic, and biomolecular analysis of organic and inorganic materials (e.g. Barrett and others 2011; Stewart and others 2012; Freestone 2015). While the movement and processing of materials and objects constitute a critical component of what makes urban sites central to societies, the bulk of finds recovered from urban excavations has until recently had little to contribute to the investigation of this connectivity. The problem is particularly acute for many staple commodities and raw materials, while rare materials and highly refined items can more often be assigned a specific origin. This situation has also contributed to stressing a widely held equation of urban connectivity with long-distance trade and 'luxuries', assumed to be socially and economically peripheral (Blaut 1993, 168). The ability to trace still more archaeological materials offers an opportunity to test this assumption. This allows a more specific study, not only of places of origin but also of flows of commodities, technologies, and innovations, which were previously beyond grasp.

Each of the developments outlined above present exciting prospects, but for the full potential to be unleashed, refined methods of dating, characterizing contexts, and provenancing materials need to be integrated. By this means, they present a prospect to explore dynamics, which were previously beyond observational range for most archaeological data. We may term this a 'high-definition' view of past dynamics. 'High definition', in this context, does not imply 'micro-scale'; rather, it expresses an approach which seeks to revise grand narratives by replacing approximate observations with more exact ones (Fig. 11.1). By multiplying the amount of data, i.e. by combining micro-scale sampling and multi-parameter analyses on the same samples, we may decisively improve the quality of the 'grand picture' of comparative archaeological and historical models.

By applying high-resolution chronologies, it will be possible to a much wider extent than previously to explore dynamics and short-term fluctuations in urban development (Athens, Rieth, and Dye 2014; Toffolo and others 2014; Wicks, Pirie, and Mithen 2014). In historical periods, even minor adjustments of the chronologies of archaeological evidence can change the order of assumed causes and effects and fundamentally alter the understanding of political events and cultural developments. Did a process of abandonment follow or precede a historically known political rupture? Did investments in fortifications precede military events, demonstrating the concerns of and stresses upon a community, or postdate it, showing the resilience and regeneration? Were changing flows of materials a precursor and possible incentive for political approaches or confrontations, or did they follow from them?

By defining local developments and assessing the impact of global dynamics on particular societies in a high-definition perspective, we may enable a more qualified assessment of modes of adaptation and strategies of resilience and expansion. This, in turn, may show, in a new way, how far and on what timescale local crises and other events had a percolating or knock-on impact on complex societies and their interaction. Change may manifest itself differently in various locations, while having a single source of origin; or similar supraregional trends may be shown to occur with different timing, thus expressing less direct interrelationships than an immediate comparison might suggest.

Network Urbanism

When seeking to elucidate aspects of urbanism in a high-definition perspective, we are confronted with other, more dynamic phenomena than those which have typically been studied by archaeology and addressed in theoretical discussions. Commonly, the development of urbanism has been addressed in archaeological studies in one of three major ways: as an aspect of social complexity, a corollary of a political dynamic, i.e. a reflection of centralized resources and power; as the formation of a spatial order, a process of agglomeration of people and communication; or as an economic process, associated with the rise of market exchanges.

It is generally accepted that urbanism cannot be reduced to any single dynamic but represents a cluster of mutually dependent phenomena. Hence, influential traditions define urbanism through 'bundles' of criteria comprising political institutions and physical structures (Childe 1950; Ennen 1953; Biddle 1976; Kolb 2002; Renfrew 2008). In this view, towns and cities are essentially regarded as accumulations of people, knowledge, and resources — 'containers of power' within a wider society (Mumford 1961; Giddens 1984). Other definitions stress the rela-

tionship between urban societies and surrounding hinterland territory (Weber 1922; Christaller 1933), to the extent that urbanism may be understood only as a part of wider (city) states (Hansen 2000) or even as derivative 'consumer cities' (Finley 1973). Investigations arising from these perspectives have emphasized relatively static political and organizational aspects of urban sites, including sanctuaries, monuments, town plans, and defensive walls, which define cities as bounded spaces and are taken to mark a common military and/or judicial identity (Hansen and Nielsen 2004).

