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# Journal of Urban Archaeology

Volume 3

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# Network Evolutions and High-Definition Narratives – An Introduction

Networks are increasingly seen as a defining dynamic of the urban process. In recent years, archaeological and scientific techniques have contributed in new ways to understanding the pace and scale of events, developments, and processes of urban network evolutions. While urban archaeology is a wide-ranging discipline and embraces approaches from all branches of archaeology and archaeological sciences, from traditional methods to the most recent advances in sciences, urban archaeology is also often limited by its scope — namely the investigation of remains connected to settlements. Taking a network perspective allows us to view urbanism in a new and dynamic light, making it possible to trace relational matters in a different light.

This issue of the *Journal of Urban Archaeology* aims to explore how interpretational frameworks and scientific techniques focused on networks can be integrated with contextual archaeological and historical approaches to form high-definition narratives of urban dynamics in the past. Network analysis has proven potential in archaeological and historical research, but adequate data has often been lacking. Increasingly, applications of isotopic, biomolecular, and geoarchaeological techniques expand the potential for archaeology to refine the precision of dates, contexts, and provenance ascribed to excavated materials.

The contributions explore evolving urban networks based on archaeological, historical, or scientific data, and which address the following questions:

- How can network theory and concepts inform research on urban societies in the past?
- How are archaeological and historical questions productively framed as network problems?
- How is network data identified and processed in urban archaeology and history?
- How are incomplete datasets and uncertainties managed in different research traditions?
- How can formal analysis methods, together with qualitative, contextual approaches, contribute to elucidate and interpret network structure, dynamics, and change in the archaeology and history of urban societies?

A network approach to urban evolutions asks how modes of connectivity might convey agency by accommodating, catalysing, or transferring changes and continuities. While the term ‘networks’ is often used as a moniker for long-distance interactions, urban networks comprise circulations and interactions between people, things, and ideas on many different scales. They include, for example, the interactions of communities in neighbourhoods, the spread of information, learning processes, provisioning, hinterland interactions, or water management. For the same reason, exploring urban networks in archaeology is not merely a question of mapping communication and affinities. The issue goes beyond the

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realm of graphs and big data to matters like these: How did multiple dynamics affect network structure and evolution? When and where did particular patterns of connectivity occur? How far were networks ‘navigable’ and manageable for actors? At what scale and pace did networks perform connectivity? Were patterns of connectivity resilient and stable or volatile over time? To engage with urban networks in the perspective of such questions, it is necessary to engage with qualitative as well as quantitative methods, and to enquire for contextual synthesis to high-definition data.

The contributions to this issue arise from the conferences ‘Network Evolutions’, held 18–20 January 2017, and ‘High-Definition Narratives’, held 15–17 November 2017, both at the Danish National Research Foundation’s Centre for Urban Network Evolutions (UrbNet), at Aarhus University. Together with a previous conference ‘Biographies of Place’ (*Journal of Urban Archaeology*, volume 2), these meetings aimed to inspire and challenge the theoretical and methodological development of concepts and models, which inform contemporary archaeological approaches to the urban past, and to develop a perspective of urbanization as a pattern of evolving social and spatial networks. The conferences included papers which reached from Southeast Asia to Europe and the Mediterranean, aiming at giving a global perspective on the agendas.

Volume 3 of the *Journal of Urban Archaeology* brings together approaches that might point the way as to how a better knowledge of the material provenance of objects can inform an understanding of urban practices and interactions, and how contextual interpretations of network data may clarify the structure, dynamics, and agency of urban connectivity. From the perspective of past people, we ask: What were the relational and interaction-based opportunities, constraints, and abilities which caused urban places and communities to emerge, endure, or cease as recognizably similar patterns from a diversity of practices and situations?

This provides for explorations into how new forms of data can be harnessed to test, challenge, and revise narratives of particular urban sites and fundamental assumptions about trajectories, dynamics, and causal conditions of urbanization in the pre-modern past. Furthermore, the papers explore concepts of urbanism and themes relating to urbanism in a historiographical perspective, which inform us about the ways in which scholarship has been shaped by directions in research. In these ways, the papers explore how the conceptual promise and challenges offered by high-definition narratives can change archaeological practice and interpretations of urban network evolutions.

# Tracing the Trigger of Social Change in the Medieval Town through Imported Food, Objects, and their Biographies

**ABSTRACT** Quantitative analysis of imported artefacts and ecofacts is a method often applied to study trade networks and cultural contacts of the medieval town. Even though such studies may be indicative, they fail to reveal the societal impact of such networks. We suggest expanding the quantitative analysis with a contextual analysis using the concept of object biographies. A contextual approach will allow us to assess to what degree cultural contacts influenced and changed the everyday lives of town dwellers. The argument is explored through a case study based on the archaeological record of Odense in Denmark covering the period c. AD 1000 to 1500. The analyses show that the increase in imports in the fourteenth century is an expression of increased connectivity, mobility, and cultural exchange in the north-west European and Baltic region. It also shows that it was influential enough to change the social practices related to table culture and hygiene measures.

**KEYWORDS** Archaeobotany; urban archaeology; Denmark; import; object biographies; medieval; trade networks.

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## Introduction

The presence of imported artefacts or ecofacts in the archaeological record is tangible evidence of patterns and processes related to networks and interaction on an interregional scale (Knappett 2013, 4). The imported artefacts are not just an expression of commercial contact. They also indicate cultural contact through which other aspects such as language, ideas, beliefs, values, norms, and practices could be transferred or translated into being part of local daily practices, standards, and lifestyles (Gaimster 2014; Jennings 2017, 15, 60; Mehler 2009, 89; Roslund 2007, 136–39). Thus, changes in patterns of imported goods and changes in practices may reflect a change in cultural influences.<sup>1</sup> Whether this change of cultural influence reflected in the imported goods actually made a difference in the daily lives of people and their worldview can only be studied in the patterns of interaction between the objects and people — in the way people would use the imported goods. To fully understand this relation, it is necessary to perform a close contextual analysis that involves artefacts, ecofacts, and structures as well as their cultural biography. A contextual analysis will shed light on the role of objects as new ideas, norms, and practices are introduced and consolidated.

<sup>1</sup> See also Dillian and White 2010 and Schortman and Urban 1987 for reviews of theories and models of social processes related to trade and exchange.



Figure 2.1. Prospect of Odense c. 1593. After Braun and Hogenberg, *Civitates orbis terrarum*. The excavated area is marked with a circle. Public domain.

Through the archaeological context and analyses of the object assemblages, it is possible to study how artefacts were manufactured, distributed, put into use, maybe reused, and finally discarded. This biographical approach highlights the interplay between human and object. Alternatively, as Igor Kopytoff (1986, 67) has put it: ‘Biographies of things can make salient what might otherwise remain obscure’. Where a classic *chaîne opératoire* approach mainly focuses on the technological and functional aspects of artefacts, the biographical approach offers an opportunity to study the material in its social and cultural context and the cognitive dimensions related to their life cycle. It allows us to explore the practices related to objects and the transformation that these go through in their life history. Artefact biographies offer a methodology that will structure the reconstruction of the processes and dynamics related to the biography of the object and nuance the understanding of the social role of objects.

Imported artefacts and ecofacts are often analysed and discussed separately.<sup>2</sup> In this study, we will combine the analysis of artefacts and archaeobotanical remains since they are both essential elements in people’s everyday lives and often appear in similar daily practices such as eating, dining, or preparing food. A combined study will provide a broader view of trade and cultural networks.

Food in archaeological contexts can provide information on past subsistence, but it can also be informative on past economic systems, culture, and social diversity. Food preparation and the access to specific food types are generally associated with gender, social status, group differentiation, and identity (Palmer and Van der Veen 2002). Identifying luxury food items may add to the understanding of changes in, and the structuring of, past societies. However, the fragmentary nature of the preservation of organic remains, as well as biased sampling methods, mean

2. E.g. several examples in Dillian and White 2010; Gaimster 2014; Karg 2007; Mehler 2009; Roslund 2007.

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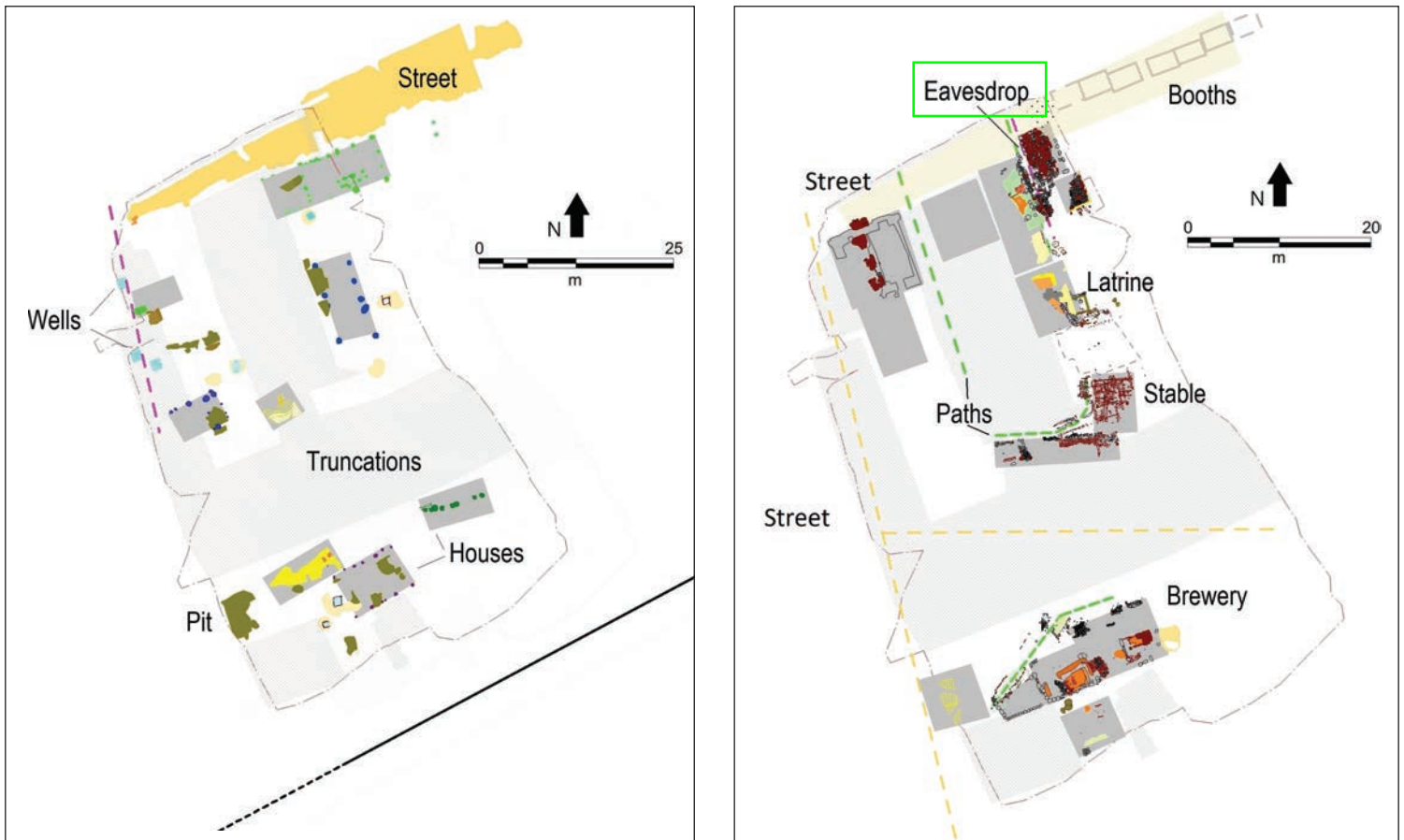


Figure 2.2. The excavated area in Odense. To the left, the settlement in the eleventh century. To the right, the fifteenth-century settlement. The dashed lines are suggested streets or alleys; the red dot-dash line marks the excavated area; the grey rectangles are suggested buildings; the large yellow area to the north is the street; the light grey areas are areas without preserved archaeology; the remains to the east of the excavation border are from a later excavation campaign (OBM9776/13-01-2016). Illustrations by K. Haase.

that food as a marker of culture or status as such can be difficult to recognize in the archaeological record (Palmer and Van der Veen 2002). The very few written sources or direct evidence for food traditions in the medieval period in a Danish context may also make it more challenging to interpret the botanical record. Food may hold economic or social importance, but this possible distinction is not visible from the food remains alone; it needs to be seen in context. Finding botanical remains in domestic or non-domestic contexts may be of importance when interpreting the food's economic or social value. Integrating the context and the associated material culture may present a fuller interpretation of the significance and role of the food remains.

In the following, we will investigate cultural networks and their impact on society seen through food, imported goods, and their biography. The argument is developed through a concrete example from the archaeological record of the medieval town Odense in Denmark.

### The Case Study

Odense is currently the third-largest city in present-day Denmark, and it was one of the largest towns in medieval Denmark. In the medieval period, towns were centres of consumption and gateways where imported, regional, or local goods were redistributed to smaller towns and the hinterland. As an example, written sources testify that the inhabitants of Odense traded oxen, horses, grain, and animal hides to other towns in the late medieval period (Poulsen 1988, 155, 161, 199–200; Hybel and Poulsen 2007, 20). Therefore, towns in general, and Odense in particular, provide an excellent case for the study of imported artefacts and ecofacts and the societal impact of interregional networks. Another vital aspect to the choice of Odense as a case study is that extensive excavations (site code OBM9776) took place in the medieval centre of the town from 2013 to 2014 (Fig. 2.1). A contextual methodology with extensive sieving and sampling for archaeobotanical as well

as zoo-archaeological analysis was applied (Haase 2017). The archaeological strata presented excellent preservation conditions for wood, bone, and other organic material. An extensive find assemblage as well as well-preserved structures, such as stalls, houses, stables, latrines, paths, roads, fences, manure heaps, and other structures from the eleventh to sixteenth centuries,<sup>3</sup> were uncovered (Fig. 2.2). Without the contextual approach and extensive sample strategy, it would not have been possible to perform analysis on object biographies or gain useful insights into the development of imported goods and foodstuffs.

Despite the size of the excavation, the site is not representative of Odense as a whole. In the medieval period, it was located in the town's centre close to the town hall, the cathedral, and the main thoroughfare (Fig. 2.1). Written sources from the fifteenth century testify that high-status artisans, merchants, doctors, and members of the town council inhabited the area (Christensen 1988, 158). The image we get from this particular site may therefore reflect the well-off, the well-connected, and possibly the 'first-movers' of the town, which is vital to keep in mind when discussing the results of the analysis.

### **Identifying Imported Goods**

As mentioned above, many archaeologists have discussed imports and the implications of imported goods when seen as empirical evidence of intersocietal contact (e.g. Dillian and White 2010; Gaimster 2014; Naum 2014; 2016). When discussing import, there is the added task of identifying imported goods and differentiating them from local goods (Schortman and Urban 1987). In this process, it is also essential to analyse the relationship between local/regional and interregional goods to establish the relative significance of import.

In this study, we see imported goods as objects that are of non-local and non-regional origin and were transported to the town through trade, as gifts, or as personal belongings (Dillian and White 2010). Whether an object is of non-local/regional origin can be defined by species or provenance analysis, or through information in written sources on their provenance. The provenance of animal-based resources (e.g. leather, bone) can be established through species analysis, assessing its ecological characteristics or by applying isotope or protein analysis. An assessment has shown that in most cases, bone and leather from OBM9776 was of local or regional origin (Brandt, Ebsen, and Haase 2020; Østergaard 2016;

2018). Palynological and macrobotanical studies can inform us whether particular plant and wood species were part of the local flora or not. Chemical and mineralogical analysis can be carried out to establish the origin of artefacts such as ceramics, glass, and jewellery. However, in this study, traditional typology has been used as a means of provenance for this group of artefacts (the clay type, shape, colour, decoration, etc.).

In some cases, it can be difficult to distinguish between local/regional and interregional products. Goods such as grain, iron, cloth, and beer could be produced locally or within the region of medieval Denmark. Yet we know from written sources such as the Lübecker poundage accounts that these items were imported to Denmark and probably also Odense in the medieval period (Hybel and Poulsen 2007). The import of products that could be produced locally may be explained by demand outstripping local supply for specific goods. It may also be that a particular product — such as German beer — is preferred (Hybel and Poulsen 2007, 366). It is not possible to ascertain when this is the case for a specific group of artefacts or ecofacts. However, it is something that must be considered in each case. In the following, the focus is on imported artefacts seen as the expression of an interregional network. Therefore, objects have been defined as local/regional when there was doubt concerning their provenance. This decision leaves an unspecified number of imported objects within the local group. We assess that this error is of little significance to the aim and results of this study (Table 2.1).

Ecological characteristics of plants may provide information on the local or non-local origins of the remains. Botanical remains are considered exotic when the source material cannot grow locally because of climate or other constraints. Examples are fruits with a natural distribution in the Mediterranean region or fruits and spices derived from Africa or Asia (e.g. Livarda 2011). While food remains from a different ecological background can be assumed to be of exotic origin, it is more difficult to distinguish between the local, regional, and exotic origin of plants with broader ecological distributions. Finding exotic plant remains in archaeological settings may therefore be an indicator of import or other types of long-distance networks.

In some cases, it may even be possible to distinguish between local and regional sources of non-exotic botanical remains. Still, it is difficult without provenance studies, such as isotope analyses. A broad natural distribution of plants makes it difficult to interpret whether a particular type of plant has been grown near the town, or whether it

<sup>3</sup> All years are AD.



Table 2.1. The distribution of objects and products present in the archaeological record of OBM9776 according to their relation to an interregional or local/regional network. Source OBM9776/16-05-2013. Data processed by K. Haase and N. Hammers.

<b>Interregional Network</b>	<b>Local or Regional Network</b>
<ul style="list-style-type: none"> <li>• Lead/tin</li> <li>• Copper-alloy objects</li> <li>• Gold</li> <li>• Glass objects</li> <li>• Belgian redware</li> <li>• Andenne ware</li> <li>• Proto stoneware</li> <li>• Paffrath ware</li> <li>• Pingsdorf ware</li> <li>• Rouen ware</li> <li>• Baltic burnished ware</li> <li>• Lübecker ware</li> <li>• Stoneware</li> <li>• Grimstone ware</li> <li>• Crucibles from Hessen</li> <li>• Clay pipe</li> <li>• Whalebone</li> <li>• Rock crystal</li> <li>• Quernstone</li> <li>• Whetstone</li> <li>• Stave-built vessels</li> <li>• Barrels</li> <li>• Walrus tusk</li> <li>• Scallop shell (pilgrim badge)</li> <li>• Hops</li> <li>• Bread wheat</li> <li>• Grape seeds</li> <li>• Fig seeds</li> <li>• Spices</li> <li>• Iron objects/iron slag</li> </ul>	<ul style="list-style-type: none"> <li>• Glazed and unglazed local earthenware</li> <li>• Baltic ware</li> <li>• Antler</li> <li>• Leather</li> <li>• Amber</li> <li>• Textile</li> <li>• Mussels</li> <li>• Timber</li> <li>• Wooden objects</li> <li>• Bone objects</li> <li>• Animal and fishbone</li> <li>• Bog myrtle</li> <li>• Apple/pear</li> <li>• Plum/cherry</li> <li>• Nuts</li> <li>• Strawberry</li> <li>• Raspberry</li> <li>• Spindle whorls (clay)</li> <li>• Travertine (building material)</li> </ul>

was imported from its hinterland or other parts of Denmark. Written sources may hold information about which economic plants were procured from the regional area. Contemporary depictions of cities and city maps showing orchards may be evidence for the local cultivation of fruits. Nevertheless, the local cultivation of fruits in orchards in or near the

town does not exclude possible import of fruits from regional settings.

A plant species that might give information on import from regional settings is bog myrtle (*Myrica gale*), which in Denmark is predominantly distributed in Jutland, and rarely occurs in other parts of the country. Archaeobotanical studies also show that the highest quantities of bog myrtle are found in Jutland, while fewer are found in Funen and Zealand.

The distribution of artefacts, raw material, and foodstuffs indicate that Odense depended on its local or regional network for essential everyday goods such as cooking pots, building materials, and foodstuffs. In contrast, an interregional network provided luxury goods such as precious metals and refined tableware.

The goods that represent interregional networks show a great variety. However, defining their exact geographic origin is, in most cases, very difficult. Figs present an interesting example. The natural distribution area of fig is in the Mediterranean region and parts of the Caucasus (Zohary, Hopf, and Weiss 2012). Over time, figs have been brought into northern parts of Europe, where there have been attempts to cultivate it, with various degrees of success. Today figs can be grown as far north as Denmark and Sweden, but whether figs found in Denmark in the Middle Ages were grown locally is unclear. Considering the economic demand of figs, we can assume that this fruit was imported in larger quantities to meet needs.

The figs found in Denmark may have been imported from the Mediterranean area, such as Portugal or Cyprus. Still, archaeologically it is not possible to establish the exact trade links. Strontium isotope analysis may provide detailed insights into the provenance of the material but cannot aid in finding the paths of trade. Written sources may, to some extent, shed more light on the complexity of the route figs may have travelled. Carsten Jahnke (2016) has studied the Hanseatic fig trade with an example of the merchant Hildebrand Veckinchusens and his trade with figs at the beginning of the fifteenth century. In this period figs were imported from southern Europe and redistributed through towns like Cologne and Bruges. In 1420, Hildebrand had difficulties selling his figs in Cologne. He then reloaded them, separated them into smaller quantities and sent them to Mainz and Koblenz. Hildebrand also sold figs in Hamburg, Lübeck, Danzig, Tallin, Narva, and Novgorod. From here, other merchants would have redistributed them, and some would end up on the Scandinavian market. The story of Hildebrand underlines that trading routes, transport, and distribution of goods are not straightforward, but goods

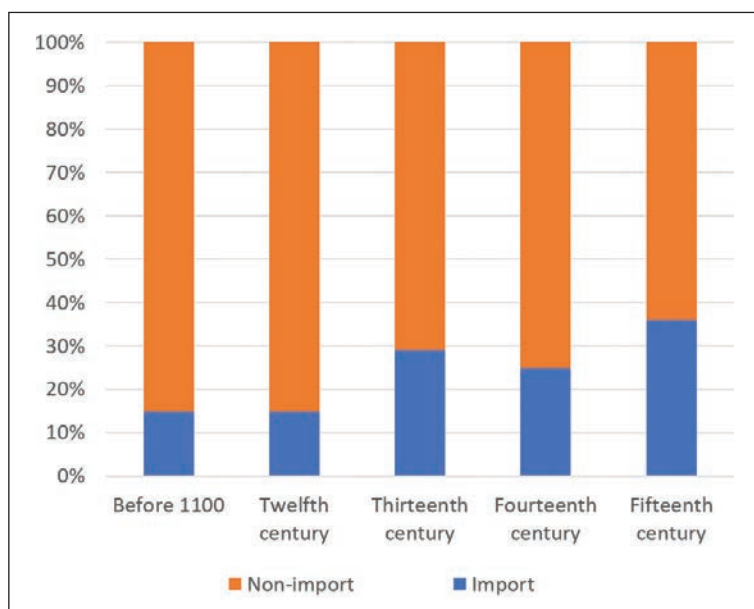


Figure 2.3. Before 1100 (n=358), twelfth century (n=2344), thirteenth century (n=2540), fourteenth century (n=5346), and fifteenth century (n=5175). Source OBM9776/16-05-2013. Data processed by K. Haase.

may have passed through many harbours and several hands before arriving at their final destination.

As the example shows, it can be dangerous to draw a direct link between the place of origin of an artefact and its place of use. Therefore, it is not straightforward to assume a possible cultural influence from the place of origin to where it was recovered. Provenance can be used as an indicator and a guideline to possible cultural networks. However, it is necessary to study the context in which the imported objects are encountered to ascertain whether there is a correlation between their occurrence and changes in society. Moreover, the ratio of imported goods compared to local produce may be a general indication of the level of interaction between the town and the world outside.

### **Interregional Trade Networks**

The number of ceramic sherds, pieces of whetstone, and other artefact types from OBM9776 have been counted to gain an overview of the level of import in Odense in relation to local products. Even though there are some issues of representation and taphonomy with this type of quantification, it indicates the significance of imported goods. Moreover, we mainly use it in a relative, intra-site comparison where preservation conditions and excavation methods are comparable.

The overall development shows a material culture generally dominated by local or regional goods

(Fig. 2.3). It also shows a presence of imported goods throughout the centuries. However, there seems to be an increase in imported goods sometime during the thirteenth century. The presence of copper-alloy and iron objects dominate the small increase in imported goods in the thirteenth century. This increase is a rise in the import of raw material rather than finished products. The emerging interregional trade in Odense is in line with the consensus that Danish towns from the thirteenth century onwards engaged in a network of trade hubs or gateways for commerce (Poulsen 2002, 49). The significant change in construction and increased size of northern European cargo ships from around the 1180s onwards are also evidence of this development (Bill 2002, 93, 112). The use of purpose-built cargo vessels is part of a development towards a specialization of merchant seafaring under royal protection, which reached a peak around 1250 (Englert 2015, 39–54).

Imported ceramics make up approximately 6 per cent of the total ceramic assemblage at OBM9776 in the period 1300–1500. Five per cent of the complete ceramic assemblage is German stoneware (270 sherds in total). For the town and the medieval period as a whole, there are indications that the amount of stoneware is between 0 and 3 per cent of the total ceramics assemblage (present case study included).<sup>4</sup> Compared to the presence of German stoneware in Næstved, Denmark, this is a low number. Research on ceramics from the harbour area in Næstved shows that the percentage of imported ceramics (mainly German stoneware) from the period 1200–1450 was between 13 and 16 per cent (Langkilde 2007, 33). According to the Lübecker poundage accounts, Næstved, Copenhagen, and Skanör were the main Danish towns where the Lübecker ships docked in the late medieval period (B. Poulsen, pers. comm.; Weibull 1966, 43). The Lübecker poundage accounts mention Odense, but it was never an important port in the north European trading network. The *Liber memorialis of Stralsund* (a record of the burghers from Stralsund who died in other towns, or burghers from other towns who died in Stralsund) only mentions Odense three times in the period from 1320 to 1471 (Andrén 1985). In contrast, Copenhagen is mentioned more than ten times (Andrén 1985, 103). Odense is on the periphery of the trade network, which the finds in general and the ceramic assemblage, in particular, seem to confirm.

<sup>4</sup> The number derives from the museum database at Odense City Museums, where only excavations from 2003 and onwards have a recording of artefacts. The analysis was done by K. Haase.

The German stoneware is not alone in representing the interregional networks of the town, and we shall therefore turn to the overall development in all the imported artefacts. Some of the imported artefacts — the ceramics, whetstones, and quernstones — can be provenanced with some certainty. If these artefacts are compiled by area of origin, it is possible to see how the areas are represented at different periods (Fig. 2.4). From this, it seems that the import from France and Belgium is small but consistent over time. Import from England is almost non-existent. Whetstones and quernstones from Norway are also imported evenly throughout the period. The import of ceramics from Germany shows a significant increase from the fourteenth century onwards, suggesting that the German area becomes increasingly important in the trade network of Odense. If other types of (less frequently occurring) artefacts are taken into consideration, it is possible to establish links to other places in north-western Europe as well. Among these are pilgrim badges from Santiago de Compostela in Spain, barrels from the southern Baltic area, walrus tusk from Greenland or Norway, and a lead ingot from Wales (Jouttijärvi 2017).

The overall impression is that the main part of the imported goods originates from north-western Europe or the area around the Baltic Sea. We can also conclude that the diversity in places of manufacture/procurement for the imported objects increases in the late medieval period. Lastly, the analysis shows that if we trace trade networks through ceramics only, the image will be less nuanced than if a more extensive and varied group of objects is taken into consideration, even though their origin might be more challenging to interpret.

### Plant Macrofossil Evidence

The botanical assemblage at OBM9776 shows similarities with the assemblages from other sites in Denmark dating to the medieval period (e.g. Hald, Howorth, and Ranheden 2015; Karg 2007; Moltzen and Henriksen 1998). The assemblage of economic plants is characterized by oats, barley, and rye, as well as a variety of collected and cultivated fruits.

Plants of presumed local or regional origin are found from the earliest deposits onwards. In addition to cereals, the most commonly occurring economic plants are strawberry (*Fragaria vesca*), raspberry (*Rubus idaeus*), and hazelnut (*Corylus avellana*). Both plum/cherry (*Prunus* spp.) and apple/pear (*Malus/Pyrus*) are also found throughout the site but in lower quantities. These species increase in quantity from the fourteenth century onwards. Strawberry, rasp-

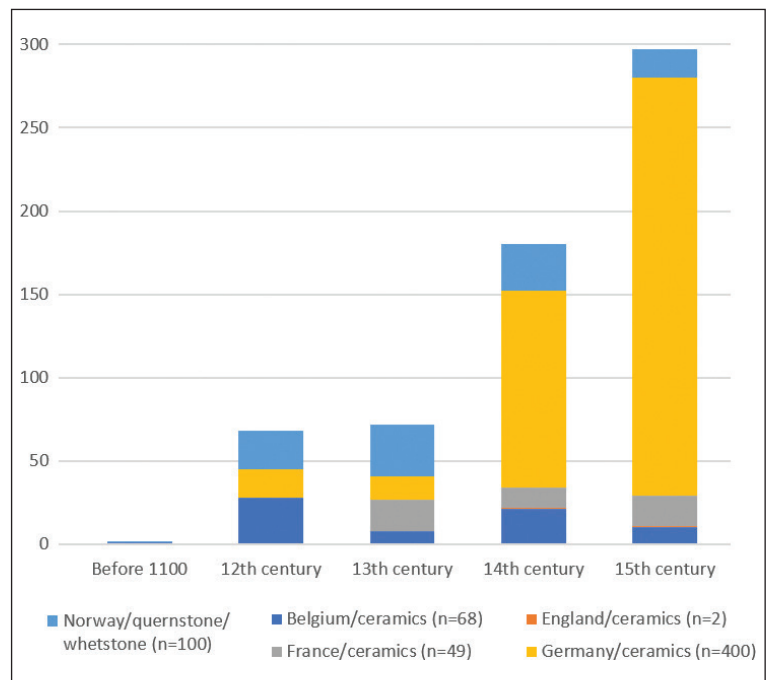


Figure 2.4. Ceramics (number of sherds) and quernstone/whetstone (number of fragments) distribution over time according to the place of origin. Areas reflected by present-day countries. Source: OBM9776/16-05-2013. Data processed by K. Haase.

berry, and hazelnut are often presumed local, since these species can be collected from the edges of the town's fields, or they can be grown in gardens. The latter two groups, plum/cherry and apple/pear, are generally cultivated and could grow in local orchards, or the fruits may have been grown elsewhere and sold on markets (e.g. Kjersgaard 1978).

Exotic plant remains found at OBM9776 appear in the botanical record from the first half of the fourteenth century. The quantity of fig and grape seeds increases in the second half of the fourteenth century and throughout the fifteenth century.

The earliest evidence of grape seeds in Denmark dates to the Late Iron Age and Viking Age (Henriksen, Holst, and Frei 2017), but these remains are rarely found in the archaeobotanical record. The first recorded occurrence of grape in Odense dates to fourteenth-century deposits from OBM9776. From this period onwards, grape seeds are sporadically found in contexts dating to the fourteenth and seventeenth centuries (Karg 2007). Fig seeds are found more frequently in Denmark from the twelfth century onwards, but only in limited quantity and distribution compared to other countries (Moltzen and Henriksen 1998; Karg 2007).

The economic plant remains from Odense show a continuation in the use of plants of predominantly local and regional origin from the twelfth to the fif-

teenth centuries. While imported fruits are found in fourteenth-century contexts, these do not reach the same quantities as local fruits (e.g. strawberry, berries, apple/pear). At OBM9776, fig seeds are found in twelve samples, and grape only in six, compared to forty-four samples containing strawberry seeds. Finds of fig and grape are also limited in other Danish towns throughout the fourteenth and fifteenth centuries (Karg 2007), indicating that the relatively low quantities of fig and grape in Odense are not an isolated phenomenon in Denmark. This picture is in contrast to medieval sites in Germany, the Netherlands, and England, where fig and grape seeds often are found in hundreds or thousands (e.g. Greig 1981; Hellwig 1997; Smith 2013). The low quantity of fig and grape seeds and their limited distribution suggest that these fruits were not part of an everyday diet in the same way as collected and cultivated fruits.

The botanical remains reveal a system of local/regional and international networks. The potential of remains to be derived from both local and regional, or regional and interregional sources, blurs the lines between the different network types, which makes it difficult to assess which networks weigh more heavily.

Regarding the organic material, especially plant remains, there are taphonomic and representation issues that need to be considered. From written sources, we know that a lot of the imported material consisted of perishable food. A survey of the exports and imports through the port of Hull shows that between 95 and 99 per cent of the goods were perishable (Gaimster 2014, 63). The amount of macrobotanical data that is available from excavations does not reflect this. There are two explanations: sampling strategies during excavation and subsequent analysis and preservation conditions of the plant macrofossil remains. How well plant remains are preserved depends on the type of remains (seeds, leaves, stems), size, durability, and quantity of the remains. Durable remains, such as cherry and plum stones, are potentially well preserved because of their hardness. These remains are not likely to fragment, but the larger size may work against the representation of these finds in archaeological subsamples. Smaller seeds may be less durable than some larger seeds. However, because smaller seeds from some plants appear in higher quantities, there is statistically a higher chance of encountering the remains than more durable, but rare, seeds.

In addition to preservation, there might be issues with the representation of material based on sampling and subsampling. Latrines often contain large volumes of material, yet it is practically impossible to sample the entire contents of a context (Fig. 2.5).



Figure 2.5. Latrine barrel from OBM9776/16-05-2013. Drawing by N. Hammers and photo by K. Haase, Odense City Museums.

Therefore, choices must be made during fieldwork about which part of the context to sample.

The red lines in Figure 2.5 indicate that there are three visibly distinct layers in the latrine, whereas the yellow square represents the approximate size of the sample taken. The example shows that a lot of the material will not be sampled. Further sample selection occurs in the lab, where samples are processed. Subsampling may lead to an inaccurate representation of the plant remains from a particular context.

The representation and taphonomic issues mean that the conclusions in this case only can apply to the actual preserved material. The priorities in sampling practices and the preservation conditions make it impossible to conclude anything based on what is not present.

### A Biography of the Stave-Built Vessel

We have established that the interregional network of Odense was mainly related to the area around the Baltic Sea and north-western Europe. The question

is if this trade network is also a cultural network in the sense that it affects the daily lives, norms, and practices of the inhabitants of the town. One way of tracing the impact of the trade networks is by looking at the relations between artefacts and humans through the biography of an artefact (Jervis 2014, 4). In the present study, the wooden beakers or stave-built vessels are chosen as an object for a biographical study for several reasons. The vessels are most likely imported (see below), and many of them are well contextualized in the archaeological record. Moreover, they are closely related to regular human behaviour since they are everyday objects.

From OBM9776 there are one hundred vessels or fragments of vessels in total. They are found in thirteenth-century contexts, but they have mainly been found in contexts from the second half of the fourteenth century. In the following, we will study the biography of stave-built vessels from their manufacture, to their distribution, use, reuse, and discard, in order to analyse the interaction between human and artefact as well as the relation to other types of material culture.

### Manufacture and Distribution

Species analysis of the wood from the stave-built vessel shows that the staves were made from spruce (*Picea abies*). Spruce has been documented in pollen samples of late fourteenth-century lake sediments but appears only in minimal amounts (Rasmussen and Bradshaw 1998, 66). Spruce is commonly perceived as being introduced into Denmark around the year 1730 (Larsen and others 2013, 121, 400–01). Before 1730 spruce may have been imported from Norway, Sweden, Germany, Poland, or the eastern Baltic area. Stave-built vessels found in Norway have been interpreted as an import. In Bergen, they are found in those parts of the town that were dominated by merchants related to the Hanseatic League (Thomsen 2014, 17). The assertion that stave-built drinking vessels were imported to Denmark is supported by a written source from 1552. It states that a customs officer in Aalborg was ordered to buy a barrel of stave-built drinking vessels (Bencard 1969, 42).

The wooden vessels are known from excavations in Norway, Sweden, Germany, and the southern and eastern Baltic areas from the beginning of the twelfth century, and there are examples in Lübeck and Tallin from the thirteenth century (Vissak 2006, 503). They were manufactured by local artisans or coopers who would probably collect their raw material from the nearby woods. The stave-built vessel was a mass product and was exported as bulk goods.



Figure 2.6. One of the stave-built vessels from Odense. Photo by Jens Gregers Aagaard.

Throughout the medieval period, the predominant way of transporting and distributing goods was by sea. From the thirteenth century onwards, the Hanseatic League was the dominating transport agent in the North Sea and Baltic Sea region (Demuth 2015, 339; Mehler 2009, 90). As mentioned earlier, the link from the place of production to the consumer was rarely direct, and there are many possible scenarios of how goods ended up at their final destination. Goods were transported from place of production to a market, from one harbour to another, sold off, reloaded, etc. Some were even repacked or separated into smaller entities (Jahnke 2016). The ships would pick up goods along their sailing routes and in a way become floating supermarkets, carrying bulk goods, but also other items in smaller amounts — both everyday items such as the stave-built drinking vessels, and luxury products. One example is the Egelskär (Nauvo) wreck that sank in the archipelago south of Turku, Finland, in the late thirteenth century carrying a very mixed cargo (Tevali 2010, 4–5). The Egelskär ship was not an ocean-going vessel but a trading vessel that would transport imported goods between the major ports along the coast for redistribution (Gaimster 2014, 66). The cargo of the Egelskär wreck consisted of Danish limestone, whetstones from Norway or Germany, and Swedish iron,

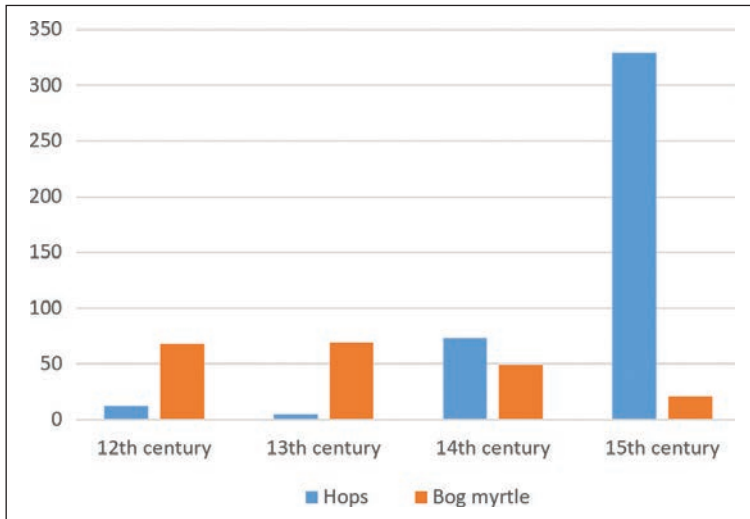


Figure 2.7. Temporal change in absolute number of botanical macroremains from hops and bog myrtle. Illustration by N. Hammers.

as well as stoneware from Lower Saxony. Therefore, the presence of imported goods in the archaeological record is in general rarely evidence of a direct link between place of production and buyer, or even between merchant and buyer. It is more an indication of the possible links and the cultural catchment area of a place. It also must be taken into consideration that goods may be acquired through piracy and sold off or that illicit trade has taken place (Mehler 2009, 96–97). Imported goods can also be the result of people carrying personal belongings with them, as was the case of the German diaspora living in Hanseatic towns outside Germany (Naum 2016, 136). The consequence of this is that when a stave-built vessel from, for example, the eastern Baltic area is found in Odense, Denmark, it is not necessarily an indication of trade or communication between this area and Odense. However, it may be possible evidence of a ship commissioned by a Hanseatic merchant having picked up goods in the eastern Baltic and distributed these alongside other bulk goods from areas where the Hanseatic League had trade connections. Eventually, the stave-built vessel would be unloaded on the market in Scania and redistributed to the market in Odense along with other goods such as herring, salt, figs, stoneware jugs, and other products.

### The Use

The use of the stave-built vessel is known from late medieval frescos from Danish churches and northern German altarpieces, where they are often shown as drinking vessels.<sup>5</sup> In this relation, it is worth not-

<sup>5</sup> More examples in Bencard 1969, 42.

ing that the increase of stave-built vessels coincides with an increase in the presence of stoneware at the beginning of the fourteenth century and onwards. The stoneware vessels are mainly jugs and pitchers, all linked to beverages, and, likely, the wooden vessels were also drinking vessels. Even though the vessels are a mass product made from wood, there is nothing that indicates that they were a simple kind of tableware. They were most likely appreciated for their practical function and delicate appearance (Fig. 2.6).

At the same time as the increase in the use of stoneware and stave-built vessels in Odense, hops (*Humulus lupulus*) becomes more frequent among the plant macrofossils, compared to bog myrtle. Bog myrtle is a bog plant, and the leaves and fruits were used in beer brewing as a flavouring and preservative. The plant grows on acidic moorland, with a natural distribution in north-west Europe (Behre 1999; Günther and Karg 2000, 2–3; Viklund 2011). Evidence for the use of bog myrtle in Denmark dates to prehistoric times, whereas the use of hops is not widespread until the Middle Ages (Günther and Karg 2000, 2–3). In Sweden, a shift from bog myrtle to hops is noted in the thirteenth century, while the evidence from the Danish macrofossil records points towards a shift in the fourteenth century (Viklund 2011, 235). Sources regarding the cultivation and import of hops provide varying insights, but the consensus is that hopped beer was introduced by the Hanseatic League in the thirteenth century (Viklund 2011, 240). Written sources provide evidence for both local cultivation of hops, especially in monastery gardens, and the import of the plant (Enemark 1994, 250; Hybel and Poulsen 2007, 213; Poulsen 2000, 66; Viklund 2011, 240). Authorities tried to limit the import of hops to Denmark through a decree on the intensification of hops cultivation in the fifteenth and sixteenth centuries (Hybel and Poulsen 2007, 214). Moreover, a decree issued by King Erik Glipping in 1283 stated that he who imports, sells, or buys German beer should be heavily fined (Poulsen 2002, 32). The ban is repeated several times throughout the second half of the fourteenth century and up to the late fifteenth century (Unger 2004, 68). A limited import of beer as a finished product could be the reason for the increased quantities of hops finds as an indication for local production of hopped beer.

At OBM9776, the botanical evidence shows a shift in the fourteenth century from the use of bog myrtle to the use of hops, with a peak in the mid-fifteenth century (Fig. 2.7). The increase in the use of hops coincides with the increasing import of stoneware from northern Germany, as well as stave-built

vessels. The shift in the use of flavouring and preservative in beer can be an indication of changing traditions and the adoption of new brewing practices. It can also be related to legislation demanding the local cultivation of hops, in order to limit hops import from Germany (Andersen 1991, 96–99, 187; Hybel and Poulsen 2007). Archaeobotanical material and written sources provide evidence for both the local cultivation of hops as well as the import of the plant.

The increase in stoneware jugs, stave-built vessels, and hops suggests that a European consumption and table culture, in the shape of German beer and drinking vessels, was introduced into Odense in the fourteenth century. The ban on importing, buying, and selling German beer indicates that the import of German beer was increasing to such a degree that it became a challenge to local trade and threatened to change consumption patterns and social norms. Some of the barrels found in Odense may have contained imported wine or beer. The barrels have been dated, and their provenance is known to be the southern Baltic coast (Germany or Poland) or the Weser area, Niedersachsen, or Flanders (Belgium). The oldest barrel is dated to sometime after 1264 and is most likely to come from Lübeck (Daly 2016, 3–4). It is deposited in a layer that is dated to the beginning of the fourteenth century. Whether it came directly from Lübeck to Odense with its original content is unknown, but the short period between production and disposal seems to indicate so. The introduction of barrels from the southern Baltic coast in Odense is consistent with the general impression we get from the Danish material — that barrels from this area are predominant in Denmark from the early 1300s (Daly 2007, 159–79). This is also in agreement with the written sources, in which there is evidence of German beer becoming a regular product in medieval Denmark (Poulsen 2002, 42).

Even though we do not know the exact origin of the stave-built vessels, we know that the increase in numbers may represent the introduction of drinking and eating practices linked to a European consumption culture. We do not know how this transfer took place, but one suggestion is that the increase in trade and sea-going transport from the thirteenth century and onwards reflects a general increase in mobility of people. With this increased contact and connectivity, it was possible to witness how practices were performed in other cultures or by visitors from other cultures. If people have not seen the artefacts being used in their original context — either at their place of origin or by a visitor bringing the artefact — a cultural transaction is not likely to take place (Linnaa Larsen 2006, 168). The written



Figure 2.8. Bowls associated with wine or beer drinking can be seen in this French illuminated manuscript from the thirteenth century (*Li livres dou santé* by Aldobrandino of Siena. British Library manuscript Sloane 2435, fol. 44<sup>v</sup>). Public domain.

sources in Odense only mention a few foreign merchants as citizens. However, foreigners would likely have visited the town regularly to trade or participate in ecclesiastical matters (Rohwedder 2007, 16–19). Another indication of foreigners being an increasing part of town life in the late medieval period is the founding of the ‘Elendegilde’, a guild, in Odense in 1435 (Christensen 1988, 127). The guild was mainly addressing immigrants or transnationals.

The increased mobility is also represented by locals from Odense who would go abroad either as merchants or as journeymen after ending their apprenticeship (Demuth 2015, 341). The wandering would not only spread technologies but also consumption culture and other social practices. It was possible to continue the practices that one had witnessed abroad in Odense because the extensive trade network made it possible to acquire the type of vessels, beverages, and food linked to them.

Another example from fifteenth-century Odense shows how the imported consumption culture was adapted to or merged with local traditions (Haase 2017, 293). During the first half of the fifteenth century, a house with a semi-basement burned down and was abandoned. It was filled in with rubble from the building, and it seems many of the household items were left in the rubble. Amongst these items were a high number of intact stoneware jugs from

Lower Saxony and the Baltic area, two tiny stoneware jars, and local wares consisting of both jugs and bowls (Haase 2017). The local wares were sherds from small shallow bowls. They are interpreted as drinking bowls and may be a local version of the stave-built vessel (Fig. 2.8).

### ***The Last Stage of the Use-Life of the Stave-Built Vessel***

Looking at the last stages of the life of the stave-built vessels we turn to a latrine dated by radiocarbon analysis of the content to the last part of the fourteenth century (AAR AMS 2017,<sup>6</sup> sample AAR-25950). The artefacts related to the latrine are a mixture of local objects and a few imported objects. The artefacts reflect the overall image of the imports of the fourteenth century. The latrine is most likely related to the house that burned down, and the analysis of artefacts as well as plant remains supports the impression of a wealthy household. They were consumers of imported artefacts and foodstuffs. In particular, the macrofossils related to the human excrement and thus the diet of the people using the latrine confirm this impression. Amongst these were black mustard (*Brassica nigra*), fig (*Ficus carica*), grape (*Vitis vinifera*), hops, and raspberries (*Rubus idaeus*). General waste also ended up in the latrine, which is shown by the discovery of nutshells and copper-alloy pins. Finally, some artefacts are interpreted as being hygiene related: leather fragments, two small sticks, bowls, and vessels. The sticks may have served as sponge sticks or *spongia* as seen in Roman latrines. However, these are shorter, between 17 and 20 cm, compared to the Roman sticks with a length of c. 25 cm. The sticks from Odense were made from elder wood which is said to have antiseptic properties. The stave-built vessels served as water containers to soak and rinse the cloth or leather that would then be used as toilet paper. No less than seventeen fragments or whole bowls and vessels were found in the latrine. In Tallinn, the stave-built vessels have also been found well preserved in cesspits (Vissak 2006, 503). It is an indication that they had been put to the same type of use as in Odense.

The latrine in Odense was meant to be emptied when full. It seems this idea of having a permanent latrine is an imported concept introduced at the beginning of the fourteenth century in Odense. Permanent latrines are quite common in Europe from

<sup>6</sup> ‘Radiocarbon Report (No. 1897). Aarhus AMS Centre Department of Physics and Astronomy’ (unpublished report, 22 March 2017).

at least the thirteenth century (Keyes 2016; Smith 2013). In Odense, the stave-built vessels and the possible sponge sticks are only seen in direct relation to latrines from the last part of the fourteenth century and onwards, suggesting that permanent latrines and the use of hygiene measures are related. Using this type of latrine may also be a status marker.

The stave-built vessels, the stoneware jugs, hops, and barrels are some of the imported goods that reflect the interregional networks of Odense and show a connection to the north-west European/Baltic cultural sphere. This is the case even if the amounts of stoneware and the written sources indicate that the town was at the periphery of the Hanseatic trade network. Studying the biography of the stave-built vessel, how it was used, reused, and discarded has revealed more than just the practices related to its use. It has revealed changes in other practices, such as dining habits, food culture, and hygiene. The analysis has shown that cultural contact in the fourteenth century, illustrated by trade networks, had an impact on the daily life practices of the inhabitants in Odense.

## **Discussion**

As the present example shows, it is a multitude of artefacts and the context in which they appear that are indicators of connections and cultural interaction. It has become evident that it is more productive to see imported objects as cultural markers rather than carriers of culture (Demuth 2015, 355; Gaimster 2014, 63). This distinction is important since it indicates that it is not the artefact itself that transfers culture, but rather that artefacts represent the possibility for cultural interaction and cultural transfer. This shifts our focus from objects as carriers of culture to the relationship between objects, people, and ideas (Jervis 2017, 150). It also means that the significance of material culture may change according to the nature of that interaction — that their meaning is relational (Jervis 2014, 3; 2017, 149; Naum 2014, 673). Artefacts, structures, and ecofacts play an active role in making social and cultural interaction tangible as they become expressions of routinized practices (Christophersen 2015, 111). As shown, these patterns of practice and relationships are revealed through a contextual and biographical approach to the archaeological record (Jervis 2011, 240).

The distribution of stoneware, decorated red earthenware, brick architecture, and stove tiles that spread in the Baltic Sea region from the thirteenth century and onwards has been labelled ‘a Hanseatic



material signature' by David Gaimster (e.g. 2014, 64). This concept of 'cultural packages' and artefacts as carriers of a specific culture has been debated and nuanced in several studies since (Immonen 2007; Jervis 2017; Linaa Larsen 2006; Mehler 2009; Naum 2014; 2016). Instead of arguing that what we see in the case of Odense is a Hanseatic material signature, we argue that it is a result of closer interregional connectivity to Europe — specifically north-western Europe and the area around the Baltic Sea. This type of connectivity is what characterizes the networks of Odense. They are interregional rather than just local, but not on a supraregional scale. The connections that may be inferred by the presence of imported goods are not reflecting a direct contact to the place of origin. Instead, they are brought to Odense through intermediate hubs and harbours (Sindbæk 2017, 556). The cultural influence does not derive from the place of origin, but from the distribution network. The connectivity between Odense, the region around the Baltic Sea, and north-western Europe was dense enough to trigger social change.

Even though we are not talking about global connections in Odense, the globalization approach is considered fruitful since it stresses processes that reach beyond national borders (Sklaire 2006, 59). According to Carl Knappett, globalization processes are defined by complex connectivity (Knappett 2017, 29, citing Jennings 2011, 2 and Tomlinson 1999). It is probably going too far to characterize the networks of Odense as complex; instead, what we have seen in the case of Odense is an example of increased connectivity where some elements which also characterize a globalization process are present (Hodos 2017, 4; Jennings 2017, 14–16). The use of stoneware, the preference for hopped beer, and the implementation of new sanitary measures indicate 'homogenization' in a European context, where specific practices are imported and adjusted to local circumstances (Jennings 2017, 14). The mixture of locally produced and imported tableware in the performance of a European consumption culture shows a translation or adaptation consistent with the process of homogenization, where the local culture adds its fingerprint. Instead of characterizing the processes and connectivity as globalization, they can be seen as part of a Europeanization process — a process that was enabled by the mobility of people and trade and resulted in an exchange of culture, practices, ideas, and technologies.

## Conclusion

The outcome of our analysis of the imports of Odense has been twofold. The general overview has shown that it is possible to get an indication of the origins and significance of interregional networks through a quantitative approach. However, it must be kept in mind that the presence of specific artefacts and ecofacts is not necessarily evidence of direct contact. Furthermore, the analysis shows that it is only through a contextual analysis that the impact of such networks can be assessed and described. The biographical approach has proven to be a valid and operational method in analysing the societal changes triggered by networks and cultural contacts. The methodology has also proven to be useful for emphasizing the relational aspects of human–object interaction.

