FEDERICA SULAS AND INNOCENT PIKIRAYI

From Centre–Periphery Models to Textured Urban Landscapes

Comparative Perspectives from Sub-Saharan Africa

ABSTRACT The role of peripheries and satellite settlements around ancient cities is a critical issue in understanding past urban phenomena. The relations between core urban centres and other settlements have often been considered using centre–periphery models. The limitations of such approaches are now emerging as new evidence for interdependency, fluidity, and changeability between cities and their surroundings increases in quality and complexity. This paper reviews the relations between ancient capital centres in Africa and their peripheries, using Aksum and Great Zimbabwe as case studies. It attempts at reconciling indicators of interdependency between these sites and core urban areas that current narratives of urban settlement struggle to accommodate. The exercise opens new avenues to reconfigure spatial representations and understandings of centre–periphery relations at specific sites and begin to think about urban regions and textured landscapes.

KEYWORDS Aksum; Great Zimbabwe; African urbanism; urban landscapes; peripheral settlements.

Acknowledgements and Funding Details

We are grateful to the Aarhus University Research Foundation for sponsoring a research visit to host Innocent Pikirayi in Denmark, which enabled us to develop the manuscript. For data on Great Zimbabwe, we are deeply grateful to all who shared fieldwork with us, in particular: Kefilwe Rammutloa (Yale University), Ruan van der Merwe and Nicole Schuttee (University of Pretoria); the staff of the NMMZ, and especially Justin Magadzike, Tawanda Mukwende, Lovemore Mdima, Elton M. Sagiya, and Godfrey Mahachi; and, at Great Zimbabwe University, Tendai T. Musindo and her students for support and assistance. Fieldwork was possible thanks to generous support of the South African National Research Foundation (NRF) and thanks to necessary research leave granted by the Department of Anthropology and Archaeology, University of Pretoria, and the Danish National Research Foundation under the grant DNRF119 — Centre of Excellence for Urban Network Evolutions (UrbNet), Aarhus University. For fruitful discussions and inspiration while developing this paper, our appreciation extends to Rodolfo Fattovich, Christopher Smith, and Roland Fletcher. We are grateful to the editors, Rubina Raja and Søren M. Sindbæk, for the invitation to contribute to the journal. Our deep appreciation extends to two anonymous reviewers, the editors, and Eva Mortensen for constructive and detailed comments that provided valuable guidance to revise and improve this paper. Any mistakes remain our own responsibility.

Introduction

The relations between centres and peripheries have long been a topic of historical enquiry into past societies, fuelling an eclectic tradition of studies in archaeology and cognate disciplines that encompasses theoretical and methodological realms (see e.g. Champion 1995; Evans and Gould 1982; Hall, Kardulias, and Chase-Dunn 2011; Rowlands 1998; Rowlands, Larsen, and Kristiansen 1987; Small 2006; Vionis and Papantoniou 2019).

From central-place theory and world-system theory to settlement archaeologies and network theory, archaeological research on centre–periphery relations has largely focused on the structure of integrated, regional economic systems. Centres have been seen as areas controlling technological skills and production, forms of labour organization, and ideologies that were supported by raw materials and surplus products from the peripheries (Rowlands 1987; 1998). In these views, the term 'periphery' acquires an economic connotation that shapes understand-

Federica Sulas (fs286@cam.ac.uk) is an archaeologist with specialisms in geoarchaeology and interests in past urban landscapes and resource uses in sub-Saharan Africa. At the time of writing this article, she was Assistant Professor at the Centre for Urban Network Evolutions, Aarhus University. Now she is Senior Research Associate at the McDonald Institute for Archaeological Research, University of Cambridge.

Innocent Pikirayi (innocent.pikirayi@up.ac.za) is Professor in Archaeology, Department of Anthropology and Archaeology, and Deputy Dean, Postgraduate Studies and Research Ethics, at the University of Pretoria. His research focuses on the development of ancient complex societies, including the emergence of urbanism and the role of water in social formation. At the time of writing, he was AUFF Visiting Professor at the Centre for Urban Network Evolutions, Aarhus University.

BREPOLS PUBLISHERS
10.1484/J.JUA.5.120910

ings of, and approaches to, relations between places — encompassing spatial, social, cultural spheres (Rowlands 1998, 220–21). The idea of centrality and central functions is at the heart of hierarchy of sites, and how they relate to their surroundings. Within the large field of studies discussing world-system theory and its ever-growing ramifications, hierarchies and relations between settlements are viewed from an economic viewpoint with metropoles (or cores) controlling satellites (or peripheries) that provide raw materials (Hall, Kardulias, and Chase-Dunn 2011). Such connotations of centre–periphery relations have deep roots in global geography, where the concept has long been central in regional analysis and development-planning theory, splitting the world between a centre formed by developed countries with market-oriented and centrally planned economies surrounded by a periphery of resource-providing regions (Mabogunje 1980). Stemming from Geography thinking in 1930s Germany, for example, central-place theory sought to explain the spatial distribution of urban settlements, how they evolve and operate as 'central places' by providing services to their surroundings (Butzer 1982, 219–23; Vionis and Papantoniou 2019). In this perspective, centre–periphery relations are viewed as the product of economic rationality and the maximization of mutual benefits through production specialization. In extreme representations, such relations are seen as arising from the domination and the exploitation of the periphery by the centre. In the 'domination' model, the bargaining power of the centre vis-à-vis the periphery is as important as the structure of centre–periphery relations. However, such perspectives fail to accommodate two fundamental aspects: on the one hand, interactions are not static and change over time; and, on the other, natural resources are finite, and the co-existence between 'centres' and 'peripheries' — however these are defined — relies on interdependencies between the source of resources and their use. In this respect, network theory has recently contributed new approaches and perspectives to the study of the relations between settlements, regions, and systems. Network approaches have gained terrain in charting links between places as represented by flows of materials, people, and ideas (e.g. Brughmans, Collar, and Coward 2016; Knappett 2013; Östborn and Gerding 2014; Sindbæk 2007). As we learn more about the interlinkages between and across spatial and temporal spaces, it is increasingly apparent that several things relate to each other, and they keep or change these relations depending on conditions.

In this paper, we address some of the issues concerning understandings of 'centres' and 'peripheries', following recent discussions around major ancient cities. Building on these considerations, we then move on to reconsider questions of 'peripheral sites' located in close proximity of capital centres of two pre-modern empires in sub-Saharan Africa: Aksum in northern Ethiopia and Great Zimbabwe in the south-central plateau of Zimbabwe (Fig. 5.1). Here, new indicators of settlement *continui*, spatial joins, and textured urban fabrics call into question long-standing models of settlement organization, 'peripheral sites', and centre–periphery relations. Recent findings provide new insights and also open avenues to interrogate archaeological, historical, and environmental archives in order to examine the relation between centres and peripheral sites. Revisiting available records in the light of new ones, we discuss settlement ecosystems and elaborate on spatial-temporal relations at Aksum and Great Zimbabwe using new conceptual frameworks of textured urban landscapes and urban regions.

Centres, Peripheries, and Textured Urban Landscapes

Recent research is increasingly questioning the application of a centre–periphery model to reconstruct social complexity and state formation, especially at regional scale and landscape level (e.g. Jaang and others 2018; Jennings 2006; Hafsaas-Tsakos 2009; Small 2006; Smith 2017; see also Anderson 2016). In China, for example, new findings are now expanding the spatial and temporal resolution of urban phenomena traditionally linked to archaeological records from the Central Plains during the mid- to late second millennium BC. The presence of complex societies in the loess highland of China has recently been attested as early as 2000 BC (Jaang and others 2018). These new findings show that the loess highland, with its newly discovered urban settlement of Shimao, was the economic heartland of an extensive network of exchange and trade, rather than a passive transfer zone between the steppe and the Central Plains as portrayed until now (Jaang and others 2018, 1019–20). The new Shimao sequence provides a local perspective on socio-political organization and development to re-examine models of the Chinese cultural landscapes and urbanism, and to reconfigure the position of the loess highland. An additional consideration emerging from this example is how quantity and diversity of finds shape the ways in which we define settlement hierarchies, with most research concentrated on large sites or areas of dense archaeological record, often still lying within a blank surrounding canvass, stretching as far as the limit of archaeological survey. Residuality in the archaeological record remains a main challenge

for understanding spatial organization and urban phenomena (see Butzer 1982, 219–28). Indeed, far less attention has been placed on settlements or sites located in the immediate vicinity of core urban areas but somehow considered distinct from them, and often referred to as peripheral or satellite with regards to the centre. The distance implied in such vicinity is, of course, contextual to the area of study.