If urbanism is regarded instead in the active tense, other features come to our attention. What is special and recognizable about urban sites is not only their physical structures or spatial patterns but the movements and engagements of people and things that pass within and between them and the processes engendered by these interactions. This is increasingly recognized in recent research. Beyond its political and economic role, urbanism is a catalyst of life-ways marked by social complexity and networks of wider, ultimately global, interdependence (e.g. LaBianca and Scham 2006; Howell 2010; Jennings 2010; Taylor 2012; 2013; Sindbæk 2007; 2013; 2015; Raja 2012; 2013; 2015).

To the extent that previous historical and archaeological research traditions have approached networks as an aspect of urbanism, it has been broadly considered as expressing quasi-colonial centre–periphery relations (Stein 2002; Gosden 2004) or considered an effect of social hierarchies (e.g. Adams 1966; Tilly and Blockmans 1994; Hansen 2000; Algaze 2005), sometimes 'little more than an appendage to the concept of "the state"' (Cowgill 2004, 526). Yet, networks are constituents of a much wider range of affairs and not merely in the simple sense that things are connected. Since the 1990s, research on social, technological, and other networks have drawn attention to the importance of network organization and topology. It matters not only how many people are integrated in a society but also how they are connected and where. In this perspective, the presence of urban centres may have a profound impact as hubs of communication. This may even be seen as a principal — and formative — role of urban sites, a dynamic of 'network urbanism' (Dupuy 2008).

Networks are integral to urbanism above all through 'the overwhelming communication advantage of cities' (Taylor 2012, 416). The simultaneous presence and accessibility of a variety of people and resources, which are characteristic of urban sites, enable things to happen which might otherwise be difficult to accomplish. The practices, which arose as a consequence, are the focus of what may be called a network perspective on urbanism. They may comprise conspicuous long-distance contacts, commercial exchange, and complex divisions of labour — things which have long been seen as characteristic elements of urban life; but they can equally be seen to include more localized patterns of practice and circulation, which reveal equally distinctive aspects of urban networks.

Network Dynamics — The Local Agency

It remains a challenge to identify and disentangle the effects of regional or intra-urban networks through the archaeological records. Rather, existing data and approaches often appear to reinforce the structural view of urbanism. For example, attempts to analyse city plans and understand their spatial layouts may involve communication and interaction on different levels, but often in terms of central decisions and static conditions rather than active network dynamics (Laurence 1994; Haug and Kreuz 2016). Another line of enquiry into connections between urban environment and individual engagement is the epigraphic record, which may tell, for example, about the local, regional, and imperial financing and dedication of buildings, monuments, and other structures, but which reflects a narrow range of practices mostly carried out by the elite (Millar 1993; McMullen 1982). Such approaches stand in stark contrast to the broader set of practices reflected in the archaeological record of cities.

Urban streets are another feature which is often described as part of the structural, even monumental, aspects of cities. In the case of the Roman Empire, this is often reflected through the layout of the main axis of urban sites where a main street ran through the centre of towns and, at strategic points, was transversed by smaller, but still monumentalized side streets. Yet, this was certainly not the case as soon as one left the monumentalized parts of the streets, which often did not project as far as earlier thought (Lichtenberger and Raja 2015, 494–96). Neighbourhoods and their inhabitants turn out to have had a profound influence on the way in which streets and paths were maintained within their smaller urban zones when we dive into the accumulations/layers in the archaeological stratigraphies. To what degree the overarching civic organization was involved in deciding such processes remains an open question, but neighbourhoods outside the central zones of a city may provide us with new information about the organization of urban life and therefore also the network aspects of urbanism.

Figure 11.2. Trench J profile showing dense layers of ceramic fills used as fill material under a complex and as street pavement. Streets in the Northwest Quarter of Roman and early Islamic Jerash (Gerasa), Jordan, were repeatedly maintained over centuries with a strictly selected mixture of hard- and well-draining materials including ceramic and other urban waste. In a network perspective, this practice testifies to a surplus of concentrated activity and associated circulation of materials, which all contribute to the complex biographies of urban stratigraphies. Photo by the Danish-German Jerash Northwest Quarter Project.