Our analysis shows that the interregional networks of Odense before the fourteenth century were dominated by the import of raw materials such as copper alloys and iron. During the fourteenth century, the character of the networks changed and became dominated by goods distributed by the Hanseatic trade network. The range of goods became more diverse and included manufactured goods and foodstuffs. The diversity and increase in import reflect a general increase in mobility and cultural exchange in the north-west European and the Baltic region in which Odense took part. The density of the connectivity and the increase in mobility of both goods and people were catalysts for changes in the everyday lives of the inhabitants of medieval Odense. The changes were manifested in the introduction of new social practices and left as imprints in the archaeological record.

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# A Long-Term Archaeological Reappraisal of Low-Density Urbanism

## *Implications for Contemporary Cities*

**ABSTRACT** Dispersed, low-density urbanism has conventionally been considered as a unique consequence of industrialization and factors such as mechanized transport. Pre-industrial urbanism by contrast, has been perceived almost entirely in terms of compact densely inhabited cities with a strong differentiation between an urban and a rural populace. Evidence demonstrates, low-density settlements were a notable feature of the agrarian-urban world, especially in the tropics, and have been a characteristic of every known socio-economic system used by *Homo sapiens*. This paper situates past examples of large, low-density, dispersed urban settlements, with their long histories and their distinct patterns of growth and demise, in relation to contemporary low-density cities. This critical reappraisal of low-density, dispersed cities in the context of a long and culturally diverse urban past is significant for addressing urban sustainability challenges.

**KEYWORDS** Low-density urbanism; comparative urbanism; cities; urban sustainability; dispersed urbanism; settlement archaeology; urban planning; urban archaeology.

### Introduction: Context and Issues

The proliferation of dispersed, low-density urbanism in today's world has inspired considerable scholarly and popular interest (Angel 2012; Ewing and others 2018). Although there is no consensus in

the literature, the predominant view has been that low-density settlement patterns are a new phenomenon (Bogart 2006; Nielsen 2017; Moroni and Minola 2019). Dispersed urban forms are still considered to be related to new and novel variables such as mechanized transport (Gutfreund 2005), the commercial real estate industry (Ehrlich, Hilber, and Schöni 2018), the rise of the middle class (Gunn and Bell 2011), and the changing political economy of the consumer city (Salvati and Carlucci 2016, 1356). More often than not such descriptions speak of the destruction of the historical city (Ross 2015, 1–5). But, in fact, low-density urban settlements are not new. Low-density settlements have been a recurring feature of past societies and are particularly prevalent in the tropical landscapes of urban societies in the medieval world (Fletcher 2009). Archaeological precedents provide scholars, planners, and urban experts with complete case studies of low-density cities as they have grown, flourished, and declined over 500- or even 1500-year time spans (Hall, Penny, and Hamilton 2019; Klassen, Weed, and Evans 2018). The life cycles considered by most urban-sustainability experts come nowhere near this time frame (Güneralp and others 2017; Rubiera-Morollón and Garrido-Yserte 2020). If we wish to seriously discuss the design of sustainable and resilient cities for future generations, such archaeological case studies provide valuable experiential references, or 'natural experiments', to use the terminology of Jared Diamond and James Robinson (2010), and dissolve the assumed correlation between industrialization,

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capital markets, and low-density urbanism. Instead, low-density settlement must be viewed as a mode of settlement organization that is currently facilitated by factors such as mechanized transport but is not determined or uniquely caused by the technical and economic circumstances of the past two hundred years. This is crucial for two reasons. First, it is important to know that present-day dispersed urbanism is not a peculiar and transient form of human behaviour and, as a result, it may be rather harder to convert to a compact pattern than opponents of urban sprawl might wish. Secondly, it is important because the removal of a necessary connection to mechanization means that alternative paths to urbanism were possible as a derivative of the industrial revolution. Urban dispersion and the evolution of the industrial capitalist complex are two different processes. The most frequent explanation for the urban forms of the nineteenth and twentieth centuries is to link industrialization and urban expansion in a causal relationship (Bogart 2006). Archaeology shows us that dispersed urbanism has its own clear path, without a strict causal relationship to the political economy of societies. In essence, urban theorists must advance a far more profound appraisal of urban form than the ascription to transport, residential preference, and market dynamics that has been posited so far (Newman and Kenworthy 2006; 1999; 1989; Nielsen 2017; Moroni and Minola 2019). Such arguments imply that modern-day low-density urbanism is an inevitable consequence of the industrial urban complex. By challenging and removing deterministic links between low-density cities and industrialization (Ewing and others 2018), society can adopt a more nuanced approach to understanding low-density urban forms and their evolution and performance. Further it frees up possibilities for the transition towards sustainable transformation of current low-density patterns, even if such a transformation will be a rather more demanding task than critics of sprawl might recognize or wish to acknowledge (Ewing and others 2018; Moroni and Minola 2019).

Cities and towns located in tropical latitudes, in Mesoamerica, South Asia, and Southeast Asia, share many similarities with temperate cities (Trigger 2003; Smith 2003). However, they have not received the same focus or volume of research as have the compact urban traditions of the Mediterranean, temperate and arid regions, including Mesopotamia, India, and China (Graham 1999); nor have they received an equivalent measure of global attention, except for the romance of their 'lost in the jungle' image (Clémentin-Ojha and Manguin 2007). As a result, the general archaeological models of urbanism

(Zuiderhoek 2017) tend not to be based on the cultural traditions of the humid tropics (Graham 1999; Isendahl and Smith 2013). This paper is an initial step towards correcting that bias and establishing a body of knowledge that provides the pre-industrial precedents for modern, low-density industrial cities. To do this the paper challenges the artificial separation between pre-industrial cities and industrial cities and focuses on low-density spatial patterns that reoccur through time. As Monica L. Smith argues:

Rather than seeing cities as fundamentally changed by the advent of the Industrial Revolution and the global connections of the modern world, new anthropological research suggests that both ancient and modern cities are the result of a limited range of configurations that structure human action. (Smith 2003, 2)

Low-density cities are now well documented in the archaeological record. In lowland Central America, Maya cities have been well known since the 1960s (Willey 1956b; 1965; Sabloff and Fash 2007). More recently, the great urban complex of Angkor has been mapped (Evans and others 2007); it extends across approximately 1000 km<sup>2</sup> of central route-grid networks, surrounded by dispersed occupation mounds in vast suburbs, interconnected by canals and roads. There is also a need to consider the examples of the great Buddhist cities of the dry zone of Sri Lanka, Anuradhapura and Pollonaruwa (Coningham and Gunawardhana 2013). They involve central concentrations of massive shrines and monasteries, surrounded by an even scatter of occupation around networks of huge reservoirs and canals. Pagan in Myanmar (Hudson 2004) is another example, although more on the scale of the Mayan centres. There were even mobile, widely spread-out urban settlements (Fletcher 2020). In Ethiopia, mobile low-density cities, the *ketema*, were the temporary dry-season capitals of the rulers, classically represented by Addis Ababa in 1897, just as it settled into its present, permanent location (Pankhurst 1979). We must now recognize that this type of urbanism is also more common than supposed. The Mughal's tented, moving capitals in India are the best known representative of this pattern. The sprawling, transient population that congregated in the dry season around the Achaemenid capitals of Persepolis and Pasargadae perhaps belong to this category (Cleary 2018).

The proposition that the low-density city is a rather more common yet overlooked form throughout history is illustrated by the capital of the Spartans, the Achaemenids' ruthless enemy, whose 'city' was described as consisting of 'five villages' and being

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semi-urban in nature (Cartledge 1980). Sparta was disparaged, albeit accurately, by Thucydides, who commented:

Suppose the city of Sparta to be deserted, and nothing left but the temples and the ground-plan, distant ages would be very unwilling to believe that the power of the Lacedaemonians was at all equal to their fame. Their city is not built continuously, and has no splendid temples or other edifices; it rather resembles a group of villages, like the ancient towns of Hellas, and would therefore make a poor show. (Thucydides, 1. 10)

Sparta was an example of a dispersed settlement (Morris 2005), of a type that was probably common in Greece in the archaic period — ‘like the ancient towns of Hellas’. Nevertheless, Sparta is still described as consisting of a ‘cluster of separate villages’ in recent literature (Zuiderhoek 2017) rather than as an extensive area of dispersed suburbs around a central urban area. And that Spartan model was a dominant feature of the history of classical Greece for nearly three hundred years. The Western perception of urbanism has been so comprehensively taken over by the compact, bounded image of classical Athens as the definitive form of urbanism that it requires the titanic scale of Angkor and the present-day Southeast Asian *desakota*<sup>1</sup> to bring the alternative Spartan model into full public view.

The critical comparative approach presented in this paper, commences with a brief overview of the descriptive measures and language used to characterize low-density cities. This is followed by short regional case studies on the recognition and survey of both medieval and modern low-density cities. The paper concludes with a discussion on the contribution long-term assessments of low-density urbanism can make to contemporary urban decision-making. The discussion is framed using critical aspects of the debates on sustainability, and covers aspects such as the durability of urban forms and the processes, economies, and environmental contexts that support those forms. Such long-term temporal perspectives have important implications for decisions made about the sustainability of today’s cities. As Christian Isendahl and Daryl Stump (2019) argue, information from the past needs to engage with the possibilities and the risks of the present and future.

## Describing Low-Density Cities

Dispersed urbanism is a ubiquitous feature of the modern world and has created a taxonomic melange. Today’s low-density cities look nothing like the older, dense downtown areas that most of us still call ‘the city’. Historical downtown precincts now exist in a much wider and more extensive context, characterized by suburbs, freeways, farmland, parks, and jogging paths. The corporate office, car park, and mall have replaced the town square, city block, and high street. The number of neologisms for urban areas today emphasize just how difficult it is to describe and understand these dispersed environments, which the extensive social-science and planning literature refers to using a variety of terms, such as conurbation, megalopolis, *desakota*, low-density complex, peri-urban, suburban cities, edge cities, and sprawl (Brenner 2014, 15).

Low-density, dispersed regional cities contain far more open space than their compact counterparts (Angel, Parent, and Civco 2012). The open space includes agricultural land, derelict brownfield sites, remnants of forest, natural drainage networks, and obsolete urban precincts. Within low-density cities, the ratio of open space to built space is significantly greater. Landscape plays a profound role within these dispersed cities. Given the increasing significance of open space and the dissolving of rural and urban categories, a new language and set of descriptive metrics are required to provide empirical foundations for intuitive observations (Boyko and Cooper 2011).

Although there is a range of metrics and physical attributes used to describe an urban form, density is the classic measure used for describing both modern industrial and pre-industrial cities (Tsai 2005; Storey 2006, 2). The simplicity of the index makes it useful as a global, comparative metric, allowing urban researchers and professionals to process data as a series of points or transects. The data can then be visualized as a density surface or as density gradients, without the need to rely on arbitrary boundaries, or cut-off points, which have inhibited the understanding of low-density urbanism to date. Understanding variation is crucial, both across different examples in different regions and within any one urban settlement. To construct a picture of urban densities, it is essential that variation in density is understood at the scale of the urban region, the metropolis, the urban precinct, and the urban parcel.

Central to urban definitions in archaeological (Drennan and Peterson 2012, 62) and urban planning (Dovey and Pafka 2014, 66–67) contexts is the idea that there are two broad kinds of urban den-

<sup>1</sup> The vast industrial urban systems of Southeast and East Asia were first recognized and described by McGee (1991) as *desakota*. This neologism literally means village-city and forms the characteristic urban form within this region.

sity: demographic and material. Some cities have quite high demographic densities and low material densities, whereas others may have a high concentration of built structures but very low or temporary demographic densities. Demographic growth in developed countries has slowed dramatically and, in some cases, populations are shrinking. However, this does not prevent material growth as populations move out of urban cores to live in and build on the peripheries of cities. By contrast, cities in developing countries are growing dramatically in terms of both population and material. Both types of spatial urban growth contribute to increasingly dispersed settlement patterns (United Nations Population Fund 2007; Angel, Sheppard, and Civco 2005). Demographic distributions within a city do not always correlate with the distribution of built structures. Although some cities are experiencing suburban population growth, their physical centres are experiencing a decrease in density. This is true of Paris, Brussels, Amsterdam, Rotterdam, Lyon, Chicago, and, the classic example, Detroit. Some cities, such as London, are experiencing a general population decline, but this pattern is divided between a sharply decreasing population in the core area of the city and a less marked decline in suburban areas (Oswalt and Rieniets 2006). Gregory K. Ingram (1998, 1022), writing for the World Bank, stated that population growth in large cities does not usually increase the population density of already dense areas; rather, it encourages population increases in less developed, extensifying areas at the periphery of the city.

One way of measuring the correlation between built environments and population distributions in dispersed cities is with gradient curves that describe the spatial distribution of populations. Within those overall gradients, an urban area may also have spikes of population density. Redistribution of populations across metropolitan areas occurs because there is not a causal link between demographic density and the material structure of a city. The material framework of a city, by virtue of its subdivision pattern, or the type of its constitutive materials, may constrain density. However, this framework does not necessarily determine land uses or population densities, both of which change more rapidly than does the material framework. Some urban areas may be abandoned as other areas thrive.

Contrary to common assumptions, there are no general, globally applicable, modal population-density values for urban areas. Such values are not supported by the reality of urban or rural environments in either historical or contemporary contexts (Fletcher 1995, 73–79; 2009, 8). Population-density values vary dramatically for urban areas as has been noted for

many years, for example by Doxiadēs (1968, 126). Locating concepts and categories such as ‘the city’ within a global spectrum of densities is problematic. The range of densities in and between cities is staggering. Cities such as Atlanta have an enormous footprint, of more than 5000 km<sup>2</sup>, but are populated by a meagre 800 people per km<sup>2</sup>. Chinese cities often have densities of 4000 to 10,000 people per km<sup>2</sup>, and European cities operate at around 4000 per km<sup>2</sup>. Australian cities typically have densities of around the 2000 people per km<sup>2</sup> mark (Susteren 2005). It is evident that there is neither a causal nor a definitional relationship between density and the urban condition. There are rural areas in developing nations, such as Bangladesh, with densities approaching or surpassing the urban densities in industrialized nations, such as the US and Europe (Fletcher 1995, 92–95; Qadeer 2000; 2004).

High demographic density is not a sufficient proxy for the urban because it is not a definitive measure of a society’s level of urban development and nor has high density historically been a requirement for urbanism. As for urban settlements, the spatial variation between rural settlements is high, not only between cultures, but also within geographic regions. Density is a useful index when describing urban or rural settlements, but it is necessary to couple it with other metrics for it to be meaningful. The United Nations collated definitions of the ‘urban’ from around the world in an attempt to produce a uniform overview of urban areas. However, it reached the conclusion that the tremendous variety of settlement types in the world meant that it was not possible, nor desirable, to adopt uniform criteria to distinguish urban areas from rural areas (United Nations Department of Economic and Social Affairs Population Division 2012, 31). V. Gordon Childe (1950) and Robert McCormick Adams (2005) emphasized the need to define urban settlements with a variety of socio-economic and spatial criteria. Countries such as Indonesia base urban definitions on a combination of population density, economic activity, and the presence of ‘urban-like’ infrastructure and institutions (Department of Economic and Social Affairs 2016, 119). In contrast, China bases its definitions primarily on administrative boundaries and with the presence of administrative committees (McKinsey Global Institute 2009). In the Chinese historical perspective on urbanism the definition of the city has been dominated by the sign for ‘wall’ (von Falkenhausen 2008, 209–10). Commonly used yet artificial distinctions between urban and non-urban areas rely on a hierarchical distinction between demographic densities. City centres are the densest environments, followed by less dense suburbs,

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rural areas, and wilderness (Segal and Verbakel 2008; Cowgill 2004, 526–28). However, modern dispersed cities teach us that specific high-density population values are not necessary for urban operations to take place (Segal and Verbakel 2008). The World Bank (Gill 2009) suggests that the rural–urban dichotomy is not an adequate approach to managing cities and recommended, instead, more realistic representations of the built environment based on an evolving ‘portfolio of places’. Increasing urbanization results in a continuum of both density and urbanity, with a primary city at one end of this continuum, followed by a whole spectrum of settlements, ranging from large satellite cities to small-scale villages and towns to larger conurbations. It is only possible to loosely classify such places as either rural or urban. Today, a combination of geospatial and socio-economic sources are critical in defining different urban areas. Individual urban agglomerations lend themselves to definition through remote sensing of land-use areas, whereas metropolitan and megalopolitan areas require a more complex mix of demographic and remote-sensing analysis. This mix is required because, by definition, metropolitan areas encompass non-contiguous urban areas within a functionally related area. The polycentric urban territory requires new ways of examining and understanding urban territories. What follows is that the identification of these kinds of urban settlements requires extensification of survey methodologies rather than a focus on the more obvious, higher-density central areas. The following archaeological cases demonstrate just that — a gradual expansion of survey methods combined with new theoretical models and urban epistemologies.

### The ‘Discovery’ of ‘Lost’ Cities in Tropical Forests

Dispersed urban settlements were relatively unknown for around five hundred years after the decline of tropical-forest urban centres of the Maya, Khmer, and the Sinhalese. Except for the occasional sixteenth-century explorer, no travellers from the compact urban societies of the ‘Old World’ had seen the dispersed urbanism of the literate societies, outside the modern incarnations in North America and Europe. Even the Chinese, with their long and continuous literary and administrative tradition, had only a few descriptive records of visits to such past cities. The most famous example of such records is that of Zhou Da Guan’s visit to Angkor in 1295–1296 — although he, of course, perceived only the part that he could catego-

rize in terms of a typical Chinese-type urban walled enclosure (Zhou Da Guan, *A Record of Cambodia*).

Europeans first began to encounter abandoned, dispersed urban settlements in the great tropical forests of the world in the nineteenth century. To the explorers, the cities were ‘lost’ places, buried in a romance of mysterious tragedy. Local populations knew the great urban landscapes, with their monuments and texts, and they often advised and assisted travellers to reach them. European reports of Anuradhapura began to appear from the seventeenth century, but it was only in the nineteenth century that the great sites of Anuradhapura and Polonnaruwa were ‘rediscovered’ and secured in the Western consciousness. When British administrators were surveying Sri Lanka in the nineteenth century, the ruins of Anuradhapura and Polonnaruwa were ‘discovered’ by British archaeologists, such as H. C. P. Bell (Devendra 1959). This pattern of discovery and rediscovery is surprisingly similar to that which occurred at Angkor. Various missionaries visited the site early in the nineteenth century, but it was only in the 1860s, when Henri Mouhot (1863) publicized the discovery through engravings and souvenirs, that the site captured the public’s imagination. In a similar way to the reuse of medieval infrastructure in Sri Lanka, colonial administrators in Cambodia retrofitted parts of the medieval infrastructure of the dispersed complex of Angkor in an attempt to increase agricultural production in the 1920s and 1930s (Groslier 1979). The growth in awareness and popularization of Maya settlements shared some similarities with the ‘discovery’ of the Sinhalese and Khmer settlements. After the classic Maya period, the demographic concentrations of the Maya shifted from the inland centres, with their elaborate monuments, to the relatively plain architecture of the post-classic settlements on the coastal areas of the Yucatán Peninsula. Although the Spanish established some centres such as Mérida, they were not as interested in the Maya landscapes as they were in the gold-rich Aztec lands of Mexico.

In the first half of the nineteenth century, an Englishman, Frederick Catherwood, and an American, John Stephens, explored the abandoned Maya centres of Copán, Palenque, and Uxmal (Bahn 1996, 111–12). On their second expedition, they located the mighty Terminal Classic centre of Chichén Itzá in central Yucatán and numerous smaller sites. Like Mouhot, Catherwood recorded the Maya art in magnificent drawings. Catherwood’s drawings were remarkably accurate and inspired a surge of literary and scientific activity (Bahn 1996, 111–12).

### Landscape Approaches and Dispersed Urbanism in the Archaeological Record

Even though most of these sites were rediscovered in the nineteenth century, it was only in the second half of the twentieth century that an understanding of them as dispersed urban settlements developed, especially in Mesoamerica, Southeast Asia, and Sri Lanka. The recognition of dispersed urbanism in the archaeological record is the result of landscape-based investigations and settlement. Comparisons between

such societies first occurred in relation to the Maya and Khmer, when Michael D. Coe (1957; 1961; 2003) pointed out the similarities in the layouts of their settlements. Both societies featured two basic urban elements — magnificent temple complexes surrounded by clusters of residential structures. The work of the Mayanists (Fig. 3.1) in the 1950s and 1960s led to the conception of the sprawling urban landscape, spread around the clusters of ceremonial buildings (Willey 1956a; 1956b; Sabloff 1990; Sabloff and Fash 2007; Chase and others 2011). However,

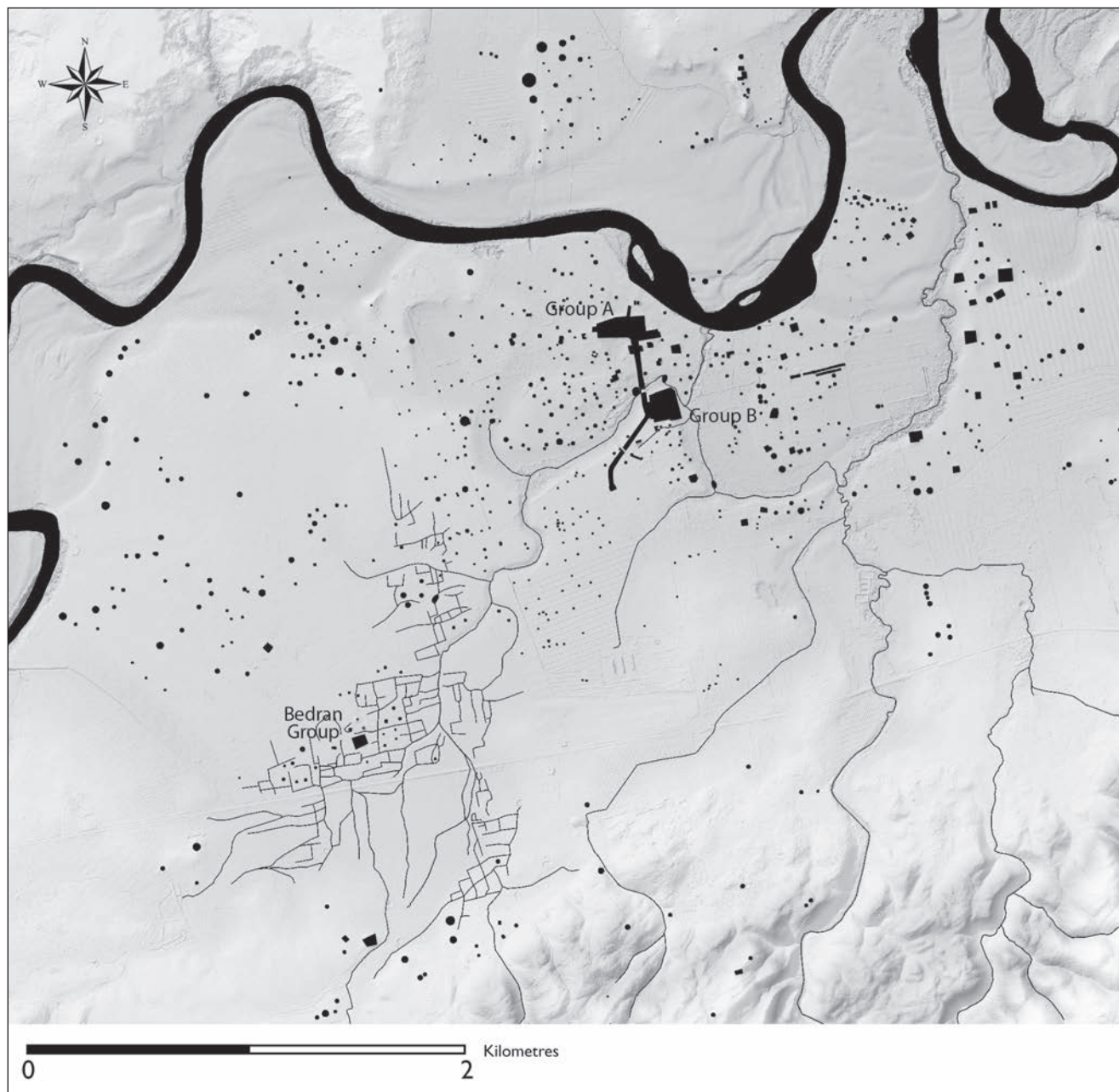


Figure 3.1. Dispersed Maya settlement pattern at Baking Pot, Belize, Central America. Despite the variation in density, spatial structure, and functional components in Maya sites, they all demonstrated a dispersed pattern of settlement surrounding elite religious centres — the two basic elements of the lowland Maya settlement pattern. Map adapted from data provided by Claire Ebert (Ebert, Hoggarth, and Awe 2016).

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a more global picture of dispersed urbanism only began to emerge a decade or so later, with articles such as those by Bennett Bronson (1979), which suggested similarities with societies in Indonesia and Sri Lanka. More recently, Fletcher has placed Angkor in a global milieu as a low-density urban complex (Fletcher 2000–2001; Fletcher and others 2003). Survey programmes at Anuradhapura (Coningham and others 2007; Coningham and Gunawardhana 2013), Bagan (Hudson 2004), and Angkor (Evans and others 2007) in the first decade of the twenty-first century continued to transform our understanding of low-density urbanism.

The study of dispersed urbanism in archaeology began with the Maya sites and the innovations inspired by Gordon R. Willey's settlement archaeology. Willey's work shifted the emphasis from Mayan elites to the broad residential and agrarian landscapes that were of consequence to the majority of the population. The increasing attention given to the settlement archaeology of the Maya was predominantly brought about by Willey's work in lowland Mesoamerica on the classic Mayan settlements of the seventh to the tenth centuries AD (Ashmore and Willey 1981; Feinman and Billman 1999). Willey's work revealed that the Mayan centres were not isolated ceremonial centres, but were located within extensive settlement regions, dotted with house mounds, within the valley of the Belize River. Willey found that these house-mound clusters ran in a more or less continuous distribution from the Guatemalan frontier for a distance of around 50 km to the north and east, with each cluster consisting of groups of a dozen to three hundred or more mounds (Willey 1956b, 778). Willey's study of the Maya lowlands of the Belize Valley led him to envisage that the relationship between the scattered residential clusters and ceremonial centres was considerably more tightly knit than the conventional picture supposed (Willey 1956b, 777). According to Willey (1956b, 778), the continuous settlement of the Belize Valley created the 'impression of a large but well-integrated network of theocratic stations and substations, all supported by a peasantry indoctrinated with many of the values of urban life'. Willey's settlement studies of the Belize Valley (Willey 1956a; 1956b; 1965) were followed by similar studies by Willey and other archaeologists at Tikal (Haviland 1965; 1966; 1970), Seibal (Tourtellot 1970), within the Rio Bec region (Adams 1981), in southern Quintana Roo (Harrison 1990; 1993), at Dzibilchaltun in the northern Yucatecan plains (Kurjack and Garza 1981; Ashmore 1981; Willey 1990, 170), and at Caracol (Chase and others 2011). Despite the variation in density, spatial structure, and functional components in this sample of sites,

they all demonstrated a dispersed pattern of settlement surrounding elite religious centres — the two basic elements of the lowland Maya settlement pattern. This has been articulated in terms of the green city and the agro-urban landscape by Elizabeth Graham and Christian Isendahl (2018). Equally the outer suburbs and peri-urban landscapes are clearly represented in the new LiDAR surveys of the classic Maya region in lowland Mesoamerica (Canuto and others 2018). These settlements demonstrated remarkable variety and scale, but featured the same clustered housing. In some urban settlements, this clustering was more fragmented, whereas in others, it was tightly organized or diffused amongst the agricultural landscape more evenly. In all the examples, there was a great deal of open space between the residential clusters (Fig. 3.1).

Maya cities such as Piedras Negras, Tikal, and Caracol had distinct clustered central areas and varying arrangements of extensive suburban areas. Most sites presented a gradation of settlement density from the core zones out to peripheral residential clusters (Webster 1980, 834) and more clearly shown in the recent LiDAR surveys. Surveys of Maya centres between the 1960s and 1980s indicated that residential densities were in the order of about six people per hectare (Sharer and Traxler 2005, 688). Inter-site densities would have been much lower. Even though cities such as Copan had a higher density of structures than most Maya centres, its structure remained dispersed, with the scattered residential clusters interspersed and a large amount of space between them.

A new vocabulary developed to discuss such urbanism, and the emphasis was not so much on the individual buildings, but instead on how multiple structures related as a unit. Groups of large buildings at Tikal became 'twin pyramid complexes', and habitation mounds were described as 'clusters'. The new emphasis was on the regular spatial relationships between and within the clusters (Becker, Jones, and McGinn 1999, 138). Scott Fedick (1996) contributed a landscape vocabulary, speaking of 'mosaics' of land use. The use of this new vocabulary shifted the emphasis from the individual site to the site's position within the landscape and, most importantly, to its relationship with open space. The complex geometric and apparently randomly dispersed scattering of Maya residential clusters has contributed to some scholars avoiding a discussion of the significance of the dispersed layout of the settlements. The structure of Maya settlements can perhaps be described as fractal, and more sophisticated analytic methods (Brown and Witschey 2003) using such geometries may provide insights into the structure of low-density urbanism in other societies.



Figure 3.2. Angkor's suburbs and hydraulic network formed a vast, low-density urban complex. This map of Greater Angkor, Cambodia, Southeast Asia continues to expand and change with advances in theory and survey methods. Map courtesy Evans and others (2007; 2013).

Research on the Maya has presented us with a whole portfolio of cities to aid our understanding of dispersed urbanism. By contrast, our understanding of Khmer urbanism has developed from studies of Angkor over the last hundred years by the EFEO, then the intensive surveys of Greater Angkor by Christophe Pottier (1999), and by the Greater Angkor Project (Evans and others 2007; Hendrickson 2007; Hawken 2012) and LiDAR coverage in collaboration with KALC (Evans 2016). Since 2010 the analysis has extended to more Angkorian settlements through the work of Damian Evans and others on Koh Ker, Banteay Chhmar, and Sambor Prei Kuk as well as the surveys on the Kulen (Evans

2010; 2016; Evans and Traviglia 2012; Evans and others 2013). The first compelling vision of the city of Angkor as a dispersed urban complex was put forward by Bernard P. Groslier (1979), building upon a century of scholarship. Groslier's diachronic vision of the metropolis presented a network of large-scale hydraulic infrastructure that integrated the temples and agricultural landscapes. However, the systematic demonstration of the existence of such an urban landscape only really began in earnest with Pottier's (1999) mapping and excavation programme. The density of archaeological sites, mapped by Pottier from aerial photographs, was far greater than shown on previous maps. The new maps revealed that the

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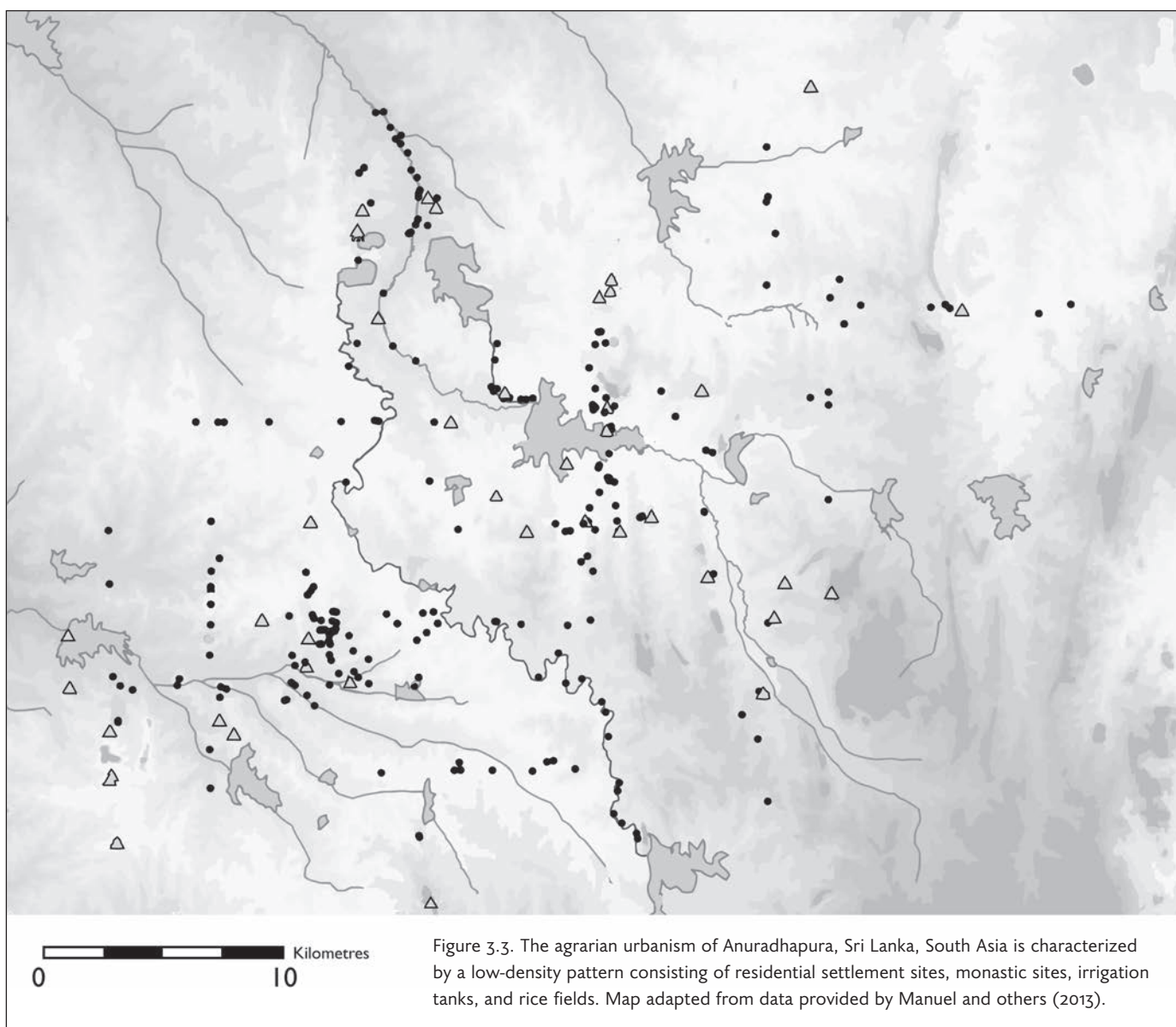
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temples of Angkor were located amid a repetitive pattern of dispersed occupation clusters including habitation mounds around local temples and water tanks, forming extended hydraulic suburbs. Fletcher and others (2003) proposed that these suburbs and the hydraulic network formed a vast, low-density urban complex. The entire complex was mapped by Pottier (1999), Evans (2007), and Hawken (2012; 2013) showing that over nearly 1000 km<sup>2</sup> of numerous occupation clusters were dispersed amidst Groslier's large-scale hydraulic infrastructure and rice fields to create the urban complex of Greater Angkor (Fig. 3.2).

In central northern Sri Lanka, another form of dispersed urbanism emerged (Fig. 3.3), structured around the exploitation of the region's distinctive dendritic pattern of valleys and perennial streams.

This pattern of dispersed urbanism is remarkable for its evolution and stability over a 1500-year period and for its dramatic and irreversible decline after the thirteenth century AD. Like the settlements of the Maya and the Khmer, Sinhalese settlements demonstrated closely interlocking urban and rural spatial systems (Coningham and Gunawardhana 2013). The settlement infrastructure operated at both a territorial and a metropolitan scale. At the territorial scale, the system consisted of a series of cascading tanks in a one-settlement–one-tank system (Gunawardana 1971). Each tank and settlement association formed an ecological unit that was hydraulically and socially integrated with surrounding communities through a system of *rajakariya* or corvée labour — literally, 'service to the king' — which required common



people to dedicate a certain number of days to the maintenance of hydraulic infrastructure for the benefit of their hydraulic society. At the local scale, the Rajaratan settlement pattern was based on a three-part functional relationship between the temple (*vihara* or *dagoba*), the tank (*wewa*), and the paddy field (*ketha*) (Siriweera 2002; Chandrasena 2007, 31).

This pattern of temples surrounded by residential clusters of an urbanized farming population, which worked in and commuted to the temples regularly, can be seen in Maya, Sinhalese, and Khmer urbanism. Images of isolated temples lost in the exotic jungle have gradually been displaced by those of a highly structured landscape of residential localities and agricultural infrastructure, especially at Caracol. The tropical forest world was the locus of a form of urbanism quite different from the conventional, pre-industrial Eurasian–East Asian model of compact, bounded cities. The agrarian-based, low-density, dispersed cities offer a crucial comparative reference that assists in understanding the significance and potential consequences of the range of urban variation that exists globally today.

### Patterns of Contemporary Dispersed Urbanism

Globally, the spatial footprints of cities are radically expanding, and urban population densities are decreasing (Angel, Sheppard, and Civco 2005). Considering the tremendous variety of metropolitan forms, the near universality of this trend is extraordinary. Cities in developed nations are dispersing; those in the developing world are dispersing at an even greater rate (Angel and others 2016). If current trends continue, the area of urban land cover in both developing and developed regions will more than double between 2000 and 2030 placing pressure on a range of biodiversity, agricultural, and other vital systems (Seto, Güneralp, and Hutyrá 2012, 16083). Such expansion threatens global biodiversity, ecosystems, and croplands (Seto, Güneralp, and Hutyrá 2012, 16083; Bren d'Amour, Reitsma, and Baiocchi 2017).

It is possible to trace three phases of urbanization over the last three hundred years. The first phase of global urbanization began in the eighteenth century, with the industrialization of the now developed world. The second phase of urbanization began in the second half of the twentieth century, with the expansion of the so-called post-industrial cities, and the third distinctive phase is currently demonstrated by the rapid urbanization in Asia, South America, and Africa, which is characterized by a simultaneous transition to industrial and service-based, post-in-

dustrial forms (United Nations Population Fund 2007, 1). These three phases of urbanization are alike in their dramatic shift to low-density patterns.

The conventional pattern of a dense city core, surrounded by suburbs, a peri-urban fringe, and a rural hinterland does not accurately describe today's cities. Industrial cities have experienced extensive decentralization, becoming predominantly suburban and peri-urban cities (Ingram 1998). Today's urban centres stretch from one city to another in polycentric agglomerations of varying density, in what Kim Dovey and Elek Pafka (2014) call density 'assemblages'. Rather than expanding continuously outwards, cities today frequently develop multiple centres in non-contiguous developments that leap-frog over patches of open space to develop satellite patches.

### Twentieth-Century Urban Space in the West

The dispersed cities that Europeans live in today have primarily developed from compact medieval cities (Hohenberg and Lees 1995). Even though the European medieval city is a late innovation in the history of urban forms, the lived experience of this type of city has strongly informed the Western conception of urban form. The simple reason for this is that the basic street pattern of almost every European city core is a product of the medieval period. Since its establishment, this pattern has been demonstrably resistant to change (Friedrichs 1999) and now exists within an extensive urbanized territory. This is not an abstract territory of urban nodes and virtual networks but a landscape of built infrastructure and fragmented urban space.

This urban landscape has been documented by the architect Xaveer De Geyter (2002) using Landsat 5 imagery and geographic information system (GIS) data. De Geyter's images spatially describe the fragmented, curving urbanized band of development that stretched from London to Paris, then down through Belgium and Switzerland to Italy. This megalopolis was nicknamed the 'Blue Banana' by Roger Brunet (1989) in the 1980s. Since that time, various descriptions of the dispersed territory have portrayed Europe as a complex urbanized mosaic (Illeris 1992; Hospers 2003; Reimer 2010). Brunet's (1989) description explained how cities in Europe had an influence beyond their national borders and acted together as *tissus de villes*. Interestingly, it showed Paris as quite isolated from the urban economic tissue; the production of the report may have been motivated, in part, by Paris's situation within what Brunet called

a *lacune* (literally, a gap). Brunet's maps were perhaps the first to portray the modern cities of Europe graphically as an integrated ensemble of shared economies, international functions, new network technologies, and shared demographic behaviour. Since Brunet's work, maps produced showing this regional urbanity have become commonplace. The urban territories of today, described variously as 'growth triangles' and 'regional development zones', all owe something to Brunet's maps. Just as we have learnt to see these extended modern urban regions through conceptual and mapping innovations, archaeologists such as Robert McCormick Adams (1981) have used innovative approaches to visualize and map earlier urban regions such as 'Heartland of Cities' in southern Mesopotamia. The deep history and vast urban scale of such landscapes remains obscure to most contemporary urbanists who operate with a shallow appreciation of the urban and ecological foundations they build upon.

Europe's industrial revolution followed Brunet's blue banana, and three hundred years later urban and economic development remains concentrated within this industrialized arc (Polèse 2010, 73). The contours of this urban territory mainly follow the axis of the navigable Rhine River, from Rotterdam in the north to Basel in Switzerland, taking in the dense conurbations of the Dutch–Randstad, the Rhine–Ruhr, and the Rhine–Main. This region was linked with English towns across the Channel prior to the industrial revolution. These links, combined with the Rhine's confluence of river systems, gradually developed into a complex web of canals, which fostered economies of scale and agglomeration. Over time, new networks involving paved roads, rail, and highways complemented what is arguably the densest navigable waterway system in the world (Polèse 2010, 74).

The Flemish Diamond of Belgium illustrates this condition well. Despite being one of the most densely

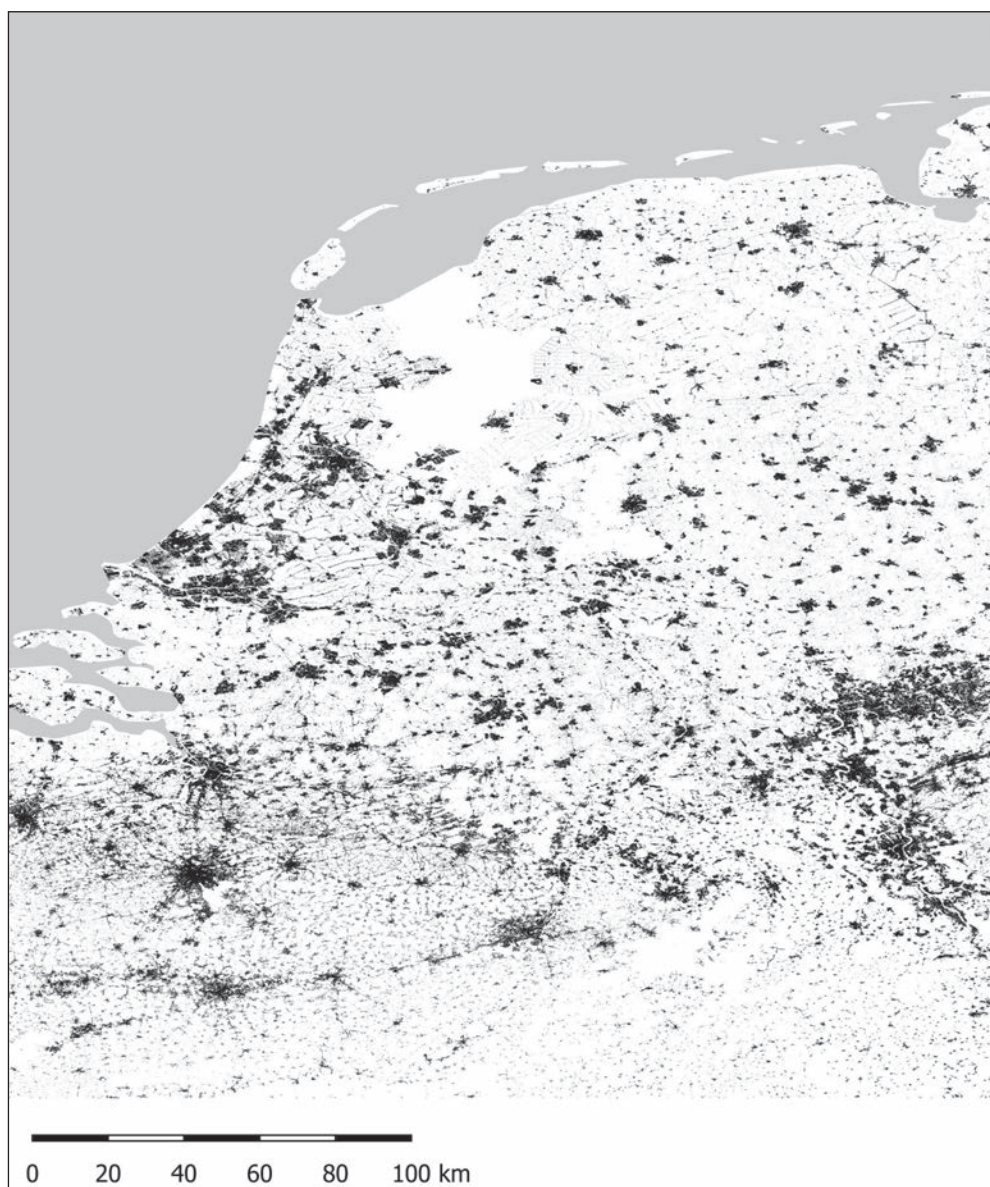


Figure 3.4. The Randstad, Netherlands, the Ruhr, Germany, and the Flemish Diamond, Belgium are a few of the many urban regions within northern Europe. They form a continuous, if fragmented, urban landscape, comprised primarily of open space. Although a green landscape is perceived when travelling through many of the region's open spaces, the forests and fields sit within the densest regional network of infrastructure in the world. Map by authors produced with data from OpenStreetMap (planet dump, data file from 2020, <<https://planet.openstreetmap.org>> [accessed 24 January 2021]) and Global Urban Footprint data (Esch and others 2017).

populated regions in Europe, with 1100 inhabitants per km<sup>2</sup>, 60 per cent of the Flemish Diamond consists of open space, including fields and forests. Rather than dense, isolated compact cities, the region consists of a continuous, if fragmented, urban landscape, comprised primarily of open space. Although a natural landscape is perceived when travelling through these open spaces, the forests and fields sit within the densest regional network of infrastructure in the world (De Geyter 2002, 162).

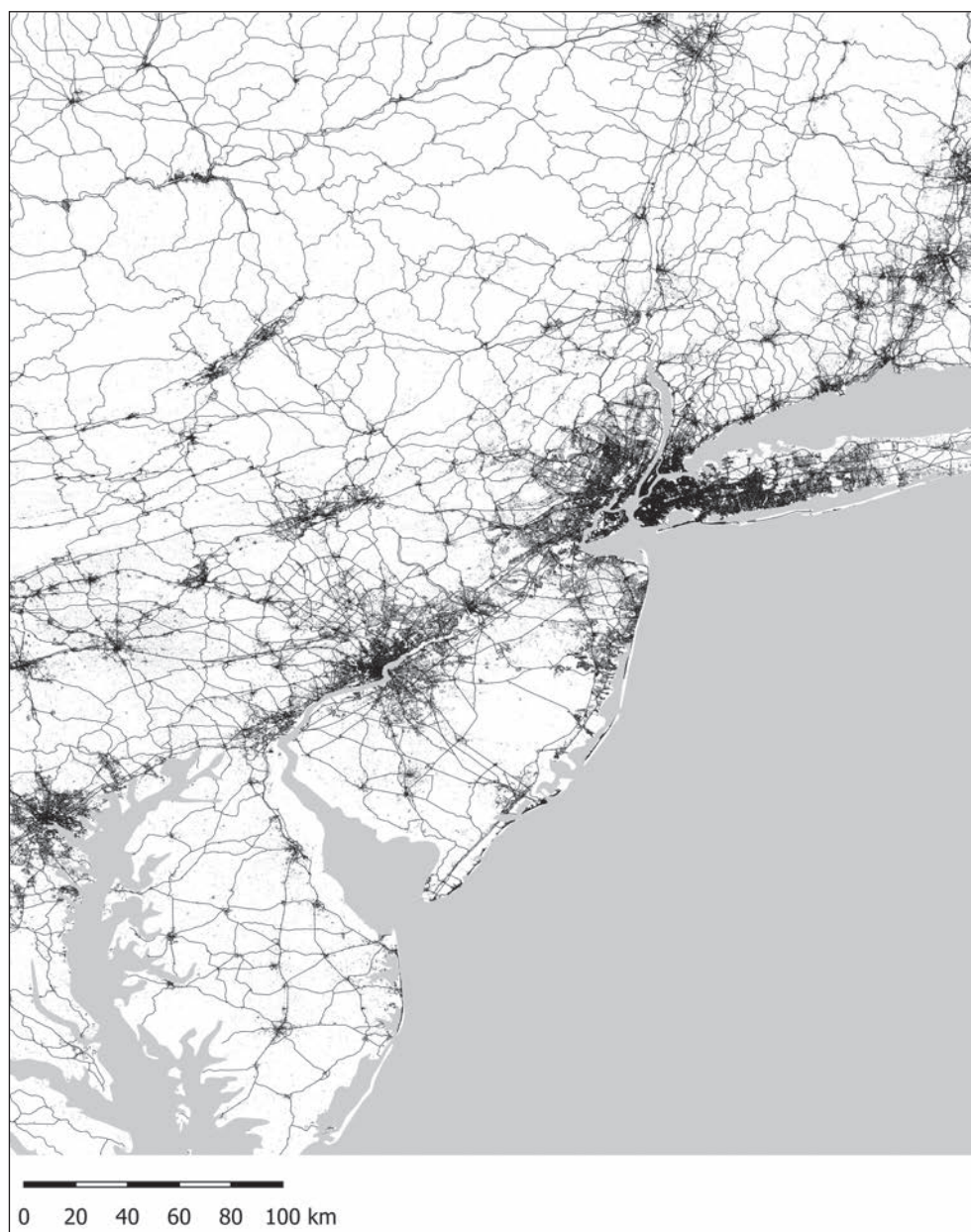


Figure 3.5. The East Coast Megalopolis, USA, North America. In the 1960s French geographer Gottman described the formation of the urban territory located on the US eastern seaboard – the East Coast Megalopolis. His comprehensive account traced the development of scattered nineteenth-century towns into a polycentric urban region dominated by the four interconnected metropolises of New York, Boston, Philadelphia, and Baltimore. This vast territory is, however, not so different from the scale of medieval Khmer low-density urbanism. Current day Baltimore and Washington, DC fit comfortably side by side within Angkor’s footprint as we now understand it. Gottman’s insights have continued to shape our perception of urban regions. Map by authors produced with data from OpenStreetMap (planet dump, data file from 2020, <<https://planet.openstreetmap.org>> [accessed 24 January 2021]) and Global Urban Footprint data (Esch and others 2017).

This type of dispersed city is perhaps most apparent where the historical nineteenth-century city forms were either overwhelmed by new industry or never really took hold, for example, in the Ruhr area of Germany (see Fig. 3.4). Europe is first and foremost an urban archipelago comprised of 3500

agglomerations with more than 10,000 inhabitants, 365 agglomerations with 100,000 inhabitants, and 32 agglomerations with more than one million inhabitants. The constellations of interconnected small and medium-sized cities are the defining characteristic of Europe’s urban territory (Mega 2010, 19), with the larger cities, such as London and Paris, being the outliers from the general pattern.

Brunet’s organization, the Délégation à l’aménagement du territoire et à l’action régionale (DATAR) (in English, the Delegation for Spatial Management and Regional Action) was created in 1963 as a central state agency ‘to accompany the development of the French desert around Paris’ (Cole 2006, 37) and to promote decentralization strategies. In the 1960s, another French geographer, the well-known Jean Gottman, gave an account of a similar urban territory located on the US eastern seaboard — the East Coast Megalopolis (Fig. 3.5). His comprehensive account traced the development of scattered nineteenth-century towns into a polycentric urban region dominated by the four interconnected metropolises of New York, Boston, Philadelphia, and Baltimore. Gottman’s insights went beyond a simple discussion of population densities. He powerfully described the complex socio-economic drivers, the land-use patterns, and the polycentric nature of the urban region. Importantly, he demonstrated the reality of urban growth and shattered the stereotypes of compact European cities and expansive agricultural hinterlands that

defined the Western urban tradition (Gottman 1961). Gottman’s insights have continued to shape our perception of urban regions (Gottman and Harper 1990; Morrill 2006; Lang and Knox 2009) and have been critical in assisting the recognition of low-density agrarian urbanism within the archaeological

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record that existed in previous centuries (Evans and others 2007).

