

Urban Labels and Settlement Trajectories

ABSTRACT Archaeology has conventionally managed information about settlements into a set of types: campsite–encampment, hamlet–village, and town–city. These were tightly defined but have now become rather less specific. They are broadly understood as categories of different magnitude and still tend to be framed within a stage-theory premise of linear transformation from smaller settlements with more mobile communities to larger ones with less mobile communities. However, what has become apparent is that the agrarian-based urbanism contains compact, high-density settlements with sedentary populations and dispersed, low-density settlements of considerable size and also contains urban settlements which were seasonal and entirely mobile. In addition, it is now clear that definitions of urbanism are regionally specific and that global definitions have become tenuous and increasingly decoupled from material actuality. Therefore, to communicate cross-regionally we need to respect regional uniqueness *and* analyse the dynamic trajectories of urban settlements as the basis for consistent global cross-comparison of patterns of difference.

KEYWORDS Urban; regional; global comparison; Interaction-Communication Matrix; trajectories; outcomes.

Introduction

Urbanism has become a protean term of great plasticity, indeed it always has been, but this was concealed by the regional localism of scholarly interaction, plus a ‘Western’ self-focus. These concealing effects are now being overtaken by global interaction and multi-regional self-focus. The core issue is the relationship between regionality and global comparability. Each region has its own unique set of priorities, problems and perspectives, and social characteristics. Concurrently a global viewpoint allows uniqueness to be placed in a larger context which allows the significance of a regional example to be appreciated. There is therefore both a fundamental disjunction and a complementarity between local meaning and global significance.

Regional traditions of scholarship are the foundations of archaeology. Without expertise and precise professional knowledge of local circumstances, materiality, sociality, and change over time, the archaeology of a region cannot be either perceived or examined. And global archaeology can only be done once a variety of regional archaeologies are available. The corollary is however, that while expertise and perspective from another region may be informative, no regional tradition can legitimately tell another regional tradition what labels should be used or how they should be defined. Nor can a region specify that its materiality-sociality associations are somehow a universal. Even meanings of words vary, so universal social categories are unlikely. The European languages use ‘civilization’ but the French can speak of the ‘La Civilisation du Palaeolithic’, which the English speakers do not. And in the Chinese language the term ‘wenming’ refers to the phenomena labelled as ‘civilization’ by others but has additional connotations specific to its Chinese cultural context.

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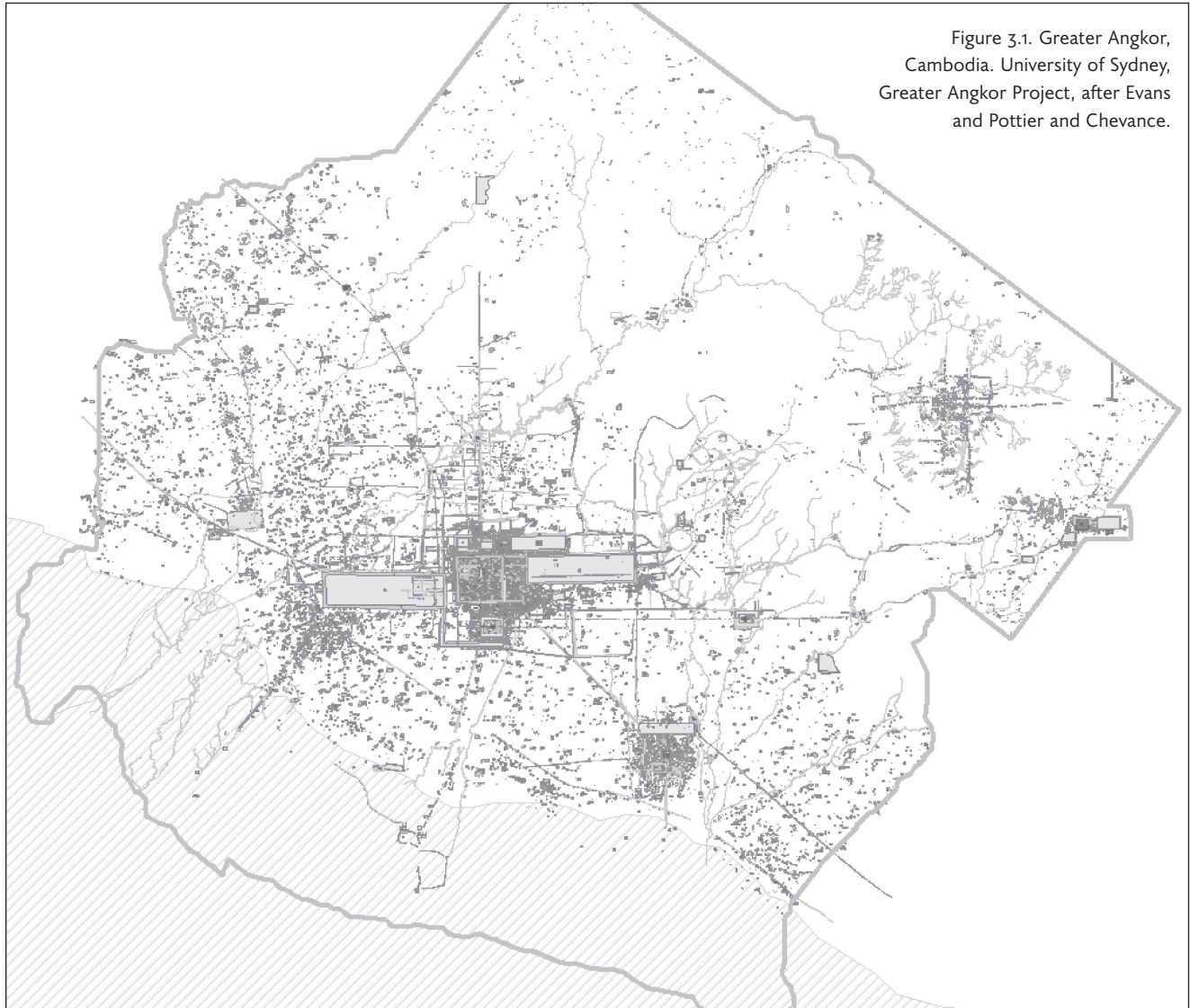


Figure 3.1. Greater Angkor, Cambodia. University of Sydney, Greater Angkor Project, after Evans and Pottier and Chevance.

What this means is that a definition of urbanism or a disagreement about its meaning in one region has no specific legitimacy in another. Whatever the debate about whether or not the *wik* of Western Europe are urban (see Theuvs 2012), it actually makes no difference to what Danish scholars may wish to label a site like Ribe (Ashby and Sindbæk 2019). China has its own terminology and meaning — predicated on the Chinese script sign for ‘wall’ — associated with places which Western scholars have conventionally called ‘urban’ (von Falkenhausen 2008, 209–10). And the Chinese researchers can apply their label to whatever sites they choose. When, however, the Chinese term — and what is associated with it — is attached to the term ‘urban’ in translation, then this would imply some global cross-consistency as a basis for comparative analysis. But the application of the term ‘urban’ has now become so diffuse in its meaning and connotations worldwide that the label

does not allow consistent cross-comparability. We therefore risk scholarly disputes and conflicts deriving from divergent designations of ‘urban’ in different regions for different purposes.