In ancient Gerasa, modern Jerash, Jordan, a site with an occupation history spanning more than two thousand years, new research on the urban infrastructure provides an example of how urbanism and the organization of infrastructure may be viewed in a different light (Lichtenberger and Raja 2015). Gerasa was a fairly important city, which flourished throughout the Roman, late antique, and early Islamic periods. It formed part of the Decapolis in northern Jordan, which was a grouping of at least ten cities. Due to its state of preservation and the research undertaken in the 1920s and 1930s, the city has been used as a prime example in discussions about the fate of urban development in the eastern Mediterranean (Kraeling 1938; Liebeschuetz 2001, 297–98). The 'cityness' (Wickham 2005, 593) of Roman and late antique Gerasa has been appreciated primarily in terms of its civic architecture and impressive monuments. The foundation of numerous churches from the fifth to seventh centuries AD has been seen as evidence for continued prosperity and civic coherence of the community. Conversely, the abandonment of a number of public buildings, i.e. the pagan sanctuaries, and the increasing encroachment of structures set into the porticoes of the monumental main and side streets, have been viewed as signs of pervasive urban decline from the late antique period onwards (Jones 1940; Cameron 1993).

However, the work done by the Danish-German Jerash Northwest Quarter Project 2011–2016 within the highest area of the city walls of the town offers a different perspective on the development of the city (see Lichtenberger and Raja in this volume). The fieldwork revealed that this approximately 4 ha large area underwent an intense and continuing development at least from the second to the mid-eighth centuries AD (Lichtenberger and Raja 2012; 2015; Kalaitzoglou and others 2012). Among other features, this development can be traced in the layout and continuous attention paid to the maintenance of the complex street network.

The Northwest Quarter was a structured neighbourhood laid out on a series of partly artificially constructed terraces on the highest ground within the walled city, an area commanding the best view of the city and almost certainly a location associated with a great deal of prestige. This was surely the case both in the sixth century AD when a monumental ecclesiastical complex connected with the Roman army was constructed here (Haensch, Lichtenberger, and Raja 2016; Lichtenberger and Raja 2018) and in the early Islamic period when a series of richly decorated private houses were constructed on the so-called East Terrace (Lichtenberger and Raja 2016; 2017; Barfod and others 2015).

The east–west-running streets laid out on the various terraces constituted the main arteries of the area, and north–south-oriented streets connected the terraces with each other. The streets were approximately 2 m broad and trace a combined total of more than 500 m of traffic arteries through the area (Kalaitzoglou, Lichtenberger, and Raja 2014; 2015). These streets were in continuous use from the third to the mid-eighth centuries AD, and possibly beyond. They were not paved with stone slabs, as was customary in Roman-period cities. Instead, they were covered with a dense mix of ceramic and other urban waste, including animal bones (Fig. 11.2). The materials used, however, were not randomly disposed waste materials but a strictly selected mixture of hard- and well-draining materials. They show up in the excavations as thick layers of repeatedly maintained surfaces. Over and over again, they were repaired and maintained in similar ways in order to upkeep their function. The streets were firm and level and must have been well suited to human and animal traffic — arguably superior to hard and potentially slippery stone slabs. They serviced an area where other findings testify to production — including oil presses, implying traffic of heavy goods, and at least one church complex, indicating public activity.

In a structural view of urbanism, these waste-paved roads appear less impressive than the more familiar paved roads of the Roman and Byzantine periods. In a network perspective, however, they are even clearer expressions of urbanity. They testify to the abundant availability and reuse of allocated materials, including huge amounts of the locally produced ceramics, which must have been handled in such a way that it could be reused, e.g. in connection with the paving and repairs of these streets. The strict selection of materials and repeated maintenance of the streets in a similar fashion over centuries express a high degree of civic organization and control. Their persistent maintenance demonstrates a high density of activity and traffic. The mixture of public and private interests implied by the controlled reuse of materials circulating within the urban space expresses a strictly urban community — more so than the public commission and allocation of engineered structures. Rather than their make-up being indicators of urban decline and settlement contraction, the dense and actively maintained street grid in fact underlines an intensification in the settlement pattern during a period which is usually said to be a period of decline.

The 'cityness' of the example brought forward here does not relate to governed structure but reflects situations that imply an inordinate amount of organized mess — a surplus of concentrated activity and associated circulation of materials, which all contribute to the complex biographies of urban stratigraphies. This view of urbanism allows for some quite different perspectives compared to the customary focus on institutionalized static structures and large-scale investments, such as city walls and stone-paved streets. Rather than being defined as a confined context, urbanism comes into view as a connected condition. The examples show how a network perspective, not only comprising long-distance and hinterland interaction but also intra-site circulation, may contribute to redefine the nature of urbanism.