As archaeological findings expand the spatial-temporal horizon of ancient urban centres, the vexing question of where an urban centre ends and its periphery starts becomes an epistemological conundrum, whose solution — if available in the realm of logical reasoning — might not necessarily bring things forward. Then, the nature of sites located in the proximity of core urban areas becomes even more elusive. This is only in part a problem of defining urbanism in terms of forms and densities as it also encompasses issues of urban services, resource uses, environmental change, and so much more. Even the history of the Eternal City, Rome, has recently been shaken by a new reappraisal of its early development (Smith 2017). Rome's territorial expansion has long been understood with reference to the *Ager Romanus antiquus*, which can be loosely described as a finite (conceptual and physical) space recognized by the ancient Romans as the territory of Rome's expansion. In asking how Rome grew to become the largest city in Latium, Christopher Smith's (2017, 10–11) new critique cleverly and insightfully refocuses the perspective by raising two critical points, directly relevant to ancient Rome but equally applicable to other contexts: 1) spatial conceptualization, or how ancient people understood space and how such understandings relate to the way we understand and represent space; and 2) the notion of territory or frontier in the past, and how it relates to the one we apply to ancient cities. These central issues deal with perceptions and ways to understand the world around us: What would an ancient Roman make of current urban planning? Rhetorical questions aside, Smith's concerns touch upon one of the most debated and controversial issue in archaeology: the use of analogy by translating our understandings, concepts, and perceptions to the past.[1] Having reviewed the evidence, Smith (2017, 21–22) concludes that 'whilst the notion of a frontier encouraged us to look outwards, the notion of a loosely defined but variously celebrated territory might encourage us to look inwards'.

Indeed, it is by looking 'inward' and around that we can best appreciate local environmental settings and how they relate, link, or separate central and non-central places. In this respect, a view of landscape as a heterogeneous area composed by different ecosystems interacting with each other across time and space — following landscape ecology — affords a much wider and deeper perspective for examining settlement organization (Butzer 1982; Vionis and Papantoniou 2019; see also Evans and Gould 1982). An approach that has been gaining terrain in the Tropics is that of looking at urban phenomena and expressions from a landscape viewpoint. Christian Isendahl (2012), for example, has shown the interdependencies between population density, land use, and ecology of Maya cities in the Puuc Region, Yucatan. Here, the rapid urban growth of the Terminal Classic period and the decline of the post-Classic period (seventh to eleventh centuries AD) are all packed in four centuries. Recent work on the Maya city states of Mesoamerica can be considered as a departure from mainstream approaches to urban settlements by demonstrating the viability and necessity of approaching ancient cities as agro-urban landscapes (Isendahl 2012; Graham and Isendahl 2018; see also Sinclair, Isendahl, and Bartel 2016). There is now a growing body of literature discussing ancient urban landscapes (e.g. Altaweel and Palmisano 2019; Fattovich 2008; Fleisher 2010; 2013; Fletcher 2011; 2019; Graham and Isendahl 2018; Green and Petrie 2018; Isendahl 2012; McIntosh 1999; 2005; 2015; Smith 2014; Wynne-Jones and Fleisher 2015). In Monica L. Smith's (2014) view, for example, urban centres have inner and outer landscapes whose physical remains can be read as the materialization of social, political, economic, and ritual interactions.

The examples cursorily cited above serve to illustrate some critical issues concerning the centre–periphery model applied to ancient urbanism. Centre–periphery structures are dependent on specific spatial-temporal frames. The discovery of the Shimao not only brings back the development of social complexity in China a few hundred years, but it also expands its spatial dimensions. If this new scenario might be seen as a flipping coin exercise — depending on which side of the Chinese plateau one might stand — Christopher Smith's (2017) longer-term perspective on Rome's expansion clearly shows the shortcomings in logic and practice of deploying non-contextual frameworks of space and time to the past. In this case study, fluidity and changeability appear as properties of urban growth, rather than expression of transformation and alienation. These properties are also well illustrated in the workings of the Maya agro-urban landscapes, which offer a best example of the interdependencies between different components of the urban fabric.

1 Wylie 1985. For recent developments, see Cunningham and McGeough 2018.

Figure 5.1. Map of Africa showing the location of Aksum and Great Zimbabwe. Base map by Eric Gaba, Wikimedia Commons user Sting, CC BY-SA <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons.

Mindful of issues of residuality in the archaeological records and ecosystem complexity, we ask: How can we configure the footprints of past urban systems surviving in the landscape in order to recognize, connect, and distinguish components and features of spatial organizations? We find it useful here to consider landscape texture. In visual arts and landscape design, texture refers to a perceived, visual, and physical property of a solid surface as expressed in patterns of variations. These are commonly based on shape and size of elements and patterns making up a surface — such as, for example, its roughness/smoothness. In soil science, texture is the 'feel' of a moist soil to the fingers, determined by its mineral particles and organic matter, providing an approximate measure of the particle-size distribution (Fitzpatrick 1986, 88–89). As such, texture conveys variety and contrast to a landscape, affecting ecological processes (Plotnick, Gardner, and O'Neill 1993; see also Newman and others 2019) but also perceptions. For example, variation in species composition and abundance at landscape scale depends on habitat heterogeneity and specific patterns of dispersal and resource use. When disturbance alters the landscape texture — such as, for example, erosion gullies forming after a storm — then patterns of species abundance will also be altered. Such alterations produce, thus, physical gaps in the texture. Stretching the concept further, we might consider how texture is perceived beyond its physical appearance. One such example might be a 'frontier' as the space demarcated by boundaries where a wall would physically produce a 'break' in landscape texture, which might or might not appear the same on either side of the wall. But, as seen above in the case of ancient Rome, a physical frontier does not necessarily translate into a conceptual one. Conversely, a space devoid of physical barriers does not imply free movement. In this paper, we use 'textured landscape' to emphasize the complex, relational, and interdependent properties shaped by human and ecological processes at work in an urban settlement. Such properties might also be recognized at regional level where different settlements and sites can be seen as components of an integrated (settlement) network. In this, we find useful Raphael Greenberg's (2002, 4) considerations that 'regions are small enough to permit close familiarity with specific stratigraphic and cultural sequences, and large enough to exhibit a spectrum of social and economic interaction'. The term 'region' — as much as 'landscape' — bears different meanings in archaeology, often shaped by prominent topographical divisions. Here, the work of Karl W. Butzer (1982, 63, 230–78) helps us refining the scale with his 'medium-scale environment' encompassing a range of habitats supporting settlement. In this spatial framework, the challenge remains to account for changes in social, cultural, and ethnic boundaries over time. In our case studies, we maintain the conventional, physical-geographic definition of a region, while recognizing the evolving human dimensions of our study areas.

Peripheral Settlements and African Urbanism

Approaches to past urbanisms have been influenced by models derived from developments in the Northern Hemisphere from the Hippodamian plans of ancient Greek cities and the concentric layout of medieval towns in Northern Europe to the early Mesopotamian centres of the Near East. These models were seldom recognized in tropical and subtropical regions. In these contexts, recent comparative analyses have developed new frameworks and models for understanding urbanism in its diversity (e.g. Fletcher 2011; 2019; Graham and Isendahl 2018; McIntosh 2015; Sinclair, Isendahl, and Bartel 2016). In particular, the concept of agro-urban landscapes, mentioned earlier, has opened a new avenue to overcome the traditional urban–rural divide by reconnecting spaces of power and rule with their sup-

Figure 5.2. View of Stelae Park, Aksum. Photo by F. Sulas.

Figure 5.3. The Great Enclosure seen from the Hill Complex, Great Zimbabwe. Photo by F. Sulas.

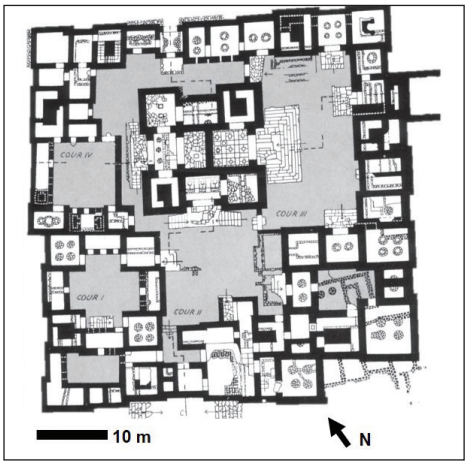

Figure 5.4. View and plan of the Dungur building (late sixth/early seventh century AD), Aksum. Plan modified after Anfray 1990, 102; photo by F. Sulas.

porting and operational dimensions. Others have placed emphasis on the layered nature of cultural landscapes — where economic, symbolic, and ritual power dimensions overlap and interact with individuals, communities, and societies (e.g. Fattovich 2008; Smith 2014; Wynne-Jones and Fleisher 2015).