Core Issue

At the most extreme, for example, if we open a discussion worldwide about the initial formation of urbanism what answers might we obtain? Using the old designations of PPNA Jericho (Kenyon 1952) and Çatalhöyük (Mellaart 1967) as towns the prime candidate would be the Levant in 8000–6000 BC. But these sites have begun to go out of fashion as ‘urban’ (Grosman and Munro 2017; Finlayson and Makarewicz 2018), though given the global diversity of the term there seems little justification for removing them. But the ambiguity that calling them ‘urban’



Figure 3.2. East Coast Megalopolis, USA. University of Sydney, after Doxiadis.

creates, is serious. If we retain them as urban, then urbanism commences from the initial development of agriculture by mobile communities and — putatively — from the start of sedentism. And that is a *big* proposition, as it makes ‘village’ life a secondary epiphenomenon, which has many disturbing logical consequences — especially that the most common, long-lived, lower-energy settlement form (the village) would derive from the rarer, higher-energy

settlement form (the city) and that the rarer form would derive directly from hypothetical antecedent mobile societies and economies. Another option is to follow on the proposition that ‘urbanism’ applies to the Trypillia sites in Ukraine in the late fifth and early fourth millennia BC (Videiko 2007), leading to the situation that, potentially, Ukraine has the earliest urbanism — or does China, now that the Lungshan mega-sites are designated urban (Zhao

2013; Underhill 2017)? And what then is the relationship to the conventionally designated initial 'urban' settlements of Mesopotamia, Egypt, India-Pakistan, and China from the third and second millennia BC and of Mesoamerica and Peru from the late first millennium BC to the early first millennium AD.¹ The potential for rancorous interregional disputes, grandstanding, and futile antagonisms is very high. One option is simply to avoid worldwide cross-comparison, which will make the job of global journals somewhat problematic. Or we can accept that there are regional differences about the definition of urbanism and agree not to debate them — but that risks stifling discourse.

The alternatives are that we either have to eschew global questions or otherwise try to work out some way to pursue them that does not lead to futile definitional disputes of an almost canonical flavour. Plainly many researchers wish to continue with global engagement and have devised pragmatic 'live and let live' solutions to do so — a very archaeological 'grounded' practice. Another pathway to continuing global discussion is to recognize that we are talking about very diverse phenomena under one generic label. The sites we are discussing are not a homogenous lump. They are instead tremendously diverse. And that offers a pathway to productive discourse and debate. For example, the conventionally recognized first cities of the six classic regions are considered to be compact settlements. That is significant, because those known initial compact urban cases led to a long continuing urban tradition — with one possible exception to which I will return. By contrast, after the demise of lower-density, large settlements, such as Greater Angkor (Fig. 3.1) (Fletcher and others 2003), there were not long, ongoing regional traditions of the same kinds of settlements. This is a profound operational difference which is seriously topical in the present when we have a need to appraise whether or not our current, industrial, low-density, dispersed urban aggregations such as the megalopoleis (Fig. 3.2) (Gottman 1961) face serious risk and whether or not they can maintain urban continuity (Fletcher 2018). Any cases of continuity for pre-industrial low-density settlements would therefore be deeply consequential. But their significance would be obscured by homogenizing them under a generic, undifferentiated urban label.

These crucial physical characteristics and the various relationships to long-term outcomes associated with them may then generate useful debates, which may become quite rancorous but will get us

somewhere. For example, if it could be shown that large Trypillia sites were inhabited at higher densities by long-term, permanently sedentary communities (Müller, Hofmann, and Ohlrau 2016) contrasted to a lower-density form (Gaydarska, Nebbia, and Chapman 2019), then a vigorous and coherent debate can develop. Likewise, if it can be shown that there was no 'gap' between Harappan and Gangetic urbanism, then that region would join all the other initial compact urban regions with long continuities of an extremely durable settlement pattern.² Conversely, if it can be shown that there was no continuity between the two traditions then that 'gap' becomes profoundly important because it will help to tell us what does and does not lead to the long continuity of compact 'urbanism'. Again, that could be quite some dispute — but it would be worth having and would drive up research standards in the bid to win the case, either way. And we may perhaps also learn something very new — that the debates are about something other than we thought they were.

How Did We Get to the Current Protean 'Urban' Label?

In the 1930s 'urban' was a coherent theme of great significance. The viewpoint was both global and primarily and selectively European and North American, as for example in Lewis Mumford's famous *The Culture of Cities* (1938). The current conundrum has its basis in two circumstances which had a nineteenth-century ancestry and were inherent to the overviews of the 1930s and 40s. First, that only the terms hamlet–village, town–city, or the even more restricted rural cf. urban were, by convention, available. They had to describe the entire spectrum of settlement sizes and functions produced, by what have been presumed to be sedentary communities, over the past eight to ten thousand years. Given the degree to which settlements have changed in size this is a seriously depauperate taxonomy only somewhat remedied by adding megalopolis, conurbation, and *desakota* for current megacities. They are however, still specified as cities. Secondly, these labels were inserted into a ranked hierarchy of cultural progress in Stage Theory with 'civilization' attached to the city and urbanism, as its latinate ancestry specifies. This continued through into the 1950s, as in the work of V. Gordon Childe. The effect is that a very limited taxonomic set was tied into a theory which specified superiority for urban society and specif-

1 See Daniel 1973 for the old synthesis.

2 See summary of the context by Kenoyer 2015, 102–13.

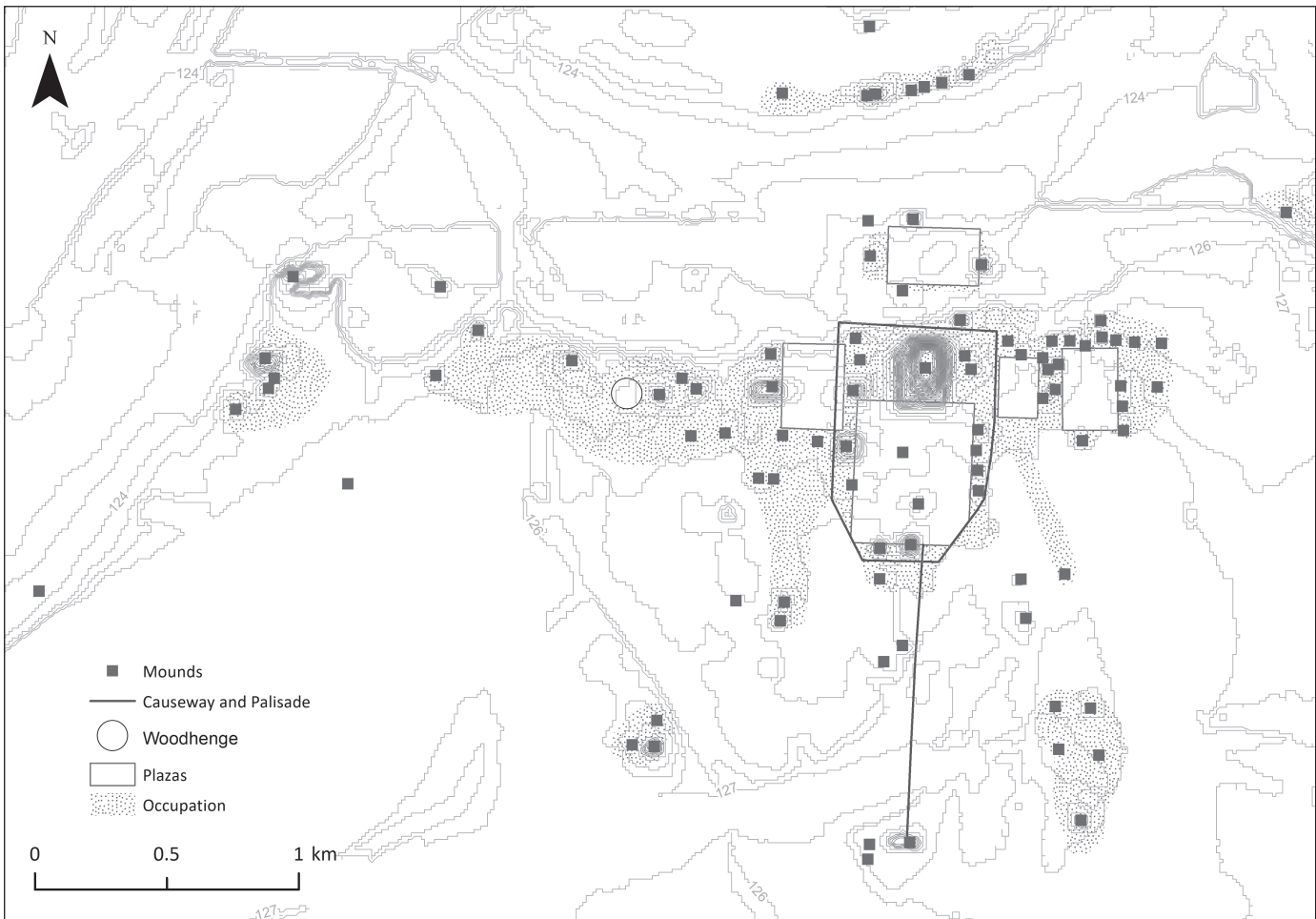


Figure 3.3. Cahokia, USA. University of Sydney. Courtesy of Kirrily White; contours after ALOS PALSAR DEM by JAXA; occupation after Pauketat and Lopinot; plazas after Kelly.