Network Dynamics — The Global Currents

Archaeological discussions of networks, whether urban or otherwise, often prioritize long-distance connectivities, because these have clearly identifiable corollaries in the form of displaced, non-local goods and objects. These are aspects that may be particularly prone to investigation through the approach of a high-definition archaeology. The range of elemental, isotopic, and biomolecular tracing technologies that are currently becoming operational extends the ability to pinpoint stages and cycles in networks of urban exchange and production. The advance of tracing methods has been most evident for organic materials such as animal bone, which were until recently often recorded and assessed as bulk finds. The possibility to trace the individual origin of organic objects through isotopic analysis is transferring such finds from the realm of statistical proportions to that of individual object biographies with a greatly increased potential to illuminate urban connectivity.

A salient point is to determine what such materials reveal beyond the presence of interregional flows. Changing flows may reflect a wide range of

processes among either dispatching, receiving, or intermediary societies, and what needs to be uncovered is the dynamics that conditioned patterns and changes, and how the flows in question contributed to these. In which situations did long-distance contacts and commercial exchanges simply correlate with internal developments and decisions, and when did they have the power to convey economic or political influence across regions? This question is the focus of debates on the transmission, amplitude, absorption, and ultimately societal significance of premodern precursors of globalization and of the role of urbanism in this process (Jennings 2010; Beaujard 2012). In assessing the answer, contextual, high-definition evidence is key.

A historical conjuncture, which often invites discussions on the role of premodern, global network dynamics and urbanism, is the recalibration of Afro-Eurasian political relations and economic ties following the Abbasid revolution and seizure of power in the Middle East after AD 750. The 'Abbasid world system' (Abu-Lughod 1991) involved a major internal realignment of the resources of the central lands of the early Islamic Empire, as the Syrian/Levantine heartland of the defeated Umayyad caliphs was replaced by a political and economic order focused on Mesopotamia (Kennedy 2007, 133). This process sapped old centres like Jerash, which was only sparingly rebuilt and reoccupied after a devastating earthquake in AD 749. In their place, the resources of Middle Eastern government and elites were concentrated for the next century in the region of Baghdad. With this relocation came a stimulus of trade patterns focused on the traditional tendrils of Mesopotamia — the Indian Ocean and western Silk Road countries — but operating with a new reach and intensity (Campbell 2017).

The trade patterns stimulated by the rise of the Abbasid Empire is convincingly argued to have occasioned an unprecedented focus on maritime long-distance trade from the late eighth century AD in Tang China (Miksic 2013). The effects of the Chinese maritime trade are also noted in the proliferation of Chinese ceramics in Persian Gulf ports, such as Siraf (Priestman 2013), and in south-east Asian shipwrecks (Krahl and others 2010). In the East African seaboard, the eighth and ninth centuries are marked by a proliferation of Swahili coastal emporia with evidence for Middle Eastern trade (Campbell 2017). In the West, the rise of Abbasid power has been argued to be a factor affecting the 'Carolingian renaissance' of Charlemagne's Frankish Empire in the late eighth century AD, both as a factor realigning the Mediterranean balance of power (Hodges 2012) and, more directly, as an economic stimulus reaching western Europe through a new 'Northern Arc' of trade from the Islamic world through Russia and Scandinavia to the West (McCormick 2001, 606).

The reality of this trade pattern is suggested by the occurrence of Islamic silver dirhams in a number of hoards and settlement finds in Russia and the Baltic Sea region beginning from the last decades of the eighth and the start of the ninth centuries AD. Its starting point in time and causal relations to wider processes of change, however, remains debated. After *c.* AD 860, coins and other Middle Eastern materials begin to occur regularly and abundantly in the northern lands. Before *c.* AD 800, the finds occur sparingly, and it has been argued that they 'have no substantial presence in the archaeology' and 'can therefore scarcely be used as evidence of regular contacts with the dirham-using areas both within and around the Caliphate' (Kilger 2007, 214). Could the early coins signal a catalyst for new economic development (Noonan 1998), or did they amount to a mere down-the-line addition to the pre-existing links between the Carolingian world and its northern periphery (Ambrosiani 2005)? The most promising place to look for further clarification is in the trading emporia, which focused economic ties between regions.