A long-standing and fast growing tradition of studies has compiled a rich corpus of information on African urbanism (e.g. Freud 2007; McIntosh 1999; 2005; 2015; Phillipson 2012; Sinclair and others 2010; Sinclair, Isendahl, and Bartel 2016). Ancient urban settlements have been studied in Africa for over a century, and their remains have captured the imagination of travellers from far earlier periods. The majestic ruins of stone buildings mesmerized medieval travellers from Europe who ventured to sub-Saharan Africa in search of Prester John and his Christendom (Beckingham and Huntingford 1961; Pikirayi 2001). From the early sixteenth century, Portuguese accounts often provide the earliest portraits of ancient 'cities', such as Aksum and Great Zimbabwe that are described in a lively environmental and ecological setting of productive farmlands, springs, and woods (e.g. Garlake 1973, 51–64; Huntingford 1989).

Indeed, Aksum and Great Zimbabwe have long been a focus of fascination, scholarly enquiry, and scientific analysis. Aksum emerged as the capital centre of the Aksumite Kingdom in the late first millennium BC and grew to control a vast territory stretching northern Ethiopia, central Eritrea, and southern Sudan, and at times reaching further afield across the Red Sea. Following the peak of expansion and growth in the first few centuries AD, Aksum began to decline in the late sixth century, and it appears that it was no longer in control by the eighth century AD (Phillipson 2012; Fattovich 2010; 2019). Further south, Great Zimbabwe grew as the capital of a new empire in the thirteenth century AD, thriving for over two centuries, and likely much longer (Chirikure and others 2013; Pikirayi 2001; Sinclair 2019). At both Aksum and Great Zimbabwe, occupation predates the emergence of the urban settlement of a few centuries. The core urban area of both settlements has long been understood with reference to stone-built monuments encircled by a web of smaller settlements, structures, and other features (Figs 5.2–5.4).

Aksumite Urban Region

Aksum is located on the Tigrean highlands of northern Ethiopia, at the northern edge of the Ethiopian escarpment. Enjoying a topographic position (*c.* 2200 m altitude) above the hot and dry Sudanese lowlands and Eritrean coastal plains, and below the cold mountain peaks to the north-west, this area is characterized by a temperate climate with two rain seasons and high geological variability translating into a richly diverse topography and land cover.

Long a focus of archaeological investigations and systematic surveys (Bard 1997; Fattovich 2008; 2010; 2019; Fattovich and others 2000; French, Sulas, and Madella 2009; Michels 2005; Monneret de Villard 1938; Munro-Hay 1989; 1991; Phillipson 1997; 1998; 2000; 2012; Sernicola 2017; Sernicola and Phillipson 2011), the settlement record at Aksum is significant and almost unparalleled in the wider region. Recent syntheses and spatial analyses provide a comprehensive record of the settlement pattern at Aksum before, during, and after the decline of the eponymous kingdom (Fattovich 2019; Sernicola 2017).

By the early first millennium BC, permanent settlement is amply documented in the Aksum area with sites clustering on the hilltop of Bēta Giyorgis, at the base of the hill, and to the north of the present town (Fig. 5.5). Around the fifth century BC, a new polity emerged and was centred on Bēta Giyorgis hilltop, and rural compounds were present along the slopes. By the late first millennium BC, the residential area emerged in the Aksum plain, and the whole settlement reached a maximum extension of 180 ha in AD 400–600 (Fattovich 2019, 11; Sernicola 2017, 47). In the sixth century AD, the settlement occupied a much smaller area (*c.* 80 ha) concentrated around the cathedral and, by the late seventh/early eighth century AD, Aksum was no longer the capital city with an occupation in the core urban area now reduced to *c.* 40 ha. If very little is known about the following few centuries, new records indicate substantial occupation and land use in the greater Aksum area during the period between the tenth and sixteenth centuries AD (Sernicola 2017; Sulas 2014).

Covering an estimated area of 70 km², the Aksumite capital (mid-second century BC–fifth century AD) included residential and funerary monumental complexes, villages, isolated hamlets, and, following the introduction of Christianity (mid-fourth century AD), churches (Anfray 1990; Fattovich 2008; Fattovich and others 2000; Munro-Hay 1989; Phillipson 2000; 2012). The residential complexes, possibly elite compounds, had multi-storied and rectangular buildings with open courtyards (Phillipson 2012, 124–26; see also Anfray 2013) (Fig. 5.4). Funerary monuments and tombs at Aksum consisted of stone platforms associated with different types of stelae (Fig. 5.2), pit graves, shaft tombs, staircase tombs, and constructed tombs (Fattovich and others 2000; Phillipson 2012, 139–57). In Christian times, apsidal basilicas were built on a stepped podium (Phillipson 2009). A great portion, if not the largest, of the population probably lived in small sites (*c.* 1–3 ha) that are interpreted as farming compounds and hamlets (Michels 2005; Sernicola 2017). Non-elite residential buildings were also built in stone with undressed and mortared walls, shaping rectilinear plans and narrow alleys in urban settings (Phillipson 2012, 125–26). The few excavated examples of rural houses in the Aksum region, mainly dating to the fourth–sixth centuries AD, are of different sizes and sometimes contain exotic, imported goods (Fattovich 2008, 10–11; Fattovich and others 2012; Ricci and Fattovich 1987). Aksumite clay models of small, rectangular thatched houses might represent lower-status dwellings (see e.g. de Contenson 1963, Plate 38; Munro-Hay 1989, Fig. 16, 288). Around the monumental core, survey records show a loosely spaced fabric of non-elite residences. In Aksumite times (*c.* mid-second century BC–eighth century AD), the core urban area is formed by elite residential and funerary complexes

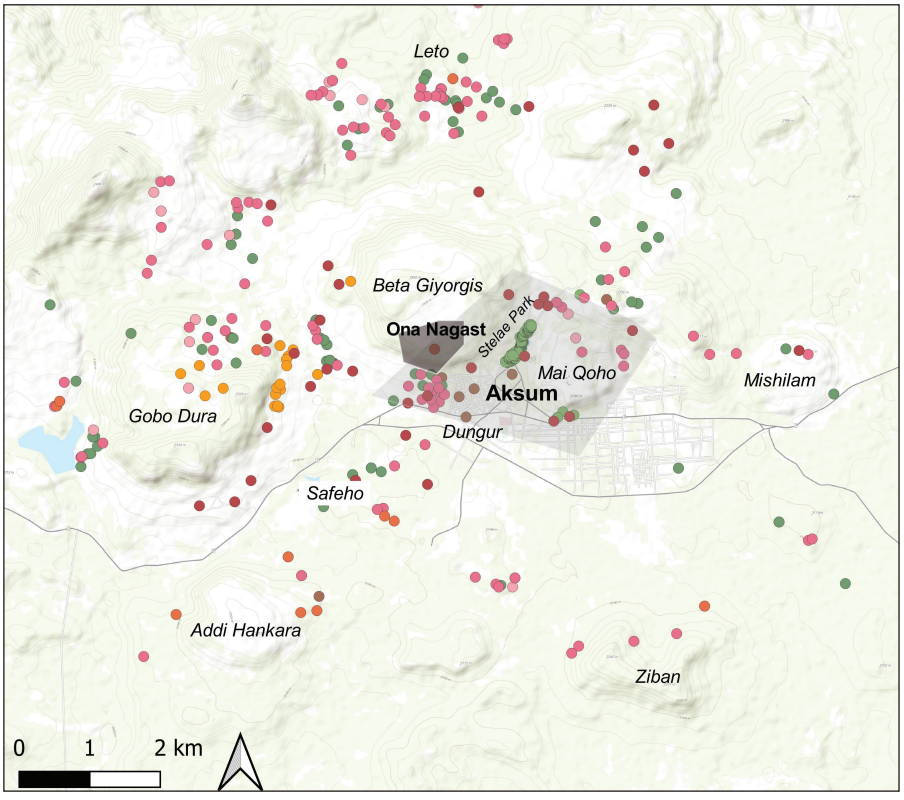

Figure 5.5. Map of Aksum showing the distribution of Aksumite sites and structures (colour spheres). The dark grey shape indicates the potential extension of the early centre at Ona Nagast, on Beta Giyorgis, in the last first millennium BC, and the light grey one represents the probable core urban area of Aksum around the mid-first millennium AD when the kingdom reached its peak. Data from Fattovich 2010; 2019; Phillipson 2012; and Sernicola 2017. Map by F. Sulas.