ically for the compact urban form of it, as seen in Western societies. That had one quality, which was that in due course it had, logically, to incorporate other cultural regions with compact cities, such as the Indian subcontinent and Eastern Asia, into the high rank. European culture had to reserve its superiority either to very specific social traits or to the urbanism of industrialization.

The problem which stage theory created was to systematically attach great cachet to being 'urban'. Once the postcolonial world removed the capacity of the European regional tradition to dictate what was and was not 'urban', the expanded use of the term has become immensely useful. It has become available as a strategy for demolishing the remnants of stage theory and ascribing cachet to other cultures which can now be said to have had urban settlements. This has been profoundly important in Africa. It also has a remarkable resonance in North America where Tim Pauketat (2007) has argued with great vigour that Cahokia (Fig. 3.3), with an area of 16 km² in the twelfth century AD (Fowler 1997), could not credibly

be denied the label 'urban'. To argue that the term 'urban' should not be applied to the settlements in a region has therefore become tantamount to insulting the local cultural tradition. Straightforward respect precludes this option. Therefore, the labels 'urbanism', 'urban', and the city have proliferated across a wide spectrum of settlement types, sizes, and functions. The epithet 'The Lost City' has gained great currency even though, in actuality, none of the famous examples, such as Machu Picchu and Angkor, was ever lost by the local people. Metaphorically speaking, to stagger out of the jungle and announce that you had 'discovered the Lost Village' was unlikely to win prestigious sponsorship for further research. Variants of the 'Lost City' invocation are a feature of academic publication. The term 'urban' has a cachet quite lacking in other labels.

The label 'urban' has also been very amenable to this expansion of its protean applicability because it has been, in actuality, rather vague for more than seventy years as Gordon Childe and Robert McCormick Adams, paragons of archaeo-

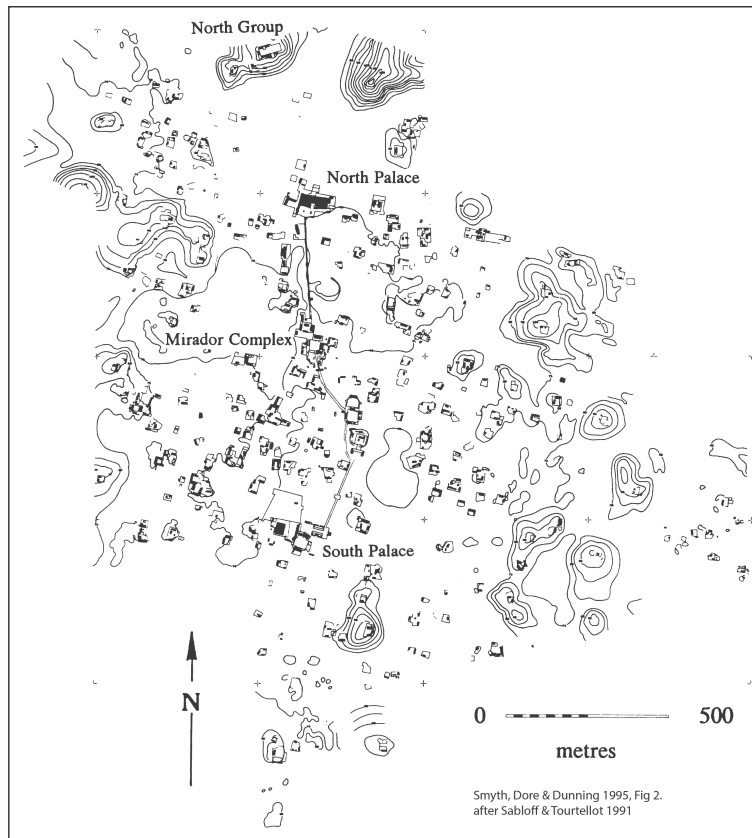


Figure 3.4. Sayil, Mexico. Courtesy of Jerry Sabloff.

logical urbanism, remarked. Childe (1950, 3) commented that ‘The concept of the “city” is notoriously hard to define [...] the common factors are quite abstract’. Adams (1981, 81) reiterated the concern in 1981: ‘Urbanism, to be sure, denotes no set of precise, well-understood additional characteristics for societies so described’. Glenn Reed Storey (2006, 2) in 2006 restated the conundrum of trying to define urbanism globally by observing that cities are ‘home to urban activities’ and can be defined as such when there is ‘some (if not universal) consensus among the scholars who study *that* place and *its* cultural setting’ (my italics). The divergences continue as the term becomes ever more protean.

The debates which divergent views of urbanism can generate, are illustrated by the responses to Bisserka Gaydarska’s (2016) paper in the *Norwegian Archaeological Review* (e.g. see Christopherson 2016, 58–61; Mogren 2016, 73–75). The spectrum of ways to present comparative overviews, the different definitions, inclusions and exclusions, and the foci of those overviews have also been very varied and divergent, as illustrated by the work of Monica Smith (2019) and Mike Smith (2011). Despite these differences, sociality is still the prevalent explanatory approach, as also for David Wengrow (2019a) and for Norman

Yoffee (2015). The field of urban studies in archaeology is now complex and very diverse yet also still segmented on a very large, analytic scale. Connecting past and present urbanism analytically, as advocated by Mike Smith (2012) has begun with specific concepts, such as settlement scaling theory (Lobo and others 2020; Bettencourt and Lobo 2019), but this is not, as yet, a widespread and systematic practice. And while Historical Archaeology has made substantial contributions to the specific study of the early industrial city (e.g. Murray and Crook 2019), David M. Carballo and Brent Fortenberry (2015) point out that cross-period integration of urban analysis, through that sector of archaeology, is just beginning.

Given the lack of agreement and the diversity of articulated ‘urbanisms’ there seems to be no coherent grounds within the existing scope of the term ‘urban’ to exclude any place as huge as the 7 km² of Great Zimbabwe (Huffman 1972; Pikirayi and Chirikure 2011) and its large, central, stone-built structures, by defining it as ‘not urban’. That would be extremely problematic unless it were a decision within the community of African and Africanist scholars. The same applies to the regional specialists who work on Liangzhu and Taosi in the Chinese Lungshan tradition, Heidengraben in Late Iron Age Europe, or Chaco Canyon of the Ancestral Puebloan culture in North America. ‘Urbanism’ can be — and is — mainly used within each cultural region in terms of its own particular and operationally appropriate form. The great local power and vitality of the label, which continues today, is therefore its capacity to absorb new propositions and new associations and to continue to facilitate regional research and discussion. It is readily adjustable to numerous academic purposes.

But when, as is now certainly the case, encompassing a global, long-time depth overview is increasingly necessary (Wengrow 2019b; van der Leeuw 2018; Fletcher 2018) — both out of a respect for the commonality of humankind, and because of the increasingly apparent global risks which we face — the term on its own is problematic and its regionalism begins to look like a problem. But that regionalism is not actually the problem at all. The term seems to be working well in regional contexts and can produce constructive disagreements. The problem is an assumption that the term should in itself serve *both* the regional and the global role, beyond being a generic placemaker for knowing broadly what we are talking about.