Ribe in Denmark is part of a very different line of urban evolution than Roman Jerash. It belongs to a group of small trading emporia which grew in costal and riverine landing places around the northern European coasts from the seventh century AD. North of the former Roman provinces, there was no previous tradition of urban settlement, and the emporia mark a first departure towards urban settlements and networks in this part of the world. The emporium in Ribe has been targeted by several major excavations since its discovery in the 1970s (Bencard, Jørgensen, and Madsen 1981–1990; Feveile 2006).

The layout of the settlement is deceptively simple: a central, wood-paved street following the course of the river, densely lined with housing plots and set between a back zone of villas and cemeteries and the (as yet unidentified) riverside harbour front. Even so, the density and character of occupation clearly set the settlement apart from contemporary rural sites. What distinguishes this place as an urban site are the concentrated finds pertaining to long-distance trade, such as coins, non-local ceramics, and glass vessels, as well as evidence for specialist crafts including ferrous and non-ferrous metalworking, glass and glass-bead making, and bone- and antler-carving (Sindbæk 2007; Barfod and others 2018).

Among the early North Sea emporia, Ribe has a special potential to trace the early development of the trading network by means of its remarkably

Figure 11.3. A small cache of dirham imitations excavated in Ribe, Denmark, from layers dated to the period *c.* AD 780–90, is the earliest reliably dated evidence for Islamic silver coins in Scandinavia. Although a unique find, the high-definition excavation and phasing of the site allow us to place the find in the context of a definite network change with comprehensive implications for the configuration of exchange. Museum of Southwest Jutland, inv. no. ASR9 x500. Photo by Rita Fredsgaard Nielsen.

intact stratigraphy of finely laminated occupation layers. It has proven possible to distinguish phases as short as a decade and thus to compare the occurrence of object types and materials across the duration of the settlement from the earliest occupation *c.* AD 710, to the termination of the presently known sequence around AD 850 (Feveile and Jensen 2000). In this way, it is possible to outline a narrative of the global trading flows in one of the nodal sites of the North European world in the time of the Abbasid world system.

Ribe's earliest long-distance contacts, in the early and mid-eighth century, were focused on the Frankish realm, as evidenced by finds of a range of western European goods such as pottery, glass, coins, and Mayen basalt quernstones (Feveile and Jensen 2006, 132–50). The early arrival of early Islamic silver coins manifests itself indirectly in an intriguing find in the town. This was a small cache of between four and seven dirham imitations — possibly for use as jewellery — all corroded together into one block of metal (Fig. 11.3). The two outer surfaces showed stamp-identical imitations of an Umayyad dirham struck in 81 AH/AD 700–01, supposedly struck in the periphery of the Caliphate. The find was excavated in the so-called 'Post Office' site (ASR 9), where strict stratigraphic control was practised during excavation, and can be assigned to phase E of the site, dated to the period *c.* AD 780–790 (Feveile 2006, 299). While these are imitations rather than actual dirhams, they testify to knowledge and circulation of Islamic coinage. The date makes this find the oldest reliably dated evidence for Islamic silver coins in Scandinavia.

Although a single find, the high-definition context of the urban stratigraphy enables us to put the coins into a context, which allows a justified interpretation of network flows. 'Phase E' of the 'Post Office' site also marks a notable shift from older phases, where hundreds of locally made glass beads occur, to a new pattern where imported beads first supplement, then all but replace local bead production. A high rate of retrieval, achieved through the consistent use of water sieving, documents that from this phase onwards, hundreds of Middle Eastern segmented metal-foil beads, *Augenmosaikperlen*, and drawn-cut beads occur consistently in the layers, while only a handful (intrusive?) are seen in earlier layers (Feveile and Jensen 2006, 148). The importation of beads quickly grows so substantial that, by AD 800, the local glass-bead production has largely ceased. The lump of Islamic coins may be a singular find, but it marks a consistent change of connectivity.