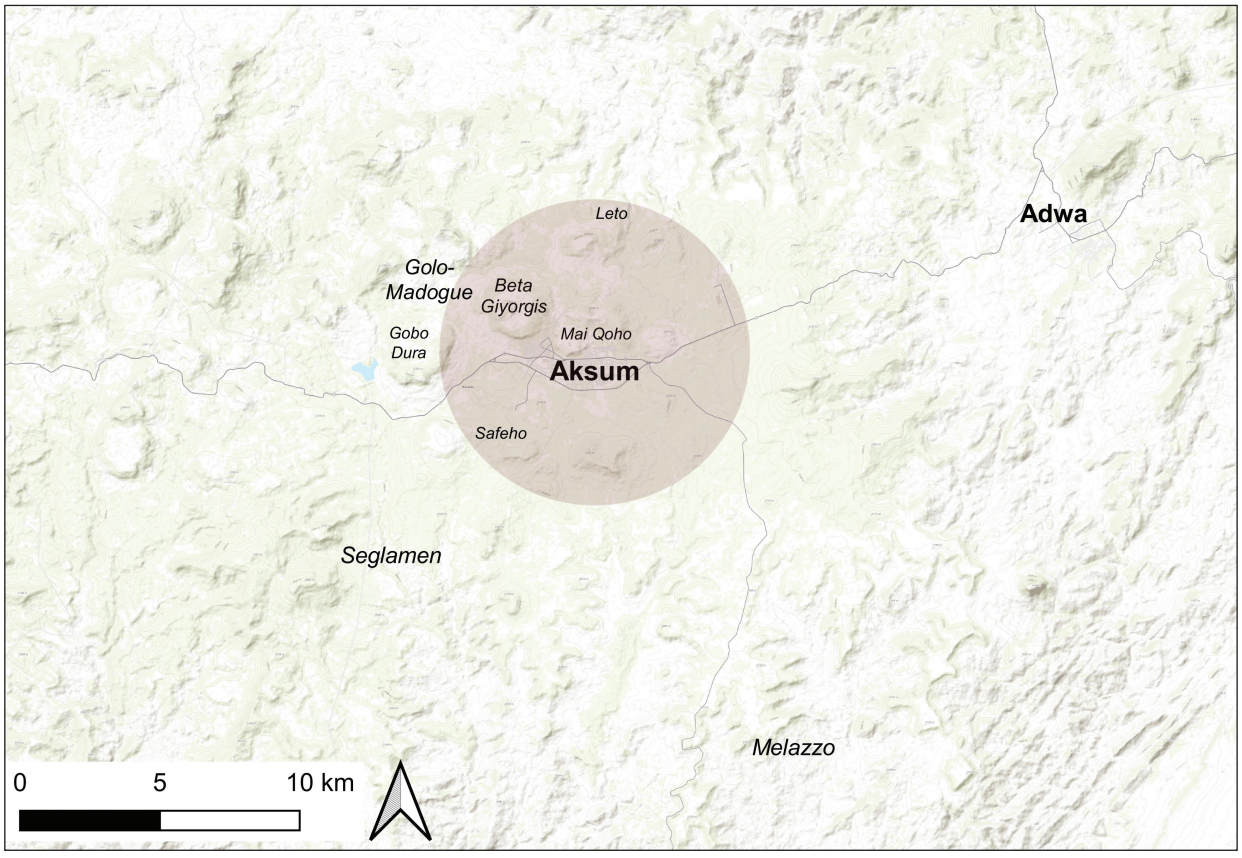

Figure 5.6. Map of the greater Aksum area and distribution of 'satellite' settlements mentioned in the text. Map by F. Sulas.

located at the opening of the Aksum plain and, from here, a mesh of smaller residential units cover some 5 km radius around it. Whilst slightly larger than the size considered by earlier studies, the ancient settlement area known today is still portrayed as a roughly circular distribution of structures and sites with density decreasing away from the centre (Fattovich 2019; Sernicola 2017) (Fig. 5.6). In the latest and most complete archaeological map developed by Luisa Sernicola (2017, 39–42), a tripartite division of the settlement area is proposed on the basis of the density of sites, forming three concentric rings (or zones) around the city centre. Here, the outer ring (zone C) covers the largest spatial extension (67 km^2) and hosts over a third of the overall archaeological record, mostly non-elite residential units and temporary dwellings. This area is interpreted as the outskirt of the ancient city: a largely peripheral area primarily dedicated to farming and animal herding. From a perspective centred in the core urban area, this organization of the ancient settlement pattern with a productive periphery encircling the centre is easy to follow. However, by moving the viewpoint to beyond the city centre, the nature and extent of such a peripheral area become far less convincing. First, as amply recognized (Fattovich 2019; Sernicola 2017, 43–47), archaeological survey and investigations provide a substantial but yet fragmentary record of the settlement at Aksum. Research to date has primarily focused on an area of about 5 km radius around the ancient city centre and, thus, records from areas further afield are few and far between. That said, there is record of substantial occupation just outside the outer ring, including three settlement areas referred to as 'satellite settlements' around Aksum (Fig. 5.6). About 7 km northwest of Aksum, archaeological excavations have uncovered the remains of an Aksumite monumental building complex, possibly with religious function, at Ouchatei Golo-Madogue (de Contenson 1961a). To the south-east and about 10 km from Aksum, in the area of Melazzo, late 1950s excavations recorded the remains of monumental buildings and other stone structures, spanning the first millennium BC and the first millennium AD (de Contenson 1961b; Leclant 1959; Phillipson 2012, 29–30). To the south, the area of Seglamen (*c.* 15 km from Aksum) was home to a pre-Aksumite settlement (first millennium BC) with ceremonial monumental buildings, and also domestic deposits of the late first millennium AD are known from here (Fattovich and others 2012; Ricci and Fattovich 1987; Sernicola and Phillipson 2014).

Figure 5.7. Settlement structures on the Hill Complex, Great Zimbabwe. Photo by F. Sulas.

Further to the east, two clusters of settlement sites were present around *c.* 150 BC – AD 150 near Adua and Yeha, 25 and 50 km east of Aksum, respectively (Michels 2005, 111–14) — Yeha had been the main centre of a pre-Aksumite polity during the first millennium BC (see Fattovich 2019).

Second, the regional topography might also have played a role in the settlement pattern. The areas just north of Aksum lie at the edge of the Ethiopian plateau, rapidly dropping to the now Sudanese arid lowlands. No Aksumite sites are known beyond the areas of Addi Tsahafi and Leto (*c.* 5 km from the city centre, Fig. 5.6). Further afield, the lowlands were occupied by various pastoralist groups in Aksumite times. On the remaining three sides of the Aksum plain, the plateau stretches much further afield, dotted by hills and valleys still lying in the optimal climatic belt of 1500–2200 m above sea level. This is the area with the greatest density of Aksumite settlements.

Great Zimbabwe Urban Landscape

Iron Age archaeology in southern Africa has a long tradition of studies of spatial organization and human–environment interaction with Great Zimbabwe and its surrounding being a prime focus of analysis (Kim and Kusimba 2008; Huffman 1996; Mtetwa 2017; Ndoro 2005; Pikirayi 2001; 2018; Pwiti 1997; Sinclair 1987; 2019; Sinclair and others 1993; Sinclair, Isendahl, and Bartel 2016). Great Zimbabwe lies at an altitude of about 1100 m above sea level on the southern edge of the Zimbabwe escarpment. Predominant granites and important aquifers give rise to a characteristic landscape of granite and granodiorite hills and micro-catchments. Within a wider region characterized by highly seasonal rainfall, Great Zimbabwe and its environs enjoy downpours and moisture brought in by orographic rainfall in the form of mist, supporting vegetation cover, crop growing, and animal herding.