However, ‘urban’ cannot now function beyond that generic condition. The reason is that two other changes in our understanding of urbanism have altered its fundamental character and what we under-

stand about the way it operates. We have got to this understanding because the increasing diversification of the meaning of 'urban' has freed the option for additional critical inquiry into the forms which it can take and the ways in which it can operate. The first, great and obvious stimulus for reappraisal is that the largest examples of industrial urbanism have ostentatiously moved to a sprawling, dispersed format (Angel 2012; Angel, Parent, and Civco 2012) wrapped around former, separate compact cities, which are now the multicentric, relatively small, and denser nodes within vast new urban landscapes. The term *desakota* or 'rural urban' (McGee 1991) encapsulates the character of these urban multicentric complexes, variously also called megalopoleis and conurbations. These industrial cities contain large areas of farming or other non-residential uses.

What logically follows is that other non-industrial urban settlements may, therefore, have had a similar form. We could, indeed, have known this was the case since the 1960s when the extent, patchiness, and internal dispersal of occupation (see Appendix 1) in the great Maya sites (Fig. 3.4) became known (Willey 1965; Graham 1999; Graham and Isendahl 2018). However, this did not happen in the 1960s. The dispersal of these characteristics was not emphasized. Though they were not concealed, the emphasis was on the density of the distribution of occupation mounds and on the 'big' populations and the large labour force needed to build the monuments. These were in essence 'urban'-scale places. By the 1990s, however, in south-east Asia, another recognition of low-density agrarian-based, dispersed urbanism (see Appendix 2) was in progress initiated by the tenacity of Christophe Pottier (1999) and by the University of Sydney's team in collaboration with Christophe and the APSARA Authority on Greater Angkor (see Appendix 2), working on the increasingly accessible and detailed remote-sensing data from NASA JPL (Evans and others 2007) and the more recent LiDAR surveys (Evans and others 2013). As a consequence, when combined with knowledge about the megalopoleis, the argument that a fundamental characteristic of urbanism is compact occupation, strongly differentiated from the rural world, is simply invalid. These dispersed settlements, in the present and the past, can and frequently do have denser areas especially at their centre, or else have multicentric loci, even though the total area of the urban complex is dominated by dispersal, both of occupation locations and formal structures, such as shrines. Fundamental assumptions about the key socio-economic and political roles of close proximity are not tenable. Furthermore, the presumed rural and urban functions are integrated within the

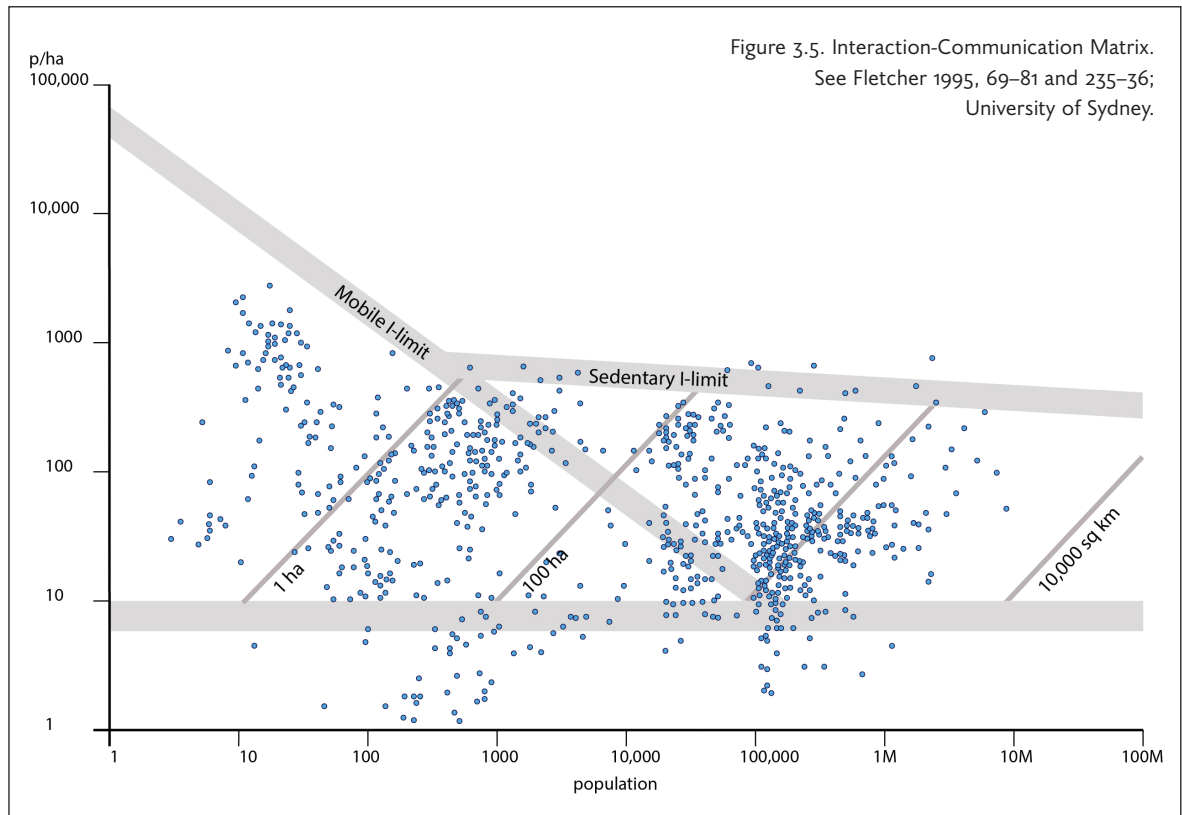
urban area and cannot be operationally separated. Standard assumptions, based on selective substantive analogy, about what materiality goes with what sociality are untenable. That operational analogy can be used to relate combinations of materiality and sociality to outcomes is another matter altogether.

The second great stimulus for redefining the operational characteristics of urbanism came from far outside urban studies, by way of the redefinition of the status, role, and impact of mobile communities. In the first instance this term applied to hunter-gatherers, but researchers like Eric Higgs (1975) began to speak more generally of mobile communities and mobile economies.³ A variety of scholars had already recorded the crucial information, but there had been no logical premise for bringing it together. Higgs's redefinition of what we were studying, which specified that other mobile societies were themselves profoundly significant economically, socially, and politically, provided that premise. The huge camps of the Plains Indians were well known (Bushnell 1922; Fletcher 1991, 400–05). That the Mongols had lived in vast mobile communities — the *ordu* — which were observed and recorded in the thirteenth century, was also known (William of Rubruck in Rockhill 1900). William of Rubruck remarked: 'When I saw the *ordu* of Baatu, I was astonished, for it seemed like a great city stretched out about his dwelling, with people scattered all about for three or four leagues' (Ruysbroeck and Jackson 2017, 267).

And papers were written in the 1960s on the moving, seasonal capitals of the seventeenth- and nineteenth-century Ethiopian rulers (Horvath 1969; Pankhurst 1979; Fletcher 1991, 405–10), but that reality was not widely recognized. When put together with Carla M. Sinopoli's (1994) review of the information on the great encampments from which the Mughal emperors had periodically, and sometime frequently, ruled India it was apparent that human beings could aggregate in huge mobile communities living in vast seasonal encampments. That these could have 'urban' functions was unavoidably apparent for the Ethiopian and Mughal examples. That the thirteenth-century Mongol encampments also had 'urban' functions is inescapable (Biran 2013, 273). They had a writing system and managed sectors of an empire through regular administration offices, they received embassies, a market operated adjacent to the main encampment, and the *ordu* were supplied with grain from obligated villages, transported into the encampments.⁴

3 And see Whittle 1997 for a taxonomy of mobility.

4 Rockhill 1900, p. 68 of the text of William of Rubruck.



Once being ‘urban’ includes mobility, then the old sureties of what constituted urbanism are gone. Urbanism covers settlements ranging from overall high- to low-density occupation (on the order of 500 to 5 p/ha), sizes ranging from the few hectares of Megiddo to the plus 100,000 km²-extent of the larger megalopoleis, like the East Coast Megalopolis in the USA or the Pearl River Delta complex in China, and now also includes the spectrum from intensely sedentary to very mobile. Urban settlements can be continuously inhabited for many centuries and can remain in one place for only a few weeks.