The wider assemblage makes it clear that these events are accompanied by further changes. Slightly after the arrival of eastern beads and coins, in phase F, the occurrences of Frankish Badorf and Tating ware, arguably used by non-local merchants, grow notably (Feveile and Jensen 2006, 136–37). A steep growth in the import of copper alloys is marked by a sharp increase in the refuse from non-ferrous metalworking (Feveile and Jensen 2006, 136–37). At the same time, the simultaneous arrival of the first goods pointing to trade with the Scandinavian Peninsula — reindeer antlers used as raw material for comb-making — points to a multidirectional reconfiguration, rather than simply a change to the content carried by the established Frankish connections (Ashby, Coutu, and Sindbæk 2015).

The arrival of Middle Eastern coins and beads in Ribe, at the North Sea border of Europe in the AD 780s, thus marks a definite shift with comprehensive implications for the configuration of connectivities, which made this small emporium a node in an urban exchange network. A high-definition excavation and phasing of the site stratigraphy allow us to monitor the character, chronology, context, and impact of the event. The rarity of such precise excavation data, however, leaves important questions open: To what extent were the changes a result of local decisions, such as new alliances or partnerships, or a changing pattern of transportation, such as the increasing use of sailing vessels? How far was

it linked to wider, supraregional changes, such as the intense conflicts of Charlemagne's Saxon Wars in the AD 770s and 780s — or the slightly later intense investments in the emporium Dorestad, Ribe's closest trading partner (Coupland 2010)? And how far is it ultimately an outcome of the global currents of changes issuing from the rise of the Abbasid Empire, which also caused the decline of activity in Jerash after AD 749? In order to address such comparative questions, we require more fieldwork to be undertaken in a high-definition approach.

Regarded in the context of contemporary network shifts, both in the region of provenance and reception, the early Islamic coins in Ribe take on a different meaning as actors in a change of constellation. A network approach challenges the entrenched dichotomy between local hinterland interaction and (supposedly derivative) 'long-distance trade' (e.g. Wickham 2005) by asking how far and how quickly urbanism might convey agency by catalysing or transferring changes (Sindbæk 2013; Raja 2012). It is not the scale or provenance of flows as such which are important but rather their high-definition contexts.

Conclusion

A practice-centred high-definition approach to urbanism will complement structural definitions in which urbanism is approached in terms of built environment or investments such as large-scale monuments or defences (Hansen 2000; Renfrew 2008; Frederiksen 2011). Such perspectives are prone to encourage a static view and to overestimate structural continuity as well as overlooking continuity in detail as underlined in the case studies presented here.

A high-definition approach to urban archaeology may highlight aspects of practice which are frequently sidelined in contemporary research. One aim must be to refine methods for exposing internal food production and 'hinterlands' in terms of urban gardening, animal keeping, fishing, and water management — activities which made some premodern urban societies more self-sustaining than acknowledged by conventional models of urban–rural exchange (Lichtenberger and Raja 2016). Another desideratum is to identify geoarchaeological 'fingerprints' of specialized manufacturing, which might provide a reliable index of activities such as metalworking or tanning for which traditional archaeological proxies are vulnerable to shifting patterns of waste disposal and preservation. Closely related to this, we must seek a protocol for establishing levels of pollution as a comparative index of urban living conditions.

An ideal biographical work programme for urban archaeology would include several integrated projects concurrently investigating material culture, built structures, micromorphology, archaeobotany, microbiology, and soil geochemistry. The inclusion of many new variables calls for novel basic research at each site in order to gain knowledge on how and whence hitherto uncharted elements entered the city and how they are cycled biogeochemically within anthropogenic deposits (Walkington 2010). Initially, these aims will be high-risk objectives, but where successful, they will supply groundbreaking new analytical tools by which to review urban development.

The full potential of a high-definition approach to urban archaeology is nested in the combined analysis and contextual interpretation of composition, connectivity, and chronology. Well-characterized contexts provide for a surer understanding of dated materials; well-dated contexts allow for more decisive interpretations of connectivity and other dynamics in relation to historical events and trajectories. Harnessing this potential for urban archaeology, we may aim at refining views on large-scale events in order to move from 'grand narratives' to 'high-definition narratives', integrating high-precision chronologies, site biographies, and recorded history. In refining the comparison of written history and archaeology, such an approach has real potential to transcend existing disciplinary and epistemic boundaries within and between archaeology, history, and science.

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