Many professionals and scholars regard the US as the archetype of dispersed urbanism. US technological stereotypes and land uses colour much of the discussion of dispersed urbanism today. Dramatically lower in density than its dispersed European counterparts, the urbanism of the US is epitomized by iconic technologies such as cars and freeways. However, such technological aspects of US urbanism are a distraction from the urban spatial pattern that will most likely be a much more enduring legacy. Post-war US development produced a multi-nodal integrated urban structure at both the metropolitan and megalopolitan scales (Lang and Knox 2009, 790). Robert Lang and Paul K. Knox (2009, 790) suggested that the increased scale at both levels did not tear cities or regions apart, but produced new types of connectivity. The megalopolitan project (Lang and Dhavale 2005), which was designed to show where the next one hundred million Americans would live, identified twenty emerging megalopolitan areas that are defined as a complex of metropolitan areas, with overlapping commuting patterns and various types of urban landscapes, such as urban cores. Even though dense urban fragments, such as Manhattan and downtown Chicago, are the epitome of urban density, these fragments sit with Gottman's much larger, much more dispersed megalopolis. These dense centres are mere moments in an extensive, fragmented, and functionally related urban fabric. Like a Khmer pyramid and monastery sitting within a dispersed residential landscape of rice fields and thatched suburbs, Manhattan is not an anomaly but the elite centre for a much wider urban territory. The densest city in the world, Hong Kong, has the same relationship with the Pearl River Delta, a vast urbanized region of rice fields, factories, and aquaculture, which typifies what the scholar, Terry McGee (1991) has called the *desakota* city — a city with agriculture interspersed throughout its urban structure, where residents adopt both rural and urban livelihoods. The residential dispersal that was characteristic of the low-density cities of the agrarian world prior to c. 1500 AD reappears, without any direct cultural or historical connection, in modern conurbations.

### Asian Cities, Rapid Urbanization, and the Rural–Urban Continuum

Cities in the developed world, which urbanized in the nineteenth to mid-twentieth centuries, are not necessarily the most polycentric worldwide, as urbanization in Asia is moving increasingly towards

polycentric forms. Asian urban populations are shifting to suburbs or satellite towns, which are linked to a main centre via commuter networks. This phenomenon is particularly prevalent in large Indian cities, where ring towns or dormitory suburbs have formed around central cities, such as New Delhi and Mumbai. Conversely, urban growth patterns in China have been inclined to produce 'city regions', where largely independent cities have developed mutually beneficial networks within urban territories. Despite the fact that megacities in Asia have received much more attention, both popular and academic, the bulk of future urban population growth is projected to occur in smaller cities and towns, which will form part of a dispersed urban territory in much the same way that the newer urban developments in western Europe have done. Most often, this growth has occurred without a synchronized transition to decentralized government and without timely local capacity building. As a consequence, fragmented peripheral urban growth has been stimulated (Cohen 2006; United Nations Population Fund 2007).

But what has also developed are increasing connections between previously separate urban centres to create vast stretches of urban landscapes in which large areas of previously rural land are distributed amongst extensive urban communication networks. Just as the US cities of the 1960s appeared revolutionary in the eyes of Continental geographer Gottman, cities such as Bangkok, Beijing, Mumbai, Manila, Jakarta, Tianjin, Kolkata, and Guangzhou seem revolutionary to Western geographers and urbanists today. Formerly distanced as exotic locations, such cities provide glimpses of urban possibilities not previously acknowledged. The rapid development in Asia has produced extremely fragmented cities, despite areas of density within the urban territories that far surpass anything in the West. Asia is driving today's wave of urbanization, and it is predicted that the expansion will be nearly thirty times as large as the urbanization that unfolded in the US more than half a century ago. Manuel Castells suggested this in the 1990s, when he wrote that the Pearl River Delta metropolis of southern China, 'only vaguely perceived in most of the world at this time, is likely to become the most representative urban face of the 21st century' (Castells 2011, 439).

It is expected that Asia's current urbanization will occur in less than twenty years and therefore by 2025, nearly 2.5 billion Asians will live in cities that make up almost 5 per cent of the globe's urban population (McKinsey Global Institute 2009, 168). India's urbanization is less proactive and mature than China's planning regime but, over time, it may become more dispersed than China's because of the

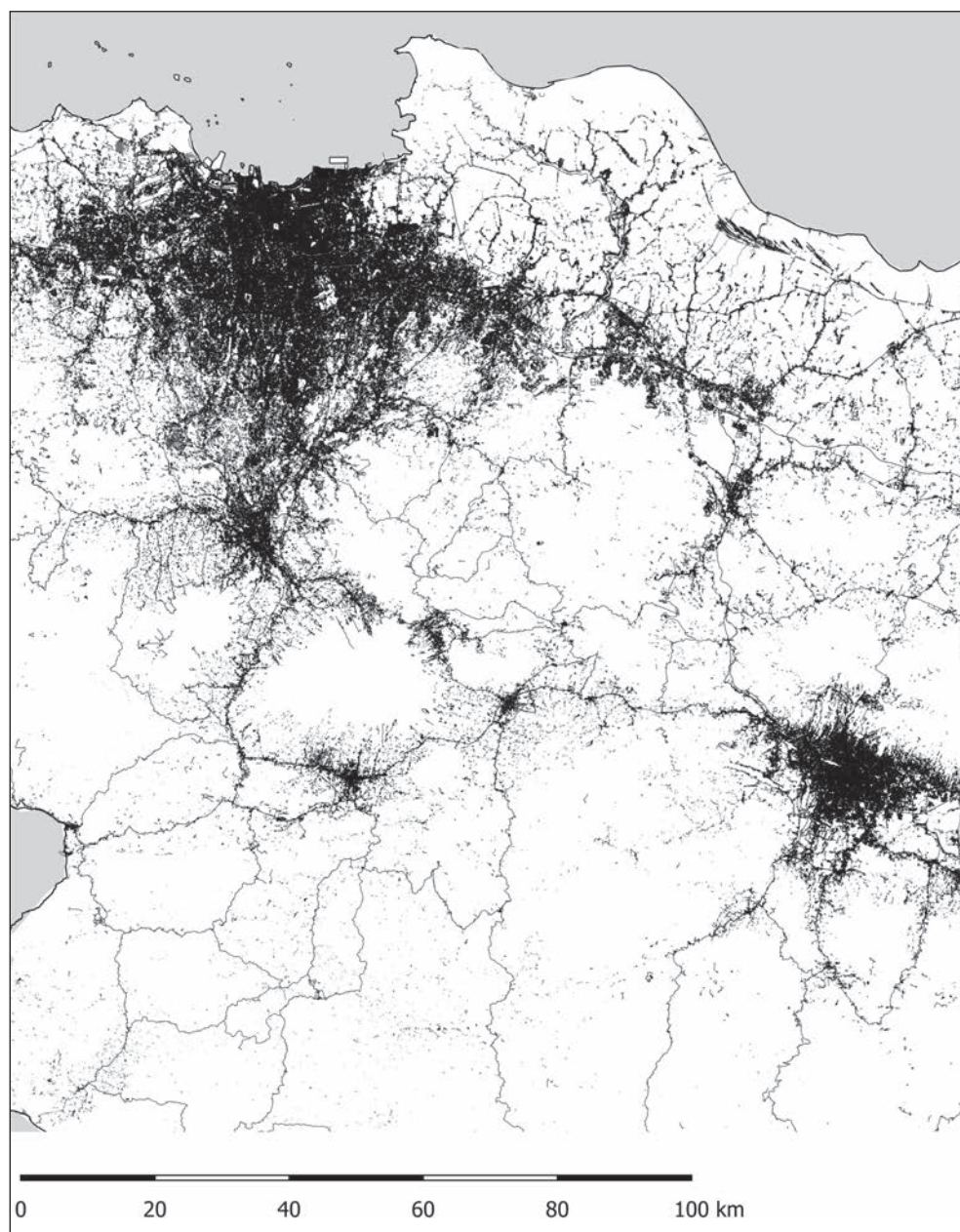


Figure 3.6. Greater Jakarta, Indonesia, Southeast Asia. It was in the Southeast Asian metropolis of Jakarta that the characteristics of dispersed Asian urbanization were first observed by McGee (2008; 1967; 1971) and defined as a *desakota* system. Like many of the urban territories of Asia, Jakarta consists of a large city core within heavily populated urbanizing regions of wet rice agriculture. The Jakarta metropolitan area, known locally as *Jabodetabek* includes the national capital Jakarta as the core city as well as five satellite cities and four regencies in a fragmented and patchy pattern of suburban and agricultural landscapes. Map by authors produced with data from OpenStreetMap (planet dump, data file from 2020, <<https://planet.openstreetmap.org>> [accessed 24 January 2021]) and Global Urban Footprint data (Esch and others 2017).

diverse portfolio of large and small cities throughout the country and the federal structure of the country (McKinsey Global Institute 2009, 139–42). However, it was in the Southeast Asian metropolis of Jakarta that the particular characteristics of Asian urbanization were first observed (McGee 2008; 1967; 1971;

Jakarta expanded, it did not alter many of its rural surrounds. Instead, urban and agricultural patches were interspersed with infrastructure and suburban enclaves. The city encapsulated the rural villages, creating a different kind of metropolis. McGee aptly named the condition *kota-desai*, a fusion of

McGee and Universiti Kebangsaan Malaysia 2009; Kelly 2007) and defined as a *desakota* system (see Fig. 3.6).

Many of the urban territories of Asia include large city cores, within heavily populated urbanizing regions of wet rice agriculture. Increases in skilled labour and investments in accessible technology have accelerated the development of these agricultural regions. Cheap mechanized transport, such as the two-stroke scooter, has facilitated the movement of people, commodities, and capital, networking these regions without the need for the high per-capita infrastructure investment that characterized the development of the more developed nations, earlier in the twentieth century. The result of this process has been the creation of urban territories of farmers, with population densities that have frequently exceeded American and European suburbia. The specific nature of industrialization in Asia has been linked repeatedly to the nature of rice production in Japan, Taiwan, and, most recently, China (Bray 1986, 134–39). The tightly interlinked distribution of labour and capital throughout space and time distinguishes these rice economies from those of the West and is a driver of *desakota* development (Bray 1986, 140).

McGee, the originator of the *desakota* concept, formed his ideas through long observation of the dispersed settlement of Jakarta as it developed in the 1960s. McGee's (1971; 1967; 1991) *desakota* concept is based on his observation that the conventional division between rural and urban is obsolete in such cities. As the city of

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three Bahasa-Indonesian words: *kota* for city, *desa* for village, and *si* for process. Subsequently, McGee rearranged the terms to create *desakotasi* to describe this process of development and *desakota* to describe the settlement that results from that process. The type of urbanism described by McGee involves a regional spatial expression, encompassing central urban cores, satellite towns, peri-urban areas, and extensive intervening spaces with relatively dense populations and intensive traditional agricultural land uses, in which wet paddy cultivation has often dominated. Since McGee wrote about the *desakota* in the 1990s, others have formalized the criteria that characterize *desakota* regions (Desakota Study Team 2008, 12–15).

The characteristics of specific *desakota* regions vary considerably. In South Asia, the diffusion of communication technologies into rural areas is perhaps the major driver of *desakota* dynamics. Roads and mobile phones are having a widespread but little-understood influence on development. The implications for resource management are significant. This technology diffusion is taking place within the context of moderate urbanization trends and high rural population densities. Rather than cities growing rapidly, a more diffuse urbanization of rural areas is occurring (Desakota Study Team 2008, 19–20). Two types of *desakota* developments are occurring in China. Both development models originate from the transition to a market economy. The first model involves large-scale collective development, in which industrial enclaves and super-blocks form one of the major drivers of China's rapid urban dispersal (Monson 2008). This developmental model represents a capitalist transformation of the commune. It manifests itself in the form of massive urban fragments inserted into the countryside. By contrast, smaller and more diffuse family–village spatial units are developing according to a bottom-up model. Rural settlements are expanding and merging along linear infrastructure, such as roads, and are developing their own special economies and forms of urbanism (Guldin 1996, 279; 2001). The combination of these two development processes has generated the extremely rapid urbanization of eastern China, as cities expand into territory that is itself becoming urbanized.

What is notable is that the *desakota* urban form is developing in a variety of different contexts suggesting that it is a very robust and active urban phenomenon. State reforms have primarily driven the development of *desakota* regions in China. However, in Africa and Southeast Asia, it is the instability of governments that has driven *desakota* settlement systems, as *desakota* zones present a form of income

security against ecological failure and economic vulnerability (Desakota Study Team 2008, 19–20; Hawken 2017). Either way, planning strategies have resulted in a conflation of the urban–rural interface into a more complex peri-urban condition, marked by heterogeneity and fragmentation. The *desakota* phenomenon has generally been overlooked, underestimated, and under-reported for two major reasons. First, there is a prevailing prejudice against urban farming and rural forms of employment within an urban context, as they are seen as backward and polluting (Smit, Nasr, and Ratta 2001). Second, urban authorities in developing countries have not generally facilitated urbanization trends. Most authorities have attempted to restrict the growth of cities (Pearce 2006) by limiting development to forms that fit preconceived ideas of formal planning. These conventional forms rarely facilitate equitable access to diverse income streams (Saunders 2010). Cities are developing spatially to become more dispersed, more fragmented, and more polycentric. Although these three spatial changes vary globally, they are generally a function of scale. Compared with more established urban societies, cities in the developing world are developing according to different urban trajectories, and they are developing different density gradients and using different technological assemblages. However, the general trends of dispersion, fragmentation, and polycentricism are occurring globally (Ingram 1998; Angel 2011; Angel and others 2016).

Equally within the archaeological record the widespread existence of the pre-industrial low-density, dispersed settlement form, which occurs even more widely than just its agrarian-based urban form (Fletcher 2019; Fletcher and White 2018) suggests that we can expect to find more examples of the low-density urban form than have as yet been recognized. The emergence of new survey technologies, and more importantly new analytic methods, have supported the recognition of low-density urbanism in both archaeological and contemporary planning contexts (Hawken 2007). Understanding the nature and existence of low-density urbanism has been challenging in both past and present situations. The extensive and reoccurring nature of low-density urbanism thus requires a theoretical framework that is open and inclusive of both past and present urbanism. Anything less is to face the formidable challenges of global urbanization blind, moving forward without the benefit of the deep knowledge offered by the archaeological record.

## Concluding Remarks: Dispersed Urbanism as a Recurring Urban Pattern

From an archaeological perspective, the comparative global project involving dispersed cities has expanded from its initial recognition in the 1950s and 1960s to substantial developments in the twenty-first century. Future research approaches will need to take into account the comparative frameworks put forward by researchers in other regions, and draw on recent advances in spatial sciences to develop a methodology applicable to cities across a broad archaeological time frame. Such a comparative method relies on well-developed examples and a common descriptive base. Humans are subject to the same ecological boundary conditions as other species and exhibit enormous variation in energy and resource use and in social and spatial organization. Therefore, the patterns of variation in urban systems are part of the sustainability challenge now facing cities around the world. It is critical that researchers and the public understand the long-term consequences of this variation so that urban planners, designers, and governments are able to interact effectively with these trends and engage with the risk associated with low-density urbanism under the impact of severe climate change and global resource and systems limits.

Present-day urban societies distinguish themselves from those of the past through rapid innovations and new technologies. It is undeniable that human societies are changing — but in what ways and by how much? Scholars have viewed the questions raised by low-density cities as an innovation tied to technological variables such as the automobile, freeways, and mechanized urbanism. The spread of industrial-based, low-density cities has been perceived as a special phenomenon associated with the massive and unprecedented urban expansion of global populations. Urban scholars tended to view the decline in urban densities as an event unique to our ‘urban age’. This rather myopic perspective is increasingly untenable. Scholars such as Neil Brenner and Christian Schmid (2014) have rightly challenged the limited focus of the urban age calling for new theoretical perspectives and methods to enhance our urban perceptions. The 5000-year urban history of humankind contains numerous examples of low-density urban settlements. If examined more closely, the archaeological record should continue to reveal further new evidence of this kind of urbanism. This paper testifies to this increasing knowledge base, indicating that low-density urban environments have occurred

as both structural fragments of larger settlements and, frequently, as the dominant settlement pattern in many regions throughout the urban history of humankind.

The debate has changed and it is no longer defensible to speak of low-density settlements as transient or ephemeral phenomenon that can be readily altered. Low-density settlements are, by contrast, a recurring settlement form. Instead of classifying low-density settlements as an aberration, we need to shift our focus to understanding the particular dynamics of low-density urban ecologies and economies, and the specific kinds of pressure that they exert on their regions and inhabitants. The question is no longer how we avoid this condition but what is the best way to manage this massive change in settlement form (Angel 2011). Current urban expansion devastates agricultural and ecological landscapes through its resource-intensive operational processes, its predilection for simple biodiversity associations and monocultures (Bren d’Amour, Reitsma, and Baiocchi 2017; Barthel and others 2019), and unsophisticated land-use policies (Geneletti 2013). Past low-density societies, of which the Khmer and Maya are the most notable examples, were vulnerable to many of the same pressures that we are facing today. Scholars, such as Brendan M. Buckley and others (2014; 2010), Lisa J. Lucero and others (Lucero, Fletcher, and Coningham 2015; Lucero, Gunn, and Scarborough 2011), and Fletcher and others (2017), have called attention to issues of climate change in relation to these societies. Fletcher (2018) has noted the increasing risk of extreme climate events to urban infrastructure in large, low-density cities, and Michael E. Smith (2010) has highlighted the potential for past cities to inform the management and design of current urban settlements and neighbourhoods.

Equally, our own experiences of living within such low-density environments provides archaeologists with a lived reference to reconsider the operation of past low-density societies, which, so often, have been overshadowed by more compact urban forms in the archaeological record. Just as the patterns of the past inform the present, our present experiences can improve our comprehension of the past. Low-density urban environments are with us to stay. It is time we acknowledged the challenge of operating, altering, circumventing, and sustaining such environments as recurring urban patterns rather than as isolated and unusual events.

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# Interfaces and Crossroads, Contexts and Communications

## *Early Medieval Towns in the Syr-Darya Delta (Kazakhstan)*

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**ABSTRACT** In the late first millennium AD, the Aral Sea region comprised two broad cultural zones: in the south the civilizations of Central Asia, in the north the steppe nomads. On their interface, in the delta of the Syr-Darya, there is an isolated cluster of urban sites, including Dzhanakent. Fieldwork results show that in the ninth to eleventh centuries AD this site was a fortified urban settlement, but it had a predecessor from the sixth/seventh century onwards. Urban design and finds indicate close links to the southern civilization of Khwarazm, but also to local populations and Turkic nomads. It is suggested here that Dzhanakent may originally have been a Khwarazmian trading post, later serving as nomad winter quarters while continuing as a transshipping point on the crossroads of two important trade routes. Location and functions also raise questions about the application of emporia typologies to this case.

**KEYWORDS** Urbanization; emporia; medieval trade; Kazakhstan; Central Asia; Khwarazm; Khorezm; Oguz; Dzhanakent; Yengi-kent.

Dzhanakent (45.612029 N, 61.921513 E) is the site of a deserted early medieval town just east of the northern Aral Sea, in the dried-out delta of the river Syr-Darya (the Jaxartes of Classical Antiquity). The first short reports about the site go back as far as the mid-eighteenth century (Arzhantseva and Gorshenina 2018).

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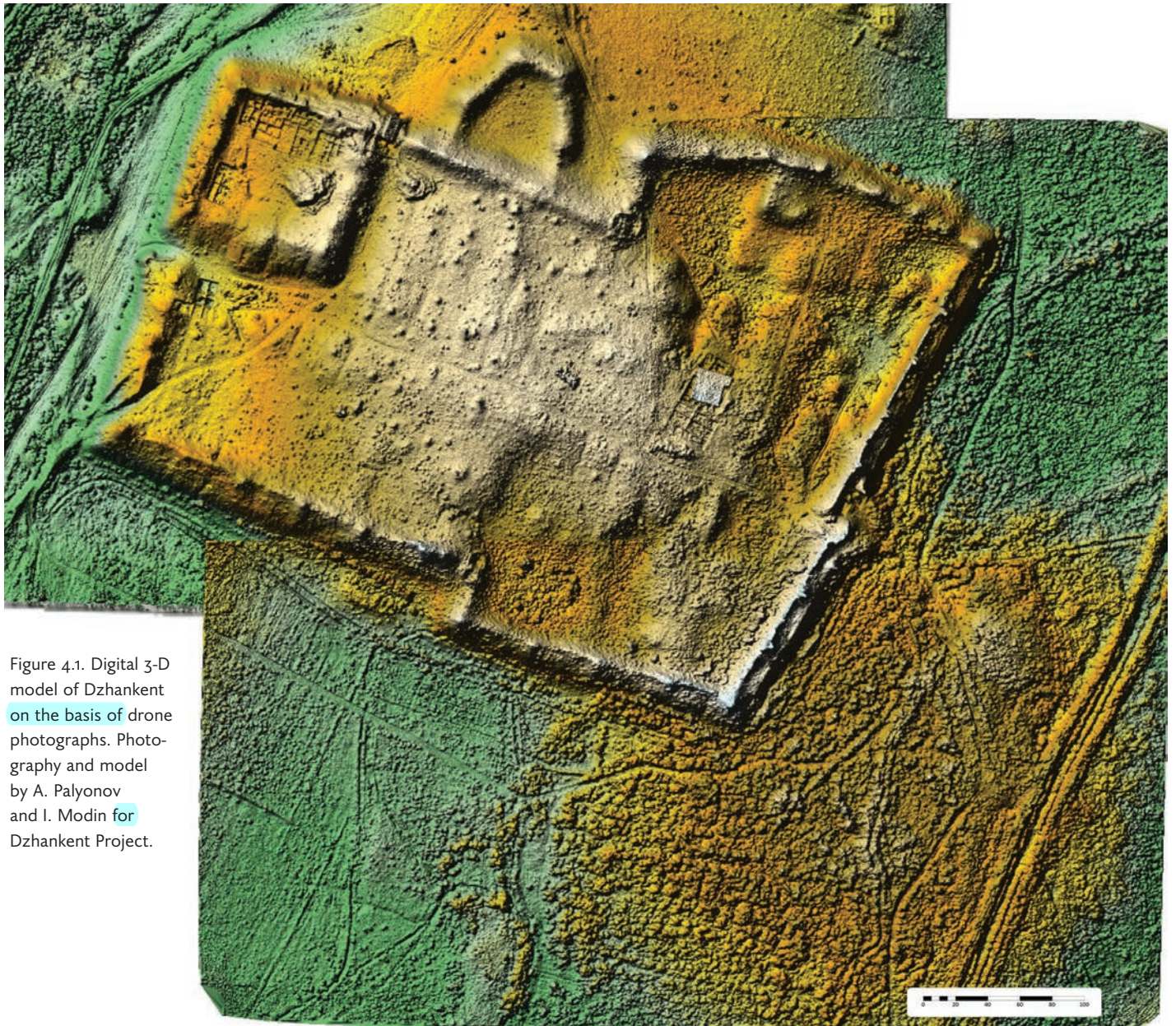


Figure 4.1. Digital 3-D model of Dzhankent on the basis of drone photographs. Photography and model by A. Palyonov and I. Modin for Dzhankent Project.

Members of the Khorezmian Archaeological and Ethnographic Expedition of the Academy of Sciences of the USSR, directed by the famous archaeologist Sergej P. Tolstov, took aerial photographs, surveyed the site, compiled a plan of visible features, and collected surface finds on a couple of occasions between 1946 and 1963 (Tolstov 1947; 1962). But systematic excavations of the interior of the fortified site only started in 2005, continuing in annual seasons until the present (Arzhantseva and others 2007; Akhatov and others 2008; Arzhantseva and Tazhekeev 2014). An excavation season in 2011 by an international team produced the first radiocarbon dates for the site, supporting the hypothesis of settlement at this place a couple of centuries before

its first mention in written sources of the tenth century (Arzhantseva and others 2012).

Until a decade ago, ideas and debates about Dzhankent had been dominated by notions of this being the ‘capital’ of the Turkic Oguz nomads, which was called Yengi-kent in the written sources (Bartol’d 1968; Tolstov 1947; 1962; Agadzhanov 1969; Levina 1971; 1996; Baipakov 1986; 2007; Vajnberg 1999). The greater time depth, indicated by the radiocarbon dates and confirmed by new finds, has begun to change ideas about the origins of urbanization in this region and at this particular spot. The present paper is a further step in this process of rethinking the origins and functions of Dzhankent, and it does so by a specific focus on the contexts and links of

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the site as they are apparent in geographical conditions, archaeological finds, and textual sources. Work along these lines has already shifted the interpretation of the urban origins of this site firmly towards long-distance trade, with state formation being a significantly later and less certain factor in the process.

The approach adopted here is to look at the site and its contexts at three levels: (1) the site itself and its immediate surroundings; (2) its local region in the coastal zone of the Syr-Darya Delta comprising an area of about a 50 km radius around Dzhankent; and (3) the wider region of Central Asia between the Caspian Sea and the upper reaches of the Syr-Darya, an area of about 1000 km in radius. This is a bottom-up approach, starting with the site itself, then adding in neighbours, links, and barriers on various scales. The resulting picture provides a visualization of actual connections of the site as a basis for interpretations. In that sense, this paper is not a case study of social network analysis (SNA) (Brughmans 2013; Knappett 2013), but represents the prolegomena towards such an analysis. In the future, Dzhankent may well serve as a case study of network analysis;<sup>1</sup> this requires more quantitative data on a refined chronological scale, which the new international fieldwork project that started here in 2018 should provide. But even before that hoped-for state of affairs, Dzhankent already offers comparative perspectives on the causal links between the intertwined processes of urbanization, state formation, and trade in the Early Middle Ages.

### Level 1: The Site of Dzhankent

A visitor to the site today will see a roughly rectangular enclosure made of earthen ramparts topped by adobe (mud-block) walls (Fig. 4.1). Even a cursory glance shows surface features within the enclosure, and aerial photographs reveal their regular patterns. Our fieldwork since 2011 has revealed the existence of two, or possibly three, occupation phases. The earliest is a largely hypothetical Hellenistic phase postulated by Tolstov (1947). A deep trial trench in 2011 and 2013 showed a possible early destruction layer and a sterile layer below the seventh/eighth-century phase, with natural subsoil not yet reached, so there is possibly an earlier phase underneath. Whether this is Hellenistic, remains to be seen; if it turns out to be, it seems that there was no direct occupation continuity to the later phases.

Evidence for the first datable occupation phase (Dzhankent I) consists of seventh/eighth-century pottery and sixth/seventh-century radiocarbon dates from three trenches: in the deeply stratified town quarter just outside the eastern citadel wall (Trench 2), from under the southern town wall (Trench 5) (Arzhantseva and Tazhekeev 2014), and from the centre of the lower town (Trench 1) where natural was reached in 2020. The finds include pottery in the regional Dzhety-asar tradition as well as Afrigid pottery and Khwarazmian wares from the Amu-Darya region, though quantification of their proportions is not yet possible. The limited trenches do not give any insight into the nature of the settlement in this phase, but the position of the occupation layer *underneath* the late ninth- or tenth-century wall in Trench 5 should imply an open, undefended settlement; otherwise one would have expected the later rampart to have been built on top of earlier walls. The find of a cat skeleton from around the late eighth century may imply the beginnings of an urbanization process by this stage, the argument being that cats are essentially urban animals (Haruda and others 2020). Further observations on layout, economy, social structure, and environment of this phase are not yet possible.

Virtually all data and information relevant to these aspects relate to the second phase of the ninth to eleventh centuries (Dzhankent II). In this phase, the settlement was given the form visible today: a fortified town with a size of 16 ha, a corner citadel, an empty annexe, two main gates, and a regular layout of buildings and quarters in at least parts of the enclosed area (Fig. 4.1). Together with other observations, such as the dense occupation of the interior and a possible metal workshop in the lower town (*shahristan*), all these aspects point to the urban nature of the settlement in this phase. While the state of documentation and publication of the excavations inside the citadel (Bajpakov, Voyakin, and Il'in 2012) does not allow any inferences about its inhabitants, the very existence of a citadel points to an elite element (social or military) in the population, as does the discovery of a wall painting in one of the excavated houses in the lower town (Arzhantseva and Tazhekeev 2014). The regular layout in a chequer-board pattern suggests the existence of an authority in charge of planning, and a rebuilding of the site in a single coherent process in the late ninth or the beginning of the tenth century.

Urban design, architecture, finds, and written sources suggest links in three main directions: north, south, and south-east. Contacts with, or the presence of, nomads from the steppes north of the Syr-Darya are indicated by handmade pottery decorated in a

<sup>1</sup> For potential ways forward, see Mills 2017; Peeples 2019.

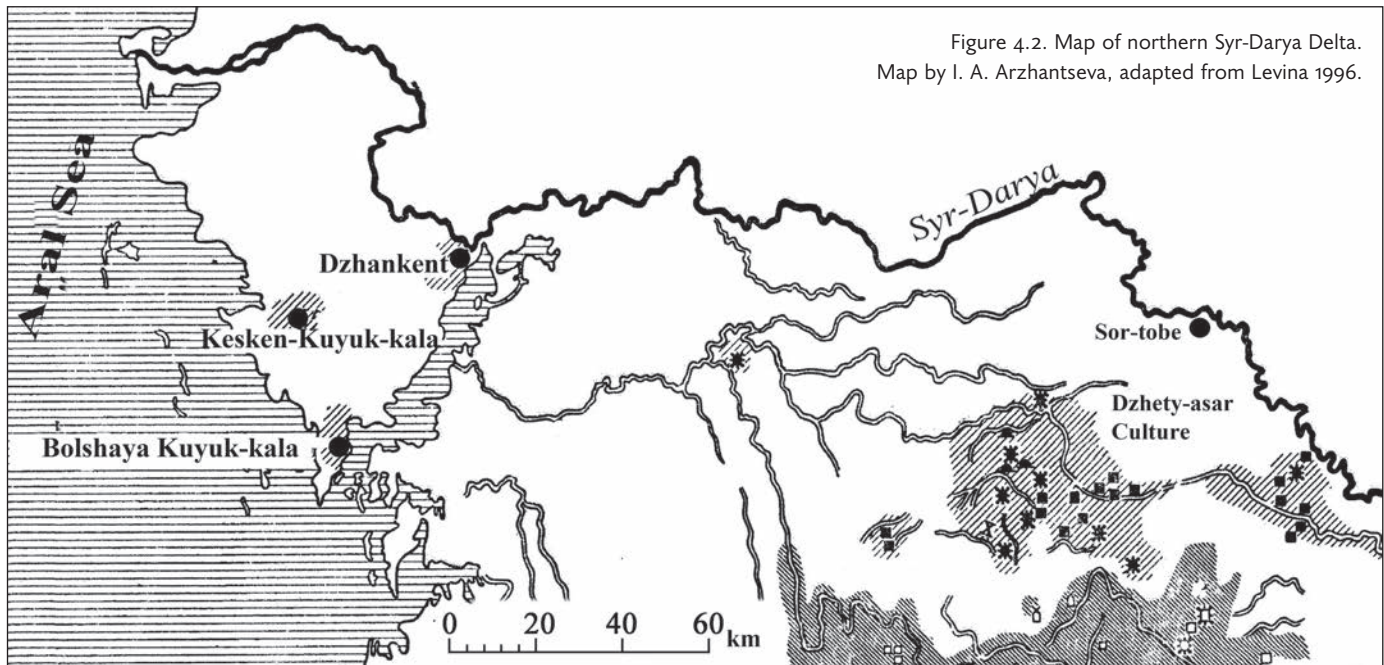


Figure 4.2. Map of northern Syr-Darya Delta.  
Map by I. A. Arzhantseva, adapted from Levina 1996.

distinct style which is thought to be Oguz, by belt fittings of eighth/ninth-century Turkic type, and possibly by a few weapon parts found in the lower town (Arzhantseva and others 2007). A nomad presence is confirmed by the reports of Arab geographers of the tenth to twelfth centuries (Ibn Rustah, Ibn Hawqal, al-Masudi, al-Idrisi) referring to an Oguz town called Yengi-kent ('New Town' in Turkic) which, according to some reports (Ibn Rustah, Ibn Hawqal), was the seat of the Oguz ruler (the *yabgu*), or at least his winter quarters (*Hudud-al-Alam*, 150, 166, 184, 221; Agadzhanov 1969). This town of Yengi-kent has long been identified with the site of Dzhankent (see Bartol'd 1968).

Direct southern contacts to the civilization of Khwarazm on the river Amu-Darya are evident in pottery and architecture. The pottery finds include a large proportion of vessels which are made from light clay and are closely similar to early medieval settlement pottery from Kerder (in the Amu-Darya Delta) and Khwarazm. The urban design of Dzhankent and the construction of the town wall have their best analogies in Khwarazm, at sites such as Bazar-kala (rectangular layout with corner citadel, fourth/third centuries BC; Lavrov 1950, 40), Fortress no. 136 (T-shaped outline, seventh/eighth centuries AD; Nerazik 1966, 24), and Toprak-kala (regular layout of the interior, third/fourth centuries AD; Nerazik and Rapoport 1981, 10), as well as Kurgancha-kala and Khajvan-kala in Kerder (chequer-board layout of the interior, seventh/eighth centuries AD; Yagodin 1973; 1981). These details suggest the involvement of Khwarazmian architects in the building of this phase

of Dzhankent while the small domestic dwellings in Central Asian style, each with *sufa* (bench) and central hearth, imply the presence of resident southerners in the town (Khazanov 2005, 165).

Links to the south-east, to the core regions of Central Asia, may have been direct, or indirect via Khwarazm. The existence of such links is demonstrated by about a dozen coins, among them Samanid *fels* (copper coin) of Abd el-Malik (343–350 a.h./AD 954–961, stamped Bukhara 347 a.h.), several cases of Arabic graffiti on pottery (one in Kufic script of the late ninth century; V. Kuleshov, pers. comm.), and Arab lettering on three eggs found inside a tenth-century pottery vessel on the outside of the citadel. Direct contacts to the Bukhara region would have been along the Northern Silk Road branch following the Syr-Darya, perhaps also using river transport. Written sources underline the obvious importance of the river itself as a means of communication and transport: they refer to the existence of a river port at Dzhankent where goods were traded, and to grain being imported into the town from oases on the river (Agadzhanov 1969). The latter report ties in with the apparent absence of contemporary villages or agricultural estates in the immediate vicinity of Dzhankent; on the other hand, palaeobotanic evidence of spelt points to the local production of grain (Ivanova, Bronnikova, and Gol'eva 2014).

As yet we are lacking archaeological and geomorphological confirmation that Dzhankent was located on a river channel in the delta. The palaeo-channel immediately outside the eastern wall

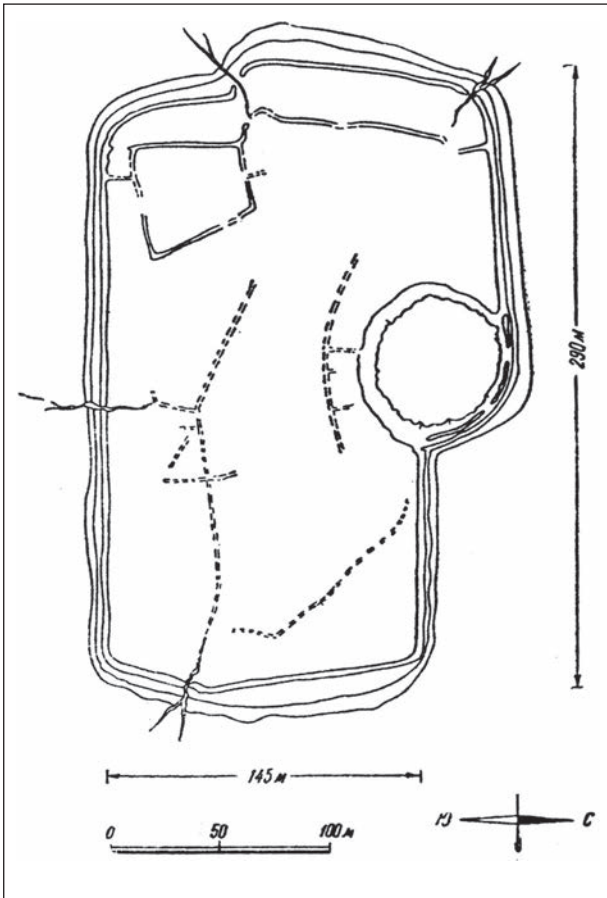


Figure 4.3. Plan of Bolshoya Kuyuk-kala.  
Archive of the Khorezmian Expedition.

of the town has now been OSL-dated to prehistoric times, so the early medieval port will have to be looked for at a greater distance; in historical times, this kind of distance was typical for towns on the Amu-Darya where the fear of erosion and sudden riverbank collapses led to safety margins of several kilometres between towns and their nearest river channels. Maps showing the coastline of the Aral Sea in the 1930s–40s (Fig. 4.2) seem to show, about 5 km south-east of Dzhankent, the end of what looks like a long inlet which gave direct access to the main body of the Aral Sea. However, the preliminary inspection of test cores in 2019 suggested that this ‘bay’ may have been a series of shallow sweet-water lakes in the delta. Pending the final clarification of this issue, it is still possible to note that the location of Dzhankent would seem to correspond to a standard location type of river ports close to the sea shores of north-western Europe in the Early Middle Ages (Clarke and Simms 1985; Hodges and Hobley 1988; Hill and Cowie 2001; Pestell and Ulmschneider 2003; Ludowici and others 2010).

## Level 2: The ‘Marsh Towns’ of the Syr-Darya Delta

Much the same can be said concerning the locations of Kesken-Kuyuk-kala and Bolshaya Kuyuk-kala, two apparently similar and contemporary sites in the local region. While Dzhankent had been known from military and travellers’ reports since the eighteenth century, the other two sites were only discovered in 1946 by the Khorezmian Expedition. In his seminal article on the three sites, Tolstov had called them ‘marsh towns’ on account of their landscape setting in the 1940s (Tolstov 1947). They are located in the southern part of a triangular area between the Aral Sea and the ‘inlet’ south of Dzhankent. This would seem to be the peninsula, described by an eighteenth-century Russian military mission (Muravin and Gladyshev in 1740–1741) as being 100 verst long and 45 verst wide,<sup>2</sup> in which Dzhankent was located at the time (Arzhantseva and Gorshenina 2018). In this peninsula, the three town sites form a triangle with mutual distances of between 30 and 50 km (Fig. 4.2). Kesken-Kuyuk-kala forms the westernmost point of the triangle; a palaeo-channel runs immediately past its northern and north-western edges directly to an ancient shoreline of the Aral Sea as is recognizable on satellite images; the distance from the site to the shoreline is less than 5 km. Bolshoya Kuyuk-kala is the southern point of this triangle, close to the tip of the peninsula and only a short distance (approx. 1 km) from the old shoreline.

Fieldwork on these sites has been of uneven extent and quality, but in any case less extensive and informative than at Dzhankent. Looking at the three sites as a group of possibly related settlements reveals a number of common features: defensive walls enclosing areas between 10 and 20 ha, an internal citadel, dense occupation of the interior, and finds dating from the seventh to the tenth/eleventh centuries. While, in the absence of actual fieldwork, little more than the outline and stray finds are known of Bolshoya Kuyuk-kala (Fig. 4.3) (Arzhantseva and Ruzanova 2010), this summary description certainly seems to apply to Kesken-Kuyuk-kala (Fig. 4.4). An aerial photograph of exceptional quality taken by the Khorezmian Expedition in 1946 shows a dense arrangement of small structures inside the walls (Archive of the Khorezmian Expedition Comp. 142 Reg. 8 F. 3/4). This seems to be confirmed by a somewhat schematic plan of tenth-century single-phase structures made available on the internet and based on excavations undertaken between 2008 and 2015

2 One verst is almost exactly 1 km.

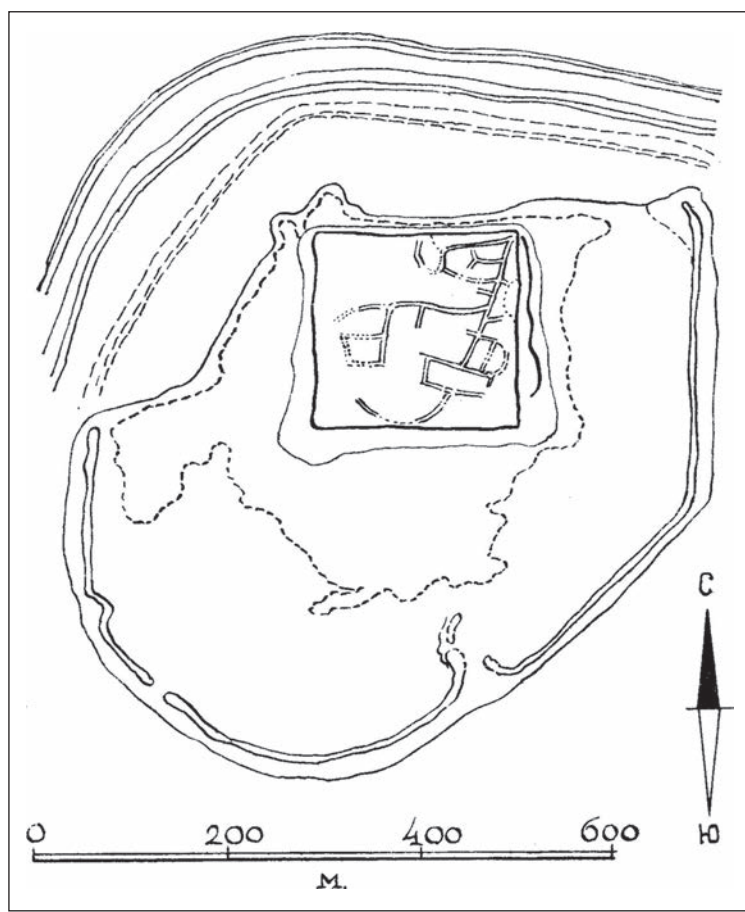


Figure 4.4. Plan of Kesken-Kuyuk-kala.  
Archive of the Khorezmian Expedition.

in a rectangular inner enclosure (size 200 by 200 m; probably an internal citadel, *pace* the excavators calling it *shahristan*) (Baipakov 2019, 419). Finds from the excavations have the same typological range and chronological span as those at Dzhankent; chronologically earlier stray finds are known, so Kesken-Kuyuk-kala may also have a pre-seventh-century phase although there are no documented stratigraphic observations here to support this. The excavators claim the existence of a mint in the town, but the evidence for this has not been presented. Their identification of Kesken-Kuyuk-kala as the ancient town of Dzhuvvara, mentioned by Al-Idrisi (Bajpakov, Voyakin, and Il'in 2012), is an interesting suggestion which needs to be backed up by further historical research.

The comparatively close spacing of three contemporaneous sites of similar size and appearance would strongly suggest a linkage between them. While the impression of an urban network is hard to escape, there are, however, no direct links apparent between the three sites, only common links to regional culture (in the Dzhety-asar tradition) and

to external contacts (Oguz nomads and Khwarazm). The apparent absence of rural sites of seventh- to tenth-century date in the area between them also makes it impossible to draw inferences about their relative positions in the settlement pattern of the delta region.

### Level 3: Central Asian Urban Networks and Communications

It is only when we step back and look at the overall historical geography of the Early Middle Ages beyond the Syr-Darya Delta that the special position of the 'marsh towns' becomes apparent: they represent an island of urbanism in a sea of sand, steppe, and marshes, far removed from the urban networks of the Central Asian heartlands. From Dzhankent, it is some 500 km as the crow flies to Jurjania (Gurgench), the centre of Khwarazm in the Amu-Darya river oasis, and not much less to the closest Khwarazmian towns. Upriver, it is about 600 km to Sauran and Shavgar, the nearest towns on the middle Syr-Darya, and roughly the same distance again to Samarkand and Bukhara, the economic and political hubs of Central Asia (Fig. 4.5). The town of Dzhend (or Dzhankala), located between the 'marsh towns' and Sauran, was a later development mainly dating to the eleventh to fourteenth centuries (Tolstov 1948, 60–61; 1962). There were no comparable centres of urbanism north and north-west of the Syr-Darya Delta; the steppes north of the river were devoid of towns. The nomad capitals on the Volga, Itil of the Khazars and Bulgar (or Bolgar) of the Bulgars (Noonan 1997; Puteshestvie Ibn Fadlana 2016), were some 1000 km to the west/north-west and 1400 km to the north/north-west, respectively, and their urban status is debatable although they were important trading sites. This broad picture is, at any rate, the situation in the late ninth to tenth centuries; the evidence for the occupation of urban sites in the seventh to early ninth centuries is much scantier.

The 'marsh towns' were, thus, a curious outlier of early medieval urbanism, with an apparently Khwarazmian model transplanted from the Amu-Darya to the Syr-Darya, into the corridor of the Northern Silk Road, into the contact zone of southern civilization with the northern steppe populations. Their location and appearance beg the question as to the motives: Why were they placed here, at the time when they were placed here, and why were they then transformed? In the seventh century, Khwarazm was an independent polity made up of a number of autonomous city states, united by a common Iranian



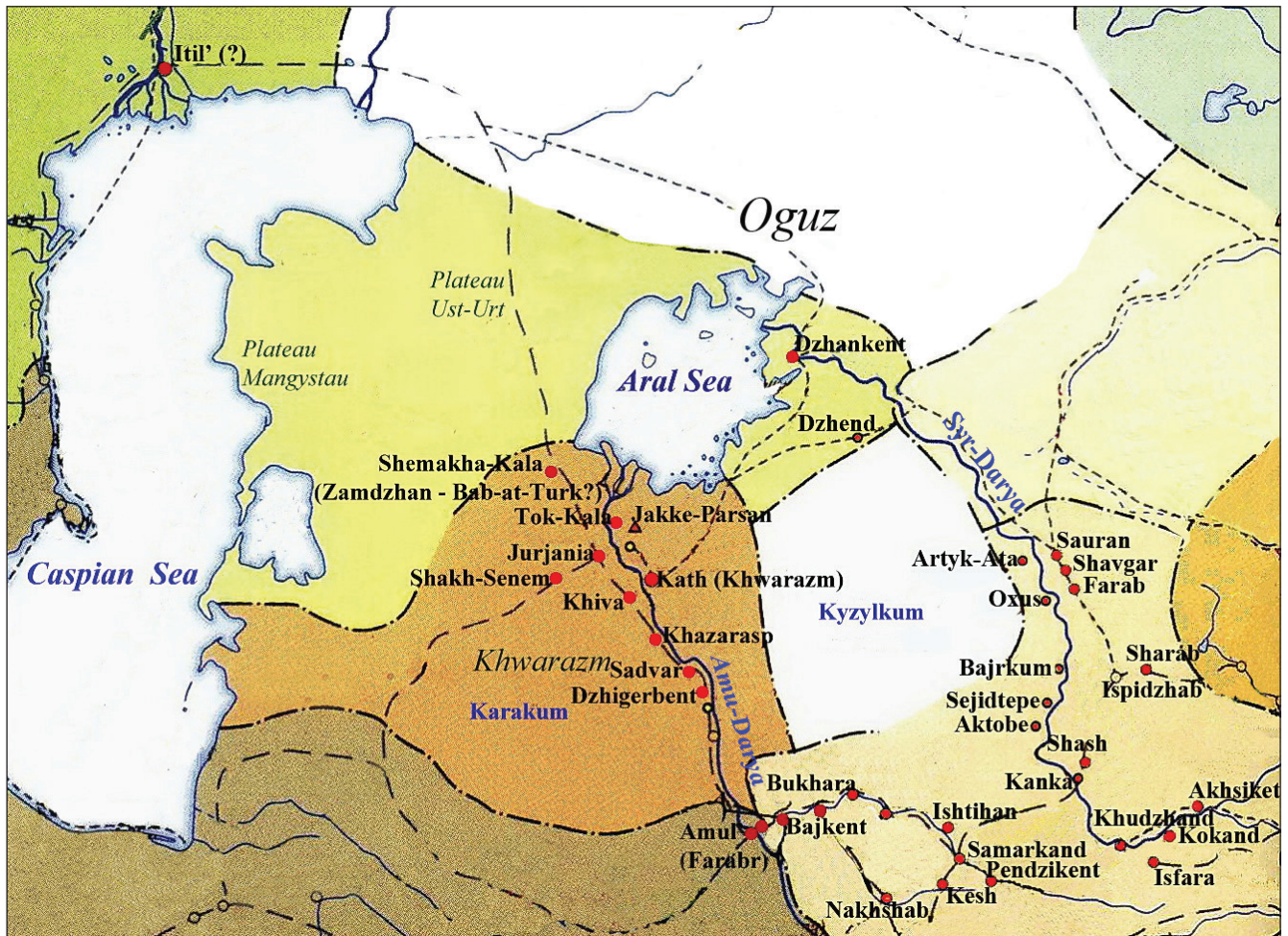


Figure 4.5. Map of Central Asia showing urban sites of tenth-century date. Map adapted by I. A. Arzhantseva.

culture and a tradition of exchange and long-distance trade. By the tenth century, it was a province of Islamic Central Asia, semi-autonomous at times, but mostly overseen or ruled from Bukhara, and with a distinct Islamic culture (Arzhantseva and Härke forthcoming). In-between these two horizons, a number of events had reshaped the region: between the sixth and eighth centuries, the collapse of the regional Dzhety-asar Culture south of the lower Syr-Darya, leading to a population shift to the north, west, and south-west, towards the river and downstream in the delta; in the later sixth or seventh century, the formation of a northern branch of the Silk Road, running north around the Aral and Caspian Seas (Kovalev 2005); from the eighth century, the Arab conquest of Central Asia; and in the late eighth to early ninth centuries, the arrival of the Turkic Oguz nomads on the steppes east of the Aral Sea and north of the Syr-Darya (Agadzhanov 1969), making them direct neighbours of the settlements which would be turned into 'marsh towns' in due course.

For a better idea of the purpose and function of the 'marsh towns', the lines of communication and their geographical constraints need to be added to the historical context. Early medieval east-west trade would have run along, or on, the river Syr-Darya which offered a corridor and a means of transport for the Northern Silk Road from the late sixth or seventh century onwards (de la Vaissière [n.d.]). The 'marsh towns' must have been part of the network created by this line of communication. The site of Sor-tobe, some 200 km upriver from Dzhankent and more than half destroyed by the eroding riverbank, may represent a type of way station we should expect, and look for, along the Syr-Darya: a small enclosed site (internal size originally perhaps 1 ha, pretty exactly the size of the citadel in the 'marsh town' of Kesken-Kuyuk-kala) with a chronological range of finds closely similar to that of the 'marsh towns' (Kurmankulov, Arzhantseva, and Tazhekeev 2011).

The other line of communication crossing the Aral Sea region ran north-south, from the lower and middle Volga to Khwarazm. The trade running

along this corridor in the tenth century is attested in some detail by Al-Muqaddasi writing at Jerusalem:

From Khwarazm: sable, grey squirrel, ermine, mink, fox, marten, beaver, spotted hare, goat-skins, wax, arrows, birch wood, fur caps, fish glue, fish teeth, castoreum oil, amber, horse hides, honey, hazelnuts, falcons, swords, armour, maple wood, Saqalib slaves, sheep, cattle — all of this obtained from Bulgar [...] And themselves [i.e. the Khorezmians] produce grapes, lots of raisins, biscuits, sesame, striped clothes, carpets, blankets, wonderful brocade (for gifts), locks, colourful clothes, bows which can only be used by very strong people, special cheese and fish. There they also build and finish ships. (Al-Muqaddasi, *Ahsan al-taqāsīm*, 169–70)

It is worth noting that slaves and livestock were specifically mentioned as trade goods from the north, the Saqalib slaves apparently being Slavs or Finno-Ugrians (Jankowiak 2017; *pace* Ott 2014, 36). The horse hides in the list of trade goods point to the crucial importance of leather supplies in bulk for the armies of the civilizations east and south of the steppe belt, a factor which Nicola Di Cosmo (2014) has suggested to have been of key importance for the formation of the Silk Road in the first instance. While his observation relates to China of the Warring States, it must surely apply also to the reputable armies of early medieval Khwarazm which, after all, exported mercenaries. Finally, for the specific argument developed here, one might highlight that ships were counted among the notable products of Khwarazmian industry.

The direct link from Khwarazm to the north faced two formidable obstacles: the arid Ust-Urt Plateau west of the Aral Sea, and the huge double delta of Amu-Darya and Syr-Darya east of the Aral Sea. It has generally been assumed that north–south communications would take the western route, across Ust-Urt, and there are two powerful pieces of evidence for this: the testimony of Ibn Fadhlān and the archaeological evidence of caravan routes. On his journey from Baghdad to Bulgar in 921–922, Ibn Fadhlān travelled by camel caravan across the Ust-Urt Plateau, and the detailed description in his celebrated *Risala* provides a vivid picture of the hardships and deprivations he endured when passing through this life-threatening environment in winter (Ibn Fadhlān, *Risala*, 10–11). The archaeological evidence of caravanserais, watchtowers, and defended way stations demonstrates the existence of two ancient routes across Ust-Urt: one going north-west towards the shore of the Caspian Sea, via the sites of Kulanly and Kyzylkala; the other leading straight north, via

the caravanserais of Beleuli and Pul'zhaj to the fortified northern terminal at Zhezdy (Manylov 1979; Manylov and Yusupov 1982; Samashev and others 2007). While the archaeological evidence dates these sites mostly to the fourteenth century, there can be little doubt that they replaced earlier structures in the same locations, and in some cases this assumption is confirmed by earlier artefact finds.