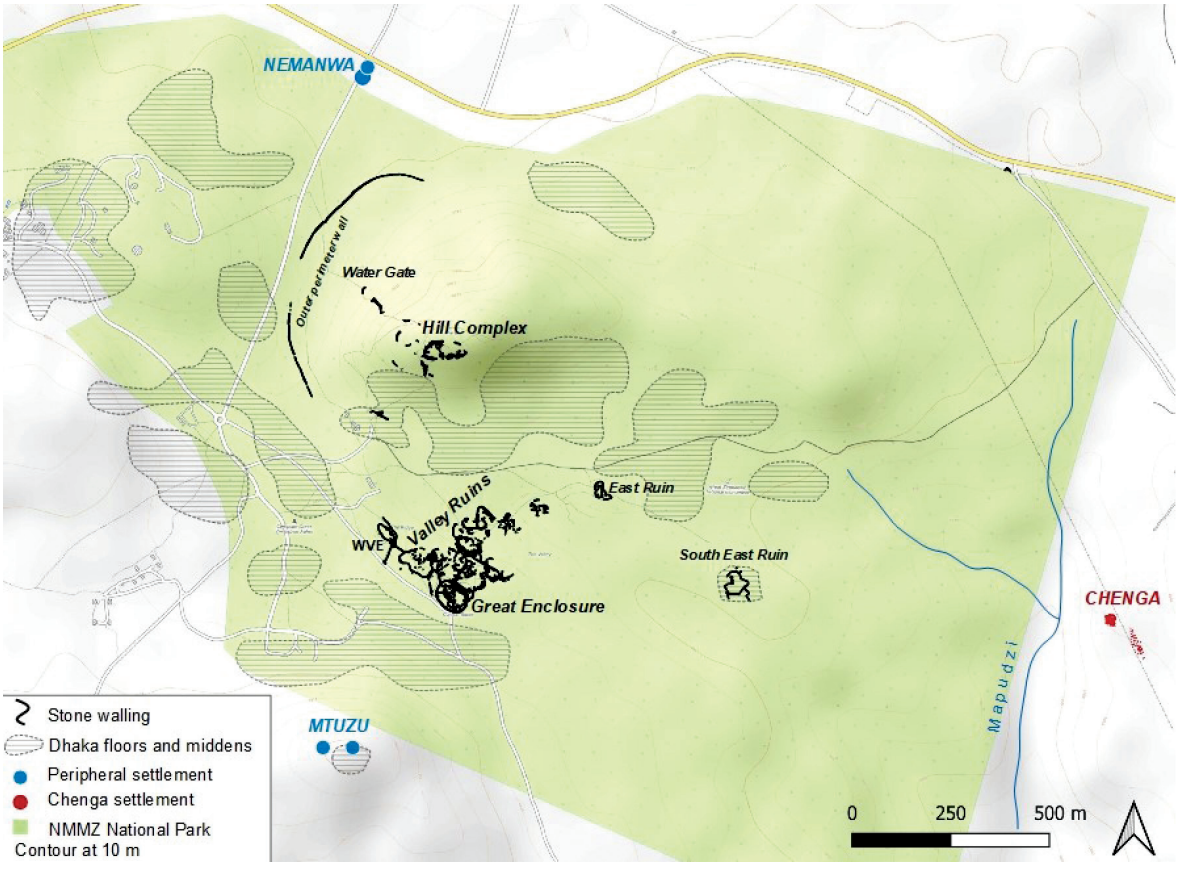

Figure 5.8. Plan of Great Zimbabwe showing the location of the so-called 'peripheral' settlements. Data from Chirikure and others 2017, Pikirayi 2001, and Sinclair 1987. Plan by F. Sulas.

The ancient settlement has long been understood with reference to stone-built monuments encircled by perimeter walls: the Hill Complex, the Great Enclosure, and the Valley Complex (Figs 5.3, 5.7–5.8). In Peter Garlake's (1970, 506) view, Great Zimbabwe was a 'nuclear site', developing a stable cultural continuum from the early thirteenth to the mid-fifteenth centuries AD, and probably stretching earlier (Chirikure and others 2013). A web of stone-walls, earthen (*dhaka*) structures, and other features populate the spaces in between these monumental complexes (Ndoro 2005) (Fig. 5.8). Remains of stone-walling and earthen structures, however, are not limited to the perimeter area and stretch further afield. These include the so-called 'peripheral settlements' (Ndoro 2005, 3), which are scattered within about 2 km radius of the core urban area on the surrounding hills and uplands such as Mtuzu, Nemanwa, and Chenga (Pikirayi 2001, map 5.1). While none of such sites has been investigated in detail, it has been suggested that they might have hosted members associated with the ruling elites or successive rulers (Huffman 1996; but see also Beach 1998; Chirikure and Pikirayi 2008). If Webber Ndoro's (2005, 3) estimate that the core central area amounts to a mere 10 per cent of the whole, then most of the population might have lived in these so-called peripheral areas. Recent reassessment of sites immediately outside Great Zimbabwe's perimeter walls by Shadreck Chirikure and colleagues offers new important insights into the spatial geography of occupation and social relation (Chirikure and others 2018). In questioning the long-held division between the elite and the so-called 'commoner' settlements at Great Zimbabwe, this study shows that extramural settlements had access to resources traditionally associated with elite occupation in the Hill Complex, such as precious metal objects and imported glass beads. The new findings show that research on settlements outside the perimeter walls and beyond the core monumental areas has a unique potential to contribute new, contextual information on socio-ecological dynamics and long-term trajectories of urban development at Great Zimbabwe. On the one hand, this is where most of the population, urban services, and regimes are likely to have been concentrated. On the other, given the variety and extent of archaeological excavation in the core urban area (Ndoro 1997; 2005; Chirikure and others 2017), the greater urban landscape of Great

Figure 5.9. View of Chenga enclosure with Hill Complex in the background. The stone-walling style has been ascribed to the Zimbabwe Culture Period 4 (*c.* AD 1200–1700). Photo by F. Sulas.

Zimbabwe is likely to offer better-preserved archaeological deposits.

Recent investigations at Chenga Ruins, one of these 'peripheral settlements', offer new insights to reconsider the spatial organization and centre–periphery relations in the greater Great Zimbabwe landscape. Chenga Ruins comprise a dry-stone enclosure complex located on the Boroma Ridge at just over 1000 m above sea level, overlooking the Hill Complex, the East Ruins, and the Great Enclosure (Fig. 5.8). In the early 1900s, the then curator of Great Zimbabwe, Richard N. Hall (1905, 426–28), produced a sketch of the enclosure and commented on the strategic position, affording views over multiple valleys. After clearing of 'foreign soil' from later occupation, two buried gates within the dry-stone walls were located, but apparently no material culture was associated with them (Fig. 5.9). On the possible origin of these ruins, local people would consider these as built by a group of later comers (Barotse or Lozi) several generations ago (Hall 1905, 427). The first assessment of the ruins by an archaeologist, Garlake, through an examination of the building style, linked these ruins with the Zimbabwe Culture Period 4 and suggested a date spanning the fourteenth and the fifteenth centuries AD (Garlake 1970, 499). In the late 1980s, the then archaeologist in residence at Great Zimbabwe, David Collett, excavated a trench that exposed a *dhaka* floor inside the main enclosure and retrieved artefacts and other finds. Whilst no full publication of this excavation exists, recent analysis established that ceramic findings, largely undiagnostic sherds, belong to Zimbabwe Culture Period 4 — a period that now covers a large timespan AD 1200–1700 — and faunal remains appear to be primarily from cattle with few fragments from wild game (Chiripanhura 2018, 100–01, 161–62). If these findings warrant the antiquity of Chenga Ruins and contemporaneity to the period of emergence and expansion of Great Zimbabwe, the nature and function of this complex remain elusive until now. Recent archaeological survey and excavation in and around the complex provide new, important insights. Inside the main enclosure, contextual excavation of a trench has exposed a series of domestic occupation deposits (Fig. 5.10). The domestic occupation deposit already recorded by earlier sondages was found overlying a second, earlier occupation level associated with substantial architectural rubble, a packed-earth floor, and a concentration of microlithics, charcoal, and a few potsherds (Fig. 5.11). Almost 8 kg of minute fragments and 267 microlithics (1–2 mm in size) were retrieved. The lithic assemblage displays a distinctive pattern with the highest num-

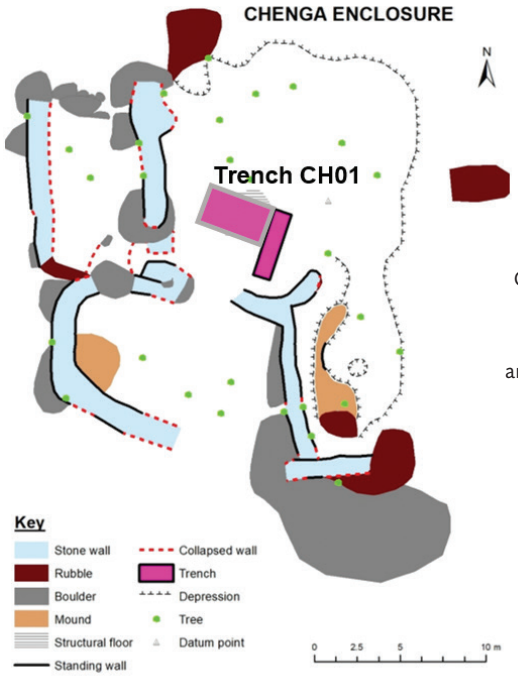

Figure 5.10. Plan of the Chenga complex, showing the location of the trench (CH01) and the archaeological stratigraphy. Plan by Justin Magadzike; section by F. Sulas.