Now that urbanism can include low-density occupation *and* be mobile and operate across a vast variety of sizes and durations, claims to be able to define ‘urbanism’ by some agreed set of universal criteria are gone and cannot be restored, whether those criteria are definitively physical or intangibly social. No socially meaningful index could encompass all the divergent magnitudes, densities, and temporal organization and their associated materialities and varying outcomes. Materiality and sociality are not deterministically linked. Outcomes do not have determinate correlations with initiating causes such as sociality. And a social index broad enough to encompass the social life in all the varied forms of settlements currently residing under the label ‘urban’

would be so generalized that if it could exist across this variety it could also exist in a diverse range of other kinds of communities and places. Such an index could not therefore be definitional. What is important however, is that the recognition of these characteristics of low-density and mobility does not affect the analysis of urbanism in regions where they are not present. Urban mobility in Ethiopia does not per se obligate the adoption of that characteristic as a feature elsewhere in the world, nor does it show that the concept of sedentary urbanism elsewhere is in error. What it may do is lead to new questions about old familiar phenomena. Once we know that Ethiopian rulers could tax their state by moving the capital to the provinces, the familiar procedure of bringing tax into a fixed sedentary capital is no longer a self-evident given but becomes an interesting issue, even a problem. Why did that form of fixed-base, compact, robust urbanism persist rather than the more flexible mobile system used in Ethiopia? We also need to ask whether there were mobile capitals which we are missing. Perhaps the nomadic groups which moved into Europe after the end of the Roman Empire might provide examples, for instance Pliska, an extensive, sparsely occupied settlement of the Bulgars between the seventh and the ninth centuries AD (Henning 2007) among oth-

ers. As I have argued (Fletcher 1998), we also need to rethink how we comprehend African urbanism and its relationship to mobility, as Akin Ogundiran is currently doing. In my view the imperial Mongol *ordu* also need to be re-envisioned from an archaeological viewpoint.

Trajectories

Due to the combination of diverse physical characteristics and the immensely varied forms of different regional urbanisms, we need a new way to integrate our enquiries, worldwide. With no feasible standard definition, a procedure to facilitate cross-comparability is essential. We do know that there is pattern in the trajectories of the basic physical characteristics of settlements, their extent, and their density.⁵ Focusing on the trajectories of settlement growth and demise may therefore offer analytic engagement and be less confusing than trying to rigorously define static settlement types. For the context of settlement trajectories we need to look briefly at the overall pattern of settlement sizes and internal densities. A sample of settlements for which we can obtain area data, i.e. their spatial extent and an independent population report, provides a general overview (Fig. 3.5) (Fletcher 1995, 74–79). In brief, human residential densities within settlements vary substantially from very dense to extremely low density. Two substantially different behavioural boundary conditions are apparent for interaction (Fletcher 1995, 78–80). Each generates different patterns of relationship between density and community size. The upper limit on operable density for communities recognized as sedentary (the Sedentary I-limit) decreases gradually from dense, village-sized communities (c. 1000 people) to dense cities of a million or more people. Below this I-limit, viable sedentary communities range between maximum densities of about 1000–500 p/ha and minimum densities of about 7–2 p/ha. Within this spectrum, as the population sizes and settlement areas of sedentary communities increase, the overall density within the settlement also increases (Fletcher 1995, 173). By contrast, known mobile communities have much higher maximum operable densities for very small communities, but the mobile interaction limit for communities, making substantial use of mobility, drops steeply as community size increases (Fig. 3.5). Mobile communities can operate from residential densities of over 2000 p/ha down to less than 10 p/ha. Within

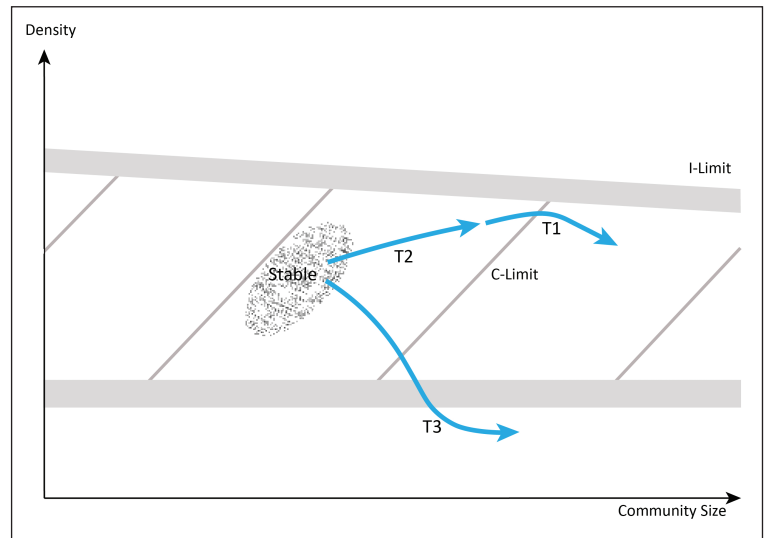


Figure 3.6. Trajectories on the I-C matrix. University of Sydney.

that spectrum, as community size and settlement increases, overall densities decrease (Fletcher 1990, 1991; 1995, 173; 1998), i.e. the reverse of the trend for sedentary communities. Todd Whitelaw (1991) identified the same pattern for complex hunter-gatherer communities in North America.

The difference in the gradient of the upper boundary on viable residential densities for mobile communities and the different trend in density relative to increases in mobile community-size specify that communities which make substantial use of mobility operate under different behavioural constraints from sedentary communities. That is consequential because different trajectories of growth will necessarily occur for both, and we must presume that at various times in the past the various trajectories of mobile and sedentary communities have been occurring concurrently in adjacent regions in settlements of similar size, though not necessarily at similar internal densities. In addition to the spectrum from mobile to sedentary urbanism they may also have been generating trajectories going in different directions across their respective ranges of operable density. Therefore, areal extent and density alone will not securely serve to differentiate them. As discussed below degrees of mobility in community behaviour must, in due course, necessarily be included in the basic characteristics required for the cross-comparison of settlements.

Another set of boundary conditions constrain the extent of settlements (Fig. 3.6). This kind of limit is a function of the range over which the communication assemblage of a community can adequately transmit information. As communication systems have changed over the past five thousand

⁵ See overview in Fletcher 1995.