Given Ibn Fadhlān's testimony and the geographical conditions, it is fair to say that the possible route east of the Aral Sea has not been given sufficient attention in published discussions of communications in this region (see Agadzhanov 1969). There are good reasons for this lack of interest: the absence of actual evidence and the environment. The river deltas of Amu-Darya and Syr-Darya, so extensive that they merged close to the Aral Sea, created a series of river channels which overland travellers would have to cross one after the other, in a laborious process described by Ibn Fadhlān for the crossing of rivers on the northern steppes (Ibn Fadhlān, *Risala*, 22–23). Swamps and marshes may have added to the problems although these obstacles can hardly have been bigger than those to be faced on the western side of the Aral Sea. The lack of archaeological evidence east of the sea may well be due to erosion and destruction which is to be expected in a delta with frequently changing river channels, as is demonstrated by the case of semi-destroyed Sor-tobe (see above). Loss of evidence might be one explanation why the 'marsh towns' seem to be isolated dots on the early medieval map of the region, without any evidence of support infrastructure linking them to Khwarazm.

Indirect evidence of the 'marsh towns' being involved in the north–south trade between Central Asia and eastern Europe is their chronological range: their occupation appears to have ended at the time when the influx of Central Asian dirhams into eastern and northern Europe ceased (Kovalev [n.d.]; 2017). In the case of Dzhankent, the chronological coincidence extends to its origins: its reconstruction as a Khwarazmian-style fortified town happened just when the 'silver flow' of Samanid dirhams to the north commenced, at the end of the ninth century or around AD 900 (Kilger 2008), and the town was abandoned not long after the time when that flow ceased, in the early eleventh century. It may also not be coincidental that the Oguz polity disintegrated at about this time; evidence of fire in the uppermost occupation layer of the 'marsh towns' (patchy at Dzhankent, extensive at Kesken-Kuyuk-kala) is a hint that this disintegration was accompanied by upheaval. A more tangible piece of evidence linking Dzhankent to the slave trade from the north to

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Central Asia is the town's northern annexe: completely devoid of structures or buildings, it has a thick occupation layer containing keratin-eating microfungi, which implies that animals or humans had been penned up here; at the same time, low levels of phosphorus in the occupation layer point, in the opinion of the soil scientists on the project, to humans rather than animals (Ivanova, Bronnikova, and Gol'eva 2014; M. Bronnikova, pers. comm.).

Comparing the available north–south transport routes, the desert route across Ust-Urt may have been a good choice for the transport of luxuries by camel caravans from the south to the north (exactly as described by Ibn Fadhlān). But it stands to reason that it would have been a less obvious choice for the movement of livestock and slaves from the north to the south (as recorded by Al-Muqaddasi, but without details of the exact route taken). The relative merits of regional travel by water versus overland across Ust-Urt are illustrated by an episode from the Russian Civil War in 1920. During the flight south of the Ural Cossacks under General Vladimir S. Tolstov (an uncle, incidentally, of the founder of the Khorezmian Expedition), a group of about a dozen men led by Colonel T. I. Sladkov detached themselves from the main van and captured a fishing boat on the Caspian Sea shore at Krasnovodsk. It took them a few days to get across the sea to the Persian shore safely and without a single loss of life. The main van meanwhile marched across Ust-Urt, taking two months to reach safety in Persia, and losing about forty lives (out of almost exactly two hundred) in the process — not by enemy action, but because of exhaustion and lack of potable water (Masyanov 1963, 141–54; Arzhantseva 2016, 100, 103–05).

In the light of the obstacles on the overland routes, the possibility of north–south transport across the Aral Sea should receive more attention. After all, Al-Muqaddasi considered the shipbuilding skills of Khwarazm worth mentioning (see above); and the 'marsh towns' close to the north-western shore of the Aral Sea would have offered transshipping ports for changes in the mode of transport (land – river – sea) while at the same time providing a link to the Northern Silk Road.<sup>3</sup> Seaborne communications might, therefore, be another explanation for the apparent lack of caravanserais and other infra-

structure east of the Aral Sea, between the 'marsh towns' and Khwarazm.

## Conclusions

Archaeological evidence, historical context, and geographical considerations lead to a new hypothesis for the development of the 'marsh towns' which rests mainly on the case of Dzhankent where the evidence is the most detailed. By the seventh century, the settlements on the sites of the future 'marsh towns' appear to have been founded by a displaced Dzhetysay population which had moved out of the abandoned irrigation areas further upstream in the delta. At some stage in the seventh/eighth centuries, Khwarazmian traders reacted to the increasing activity on the Northern Silk Road by establishing trading posts in these fortuitously located fishing villages. When the Oguz nomads arrived on the steppes to the north of the river around the end of the eighth century, they established control over the delta in due course. By the end of the ninth century, they were taking advantage of the location of these sites which now found themselves on the crossroads of the Northern Silk Road and the north–south route connecting Central Asia to the Viking-period trade network on the east European rivers. In the late ninth or tenth century, Khwarazmian architects under Oguz direction redesigned and rebuilt the native settlements into fortified towns where the Oguz elite could establish their residences and winter quarters; that is how Dzhankent, the most Khwarazmian in appearance, became known as the capital of a nomad ruler (the *yabgu*). Until the early eleventh century, these 'marsh towns' served as entrepôts and transshipping points where goods could be moved from one trade route to another, and between various modes of transport. In the eleventh century, the disintegration of the Oguz polity and the dissolution of the east European trading network led to the demise of the 'marsh towns'.

The key point of the reinterpretation of the 'marsh towns' attempted above is the suggestion that these were outlying trading posts, and that Dzhankent's role as 'capital' of a nomad state was secondary. While the location of the towns in relation to river and sea, and the regular appearance of their interior, which suggests planning, are reminiscent of western European emporia of the same period, their location in relation to their parent polity is not. The western emporia were founded on the edges of their respective polities while the 'marsh towns' were at a fair distance from Khwarazm, establishing a distant junction on major trade routes and on the interface of civiliza-

<sup>3</sup> In a typescript written in parallel to, and independent of, the present paper (which was drafted in early 2018), Jonathan Shepard (Oxford) has also picked up on the implications of the location of the 'marsh towns', and uses the apposite term 'nexus' for them as part of a wider argument concerning the Silk Roads networks (Shepard 2018). He also emphasizes the important intersections of north–south routes with the east–west Silk Roads.

tion and steppe. In that sense, they are similar to outlying ports of trade on, or beyond, cultural borders such as the Greek colony at Al Mina in the Levant (Luke 2003), the early Roman iron-trading site of Magdalensberg in the Austrian Alps (Piccottini, Vetter, and Dolenz 2003),<sup>4</sup> or the late medieval Genoese and Venetian trading sites on the coasts of the East Mediterranean and Black Sea (Lopez 1963; Di Cosmo 2005), possibly even the Hanse ports (Falk, Müller, and Schneider 2014).

If one were to fit Dzhankent into typologies of trading sites, it would represent a development from Richard Hodges's (1982) Type A 'gateway community' to a developed Type B 'emporium' with planned streets and dwellings, combined with the central-place functions of Type C. In the classification by Dagfinn Skre (2012) of early medieval trade and craft sites in southern Scandinavia, features of his type of 'nodal markets' (seasonal specialist craft production and trade sites) might be comparable to the early phase of Dzhankent while the type of 'towns' (planned permanent sites in border locations) has clear similarities to the fully urban phase of later Dzhankent. In Joanna Luke's (2003) typology of ports of trade, Dzhankent would probably be close to her Type C (a diaspora port at the edge of the host polity), but with elements of Type B (an autonomous port on a transition point of geography or mode of transport), which was later turned into a Type A port (on a cultural border, but controlled by the hinterland, here the Oguz polity).

Thus, the case of Dzhankent and the other 'marsh towns' is instructive because it demonstrates that typologies, be they neat or fuzzy, do not cover all aspects of the case (in respect of Luke's typology), or they describe developmental change rather than a single type of site persisting over time (with reference to Hodges's and Skre's typologies both of which also include cases of sites changing their type). The case of the 'marsh towns' also shows that such typologies cannot be easily taken out of their regional and historical contexts to be applied elsewhere, but typologies remain useful nevertheless because they draw attention to common questions and to cross-cultural similarities.

The main aspects for the reassessment of the 'marsh towns' have emerged from a consideration of topographies, geographies, and lines of communication, and this suggests that a formal network

analysis of Dzhankent and the other 'marsh towns' may have great potential, offering as they do evidence of links via material items (demonstrably), people (probably), and ideas (obviously). But such an approach would require additional data because so far only one site (Dzhankent) offers partly sufficient evidence, and mainly for one of its two phases; and realistically speaking, more and better data can in the foreseeable future only be obtained from Dzhankent. The preliminary exercise conducted here is therefore also useful in identifying which data are required in order to add to, or falsify, the above model.

First of all, more dating evidence is needed in order to verify and refine our ideas about the time depth of the 'marsh towns'. For the earlier phase of the seventh to ninth centuries, evidence of the settlement layout should help us to identify at which point in time urbanization set in. An effort needs to be made to find the river port of Dzhankent in order to date the beginnings of water transport at this site, and because it should provide insights into transport facilities, ship technology, and trade goods, much like the excavation of the port at Gnezdovo<sup>5</sup> has done for Viking-period river transport further north. Quantification of the links in a network model would require a quantification of the various pottery styles (Dzhety-asar, Khwarazmian, and Oguz) and coin types by stratigraphic levels. A close analysis of the Khwarazmian pottery might also be able to identify several regional or local origins because one possible explanation of the close clustering of these three contemporary sites in the Syr-Darya Delta would be the competing trade interests of rival towns, as happened in the case of classical Greek and medieval Italian colonies. Beyond quantification, work on this paper has highlighted the necessity to go back to the written sources of the period because these contain much directly relevant information, particularly for the tenth to eleventh centuries.

Some of these tasks are already scheduled for the current research project at Dzhankent, others will be added if time allows. With these new data, a proper network analysis should be more feasible and promises further insights into the role Dzhankent and its immediate neighbours played in the regional economic and communication network of the Early Middle Ages.

4 We are grateful to Michael Fulford (Reading, UK) for drawing our attention to this site, and to the possibly parallel case of pre-conquest Silchester (England).

5 Murasheva and Pushkina 2002; Murasheva and Malysheva 2017; <<http://www.gnezdovo.com>> [accessed 26 September 2020].

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# High-Definition Urban Narratives from Central Rome

## *Virtual Reconstructions of the Past and the New Caesar's Forum Excavations*

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### Disclosure Statement

Authors are listed alphabetically. The authors declare no conflicts of interest. The first phase of excavation took place between 14 December 2018 and 6 March 2019. Additional field documentation was conducted in April and May 2019. The excavation was coordinated by Massimo Vitti and supervised by Giovanni Murro, in collaboration with Cominio srl.

**ABSTRACT** Since 2017, excavations have taken place on Caesar's Forum in Rome. The area holds archaeological evidence covering three thousand years of Rome's prehistory and historical periods. The excavations offer wide-ranging research possibilities connected to the urban development of one of the classical world's pivotal city centres. However, the location's centrality also offers challenges when transforming the vast bulk and complex nature of the archaeological data into scientific publications, while also making the results accessible to the public. This article presents results from the first excavation phases within a best-practice Open Data strategy embedded into the project from its outset. The applied methods and techniques ensure that traditional, analogue scientific publications are supplemented with online access to the excavation's raw data, high-resolution illustrations, and 3-D reconstructions obtained through laser scans and photogrammetry.

**KEYWORDS** Rome; urbanism, virtual reconstructions; archaeology in modern cities; *longue-durée* perspective; high-definition narratives; cultural heritage preservation strategies.

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## Introduction

Rome constitutes one of the most famous and continuously studied urban centres in the world with human activity reaching back several millennia in time. Since 2017, a Danish-Italian team has been exploring the hitherto unexcavated parts of the area most renowned for having housed the extensive public building project by Gaius Julius Caesar initiated in 46 BC, namely his public forum (Fig. 5.1).<sup>6</sup> The space occupied by Caesar's Forum counts as one of the most central urban excavations in the entire classical world due to its location in the heart of Rome in a period, when the city was the absolute leading power in the Mediterranean and stayed so for several centuries to come (Claridge 2010; Coarelli 2014; Erdkamp 2013). The construction of Caesar's Forum was pivotal in changing the way in which central Rome developed in the later imperial period, and it shaped and framed political, social, and religious ideas for centuries (Raja and Rüpke 2021). However, despite the fact that the location has received most attention for being home to the first forum dedicated by one prominent individual, the area holds other extremely significant evidence of Rome's urban development, when viewed in a *longue-durée* perspective (Jacobsen and Raja 2018; Jacobsen and others 2020; Jacobsen and others forthcoming). Aside from its importance in the late republican and imperial periods, the location is also central to our understanding of Rome's early developments from the Recent Bronze Age onwards and for the city's development throughout Late Antiquity until the time of Mussolini, when the Via dell'Impero was laid out. The Caesar's Forum area holds archaeological evidence, which covers the entire chronological span of Rome's formation and growth, more than three thousand years from its prehistoric past until modern times (Amici 1991; Castagnoli, Morselli, and Tortorici 1982; De Santis and others 2010; Delfino 2010a; 2010b; 2013; 2014; La Rocca 2001; Meneghini 2009; 2017; Meneghini and Santangeli Valenzani 2004; 2007; Molinari and Spagnoli 1990; Morselli and Tortorici 1989; Ricci 1932; Santangeli Valenzani 2001; Vitti 2005; 2006; Maisto and Vitti 2009). Today, the space is literally situated a stone's throw from the Altare della Patria (the Victor Emmanuel II National Monument), while the Colosseum and Maxentius's Basilica are located not far away. The location is without comparison certainly one of the most visited areas in the modern urban landscape of Rome today, a fact that brings with

it several challenges when planning and conducting archaeological research (Jacobsen and others 2020).

While providing the Danish-Italian Caesar's Forum Project with the exceptional possibility to excavate and examine all phases of Rome's history, the area's complex stratigraphy that includes remains accumulated continuously over millennia further underlines the pertinent archaeological challenge in excavations due to necessity to demolish the remains of cultural phases in order to proceed to the subjacent — a dilemma that is especially present in urban archaeology with its compact layering. Therefore, this article focuses on the high-definition documentation strategy implemented in the project. Focus is here particularly given to the laser scanning and photogrammetric methods implemented and the envisaged development of virtual and augmented reality of the Caesar's Forum site through time, which will make the various cultural phases accessible for the general public in their excavated state as well as in their reconstructed states. The concept of creating a 'digital twin' of the excavated remains and their suggested reconstructions — i.e. a digital model with implicit storage of the excavation data, updatable as the excavation progresses — will prove useful both in relation to the project's research aims and the processing of data and, in the long run, in relation to the dissemination of the excavation results to the general public.

## Tracing Urban History across Millennia: The Case of the Caesar's Forum Area

Often city centres in Mediterranean urban sites offer immense potential for examining the dynamics of urbanization processes in areas which often have been continuously inhabited through thousands of years (Woolf 2020). Archaeological stratigraphies hold archives of unleashed information deposited in place with the activities of ancient life, and they offer information on the continuing reshaping of spaces, which often were complex processes. These processes need to be disentangled carefully through the application of high-definition methods.<sup>7</sup> Accordingly, the primary archaeological data is extracted on multiple levels calling for an equally multilayered high-definition approach to the fine-meshed empirical evidence and accumulated data collected during fieldwork. The aim of the new excavations on Caesar's Forum is to significantly increase the understanding

<sup>6</sup> See project webpage <<https://cas.au.dk/en/cfp/>> [accessed 27 October 2020].

<sup>7</sup> For such approaches taken recently, see Barford and others 2020; Bes and others 2020; Croix and others 2019; Lichtenberger and Raja 2020; Lichtenberger and others 2019; Raja and Sindbæk 2020.

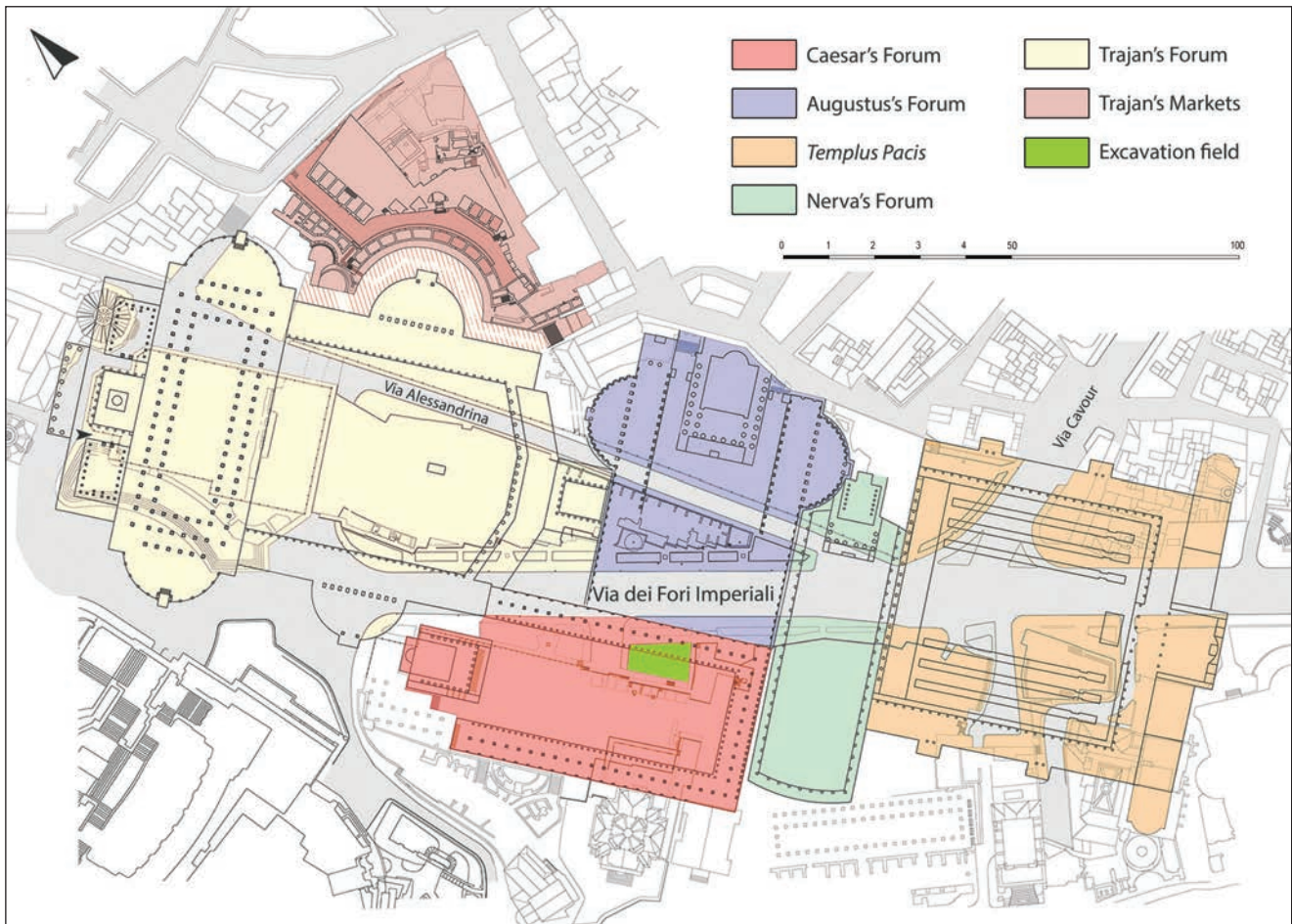


Figure 5.1. The location of the current excavation field in relation to modern and ancient structures. Illustration by the Caesar's Forum Project.

of the urban development processes in Rome across three millennia through implementing a targeted analysis programme throughout the excavations and re-evaluate the results of earlier excavations in the area in close collaboration with the earlier excavators (Jacobsen and Raja 2018; Jacobsen and others forthcoming; Jacobsen and others 2020; *Foro di Cesare* I–II). The excavations will work their way through more than seven metres of compact cultural layers, documenting all phases in detail. Even though the project is currently occupied with the modern phases at the site, this cross-section of the entire urban history is obtainable as excavation activities have taken place in the area of Caesar's Forum through more than a century. Stratigraphies of the various periods have been documented, although these remain published in chronologically focused reports and articles, until now not integrated into a *longue-durée* narrative.<sup>8</sup>

<sup>8</sup> For a historiographic review of the excavation activities at the site, see Sauer 2021.

The northern half of Caesar's Forum with its temple dedicated to Venus Genetrix was first brought to light during excavations in 1931–1932 (Ricci 1932). These excavations were conducted in connection with Mussolini's construction of Via dell'Impero, the triumphal road that runs in a straight line from Piazza Venezia to the Colosseum, today known as Via dei Fori Imperiali.<sup>9</sup> Before this grand urban building project was initiated, the area of the Imperial Fora was concealed by a prominent residential area, the Alessandrino Quarter, which comprised one of the most densely inhabited neighbourhoods in the historical centre of Rome (Jacobsen and others 2020, 38). The Alessandrino Quarter was established during the second half of the sixteenth century in order to accommodate Rome's rapidly growing population. At that point in time, the area was part of a swamp — colloquially known as *i Pantani* — which had developed since the eleventh century AD, when the

<sup>9</sup> On fascism's use of the Roman past, see e.g. Arthurs 2012; Baxa 2010; Nelis 2007; Visser 1992.



Figure 5.2. *Descriptio*, 1577. The figure shows a section of Étienne Dupérac's map of Rome, showing the earliest phases of the Alessandrino Quarter in the area of the Imperial Fora. Source: Associazione Culturale info.roma.it.

medieval occupation of the site had been abandoned due to the increasing presence of water in the area (Meneghini 2017). The residential area was named after Cardinal Alessandrino, Carlo Michele Bonelli (1541–1598), who had been one of the promoters of the area's urbanization together with the Della Valle family. The earliest phase of the neighbourhood is seen depicted on Étienne Dupérac's map of Rome from 1577 (Fig. 5.2), which reveals a profoundly different urban space than that of today's historical centre. On Dupérac's map, the approximate location of Caesar's Forum area is somewhere in between the Arch of Septimius Severus and Trajan's Column, within the halfway stretch closest to the first-mentioned. While the Alessandrino Quarter continuously underwent rebuilding and renovations, reaching its maximum expansion in the mid-1700s as visible on

Giovanni Battista Nolli's map from 1748 (Fig. 5.3) (Meneghini 2009, 240), the neighbourhood was inhabited until the 1920s, when its about four thousand residents were evicted and, for the most part, transferred to the newly established neighbourhoods of Gordiani, Pietralata, Prenestino, S. Sasilio, and Tiburtino (Cederna 1979, 192). The first phase of the new Danish-Italian excavations, conducted in 2018–2019, uncovered the remains of the 1900s apartment buildings from the Alessandrino Quarter and the subjacent cellar and sewer structures, of which the oldest elements date back to the very birth of the Alessandrino Quarter in the second half of the sixteenth century (Jacobsen and others 2020, 46; Jacobsen and others forthcoming). Accordingly, the Alessandrino Quarter comprised a central urban space in the historical centre of Rome

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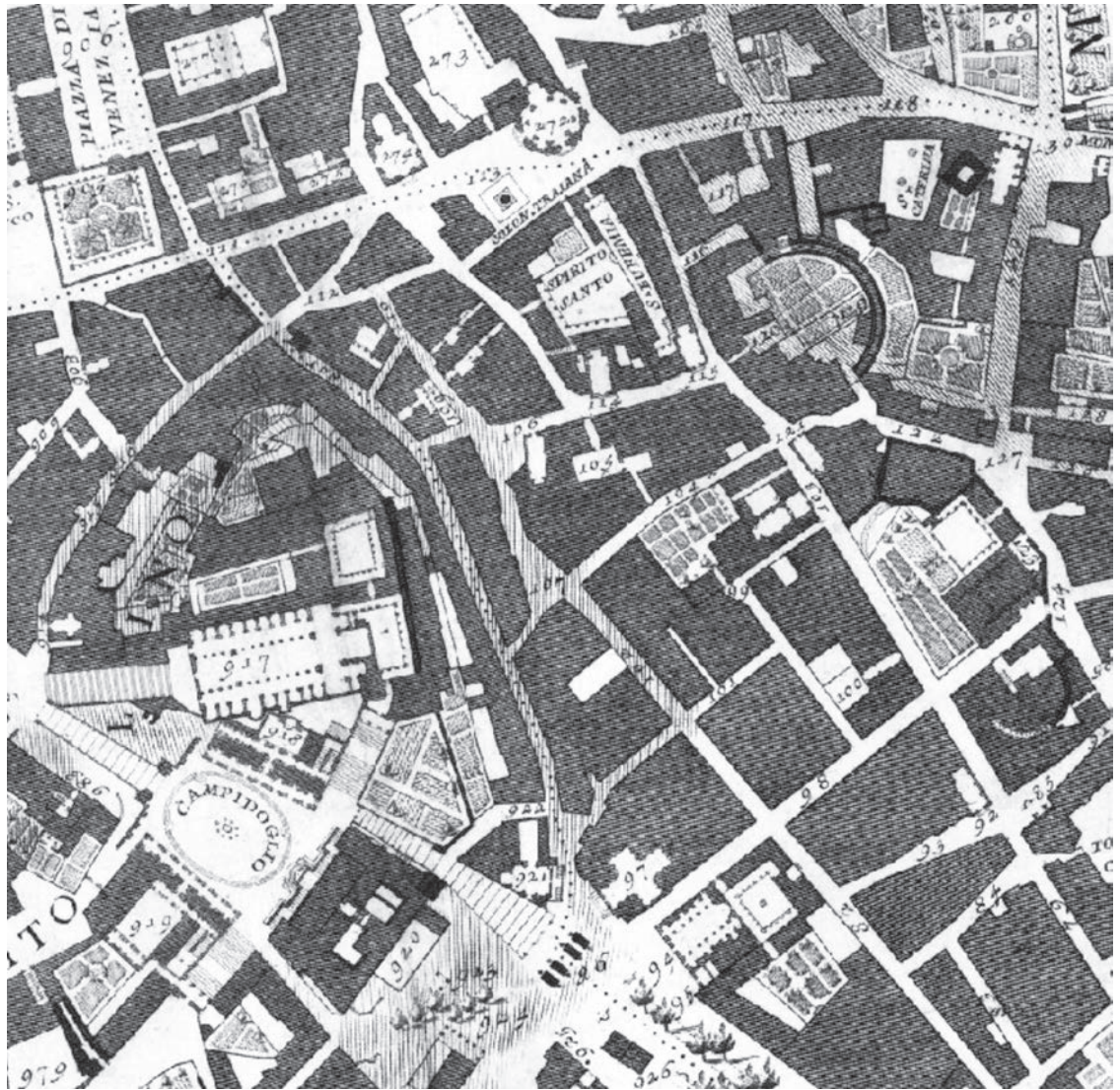


Figure 5.3. *La pianta grande di Roma*, New Haven, the Arthur Ross Collection, 1748. The figure shows a section of Giovanni Battista Nolli's map of Rome (1748) in the area of Caesar's Forum. The church marked with '97' in the middle of the figure is the Chiesa dei Santi Luca e Martina, situated in the southwestern end of Caesar's Forum. Reproduced with permission of WEBGIS Descriptio Romae.

for more than three hundred years. Yet, it is today completely erased, and it has never before constituted a focal point in the various excavations conducted in the Imperial Fora area, although some excavations of the neighbourhood have been undertaken by the Sovrintendenza Capitolina ai Beni Culturali in Trajan's Forum, Augustus's Forum, and Nerva's Forum in connection with the exploration of the Via Alessandrina, one of the residential area's main roads (Bernacchio 2017; Meneghini 2000; 2016–2017, 460–62; Meneghini and Santangeli Valenzani 2010, 141–230; Molinari and Spagnoli 1990; Pocino 2008).

The cellar and sewer structures of the Alessandrino Quarter unearthed in the new excavations presumably rest upon the remains of medieval houses, the so-called *domus terrinee*, dating between the ninth and eleventh centuries (Meneghini 2017). Previous excavations at the Caesar's Forum site (1998–2008) have demonstrated the medieval phases at the site to

be characterized by the presence of orchards, vineyards, and vegetable gardens (Fig. 5.4a–b), together with the *domus terrinee* (Fig. 5.5). These one-storey houses each consisted of one single room, which often incorporated reused Roman-period architectural elements from the area, such as fragments of columns and blocks of marble, but also a range of other ancient materials such as terracotta tiles and amphora fragments. The Roman-period material is, however, reused merely as building materials inserted into the wall constructions in an unstructured manner, quite different from the processes observed in organized spoliation of Roman elements, as encountered in e.g. late antique and medieval church constructions (Meneghini and Santangeli Valenzani 2004, 45–51, 178–79; Fabricius Hansen 2015).

Below the medieval phases, the excavations will continue through the late antique, imperial, and late republican phases of the site. Originally, Caesar's



Figure 5.4a. Reconstruction drawing of the medieval orchards and vegetable gardens in the Caesar's Forum area. Source: Sovrintendenza Capitolina ai Beni Culturali/The Caesar's Forum Project.

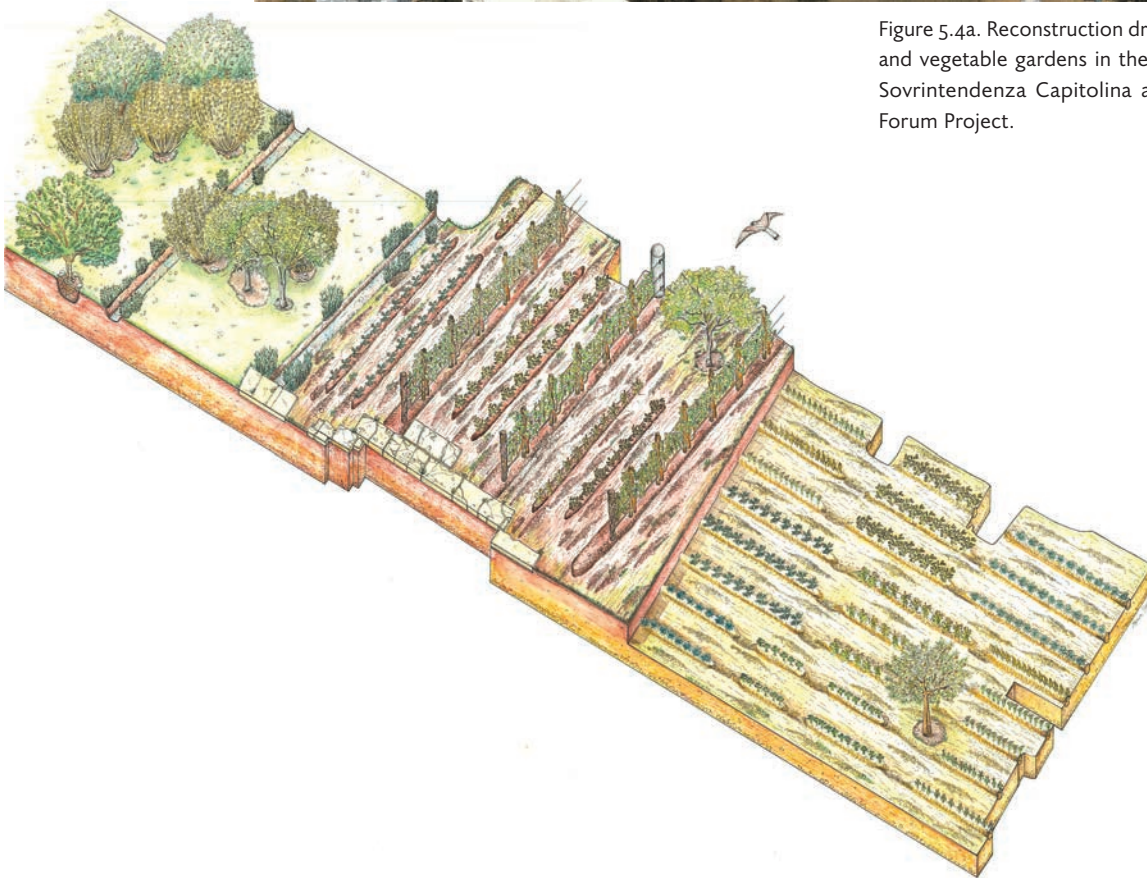


Figure 5.4b. Graphical reconstruction of the medieval orchards and vegetable gardens in the Caesar's Forum area based on the 1998–2000 excavations. Source: Sovrintendenza Capitolina ai Beni Culturali/The Caesar's Forum Project.



Figure 5.5. The remains of the *domus terrineae* on Caesar's Forum. Photo by the Caesar's Forum Project/Giovanni Murro.

Forum was laid out in an area where republican elite houses had been standing, as we know from written sources, which convey to us that the Roman writer and politician Marcus Tullius Cicero and Gaius Oppius had bought the land from private owners at a high cost (Cic., *Att.*, IV.17; Suet., *Iul.*, 26; Raja and Rüpke 2021). The building project was one of extreme prestige. The first of its kind in central Rome right next to the Roman Forum, the public space of the Roman people. In addition, archaeological remains in the form of a pit with domestic pottery and tiles dating to the middle and late republican periods further lend support to the literary sources (Bertoldi and Ceci 2013, 45–47). Today, two-thirds of Caesar's Forum has been uncovered, of which the major parts were excavated in the 1930–1932 excavations and further areas in the 1998–2008 excavations, which were conducted in relation with the Great Jubilee as part of a joint project between the Ministry of Cultural Heritage, the Sovrintendenza Speciale per i Beni Archeologici di Roma, and the Sovrintendenza ai Beni Culturali del Comune di Roma. Between 1998 and 2000, the excavations unearthed an area of 3500 m<sup>2</sup> in the southern half of Caesar's Forum (La Rocca 2001; Meneghini 2009). While Cicero and Oppius had bought the land in 56 BC, the construction of Caesar's Forum began in 54 BC with a grand-scale levelling of the area, which was otherwise sloping up towards the Capitoline Hill. By evening out a difference in height of three to four metres over fifty metres in the northern end of the area, a level forum square was created (Fig. 5.6). The Caesar's Forum complex with the temple to Venus Genetrix, the mythical ancestress of gens Julia (see

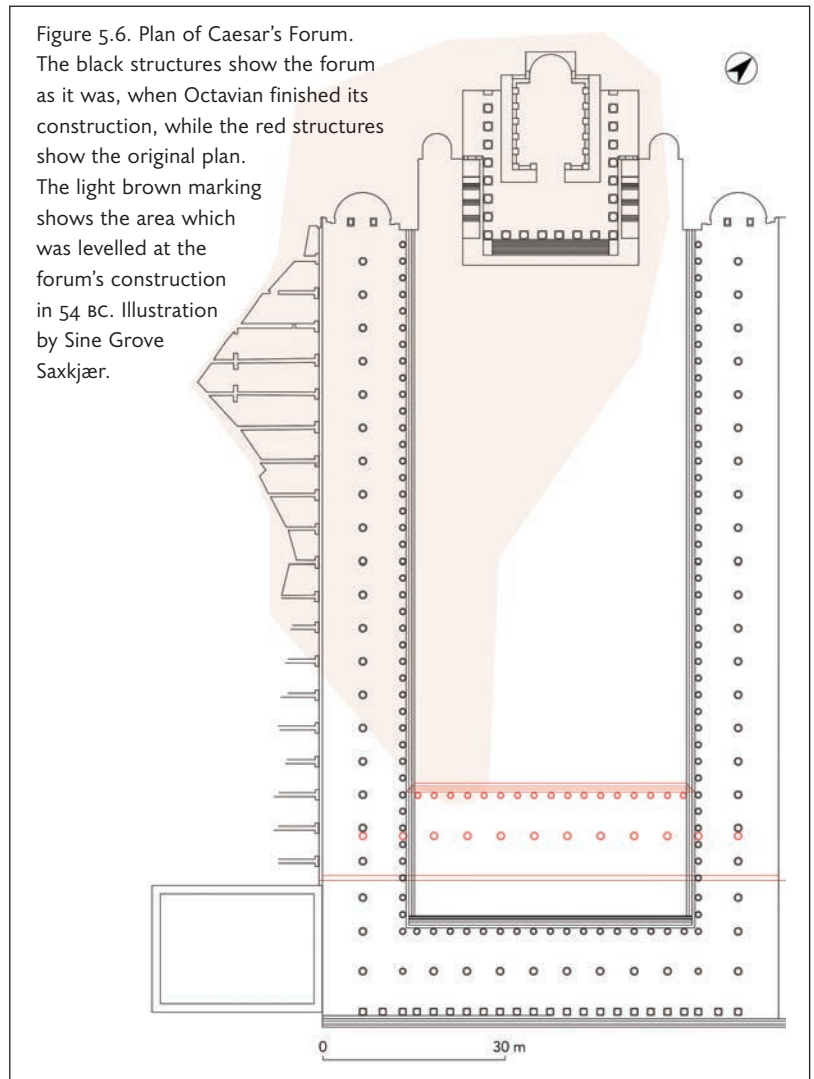


Figure 5.6. Plan of Caesar's Forum. The black structures show the forum as it was, when Octavian finished its construction, while the red structures show the original plan. The light brown marking shows the area which was levelled at the forum's construction in 54 BC. Illustration by Sine Grove Saxkjær.



Figure 5.7. One of the prehistoric burials, T.8, dating to the Latial phase IIA1 (c. eleventh to tenth centuries BC). Source: De Santis and others 2010, 267, fig. 11.

e.g. Farney 2013; Saxkjær 2021; Smith 2010; Weinstock 1971) in one end of the rectangular square (approx. 115 × 30 m), which was otherwise surrounded by colonnades on the remaining three sides, became a benchmark for the displays of imperial power encountered in the Imperial Fora in the centuries to follow, such as seen in Augustus's Forum, Nerva's Forum, and Trajan's Forum as well as in the *Templum Pacis* complex by Vespasian (Jacobsen and Raja 2018). However, Caesar did not live to see his forum finished. Although Caesar inaugurated the temple in 46 BC, the forum complex was not completed until after his death in 44 BC. Its construction was finalized by Octavian (later to become the first Roman emperor with the name Augustus), Caesar's adoptive son, who also enlarged the square's original layout towards the south (Delfino 2010a, 335).

Underneath the levels of Caesar's Forum, the excavations are expected to uncover the pre-republican

settlement contexts on the site in addition to potential scattered remains of the republican residential contexts. In the 2005–2008 excavation campaigns, archaic settlement remains were uncovered in the form of two stone-built structures and several wells together with tiles and domestic pottery (Delfino 2014, 64–135; 2010b; Sauer forthcoming). The oldest archaic phase dates back to the beginning of the sixth century BC, while the structures were rebuilt several times in the following centuries until the late republican phase, predating the construction of Caesar's Forum (Delfino 2014, 124).

The earliest traces of human activities in the Caesar's Forum area consists of sporadic finds of pottery together with post holes and a series of wheel-tracks, datable between the thirteenth and eleventh centuries BC (De Santis and others 2010, 261–62; Meneghini 2009, 12). The Bronze Age wheel-tracks predate a prehistoric burial ground, which was established in the area in the eleventh century BC. A total of twelve tombs have been excavated in the Caesar's Forum area. Ten tombs have been dated to the eleventh and tenth centuries BC: six cremation tombs, of which five have been ascribed to adult males and one to a child, together with four inhumations tombs, of which two are identified as female (De Santis and others 2010, 263) (Fig. 5.7). These tombs are believed to have been part of a larger necropolis area situated in the valley between the Capitoline and Quirinal Hills, as indicated by additional finds of contemporary burials at the Augustus's Forum site (Meneghini 2009, 12). The remaining two tombs date to the mid-eighth and last half of the eighth century BC (De Santis and others 2010, 278). Both are infant burials equipped with rich sets of funerary goods, situated inside a hut structure, i.e. examples of the well-known Latial practice of *suggrundaria* (Fulminante 2018, 198–99). This hut structure had been erected on top of the aforementioned burial ground, indicating that it had gone out of use, and the area transformed into a residential area sometime during the late ninth or early eighth century BC (Meneghini 2009, 19).

Due to the location in the south-eastern part of Caesar's Forum, which was left untouched by the large-scale levelling of the area (cf. Fig. 5.6) in connection with its construction, the excavations of the Caesar's Forum Project are likely to encounter all of the cultural phases described above, and the project therefore constitutes a unique opportunity to reassess Rome's urban and pre-urban history from its earliest phases until today in a *longue-durée* perspective. What is more, through the carefully targeted analysis of specific phases of the stratigraphy, the project aims at refining its various phases as well as estab-

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lishing the changing urban networks that influenced and formed the city's formation and development.

### Challenges and Possibilities in Urban Archaeology: High-Definition Documentation Strategies and their Implications

A pivotal aim of the excavations is to document all of the site's phases in the most comprehensive shape possible in order to convey as much data about the various phases as possible to researchers and the general public. Contemporary with the excavations a subproject has been launched in which a comprehensive 3-D scan of Caesar's Forum is being undertaken. Furthermore, a topographical map is being created, which is aligned with the mapping of the rest of the imperial fora region. The 3-D scans are produced through the use of drones. The two 3-D models are being produced in CAD in 1:50: one shows the present-day street level and the other the original late republican-period forum level. Already existing digital and analogue excavation data and topographical data from the Archivio dell'Ufficio dei Fori Imperiali is also being incorporated into these models.

The Caesar's Forum excavation will work its way through the aforementioned seven metres of compact cultural layers including more than three thousand years of urban history, eradicating the various phases as the excavation proceeds, but with today's state-of-the-art technological documentation methods, the project's documentation strategy aims at securing all data from each cultural phase, enabling the possibility of continuously revisiting and reworking it (Roosevelt and others 2015). In addition, the raw data of the project will be made available in online repositories. In this way, interested researchers can not only find and access the raw data, but also reuse it in their own research, since it will be made available in interoperable ways, e.g. in downloadable forms of various kinds depending on the datasets.<sup>10</sup>

Within the Caesar's Forum Project, laser scanning and photogrammetry constitute core elements in the overall documentation strategy in order to create an as detailed and reproducible documentation record as possible. Both methods are easily integrated in the creation of models and in the archaeological documentation, and the combination of the two techniques allows for the creation of a precise diachronic and typological mapping of the

structures that will be demolished during the excavations. What is more, their precision and rapid data collection makes the methods an obvious choice, not least for urban archaeology where the surrounding environment with its required safety measures — the Caesar's Forum excavations being situated in one of Rome's most visited areas — demands a high pace for the excavation activities. In general, the techniques for visually documenting archaeological excavations have rapidly evolved over the last twenty years. Today, such documentation methods have often de facto replaced the traditional documentation and survey systems, which gradually developed and improved from the sixteenth century onwards. This change has resulted in a general fusion between what was traditionally the work of land surveyors on the one hand and archaeologists on the other hand, as technological advances have made the required knowhow more readily accessible. While the new methods come with a noted change of pace in documentation techniques, which has given way to hitherto unprecedented perspectives that lead to an enrichment from a purely technical-archaeological point of view as well as with respect to the future dissemination possibilities of the same to the general public, they also present a risk of a decrease in deep knowledge and specialized skills (Giuliani 2008, 9–12). The new indirect survey technologies can potentially cause an abstraction from the context and the cognitive processing of the same, as it is now in fact possible to create a complete laser-scanned survey of a given site almost without touching the archaeological remains. Still, with careful application of these methods and the specialists involved, the benefits outweigh the potential pitfalls.

Accordingly, the first step in documenting contexts of structures excavated within the Caesar's Forum Project involves the use of the laser scanner and close-range and aerial photogrammetry,<sup>11</sup> methods that are increasingly common in archaeological excavations. Starting with the first of the mentioned instruments, its main purpose concerns purely technical documentation. The scan performed by the instrument produces a three-dimensional point cloud containing millions of points reproducing the artefact. Each measured point contains three-dimensional (x, y, z) and colorimetric (RGB) spatial information. The laser scanner has multiple advantages. First of all, it allows for a complete three-dimensional acquisition of precise geometric and dimensional data. Another important operational aspect is the speed in data acqui-

10 For the project's Open Data strategy and adherence to the FAIR principles (Wilkinson and others 2016), see Jacobsen and others 2020, 36–38.

11 On general characteristics and critical aspects of these techniques, see Gonizzi Barsanti, Remondino, and Visintini 2013.

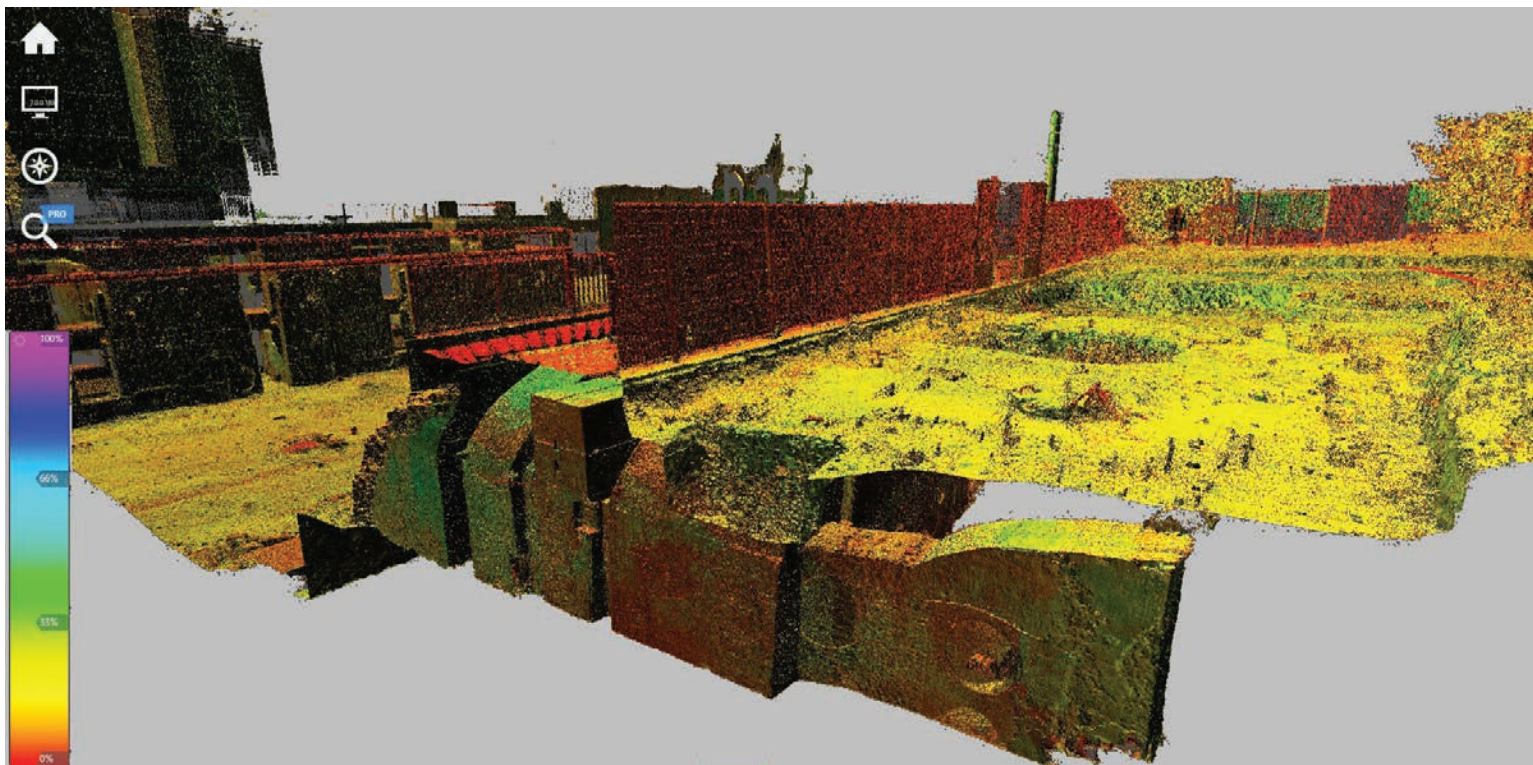
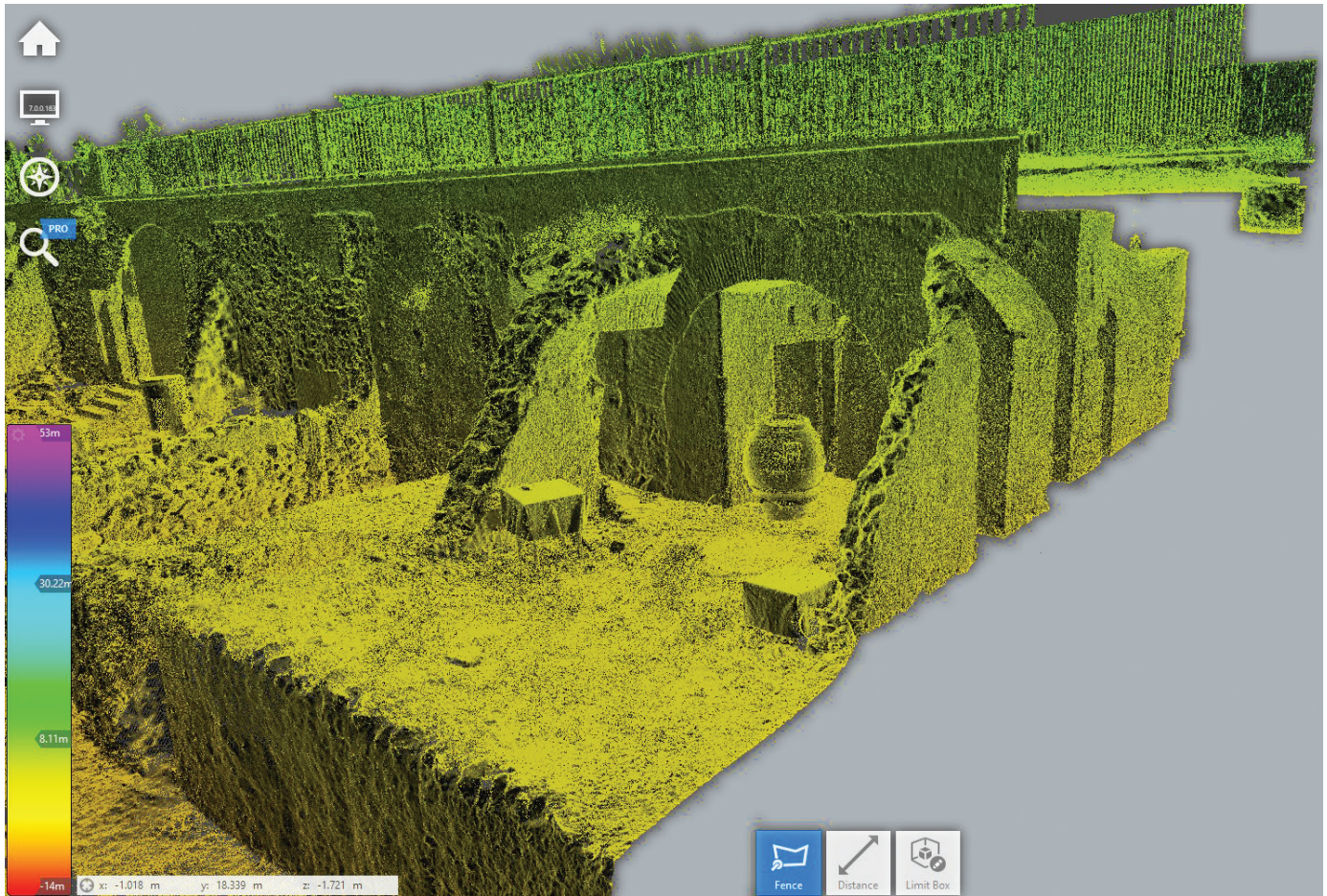


Figure 5.8. Laser-scan models of the excavation area. Models by the Caesar's Forum Project/Giovanni Murro.

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Figure 5.9. Photogrammetric model of the Alessandrino cellar structures below the excavation field. Model by the Caesar's Forum Project/Giovanni Murro.



sition (also performing the pre-alignment of scans in the field through the use of specific software such as the one found on all Leica Cyclone FIELD) and the possibility of performing scans even completely in the dark, as was the case in connection with the cellars below the Alessandrino Quarter and thus the initial excavation area of Caesar's Forum (close to the no longer existing Via Cremona), where very positive tests were carried out this way. In the case of a construction in several levels, such as the one under consideration with a first floor and cellar structures, the laser survey also constitutes a fundamental tool in the pre-excavation preparation phase. The point cloud produced can be imported into the most common CAD and BIM software to perform a series of complex operations in a short time, such as volumetric calculations, extrapolation of plans, sections, and elevations (Fig. 5.8). This has proven essential in the planning of the demolition of the Alessandrino cellars and sewers, which are required for the excavations to reach subjacent phases.