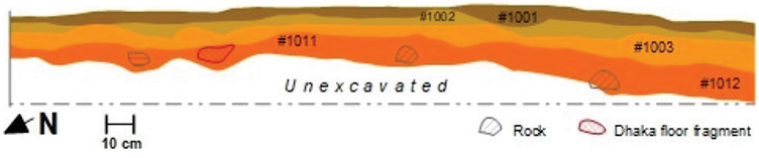

Figure 5.11. View of domestic deposit with compact and degraded *dhaka* floor at CH01, Chenga. Photo by F. Sulas.

ber of retouched flakes, cores, and knapping debris recovered from the lowermost occupation deposits (Fig. 5.12). Noteworthy, despite a rigorously stratigraphic excavation and 100 per cent fine-sieving of all the earth lifted, no precious goods or import markers, such as glass beads or precious metal, were recorded. Outside the Chenga complex, the presence of a substantial mound (*c.* 45 × 27 m) was located some 50 m to the south-east, following the recovery of surface potsherds, including Zimbabwe-period black graphite and imported green-glazed ceramics. A test trench (1 × 1 m) exposed a densely packed midden deposit full of ceramics, faunal remains, lithics, and daub fragments (Fig. 5.13). The survey records further reveal a much wider extent of archaeological remains within the broad Chenga landscape and the Mapudzi Valley between the Boroma Ridge and the East Ruins. Radiocarbon dates from both the domestic deposits inside the enclosure and the large midden nearby place these findings firmly in the fourteenth century AD (Pikirayi and Sulas in preparation).

Urban Regions and Textured Landscapes

Given the density and intensity of settlement records from within and around Aksum, the proximity of urban settlements to the capital city and their distribution beyond it, defining central versus peripheral areas is highly problematic, depending as it would on one's standpoint. In this respect, David W. Phillipson (2012, 119) has remarked that the incomplete record from Aksum 'suggests a loosely packed mixture of buildings and other features that were heavily variable in scale, function and socio-economic status, with little formal demarcation between them'. Whilst acknowledging that structures and features are increasingly dispersed away from the centre, estimating the total size and shape of the area occupied by ancient Aksum remains highly speculative. What matters, following David W. Phillipson (2012), is that the Aksumite settlement was significantly larger than several, contemporaneous cities elsewhere — against the peak of 180 ha estimated for Aksum in the mid-first millennium AD (Fattovich 2019; Sernicola 2017), Phillipson (2012, 119) mentions, for example, two famous contemporaries: Roman London (140 ha) and the ancient West African city of Jenne-Jeno (33 ha). Rather than representing boundaries, the extensive archaeological record of Aksumite settlement might be reflecting an essentially urban region, with permeable and fluid occupation and movement space linking the seat of power at Aksum to its hinterland.

Figure 5.12. A selection of lithic finds from CH01: quartz minute flakes and two cores. Photo by F. Sulas.

Figure 5.13. View of large mound recently discovered at Chenga with scatters of pottery and *dhaka* rubble visible on surface, as Innocent Pikirayi and students survey the extent in preparation for full recording. Photo by F. Sulas.

The new records from Chenga, albeit fragmentary, bring new important insight into the urban landscapes of Great Zimbabwe. Inside the main enclosure there is now evidence for at least two phases of occupation, and the substantial amount of rubble suggests that both these phases might have been associated with daub houses, but the quantity of lithic finds are somewhat different in the two phases. The few, undiagnostic Zimbabwe-period sherds are consistent with what remains of the finds from previous excavations (Chiripanhura 2018, 100–01). *Dhaka* structures and houses are a common feature of Zimbabwe-period enclosures in and around Great Zimbabwe, and these are often associated with very shallow stratigraphy. The Western Valley Enclosure (WVE in Figure 5.8), for example, yielded remains of *dhaka* rubble and floor within a stratigraphy reaching *c.* 25 cm in depth (Collett, Vines, and Hughes 1992, 155–56), in line with the new stratigraphic sequence at Chenga. The relatively low density of ceramics is also consistent with findings from other *dhaka* structures within the stone enclosures. A most distinctive record from Chenga concerns the lithic assemblage, which, to the best of our knowledge, has no parallel in scale and context. Whilst a detailed study of this assemblage is on the way, the density and nature of lithics retrieved invite some preliminary considerations. Only retouched flakes, cores, and possibly knapping debris of chalcedony and quartz were found, and they were present throughout the sequence exposed in the trench (Fig. 5.12). The assemblage is suggestive of a specialized, stone-knapping activity targeting chalcedony and quartz, both available locally. Outside the Chenga complex, the presence of an extensive mound strongly points to a substantial occupation of the area. While the sondage on the mound barely scratched the surface of a substantial midden, the trench inside the enclosure exposed a large area to a depth of over 80 cm.

These preliminary findings, albeit fragmented, provide a compelling case for a reconsideration of the view that Chenga was an 'isolated' outpost at the periphery of the core Great Zimbabwe settlement. The findings from Chenga and its surroundings offer a new perspective for charting the history of the Great Zimbabwe urban landscapes. The extensive midden mound and stratified deposits within the Chenga enclosure suggest substantial occupation of this area, at least in the fifteenth century AD. While analyses of material cultures are on the way, the recovery of substantial amounts of lithics are suggestive of an exclusive, possibly specialized, microlithic industry on chalcedony and quartz, both available locally. Lithics, such as worked flakes or knapping debris, are seldom (never?) reported from sites excavated in and around Great Zimbabwe. It is noteworthy that Henry Balfour (1906) picked up similar microlithics at Khami in 1905, where they appear consistent with the designs found on local Khami-type ceramics (Pikirayi unpublished). This questions whether the new Chenga record is indicative of a special economic/resource-processing vocation of its settlement or, simply, an 'artefact' of archaeological practice — as detailed contextual excavation and fine-mesh sieving of all earth lifted are a prerequisite for the recovery of minute lithics, such as the ones from Chenga. Here, also absence of evidence might be informative: our survey and excavation detected no indicator that this occupation was not linked to other settlements and features within the core urban area. Rather than following a centre–periphery model, the new finds from Chenga, albeit

preliminary and still fragmentary, acquire new value when considered within the context of a long-lived, dynamic urbanizing landscape.

Conclusions

A reconsideration of the settlement organization at Aksum and Great Zimbabwe from a spatial perspective enables us to accommodate interdependencies between core urban areas and their surroundings.

The new settlement record from the greater Aksum area seems to expand, rather than define, a dynamic socio-environmental frame of interactions between people, practices, and resources. While these change over time and across space, there is some consistency in the spatial configuration of settlement densities and typologies: clusters of elite and monumental structures surrounded by progressively dispersed but organically connected productive settlement areas, and so onto neighbouring clusters. Whilst places clearly differed in importance, drawing a limit between the Aksum settlement and nearby places with contemporary elite and non-elite residential areas, such as Melazzo, can hardly find justification in the available archaeological record. Perhaps, mindful of the new reading of Rome's *suburbium*, the settlement densities and sequences around the greater Aksum area might be best understood as part of an urban region, where power-production relations shifted from time to time across a spatial continuum.

Peripheral settlements are always an integral part of the core, as these play a crucial part in enhancing the dynamics exhibited at the centre. In this respect, the new record from Chenga might afford a new angle to look at the Great Zimbabwe landscape. The production of microlithics, for example, provides evidence of functionality that might be linked to different purposes and products, such as decorating ceramics. In this scenario, records of settlement and production at Chenga and other neighbouring places might be best considered as part and parcel of an organic, operational urban landscape for Great Zimbabwe.

In conclusion, thus, we see scope for reconsidering the sizes of ancient African cities, reflecting on the record from Aksum and Great Zimbabwe and on how the 'urban process' might have created huge distances between perceived centres and peripheries. Distances, conceptual and physical ones, can also be seen as spaces between different textures — how one understands and operates at any point in these spaces is influenced by environmental, cultural, and social conditions at either end. To the eyes of some seventeenth-century Portuguese travellers, there was no town in northern Ethiopia that could be called a city (Barradas 1634, XXXIII. 119–20), whereas Mutapa capitals in northern Zimbabwe reached more than a 'league' (3 km) in circumference (see Pikirayi 2009).

Works Cited

Altaweel, M. and A. Palmisano. 2019. 'Urban and Transport Scaling: Northern Mesopotamia in the Late Chalcolithic and Bronze Age', *Journal of Archaeological Method and Theory*, 26: 943–66.

Anderson, H. 2016. 'Urban or Urbanization?', *Norwegian Archaeological Review*, 49: 62–64.

Anfray, F. 1990. *Les anciens Éthiopiens: siècles d'histoire* (Paris: Colin).

——. 2013. *Le site de Dongour (Axoum, Éthiopie): recherches archéologiques* (Hamburg: Books on Demand).