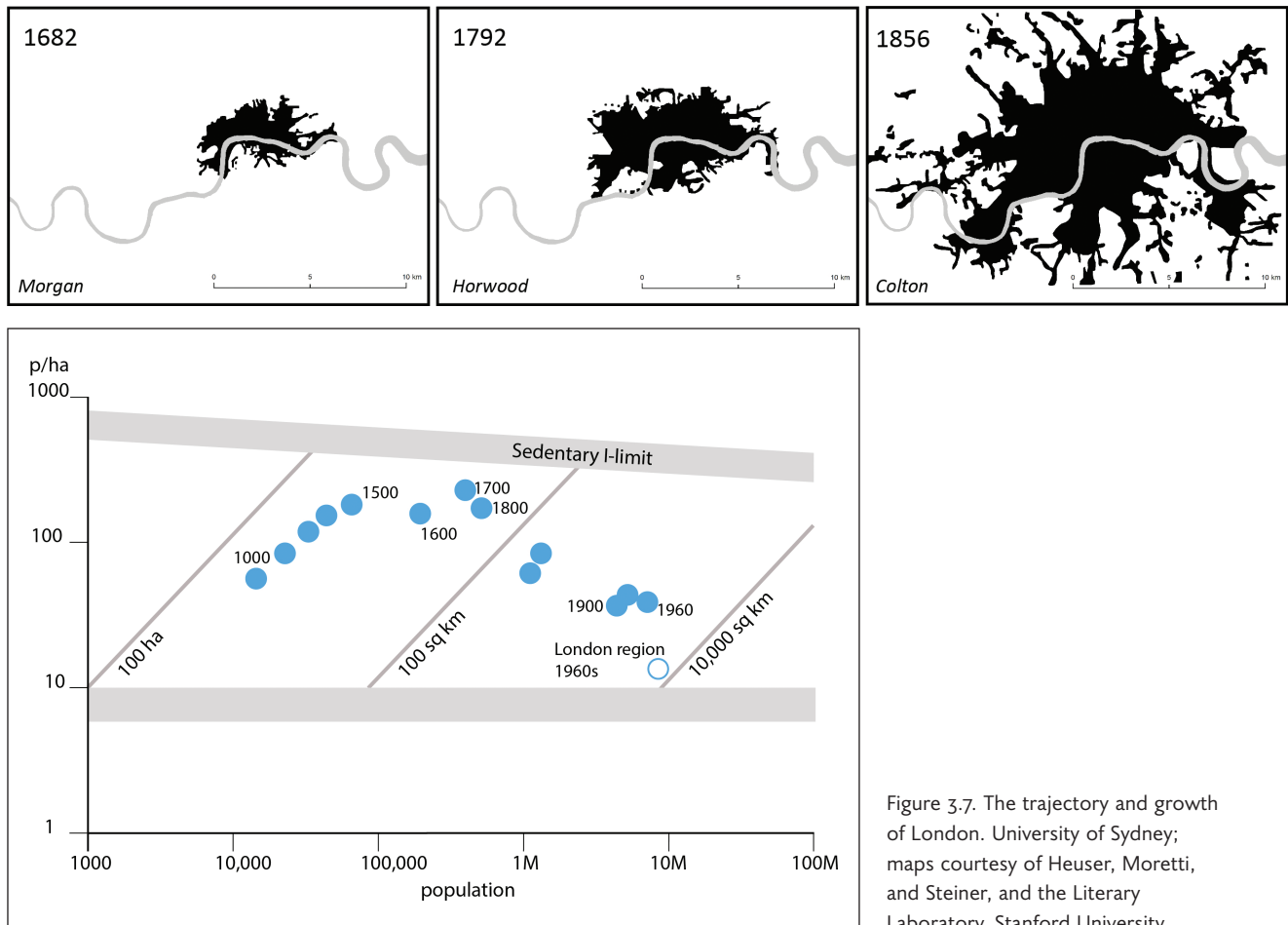


Figure 3.7. The trajectory and growth of London. University of Sydney; maps courtesy of Heuser, Moretti, and Steiner, and the Literary Laboratory, Stanford University.

years the maximum operable size of compact settlements has changed through a process of punctuated equilibrium (Fletcher 1995, 95–98, 126–62, and 223). I have, as a convention, previously defined various C-limits for compact settlements, for example as a limit at approx. 100 ha — which was exceeded by communities using concrete information systems like the quipu and writing; and a limit of an area of approx. 100 km² — which was exceeded by communities using mechanized data transmission, such as printing. In some ways it would be better to specify the range of the more common settlement sizes sustained by a given mode of communication. For example, concrete information systems predominantly sustain settlements up to 15–30 km² in extent with rare cases reaching approx. 100 km².

The interaction and communication limits are phase-change zones in a field of varying degrees of operational stress. The spatial matrix provides a frame of reference for comparing the trajectories of settlements without homogenizing categories and facilitates the study of complementary difference rather than promoting oppositional categories. The Interaction-Communication Matrix represents

a field theory with phase-change boundary conditions at the various operational limits on viable interaction and communication. Settlement diversity can be mapped across the field of the matrix in relation to varied combinations of materiality and sociality and outcomes (Fletcher 2004). For example, the very large, compact city of Chan'gan, the capital of the Tang Dynasty, absorbed 40 per cent of the annual grain tax revenues of the Tang Empire (Wright 1967, 144) and was therefore a serious burden on the state. It also had a shorter duration as a viable city compared to other, smaller imperial capitals (Fletcher 2004, 127 and 136).

For sedentary communities, three major kinds of settlement trajectories move across the matrix generated by the cumulative stresses towards the I- and C-limits (Fletcher 1995, 99–109). These are neither comprehensive nor exclusionary. They do, however, encompass much of the spatial and temporal behaviour of the settlements occupied by sedentary communities. The first is the familiar, compact trajectory which is inherent to the great settlement size transitions (Fig. 3.6). These generated the sustained, agrarian-based sedentism in set-

tlements larger than 1 ha, then the shift to agrarian urbanism in settlements larger than 1 km², and most recently the shift to industrial urbanism in settlements larger than 100 km² (Fletcher 1995, 113). The settlements involved in these transitions appear to have been quite compact. London in the eighteenth and early nineteenth centuries (Fletcher 1995, Fig. 5.11) is a classic example (Fig. 3.7). Continuity of settlement form and tradition runs through this trajectory, for example from a group of villages, to Rome as an imperial capital, to medieval and early modern Rome, and to industrialized Rome. On a larger scale the general continuity of urban form in China is well recognized, as is the connection from south-west Asia to the Mediterranean to Western Europe, to the global, European-style cities of the nineteenth and early twentieth centuries.

The second kind of trajectory I have referred to previously as a stasis trajectory (Fig. 3.6) (Fletcher 1995, 115–17). This trajectory occurs when a compact settlement reaches the maximum operable size for its communication systems. A classic example is Chang'an, which was the largest walled city on the planet, and only marginally increased in area from its establishment in the sixth century to become a 90–100 km² giant with a population of about 0.8 to 1 million. By the tenth century it had ceased to be viable and was abandoned (Xiong 2000).