The photogrammetric approach constitutes another core element in the project's documentation strategy. This technique allows the acquisition of metric data from an object starting from a series

of photographs. Using software (the best known is Metashape by Agisoft) the frames are first aligned, for which the spatial positions are recognized. If the used camera is not equipped with GPS, the preliminary orientation in the defined common reference system will be required. The photogrammetry, although being slower than the laser scanner in the data acquisition phase and having a lower precision (Barsanti and others 2014, 141–58), has some important strengths: it is in fact much cheaper, with the possibility of obtaining data even using non-professional photographic equipment; the process of learning the basic technique is faster and does not necessarily include previous notions in the field of three-dimensional modelling; it produces textures of much higher quality than those of a laser scanner, ultimately proving to be a more flexible method also in the process of processing the data and the final products obtainable. This was also the case with the test that was carried out in the cellars below the excavation area (Fig. 5.9). The survey, obtained by artificially lighting all the detected environments, showed coverage and geometric precision inferior to the laser



Figure 5.10. The Domus Romane below Palazzo Valentini with its plexiglass floorings and use of light installations to create reconstructions of the Roman domus. Source: Amministrazione della Città Metropolitana di Roma Capitale.

scanner, but with an extremely well-defined surface texturing. The potential, which marks the transition from a ‘flat’ to a volumetric documentation, also concerns didactic aspects with the possibility of precisely recreating, revisiting, and questioning urban contexts destined irremediably to disappear within a few years. As for the laser scanner, the three-dimensional products obtained through photogrammetry can serve as a basis for creating virtual-reality models and experiences,<sup>12</sup> importing the *meshes* obtained in cross-platform graphics engines such as Unity and Unreal Engine.<sup>13</sup>

12 One of the first discussions on the subject is found in Ch’ng, Stone, and Arvanitis 2005, while Pescarin 2014 presents a more recent analysis.

13 On the creation of virtual environments, see also Dhanda and others 2019.

### Visualizing the Past in Modern Urban Contexts: Virtual Reconstructions of Urban Spaces for Research and the General Public

The above-mentioned technological methodologies are not only of pivotal importance in relation to research. Within the field of disseminating knowledge to the general public, advanced technologies such as multimedia technologies, virtual reality (VR) and augmented reality (AR) have become key tools through which to communicate archaeological sites. This goes hand in hand with tourism promotion, as the technologies make the archaeological remains comprehensible in their reconstructed shape which enhance the visitor’s experience profoundly (Iacovino, Tommaso De Paolis, and Ndou 2020, 4; Ferdani and others 2019). It furthermore broadens the possibilities of making otherwise complex archaeological remains interesting for the general public and not only for experts: even ancient structures with only a few elements preserved for posterity can now with

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Figure 5.11. The reconstructed Golden Vault Room in Domus Aurea, accessible through virtual reality.  
Source: Parco archeologico del Colosseo.

multimedia technologies, virtual or augmented reality be disentangled for a wide audience.

In Rome, the archaeological authorities have been frontrunners in applying such new advanced technologies. An early example on the use of multimedia technologies in an on-site musealization is *Le Domus Romane di Palazzo Valentini*, situated immediately adjacent to Trajan's Forum. Following a profound renovation of the sixteenth-century Palazzo Valentini, archaeological excavations in 2005–2009 uncovered a series of building phases dating between the first and fifth centuries AD beneath the palazzo, most importantly two rich domus of mid- and late imperial age, refurbished between the end of the third and mid-fourth centuries AD, together with a thermal complex. The exhibition was inaugurated in 2010, allowing for its audience to view the archaeological remains through about 200 m<sup>2</sup> of plexiglass floorings, offering virtual reconstructions and explanations of the remains with the use of lighting effects (Baldassarri 2017; Del Signore 2016; Napoli and Baldassari 2015) (Fig. 5.10). However, during the last decade the technology has rapidly advanced. With virtual reality it is now possible to create a simulated environment, while augmented reality makes it possible to integrate virtual objects into real environments in real time, which makes these technolo-

gies a perfect match for archaeological sites. One of the pioneering projects in Rome integrating these technologies was *L'Ara com'era: Un racconto in realtà aumentata e virtuale* at Museo dell'Ara Pacis, running from 2016 to 2019. The project combined 3-D reconstructions and computer graphics, which made it possible to visit the ancient Campus Martius in a 360° environment and see a Roman sacrifice in virtual reality, while the VR headsets worn by visitors in the museum further made it possible to admire Ara Pacis in all its original colours (<[www.arapacis.it](http://www.arapacis.it)> [accessed 4 November 2020]). Since 2017, it has been possible to visit the archaeological restoration site of Domus Aurea, where the innovative use of multimedia together with the implementation of both virtual and augmented reality makes it possible for visitors to experience the virtual reconstruction of Emperor Nero's golden palace. Especially the high-definition installation in augmented reality in the so-called Golden Vault Room creates a time-travel experience back to the palace's rediscovery in the Renaissance and back to its original splendour (Borghini, Scoccianti, and D'Alessio 2019) (Fig. 5.11). The Terme di Caracalla inaugurated their augmented-reality project the same year as Domus Aurea, making it the first archaeological site in Rome to be visitable in its entirety in a 3-D reconstruction with

the use of portable VR headsets (Cochetti and others 2018). Lastly, it is worth mentioning the Circus Maximus, where a similar use of the VR and AR technologies enables the site to be seen through all its historic phases, the project being launched in 2019 (Buonfiglio and others 2018).

The above examples demonstrate the gradual development of multimedia techniques as well as the increasing competencies to incorporate them as part of the musealization of archaeological sites during the last decade. What is more, the examples further demonstrate the aim to make a virtual reconstruction of the Roman phases available for the general public to be a reoccurring element across these museological projects. In general, the Roman — and not least the imperial — phase of Rome's urban history often constitutes the pivotal focus in excavations as well as in the musealization of archaeological sites. As described in the above, the Caesar's Forum Project aims at examining and broadening our current understanding of all phases within the city's urban development from its earliest Bronze Age phases until the historical remains from the beginning of last century. This goes for the excavation and research strategy of the project as well as for the later dissemination of these to the general public. Accordingly, for the first time in the historical centre of Rome, augmented and virtual reality will be developed for the Caesar's Forum area so that it will be possible to visit all cultural phases — preserved as well as demolished — of the site as well as their reconstructions. This duality will give the audience insights into both the different excavation phases as well as the reconstructions for which they formed the basis. It will create the possibility of a three thousand-years' time travel as well as a unique account of the levels and phases in a modern urban excavation.

A preliminary documentation will be carried out in relation to the areas subjected to demolition and excavation, which aims at creating a virtual tour, through a procedure divided into several phases, starting with the acquisition of data through spherical photos taken with a 360° camera and ending with the creation of a code file to be uploaded to the web. In this case, the dissemination possibilities are immediate and within the reach of a global audience, without limitations on computer literacy. The digital detection technology is ultimately functional to the data storage of urban monumental contexts destined to disappear, while at the same time it can be converted into an instrument for the enhancement and use of architectural heritage through the use of 3-D printing. The latter technology has found development in cultural heritage especially in the

museum field (Francescangeli and Monno 2010; Revello Lami 2017), but it can also find an interesting application in the reproduction of monuments and buildings. What is more, the creation of such a virtual archaeological path — a 'digital twin' — which exists parallel to the actual excavations, will overall increase the level of accessible information, just as it can overcome geographical barriers as it can be accessed from anywhere in the world — this not only being in terms of the general public, but also in relation to ongoing research activities. As shared virtual archaeology, such documentation must foremost act as 'un sistema di comunicazione e di validazione delle fasi di ricerca bottom-up e top-down, una silloge di dati e prove dinamici altrimenti non desumibili se non con logiche di feedback' ('a system of communication and validation of research phases bottom-up and top-down, a collection of data and dynamic tests otherwise not deducible except with feedback logic') (Forte 2007, 9). Due to this methodological premise, the chosen techniques range from 'simple' methods, such as 360° virtual spherical photos of the excavation's various phases, to the creation of more structured environments, measurable and fully navigable three-dimensional models, which furthermore can be explored and printed in scale. In the previous twenty years, there has been both a quantitative and qualitative increase in projects related to the digitization of cultural heritage, each with their own specific focus on aspects, such as the architectural aspects within the Rome Reborn Project (see Frischer and others 2006, 163–82) or the cartographic-urbanistic aspects within the Descriptio Romae Project (<[www.storiadellacitta.it/2017/11/04/webgis-descriptio-romae](http://www.storiadellacitta.it/2017/11/04/webgis-descriptio-romae)> [accessed 4 November 2020]). While following the path of these previous projects, the Caesar's Forum Project seeks to add new and improved elements, especially in relation to the continuous dissemination of results related to the different cultural phases of the ongoing excavations of the Caesar's Forum Project. Thus, the excavation is divided into two separate entities: the physical one and the immaterial digital twin. The latter will be configured as a container of interrelated contextual elements, consisting of images and interactive information. Compared to its physical counterpart, the digital twin has the possibility of becoming not only a container of information elements located beyond the excavation context, but it can also provide a direct link to its user. As emphasized elsewhere (Ceraudo and Murro 2016, 71), this correlation cannot be separated from one central prerogative: the intelligibility of the ancient remains. A common mistake is in fact to believe that an archaeological context can easily be understood by

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Figure 5.12. Already at its present stage, the excavation has yielded residual findings from the Roman period, such as a Roman brick, datable to the tetrarchic period, and a fragment of a marble architrave frieze from the Augustan age that were among the residual finds from US 1001. Photo by Giovanni Murro/the Caesar's Forum Project.

everyone through the use of technical terminology or technical plans and images that in fact require a certain level of prior knowledge in order to be understood. The described digital tools are aimed not only at describing or conveying the emerging data (i.e. the archaeological finds and remains), but also at communicating, strictly scientific, reconstruction hypotheses at different levels, both chronological and purely dimensional from an urban scale — e.g. building complexes — to those of smaller dimensions — e.g. a specific architectural fragment, sculpture piece, etc. Compared to previous projects, the project aims to improve the relationship between context and user by reducing the 'gap' between a peer and public audience that too often has characterized the panorama of cultural-heritage enhancement.<sup>14</sup> This further entails that in addition to the above-mentioned public dissemination purposes, an additional aim is to collect and critically organize the data on the overall urban planning of the site in its various phases as well as the specific construction data for the individual building structures. Within this context, the digital-twin concept is also useful. While

initially having been developed in the engineering field (Grieves and Vickers 2016), the digital twin in archaeology demonstrates an accurate representation of what has been excavated. Here, the production of a digital twin will prove pivotal. First of all, in the context of an archaeological excavation, one twin is destined to disappear, leaving the other with the task of representing the entirety of the context. Secondly, the digital twin can become a rich reservoir of information, which can be integrated with other data management methodologies.<sup>15</sup>

### A Virtual High-Definition Journey through Rome's Urban History

In relation to the virtual and augmented reality planned by the Caesar's Forum Project, the site's various architectural remains can be grouped in three broad chronologically separated categories based on their different characteristics in regards to conservation and/or demolition as well as actual physical accessibility. The three categories are constituted

<sup>14</sup> For the relationship between public and cultural heritage, see Smith and Iversen 2012.

<sup>15</sup> For the association between digital twin and Historic Building Information Modelling, HBIM, see Jouan and Hallot 2019.



Figure 5.13. Fragments of Liberty-style tiles (US 1001). Photo by Giovanni Murro/the Caesar's Forum Project.

by the architectural remains from Caesar's Forum (which will be preserved in their entirety as is the case with previous unearthed remains from this phase); the pre-Roman phases below Caesar's Forum, consisting of the archaic settlement remains as well as the prehistoric necropolis area (which, due to their subadjacent placement, are by default inaccessible); and the post-Roman phases above Caesar's Forum, that is, the remains from medieval, Renaissance, and historical times (which will be demolished during the excavations).

Starting with the republican and imperial phases, Caesar's Forum is already today for a substantial part visible to visitors. Caesar's Forum is the only forum which is uncovered in its full length. The current excavations will bring an additional important part of Caesar's Forum to light, namely to the

western colonnade towards Augustus's, and hereby make the forum visible in its full width. It is furthermore realistic that new marble elements pertaining to the sculptural decoration programme of the forum will be found (Fig. 5.12). The Roman architectural remains have already partly been documented through laser scanner and photogrammetry in order to furnish a virtual visit to Caesar's Forum. A 3-D reconstruction will transform the physical architectural remains into a comprehensive visible product through which Caesar's Forum and its architectural sculpture can be virtually experienced as it would have been in Antiquity. A crucial element in creating these 3-D reconstructions is to gain the widest possible understanding of the aesthetic expression of the forum during the Roman period, both in regards to the marble architecture as well as the sculptural pro-

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Figure 5.14. A neoclassic column base (US 1001). Photo by Giovanni Murro/the Caesar's Forum Project.

gramme of Caesar's Forum. This approach is already implemented in the project's research on excavated parts of the Alessandrino Quarter, where all excavated elements including tiles, floorings, and architectural pieces (Figs 5.13–5.14) are being incorporated in the 3-D reconstructions, and the same approach will be applied to the medieval building remains. In regards to Caesar's Forum itself, the project is launching a systematic investigation in the ancient polychromy of sculpture and architectural elements which will appear in the excavation. Investigations will apply non-invasive analyses, such as microscope studies and Visible Induced Luminescence (VIL), together with ultraviolet fluorescence (UVF). Furthermore, X-ray fluorescence (XRF) will be used to identify elements, and it is particularly suited to the analysis of inorganic pigments and glazes. It is — to the best of our knowledge — the first time that research on polychromy on Roman sculpture has been systematically incorporated in an ongoing field project and the potential research output is notable. The research field has so far been centred around analyses of sculpture in large public collections, whereas material from contemporary excavations has only rarely been the object of investigations despite having a larger research potential (Brinkmann and Brinkmann 2020, 29–48; Østergaard 2017). Except for the often-lacking basic information about provenance and find circumstances, museum pieces generally display less well-preserved colour traces due to periodic cleaning and general decay caused by continuous light exposure. Newly excavated sculpture and architectural elements, on the other hand, have not undergone a cleaning and restoration process, providing ideal conditions for investigations.

In relation to the pre-Roman remains below Caesar's Forum, their accessibility includes other

considerations. Managers of urban archaeological sites are often facing the dilemma of to what extent accessibility should be permanently secured to all parts of the site or whether these areas should be recovered or partly or fully fenced off. The issue is well known from catacombs in major cities throughout Europe and from large open archaeological areas with complex architectural layouts such as Pompeii and the Roman Forum. Prioritizing public accessibility is dependent on variables such as visitor security, actual possibility for physical access to narrow spaces, and state of conservation of the specific archaeological site. On Caesar's Forum, deep wells from the archaic period together with the aforementioned rock-cut graves from the prehistoric necropolis area present a challenge when it comes to accessibility. Previous excavations have brought to light a number of wells below the central square of Caesar's Forum, the deepest of which reaches a depth of *c.* 3 m (Delfino 2010b, 287). The wells are important testimonies of settlement patterns prior to the construction of Caesar's Forum, and they have produced vital information on the relative chronology of the deposited archaeological material within them. Excavations conducted in 1999–2000, 2005–2006, and in 2008 unearthed a total of thirteen graves (De Santis and others 2010, 259), located in relative proximity to each other below the south-western part of the forum square in an area directly bordering the excavation field of the Danish-Italian project. Based on the associated grave goods, ten of the graves can be dated to the period between the eleventh and tenth centuries BC, while the remaining date to the subsequent period. The grave goods from a limited selection of graves can be viewed in the display of the Museo Nazionale Romano, while the remaining material is kept in storeroom facilities. Today, the wells on

Caesar's Forum are covered off for security reasons, while the graves have been backfilled. Although the current excavation is yet to reach the pre-Roman levels it is fair to assume that additional wells and, not least, additional graves will surface within the new excavations. This provides the possibility of combining previous and future grave structures in a single virtual display/platform, which offers a precise 3-D prospect of the grave interior. In funerary archaeology, grave goods obviously play a role as an integrated part of the archaeological reading of depositional rites and the conception of the after-life. Grave goods and their positioning within the grave will be documented through photogrammetry in the current excavation. This will not be possible for grave goods from previous excavations, but the individual objects from each grave and their position recorded in the analogue excavation documentation will be sought, integrated, and combined with 3-D displays of the grave goods. The described virtual platform may potentially be expanded to cover all Iron Age graves from the Roman Forum and the Imperial Fora, offering a comprehensive detailed insight into the prehistoric funerary use of the area between the Capitoline and Esquiline Hills, covering both grave distribution and developments in grave rites.

With the last of the three categories — that is, the medieval, Renaissance, and historical architectural remains — virtual models will be made of both the excavated remains from the various phases as well as their reconstructions. Starting with the remains of the Alessandrino Quarter, we are here dealing with a historical period of Rome, as the neighbourhood was demolished in connection with the construction of Mussolini's Via dell'Impero (today Via dei Fori Imperiali). The last houses of the Alessandrino Quarter were demolished in 1933, while Via dell'Impero was inaugurated by Mussolini on 28 October 1932 (Meneghini 2009, 241). As written in the above, the latest renovations of the buildings took place in the beginning of last century, while the oldest parts of the subjacent cellar and sewer structures date back to the neighbourhood's establishment in the second half of the sixteenth century. All of these remains will be completely demolished in order to reach the cultural phases below, which makes the virtual reconstructions of the structures the only way to preserve and showcase this historical phase of Rome's historical centre for the general public. It will be the first 3-D reconstruction of the Alessandrino Quarter, giving visitors to the site an idea of Rome's centre prior to the 1930s. The medieval structures, on the other hand, will be partly preserved for posterity, as part of the previously excavated *domus terrinee*

(Meneghini and Santangeli Valenzani 2004, 45–51, 178–79) are visible today. The expropriation of the Alessandrino Quarter and the following relocation of its inhabitants was a crucial event in the recent history of Rome, and the following demolition of houses caused fundamental and permanent changes to the urban layout of central Rome. The described documentation of the remains brought to light during the recent excavations offers the last possibility to enhance the understanding of the cultural significance of the Alessandrino Quarter through its time as a central urban neighbourhood and until its destruction under Mussolini. Up to now, the main new insights into the history of the Alessandrino Quarter have been obtained through the historical cartography and plans together with the *brogliardi* and a limited number of contemporary street photos (Jacobsen and others 2020). The Caesar's Forum Project offers a direct expansion of the source corpus starting from a micro high-definition narrative level, including, among other things and as described, mortar composition, masonry type, and floorings. The project moves into the macro level, still through high-definition documentation, with the new visualization of the Alessandrino Quarter through 3-D reconstructions.

## Conclusion

Archaeological projects taking place in modern urban centres are confronted with a particular set of challenges, which arise from the surrounding landscape being in use on a variety of levels. This complex mosaic of challenges ranges from addressing the diversity of the archaeological deposits and structural remains to modern infrastructural issues, which are of constant concern. What is more, often there is time pressure to finalize excavations, and these are usually considered emergency excavations, since the central urban space needs to go back to being usable within the context of a living modern city. While archaeological methods have improved immensely over the last decades, and archaeological units working in city centres are immensely professional and in command of techniques and methods which allow us to document and preserve much data from such urban excavations, there is still a pressing need for making such data available fast to both the scholarly community and the general public. Notably, in respect to the former, a clear and easily implementable data-sharing strategy is imperative in ensuring the research flow in an international and interdisciplinary research project such as the Danish-Italian excavations on Caesar's Forum. We have here shown

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in which ways we attempt to make such data available through the approach taken within the Caesar's Forum Project, coordinating digital documentation with the physical documentation strategy and bringing these two kinds of documentation strategies into close communication with each other in order to optimize the understanding of the dense and complex urban stratigraphies encountered in a city like Rome.

### Abbreviations

- Cic., *Att.*: Cicero, *Epistulae ad Atticum*.  
 Foro di Cesare I: Meneghini, R. and C. P. Presicce (eds). *Foro di Cesare, I: Gli Scavi del Foro di Cesare (1998–2000)*, Rome Studies: Studies in the Archaeology, History and Literature of Rome (Turnhout: Brepols, forthcoming).  
 Foro di Cesare II: Jacobsen, J. K. and others (eds). *Foro di Cesare, II: I materiali ceramici dallo scavo del 1998–2000*, Rome Studies: Studies in the Archaeology, History and Literature of Rome (Turnhout: Brepols, forthcoming).  
 Suet., *Iul.*: Suetonius, *Divus Iulius*.

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# Srivijaya

## *Trade and Connectivity in the Pre-modern Malay World*

**ABSTRACT** The Malay city state of Srivijaya, a major actor in world economy between the seventh and the thirteenth centuries, grew at the centre of a complex set of networks encompassing much of the Indian Ocean and the South China Sea. On the basis of a critical review of past studies and the results of recent research in the archaeology and epigraphy of south-east Sumatra and the Thai-Malay Peninsula, this chapter presents a much revised and improved representation of the state and urban formation of this elusive polity, emphasizing the role of trade networks and of accompanying cultural and religious exchange networks, as operated by both local and cosmopolitan actors.

**KEYWORDS** Cities; city states; early states; trade networks; religious networks; Buddhism; Srivijaya; Sumatra; Indian Ocean; South China Sea.

### Palembang as Srivijaya: New Paradigms

Contemporary geographers and travellers described the Malay polity of Srivijaya, after its foundation in the 670s, as a prosperous polity whose powerful rulers held sway over the wealthiest Asian maritime trade route, until its power waned in the thirteenth century, as it progressively lost its ascendancy in favour of other states, both regional and distant. To this day, despite its undeniable prominence in pre-modern Southeast Asian history and notwithstanding considerable progress made during the past decades in the fields of epigraphy and archaeology, Srivijaya remains for historians a notoriously elusive political system.

After its ‘discovery’ on paper by George Cœdès in 1918, Srivijaya nurtured for decades a considerable amount of debate and controversy, based on scholarly as well as on overtly nationalistic arguments (its activity encompassed three modern nations of Southeast Asia: Indonesia, Malaysia, and Thailand, whose scholars claimed her centre to have been in their own region or country) (Cœdès 1918; 1930; 1964). Mainstream historians and archaeologists, following Cœdès, nevertheless always maintained that Srivijaya was founded in the late seventh century AD in south-east Sumatra, where a vast majority of inscriptions, statuary, and the remains of temples were discovered over the years, along the Musi and Batang Hari Rivers. The same scholars also maintained that Palembang, a major port city and the capital of the modern South Sumatra province, which yielded the principal seventh-century inscriptions and many contemporary statues, was where the new state was born and where it thrived during the first four centuries of its history, notwithstanding a complex and still poorly understood relationship with outlying areas on the Thai-Malay Peninsula and with parts of Java and Borneo.

The major difficulty encountered by the promoters of its location in Palembang was due to a major (but misconceived) heuristic gap: the hypothetical capital city of the Srivijaya rulers remained largely untraced by archaeologists. No urban area was discernible in South Sumatra that could compare, for example, to the city of Angkor, in neighbouring Cambodia, nor any concentrations of religious monuments built in solid materials, with which historians were then generally satisfied to locate Southeast Asian ‘kingdoms’. For a long time, research was indeed

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hampered by the obsession of earlier scholars with durable, stone-built monumental archaeology, and by their incapacity to apprehend a rich and powerful port city, of world economic stature, that would have left only a few tangible traces above ground. Moreover, a sovereign who appeared to be a key economic actor in Asia could then only be perceived as governing an 'empire', whose 'territory', 'provinces', and other administrative divisions had to be clearly circumscribed in the Southeast Asian landscape and placed under his direct control or under that of 'vassal' sovereigns. One needed therefore to escape from the exclusive narrative discourses maintained for decades by historians, philologists, and, following them, by archaeologists, all of them preoccupied by a quest for monumental buildings and urban structures believed to inscribe in the landscape the orthogonal signs of the hierarchical superiority of a strong political and economic power.<sup>1</sup>

Only in the 1980s, under the leadership of historian Oliver Wolters, did archaeologists abandon their quasi-obsessive quest for a new Angkor in Sumatra, and started reappraising Srivijaya as a Malay port city whose urban structure needed to be defined in its own terms. The better known early modern port cities of the Malay world were built using mostly perishable materials, with wooden houses erected on stilts, along the shifting banks of rivers or coastlines. They were not surrounded by permanent, walled enclosures, and grew into their natural environment without permanently modifying it, progressively merging on their periphery into 'rurban' landscapes (Wolters 1979; 1986; Reid 1980; 2000; Manguin 2000; 2001). Only a few religious monuments were built with solid materials, on prominences protected from tides and floods. Due to the lack of stones in coastal environments, the Malays usually made use of bricks for such shrines, whose ruin was fast, and the materials were constantly reused, to this day.

This particular disposition of coastal polities — some of them large urban centres — helps explain why they have not left a strong imprint on their respective environments. Rulers at Palembang in Srivijaya or in early Sultanate times, at Melaka, at Aceh, or at other sister cities have, as a rule, not deliberately acted in such a way as to alter the original landscape in which they settled. They rather seem to have adapted their urban structures and environments to the pre-existing geographic features of the site they chose as their abode. Only two size-

able groups of temples are known in the core area of Srivijaya (at Bumiayu upriver from Palembang, and at Muara Jambi, downriver from Jambi); both were built and developed, starting in the ninth century, away from urban centres and should be interpreted only as the seat of religious communities. Contrary to Angkor or to later Central Javanese cities (to speak only of Southeast Asia), the landscapes of Malay political and economic centres were not constructed as cosmic representations that physically embodied religious concepts.

The shortcomings of the epigraphic corpus of south-east Sumatra pose another set of problems. A flurry of inscriptions written in Old Malay (albeit with an important Sanskrit vocabulary) — all of them most probably engraved by the founding ruler of Srivijaya — provides us with precious local representations of the newly founded state. This is also when a significant amount of seventh- to early eighth-century Buddhist statues have been found in sites along both the Batang Hari and Musi Rivers, in line with the clear religious affiliation of the early rulers of the polity. After this inscriptional outburst, however, the Srivijaya rulers become irremediably mute for the rest of their history, leaving us only with contemporary textual sources produced by the foreign participants in maritime exchanges across the South China Sea (including the Java Sea and other regional seas) and the Indian Ocean to document some six centuries of local history: mainly Chinese and Arabic sources, and, to a lesser extent, South Asian texts. Their biases and frequent inadequacies often turn their interpretation into a form of guesswork or, as Wolters (1967, 169) once wrote, it 'exposes one to the danger of being banished to the lunatic fringes of early Indonesian studies'.

The environmental context of Palembang was otherwise fraught with difficulties for archaeologists: with obvious ups and downs, the port city survived the move of the political centre to Jambi in the eleventh century and the fall of Srivijaya two centuries later, to become the capital of a powerful sultanate in the sixteenth to nineteenth centuries, and the head of a petrol and charcoal-rich province whose population grew during the twentieth and twenty-first centuries from 25,000 to 1,500,000 inhabitants. Most of the archaeological sites of the early Srivijaya period, due to a shallow stratigraphy, were eradicated in the corresponding urban development process. In the 1980s, archaeologists nevertheless started unearthing in the interstices of the modern urban fabric substantial evidence of economic and religious activity during the period of Srivijaya's heyday (seventh to eleventh centuries) and for later periods, thus confirming both the local

<sup>1</sup> Manguin 2001; see McIntosh 1999a; 1999b for comparable approaches to African early urban forms where power is not reinforced by monumentality or other signposts to permanence.



epigraphic record and foreign accounts of the polity, and the existence there of the first known sizeable city and state of Island Southeast Asia.

These archaeological discoveries, in turn, prompted new readings of seventh-century inscriptions, and a reconsideration of Malay sources pertaining to comparable port cities of the Early Modern Era, some of them (such as Melaka) claiming descent from the prestigious polity they knew had thrived at Palembang. Inscriptions provided vernacular representations of the newly founded polity named Srivijaya, depicting an early form of state structure, far removed from the ‘imperial’ paradigm usually associated with mostly agrarian Southeast Asian polities such as Angkor or Majapahit. What was then brought to light was a radically different, less mature form of state, now confirmed by archaeological work: a palatial centre of power at Palembang with a direct control only over its immediate urban surroundings; a limited core area in south-east Sumatra comprising formerly autonomous polities now brought under the control of a reduced patrimonial administration, extending to both upriver and downriver hinterlands, possibly also to wider overseas ‘umlands’, along the coasts of Sumatra, or across the Melaka Strait — polities that all adjured to remain ‘loyal’ (*bhakti*) to the Srivijaya rulers (this is the Sanskrit term used in seventh-century inscriptions); finally a wider periphery only progressively being brought into a thalassocratic sphere, weaving an extensive social space. Secondary hubs were thus connected under various guises to the central place by an intricate network of economic, religious, diplomatic, and kinship ties, possibly forming a city state culture starting in the eighth century and no doubt partaking in the ninth- to tenth-century economic boom (Kulke 1993; 2016; Manguin 2000; 2002; Wade 2009).

Srivijaya, as later Malay states, was undeniably an economically efficient polity, but it was also intrinsically unstable in terms of landscape, and a shift of the political centre to alternative urban centres was always an option. Palembang remained its ‘capital’ until the late eleventh century, when the power shifted, for reasons not fully understood, to the neighbouring Batang Hari River basin, with Jambi as a main urban centre (Wolters 1966). After the eleventh century, following radical shifts in the Asian power balance — a reunited China under the Song and the expanding Cholas in southern India now competing for economic domination at sea — devolutionary processes brought about an inability of rulers in south-east Sumatra to sustain the economic supremacy of their coastal polities, allowing a variety of other regional port cities to break away from the former centre of power. Harbour sites

along both coasts of the Thai-Malay Peninsula that had developed a close cultural and economic relationship within the Srivijayan orb now recovered their full autonomy.

Only by bringing together all these sets of data can we start reconstructing a fuller, if fragmentary, image of Srivijaya. The development of functional or structural models, based on contemporary and later vernacular representations of the system, has also helped us identify the social and economic actors at work in the capital of Srivijaya.

## Archaeological and Textual Evidence

### *The Archaeology of Palembang*

For all the reasons exposed above, a satisfactory account of the urban site of Palembang will never be provided by archaeology alone, even if a finer grained approach than that used in the 1980s and 1990s is applied in the future in the few spots left available for systematic excavations. Patchy but significant results in the field of archaeology have nevertheless been obtained after the 1970s, many of them located away from the disturbed urban environment.

The main archaeological breakthrough in recent years is the unveiling of a variety of coastal sites in tidal wetlands, tens of kilometres downstream from Palembang. In what appears to be dense settlements of houses built on stilts around the third–fourth century AD, archaeologists have unearthed artefacts such as ceramic wares, tin pendants, and coins, glass, stone, and gold filigree beads, all of them common markers of long-range Indian Ocean and South China Sea exchange networks. The extent, the wealth, and the outreach of these sites prove that state formation and urbanization processes were at work long before the foundation of Srivijaya, and that long-distance trade looms large as one of their main facilitators (Agustijanto Indradjaya 2012; Manguin 2017; 2019a). During the sixth and seventh centuries AD, changing circumstances in the history of the ancient world brought about a steady increase of Asian maritime trade, to the detriment of the overland route. The reunification of China under the Sui and Tang dynasties and the demise of the Persian long-distance trade exerted a great impact on Southeast Asia’s burgeoning kingdoms. A huge Chinese market opened with empty niches for Southeast Asian traders and their goods. Indonesian commodities replaced Middle Eastern true incense, in growing demand in China for Buddhist rituals. Camphor, benzoin, and other oleoresins from Sumatra, Borneo, and the Thai-Malay Peninsula soon became standard trade articles alongside gold, tin, and spices (Wolters

1967). Nautical archaeology has moreover ascertained in recent years that Southeast Asian shippers, heirs to a mature technical tradition, had for centuries been developing skills for the construction of large trading vessels which plied routes from China to India (Flecker 2003; Manguin 1980; 1993b; 1996; Liebner 2014).

This is also the time when, according to Chinese accounts, a variety of small polities appeared in south-east Sumatra along the 'favoured coast' — a phrase coined by Wolters (1967) in his pivotal text-based study on the origins of Srivijaya — the compulsory passage between the Straits of Melaka and Singapore and the Java Sea. These early polities adopted Indian religions: Vaishnavism (a devotional, sectarian form of Brahmanism) flowered at Kota Kapur, a site facing the mouths of the Musi River on the tin-producing island of Bangka (Lucas, Manguin, and Soeroso 1998; Manguin 2019b); other polities on the Sumatran mainland adopted Buddhism.

Situated near Jambi, along the Batang Hari River, Malayu (the eponym polity of the Malays), became in the second half of the seventh century a centre of religious and Sanskrit learning frequented by Chinese Buddhist monks on their way to India in quest of canonical texts. The erudite Buddhist monk Yijing, who then spent some ten years in south-east Sumatra, tells us that, not long after 670, Malayu was absorbed by Srivijaya (*Shilifoshi*), a new city where 'there are more than a thousand Buddhist priests whose minds are bent on study and good works; their rules and ceremonies are identical with those in India'. From there on, *Shilifoshi*/Srivijaya kept sending embassies to China, and clearly became one major trading operator of Asian seas. Jayanaga, the first known Buddhist ruler and probable founder of the polity, had a dozen inscriptions engraved in Old Malay in Palembang proper and at the periphery of the core area he directly controlled, all of them dated to the 680s.<sup>2</sup> Recent archaeological surveys and excavations at Palembang have only revealed scattered evidence for this earlier phase of Srivijaya history, mainly in the form of late seventh-century inscriptions and contemporary Buddhist statues. All the available finds and their sites were plotted on an archaeological map where the ancient riparian environment of the city was reconstructed from field surveys and ancient maps. Seafaring has also been evidenced: remains of large ships dating from pre- and early Srivijaya times were found in and

around Palembang, all belonging to the Southeast Asian technical tradition, thus clearly indicating sea-borne economic activities. Archaeological research carried out far upriver along the Musi and Batang Hari Rivers also brought to light buried foundations of brick temples and related Buddhist statues dating from the seventh or early eighth century, proving that Srivijaya's core area in south-east Sumatra extended as far upriver, no doubt to better control the downstream flow of gold and forest products and supplying the upstream communities with manufactured goods, salt, and protection from potential overseas enemies.

The archaeological excavations carried out in the 1990s at a variety of sites within Palembang that remained accessible provided evidence of intensive commercial activities, starting at the beginning of the ninth century. They confirm that the port city founded in the seventh century thrived in the following phase of Srivijaya history, within the same riparian environment. By then archaeological sites are by far more easily discernible during surveys, due to the massive presence of potsherds of durable Chinese porcelain and stoneware. Starting in the last years of the eighth century, China produced vast quantities of glazed ceramics for export, which literally flooded the markets of Southeast Asia, no doubt profoundly modifying eating habits, at least in urban centres: from there on, in many such sites, several shapes long produced in earthen wares vanished, leaving only those pots used for cooking and storing water. On the sites excavated in Palembang, these Chinese ceramics then represented some 20 per cent of the total assemblages. During the ninth and tenth centuries, most of them came from kilns of Guangdong and Fujian in southern China, which produced utilitarian ceramics for everyday use. The kilns of northern China also exported, in smaller quantities, ceramics that were the object of more prestigious trade, probably aimed at courtly milieux or rich merchants (Manguin 1992a; 1992b; 1993a). Comparable assemblages of Chinese export ceramics were brought to light along maritime routes in the Indian Ocean, Sri Lanka, the Persian Gulf, the Red Sea, and the African coasts, in declining proportions as one moved further and further away from Southeast Asia. Underwater archaeology has now proved that Southeast Asian ships transported large quantities of such trade ceramics. In the quasi-absence of Asian-built shipwrecks recovered in the Indian Ocean, one cannot determine if ships that loaded their main cargo of ceramics in Chinese harbours sailed all the way to destinations outside the Srivijaya sphere; various sources attest to the fact that large trading ships from Srivijaya did sail

2 Kulke 1993; see Manguin in press, for a review of the historiography and an updated presentation of the history and archaeology of Srivijaya.

into the Indian Ocean, but we have no precise information on the commodities they carried (Manguin 2016). After the tenth century, we know that Arab ships did not sail further east than Kedah, a convenient landfall for ships sailing across the Bay of Bengal along the 6° North parallel (Tibbetts 1979, 37–38). A sizeable proportion of these cargoes must then have been transhipped in ports of the Thai-Malay Peninsula under the banner of Srivijaya.

### **Trade in Regional Commodities and Entrepôt Trade**

Both the large island of Sumatra and, across the narrow Strait of Melaka, the more restricted lands along the Thai-Malay Peninsula produced a variety of metallic and organic commodities that carried a considerable value across the whole ancient world, and more specifically in South and East Asia. Alluvial gold was ubiquitous in the highlands of south-east Sumatra, in the immediate hinterland of the two main centres of Srivijaya at Palembang and Jambi. It was in such demand in India that the region became a true Eldorado for Indian merchants, who early in the first millennium AD gave it the name of 'Isles of Gold' (*Suvarnadvipa*), which remained attached to Srivijaya during much of its history. Tin was (and remains to this day) a major production of the west coast of the Thai-Malay Peninsula and of the islands of Bangka and Belitung (the latter only a short distance from the Sumatran mainland, facing the estuary of the Musi River). No direct archaeological proof of its early extraction has yet been brought to light, but the archaeological wealth of sites found along its production zone and its appearance in ingot form in shipwrecks recovered in regional seas dating from the ninth to the twelfth centuries confirm its importance in regional trade (mainly for bronze casting, an essential feature of both Buddhist and Brahmanical iconography).

The odoriferous oleoresins extracted from the tropical forests of Sumatra (and to a lesser extent of the neighbouring Thai-Malay Peninsula and Borneo) also found a major place as commodities traded to both east and west of Southeast Asia. They appear to have largely contributed to the birth of Srivijaya (Wolters 1967). Benzoin was found in abundance a short distance from Palembang. It no doubt was one crucial export of the early regional polities; it was in strong demand in China, where it was increasingly used in Buddhist rituals. Camphor, also in demand worldwide, was produced more specifically in forests bordering the north-west coast of Sumatra and exported through the port settlement at Barus (the status of which vis-à-vis Srivijaya is not clear), or near Brunei. Among spices, only pepper, a plant

originating from India, appears to have already been produced in Sumatra and Java in Srivijaya times (it became a true cash-crop only in early modern times).

These local productions alone may justify the early growth of port cities in south-east Sumatra. Their strategic location astride the mandatory maritime route leading from the Straits of Singapore and Melaka to the Java Sea and to seas further east soon put them in a position of power. This gave their rulers the ability to centralize in the harbours they controlled much of the flow of commodities produced in eastern Island Southeast Asia, in China, and in India: gold, tin, and resins, as discussed above; spices and precious woods from eastern Indonesia; raw products from China (copper, mercury, etc.); manufactured goods from China (metal implements, ceramics, silk, coins) and from India (cotton textiles, raw glass, jewellery, etc.). The early political systems that appeared in south-east Sumatra were thus able to develop their entrepôt functions, further enriching their merchant communities and the tax collecting local governments.

In such a context, local development of ship-building technologies, of navigational practices, and of entrepreneurship at sea could only have played essential roles in the history of the region. Nautical archaeology has indeed ascertained in recent years that polities of western Southeast Asia were instrumental in sending to sea vessels of considerable sophistication and size at least as early as the first few centuries AD. Textual and archaeological data on ancient ships can be associated with the trade-oriented, coastal polities of south-east Sumatra, whose rulers and shipmasters operated locally built trading vessels of more than respectable size (a few hundred tons is a figure often encountered in written sources) and were active agents of the development of Asian long-distance trade networks from China to India, and no doubt further east, as Madagascar was then being settled by Austronesian-speaking peoples (Manguin 1980; 1996; 2016).

### **A Centre of Religious Teaching**

Networks of economic and cross-cultural exchange served as channels for the diffusion of religious practices. The relationship between religious, economic, and political worlds was always strong along the maritime facade of Southeast Asia. In a context where state formation and urbanization were intimately linked to the growth of long-distance trade, both Buddhism and Vaishnavism played an essential role in facilitating early historic exchange and cultural interactions (Acri 2016; Manguin 2019b). This period was one of great religious and social upheavals in India,

which brought improved economic conditions for the lower castes and the intrusion of foreigners in considerable numbers. Monks, pilgrims, missionaries, envoys, and merchants of all nationalities depended on shipmasters and their crews to sail along regular trading routes and reach their overseas destinations. In Island Southeast Asia as elsewhere in the Indian Ocean, the religious affiliations of those merchants and shipmasters who made rational, consumer-oriented choices in their doctrinal affiliations helped structure parallel Vaishnava and Buddhist networks. These served as vectors of cultural exchanges resulting in the 'Indianization' of the region during the first half of the first millennium AD, after local societies chose to adopt many features of modernity from the imposing Indian neighbour.

Until the seventh century, Vaishnavism was strong among the polities burgeoning along the isthmian tracts of the Thai-Malay Peninsula and in Funan (Mekong Delta), but this creed made only few inroads into Island Southeast Asia, where Buddhism appears to have soon taken the lead. We have seen that polities along the 'favoured coast' of south-east Sumatra had adopted Buddhism; in the 680s, Srivijaya is known to have immediately adopted this religion and appears to have eliminated the Brahmanical competition (taking over the previously Vaishnava polity of Kota Kapur in Bangka, and possibly also those areas in coastal west Java where Vaishnavism is known to have been practised).

A century after foundation times, the name Srivijaya reappeared in a 775 Sanskrit inscription found near Chaiya (in peninsular Thailand). It asserts that several Buddhist sanctuaries were founded there under the auspices of a king of Srivijaya, thus inaugurating a second phase of the polity's history, during which the sovereign's international outreach was also asserted by sponsoring religious foundations in distant associated polities. A monastery was thus erected in the ninth century in the famous Buddhist complex of Nalanda (now in Bihar), a Buddhist sanctuary at Nagapattinam in southern India in the early eleventh century, and a Taoist temple in Guangdong in 1079 (possibly for the usage of a growing community of Chinese sea merchants settled in Srivijaya). The king of Srivijaya is known to have sent Buddhist sutras written on palm leaf to the emperor of China, and he built in his own capital a temple dedicated to the Chinese ruler (Salmon 2002).

Mobility and embedding of Buddhist monks and pilgrims within the seafaring merchant community appear to have been prevalent features of early Buddhism. They contributed to the creation of a complex network of human actors, of textual sources, and of religious icons that paralleled net-

works of trade commodities and facilitated the transmission of Buddhism across Asia (Ray 1994; Sen 2010; 2014; Neelis 2011; 2014; Aciri 2016). In early Indian Buddhist literature, references to gold-producing Southeast Asia (both peninsular and insular), known interchangeably as *Suvarnabhumi* or *Suvarnavipa* (Lands or Isles of Gold) were pervasive and remained so until modern times in the Buddhist areas of the region (Lévi 1929; 1931). Buddhist icons, temple architecture, and decoration were conveyed by such travelling communities. Such interactions soon generated pan-regional art styles. Art historians still debate about the name they should give to a style shared in most port cities of the ninth- and tenth-century Srivijaya orb, which they variously qualify as 'Srivijaya style', 'Sailendra style' (from the name of the Buddhist dynasty ruling then in both Java and Sumatra), or 'Javanese style' (Suleiman 1980). Soon, monastic institutions, in Southeast Asia as in India, became economic actors in their own right, receiving considerable amounts in donations in return for expectations of religious merit. The religious devotion of Buddhist and other seafarers — in Southeast Asia as elsewhere in the world — left tangible traces along sea routes in the form of ex-voto inscriptions, rituals, pilgrimage sites, and common protective divinities.

This is particularly true of Srivijaya, where economic prosperity and surplus resources entailed rulers' and merchants' patronage of religious centres. Starting in foundation times, a strong Buddhist community was kept under the protection of rulers. In the following centuries, under Sailendra rule, Palembang and later Jambi remained major centres of learning for the Buddhist community. A few examples attest to their major role. In the early eleventh century, erudite monk Dharmakirti of the Srivijaya royal family composed major texts that have survived in Tibetan versions to this day. He had as a student the famous Indian monk Atisha, who, after moving back to Tibet, was instrumental in profoundly renovating Esoteric Buddhism. The complexities and the resilience of these entangled networks is also well illustrated in Chinese sources, which tell us that, early in the twelfth century in Canton, a Srivijaya envoy is described by a Chinese author as reciting the famous tantric text known as the 'Peacock Sutra'. He did so in a language that was not understood by the audience, familiar only with its Chinese version; the latter was first translated in the seventh century by Yijing, later revised by the monk Amoghavajra, leader of the tantric sect in China in the middle of the eighth century, whose teacher Vajrabodhi had visited Srivijaya in 717. More than three centuries after Yijing's stay at Malayu and Palembang we thus

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learn that merchants sent to China by the ruler of Srivijaya were still familiar with and could recite in Sanskrit the text the same Yijing had first translated into Chinese (Skilling 1997; 2011).

Along the maritime facade of Insular Southeast Asia, religious and economic agents spread among multiple coastal hubs of prosperity. In Sumatra and south Borneo, where similar environments and settlement patterns are documented, the necessary search for firmer ground (allowing, among other social and economic activities, for the building of shrines in durable materials) entailed a shift in settlement patterns and landscapes, from downriver quaternary wetlands to the firmer ground at the edge of the tertiary peneplain further upriver. Srivijaya was thus founded at Palembang in the late seventh century. Only such new locations allowed monastic institutions to develop in these urban sites that thrived upon the strong growth of maritime trade. Buddhists also travelled upriver from major port cities, usually settling in communities where temples were built, at riparian nodes of activity, at confluents and upriver transshipment points or along interfluvial land routes leading from the Musi to the Batang Hari drainage basins, leaving material manifestations of these sacred landscapes for archaeologists to reveal.

## A World of Networks

The evidence presented above makes it clear that multiple approaches are needed beyond those usually brought into play for the study of ancient states of Southeast Asia. To write a meaningful history of Srivijaya, historians therefore need to constantly reframe such deficient archaeological and philological studies within a broader approach, taking into consideration political, cultural, and economic dynamics at both regional and global levels.

One outcome of such a wider approach brings to the fore the essential factor of seaborne and riverborne connectedness and therefore emphasizes the prominent role played by this web of land-based and maritime, regional, and long-distance networks that constituted the essence of Srivijaya: its political structure, main religion, and overall economy depended on them to survive under various guises across some seven centuries, a rare feat in troubled Southeast Asian history. For the period under consideration here, notwithstanding the dearth of quantitative data (see below), qualitative evidence allows historians to identify the centres of extraction or production of major trade commodities, the trade routes they are carried along, and the centres of transshipment

and redistribution (see Figs 6.1–6.7). Shipmasters, sailors, merchants, ambassadors, Buddhist and other pilgrims, and no doubt all other sorts of travellers from a vast array of nationalities interacted along these networks. It is through their agency that links were provided between the Sumatran and peninsular coastal city states and the vast expanse of the ancient world. Many of these actors, of various ethnic origins, appear to have based their activities in the central places of Palembang and later of Jambi, or in those port cities that were ‘loyal’ to the Srivijaya rulers. Foreign shippers and traders sailed along these same maritime routes and converged to those same ports, which commanded the mandatory passage across the straits area and linked them to hinterland networks that conveyed local productions in demand worldwide.

This evidence shows beyond doubt that the networks that are constitutive of the Srivijaya state are not to be understood only as a circulation of artefacts. They brought into play a considerable number of humans that all contributed to the creation of a social space (Manguin 2002; Hodder 2012). Social actors and traded commodities were intensely entangled at a variety of levels both in the Srivijaya sphere and overseas: local production areas (agro-forestry, mining, kilns) and their populations were connected by local actors to transit and export harbours, seats of political power, where cosmopolitan communities of shipmasters, sailors, and shipbuilders specialized in shipping these productions. Shipmasters, merchants, and members of the ruling class and religious communities are all known to have played entrepreneurial roles in trade, helping finance such capital-intensive ventures needed to send to sea very large ships and their huge and often pricey cargoes. The latter did not all belong to the core group surrounding the central power of Srivijaya, but all did congregate, at one time or another, to the port cities of the Srivijaya sphere.

Such networks were therefore a defining dynamic of local urbanization. This is so true that the foundation myth common to most coastal states of Insular Southeast Asia clearly describes a process where a local chief in a potential harbour centre can only assume authority over a successful polity after he attracts overseas exchange and the resulting wealth that cannot be dissociated from political power. As stated in the *Hikayat Hang Tuah*, a much-circulated classical Malay text, the city of Palembang — ancestral to the Melaka city state where it was compiled — could only become a powerful polity after ‘many merchants came and went to trade there. And all the people from countries without a *raja* congregated there’ (quoted in Manguin 1991, 48).

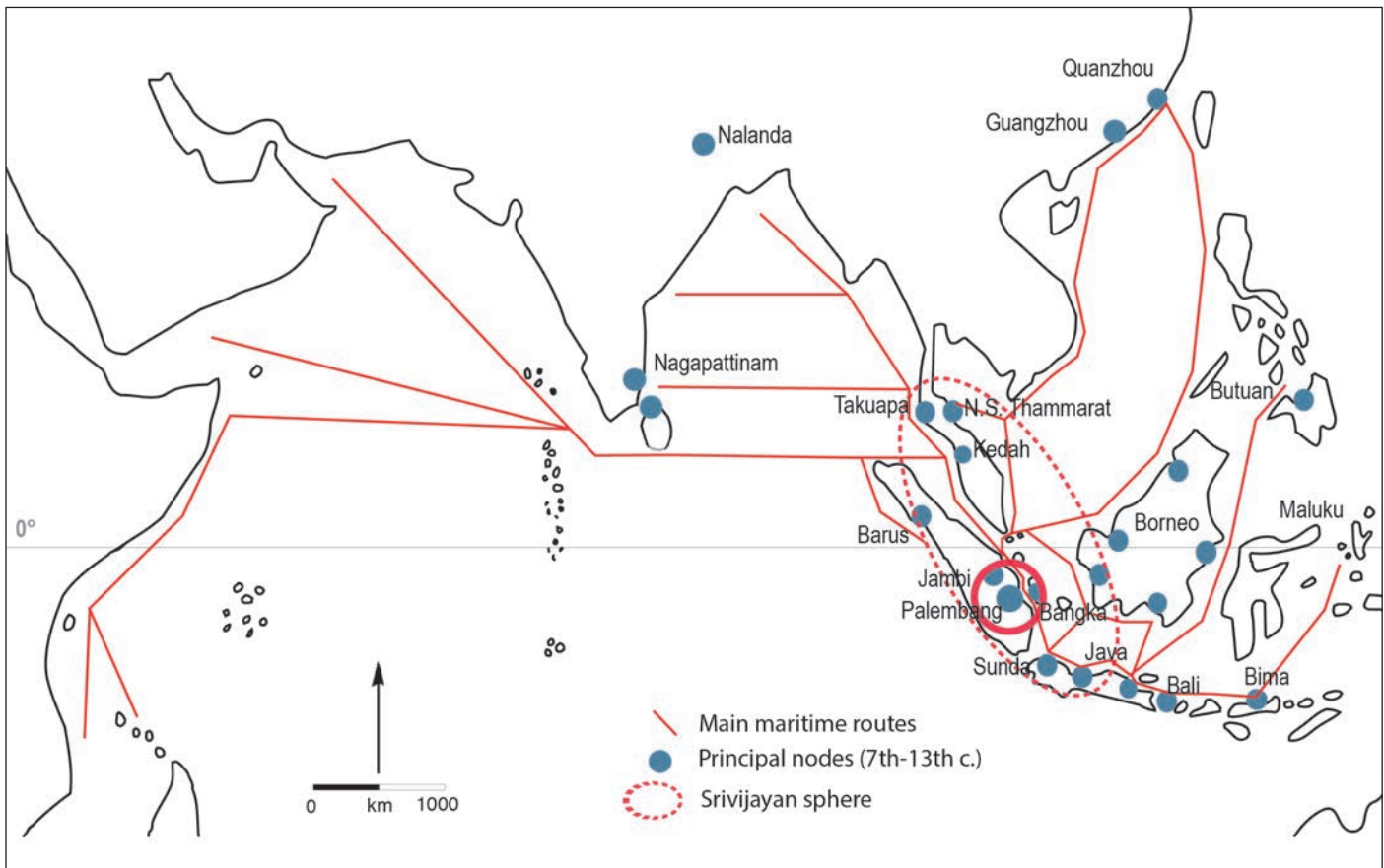


Figure 6.1. Nodes and maritime routes linked to Srivijaya networks. Map by author.