Balfour, H. 1906. 'Flint-Engraved Pottery from the Ruins at Khami and Dhlo-Dhlo, Rhodesia', *Man*, 6: 17–19.

Bard, K. A. (ed.). 1997. *The Environmental History and Human Ecology of Northern Ethiopia in the Late Holocene* (Naples: Istituto Universitario Orientale).

Barradas, M. 1643 [1996]. *Tractatus tres historico-geographici (1634): A Seventeenth Century Historical and Geographical Account of Tigray, Ethiopia*, trans. by E. Filleul and ed. by R. Pankhurst (Wiesbaden: Harrassowitz).

Beach, D. N. 1998. 'Cognitive Archaeology and Imaginary History at Great Zimbabwe', *Current Anthropology*, 39: 47–72.

Beckingham, C. F. and G. W. B Huntingford. 1961. *The Prester John and the Indies: A True Relation of the Lands of Prester John Being the Narrative of the Portuguese Embassy to Ethiopia in 1520 Written by Father Francisco Alvarez* (London: The Hakluyt Society).

Brughmans, T., A. Collar, and F. Coward (eds). 2016. *The Connected Past: Challenges to Network Studies in Archaeology and History* (Oxford: Oxford University Press).

Butzer, K. W. 1982. *Archaeology as Human Ecology* (Cambridge: Cambridge University Press).

Champion, T. (ed.). 1995. *Centre and Periphery: Comparatives Studies in Archaeology* (London: Routledge).

Chirikure, S. and I. Pikirayi. 2008. 'Inside and Outside the Dry Stone Walls: Revisiting the Material Culture of Great Zimbabwe', *Antiquity*, 82: 976–93.

Chirikure, S. and others. 2013. 'A Bayesian Chronology for Great Zimbabwe: Re-threading the Sequence of a Vandalised Monument', *Antiquity*, 87: 854–72.

——. 2017. 'Seen but Not Told: Re-mapping Great Zimbabwe Using Archival Data, Satellite Imagery and Geographical Information Systems', *Journal of Archaeological Methods and Theory*, 24: 489–513.

——. 2018. 'Elites and Commoners at Great Zimbabwe: Archaeological and Ethnographic Insights on Social Power', *Antiquity*, 92: 1056–75.

Chiripanhura, P. 2018. 'Archaeological Collections as a Prime Research Asset: Objects and Great Zimbabwe's Past' (unpublished doctoral dissertation, University of Cape Town).

Collett, D. P., A. E. Vines, and E. G. Hughes. 1992. 'The Chronology of the Valley Enclosures: Implications for the Interpretation of Great Zimbabwe', *African Archaeological Review*, 10: 139–61.

Contenson, H. de. 1961a. 'Les fouilles à Ouchatei Golo, près d'Axoum, en 1958', *Annales d'Éthiopie*, 4: 3–14.

——. 1961b. 'Les fouilles à Haoulti-Melazo en 1958', *Annales d'Éthiopie*, 4: 39–60.

——. 1963. 'Les fouilles de Haoulti en 1959. 'Rapport préliminaire', *Annales d'Éthiopie*, 5: 41–86.

Cunningham, J. and K. McGeough. 2018. 'The Perils of Ethnographic Analogy. Parallel Logics in Ethnoarchaeology and Victorian Bible Customs Books', *Archaeological Dialogues*, 25: 161–89.

Evans, S. and P. Gould. 1982. 'Settlement Models in Archaeology', *Journal of Anthropological Archaeology*, 1: 275–304.

Fattovich, R. 2008. *Kings and Farmers: The Urban Development of Ancient Aksum (Tigray, Ethiopia), ca. 700 BC–AD 1500*, Working Papers in African Studies, 4 (Boston: African Studies Center, Boston University).

——. 2010. 'The Development of Ancient States in the Northern Horn of Africa, *c.* 3000 BC–AD 1000: An Archaeological Outline', *Journal of World Prehistory*, 23: 145–75.

——. 2019. 'From Community to State: The Development of the Aksumite Polity (Northern Ethiopia and Eritrea), *c.* 400 BC–AD 800', *Journal of Archaeological Research*, 27: 249–85.

Fattovich, R. and others. 2000. *The Aksum Archaeological Area: A Preliminary Assessment* (Naples: Istituto Universitario Orientale).

——. 2012. 'Archaeological Expedition at Aksum (Ethiopia) of the Università degli Studi di Napoli, 'L'Orientale' (2010 Field Season: Seglamen)', *Newsletter di archeologia CISA*, 3: 111–28.

Fitzpatrick, E. A. 1986. *An Introduction to Soil Science*, 2nd edn (New York: Longman Scientific & Technical).

Fleisher, J. B. 2010. 'Swahili Synoecism: Rural Settlements and Town Formation on the Central East African Coast, AD 750–1500', *Journal of Field Archaeology*, 35: 265–82.

——. 2013. 'Landscape Archaeology', in P. Mitchel and P. J. Lane (eds), *The Oxford Handbook of African Archaeology* (Oxford: Oxford University Press), pp. 189–99.

Fletcher, R. 2011. 'Low-Density, Agrarian-Based Urbanism: Scale, Power, and Ecology', in M. E. Smith (ed.), *The Comparative Archaeology of Complex Societies* (Cambridge: Cambridge University Press), pp. 285–320.

——. 2019. 'Trajectories to Low-Density Settlements Past and Present: Paradox and Outcome', *Frontiers in Digital Humanities*, 6: 1–21.
French, C., F. Sulas, and M. Madella. 2009. 'New Geoarchaeological Investigations of the Valley Systems in the Aksum Area of Northern Ethiopia', *Catena*, 78: 218–33.
Freud, B. 2007. *The African City* (Cambridge: Cambridge University Press).
Garlake, P. S. 1970. 'Rhodesian Ruins: A Preliminary Assessment of their Styles and Chronology', *The Journal of African History*, 11: 495–513.
——. 1973. *Great Zimbabwe* (London: Thames and Hudson).
Graham, E. and C. Isendahl. 2018. 'Neotropical Cities as Agro-Urban Landscapes: Revisiting "Low-Density, Agrarian-Based Urbanism"', in A. Ekblom, C. Isendahl, and K.-J. Lindholm (eds), *The Resilience of Heritage: Cultivating a Future of the Past: Essays in Honour of Professor Paul J. J. Sinclair* (Uppsala: Uppsala Universitet), pp. 165–80.
Green, A. S. and C. A. Petrie. 2018. 'Landscapes of Urbanization and De-urbanization: A Large-Scale Approach to Investigating the Indus Civilization's Settlement Distributions in Northwest India', *Journal of Field Archaeology*, 43: 284–99.
Greenberg, R. 2002. *Early Urbanizations in the Levant: A Regional Narrative* (London: Leicester University Press).
Hafsaas-Tsakos, H. 2009. 'The Kingdom of Kush: An African Centre on the Periphery of the Bronze Age World System', *Norwegian Archaeological Review*, 42: 50–70.
Hall, R. N. 1905. *Great Zimbabwe, Mashonaland*, 2nd edn (London: Methuen).
Hall, T., P. Kardulias, and C. Chase-Dunn. 2011. 'World-Systems Analysis and Archaeology: Continuing the Dialogue', *Journal of Archaeological Research*, 19: 233–79.
Huffman, T. N. 1996. *Snakes and Crocodiles: Power and Symbolism in Ancient Zimbabwe* (Johannesburg: Witwatersrand University Press).
Huntingford, G. W. B. 1989. *The Historical Geography of Ethiopia: From the First Century AD to 1704* (Oxford: Oxford University Press).
Isendahl, C. 2012. 'Agro-Urban Landscapes: The Example of Maya Lowland Cities', *Antiquity*, 86: 1112–25.
Kim, N. C. and C. M. Kusimba. 2008. 'Pathways to Social Complexity and State Formation in the Southern Zambezian Region', *African Archaeological Review*, 25: 131–52.
Knappett, C. (ed.). 2013. *Network Analysis in Archaeology: New Approaches to Regional Interaction* (Oxford: Oxford University Press).
Jaang, L. and others. 2018. 'When Peripheries Were Centres: A Preliminary Study of the Shimao-Centred Polity in the Loess Highland, China', *Antiquity*, 92: 1008–22.
Jennings, J. 2006. 'Core, Peripheries, and Regional Realities in Middle Horizon Peru', *Journal of Anthropological Archaeology*, 25: 346–70.
Leclant, J. 1959. 'Haoulti-Melazo (1955–1956)', *Annales d'Éthiopie*, 3: 43–82.
Mabogunje, A. L. 1980. 'The Dynamics of Centre-Periphery Relations: The Need for a New Geography of Resource Development', *Transactions of the Institute of British Geographers*, 5: 277–96.
McIntosh, R. J. 1999. 'Western Representations of Urbanism and Invisible African Towns', in S. McIntosh (ed.), *Beyond Chiefdoms: Pathways to Complexity in Africa* (Cambridge: Cambridge University Press), pp. 56–65.
——. 2005. *Ancient Middle Niger: Urbanism and the Self-Organizing Landscape* (Cambridge: Cambridge University Press).
——. 2015. 'Different Cities: Jenne-Jeno and African Urbanism', in N. Yoffee (ed.), *The Cambridge World History* (Cambridge: Cambridge University Press), pp. 364–80.
Michels, J. W. 2005. *Changing Settlement Patterns in the Aksum-Yeha Region of Ethiopia: 700 BC – AD 850*, British Archaeological Reports International Series, 1446 (Oxford: British Archaeological Reports).
Monneret de Villard, U. 1938. *Aksum: Ricerche di topografia generale* (Rome: Pontificium Institutum Biblicum).
Munro-Hay, S. C. 1989. *Excavations at Aksum* (London: The British Institute in Eastern Africa).
——. 1991. *Aksum: An African Civilisation of Late Antiquity* (Edinburgh: Edinburgh University).
Mtetwa, E. 2017. *Technology, Ideology and Environment: The Social Dynamics of Iron Age Metallurgy in Great Zimbabwe, AD 900 to the Present* (Uppsala: Department of Archaeology and Ancient History, Uppsala University).
Newman, E. A. and others. 2019. 'Scaling and Complexity in Landscape Ecology', *Frontiers in Ecology and Evolution*, 7: 293 <https://doi.org/10.3389/fevo.2019.00293>.
Ndoro, W. 1997. 'The Evolution of a Management Policy at Great Zimbabwe', in G. Pwiti (ed.), *Caves, Monuments and Texts: Zimbabwean Archaeology Today* (Uppsala: Uppsala University), pp. 109–24.
——. 2005. *The Preservation of Great Zimbabwe: Your Monument, our Shrine* (Rome: ICCROM).
Östborn, P. and H. Gerding. 2014. 'Network Analysis of Archaeological Data: A Systematic Approach', *Journal of Archaeological Science*, 46: 75–88.
Phillipson, D. W. 1997. *The Monuments of Aksum* (Addis Ababa: Addis Ababa University Press and the British Institute in Eastern Africa).