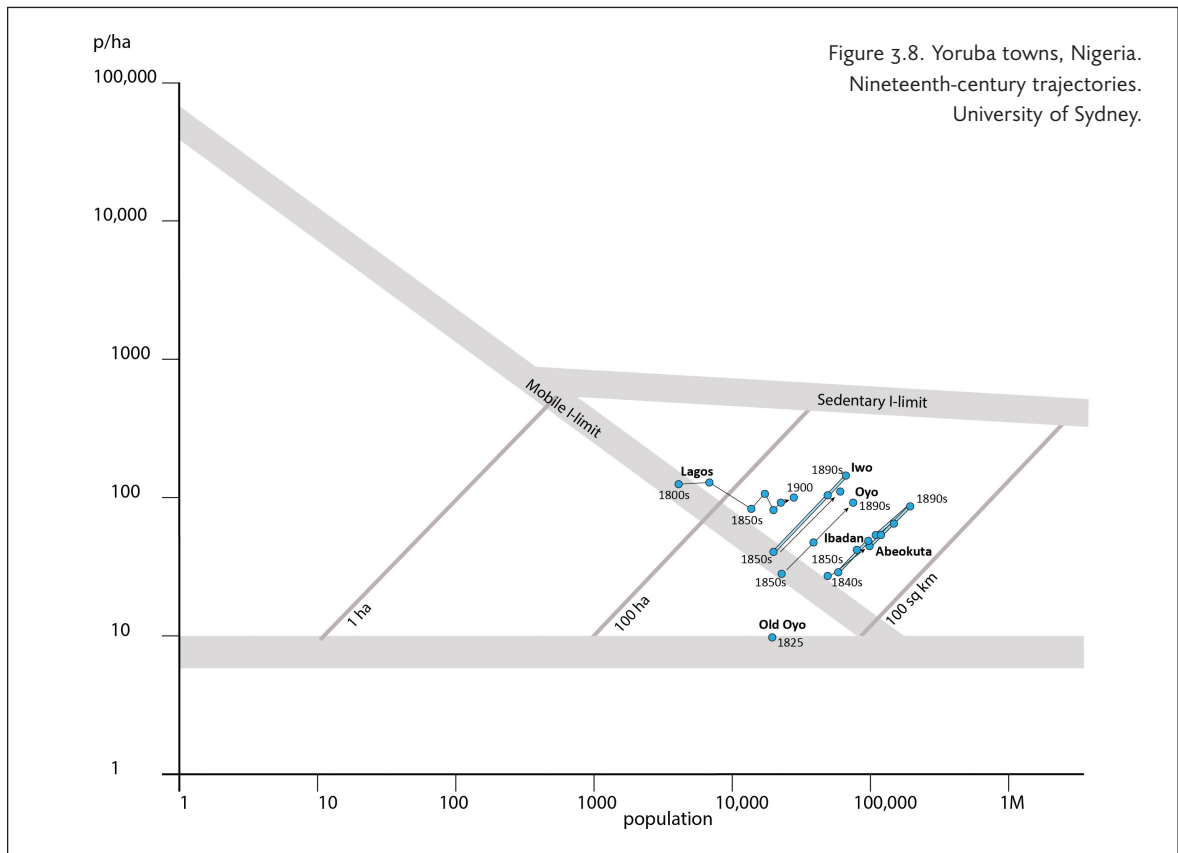
The third trajectory is a drop to lower densities (Fig. 3.6) (Fletcher 1995, 117–24) below 10–20 p/ha (see Appendix 3). We are familiar with trajectories towards overall lower densities in current industrial cities (see Angel 2012; Angel, Parent, and Civco 2012) which has also produced vast, multicentric urban landscapes of extensive dispersed occupation covering many thousands of square kilometres, e.g. the East Coast Megalopolis of the USA. A previous, low-density trajectory for agrarian-based urbanism, between the fourth century BC and fifteenth century AD, produced the great cities of the Maya, the Sinhalese, and the Khmer in the tropics, with areas larger than 100 km² up to about 1000 km² (Fletcher 2012; Lucero, Fletcher, and Coningham 2015). Another low-density trajectory also generated a suite of settlements, worldwide, in the size-range up to about 70 km². They date between the fifth–fourth millennia BC and the sixteenth–nineteenth centuries AD, with varied occupation patterns in the lower-density range⁶ and produced remarkable places like the oppida of Iron Age Europe (Collis 1984; Fernández-Götz 2018), Great Zimbabwe (c. eleventh to fifteenth centuries AD) in Africa (Huffman 1972; Pikirayi and

Chirikure 2011) with the higher-density estimate of 1.6–2.8 p/ha from new low population estimates (Chirikure and others 2017, 10, Table 2), Nebilevka (c. 4000 BC) in Ukraine with a density of 16.6 p/ha (Nebbia and others 2018, 53), Chaco Canyon (AD 800–1150) (Mills 2018) in North America with an estimated central-area density of 0.84–1.1 p/ha (Lekson 1984, 272, cf. Benson and Grimstead 2019), and Gallinazo (100 BCCAD 700) in Peru with a density of 16.7 p/ha (Millaire and Eastaugh 2011, 296).

The three familiar, compact transition trajectories would, therefore, each have been followed by a trajectory towards lower-density settlement forms. There is, in addition, a general stable state — with medium-range occupation densities and stability of size over time (Fig. 3.6). This is where most settlements have tended to exist for long periods of time, whether smaller agrarian villages or smaller agrarian and industrial towns and cities. These have given rise to the impression that an aggregate density within an 'urban' settlement, of around 100 p/ha, is somehow 'normal' and is thought, mistakenly, to allow population estimates to be derived from settlement area rather than from indices of the degree of occupational packing in settlements. This density value may be an average, but it has little meaning because the range of known residential densities is great and does not form a normal distribution for the settlements in any one region (Fletcher 1995, 107). The bulk of the small-to-medium-sized settlements after each of the major-size transitions exist in this condition. There is marked consistency in size distributions in this range, both within a region over time (Fulminante 2014, 105–32) and between regions (Fletcher 1986). These stable settlements which globally form the majority of agrarian villages, then agrarian-based towns and cities, and now the majority of industrial-based cities, deserve more attention than they usually receive. They are the 'workhorses' of any settlement pattern.

The multiple options outlined above preclude linear models of urban transformation and specify that globally we are dealing with radically different trajectories through time, whose paths and whose magnitudes are markedly different. We cannot therefore treat all 'urbanisms' as if they were operating in the same way or had the same consequences or led to the same outcomes. While the same term, low-density, as a description of a trajectory, can be applied both to present-day agglomerative cities and to Greater Angkor, that urban complex was definitely not an industrial city even though it was the same areal extent as many industrial towns. Likewise, when we apply the term low-density, quite reasonably, to the larger oppida (Moore 2017) and

6 Examples in Fletcher and White 2018; Fletcher 2019.



to the large Trypillia sites (Gaydarska, Nebbia, and Chapman 2019), and add the term ‘urban’, the fact that those sites were the same extent as many conventionally recognized, compact, agrarian-based cities does not thereby mean that they were the same kind of places (see Appendix 2). Indeed, what becomes apparent is that their crucial importance is likely to be that they did not operate in the same way at all (Fletcher and White 2018). Instead of a straightjacket produced by the label ‘urban’ we can instead move into a rich and varied interpretative landscape where we may analyse trajectories in relation to differing materialities, socialities, economies, and environments to encompass the many different outcomes which those combinations would be likely to produce. The rethinking of what was happening in order to produce the varied outcomes of the initial, compact, agrarian-based, urban transitions has had a vigorous recent articulation (Yoffee 2005). By combining trajectories and unique cultural and regional characteristics, patterns may become apparent in the diversity, avoiding both fixed categories and the ‘anything goes’ of terminological plasticity. Conversely, discovering that similar large-scale outcomes repeatedly occurred for settlements on the low-density trajectory despite economic and

socio-political differences would then be of some significance as it would suggest that the outcome relates to the trajectory in general rather than being a unique local characteristic with no broader implications. We can, therefore, systematically use complementary difference as a conceptual tool to assist the understanding and organization of data on diversity. The trajectories of settlements in terms of extent, density, and degree of mobility matter.

For example, the two great operational phenomena of mobility and low-density dispersal of occupation gain a new significance when viewed as trajectories. The nineteenth-century Yoruba towns of Nigeria display distinct trajectories (Fletcher 1998, 127–32 and 134) (Fig. 3.8) suggesting that they may have developed out of settlements which incorporated considerable mobility of the residential population into their operation. As noted earlier large African settlements prior to and into the nineteenth century AD appear to have used far more mobility in their social and economic functioning (Fletcher 1998) than conventional settlement models of urbanism have envisaged, an issue which Akin Ogundiran is currently investigating. If this is the case then the great early Yoruba towns, such as Ile-Ife, offer a profound opportunity to reappraise the relationship

between settlements designated as urban and the trajectories of their descendants. A role for mobility also has been proposed for the large Trypillia sites (Chapman and Gaydarska 2016, 297; Nebbia 2017). More broadly the implication may be that mobility played a significant role in the development of the settlements on trajectories to lower-density occupation with areas in the range up to about 70 km². Their extent and their densities tend to lie below the mobile I-limit, an issue which Kirrily White is currently investigating in a study of a global set of these types of settlements.