### Mapping and Analysing Srivijaya Networks

The maps that accompany this chapter, drawn in a rather crude way on the basis of data that mostly defies quantification, can only be subjective. Each of the main networks (Buddhism, spices, metals, etc.) has been represented for clarity's sake in a separate map. Some networks were most probably specialized and were operated by specific agents: among local productions, odoriferous resins are known to have been very much in the hands of the Malays of Srivijaya, who captured the former 'Persian goods' market to China (Wolters 1967), and so were probably the gold and tin export networks to India; the Javanese merchants appear to have been the main actors of the spice trade of eastern Indonesia, as they were in later times. Other networks, such as that of Buddhism, needed to piggyback on trade and diplomatic networks. The cartographic representations that are offered here should not distract us from the fact that only the sum of all these entangled individual networks would be able to represent the Srivijaya state system at work.

There are indeed considerable difficulties in drawing pertinent images of such networks (Sindbæk 2015). The first one, often debated in network analysis and mapping, is the consequence of the dearth of hard economic data, which is particularly true for the Indian Ocean region in pre-modern times, and to a lesser extent, for the South China Sea (the latter region does benefit from some rough figures on trade volumes passing through Chinese harbours, mainly during the second millennium AD). Southeast Asian economy is particularly poor in quantitative datasets before Europeans entered its maritime scene. No figures will probably ever be available for flows of gold, tin, resins, precious woods, or spices exported from Southeast Asia.

The only figures that can be harnessed in this context come from trade ceramic counts in the few systematically excavated sites, ceramic sherds being the only artefacts surviving in quantifiable amounts, all the way from production centres to exporting, transshipping, and importing harbour nodes. In Srivijaya times, Chinese export wares provide the bulk of the information only after they start being exported en masse in the first years of the ninth century, which

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is also when production, transshipment, and usage sites are better known from both literary and archaeological sources. Persian Gulf and South Indian pottery sherds only appear in minimal proportions in Palembang, and that is probably not as a result of trade but of their daily use by Indian Ocean crews. Rough counts of sherdage from the mainly ninth- to tenth-century Sungai Mas site in Kedah appears to provide slightly larger figures for such wares, which is expected as western Indian Ocean ships are then known to have only rarely sailed further east and to have transhipped their cargo in Kedah and other peninsular ports. But even this unique quantitative approach remains fraught with difficulties, as reliable datasets are still largely lacking for Southeast Asian archaeological sites. Moreover, for those rare site studies that have produced detailed, precise databases, there still is a dire need for standardization of artefact descriptions that would allow us to integrate data to be used in significant network analyses.

Shipwreck cargoes have in recent decades attracted much attention in both the scholarly world and among the general public. Such underwater sites have indeed provided historians with a wealth of new data on both trade patterns and on the ships that were then being put to use in Asian seas. They have, among other conclusions, returned agency to Southeast Asian shipbuilders and shippers. However, as opposed to land-site based counts of ceramics that are part of an overall assemblage, spectacular shipwreck sites provide quantifiable data that are often misinterpreted as they cannot provide, by far, a comprehensive image of trade networks. They are, more so than any other archaeological site, the product of accidents.

The first moot point results from the fact that most if not all wreck sites that provided quantitative data were excavated within commercial operations. Some of these operations have no doubt provided remarkable, scientifically described data. They are however intrinsically limited to sites with valuable cargoes, Chinese ceramics being at the top of the list among items in high demand in today's antique markets. These same ceramics also happen to be easily identifiable by fishermen, the first informers to report such discoveries. Ships specialized in carrying textile cargoes from India or spices from the Moluccas will never appear in such commercial circuits, as their wrecks will totally lack visibility for such primary informers.<sup>3</sup>

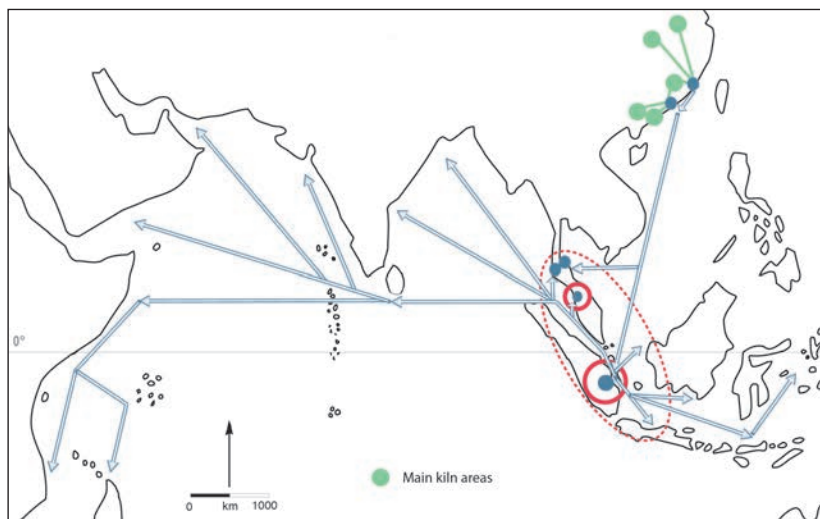


Figure 6.2. Chinese trade ceramics network. Map by author.

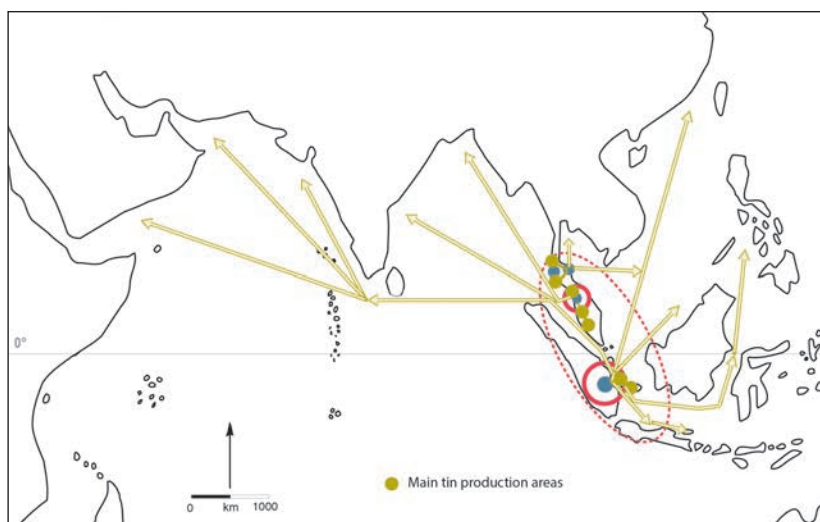


Figure 6.3. Tin production and trade network. Map by author.

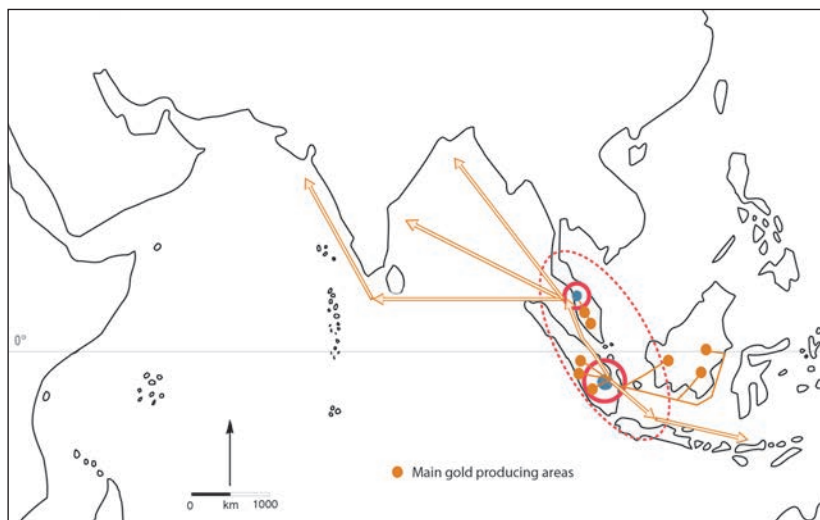


Figure 6.4. Gold production and trade network. Map by author.

<sup>3</sup> As already discussed by Michael Flecker in his 2012 work.

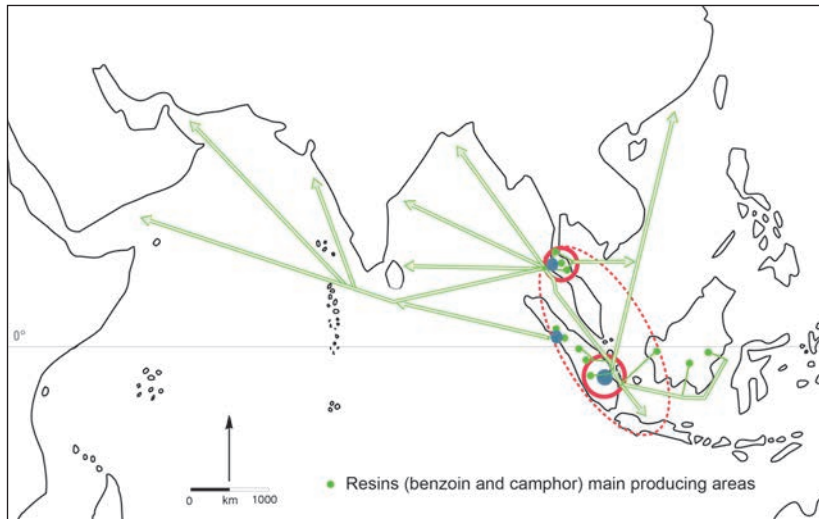


Figure 6.5. Oleoresins production and trade network. Map by author.

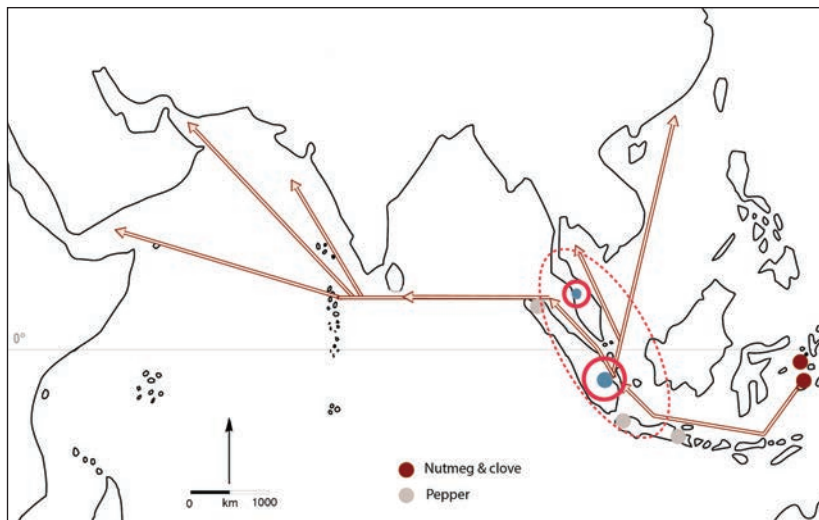


Figure 6.6. Spices production and trade network. Map by author.

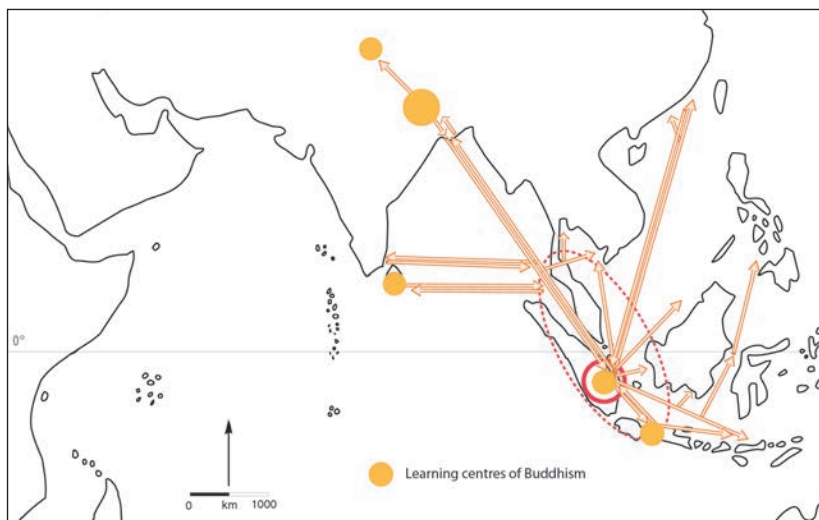


Figure 6.7. Learning centres of Buddhism. Map by author

Even when organic material is carried aboard (as in the famous ninth-century Arabo-Indian wreck known as the Belitung), not enough attention is paid to it in publications. References to star anise of Chinese origin in the Belitung report are limited to a skimpy paragraph stating that: ‘Considerable quantities of star anise (*Illicium verum*), found inside green-glazed jars with a small spout, must have been an export item’ (Krahl and Guy 2010, 29; Chong and Murphy 2017, 32, 157). No attempt is made to elaborate on its overall trade and no hard figures are provided for this cargo. The tenth-century Cirebon wreck fares no better, as we only learn it carried, besides a huge cargo of ceramics, ‘an unquantified amount’ of drugs and aromatics (Liebner 2014, 213). Better (if barely quantifying) work could be achieved on the organic cargoes of ships sailing in Southeast Asian waters, as proved by the reports issued from other excavations: two thirteenth-century ships, one recovered in the Quanzhou harbour but returning from Island Southeast Asia, and the other from the Java Sea, and one tenth-century ship known as the Intan wreck, also from the Java Sea (Salmon and Lombard 1979; Green 1983; Flecker 2002; 2003). All carried substantial quantities of organic trade commodities and artefacts for daily use of the crew, the details of which are provided in these reports. This exaggerated visibility of ceramic trade, as against the invisibility of other exchange networks carrying organic commodities with no present-day commercial value, clearly brings in a first considerable bias in the overall appreciation of trade networks in Asian seas.

Further dangers of misinterpretations moreover abound within the analyses of the highly visible Chinese trade ceramics network. A graphically impressive play by Johannes Preiser-Kapeller (2015, 131–36) based on the limited figures provided in the first publication of the Belitung wreck (Krahl and Guy 2010) cannot be said to depict the overall situation of the trade network between the Chinese and Southeast Asian seas, a fact the author of the article is well aware of. The software-generated visualizations he obtained can only provide a snapshot of an infinitely more complex scene: this is a very specific shipwreck, and it represents a very limited moment in the maritime networks of those times. As all other known shipwrecks of the ninth and tenth centuries recovered in Southeast Asian waters, the Belitung ship carried a cargo made principally of export ceramics. This comprised a majority of good-quality ceramics from the Changsha kilns,



giving the impression that such wares were in strong demand in importing markets. Much attention was also paid in reports to isolated pieces, or to those high-quality northern China wares found in minute quantities but carrying a high value in antique markets. In the absence of published systematic counts of ceramics from this Belitung wreck, one is left with the impression in the report that the Guangdong jars that were also recovered had a purely utilitarian function, being mainly used to pack Changsha bowls and star anise seeds. This may be true for this particular ship (but needs to be further demonstrated after proceeding with systematic counts), but it was not the case in the overall circulation and usage of ceramics in Southeast Asia or further west. Most ships carrying large quantities of Chinese ceramics were for practical reasons loaded with the production of one main kiln (or a regional group of kilns). Drawing broad conclusions from such perforce-isolated shipwrecks therefore presents us with a distorted view of trade patterns. The tenth-century Cirebon wreck, *a contrario*, carried an immense majority of bowls and a few other shapes of the so-called Yue-type wares from Fujian kilns, most of them of a much coarser quality (often termed 'kitchenware'), hence destined for a different market altogether than the richer Belitung cargo.

Systematically excavated ninth-century urban sites such as those of Palembang or of the Thai-Malay Peninsula (and many more less systematic excavation and survey sites) delivered at best some 20 per cent of Changsha wares, the much coarser Guangdong wares representing the vast majority of the assemblage of Chinese wares in settlement sites, including many coarse bowls that are not present on the Belitung wreck.<sup>4</sup>

One other bias regarding the cargo of the Belitung wreck is adduced by the fact that Preiser-Kapeller follows uncritically the hypothesis of the report regarding the final destination of the ship, which is thought to be the Middle East, whereas the location of the wreck in the Gaspar Strait clearly indicates that it was on its way to Palembang or the Java Sea, not to the Indian Ocean. The ship was indeed built following an Arabo-Indian sewn-plank technical tradition, and probably manned by a crew originating from the western part of the Indian Ocean; but it had been repaired using Southeast Asian materials, and thus appears to have been operating between

Southeast Asian and Chinese harbours, at least during this tragic crossing. That such a cosmopolitan situation was commoner than expected is confirmed by the recent discovery of another ninth-century Arabo-Indian sewn ship at Phanom Surin (along the coast, south of Bangkok), which was built (or heavily repaired) locally with Southeast Asian tropical timbers and ropes.<sup>5</sup>

## Conclusion

The structure of the ancient urban polity of Palembang, as defined by epigraphy and archaeology, may thus be seen as a prototype of the trading cities of the early modern Malay world, a continuity taken for granted by vernacular sources. Their very existence can only be apprehended if a network of maritime and riverine routes irrigates them. All the available evidence points to trade and cultural exchange networks and the connectivity they entail as vectors of social complexity and pan-Asian interdependence.

All the methodological difficulties evoked above should of course not prevent historians from further analysing and mapping the networks that are so vital to the Srivijaya polity. They should only keep in mind, as Carl Knappett (2011) has made clear, that their approach should decidedly be transdisciplinary. Representations drawn exclusively from the more than scarce quantitative sources available can only provide a partial image, cut off from the local terrain.

One should also point out here that polities like Srivijaya or later Malay harbour cities serve as good examples of the need to pay more attention to space and to man-made modification of landscapes. Little attention was paid until recently in international scholarship to pre-modern Southeast Asian urban forms (with the exception of Angkor). A better focus on such forms will help integrate them into the common paradigms and theoretical tenets of urbanism.<sup>6</sup>

4 Manguin 1987 and 1992b for Palembang; Ho Chuimei and others 1990 and Ho Chuimei 1991 for Ko Kho Khao and Laem Pho in peninsular Thailand; Shuhaimi and bin Zakaria 1993 for Sungai Mas in Kedah; van Orsoy de Flines 1941–1947, 70–71 for surveys of the north coast of Central Java.

5 A. Komoot, pers. comm.; Komoot 2014; Preeyanuch 2014. See also Guy 2017, with inaccurate technical information on the hull.

6 As set out, for instance, in Cowgill 2004, who does not consider Southeast Asian urban forms.

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# Intramuros

## *Investigating Relations between Cross-Industry Practices and Networks through Sixth-Century AD Sagalassos*

**ABSTRACT** This article employs network thinking in the study of cross-craft relations in order to evaluate the interconnected nature of local economic activities. In analysing the evidence for sixth-century cross-industry relations at the site of Sagalassos, it becomes possible to reconstruct the structure of the crafting network through the directionality of resources, the work practices that sustained these relations, and the historical trajectories of economic development at the local level. It also proposes some implications for the observed patterns, particularly with regard to the lime and ceramic industries.

**KEYWORDS** Craft production; Late Antiquity; cross-industry relations; ancient economy; multi-craft.

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Modern conventions in archaeological practice have defined and reinforced single-industry analyses. This is in part due to the sometimes overwhelming range and quantity of material culture unearthed by excavation, the analysis of which comes to be managed through divisions of labour according to materially defined artefact categories; for example, most projects have a ceramologist, alongside other specialists studying glass, metals, and bone. In the case of materials with large and highly diverse functional classes (such as ceramics), a project might have an even more refined set of specializations — specialists in building materials, amphorae, and tablewares. To some extent, this is a highly practical approach, as materials have particular properties that affect how they are made, used, and valued. Additionally, professional expertise on the part of the archaeologists is time-consuming to develop, and the ever-growing bodies of literature appearing on these material classes requires and encourages a substantial degree of specialization within the discipline.

These material-based artefact specializations, however, reflect and promote a system of parochialization that privileges objects, materials, and technologies over archaeological and social context. Disconnected from the full assemblage of materials, these artefacts are only subsequently interpreted as collective corpora derived from archaeological contexts. While these methodological specializations are entirely pragmatic, it is vital to stress that such artificial subdivision does not fully represent how professional lives in the ancient world were experienced. The potential limitations of materi-

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ally defined research programmes become apparent when we attempt to reconstruct the economic activities of a site, and this situation is exacerbated in the case of ancient cities. In such urban contexts, supporting specialized occupations and diverse economic activities, it is clear that artisans of all sorts were often part of the same local community; they in some cases inhabited shared neighbourhoods and could be interconnected in myriad ways. This article investigates and traces those connections in an attempt to move us away from the partitioning of material culture studies to more context-led approaches.

### **Cross-Industry Studies and Network Thinking**

One means of moving past narrow definitions of industry and focusing too specifically on single-material classes is to consider issues of what has been called cross-craft, cross-industry, or multi-craft approaches. These approaches delineate connections between different industries through the material record. While infrequently framed in explicitly ‘network’ terms, such modes of thinking about cross-craft relations are conceptually compatible with network-oriented approaches, and where these analytical frameworks have been combined they have proven to represent powerful interrogative tools with regard to craft contexts.<sup>1</sup> Network studies, however, encompass a wide range of perspectives and methodologies. Perspectives range from the highly analytical and quantitative to the largely metaphorical and conceptual, and the type of social study presented here lends itself to the latter. Given the incomplete nature of the archaeological record, variable preservation of the remains of different industries, and imprecise chronological schemas, quantitative and computationally analytic approaches (more familiar from network science) would here be largely inappropriate.<sup>2</sup> The economic sociologist, Michael Davern (1997) instead has outlined the intrinsic utility of the network metaphor as a means of explaining socio-economic behaviour by focusing on four characteristics of the network: the structure of the network; the distribution of resources within the network; the norms and rules of behaviour within the network; and the changing and dynamic nature of

networks. Here, we follow Davern’s approach, taking a qualitative approach that employs the metaphor of the social network in order to understand more comprehensively the structure of different types of socio-economic interaction at a local level. We do this through considering network topologies, directionality of resources, and historical trajectories of economic development.

### ***Archaeologically Reconstructing Cross-Industry Ties***

Within this social network framework, evidence is used to reconstruct relationships between different archaeological contexts of manufacturing. Defining the ‘nodes’ and ‘links’ of these networks, however, presents a range of complications and challenges given the nature and limitations of archaeological data — challenges that warrant some elaboration. While the actions and social presence of individuals would offer a more refined ‘node’ of analysis, these are however very difficult to identify archaeologically. Consequently, the production sites, as the smallest archaeological contexts of analysis, are utilized as nodes and as material proxies for the associated workgroups. In considering the links between worksites, there are different ways of reconstructing these network connections from the archaeological record, and they (for the purposes of this discussion) might be distinguished by the direct or indirect nature of the evidence.

### ***Indirect Evidence for Cross-Industry Ties***

Some of the evidence for interaction among artisans working in different media might be considered ‘indirect’, in the sense that similarities in appearance are seen as reflecting a transmission of ideas between industries (McGovern 1989; Rebay-Salisbury, Brysbaert, and Foxhall 2014). This could be argued in instances of skeuomorphism, wherein objects are made in reference to or representation of products more commonly manufactured in another material (Knappett 2002; Blitz 2015). Such skeuomorphism has long been supposed between pottery vessels and metal plate by archaeologists working in the classical Mediterranean world; Michael Vickers and David Gill (Vickers 1994; Vickers and Gill 1994) have, for example, demonstrated morphological and stylistic parallels between ceramic tablewares and silver and gold vessels, and E. Marianne Stern (1997) has demonstrated parallels between rock crystal and clear glass. Other such indirect evidence includes technological transfers based on design features observed

1 Brysbaert and Veters (2010), for instance, successfully applied such an approach for Bronze Age Mycenaean palatial workshops. See also Rebay-Salisbury, Brysbaert, and Foxhall 2014.

2 For successful applications to more robust bodies of data, see e.g. Collar and others 2015; Knappett 2011; 2013.

in technologies of different industries (McGovern 1989). In these cases of indirect evidence, parallels are observed in the material record, but the socio-economic nature and intensity of that connection and transmission can typically only be inferred. The materially ephemeral character of cross-industry encounters and the fact that information on products and technologies can be conveyed in ways that do not require direct social interaction make interpreting the dynamics of such connections challenging.

### **Direct Evidence for Cross-Industry Ties**

There are also instances of more ‘direct’ material evidence for the relations between industries. ‘Composite’ objects, manufactured using multiple media, might be considered in these terms, but such direct material links can also be archaeologically observed, in some contexts, through instances of sharing or pooling, either by shared spaces, infrastructure, supply networks, raw materials, or tools. In these instances, which Izumi Shimada (2007) would refer to as ‘multicrafting’, direct material links can be observed archaeologically and can be used to reconstruct relationships and scenarios wherein different parties and materials come together through the production process.<sup>3</sup>

Returning to the network metaphor, different types of archaeologically identifiable cross-industry interactions, based on either direct or indirect evidence, present different types of links between the workgroup nodes. Implied in the reconstruction of these links is inherent variability in the strength of connection and directionality of idea or material flow between workgroups. Using this network metaphor within a defined dataset, this paper attempts to investigate the material traces of cross-industry relationships in the ancient city of Sagalassos in order to reconstruct the extent and intensity of contemporary cross-industry relations during a period of significant urban economic transition — the sixth century AD.

### **Sixth-Century Sagalassos (Asia Minor)**

The ancient city of Sagalassos is situated in the western Taurus Mountains near the town of Ağlasun (Burdur Province, Turkey). Constructed atop a series of large terraces at an elevation of 1400 to 1600 m a.s.l., the site’s main occupation has been dated from the Late Achaemenid to the Middle Byzantine peri-

ods. The Roman imperial-era city had elaborately decorated upper and lower agoras, equipped with *nymphaea*, a large public bath complex, a theatre and stadium, several temples, and at least two pedestrian colonnaded streets. Such monuments embody much of the urban ‘armature’ typical of a large Roman city in the region (Parrish 2001). By the mid-sixth century, however, the city had undergone some major changes in its organization (Poblome, Talloen, and Kaptijn 2016; Waelkens and others 2006; Putzeys, Poblome, and Bes 2005). The area of the *bouleuterion* (located on the Upper Agora) had been converted into the forecourt of a large church (Talloen and Poblome 2016; Talloen, Beaujean, and Poblome 2016); the political character of the upper and lower *agorai* by this time had already taken on more commercial functions (Lavan 2006); the colonnaded street had received a sixth-century renovation (Jacobs and Stirling 2017; Jacobs and Waelkens 2013); and the *frigidarium* of the imperial bath complex was repurposed for communal dining activities (Rens and Waelkens 2011; 2012).

Alongside these monumental buildings, ample evidence has been collected with which to reconstruct the economic history of the city, particularly as concerns the notable presence of industry. This is most conspicuously concentrated for much of the city’s history in its Eastern Suburbium, located to the east of the city’s theatre and north of the only known cart road into the city. This suburban zone hosted a potters’ quarter, active for nearly seven centuries, and most notably producing a red-slipped tableware that has come to be called ‘Sagalassos Red Slip Ware’ (SRSW), which was manufactured into the seventh century.<sup>4</sup>

In many respects, the urban developments witnessed at Sagalassos are in keeping with wider trends across Asia Minor (Jacobs and Elton 2019). Late Antiquity, and especially the sixth century AD, has traditionally been viewed as a time of economic reorganization in the region, with urban development undergoing transformations related to population movements (Haldon 2006, 615), redefinitions of public and private spaces (Saradi 2006; Jacobs 2009), shifting social expectations regarding urban zoning (Saliou 1994), and a marked increase in the use of ‘spoliated’ materials (Alchermes 1994). Industry has been interpreted as playing a critical role in these characterizations, with some industries moving into the central zones of the city, public streets and por-

3 For archaeologically identified case studies, see Shimada 2007; Brysbaert 2014; Brysbaert and Vetter 2010.

4 For an overview of typology and chronology, see Poblome 1999. Several other industries have also been presumed active in this suburban zone, including glassmaking, stoneworking, and metal production, but associated workshop contexts have not yet been found.

tics encroached upon by workshop activities, and with monumental public buildings repurposed for industrial use (Zanini 2006). While these patterns have been observed at cities across the region and can certainly be seen as beginning by the early fourth century, few highly detailed analyses of the economic impact of these processes at the local urban scale have been conducted.<sup>5</sup> Yet, by identifying and tracking ties between contemporary industries during this critical period in the reorganization of the classical city, new perspectives on the nature, significance, and co-reliance of different types of industries within local economic development at this time can be proposed, yielding a more nuanced picture of urban innovation and economic resilience.

### ***Indirect Material Evidence of Interactive Practices in Late Antique Asia Minor***

Some of the evidence for the relationship between industries can be reconstructed from textual sources from the region. For instance, the fifth- to seventh-century funerary landscape of the city of Korykos (Cilicia) is perhaps best documented in this regard, recording a wide range of local trade titles (Trombley 1987). These craft occupations were typically defined according to service provided or product manufactured, with the latter also often further specifying the product function or material. Frank R. Trombley (1987) used the diversity of trades at Korykos to highlight the specialized nature of the local workforce, but the range of titles also includes occupations that almost certainly manufactured so-called ‘composite’ products (i.e. objects made from multiple, different materials). Indeed, at Korykos, cutlers, glaziers, gem-engravers, goldsmiths, and fine woodworkers are all attested in the funerary record (Trombley 1987, 20–22), and all manufactured finished products either that would have required skill in working multiple media or that brought together multiple specialists in its making. Cutlers would have combined their blades with worked bone or wooden handles; carpenters often incorporated different types of inlay into the decoration of fine furniture; and gemstones were often set into items of metal jewellery. Such objects embody cross-industry production processes and highlight the organizational diversity of production activities in ways that sometimes frustrate archaeolog-

ically defined, *etic* constructs of ‘industries’ based on narrow material categories.

Composite objects (e.g. knives with wooden and worked bone handles, enamelled metal objects, stone sculpture with inlay) have been found at Sagalassos. Other types of ‘indirect’ evidence from the city also have been interpreted as representing an exchange of ideas between industries, based on similarity of style and imagery on products. Peter Talloen and Jeroen Poblome (2005), for example, have suggested that the inspiration of depictions on relief-moulded sixth-century pottery types derived from known examples of Sassanian metal plate. While these associations between objects suggest an exchange of ideas and imagery between materials manufactured in different media, the exact nature of the interaction between artisans, particularly those within the city, remains problematic. Consequently, the remaining discussion will focus on the material evidence of direct cross-industry relations.

### ***Industry as Consumers***

In contrast to ‘indirect’ visual references and stylistic influences in the skeuomorphic relationship between pottery and metal plate at Sagalassos (described previously), the link between industries can occasionally be directly observed in the material culture of workplaces. A study of tools found in the ceramic workshops of the city have highlighted the use of instruments made in a range of materials, including worked bone, metals, and ceramics (Murphy and Poblome 2012). In many cases, these appear to be objects appropriated from the wider urban environment and employed in unconventional ways in the pottery workshops. For instance, hairpins and styluses appear to have been used as ‘point tools’, while iron knives were used as ‘fettling knives’ to cut slabs of clay (Murphy and Poblome 2012). The appropriation of widely available consumer goods for use in ceramic production appears to have been prevalent, and in most cases, these hand tools were objects that required minimal or no alteration to be employed for pottery making.

Occasionally, however, objects have also been found in the workshops that seem to represent a different type of consumer behaviour. Such an argument might be made for a copper-alloy roulette wheel, found in the East Slope pottery workshop. This tool and its multiple parts seem to be specially designed for rouletting. At Sagalassos such specially designed tools may not have been restricted to pottery workshops. For instance, a small, hollow ceramic rod with a sheathing of glass wrapped around it has been interpreted by Veerle Lauwers,

<sup>5</sup> For a good example of such a local study for Anemourion, see Russell 2002; for Kibyra, see Özüdoğru 2018; for Laodikea, see Şimşek 2018.



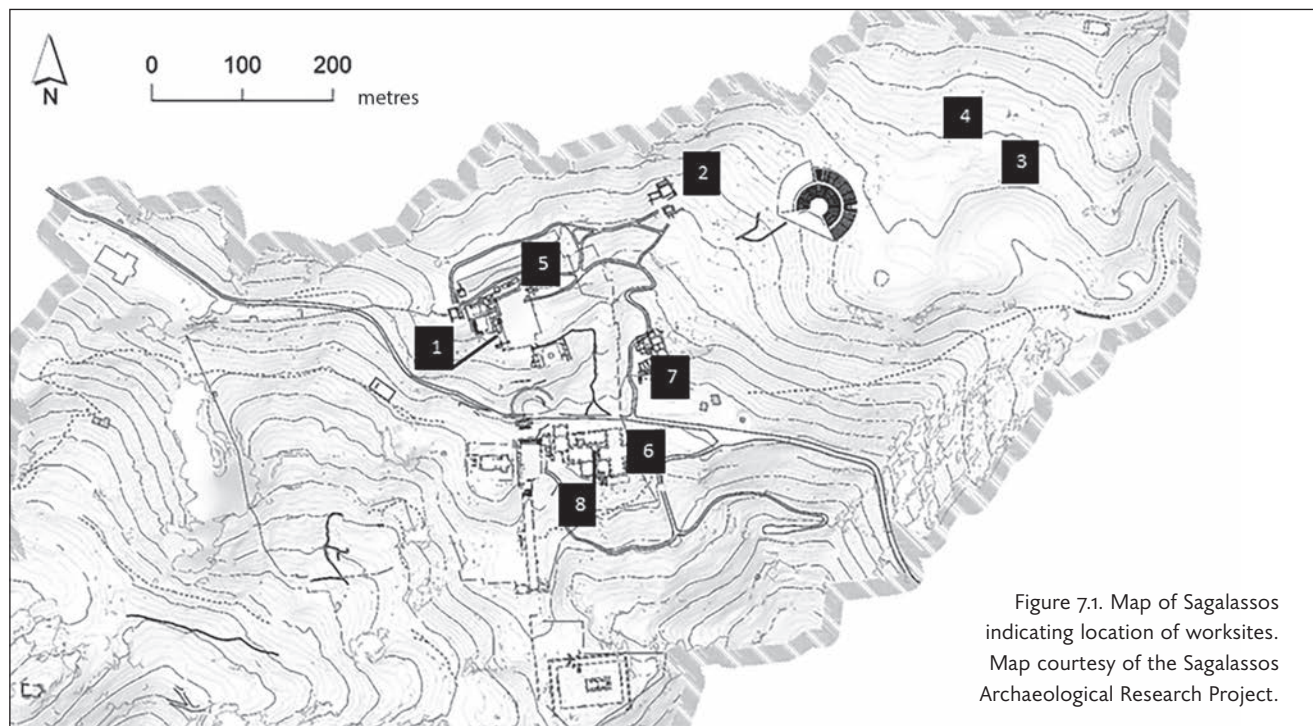


Figure 7.1. Map of Sagalassos indicating location of worksites. Map courtesy of the Sagalassos Archaeological Research Project.

Patrick Degryse, and Marc Waelken (2007a) as a *mandril*, a rod used to manufacture glass rings and beads. The *mandril* itself was formed using Çanaklı clay, the same clay used in SRSW production at the site, and had been high-fired before the sheathing of heat-softened glass was applied. While no physical structures for glass production have yet been found at the city, it has long been argued that Sagalassos hosted a local glassworking industry from the Roman imperial to Early Byzantine periods, based on a combination of archaeometric evidence and identification of secondary production waste (Lauwers, Degryse, and Waelkens 2007b). This *mandril*, however, offers direct evidence for relations between industries, either through the shared supply of raw clay or by the ceramic industry's supply of highly specialized tools for a glassmaker. In the case of the latter, and considering the specialized nature of the tool, its manufacture undoubtedly would have required direct communication among artisans.

The appearance of other types of objects might offer different perspectives on consumer practices within production contexts. For instance, used cooking pots (with sooting) have been found in many of the workshop contexts (ceramic production, lime burning, smithing). As most of these workshop spaces lack clear domestic spaces, the presence of cooking implements offers insight into the rhythms of workshop life and the commensal nature of its work crews. Although the manufacturing sites of

such cooking wares have not been identified archaeologically, the clays are provenanced to the central part of the Ağlasun Valley (Neyt and others 2012). These used cooking pots have even been found within the tableware and moulded-ware workshops of the city (which lacked any other evidence of domestic dwelling), highlighting distribution and consumption patterns between differently specialized local ceramicists. In the case of one fine-ware pottery workshop complex, a small hearth installation was also uncovered in a corner space, likely for food preparation. Other daily-life objects also appear in work contexts, including a locally manufactured moulded lamp and an *oinophoros*, which were found in the floor-fill near an early seventh-century limekiln in a former urban mansion (Uytterhoeven and others 2014; Uytterhoeven 2009; Waelkens and others 2007).

Considering these objects collectively, the connections they represent between industries raise some thoughts on dichotomies of work versus dwelling spaces and production versus consumption activities. The material links between these industries highlight different types of interaction that were embedded in the day-to-day work practices of wider society. Moreover, the role of these specialized craftspersons as consumers of both special commissioned items and everyday market goods highlights their contribution to wider consumer patterns within the late antique city.

Table 7.1. Listing and chronology of late antique industry worksites.

INDUSTRY CLASSIFICATION	WORKSITE OCCUPATION				CONTEXT INFORMATION
	Fourth century	Fifth century	Sixth century	Seventh century	
Bakery			■		Upper Agora
Textile		■			Library East
Ceramic (fine ware)	■	■	■		Library East
		■	■		Library East
	■	■			East Slope Workshop
	■	■	■		Moulded Wares Workshop Complex
Lime		■			Library East
			■		Moulded Wares Workshop Complex
			■		Upper Agora — North East Building
			■		Roman Baths – Frigidarium 1
				■	Urban Mansion
Metals			■		Upper Agora
			■		Roman Baths — Frigidarium 1
			■		Roman Baths — Service Rooms

### Overview of the Worksite ‘Network’

Numerous worksites have been uncovered at Sagalassos dated from the fourth to the early seventh centuries AD (Table 7.1 and Fig. 7.1). As regards direct evidence of cross-industry relations throughout the city, the best-preserved and most conspicuous evidence for industry in this regard is found in contexts dated to these centuries, and particularly those dated to the sixth century AD. This is in part due to it being the final, extensive occupation at the site, which thereby privileges its preservation. For the sixth to early seventh centuries, we have a large corpus of workplace evidence across the ancient city for various types of metalworking, lime burning, ceramic production, commercial food production, and antler- and bone-working. While the physical evidence for these industries is sometimes patchy and variable, the contemporaneity of so many industries makes this a particularly useful corpus with which to investigate ‘direct’ cross-industry ties with which to consider the importance of those networks in relation to the changing sixth-century urban environments. Moreover, the early sixth to the early seventh centuries AD also brackets a period that is seen to be an important transition in the organization of Sagalassos’s urban life, as reflected in the increased reliance of industry on recycled materials, the abandonment of public buildings of the earlier city, and in the closing of several fine-ware ceramic workshops.

In assessing these remains, industrial activities appear across the city — in the baths, *agorai*, and in a

large domestic mansion, and already by the late fourth century, ceramic production is observed both in the Eastern Suburbium and (for the first time in over four centuries) to the west of the theatre in the area east of the Neon Library (Poblome and others 2015). In general, then, industrial activities lack clear industry-specific patterning in their spatial distribution (Fig. 7.1). For instance, recycling industries of copper alloy and lead, as well as lime-burning, appear in the eastern rooms of the public bath complex, while a smithy and possible bakery were uncovered just off the Upper Agora (Uytterhoeven, Poblome, and Waelkens 2011; Poblome 2012). A deposit of worked-bone waste was found in a room of the macellum, suggesting a possible workplace in the vicinity sometime in the mid-fifth to late sixth centuries (Richard and Kiremitçi 2006), and a large oven was found in another room of the building. Sixth-century limekilns were found in a variety of locales, including in front of and within the North-East Building of the Upper Agora (Uleners and Altay 2009), and lime-burning was documented in some of the pottery kilns in the Eastern Suburbium (Murphy and Poblome 2016). An early seventh-century limekiln was also found in an atrium of what had been a large elite mansion (nearby sections of which had already been renovated for use as a hostel) (Uytterhoeven 2009, 442; Uytterhoeven and others 2014, 376).

Looking at the distribution of these contexts, there is an impression of a rather messy dataset, based (in some cases) more on variability than on continuity within a materially defined industry. Figure 7.2

Reference	Map ID
Poblome 2012; Uytterhoeven, Poblome, and Waelkens 2011	1
Poblome and others 2015	2
Poblome and others 2015	2
Poblome and others 2015	2
Poblome 2001	3
Murphy and Poblome 2016	4
Poblome and others 2015	2
Murphy and Poblome 2016	4
Uleners and Altay 2009	5
Rens and Waelkens 2012; 2011	6
Uytterhoeven and others 2014; Uytterhoeven 2009	7
Uytterhoeven, Poblome, and Waelkens 2011	1
Rens and Waelkens 2012; 2011	6
Claeys and others 2009	8

offers a composite network view on the relationships between different (materially defined) industries and between the individual contexts of production; the links are based on all forms of material evidence (technologies, raw materials, artefacts found in the workplaces, spatial organization of workspaces).

In outlining these connections as a heuristic exercise, some relevant observations nonetheless can be made. First, utilizing industry categories based on very general material classes provides only a very schematic outline of cross-industry links (Fig. 7.2, top). Yet, by employing more refined definitions of industries based on subtype of material being worked (e.g. fine versus cooking ceramic wares, copper alloy versus iron versus lead metalworking), a more complex network topology emerges that demonstrates patterns in the nature of interaction and the directionality in the movement of goods and transfers of spaces (Fig. 7.2, bottom). This network therefore offers a more useful starting point from which to explore the qualitative features of these connections and the work practices that support them at Sagalassos. The interconnectedness among such different industries, which supplied different economic sectors, highlights the multifaceted nature of cross-industry work practices throughout the ancient city.

#### Moving in: From Pottery to Limekilns

Some sets of relations between industries are also seen in chronological and spatial terms; for example, in consecutive occupation of workspace. This is most apparent in a ceramic workshop complex located in the Eastern Suburbium of the city (Murphy and Poblome 2016). This complex was composed of

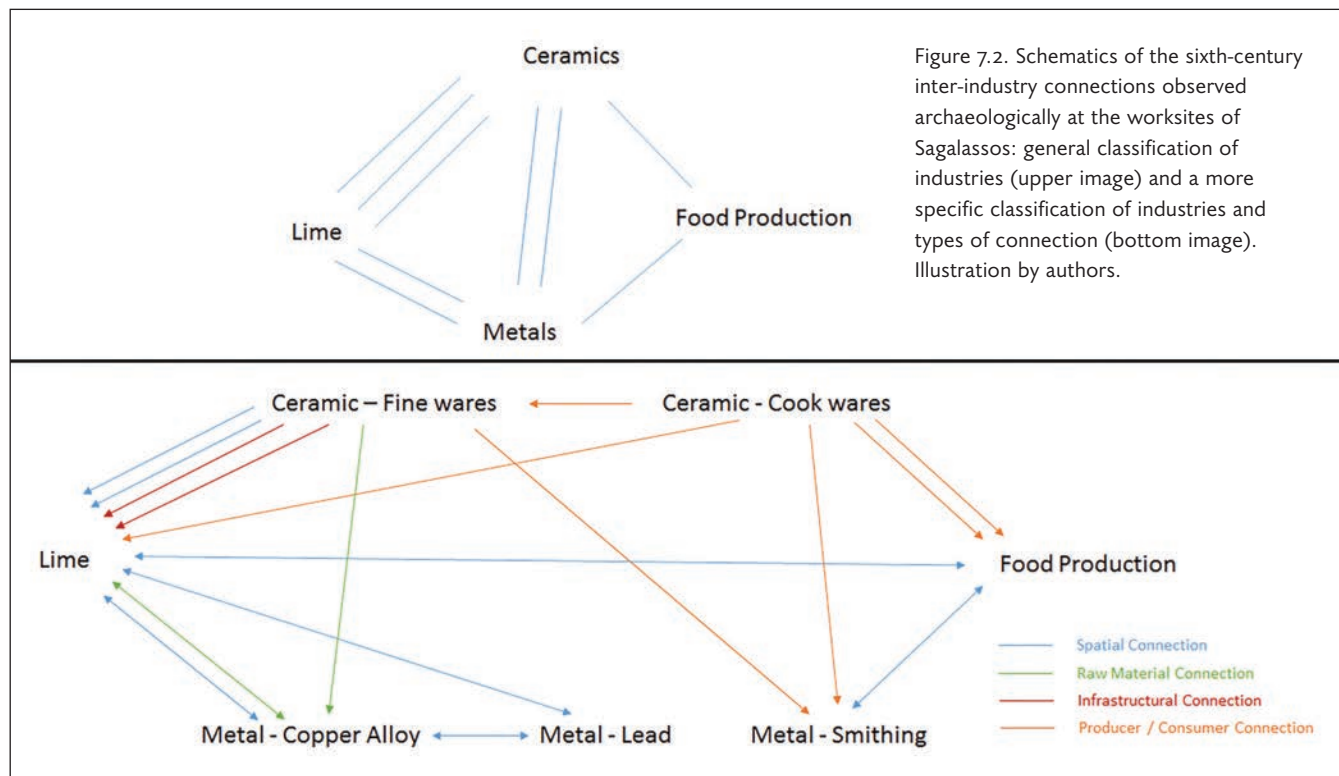




Figure 7.3. Pottery kiln converted for lime-burning.  
Photo courtesy of the Sagalassos Archaeological Research Project.

at least four architecturally independent workshop units operating into the sixth century. Shortly after the potters abandoned the complex (by the mid-sixth century), the workshops and their kilns were repurposed for lime-burning. In this transfer, the kilns were renovated; the perforated floors used to separate the combustion and firing chambers of the simple updraft pottery kilns were removed, creating a single vertical shaft with a slight ledge upon which lime and fuel might be stacked. The lower stoke-hole of the kilns was filled and the lower tile floors were partially dug out to create a small pit where ash might fall and be separated from the burned lime. The repurposing of the kilns appears to have been completed across the entire complex. Eight kilns were found containing a thick lens of powdery lime across the interior (for example, see Fig. 7.3); in the inner rooms of the workshop, rubble stone from the nearby mountain screes were piled onto the workshop floor. Inside one of the kilns, a locally manufactured amphora and some complete SRSW vessels were discovered, likely used by the workshop to hold charcoal or loose lime, and discarded with the abandonment of the complex by the lime-burners.

In this scenario of sequential occupation, workshop spaces appear to have been transferred as a single property between workgroups. The workspaces seem to have been little altered by the workers burning lime, and indeed the smashed (yet reconstructable) vessels on the floor and associated with the pottery phase of occupation suggest that many of the remains abandoned by the potters were simply trodden over by the latter group. Indeed, the occupational activity seems to have focused on the use of the kilns themselves.

From a cross-industry perspective, this repurposing of kilns demonstrates a detailed knowledge of pyrotechnologies (recognizing the continued utility of these kilns in sustaining the long, slow firing necessary for slaked lime), and a laborious but technologically strategic overhaul of the workshop kilns soon after the potters moved out. The conversion of furnaces has also been found in the pottery workshops east of the library where two pottery kilns showed similar evidence of lime-burning in their final, early sixth-century, phase of use (Poblome and others 2015, 230–31). The repetitive occurrence of these renovations at different workshop sites at Sagalassos suggests that this infrastructural repurposing fits into a pattern of reuse (from pottery to lime firing) and maintenance of technological knowledge in the early to mid-sixth-century city.

### **Organized Multicrafting: Shared Spaces**

In the network of sixth-century industry at Sagalassos, another type of cross-industry connection is observed in the tight cluster of spatial links among the worksites found in the Roman baths complex. In this once large public building complex, we can trace instances in which multiple industries were working alongside one another; that is, the concurrent operations of multiple crafts by different individuals or groups within the same or adjacent spaces or what Shimada (2007) would describe as ‘multicrafting’.

In the eastern *frigidarium* of the baths, which had already been renovated in the early sixth century for communal dining, the remains of two furnaces with lenses of lime were found in the centre of the eastern wing of the room (over an in-filled pool). The two limekilns were preserved at the lower courses and floor, and were encircled by several copper-alloy (likely bronze) working furnaces situated in the surrounding niches (Fig. 7.4). Both the lime and metal-melting furnaces were constructed of reused building tile and display similar (circular) vertical shaft designs. The copper-alloy areas also included fragments of *tuyères* fashioned from water pipes and pieces of clay moulds used to cast the melted metal. Chunks of charcoal were found affixed to thin pieces of partially melted metal. The bath building would have provisioned abundant materials that could be heat-treated to recover metal and lime. Architectural decorations, such as flooring or (white marble) wall revetments with bronze fixtures and plaques, were readily available in such a bath complex, as were perhaps also the colossal imperial stat-

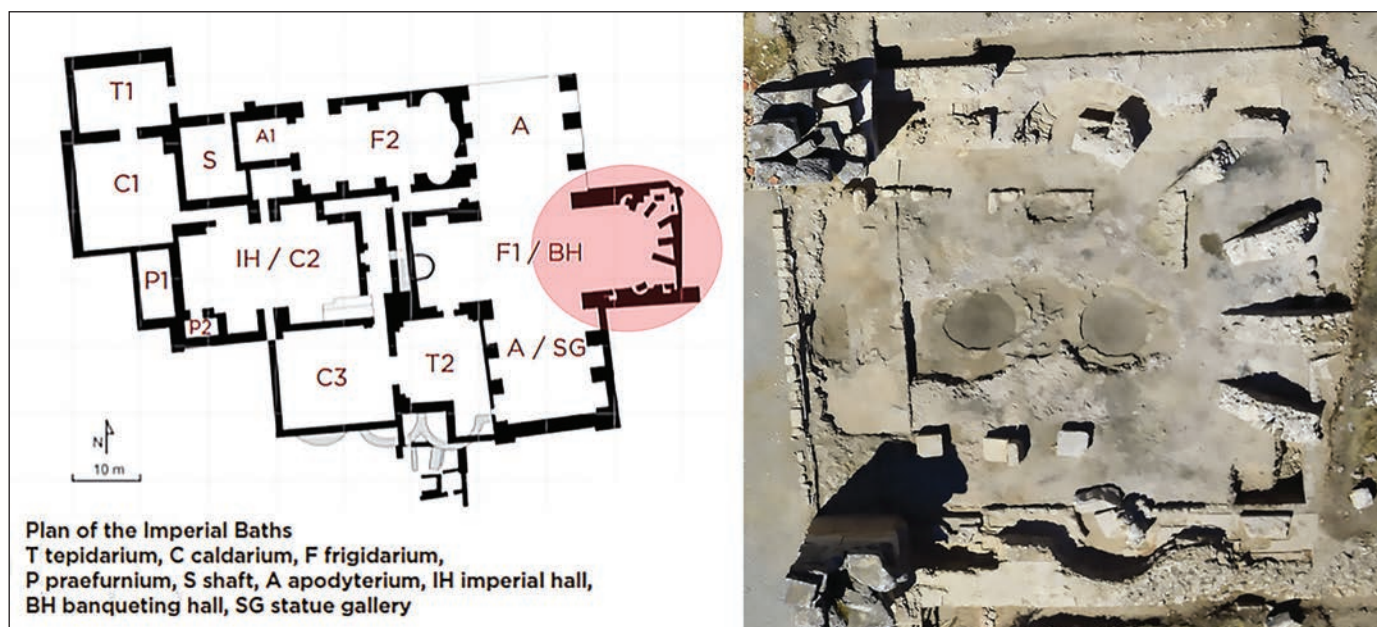


Figure 7.4. Bath complex plan (left image) and aerial photograph of lime-burning and copper-alloy work areas (right image). Plan and photo courtesy of the Sagalassos Archaeological Research Project.

uary that were found in the same room (Waelkens and others 2010, 269). These statues were originally composite objects themselves — constructed of marble heads and limbs, with gilded bronze-plated torsos — a mixed-media object perhaps befitting a multicraft organization in its recycling.

The appearance of such industry within a monumental public structure offers a stark juxtaposition of grand architecture and smoky deconstruction work, and similar late occupational contexts at other cities in Asia Minor have been cast as ‘squatter’ activities (Yegül 1986, 10). The highly interconnected nature of this multicraft arrangement warrants further attention, however, as these workspaces in the baths of Sagalassos represent a highly organized, and likely a *centrally organized*, operation involving numerous workers handling different types of material. The multiple limekilns of similar design and size suggest a high capacity of output; as one kiln was being charged, another could be cooled down. Multiple contemporaneous metal-melting furnaces likewise suggest an intense effort with numerous groups working simultaneously within a shared space. This multicraft environment represents a particularly dense and entangled web of network connections that are expressed in the organization of space, materials, and likely labour. Indeed, it is conceivable that these groups could provide complementary work support for one another, particularly in the less specialized tasks in production (breaking apart of materials, stoking of the fires). What draws these crafts together is a common reliance on mining the build-

ing for materials, and the similar subsidiary resource needs of pyrotechnological industries that rely on charcoal fuel to feed their furnaces. Moreover, the physical process of deconstruction (whereby metal fixtures needed to be removed from the stone and vice versa) created a symbiotic relationship in which the waste of one industry was the complementary raw material of another.