——. 1998. *Ancient Ethiopia* (London: The British Museum Press and the Society of Antiquaries of London).
——. 2000. *Archaeology at Aksum, Ethiopia, 1993–7* (London: British Institute in Eastern Africa).
——. 2012. *Foundations of an African Civilisation: Aksum and the Northern Horn, 1000 BC–AD 1300* (Addis Ababa: Boydell & Brewer with the British Institute in Eastern Africa).
——. 2009. *Ancient Churches of Ethiopia: Fourth–Fourteenth Centuries* (New Haven: Yale University Press).
Pikirayi, I. 2001. *The Zimbabwe Culture: Origins and Decline of Southern Zambezian States* (Walnut Creek: Altamira).
——. 2009. 'Palaces, Feiras and Prazos: An Historical Archaeological Perspective of African–Portuguese Contact in Northern Zimbabwe', *African Archaeological Review*, 26: 163–85.
——. 2018. 'Investigating Complexity: Great Zimbabwe from a Multidisciplinary Perspective', in A. Ekblom, C. Isendahl, and K.-J. Lindholm (eds), *The Resilience of Heritage: Cultivating a Future of the Past. Essays in Honour of Professor Paul J. J. Sinclair* (Uppsala: Uppsala Universitet), pp. 83–100.
——. Unpublished. *Production, Consumption and Aesthetics: Khami Pottery in the Pitt-Rivers Museum, Oxford* (Oxford: unpublished report).
Pikirayi, I. and F. Sulas. In preparation. 'A New Settlement Sequence for Chenga Complex, Great Zimbabwe: Results of Archaeological Excavations and Survey'.
Plotnick, R. E., R. H. Gardner, and R. V. O'Neill. 1993. 'Lacunarity Indices as Measures of Landscape Texture', *Landscape Ecology*, 8: 201–11.
Pwiti, G. 1997. 'Aspects of Spatial Studies in Zimbabwean Archaeology', in G. Pwiti (ed.), *Caves, Monuments and Texts: Zimbabwean Archaeology Today* (Uppsala: Uppsala Universitet), pp. 55–68.
Ricci, L. and R. Fattovich. 1987. 'Scavi archeologici nella zona di Aksum. A. Seglamien', *Rassegna di Studi Etiopici*, 30: 117–69.
Rowlands, M. 1987. 'Centre and Periphery: A Review of a Concept', in M. Rowlands, M. Larsen, and K. Kristiansen (eds), *Centre and Periphery in the Ancient World* (Cambridge: Cambridge University Press), pp. 1–11.
——. 1998. 'Centre and Periphery: A Review of a Concept', in K. Kristiansen and M. Rowlands (eds), *Social Transformations in Archaeology: Global and Local Perspectives* (London: Routledge), pp. 217–35.
Rowlands, M., M. Larsen, and K. Kristiansen (eds). 1987. *Centre and Periphery in the Ancient World* (Cambridge: Cambridge University Press).
Sernicola, L. 2017. *Ancient Settlement Pattern in the Area of Aksum (Tigray, Northern Ethiopia) – ca. 900 BCE – 800/50 CE)*, British Archaeological Reports International Series, 2860 (Oxford: British Archaeological Reports).
Sernicola, L. and L. Phillipson. 2011. 'Aksum's Regional Trade: New Evidence from Archaeological Survey', *Azania*, 46: 190–204.
——. 2014. 'Archaeological Expedition at Aksum (Ethiopia) of the Università degli Studi di Napoli "L'Orientale"' 2012 Field Season: Seglamen', *Newsletter di archeologia CISA*, 5: 479–506.
Sinclair, P. J. J. 1987. *Space, Time and Social Formation: A Territorial Approach to the Archaeology and Anthropology of Zimbabwe and Mozambique, c. 0–1700 AD* (Uppsala: Uppsala Universitet).
——. 2019. 'Towards an Understanding of Spatiotemporal Dynamics at Great Zimbabwe Contributions of the Urban Origins in Eastern and Southern Africa Programme', *Acta archaeologica*, 90: 123–34.
Sinclair, P. J. J., C. Isendhal, and S. Bartel. 2016. 'Beyond Rhetoric: Towards a Framework for an Applied Historical Ecology of Urban Planning', in C. Isendahl and D. Stump (eds), *The Oxford Handbook of Historical Ecology and Applied Archaeology* (Oxford: Oxford University Press) <https://doi.org/10.1093/oxfordhb/9780199672691.013.34>.
Sinclair, P. J. J. and others. 1993. 'Urban Trajectories on the Zimbabwe Plateau', in T. Shaw and others (eds), *The Archaeology of Africa: Food, Metals and Towns* (London: Routledge), pp. 705–31.
——. (eds). 2010. *The Urban Mind: Cultural and Environmental Dynamics* (Uppsala: Department of Archaeology and Ancient History, Uppsala University).
Sindbæk, S. M. 2007. 'The Small World of the Vikings: Networks in Early Medieval Communication and Exchange', *Norwegian Archaeological Review*, 40: 59–74.
Small, D. B. 2006. 'Factoring the Countryside into Urban Populations', in G. R. Storey (ed.), *Urbanism in the Preindustrial World* (Tuscaloosa: University of Alabama Press), pp. 317–29.
Smith, C. 2017. 'Ager Romanus antiquus', *Archeologia classica*, n.s., 68: 1–26.
Smith, M. L. 2014. 'The Archaeology of Urban Landscapes', *Annual Review of Anthropology*, 43: 307–23.
Sulas, F. 2014. 'Aksum: Water and Urbanization in Northern Ethiopia', in T. Tvedt and T. Ostigaard (eds), *A History of Water*, Series 3, 1: *From Jericho to Cities in the Seas: A History of Urbanization and Water Systems* (London: Tauris), pp. 173–97.
Vionis, A. S. and G. Papantoniou. 2019. 'Central Place Theory Reloaded and Revised: Political Economy and Dynamic Landscapes', *Land*, 8.2: 36 <https://doi.org/10.3390/land8020036>.
Wylie, A. 1985. 'The Reaction against Analogy', *Advances in Archaeological Method and Theory*, 8: 63–111.
Wynne-Jones, S. and J. Fleisher. 2015. 'The Multiple Territories of Swahili Urban Landscapes', *World Archaeology*, 48: 349–62.