As noted above the role of trajectory analysis as an investigative tool may also be useful for discussion of the degree to which continuity was lacking between settlements of varying sizes on the lower-density trajectories. For low-density trajectories the issue is whether or not continuity through successive macro socio-economic transformations has been possible. The three great trajectories towards lower-density occupation have the profoundly significant characteristic that they are apparently unrelated. The trajectory of industrial low-density urbanism does not derive from the trajectory of agrarian-based, low-density urbanism. There is no cultural continuity or influence at all. No modern megalopolis derives from the agrarian, low-density urbanism of the tropical world. Nor does the trajectory of low-density, agrarian-based urbanism derive from the trajectories of any of the members of the smaller lower-density sites that were up to 70 km² in extent. Given that we know that there is no continuity through transitions to successive magnitudes of large, lower-density settlements, the serious implication arises that this is a general characteristic of some relevance to our present and future. In addition, the larger, low-density trajectory of agrarian urban settlements did not have a sustained tradition of successors of the same form (Lucero, Fletcher, and Coningham 2015; Fletcher 2019, 1). The degree to which this was or was not also an outcome of the trajectory for the settlements up to c. 70 km² in extent is therefore crucial and requires substantial appraisal. The regional continuity of these large spread-out settlements does not generally seem to be strong or sustained. If therefore, there *was* some continuity as appears to have been the case over the past millennium for the Yoruba towns we need to know why. The way in which that continuity operated may be crucial for an appraisal of the prospects of industrial, low-density urbanism. As of now, the overall implications of the outcomes for the past examples of low-density, agrarian urban settlements between 100 and 1000 km² does not appear to be very optimistic for the present-day, low-density megalopoleis and

desakota (Fletcher 2018). Therefore, understanding the operations and outcomes of the great variety of lower-density settlements, prior to the nineteenth century AD, in the size-range up to 70 km² may be of profound significance for assessing the prospects of the large, industrial, low-density urban agglomerates of the twentieth and the twenty-first centuries. If lower-density settlements generally lack long-term cultural continuity then the implications for the low-density form of our urban future are ominous in the extreme.

Conclusions

We have good practical reasons for seeking to compare past and present. This may be of some consequence for judging the prospects of our urban future. So, whatever we decide about labels, the actual critical issues of cross-comparison relate to the dynamics of trajectories. My point is simply that some crucial research issues derive from the physical attributes of settlements, and these have no inbuilt or inherent value judgements of inclusion, exclusion, rank, or status associated with them. We can either agree about them, or they can be the topic of a resolvable dispute. On to these familiar physical characteristics, we can, however, overlay any other characteristics which we seek to compare, whether mundanities like maintenance costs, complex issues of political power and social resistance, or the rarified cosmologies, which made the magic of ritualized space in places like Cahokia, Angkor, and Great Zimbabwe.

Appendix 1: Occupation Density Index

In due course, archaeology might usefully move towards cross-comparing occupation density, i.e. amounts of structural space per unit time in a given area, rather than seeking to convert occupation density to population/residential density. Settlement area is, of course, recognizable, and the evidence can be usefully debated both in the present and in the past record. In present-day and recent settlements and those with a substantial textual record, density is usually comprehended through residential density, i.e. numbers of people per unit area. This is a practice which continues in archaeology but is fraught with logical and analytic problems when textual reports of community size are not available. Archaeology does, however, clearly recognize material patterns of occupation and we refer to densely occupied cities through to low-density or dispersed occupation. And even modern cities are referred to as 'sprawling', which characterizes their form and their internal material structure. In due course, we should shift to using differences in occupation density indicated by indices such as the amounts of built space per settlement area. These are recognizable, independent of population estimates in the present, and we are certainly able to see such phenomena in the archaeological record since we commonly refer to varying degrees of density of occupation debris, widely separated houses, or sparse occupation, among others. Shifting to analyses based on occupation density offers a globally and temporally cross-comparable and accessible index. An entire universe of methodology and concepts, built on existing expertise and technical capacity, will need to be developed to effect this agenda — a topic far beyond the word length of a journal paper.

Appendix 2: Terminology

Agrarian-Based, Low-Density Urbanism Terminology

In their 2018 paper Elizabeth Graham and Christian Isendahl develop a substantial proposal about the terminology for referring to what I have labelled agrarian-based, low-density urbanism. They propose a more parsimonious terminology of 'rural urban', which has the virtue that it follows the meaning of *desakota* applied to industrial urbanism. This terminology also has the virtue that many other urbanisms could be labelled in this way, e.g. horticultural, pastoral, etc. Rural urban works well within the study of non-industrial urbanism as it incorporates dispersal and the economy and is concerned with a more profound sense of the 'quality' of the settlement.

By contrast, agrarian-based, low-density or dispersed urbanism is just a mundane descriptor of the primary economic base and the form of the settlement space. It is necessary because modern cities are characterized by their industrial base, in contrast to those which we call agrarian-based, which predominantly had agriculture as their operational basis. Furthermore, once we are comparing cities before and after the early nineteenth century and use the term 'industrial', that qualifier offers no connotation of compact or dispersed occupation or anything in between. The specification of low-density or dispersed is necessary. Likewise, any other urbanisms on the Graham-Isendahl format, such as pastoral or horticultural urban settlements, have the same problem. They could both be compact (though I suspect that they were most likely low-density), and the dense-dispersed qualifier is needed.

Agrarian in contrast to industrial urban is therefore needed for comparison across the range of 'urbanisms', and the density specifier is necessary in that

context. All these terminologies are relevant only to context and are not universals and therefore do not need to be used in reference to all contexts. The Graham-Isendahl terminology, including horticultural and pastoral, can be used within its own specific research context — where the labels are all likely to be understood as referring to low-density settlements due to familiar observation.

The further reason for using agrarian-based and industrial-based, low-density urbanism is that we must now devise a terminology for the notable group of low-density settlements up to 70 km² in extent. If the term low-density urban is used for the oppida, the Trypillia sites, Cahokia, etc. then that group has to be differentiated from the agrarian-based, low-density cities like Greater Angkor, which could be an order of magnitude larger and have very elaborate socio-political hierarchies. Agrarian-based and industrial-based, low-density cities cannot be merged into a single category, cf. low-density trajectories which are common to all three magnitudes of lower-density settlement discussed in this paper.

Greater Angkor Terminology

The label Greater Angkor is based on terms such as Greater London, Greater New York, and Greater Shanghai as descriptors of the magnitude of the extent of the settlement, as distinct from the meanings ascribed of the place. The term Greater Angkor is a mundane descriptor and avoids resuming the meanings attached to Angkor as a place, allowing discussions of qualities and attributes ascribed to Angkor with high and complex cultural meanings without reference to the outer suburbs of Greater Angkor. Likewise, the term Greater London avoids resuming the sensory, emotive, and conceptual elaboration associated with the City of London and Central London as a statement about the mundane phenomena of the suburbs of Greater London as well.

Appendix 3: The Lower-Density Threshold Limit

The T-limit: the Threshold limit or T-limit (Fletcher 1995, 92–95) specifies the density below which the communication-limits constraint does not apply. This limit is different to the I- and C-limits because it can be passed through but then appears to be a barrier to larger settlements moving to increased densities. Previously, the value of the T-limit was formally set at below 10 p/ha because few cases were known or quantified in the 1990s. What now appears to be the case is that settlements can begin to expand substantially beyond their community's predicted C-limit value at densities in a range somewhere below 20 p/ha. This can be observed in the large, lower-density camps of Australian Aboriginal communities (Fletcher 1990, 84–85), in the suite of lower-density settlements below 70 km² (see p. 41), and also in the great Chinese megalopoleis-*deskota*, for example, the Pearl River Delta complex in 2017 at an estimated density of 12.5 p/ha (The Central Committee of the Communist Party of China and the State Council 2019, 1). While the figures may need reappraisal, as the methods for calculating the extent of dispersed settlement areas improve, the overall pattern leads to the intriguing possibility that the lower-density limit is a two-phase or multiphase change phenomenon about which we urgently need to learn a great deal more if we are to extend our understanding of the patterns and outcomes of low-density trajectories.

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