The concentration of lead cuttings (Fig. 7.5, left) found in another room of the baths may, in this respect, represent a slightly different relationship with the other two industries located in the complex. Situated nearby in a narrow service room originally intended to stoke the fires of the hypocaust furnaces of the central *caldarium*, dozens of pieces of cut lead were discovered in 2009 (Claeys and others 2009). While it is possible that these fragments represent the remains of some sort of construction activity or a collection of used lead pieces (for instance collected from window panes), considering the activities documented in the nearby rooms, these might also be seen as recycling operations, perhaps of lead fixtures and pipes removed from the water heating system. Lacking any sort of drippings (associated with soldering) and using the classification of tool-cut marks on lead developed by Anika Duvauchelle and Nicolas Monteix (2013) in their study of lead working at Pompeii, it is possible that this space was dedicated to melting and recasting lead — perhaps even in the shape of lead ingots of the sort found on the North–South Colonnaded Street of the city in a sixth-century deposit (Fig. 7.5, right).

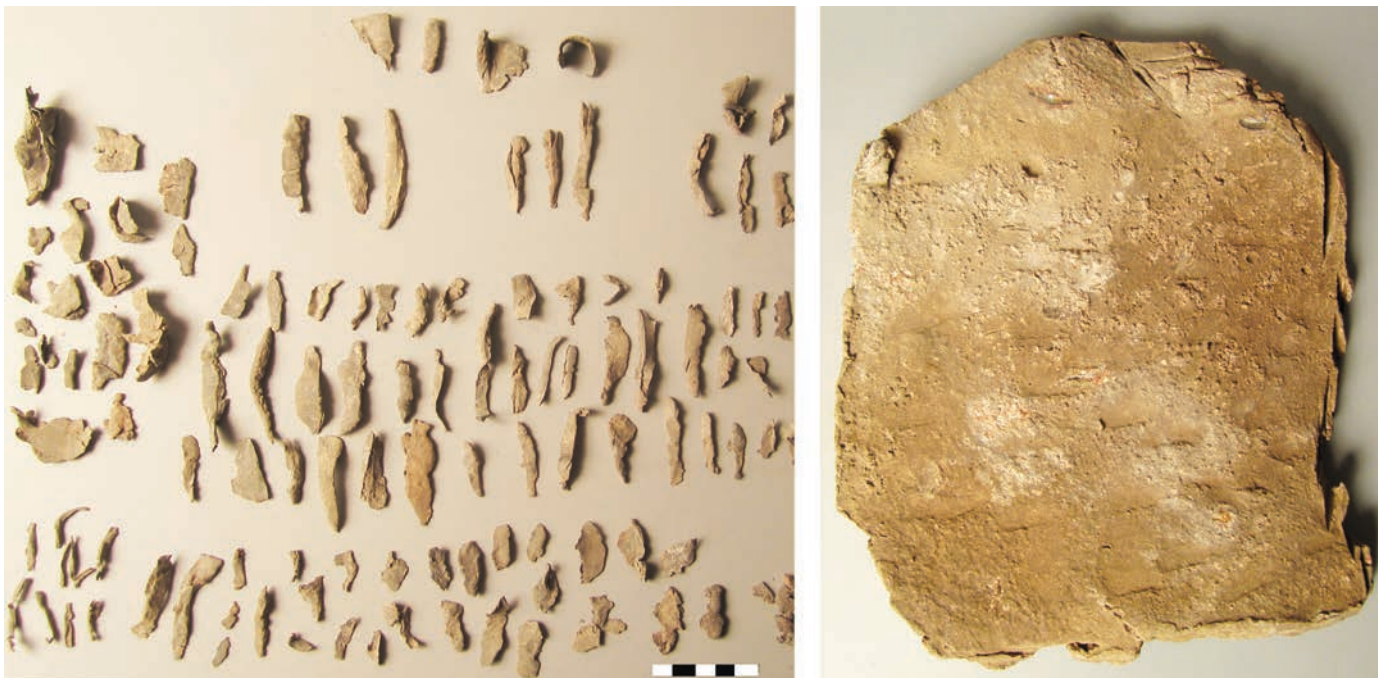


Figure 7.5. Remains of lead cuttings from service rooms of the bath complex (left image) and a lead ingot from a sixth-century context on the colonnaded street (right image). Photos courtesy of the Sagalassos Archaeological Research Project.

The bath industries were reliant on recycled stone and metals, and reused brick and water pipes (likely also retrieved from the disused building) were used to construct their furnaces when most of the shell of the building was still intact. Yet many of the other expendable raw materials were acquired in traditional ways that utilized supply networks sustained by long-running industries, such as ceramic manufacturing. This is most clear in the use of clay in the casting of copper alloy in the bath workshops. The fragments of grey clay have been identified as deriving from the Çanaklı Valley, and they match the clay source employed by the SRSW industry (i.e. these clays were used to manufacture the city's tableware throughout its seven centuries of production) (Degryse and Poblome 2008; Degryse and others 2008). This copper-alloy casting site was accordingly being supplied its clay through the same networks as the pottery workshops operating in the city. What is perhaps most remarkable about this sharing of supply chains is that this particular clay fabric was transported to the city from a valley situated over eight kilometres from Sagalassos and several hundred metres below the city (in the lower valley systems of Sagalassos's ancient territory). The copper-alloy recycling industry was employing these particular clays despite the presence of several nearby clay sources, even located in the city itself (Degryse and others 2008). As regards fuel sources, paleoethnobotanical analyses of the fuel from these

contexts are less refined than those of clay sourcing. Yet the current state of analysis of the charcoal also suggests that industries across the city at this time were commonly reliant on the same ratios of cedar, pine, and oak that had long been supplying the city, while palynological results suggest some changes to the wooded slopes around Sagalassos in the fourth century (Vermoere and others 2003). Together, these data support a view that these demolition works and recycling industries, while reliant on recycled materials, were likewise connecting to and helping to maintain regional supply networks.

While the scale of these industry activities is striking, the presence of so many recycling industries involved in the simultaneous mining of materials from the former public baths may be interpreted by some as an unrestricted, opportunistic economic extraction. Considering the intensity of these interactions, however, their organization is unusual for the city at the time and suggests that it may have been coordinated. Moreover, recycling of copper alloy (and possibly lead) is likely indicative of the lack of regional availability of these ore sources in the territory of Sagalassos and, as a practice, their recycling had a long history at the city (as evidenced by isotopic analyses of such materials). In fact, in the case of architectural lead, isotopic compositions from all periods of occupation at Sagalassos (even the Hellenistic and high imperial periods) suggest a high degree of mixing of materials from multiple

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sources (i.e. an indirect indication of recycling) (Degryse and others 2009). A similar scenario can be suggested in the case of glassworking at the site. The vast majority of glass throughout the Roman and late antique periods was manufactured from raw materials acquired from Egyptian and Syro-Palestinian sources (Degryse and others 2009). In this respect, recycling of bulky, non-local raw materials derived from sources well beyond the territory of Sagalassos has a deeper history at the site. While recycling of raw materials (metal, stone, etc.) as an economic practice can hardly be said to uniquely characterize the sixth century, the scale of the recycling works in the former bath complex at this time highlights the unique character of this multicraft work organization.

### **Cross-Industry Relations: Networks and Economic Development in the Sixth Century**

The late antique phases of many cities across Asia Minor have come to be characterized by changes in urban organization, and industry has prominently featured in this discussion, both in terms of the rise of recycling activities and in terms of its appearance in what in earlier times would have been unexpected public places (monumental buildings, public porticoes). While often couched in narratives of economic 'decline' or technological 'stagnation', this network approach by contrast takes a more nuanced and highly localized view on these large-scale processes of urban economic development through the local craftspeople of sixth-century Sagalassos. This raises the question: What do these observations regarding networked industries have to offer to our understanding of the late antique urban economy at Sagalassos that might otherwise be missed by single-industry studies?

First, this network approach highlights how widespread industry was throughout the city at this time, and how interconnected these craftspeople were through multiple ways (exchange of products and materials, as well as sharing of infrastructure and spaces). Using the structure of the network and strength of these connections as entry points to explore these relationships brings to life the types of daily work practices in the city at the time that reinforced these connections. The archaeological reconstruction of these practices also highlights the role of local producers, being not only engaged in recycling activities and reusing materials (activities often characterized as being derivative), but also as being actively involved in exchange as consumers of

both specially commissioned and general market goods, as well as regionally traded raw materials. This engagement suggests continued economic activity that was embedded in local and regional socio-economic networks and established work practices.

Second, the spatial clustering of these inter-industry links also calls attention to the rather unusual nature of the operations found in the Roman baths complex. Not only are these connections defined spatially (in their concentration and arrangement), but the material record of the work practices that took place in those areas suggests an intense interaction. These were targeted operations that accumulated materials, such as copper alloy (and possibly lead), that had been imported from beyond the city's hinterland for many centuries. The unusual strength of these connections conceivably reflects a high degree of organization in bringing together work crews trained in working different materials. Various scenarios might be proposed for such an arrangement, including the rent or sale of buildings by imperial or civic authorities to private individuals, guilds, or civic *decurions* (Saradi 2006, 186–210), although based on the current evidence, it is difficult to speculate on the specific institutions or actors involved at Sagalassos.

Third, by employing the network metaphor for the datasets of this period, attention is drawn to certain patterns and intensities in industry entanglements. There are two industries in particular that stand out in this regard: lime-burning and fine-ware ceramic production. Both demonstrate a high degree of connectedness with other industries that is expressed in a wide range of material expressions (spatial, material, infrastructural) (Fig. 7.2, bottom). Each therefore warrants further discussion.

Lime-burning was widespread across the city. The number of lime-burning kilns dated to the sixth century is notable, and the growth of this industry is certainly tied to the building activities of the city and the architectural styles of the sixth century, which involved setting building tile and reused stone in a heavily applied lime mortar. This is not to say that lime-burning was unique to this period; in fact, Roman imperial-period lime-burning has been observed in the Eastern Suburbium and in the late fourth century in the workshops located near the library. Many of the limekilns dated to the sixth century, however, likely sustained early to mid-sixth-century building projects. New building projects included the church on the Upper Agora, a section of the fortification walls, as well as major renovations of existing structures, including domestic quarters in a (former) Urban Mansion complex (Waelkens and others 2007). While the increased demand for lime

may help to explain its prevalence in the dataset, the interconnected nature of its activities demonstrates their embeddedness in the local craft network. Such network entanglement may have encouraged the high degree of technological innovation and diversity of context observed with this industry. In general, lime-burning appears in a wide range of contexts — from disused workshops to construction sites, demolition sites, and domestic contexts, and the kilns themselves are technologically diverse, with variation in the size, design, and construction materials of furnaces as well as with differential levels of infrastructural investment. This network approach offers new perspectives on some of the unusual features of this industry's organization.

The significance of the connections of the fine-ware ceramic industry appears to present a different story. The continued presence of tablewares, figurines, and other fine-ware ceramics in contents associated with consumption and use (including the worksites described previously) demonstrates that Sagalassos continued to provide a local consumer base for the fine ware industry throughout Late Antiquity. Yet, in addition to the number and diversity of connections, what is particularly noteworthy in its cross-industry network is the directionality of those diverse connections, which tend to move goods and transfer spaces and infrastructure to other industries. The wider significance of the connections between the ceramic industry and others in the city may be evidenced in the case of regional supply networks that were still being maintained into the sixth century, particularly the eight-kilometre-long clay transport from Çanaklı, which (even in the most prosperous of Sagalassos's times) was beyond typical limits of catchment areas. In some sense, the degree of connectivity and directionality of resources perhaps reflect the role of this long-standing, archaeologically conspicuous, and thereby (presumably) economically significant tableware industry, which when studied in isolation in the mid-sixth century appears to have been downsizing, but still demonstrated a high degree of product specialization and continuity in ceramic forms

and technical execution. Thus, the ceramic industry at the site seems to have provided an economic 'anchor' for other industries of the city during this time of transition. This was perhaps not so much due to its scale of production (which by the late sixth century appears to have begun to dwindle), but rather due to its socio-economic relationships that were founded on more than seven centuries of craft tradition, sustained through regional transport and supply networks, technological knowledge and investment, and an established local consumer base.

## Conclusion

This article has used the case of Sagalassos as a means of interrogating the utility of the network metaphor for the study of local cross-craft relations. Production studies in the last decade have begun to expand the ways in which they approach the study of craft production and how they socially frame these types of economic activities. Drawing together two current bodies of scholarship — network thinking and cross-industry studies — this exercise gives pause regarding our *etic* archaeological categories in archaeological analyses of economic organization. It is clear in tracing the connections between work contexts that there were numerous ways in which industries interacted with one another in the past and variable material expressions of that interaction. Moving between the pragmatic divisions of study reinforced by specialized archaeological practitioners and approaches that emphasize the interconnectivity of production activities within a local community, this study has brought to life work practices and the roles of different industries within the city's economic organization that might otherwise have been overlooked in single-industry studies. By exploring the topologies of these networks and the types of connections therein, rather than offering a new economic history of late antique Sagalassos, this study instead serves as a means of socially reframing the data for the period in new ways that provide a fresh line of research.



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# Towards Romanization 2.0

## *High-Definition Narratives in the Roman North-West*

**ABSTRACT** This article explores the implications of studying Romanization 2.0, a concept that entails putting connectivity and human-object entanglements at the centre of new high-definition narratives. While this perspective brings important pay-offs, decentring Rome in historical narratives and moving beyond the methodological nationalism that has often dogged studies of Roman imperialism, it also presents archaeologists with an array of methodological challenges. How can the Big Data of multiple localities connected by flows of objects and people be appropriately visualized and analysed? To address this question, I present some results from a project concerning the selection of standardized objects in funerary contexts and their impacts on local communities in Britannia, Gallia Belgica, and Germania Inferior, c. 100 BC–AD 100, drawing on a database of over three thousand grave assemblages.

**KEYWORDS** Romanization 2.0; funerary assemblages; standardization; pottery; fibulae.

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### Romanization 2.0

The idea of Romanization 2.0 refers to a new way of conceptualizing and interpreting the Roman world and its material culture. It was first coined in a discussion article in *Archaeological Dialogues*

by Miguel John Versluys (2014, 6; Woolf 2014). The novelty of this concept lies in its explicit use of perspectives deriving from the historical study of globalization and the so-called ‘material turn’. In the first place, globalization theory encourages researchers to rethink issues of analytical scale to address the ‘global’ and ‘local’ simultaneously (Pitts 2017a). Here ‘global’ is taken to denote pan-regional scales of analysis and may correspond with emic cultural constructs such as *oikumene* and *orbis terrarum*, as opposed to being global in a literal planetary sense. Following this line of inquiry entails doing away with the boundaries that artificially constrain the analysis of moving people and objects in a highly interconnected Roman world. In this way, the perspective marks a considerable break with scholarly traditions in which histories and archaeologies of individual provinces are commonplace, especially when those provinces broadly correspond with modern nation-state boundaries (e.g. Britannia and Britain). From an archaeological standpoint, it also necessitates a move away from ingrained approaches to individual archaeological sites ‘in context’, towards the simultaneous comparison of multiple sites at once, as part of a larger connected empire. An emphasis on globalization helps us to think of the Roman world less in terms of separate containers (Roman, native, Gallic, Greek, military, civilian, urban, rural, etc.), but rather a single container variously characterized by flows and blockages in the movement of people and objects. Privileging connectivity and mobility facilitates narratives that decentre Rome and a more complex polycentric conceptualization of empire.

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If the contribution of globalization thinking to Romanization 2.0 mainly concerns the adoption of new conceptual and analytical scales, the material turn helps to flesh out the picture — literally and figuratively. At the most basic level this requires objects and material culture to be pushed to the forefront of historical investigation, since it is primarily (and arguably only) through the movement of objects, styles, and materials that globalization may be reliably and consistently studied in a connected Roman world. Versluys (2014, 15) provocatively asks us to imagine a Roman world in which none of the extant Roman literary sources had survived for modern audiences. The result of this thought experiment, he proposes, is not so much a bounded empire divided into cellular provinces, but rather a picture of Eurasia characterized by diasporas of objects, in turn producing varied repertoires of material culture and specific forms of human–thing entanglements, or objectscapes (Versluys 2017; Pitts and Versluys 2021). Putting objects centre-stage ought to involve addressing the fundamental questions of what objects *did*, by privileging their stylistic, material, and contextual properties. In this way, Romanization 2.0 asks its adherents to attempt to go ‘beyond representation’, by placing secondary emphasis on the older paradigm that prioritized the question of what objects *meant* (Van Oyen and Pitts 2017). For example, the imitation of *terra sigillata* designs in the local pottery repertoires of early Roman Europe was once variously interpreted representationally in terms of progressive emulation of Roman symbols (Millett 1990, 38), the creation of new local consensus of taste (Woolf 1998, 202), and the spread of luxury (Wallace-Hadrill 2008, 421). In contrast, the new paradigm demands a more rigorous investigation of the genealogies, functions, and trajectories of the specific designs being imitated (e.g. Van Oyen 2016; Pitts 2017b; Swift 2017; cf. Gosden 2005), providing a more holistic analysis of archaeological variability, which might in turn provide the basis of a less partial ‘representational’ interpretation. More radically perhaps, Romanization 2.0 also provides a context for exploring the roles of objects as *agents*. From this perspective, the phenomenon of *terra sigillata* imitation may have had less to do with the realm of cultural politics than is often assumed, and a lot more to do with the machinations of the inter-artefactual domain, in which ‘the only factor which governs the visual appearance of artefacts is their relationship to other artefacts in the same style’ (Gell 1998, 216).

This perspective has several important implications for the study of urban contexts. For the Roman

world, globalizing processes were highly dependent on urbanization and the development of an interconnected network of cities and other settlements with essentially urban functions (i.e. military bases). As the north-west Roman provinces demonstrate, where cities did not already exist it became necessary to create them. As well as being highly connected environments, Roman cities were also made up of mega-conglomerations of objects with diverse stylistic properties. Roman cities can therefore be understood to have functioned as key interfaces between the ‘global’ inter-artefactual domain of the Roman world (as centres for the influx of objects and styles with inter-provincial circulations), and the local inter-artefactual domains of individual regions (each with their own long-lived traditions and objectscapes). While not exclusively about urbanism, Romanization 2.0 puts the role of cities into wider contexts, at both local and global scales of analysis. In this way, urban centres ought to contribute rich bodies of data to drive future applications of Romanization 2.0.

### High-Definition Narratives

Having briefly outlined Romanization 2.0, it follows to consider how this ambitious vision might be best realized and studied archaeologically. Given its object-centred approach and the much-lauded wealth of material evidence that exists from the Roman period (e.g. Gardner 2003; Van Oyen and Pitts 2017), a clear desideratum of Romanization 2.0 is to generate new high-definition narratives of the Roman world and its material culture. At this point, it is worth exploring what exactly ‘high-definition’ ought to entail. For some archaeologists, high-definition may refer to a certain level of chronological precision and accuracy in the dating of stratigraphy and broader horizons. While such a perspective is undoubtedly important to operationalizing Romanization 2.0, it is arguably not such an important missing piece in the Roman puzzle. After all, Roman archaeology has been long-blessed by tight chronological frameworks informed by the extant historical narrative, high rates of coin-loss, and the deposition of other highly standardized artefacts such as stamped *terra sigillata* pottery, in addition to other relative and absolute dating methods. In contrast, the high-definition approaches I deem essential to the success of Romanization 2.0 instead concern how archaeologists deal with the complexity and granularity of material-culture data within already tightly defined chronological horizons. The challenge involves comparing and visualizing ‘Big

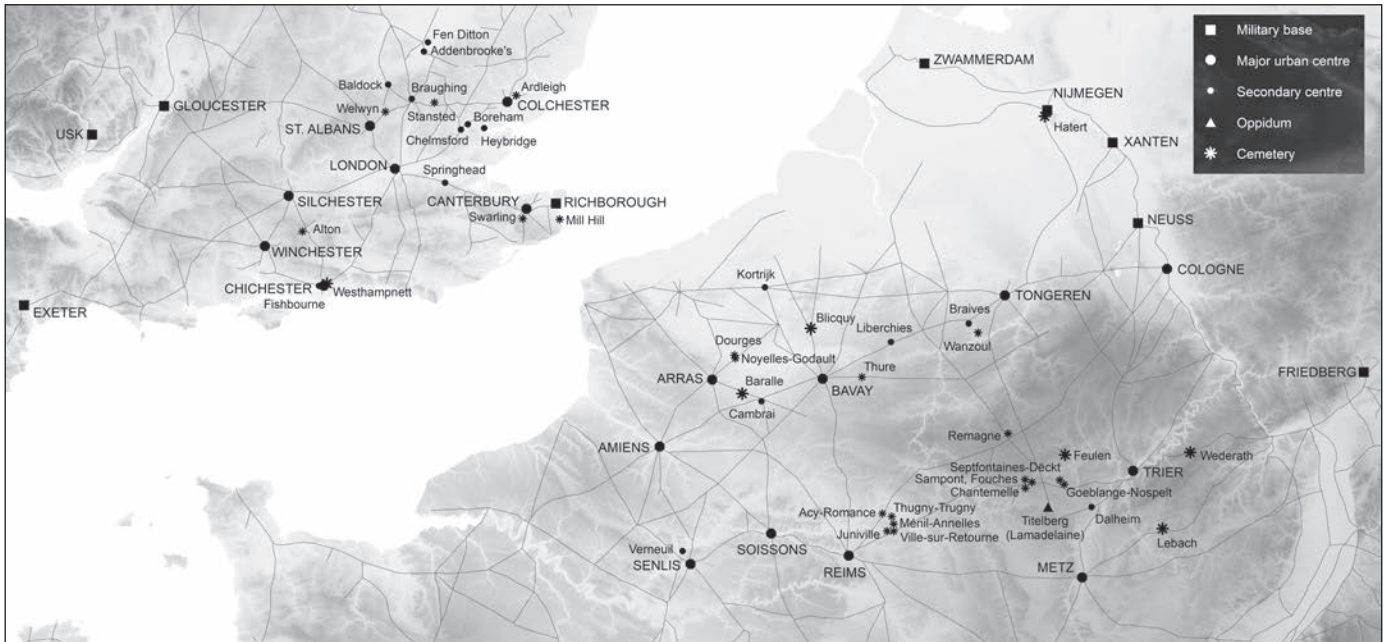


Figure 8.1. Map showing sites and cemeteries scrutinized in Pitts 2019. Map by author (Pitts 2019, 22, fig. 1.6).

Data' across multiple provinces, without sacrificing the high-definition rendering of patterns at a local or assemblage level.<sup>1</sup>

The methodological challenge of implementing Romanization 2.0 and creating new high-definition perspectives on the Roman world is undoubtedly substantial. The sheer scale of the task of comparing large bodies of complex data across multiple provinces may often be only achieved through bigger programmes involving multiple researchers (Laurence and Trifilò 2015; Gardner 2017). Other obstacles include the persistence of national traditions in recording, classifying, quantifying, and publishing the same kinds of artefacts, and the need to read specialist reports in multiple languages, which impede easy comparisons of material culture between many different localities at once. It is thus no surprise that when bigger comparisons have been attempted they tend to scrutinize classes of evidence with more universal and standardized descriptive languages, such as inscriptions and *terra sigillata* pottery, as opposed to, for example, coarse-ware pottery and the eclectic category of 'small finds'. However, these challenges should not be over-emphasized, or seen as absolute barriers. Even large collaborative projects cannot do everything at once. Arguably the most pertinent challenge is for researchers to move out of their comfort zones to consider areas of study

framed not by predetermined sites and regions, but rather by the circulation of objects. At least from an artefactual perspective, the most important methodological provisos for studying Romanization 2.0 consist of a) an appropriate *scale* of analysis to examine the impacts of circulating objects beyond individual localities and 'bounded' regions; and b) the retention of high-definition perspectives that allow the granularity of local patterns and experiences to be explored in depth and compared with other connected localities, going beyond the top-down perspective of 'dots on a map' and the complexities concealed by such visualizations (Pitts 2020).

The high-definition approach to Romanization 2.0 that I wish to explore in the present article involves both chronological precision and contextual granularity. More specifically, this entails taking well-defined assemblages or packages of objects that might normally form the basis of detailed intra-site analyses (e.g. Pitts 2010), and instead comparing them simultaneously at a pan-regional scale with hundreds of other contemporaneous assemblages. By repeating the exercise for successive tightly-dated chronological horizons, this should create a platform for new high-resolution narratives of big-picture phenomena without sacrificing the specificity of local perspectives. By retaining individual stratigraphically definable assemblages as the basic units of analysis, and by resisting the urge to condense the complexity of this archaeological data into the reductive categories of whole sites and regions, this kind of approach facilitates the simultaneous analysis of the 'global'

<sup>1</sup> Although not specifically addressing Romanization 2.0, see contributions in Allison, Pitts, and Colley 2018.

and ‘local’ together. Comparisons of this sort can be performed relatively easily using multivariate statistics such as Correspondence Analysis, which can take large contingency tables of data consisting of varying quantities of a plethora of different types of artefacts found in hundreds if not thousands of different assemblages. Appropriately applied, this method may be able to give a visual indication of whether an individual assemblage is typical for its region or locality, or instead more closely aligned with pan-regional or ‘international’ patterns in the selection of objects. In this way, it may be possible to establish, for example, high-definition pictures of economic and cultural practices across wide territorial vistas, illustrating the extent to which ‘objectscapes’ were actively constituted by their involvement in larger urban networks, or were more firmly anchored in their immediate local contexts.

To illustrate the potential of multivariate approaches to illuminate Romanization 2.0 and produce new kinds of high-definition narratives, the rest of this article turns to the case study of early Roman north-west Europe. The examples and trends I refer to derive from a much larger project based on the analysis of a database consisting of over eighty thousand objects, the majority consisting of pottery vessels and fibulae (Pitts 2019). The project places particular emphasis on the impact and circulation of standardized objects in the period *c.* 100 BC–AD 100, in an area taking in what would become the provincial territories of Britannia, Gallia Belgica, and Germania Inferior (Fig. 8.1). While a variety of settlement assemblages are scrutinized, a major component of the data consists of over three thousand complete grave assemblages, the majority of which can be confidently assigned to ten- to forty-year date ranges. It is these data that I wish to discuss as the basis for new high-definition narratives of the period. Given the complexity of the analyses in this project, it is not possible to repeat them in their entirety in a single article. Instead, I have chosen to illuminate key aspects of the resultant high-definition narratives through a series of individual grave assemblages.

There are several good reasons why repertoires of objects in funerary contexts are especially well suited to explorations of Romanization 2.0. The first of these concerns the ease of which data can be gathered and compared across multiple national traditions of archaeological classification and publication. In most cases, the complete contents of grave assemblages are routinely published in their entirety in the modern countries that make up the study area of this project, namely Belgium, Britain, France, Luxembourg, the Netherlands, and Germany. Unlike equivalent ‘legacy data’ in published and grey-litera-

ture reports from settlements, however, which tend to be inconsistently and incompletely published in a variety of formats in these countries, very little time needs to be taken in reconstructing the complete contents of the original grave assemblages. Indeed, the practice of fully illustrating funerary assemblages greatly assists the process of assigning objects to a unified system of types and styles, and the necessity of reassigning some older descriptions to newer pan-regional typological conventions.<sup>2</sup>

Another methodological benefit of privileging funerary assemblages is the consistency of their character and make-up in the Late Iron Age to Roman period. Since the graves in question feature just over five objects each on average, they form robust units for comparison using techniques such as Correspondence Analysis, often with the effect of producing clearer scatter plots that are not over-clustered. Crucially, the potential for high-definition narratives is greatly improved when dealing with hundreds of assemblages each composed of a limited number of discrete object selections (graves), as opposed to a smaller number of large assemblages that are the products of many individual deposition events over time (e.g. assemblages from urban settlement sequences). Perhaps most importantly, as the product of deliberate and conscious cultural selections, the study of funerary assemblages has the potential to cut to the core of the aims of Romanization 2.0, by putting human–thing entanglements at the centre of analysis (Versluys 2014; cf. Hodder 2012). This is a rather different priority to the processual archaeology of the 1970s and 1980s which privileged narratives of change based on robust urban sequences and large groups of artefacts that were statistically representative of large-scale patterns of supply and deposition. In that paradigm, which continues to inform more recent frameworks for research into the impact of urbanism (e.g. Perring 2002; Perring and Pitts 2013), funerary assemblages are typically avoided because they are regarded as being formed by economically irrational patterns of behaviour. While this criticism has little bearing on the usefulness of using grave assemblages as evidence of cultural patterning, it also urges some caution against going beyond what funerary data can tell us more generally. For this reason, the project in question (Pitts 2019) includes appropriate data from larger settlement assemblages to contextualize the selections of objects made in the funerary sphere with broader-brush data on the circulation, breakage, and loss of equivalent objects at a range of different sites and settlements.

<sup>2</sup> E.g. Deru 1996, for so-called ‘Gallo-Belgic’ wares.



Table 8.1. Numbers of graves and major classes of objects scrutinized in Pitts 2019.

Phase	Era (c.)	Graves	Coarse pottery	Fine pottery	Fibulae	Glass vessels	Animal remains	Martial equipment
1	100–25 BC	697	2494	—	608	—	207	161
2	25 BC–AD 40	783	1439	1132	594	25	97	56
3	AD 40–70	985	1843	1581	461	162	40	20
4	AD 70–100	801	1883	1551	179	183	26	7
<b>Grand totals</b>		<b>3266</b>	<b>7659</b>	<b>4267</b>	<b>1842</b>	<b>370</b>	<b>370</b>	<b>244</b>

### Humans and Things HD: Funerary Object Selection in North-West Europe, c. 30 BC–AD 100

Using a series of graves as illustrative examples of larger phenomena, this section aims to provide a sense of what high-definition narratives of Romanization 2.0 might look like. To do so, these graves are discussed in the context of wider patterns in the deliberate selection of objects among connected societies at the interfaces of what would become the Roman provinces of Britannia, Gallia Belgica, and Germania Inferior.<sup>3</sup> For the convenience of storytelling, I have structured the narrative into three major periods of change, even though more fine-grained perspectives are possible. I have also left out the Late Iron Age part of the story, which before the sudden injection of standardized objects c. 30–25 BC, is of a qualitatively different nature. Suffice to say that a handful of societies were practising the rite of accompanied cremation in flat-grave cemeteries across the region at the start of the first century BC, often with the inclusion of pottery and fibulae, and to a much lesser degree of frequency, Italian wine amphorae, hearth and feasting equipment, weaponry, and items of personal adornment. While the historically significant campaigns of Julius Caesar in the 50s BC brought significant social upheaval, its impact on the funerary record is barely discernible. However, as the early Roman period wore on, the rite of accompanied cremation became more widespread amongst not only local societies, but also communities of soldiers and colonists, thus presenting an excellent medium for exploring the evolving entanglements of humans and objects in this formative era of European history.

Before delving into the detail of object selection, it is worth considering some low-definition patterns in the make-up of funerary assemblages in

the data compiled for the periods in question (Table 8.1). Major headlines coinciding with an Augustan object-boom (phase 2) include the rise of fine standardized pottery (including *terra sigillata*), the gradual introduction of glass vessels, and corresponding declines in the deliberate placement of fibulae, animal remains, and weaponry in funerary contexts. Taken together, these dramatic changes underline the extent to which new configurations of objects were at the heart of cultural change. In this way, Romanization 2.0 in north-west Europe was not just about the selection of new combinations of objects drawn from an increasingly globalized repertoire, it also involved re-evaluating older selections of objects with more regional and local circulations. Whereas innovative new Augustan styles of fibulae helped to extend the Iron Age practice of placing brooches in graves for a few generations, sharper declines in the practices of depositing martial equipment and animal offerings may well have been hastened by the increased weight of their ‘barbarian’ connotations, especially amidst the bewildering new world of Roman things and urbanized environments. For further insights, let us now consider some high-definition perspectives on these changes for each of the periods in question.

#### Augustan-Tiberian Assemblages: The Beginnings of an Object Revolution

To begin a brief high-definition narrative of Romanization 2.0 and human–object entanglements in north-west Europe, let us consider the objects placed in two graves of Augustan-Tiberian date (Fig. 8.2). Both have been deliberately selected as relatively modestly furnished graves from cemeteries associated with Iron Age societies, to gauge the impact of what I have described as the ‘Roman object revolution’ amid two communities separated by nearly 450 miles as the crow flies. The cemetery at Lebach was in use much earlier in the first cen-

<sup>3</sup> Further outlined in Pitts 2019.

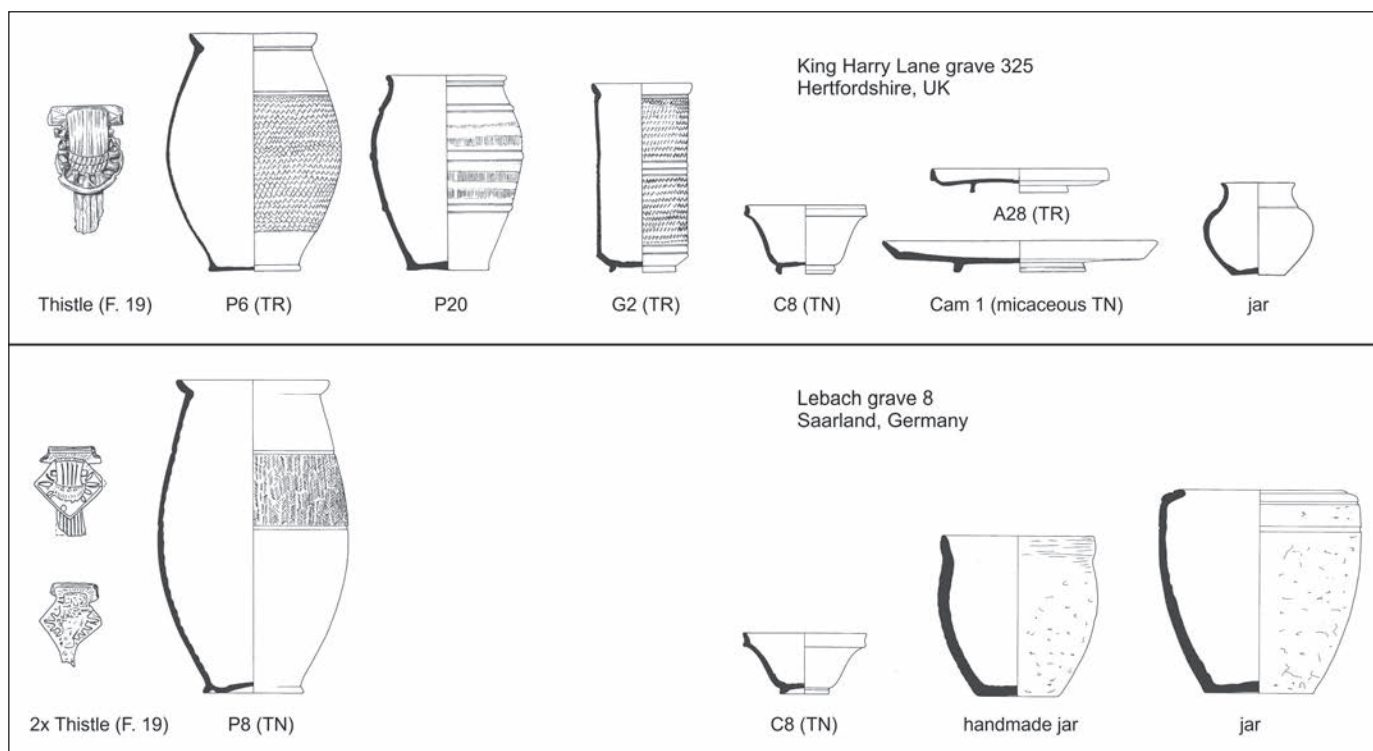


Figure 8.2. Grave 325 at King Harry Lane, St Albans (after Stead and Rigby 1989, 365) and grave 8 at Lebach (after Gerlach 1976, Taf. 9). Drawn by author.

tury BC (Gerlach 1976), whereas the first graves from the King Harry Lane cemetery at St Albans date to the last decades of the first century BC (Stead and Rigby 1989), long before the Roman annexation of south-east Britain in AD 43. Although broadly contemporary, the grave from Lebach is slightly earlier (c. 30 BC–AD 10) than the one from St Albans (c. 15 BC–AD 30). Considering the objects placed in the graves, both assemblages attest to the sudden and widespread proliferation of a new range of standardized objects. Furthermore, there are several striking similarities in the appearance and even types of objects placed in each grave. This is because the graves in question were not only selected because they belonged to cemeteries with similar origins and funerary rites, but also because they shared similar statistical properties when compared in Correspondence Analysis of over six hundred graves from the period (Pitts 2019, 103, fig. 3.21). What can the selections of objects tell us about processes of change, and why are they so similar?

Perhaps the most striking feature linking grave 325 at King Harry Lane and grave 8 at Lebach is the presence of standardized objects. Both include distinctive Thistle brooches (Feugère 1985, type 19), a new Augustan kind of highly decorative and outwardly visible fibula, which were not so much identically replicated but serialized according to the repeti-

tion of specific stylistic criteria. The type circulated widely in south-east Britain and the new Roman province of Gallia Belgica, and was not uncommon in the cemeteries of local communities at the time. Both graves also include two identical *terra nigra* cups (Deru 1996, type C8), which had probably been manufactured regionally at one of the major new urban centres recently established at Reims or Trier. Significantly, the types in question have distinct Mediterranean genealogy, deriving from the Italian *terra sigillata* form Cons. 17 (Deru 1996, 63), a phenomenon shared with the pair of platters in the grave from St Albans. Taken together, these object selections illustrate a phenomenon by which local communities were able to draw upon a new circulating repertoire of artefacts for use in the social sphere of funerary display, both within (Lebach) and outside (St Albans) the bounds of the Roman Empire. While phenomena such as this suggest the existence of a shared cultural milieu spanning political boundaries and materialized through the deliberate and highly specific use of objects, the tendency towards increased homogenization was but one facet of the revolutionary changes taking place at the time.

Another important feature of the Roman object revolution in north-west Europe was the emergence of new objects that constitute important regional innovations that simultaneously referenced more

universal styles of object with pan-regional distribution. This phenomenon can be most strongly seen in the emergence of a new category of drinking vessels, the butt-beaker, which was originally produced in Gallo-Belgic pottery fabrics but soon developed distinct regional variations. A similar process can be seen with the emergence of the Kragenfibel brooch (not present in either of the graves in question), which derived from universal styles of decorative fibulae like the Thistle, but this time with a highly specific distribution roughly coinciding with the territory of the Treveri in south-east Belgium, Luxembourg, and south-west Germany. Crucially, butt-beakers were produced in significant quantities, and constitute the single most common standardized object type in funerary assemblages in this period. Although they draw upon elements of Mediterranean design,<sup>4</sup> unlike the Gallo-Belgic plates and cups that imitated *terra sigillata*, the new butt-beakers can be considered genuine innovations of north-west Europe. The popularity of the butt-beaker in funerary contexts surely had a lot to do with the affordances of the vessel, with its capacious shape fitting with the Late Iron Age predilection for large drinking vessels, and its fine-ware style and fabric sharing elements with other new standardized ceramics of more direct Mediterranean lineage.

Butt-beakers form a dominant component of their respective graves in Figure 8.2. Two are present in the grave from St Albans, including the universally circulating form P6, and form P20, which would give birth to the distinctive P21, the only Gallo-Belgic butt-beaker form produced in quantity in south-east Britain (Hawkes and Hull 1947, form 113, see Fig. 8.3 in this article). The emergence of the latter form is testament to the nature of a connected environment that allowed communities in Britain to develop their own variant of a 'global' design, even though they were not formally part of the Roman Empire at the time. A similar phenomenon can be seen elsewhere in the region. The P8 vessel included in Lebach grave 8 not only shares a close connection with the universally circulating P6, but crucially includes a band of decoration that evoked the P1 form (not illustrated), another regionally rooted design, again with close links with the Treveri.<sup>5</sup> These innovations are highly significant, not only in demonstrating the agency of local communities (and styles of objects) in cultural change, but also for revealing the existence of shared prac-

tices and frames of reference that had little to do with the machinations of Roman imperialism. From this perspective we should not forget the remaining vessels in the graves, which comprise three jars made in fundamentally local traditions of pottery production. The inclusion of a single handmade (non-wheelthrown) jar at Lebach serves to remind us that we are still essentially dealing with Iron Age societies in the Augustan-Tiberian period, albeit those that were undergoing rapid social changes involving a new and potentially bewildering array of objects.

The selections of objects in the Augustan-Tiberian graves at Lebach and St Albans are hugely illuminative, especially when compared against the backdrop of the equivalent selections in hundreds of contemporary grave assemblages. The graves in question clearly demonstrate how the inter-artefactual domain (Gell 1998) may have informed both the appearances of objects and even the relations between different kinds of objects in funerary assemblages. Although *terra sigillata* is not present, its appearance in the region, notably at military bases and fledgling urban centres, stimulated the transfer of designs from the Italian *sigillata* repertoire into the production of new Gallo-Belgic fine wares, perhaps with the initial assistance of expertise from potters linked to the Roman military. At the same time, innovations within the Gallo-Belgic repertoire, most notably the emergence of the butt-beaker, were simultaneously universalized in the wider region and re-particularized through the development of distinct local varieties. That elements of all these repertoires and others feature so prominently in the logics of object selection in funerary assemblages, from unconquered south-east Britain to south-west Germany, is highly suggestive of the existence of a single integrated inter-artefactual domain, which surely came into being through the increased connectivity of the early Roman period. While elements of an integrated inter-artefactual domain can be seen in the Late Iron Age, most notably in the circulation of some fibula types and shared strategies for the display of status among some communities, the sudden injection of large quantities of standardized objects from the Augustan era onwards represented a genuine step-change in the pan-regional configurations of human-object entanglements. Standardized objects fostered the creation of a new globalizing *koine* (see Versluys 2015) which allowed communities and individuals to variously signal their participation in the social and cultural transformations of the age, while simultaneously offering opportunities to distinguish themselves in new ways.

4 Cf. the thin-walled beakers more commonly found in Roman military contexts at the time; Brulet, Vilvorder, and Delage 2010.

5 On object rootedness, see Van Oyen 2016.

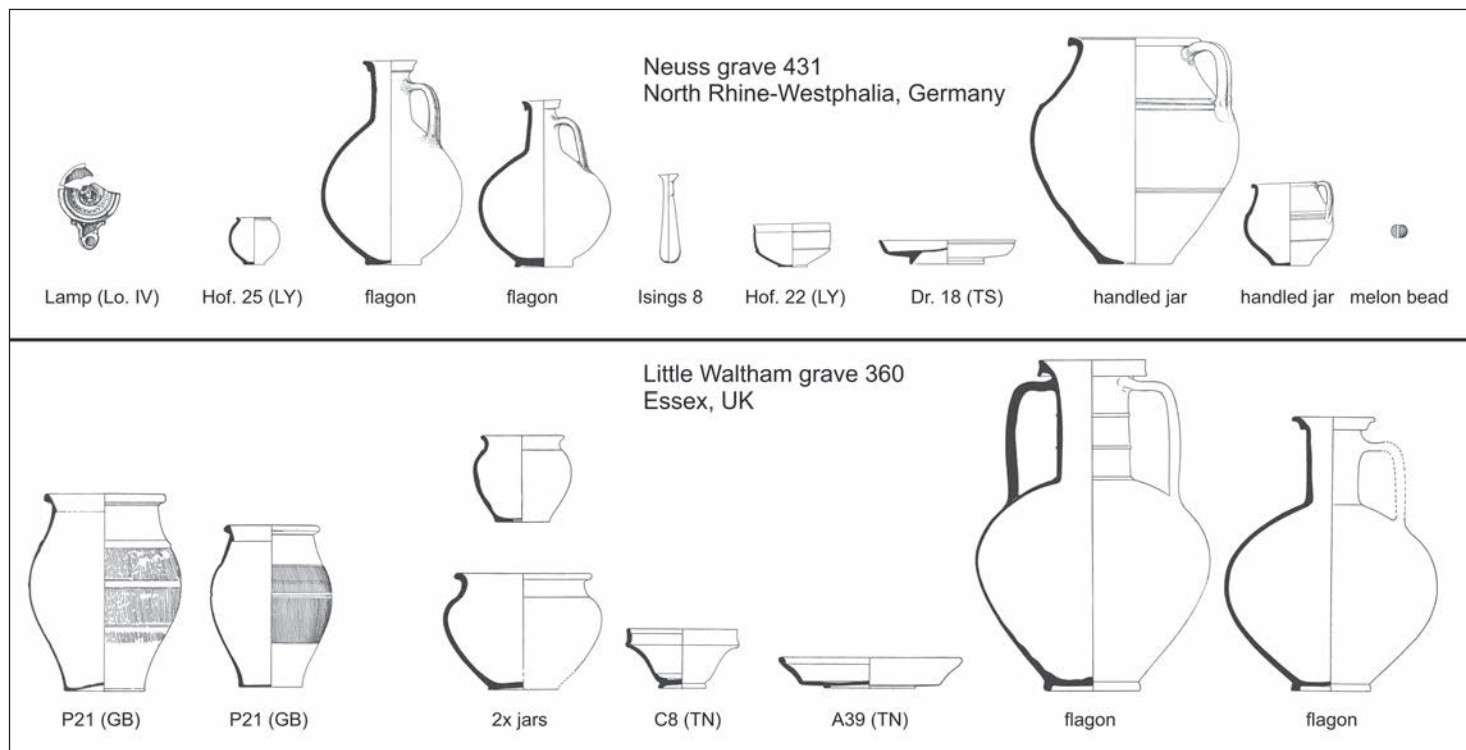


Figure 8.3. Grave 431 at Neuss (Novaesium) (after Müller 1977, Taf. 82) and grave 360 at Little Waltham (Drury 1978; reconstructed using standard types from Hawkes and Hull 1947). Drawn by author.

### ***Claudio-Neronian Assemblages: Deterritorialized Styles of Consumption***

By the middle of the first century AD, a lot had changed in north-west Europe's geopolitical landscape. A large part of Britain had now been annexed by Rome, with the beginnings of imperial infrastructure already taking shape in the new province in the form of military bases, colonies, urban centres, and roads. Elsewhere, there was renewed impetus to the development of the urban network in Gallia Belgica and the Rhineland, with new or extended street grids at Bavay, Tongeren, and Trier, and a new veteran colony at Cologne. Against this background of transformation, I have selected two graves that are this time from opposing ends of the inter-artefactual domain, at least as determined through the Correspondence Analysis of over eight hundred graves from the wider region (Pitts 2019, 155, fig. 4.20).

Grave 360 from Little Waltham, Essex (Fig. 8.3), dating to *c.* AD 50–60, comes from a relatively low-status rural settlement located roughly halfway between the new towns of London and Colchester (Drury 1978). The selections of objects in the Little Waltham grave place it firmly in the south-east Britain end of the spectrum. Indeed, its ensemble of objects shares much in common with grave 325 at St Albans in the preceding period: a pair of butt-beakers, this time

of the distinctive British variety (P21), an identical C8 *terra nigra* cup, and equivalent inclusions of platters and jars. Aside from the more up-to-date butt-beaker designs, and the presence of a couple of flagons, there is little to indicate that the practice of selecting objects for funerals had changed much in over fifty years. The selections of objects are certainly more conservative in character compared with those of the local aristocracy at Stanway, Colchester (Crummy and others 2007), which blend the basic logic of selections at Little Waltham with newer objects in use at the nearby fortress and later veteran colony at Colonia Victricencis (Colchester). If anything, the ensemble of objects at Little Waltham grave 360 can be taken to illustrate the late flourishing of patterns established in Britain in the late Augustan period. Graves of this character were increasingly widespread by the Claudio-Neronian period in south-east Britain, going beyond their earlier concentrations at pre-conquest oppida and equivalent centres. However, despite some conservative traits, including the provision of some animal offerings, as with the preceding period, the pattern of object selection in the grave from Little Waltham remains entirely consistent with patterns across the Channel in rural cemeteries in Gallia Belgica, such as Feulen, Luxembourg (Schendzielorz 2006). Such similarities suggest relatively limited change in the

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inter-artefactual domain after the watershed transformations of the Augustan era, but as we shall see, this is only half of the picture.

The second grave illustrated in Figure 8.3 comes from the cemetery associated with the Roman fortress at Neuss (Novaesium) in the Rhineland north of Cologne, and dates to *c.* AD 50–70 (Müller 1977). Although far removed from rural Essex, it so happens that the legion based at Colchester in the 40s AD had in fact been previously stationed at Novaesium before the Roman invasion of Britain. In this way, the selections of objects in grave 431 at Neuss are strongly reminiscent of those in the cemetery associated with Colchester's fortress and veteran colony, at Beverley Road (May 1930; Pitts 2019). A quick visual comparison reveals that the pattern of object selection in the grave from Neuss is entirely different to that of Little Waltham, and indeed the older traditions of local burying communities in north-west Europe at the time. Not only are the objects very different in their appearances, but so is the overall style of consumption. Large drinking vessels rooted in later Iron Age styles of display are completely absent, and the emphasis is instead on individual consumption through smaller cups and plates. Perhaps most striking is the presence of a clay lamp and a glass phial, categories of objects that were seldom found outside military bases and major cities in this period. Likewise, the inclusion of *terra sigillata*, and especially Lyon ware, are much more in keeping with a broad military template for consumption in the mid-first century AD. Even the distinctive melon bead is an item with strong representational links with the military, appearing on the tombstone of cavalryman Titus Flavius Bassus at Cologne (Bishop 1988, 71). This all begs the question of whether the selection of grave goods had more to do with underlying patterns of military supply, as opposed to innate socio-cultural logics.

Seen in its wider regional context, the object selections in Neuss grave 431 certainly fit a bigger pattern for military and colonial societies in north-west Europe. Was this simply a factor of the state-sponsoring of supply for Rome's northern imperial infrastructure, which led to concentrations of objects like *terra sigillata* and glass at military bases? While overarching supply systems certainly played a large role in influencing the kinds of objects at the disposal of military and colonial communities, they could not dictate the precise combinations of objects deliberately placed in graves. Indeed, by comparing a large corpus of graves, a very similar logic of object selection repeated across north-west Europe is revealed, often constituting variations on a single lamp, a glass vessel, a hemispherical cup (variously in *sigillata* or

Lyon ware), a plate or dish, and at least one flagon. Crucially, this combination is virtually exclusively repeated in substantial connected centres associated with Rome's imperial project, including military bases (e.g. Neuss and Exeter), veteran colonies (e.g. Colchester and Cologne), and major cities (e.g. Trier and Nijmegen). A significant difference with many grave assemblages of the cemeteries of local communities is the absence of ensembles geared towards communal consumption, with repeated combinations of standardized objects, as if to cater for multiple guests at a banquet — likely a hangover from Late Iron Age styles of consumption.

Taken together, the two graves in Figure 8.3 can be considered, in effect, to belong to two very different pan-regional deterritorialized styles of consumption, one rooted in the newly transformed Iron Age societies of north-west Europe, and the other closely connected to the new imperial and essentially urban culture of Rome's military and colonial outposts. At this point it is important to stress that the two constellations of objects cannot be simply reduced to the old binary opposition of 'Roman' and 'native'. Significantly, many of the constituent elements of the extra-imperial style of consumption increasingly used by local burying communities in this period were themselves dependent on relatively new designs of objects of Mediterranean genealogy, alongside important local innovations in media like Gallo-Belgic ware. Likewise, although two broadly different styles of consumption can be identified, these increasingly overlapped and merged by the end of the Claudio-Neronian era, as illustrated, for example, by the appearance of flagons in the grave at Little Waltham. In a connected Roman world, an increasingly integrated inter-artefactual domain ensured that differences between the objectscales of military and civilian could not remain so distinct as time progressed.

### **Flavian Assemblages: Transformation and Rebirth**

In the final decades of the first century AD, the Roman object revolution in north-west Europe took a decidedly new direction. Historically framed by the new Flavian dynasty (AD 69–96), this period saw further consolidation and urban development in the aftermath of major revolts in south-east Britain (AD 61), and among the Batavi (AD 69–70), with the creation of the new province of Germania Inferior, and the conquest of Britain reaching its greatest territorial extent under the governorship of Agricola. The graves I have selected illustrate the complexity of change at both global and local levels, and this time derive

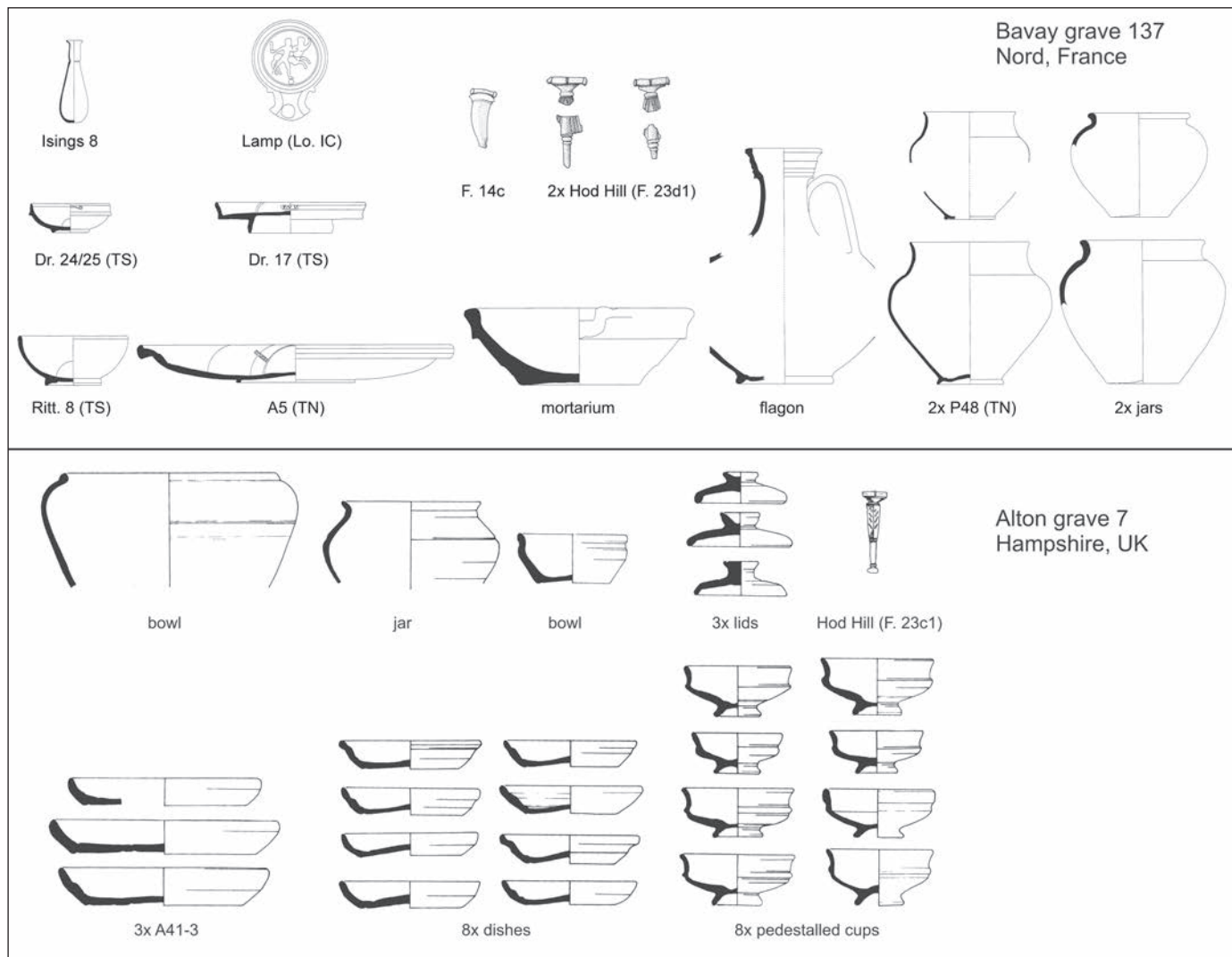


Figure 8.4. Grave 135 at La Fache des Près Aulnoys, Bayay (after Loridant and Deru 2009, 160) and grave 7 at Alton (after Millett 1986, 72). Drawn by author.

from the Correspondence Analysis of seven hundred graves of Flavian date (Pitts 2019, 195, fig. 5.12).

The first grave we shall consider in Figure 8.4 comes from the cemetery of La Fache des Près Aulnoys, located along a major road leading out of the city of Bayay, and dating to *c.* AD 70–90 (Loridant and Deru 2009). While not belonging to the richest tier of graves from the period, the inclusions in the grave indicate that it was better furnished than most. In effect, the selections of objects appear to draw in roughly equal measure on each of the two broadly different pan-regional styles of consumption described above for the Claudio-Neronian period. On the one hand, the lamp, glass phial, suite of *terra sigillata* vessels, and to some extent the flagon and mortarium all strongly evoke combinations of objects once more exclusively seen in military and colonial cemeteries. At the same time, the inclusion of fib-

ulae alongside contemporary vessels with northern European genealogy in *terra nigra* (P48 jars) firmly anchor the grave in its regional context. While butt-beakers had largely gone out of fashion by this time, perhaps because they no longer fitted with the renewed emphasis on urban sociability in funerary assemblages (Pearce 2015), there were still plenty of objects in circulation that could evoke older Iron Age practices. With the ‘fibula abandonment horizon’ now in full swing (Cool and Baxter 2016), the deliberate inclusion of brooches in this grave is a strong indicator of the prevailing logics of the local, traditional end of the inter-artefactual domain. Taken together, the cross-pollination of imperial and regional elements can be seen as a result of urban elites and groups of middling wealth increasingly drawing upon object repertoires previously used by military and colonial communities alone. Such a process was aided

by the increased circulation of *terra sigillata*, as well as the continued machinations of the inter-artefactual domain, in which the make-up of an individual grave assemblage was to a certain degree in dialogue with others in a connected system.

In its wider context, the selection of objects in grave 135 at Bavay very much echoes equivalent contemporary graves in urban cemeteries across north-west Europe, in which larger quantities of objects like *terra sigillata* and glass vessels became the norm alongside objects associated with quintessential Roman pursuits, such as literacy and bathing.<sup>6</sup> This phenomenon is attested in several exceptionally rich graves of the Flavian era, perhaps most strongly illustrated by those in the cemetery of Ulpia Noviomagus (Nijmegen), which has been associated with the city's municipal elite (Koster 2013). A crucial difference which sets graves from this milieu apart from their counterparts in military and colonial sphere of the Claudio-Neronian era is the sheer quantity of objects involved. Whereas graves like Neuss 431 are characterized by services of vessels and objects geared towards the needs of the individual, the rich municipal graves of the Flavian era feature images of feasting and the provision of commensal hospitality for multiple guests. This element of communally orientated suites of objects seems to represent a continuity of older Iron Age practices, in which large numbers of objects in the richest graves served to underline the importance of feasting as a mechanism for social interaction, as well as an effective form of funerary display for the buriers.

The inherent fusion of objectscales and funerary practices from previously separate cultural traditions in the Flavian era is undeniable. But alongside such tendencies towards convergence, it is also possible to discern several important and pronounced divergences from the increasingly global template of funerary display. One such local 'particularization of the universal' can be seen in the rural cemetery of Alton, Hampshire (Millett 1986). Here, a distinctive new regional rite emerged, as illustrated by the contents of grave 7, dating to c. AD 70–100 (Fig. 8.4). An overwhelming feature of this assemblage is the large number of standardized objects, especially pottery. At face value, such a large collection might well fit the richest tier of Flavian graves described above, despite large contrasts with the objects selected in grave 135 at Bavay. An important distinction to make with Alton is that all the objects are of local manufacture, with the exception of a sin-

gle fibula, which is of a more universally circulating design. While the sheer quantity of ceramic vessels in the grave evokes the graves of the municipal elite, as seen nearby, for example, at Winchester Grange Road (Biddle 1967), the pots at Alton were clearly of inferior quality compared with the *sigillata* and other imported vessels in cemeteries associated with new urban environments, such as Bavay. Likewise, the inclusion of other elements, such as the fibula and a range of animal offerings, are further indications of the vestiges of older Iron Age practices.

The regionally distinct rite that emerged at Alton can be interpreted as an attempt by rural societies to compete with the increasingly lavish funerary repertoires of their urban counterparts. At the same time, the rite can also be understood as a distinctive innovation that would not have been otherwise possible without immersion in a highly connected environment, with a well-integrated inter-artefactual domain. The rite at Alton is therefore a classic example of the phenomenon of 'glocalization', whereby new local forms are created through explicit reference to elements of pan-regional or global culture (Pitts and Versluys 2015, 14; Robertson 1992, 173–74). This phenomenon is mirrored in the Flavian era by the parallel emergence of strikingly 'glocal' funerary practices at other rural cemeteries, most notably among the Nervii (Gallia Belgica) and Batavi (Germania Inferior). Taking both graves in Figure 8.4 together, the overwhelming picture that emerges from the last decades of the first century AD is the emergence of a single, broadly shared imperial style of consumption for the increasingly urbanized local elite, to be set against increasingly regionalized and local divergences in practice at the sub-elite level. In other words, what we are left with is a mature template of the familiar notions of unity and diversity that would go on to characterize Roman provincial culture for at least the next two centuries (Hingley 2005).

## Conclusions

Stepping back from the detailed narratives of object selection in the preceding sections, several observations may be made. Although illuminated by a sample of only six individual graves, the preceding discussion would have been impossible without a much larger body of data to draw from, and crucially, appropriate multivariate analyses that allowed me to pinpoint representative graves and qualify the extent of their participation in local and pan-regional phenomena (Pitts 2019). If we are to move towards genuinely high-definition narratives of Romanization

<sup>6</sup> I use Roman in the sense of the ideal of *humanitas*, following Woolf 1998.

2.0, it follows that these need to be informed by not only the chronological precision and contextual granularity of individual examples, but also methodological strategies that allow such specificity to be understood in the context of the hugely complex and (almost) endlessly diverse Roman world. Many of the larger pan-regional trends discussed in the previous narrative have seldom been discussed in older scholarship largely as a result of site-based and regional archaeological research strategies confined by modern nation-state boundaries. In a world of new digital technologies and Big Data, Roman archaeologists (and artefact specialists in particular) must find new ways of overcoming the hurdles of national research frameworks and embrace the challenge of studying the connected Roman world in all its complexity.



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# Associations and Interactions in Urban Networks of the Roman Near East

**ABSTRACT** Relational approaches have profoundly changed archaeology and related fields in recent years. This has shifted focus from agents to the interaction between them. Past processes, however, are finished and gone, and the only way to investigate them is through their outcomes as preserved in the archaeological record. Every edge (tie) in a network graph describes relations and associations between the entries in the dataset, not within the societies that produced them. In order to move from description to explanation of past processes, the nature and dynamics of connections need to be addressed. In this article, the possibilities and problems connected with this are discussed from the vantage points of four common and time-tested qualitative approaches to relational data: ethnographic analogies, semiotics, Actor Network Theory, and outcome analysis, each briefly exemplified on urban networks in the Roman Near East.

**KEYWORDS** Networks; network analysis; Palmyra; Roman Near East; Actor Network Theory.

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## George Bailey Leaves the Matrix

In Frank Capra's Christmas classic *It's a Wonderful Life* (1946) George Bailey has sacrificed personal ambition, career, and freedom for a life in service of his local community. Facing bankruptcy, prison, and public scandal over an error committed by someone else, he decides to take his own life. An angel sent to prevent him from the act allows him to experience what life in the small town of Bedford Falls would have been like had George Bailey never lived. George, unsurprisingly, has problems accepting the reality of this exercise. Two tactile experiences are instrumental in convincing him of his disappearance from and subsequent reintegration into the social matrix of Bedford Falls: the rose petals given to him by his daughter earlier the same day disappear from and later reappear in his pocket, reminding him of how she also does not exist in the alternative reality without George Bailey. The loose newel cap in the old house he has restored together with his wife has annoyed him for years and has become a symbol for the constraints of family life. In the penultimate scene of the film its significance changes to become a tactile reminder of familial bliss. Both examples highlight how things may manifest and symbolize social ties (Appadurai 1986; Boivin 2008; Damsholt, Simonsen, and Mordhorst 2009), and the latter, in a mundane way, also the friction that invariably characterizes any interaction with the material world (Fletcher 2004; 2010).

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## The Relational Turn

In the early twenty-first century the humanities and social sciences, including most branches of historical and archaeological studies, have partaken in what arguably amounts to a 'relational turn'. Emphasis has moved from the study of different kinds of human and non-human agents to that of their interaction (Brughmans, Collar, and Coward 2016; Brughmans 2013; Knappett 2011; Rollinger 2020; Teigen and Seland 2017). In the fields of urban and related archaeologies this has materialized either as applications of network theory, e.g. those of Emanuel Castels (1996), Bruno Latour (2005), or Michael Mann (1986), or of the diverse set of methodologies available for network analysis, including those suitable for the investigation of social networks, spatial networks, transport networks, affiliation networks, and commodities networks (Broodbank 1993; Brughmans 2013; Brughmans, Collar, and Coward 2016; Brughmans, Keay, and Earl 2015; Graham 2006; Hodder 2012; Knappett 2011; Knappett, Evans, and Rivers 2008; Sindbæk 2007). If there has indeed been any such thing as a relational turn it builds on insights from the earlier spatial, linguistic, and material turns, emphasizing that archaeological objects are structured in space as well as in time, and that they carry meanings and can be interpreted as signs. Furthermore, they are not merely sums of form, function, and signification, but result from dynamic processes of interaction between people and their physical and cultural environments (Brughmans and others 2019; Damsholt, Simonsen, and Mordhorst 2009; Fletcher 2010; Knappett 2005).

This poses a fundamental challenge to scholars working with archaeological data from a relational perspective. We cannot assume *per se* that our evidence provides a representative record of either social, or material aspects of the past, because cultural as well as physical environments impose restraints on material as well as human agents. Roland Fletcher calls this problem 'inherent non-correspondence' (Fletcher 2004, 115). Words are often pitifully inadequate in describing thoughts and feelings as well as objects and places. Similarly, archaeological floor plans and settlement maps as well as physical remains of past dwellings only to a limited degree provide accurate information about the activities that once took place there and the people who lived there (Fletcher 2010, 462–67).

Every edge (tie) in a historical or archaeological network graph, as every association described in a qualitative network analysis, presupposes past interaction, which is more often than not taken for granted. This information, however, is not contained in the data. These describe relations and associa-

tions between the entries in the dataset, not within the societies that produced them (Hodder and Mol 2016, 1067). In order to move from description to explanation of past processes, the nature and dynamics of connections need to be addressed. Below the possibilities and problems connected with this are discussed from the vantage points of four common qualitative approaches to relational data: ethnographic analogies, semiotics, Actor Network Theory, and outcome analysis, each briefly exemplified on urban networks in the Roman Near East. The aim is neither to do justice to a large field of epistemological theory, nor to offer any easy ways out of complex problems, but to call for explicit reflection about the nature of ties reflected in archaeological network analyses in order to narrow or bridge the gap between formal/quantitative and qualitative network approaches, between network analysis and network theory/network thinking (Knappett 2016).

## Analogies

Ethnographic analogy has held the pride of place among archaeological explanations since the nineteenth century (Hodder 1982, 31–40), and rightly so. As Ian Hodder points out, every explanation rests on analogy (Hodder 1982, 11–27), and it is only fair to make it explicit. In the subdiscipline of ethnoarchaeology analogy has been formalized as method in order to move from correlation to explanation (Cunningham 2009; Hodder 1982, 28–46; Roux 2007). The lessons learned there can also be employed in the investigation of relational data drawn from other sources. Valentine Roux suggests distinguishing between static and dynamic phenomena, which may be approached by way of simple and complex analogies respectively (Roux 2007, 155–57). Static phenomena are not context-dependent and thus the same regardless of empirical setting. In a study of the Roman-period caravan route between Palmyra in Syria and Hit in Iraq, Jørgen Christian Meyer and I plotted 244 water sources between the two places using Cold War military maps (Meyer and Seland 2016). With GIS-software we imposed 20 km buffers around each source building on the static fact, gathered from nineteenth- and twentieth-century military handbooks, that 40 km is the approximate distance that humans as well as camels are able to walk in a day without detrimental effects over time. Wherever the buffers overlapped it would be possible for caravans to move, provided that they were familiar with the terrain. Importing the dataset into a graph-visualization suite we created connections between all waterholes that were within a day's dis-

tance of each other. Still waterless stretches of up to 100 km remained. Interestingly, approximately half-way along these gaps, fortified outposts identified during archaeological surveys in the 1930s existed (Gregory and Kennedy 1985; Poidebard 1934). Here water was gathered and stored in now defunct cisterns, providing the water storage not offered by nature.

Our argument, and thus each of the *c.* 1500 ties in our dataset, was based on two simple analogies based on static phenomena. The biological constraints imposed on people and animals were the same in the Roman period as today, and water supply, determined by climate and topography, was sufficiently similar for the methodology to work. Methodologically it is quite straightforward to falsify the study by challenging either of these analogies. Empirically it will be harder if water distribution and the capabilities of men and beast have indeed remained unchanged over the 1700–1800 years that passed between the phenomena we study and our proxy data.

Dynamic phenomena are a different matter, which, again according to Roux, requires complex analogies (Roux 2007, 166–69). In my studies of Palmyrene caravans, I have employed the voluminous recorded experiences of European sixteenth–eighteenth-century travellers in the Syrian Desert in order to understand the organization of Palmyrene caravans, only known through approximately thirty inscriptions. By using the analogy of the Ottoman-period caravan — an ad hoc organization, which is a social network formed by merchants and headed by a caravan leader (Turkish: *Caravanbashi*) — we can make a hypothetical reconstruction of how Palmyrene merchants (Greek: *emporoi*, Aramaic: *tgry'*) formed their own networks under the leadership of a caravan leader or head merchant (*synodiarches* / *archemporos* / *rb syrt'*) (Seland 2014; 2016, 98–112). No assertion is made that Palmyrene and Ottoman caravans were identical, but that they represent related, even similar responses to similar environmental, geopolitical, and socio-economic environments, a claim which is impossible to falsify, but that might be replaced by better models of Palmyrene caravan trade built on stronger analogies.

## Semiotics

In many cases, written records or obvious ethnographic parallels are missing. In *Thinking through Material Culture* (2005), Carl Knappett discusses how semiotics can be used to argue intentionality or meaning in artefacts, even in such cases. Knappett builds on the semiotics of Charles Sanders Peirce, who, unlike Ferdinand de Saussure, held that signs do have material aspects and thus carry meaning

also independent of language (Knappett 2005). He discusses how material objects might function as signs of a referent either as an icon, based on similarity, as an index, based on physical characteristics, or as a symbol, based on cultural convention (Knappett 2005, 87–99). One of Knappett's cases is drinking vessels and liquid-containers, from modern to Minoan periods, which might be studied from all these angles (Knappett 2005, 111–22). Turning to the Roman Near East, archaeological traces of cult activities in arid landscapes might serve as an example. From the Syrian Desert, the Hauran, and the Decapolis, a significant number of depictions of deities mounted on horses and camels, appearing sometimes alone and sometimes in pairs, are known (Weber 1995). The deities have long been associated with a nomadic lifestyle and with the caravan trade (Rostovtzeff 1932; Schlumberger 1951, 126–28; Seyrig and Starcky 1949, 236–40; Teixidor 1979, 77–92; Weber 1995). As these are figurative depictions, their intended use as icons, in the semiotic sense of visual similarity with their referents (a range of deities), is not controversial. Modern observers might protest the actuality of the referent, but for the people who produced the depictions this was hardly an issue. The depictions might also serve as signs in the sense of indexes. Their find distribution points towards association with the desert, where pastoralism was the only really viable mode of subsistence, and the depictions of camels, horses, and lances are certainly conceivable, although not unquestionable semiotic indexes of nomadic lifestyle. Of course these depictions might well have worked as signs in the symbolic sense as well. This, however, is perhaps even better demonstrated by the aniconic stelae that are widespread in connection with nomadic campsites from north Semitic settings, which served as makeshift symbols of deities (Avner 2001; Patrich 1990, 59–70; Seland 2019). In this case, we also have ethnographic and epigraphic material at hand that underpins the interpretation of these depictions as signs of cult associated with nomadism, but arguably it is possible to build a case from semiotics alone. This material might be employed in reconstructing political, religious, and economic networks in the region, but only if the nature of the ties connecting the network are explicitly discussed, thus facilitating falsification by means of alternative explanations.

Sassurean semiotics, understanding signs as independent of material objects, of course might also inform analyses of urban networks. Adam Schor utilizes social and cultural cues expressed in terminology in order to identify affinity and lack of such between members of the epistolary network of Theodoret, bishop of Cyrrhus in the fifth century

AD (Schor 2011). Mattias Brand investigates religious networks in fourth-century AD Egypt interpreting significant terms as speech acts expressing religious identity (Brand 2017). Epigraphic texts and the use of artistic and architectural templates might reasonably also be interpreted as ways of connecting with social networks. When a city in the Near East erected a statue in honour of the Roman emperor and accompanied it with an inscription, it signified affiliation with Roman imperial political networks. When a mosaic from third-century AD Palmyra depicts the local ruler, Odaenathus, conquering the Sasanian king Shapur depicted as a chimera, it signifies active boundary drawing towards Sasanian networks (Gawlikowski 2005).

### Actor Network Theory and Entanglement

Archaeological applications and adaptations of Actor Network Theory (ANT) are common ways of dealing with such situations, exemplified for example in the work of Knappett (2005; 2011; 2016) and Hodder (2012). In ANT, within archaeology primarily associated with the work of Latour, no distinction is made between human and other agents, including animals, objects, spaces, and natural environments (Latour 1993; 1996; 2005). Each such actant, as they are called in ANT terminology, assumes a role in establishing the web of relations that constitute the network, which has no existence independent of these relations. Chains of associations can be isolated and studied as networks in their own right, but actor networks are by definition infinite. Hodder operationalizes this insight by means of the analytical tool of the tanglegram, which allows the systematic exploration of entanglement between humans and things, among humans, and among things (Hodder 2012; Hodder and Mol 2016). The example used to introduce and illustrate the method is the thing–thing associations of clay at the Neolithic settlement of Çatalhöyük. This single resource is associated, or entangled, with forty-nine others, ranging from wild animals to burials and clean water (Hodder 2012, 181). Each association is based on the interpretation of evidence, the nature of which might vary from case to case (Hodder and Mol 2016, 1072). While entanglement approaches complexity by investigating each constituent part of a relational web, it might be argued that formal network analysis does the opposite by emphasizing the whole structure. Despite this and other differences, Ian Hodder and Angus Mol (2016) have demonstrated that network analysis might fruitfully inform studies of entanglement. The opposite is also

true, as each tie in a network should also in principle be based on the interpretation of evidence revealing association. Taking this challenge to urban networks in the Near East, tanglegrams can be used to explore micro-level associations on house, street, or city level. The method could also, however, be adapted to study how different elements of architecture, city plan, and epigraphic record relate to other cities or to supraregional social networks or cultural templates (Seland 2021). In Palmyra, some buildings, like the (probable) amphitheatre (Hammad 2008), are associated with imperial Roman culture. The vast investment in the 1.2 km colonnaded street reflects a conscious effort to enter into a competitive peer-polity network with cities like Apamea, Jerash, and Aelia Capitolina (Jerusalem) that also made similar investments (Burns 2017). The obviously conscious use of different language and different content of inscriptions in the *necropoleis*, main temple, colonnaded street, and agora of Palmyra also reveal associations with different and overlapping social networks that existed in the Near East in the first centuries of the Common Era (As'ad, Yon, and Fournet 2001; Seland 2021).

### Friction, Non-Correspondence, and Outcome

Fletcher criticizes approaches as those outlined above, which presuppose predictable and identifiable correlations between the social and material aspects of the human past (Fletcher 2004; 2010). He points to the friction and non-correspondence between the two caused by frequently imperfect, dysfunctional, and destructive interaction between humans and their environment (Fletcher 2004, 467–77), and also the untenability of applying ethnographic analogies of the kind described as complex above, since social practices in past societies might have been different, less effective, and even defective compared to those observed in the present (Fletcher 2010, 476–77). He illustrates this challenge as a triangle (Fig. 9.1), where the corners represent materiality, 'social action and verbal meaning', and outcome (Fletcher 2004, 115). We cannot assume that the material or textual records correspond with the social world of the past as no deterministic relationship between verbal or material expression and social behaviour exists. What we are left with are outcomes that are results of often suboptimal interaction between humans and their material surroundings (Fletcher 2004, 115). Fletcher's examples are from settlement archaeology, and he explains outcomes as 'describable in terms of a community's duration, magnitude, and degree of sustainability' (Fletcher 2010, 476–77). The concept can be trans-

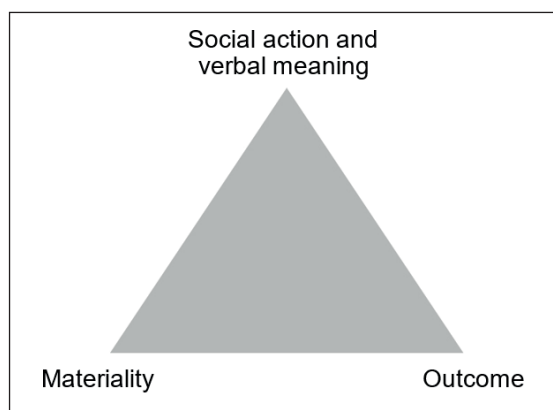


Figure 9.1. The outcome triad. After Fletcher 2004, 134.

ferred to urban networks, which may be described in the same terms. The example of Palmyra is again near at hand. The Palmyrene network had remarkable success for three centuries, and spanned from the Rivers Tyne to Indus at its height, but disappears with the Roman strike at its centre in 272–273 AD. Despite its strengths, it evidently also embedded vulnerabilities that prevented it from outliving the military reduction of its central hub, unlike Jewish networks that survived the sack of Jerusalem and subsequent dispersal (Seland 2013). Explaining such divergent outcomes, however, returns us to the challenge of interpreting the nature of the ties constituting the networks we study. In this, I accept Fletcher’s criticism regarding problems of friction and non-cor-

respondence, but I only follow the conclusion halfway. While we will never know for sure whether our ethnographic analogies, semiotic interpretations, or reconstructed entanglements adequately reflect the past we are studying, they might still help us make sense of the material signs that have come down to us from the past for our own times and our own purposes. Interpretations might easily be replaced as correspondences are better understood, due to more or different data, or more sophisticated theories and methods. In this, the outcome corner of the material–social/verbal–outcome triad is clearly a critical element that has largely been missing from past studies of materiality, and thus of archaeological network analysis.

## Summary and Conclusion

Far from offering a quick fix for the challenges of reconstructing social networks from material proxies, I have called for archaeological network analysis to explicitly incorporate qualitative discussion of the nature of ties or associations that constitute networks. I argue for a pragmatic use of analogies, semiotic analysis, studies of entanglements and associations, and outcome analysis, which in my opinion represent practical ways of bridging gaps between network theory/network thinking and network analysis, thus operationalizing the former and adding explanation to description in the latter.

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# Incorporating Geographical Imagination into Early Urban Demographic Estimates

**ABSTRACT** Global estimates of early levels of urbanization are shown to be grossly underestimated. An attempt is made to rectify this using Jacobs's ideas on cities converted into a broad 'geographical imagination', a theoretical patterning of cities. This is applied to estimates of urbanization in 300 BC to fill in the many missing cities in a current historical demographic study. This results in a sixfold increase in estimated urbanization that is interpreted as a qualitative difference based upon different approaches to understanding cities. In conclusion, some implications of this difference are discussed.

**KEYWORDS** Ancient urbanization; central-place theory; central-flow theory; cities; historical demography.

## Introduction

This paper is an empirical intervention into recent multi-millennia, world-regional demographic estimates with specific reference to their purported levels of urbanization. I will argue that the latter are immensely miscalculated; urbanization is much more prevalent than commonly assumed. To indicate the level of underestimation I employ a conceptual approach that involves thinking about cities beyond their basic statistics — population sizes — by bringing into the discussion theory about their spatial patterning. This is to employ a geographical imagination, viewing cities as components of social space. The latter, continually being produced through human activities, is structured in

many ways, and spatial organization through cities is one vital component.

The global historical demography I am dealing with is the result of two very different developments in worldwide population estimates covering several millennia. First, there are general population estimates derived from land-clearance data: the HYDE database is the prime example (Klein Goldewijk and others 2010; Kaplan and others 2010). Second, there are population estimates of cities derived initially from measures of built-up areas (Chandler 1987; Modelski 2003; Reba, Reitsma, and Seto 2016). These are the results of two separate and quite dissimilar research programmes in environmental science and social science respectively. They have been linked together in John Carl Nelson's (2014) historical atlas, and I use his results to illustrate a lack of geographical imagination in this historical demography.

The theoretical framing of cities I employ is derived from the work of Jane Jacobs (1970; 1984; 2000) wherein cities are defined by their ability to generate urban growth. There are three related characteristics of cities with which I begin my intervention (Taylor 2021). Cities provide social environments that are a qualitatively different communicative world from all other human experience (Taylor 2013). Cities provide a unique density of social communication: this is the agglomeration process mostly studied in economic research resulting in the generation of innovation (e.g. Glaeser 2011). But city agglomerations do not exist as geographical islands of activity, quite the opposite: cities are intensely connected and these inter-city networks generate the diffusion of innovations. Thus do cities develop conjointly as economies, but more broadly these processes create dynamic cosmopolitan urban places. In addition, cit-

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ies are immensely demanding and their market power enables them to shape rural areas, both near and far, to meet their production and reproduction needs.

The paper consists of three parts, first detailing the nature of the geographical imagination that I then deploy in a second part, which is the empirical core of the paper, and finishing with a broader discussion of some implications of the paper's findings.

## Geographical Imagination

By geographical imagination I mean deploying an understanding of social space, a concept predicated on the notion that society cannot be separated from the space it encompasses. Thus, 'space' is not seen as a 'platform' (or stage) on which human events unfold or where societies are constructed. Rather social space is integral to social practices and processes and therefore 'space is in society'. This is referred to as the spatiality of society.

Social space is constituted through two basic formations: spaces of places and spaces of flows (Castells 1996). The former is a patchwork or mosaic space, the latter a movement or route space. Their most explicit manifestations are political territoriality (making spaces of places) and commerce (making spaces of flows). However, they are not separate, they depend on each other: social patchworks are created and sustained by movements, social routes are generated and supported by patchworks. Therefore, the spatiality of societies consists of varying combinations of these two forms of space, but commonly one is more dominant. For instance, Manuel Castells (1996) has argued that contemporary globalization is the result of a space of flows (network society) overriding a prior space of place (industrial society).

This spatiality can be incorporated into a theory of cities, specifically the economic advantage cities derive from the first two processes identified in the introduction. First, the agglomeration processes based upon the clustering of activities create specialized knowledge that in economics is highly prized as a market externality. This is premised on the nature of the city as a place. Second, the connectivity processes create an equally valuable wider knowledge, which is also an important market externality. This is premised on the nature of cities in flows of networks. I consider this simple urban theory to be a generic understanding of cities — for instance, early Uruk tablets indicate both economic estate management activities (place-making) and economic trade activities (flow-making).

The geographical imagination that can be derived from this depiction of social spaces focuses on urban

external relations. There are two distinctive urban processes that I call town-ness and city-ness. The former is a space-of-place making process that creates local hinterlands and urban hierarchies; the second is a space-of-flow making process that creates non-local 'hinterworlds' and urban networks (Taylor, Hoyler, and Verbruggen 2010). The key point is that because they are treated as processes they can occur simultaneously in every urban settlement. Thus instead of the perennial question of whether an urban settlement is a town or a city, we ask what the balance between the two processes is. Usually the larger the urban settlement, the more important the city-ness process (Taylor and Derudder 2016, 43), but there will still be a 'downtown' servicing a local hinterland (i.e. town-ness).

It will likely be noticed that town-ness equates with central-place theory (Christaller 1966), a framework long used in archaeology to interpret settlement patterns (e.g. Renfrew 1975; Hodder and Orton 1976). City-ness provides an addition framework termed 'central-flow theory' to complement the initial theory (Taylor, Hoyler, and Verbruggen 2010). They compare as follows: central-place theory as local town-ness is essentially a simple and stable process creating a mosaic space in interlocking hierarchies, whereas non-local city-ness as central-flow theory is essentially a complex and dynamic process creating a movement space of interlocking networks. Any given urban settlement geography will be the product of these two processes. As a generic understanding it provides a functional geographical imagination for exploring social spaces where settlement patterns are not fully known.

The starting point is the old adage that the absence of evidence is not the same as evidence of absence. In areas where there is partial empirical coverage the gaps may be filled through theoretical intervention: Waldo Tobler (Tobler and Wineburg 1971) has pioneered this approach in a regional context. In similar vein, I will employ the geographical imagination above in a worldwide case study. Of course, the results can only be indicative, they are not a replacement for direct evidence. And they are only as credible as the theory. But with little or no theory of social space, the poverty of the resulting geographical imagination can generate very questionable outcomes. For instance, in a rare mention of settlements in using land clearance for estimating early worldwide populations, we are told that Susan Alling Gregg's (1998) model of a Neolithic European village of thirty people has been employed (Lemmen 2009). Did a landscape of multiple, minute 'villages' dotted in space ever really exist? In contrast, urban historical population lists focus mainly on large cities.

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Table 10.1. Nelson's population estimates, 3000–100 BC. Source: Nelson 2014.

Year (BC)	Total pop. (millions)	Urban pop. (millions)	Cities with >0.1 per cent of total population
3000	34	(<1 per cent)	Kish, Uruk
2200	52	(<1 per cent)	Akkad, Memphis, Mohenjo Daro, Ur
1400	73	(<1 per cent)	Memphis, Thebes, Babylon
700	113	1.1	Linzi, Luoyang, Nineveh, Memphis, Thebes, Babylon
300	153	2.0	Carthage, Linzi, Xiadu, Paliputra, Luoyang, Alexandria, Seleucia
100	185	3.1	Rome, Luoyang, Antioch, Ephesus, Alexandria, Paliputra, Anuradapura, Seleucia

Did a landscape of large cities devoid of small urban settlements ever exist? The functional geographical imagination provides a credible approach between these two opposite settlement extremes.

### Urbanization within Demographics: A Case Study of 300 BC

Using the HYDE database, Nelson (2014) provides population estimates for twenty-four world regions for periods from 3000 BC. He also provides estimates for urban populations (and lists major cities) but does not provide sources. Table 10.1 shows his BC results.

Because I have comparable city results for 300 BC I will use this year for my case study. Nelson's full results for 300 BC are:

- Total world population 153 million
- Total urban population 2 million
- Regional populations
  - Eastern Asia 43m; southern Asia 32m;
  - western Europe 23m; Middle East 21m;
  - all other regions less than 10m including northern Africa 5m

In George Modelski's book from 2003 there are population estimates for twenty-four cities over 100k in 300 BC:

- Eastern Asia — 11 cities;
- southern Asia — 3 cities;
- western Europe — 3 cities;
- Middle East — 6 cities;
- northern Africa — 1 city

Obviously, these are not the only cities at this time in these regions for two different reasons. First, not all ancient cities are known; however, it is reasonable to assume that large cities are more likely to be known than smaller cities. Second, smaller cities are missing in any case, because Modelski employs a threshold of 100,000 for inclusion in his data. Thus,

Modelski's data should be seen as just a starting point, most certainly not a complete urban census.

The other main source for ancient city populations (Chandler 1987) uses a threshold of 30,000 but does not provide data for 300 BC. However, this data can be used to indicate an extent of cities below 100k. For instance, for 430 BC, Tertius Chandler shows:

- 7 cities above 100k:
  - Middle East, western Europe, and eastern Asia — 2 cities each;
  - southern Asia — 1 city
- 50 cities between 30,000 and 99,000:
  - Middle East — 10 cities;
  - western Europe — 13 cities;
  - eastern Asia — 9 cities;
  - southern Asia — 8 cities

These results most certainly reflect where most early research has been carried out on ancient cities, but still shows appreciable numbers of smaller cities more than a century before 300 BC.

How to fill in the gaps? I will use Walter Christaller's (1966) empirical data as my urban-settlement prediction tool. He collected data to illustrate his central-place theory, but it has been shown that it includes the later central-flow theory process in his array of typical populations (Taylor and Hoyler 2020). I will use the original ordering applied to 1920s

Table 10.2. Christaller's hierarchy of typical populations in 1920s southern Germany. Source: Christaller 1966.

Type	Typical population	Number of urban places
L	500k = 100k × 5	1
P	100k = 30k × 3.3	2
G	30k = 10k × 3	6
B	10k = 4k × 2.5	18
K	4k = 2k × 2	54
A	2k	162

southern Germany (Christaller 1966). In this largely rural area the hierarchy consists of (Table 10.2):

The central-flow theory process is indicated by the varying multiplier for ‘Typical population’: as you rise up the hierarchy the multiplier increases culminating with an L-place being five times larger than a P-place. This is what an urban geographical imagination looks like within a largely rural area. I will combine L and P places above since these represent the cities that Modelski identifies in each region.

So how would we expect the urban landscape of eastern Asia to look like?

With eleven cities in the L and P type, this is 3.67 times more than the 3 (i.e. L + P) in Christaller’s hierarchy. I use this coefficient for the remaining layers

There should be  $(6 \times 3.67)$  G cities  
= 22 G cities with 30k population

There should be  $(18 \times 3.67)$  B cities  
= 66 B cities with 10k population

There should be  $(54 \times 3.67)$  K cities  
= 198 K Cities with 4k population

There should be  $(162 \times 3.67)$  A cities  
= 595 A cities with 2k population

We have theoretically retrieved a total of  $22+66+198+595 = 881$  cities with a total urban population of:

Total G urban population  
=  $22 \times 30k = 660,000$

Total B urban population  
=  $66 \times 10k = 660,000$

Total K urban population  
=  $198 \times 4k = 792,000$

Total A urban population  
=  $595 \times 2k = 1,190,000$

The original estimate for L- and P-type urban population is 2,020,000 so that:

Total urban population in East Asia is  
5,322,000

Using the same methodology:

Total urban population in South Asia  
is 1,610,000

Total urban population in western Europe  
is 1,360,000

Total urban population in the Middle East  
is 2,510,000

Total urban population in northern Africa  
is 820,000

Summing all regions:

Total global urban population in 300 BC  
is 11,622,000

This is a magnitude of nearly six times Nelson’s estimated global urban population of two million in 300 BC. And, of course this is an underestimate since other world regions (e.g. Middle America and Central Asia) will almost certainly have also had urban settlements in 300 BC, albeit not 100k cities. The conclusion must be that this is more than a quantitative difference; it is a qualitative shift in understanding to a different, more urban, type of society.

It is important to emphasize the finding as qualitative since the empirical calculations are very provisional: I have no faith in the final total being quantitatively correct. It will likely be higher but could be lower, but most definitely not as low as Nelson’s estimate of two million urban dwellers in 300 BC.

## Concluding Comments

There are three themes that these results address, discussed here in order of general importance.

First, there is the matter of how these results relate to other attempts at linking urban analyses of contemporary cities by social scientists to equivalent studies by ancient historians and archaeologists. My approach is to employ a city-generics approach (Taylor 2019). This idea is not supported in Alexander R. Thomas’s (2010) discussion about bringing social-science theories of cities to bear on questions of ancient urban origins. He finds a basic flaw in the theories he discusses. Specifically, he complains that they attempt only to explain the ‘Capitalist city [ ... ] not a theory of the city *per se*’ (Thomas 2010, 20). This is a feature of the theories he chooses to review; it is not the case with Jane Jacobs’s (1970) theory of urban development. The latter integrates external relations of cities into the story. In contrast, the use of settlement scaling theory (Lobo and others 2020) is clearly generic but appears to treat agglomerations without their external connectivity. Thus, it is difficult to discern any spatial patterning in the analytics thereby missing a geographical imagination we inherit from Jacobs.

Second, using Jacobs brings up her controversial ‘cities-first’ thesis — her demand theory of agricultural origins in contradiction to the conventional supply theory of agricultural origins (Taylor 2013). Consistent with the conventional position, Thomas (2010, 3) does not cite Jacobs’s wide-ranging works on cities and argues against the city as the basic unit of social analysis. But this is precisely the supposition underlying my analytic case study. Thomas (2010, 2) sets out his ideas with the rather odd notion of ‘urbanization without cities’ to enable him to deal with processes prior to the earliest

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cities. But this odd contortion leads him to describe this process as ‘trade and cultural interaction that can be identified as “urbanization”’. Furthermore, we are told this ‘developed thousands of years before cities’ (Thomas 2010, 2). That is to say, he finds evidence of ‘urbanization’ millennia before the generally accepted creation of the first cities. This position is entirely compatible with Jacobs’s ‘cities first’ thesis once cities are treated as process rather than place. Perhaps surprisingly, with ‘cities in systems’ (Thomas 2010, 3), there is some sort of squaring of the vicious circle here!

Finally, and in keeping with the spirit of Jacobs’s cities-first thesis, the empirical findings of this paper suggest much more urbanization than usually rec-

ognized. This is very important because by positing a more urbanized society there is a consequent increase in urban demand and its environmental effects. The sustaining of nearly twelve million urban dwellers (input of food and raw materials; output of waste disposal) in 300 BC needs to be factored into the long-term anthropogenic climate change thesis with revised estimates for other early years (Taylor, O’Brien, and O’Keefe 2017; 2020). In short, this analysis supports the thesis that serious urban footprints in the landscape did not begin with industrialization (i.e. recent rapid anthropogenic climate change) but started millennia earlier in a long period of slow anthropogenic climate change as shown by William F. Ruddiman (2005).

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# The Backfill

## Character Sets the Ceiling

This edition marks the first anniversary of a journal that has changed the face of archaeological publishing! Readers across the world have cheered at our bold new periodical, and we are both proud and humble. But if by happy chance the success of *The Backfill* has also helped our urbane little sister, the *Journal of Urban Archaeology* (which we allow to share our cover) to achieve some small measure of recognition, we can only be happy. Family is everything, as we know, and *The Backfill* would be the last to snub a fellow journal so littered with scraps and loose ends. Success, as I have also learned, comes with responsibility, and I assume my new position of role model with great spirit. As regular readers will know, our former editorial office space left much to be desired, but I write this editorial for the first time from new and far more fitting facilities, having taken over the former office of my colleague, Mr Dweller. Two inches of desk space makes a real difference — but so, too, does the knowledge of having finally eschewed the glass ceiling. Yes, we prove once again that *The Backfill* is indeed the place to spread your talent.

*Siri Ospley*  
Editor-in-Cheap



## All Roads Lead to Rome!

Stratigraphies are amazing. They tell you all sorts of things you did not know about the past — things both big and small, and important in understanding how the world worked. The dense, fine-meshed layers in the accumulated urban stratigraphies hold immense amounts of information about important developments, many of which are simply waiting to be unlocked through high-definition methods. Today, we can unwrap knowledge of things that have long been enigmas, and we can pull nitty-gritty submicroscopic information from these

layers, the pure earth and its invisible elements. We can blow this information up to global scale and examine it within its local, regional, and global contexts, all of which provides us with new possibilities of truly understanding the ways of the world across time and space. This is what we call high-definition narratives. Yet for all the complexity, we also need synthesis: the simple guiding concepts that can set everything in its rightful place. That is where we sometimes realize the strengths of our pre-

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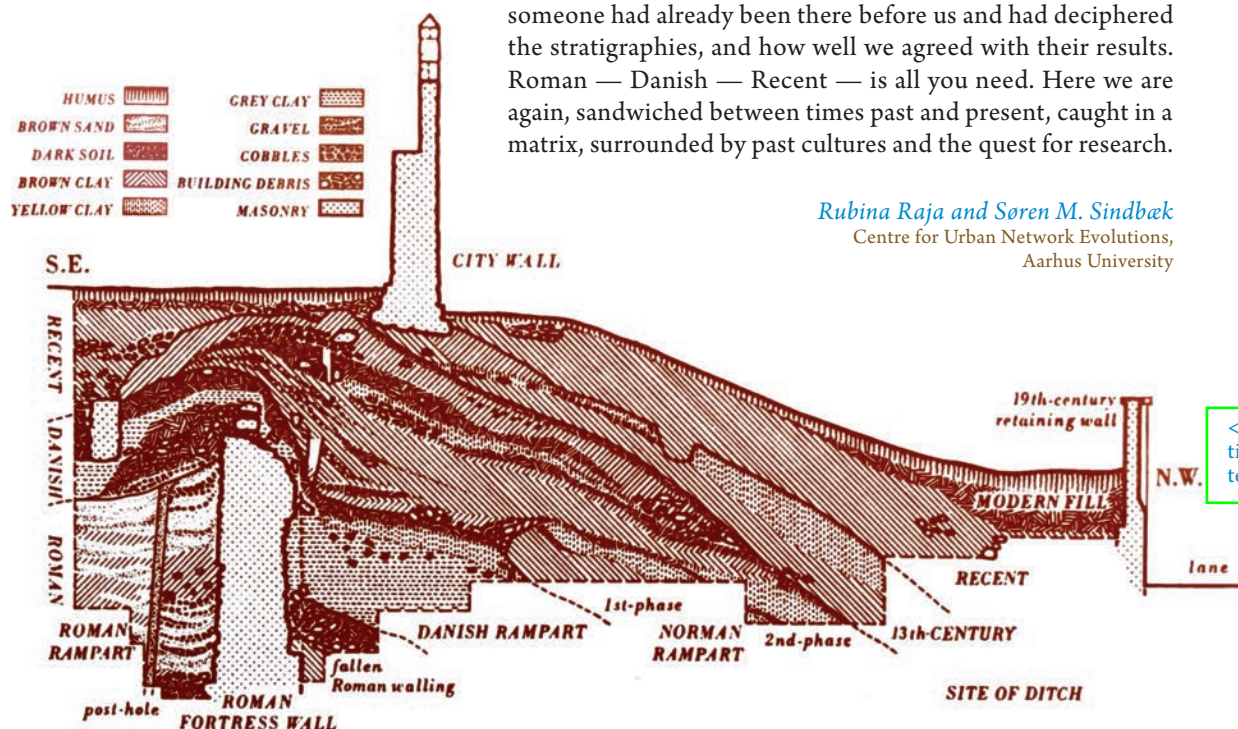
## All Roads Lead to Rome!

continued from the previous page

decessors in scholarship. In academia, it is invariably the case that someone came before you, and they could lead all roads (back) to Rome — or to Denmark.

York was an important centre for several centuries in the Roman period and the Middle Ages — and, of course, an icon of Viking Age England. We recently visited the city in order to explore its high-definition potential. What a surprise it was to discover that someone had already been there before us and had deciphered the stratigraphies, and how well we agreed with their results. Roman — Danish — Recent — is all you need. Here we are again, sandwiched between times past and present, caught in a matrix, surrounded by past cultures and the quest for research.

Rubina Raja and Søren M. Sindbæk  
Centre for Urban Network Evolutions,  
Aarhus University



<Image description and credit text goes here>

## Substratum

The concept of 'Low Density Urbanism' raise new perspectives in settlement studies.



Janek Sundahl



# Backlog

## Another Day down the Drain

Ballerina shoes. Knee-length woollen socks. Cloche hat. Back in the day, archaeologists certainly knew how to dress in the field. 'The field' here being the city of Ur in southern Iraq, known for summer temperatures of well over 45°C. You will be relieved to hear that the excavations at Ur always took place during winter.

Magnificent Ur, excavated by a team led by Leonard Woolley between 1922 and 1934, is the mother of all cities. Five thousand years of occupation has given us the famous mid-third-millennium BC Royal Cemetery, full of exquisite artwork, musical instruments, and sacrificed retainers. A ziggurat within an elaborate temple complex that kept its ritual significance for thousands of years. And, on a less dramatic scale, a second-millennium BC neighbourhood of residential houses set along winding streets, inhabited by ordinary citizens — merchants, schoolmasters, jewellers — according to the cuneiform tablets found inside.

How do you organize and run a city of this size and complexity? Well, for one thing, make sure you have efficient sewers. Drains under the floors of the courtyards, kitchens, and toilets of the houses at Ur kept rainwater from flooding homes and led away waste water, which was directed into much larger subterranean ring drains, like the ones pictured here. They were made from perforated pottery rings, arranged one on top of another in a column. Often a packing of potsherds, as seen by the drain on the left in the image, was used to help drain off the water. The ring drains worked as seepage pits and could have several under-floor channels or drains connected to them.

Leonard Woolley himself is pictured here measuring the dimensions of some impressive-looking ring drains, while Katherine Woolley, his able assistant and reluctant wife, takes notes. A gifted illustrator whose drawings brought ancient Ur to life in the public imagination, Katherine is nonetheless best known for having

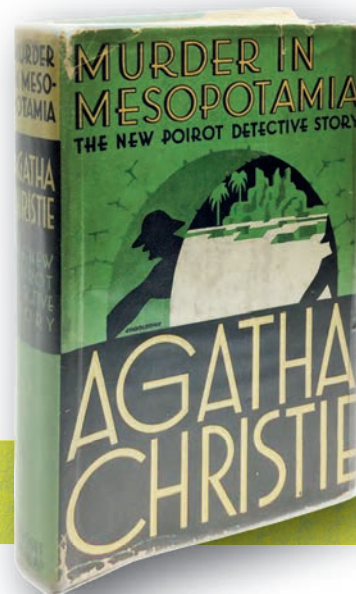


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been so obnoxious that Agatha Christie, who first visited Ur on holiday in 1928, made Katharine the murder victim in her famous novel *Murder in Mesopotamia*.

By the fifth century BC, the city itself had also fallen victim — but on this occasion, to its environment. The River Euphrates, which had been Ur's lifeline for millennia, had gradually set its meandering course at an increasing distance from the city, leaving its inhabitants thirsty and its ring drains dry. The city was deserted until, some three thousand years later, Mr and Mrs Woolley arrived on the scene, impeccably dressed for a day down the drain.

*Mette Marie Hald*  
National Museum of Denmark



## Structure is Structure is Structure

This is the first column I write from my new and — being frank, somewhat more sparse — desk space, following the rearrangement of the office by my truly wonderful editor Síri Ospley, who never ceases to amaze. As explained elsewhere, Síri has found it necessary to escape our glass ceiling. I for my part quite enjoy the skylight window. The light always reminds me of my fieldworks in the Maghreb. That was the start of a lifelong aversion against that pitfall of so much archaeological talent: the theory trap.



One memorable night in the early '60s, I was in a crowded, dusty bar room in Algiers. The place was crammed with French émigré intellectuals: Marxists, existentialists, Freudians, Lacanians, phenomenologists, and what-have-you. One guy asked if I was into Merleau-Ponty. I told him I was more into Merle Haggard.

I fled to a different table at which a quiet, stern fellow was reading. Another Frenchman, who went by the name of Pierre. He was an ethnographer, right out of Paris, here in Algiers to study the Kabyle. He looked probingly at me. 'You're not an existentialist, are you?'

'Hell no!' I said. 'I don't give a damn about metaphysics. Give me structures, that's my trade.'

Pierre looked as if lightening had struck him. 'Is this true? I've been the only one here for weeks! The Lévi-Strauss school?'

'That's my man! Just put me to work in a pair of Levi Strauss's finest, and I'll dig right into it!'

Pierre was all excitement. He pointed around the room 'You see, these people are all stuck with essences. You and I, we know it's in the fabric!'

'That's right!' I exclaimed. "'Carefully inspect the sewing", as the label says. Nobody can stitch it like good old Levi Strauss.'

'I must look up that quote', Pierre mumbled. He ordered a bottle for each of us, all the same wine, but he insisted that we shared both, pouring from his first, before instructing me to offer mine. Ah, the French!

The night wore on with talk. Pierre was a good fellow, but lost in theory, no matter how much he would pretend to talk about structures. The bar closed, and as we walked back, we passed an old Kabyle house. I thought I'd teach him a lesson and dragged him into the ruins. 'Look, my friend, this is where our work starts, these are *structures*!'

'*Mais comment ça, Monsieur Dweller?*', he asked. 'I see only ruins, where is ... the *mental*?'

'The mental? I'll tell you who's a mental if you're not seeing any structures!' I had often stayed with the Kabyle during my surveys, and made friends with quite a few. I knew their housing well.

'Here's where the cows would have been, a wet and dirty place', I pointed. 'And in the opposite corner they would store dried grain. Here on the north side was the weaving loom — that's for women, you know. Now don't come close, Pierre, we two belong here on the dark side, ha!'

Pierre was stupefied '*Touché, Monsieur Dweller!* This house is almost, *que dire ...* like a world of *structure*', he said.

'Ah, but don't forget, the house is a ladies' world!' I laughed. 'A world reversed!'

'A world reversed ...', he repeated. His eyes grew glazed. I could see I had nailed him with that one.

Poor Pierre, lost in his books. I would have been happy to say that my advice brought him on to better things, but he went back to Paris, and I guess he never put all his logic into practice. I suppose he never knew the distinction.

Sid E. Dweller

Columnist, architraveller



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