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AN EVOLUTIONARY SUCCESS STORY

The ascent of the urban ape

Greg Woolf

Urbanistic projects have dominated the last six thousand years of our species' history, appearing independently on all the inhabited continents. The majority of the population already live in cities and the trend seems to be increasing. An evolutionary approach entails explaining first what factors first made urban experiments possible in the late Holocene, and then what selective pressures made urban forms of social organization more successful than their alternatives. A range of factors, some environmental and some emerging from the characteristic of the human animal, explain the possibility of urbanism. Among reasons for the comparative advantage displayed by cities, it is argued that state formation and urbanization have tended to form synergistic relationships, the success of each facilitating the success of the other.

Keywords: cities, social evolution, Holocene, state formation.

■ THE URBAN PHENOMENON

Urbanism has transformed our planet's inhabited landscapes, and our understanding of what it means to be human. More than half of us already live in cities, and by the end of the century perhaps three-quarters will do so. The recent appearance of urbanism – the first cities were created just 6,000 years ago – and their near ubiquity today poses an explanatory challenge (Smith, 2019). Our species is perhaps 300,000 years old. As gatherers and hunters, it had successfully colonized every continent except Antarctica before the end of the Pleistocene. Our collective urban adventure began relatively recently, and urban systems have rapidly come to dominate the social landscapes of the planet.

«Our collective urban adventure began relatively recently, and urban systems have rapidly come to dominate the social landscapes of the planet»

Not everyone has regarded this as surprising. There are many variants of a civilizational myth that regards city life as a superior form of existence. These ideas have underwritten teleological accounts of human history thematized around «progress» towards a

world of cities, states and ever-improved technology. Yet the length of our pre-urban existence suggests there is more to be explained. It is now clear that not only was there no single urban revolution, but nor did urbanism «radiate out» from a small number of original centres (Childe, 1950). Cities have been invented dozens of times over the last millennia, and often

by populations that had no notion of other urban experiments. There have been frequent collapses too, so that the history of cities is discontinuous and regional.

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■ DEFINITIONS AND CHARACTERIZATIONS

A provisional definition is appropriate. Cities are densely inhabited settlements constructed to last for multiple generations, and their populations are differentiated by occupation and by wealth. All human societies are characterised by differences of role based on age and sex, and there were always a few individuals who for one reason or another were treated differently in life and in death. But the first urban societies included groups of craftpeople, traders, and often religious specialists and warriors alongside those families whose labour was mostly devoted to food production. Differences of wealth emerged from these distinctions: they are clear from a greater range of habitations within a settlement, and often from systematic differences in grave goods and even diet.

These criteria distinguish cities from large but temporary camps of the kind created by many hunters and gatherers and also from permanent settlements the inhabitants of which were barely differentiated, like the larger farming villages of prehistoric Eurasia (Wengrow, 2018). Cities can also be distinguished from the very large ceremonial sites created in some late prehistoric societies. Quite likely the inventions of cities drew on models provided by temporary mega-sites, large farming villages and great monumental complexes, but they created something new.

Early cities had a good deal in common wherever they were created. For instance, they formed nodes in two distinct kinds of exchange system. Locally cities were sustained by the extraction of food, materials, and labour from their immediate hinterlands; but most were also involved in long-distance exchanges with distant urban civilizations. Linking the two systems were organised manufacture for export, for example the production of textiles.

Morphologically early cities also display some regularities. Intrasite communications systems were required for the circulation of food, water, fuel, waste, and information, as well as of traded goods and manufactures. The limits of cities were clearly demarcated by walls, canals, perimeter roads, and sometimes shrines and cemeteries. Spatial

**«Early cities had a good deal
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organization within cities varied from culture to culture. Some devoted major areas of space to temples and the residences of rulers; others seem to have been more egalitarian. Communal spaces for collective ritual and perhaps political meetings frequently appear, but neighbourhoods took different forms from one region to another.

There are also significant areas of variation.

Early cities have varied in size from just a few thousand to hundreds of thousands in the capitals of pre-industrial empires. The cities of Mesoamerica were huge compared to those of the Mediterranean Basin. Eurasian empires were characterised by very hierarchical urban networks

in which a few cities of several hundred thousand coexisted with thousands of much smaller urban entities. Distinct trajectories of urbanisation explain some of the variation. Some urban systems emerged through differentiation within previous settlement networks, others through rapid concentrations of



The success of urban experiments was not a smooth process: in many places, cities shrank or disappeared due to different factors. For instance, the so-called Classic Maya Collapse has been attributed to environmental changes that led to its downfall. In the picture, the temple of Kukulcán (also known as *El Castillo*), built by the Maya civilization between the 8th and 12th centuries CE, which dominates the Chichén Itzá archaeological site in the state of Yucatán (Mexico).



population. It is also likely that environmental factors played a role in shaping urban forms. A number of cities were relatively low density with residential areas separated by gardens and other open spaces (Fletcher, 1995). This has been thought typical of the tropics. Other cities were more concentrated, sometimes with multi-storey residences.

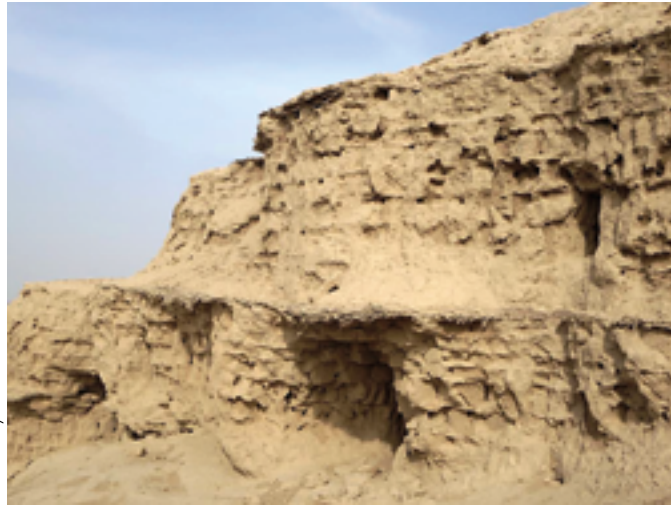
The testimony of ancient, mediaeval and early modern travellers such as Ibn Battuta, Marco Polo, and the conquistadores show that it was always easy to recognise cities, but that their local peculiarities were also apparent. Until very recently, when building technologies and architectural styles became globalized, the urban systems of the world appeared like a family of cousins with recognisable common features but also local peculiarities.

■ BEYOND URBAN ORIGINS

The utility of *city* as an analytical category has rarely been contested. Urban origins are more controversial.

Explanations of particular urbanizing episodes have varied enormously (Ucko et al., 1972). Some stress the impact of warfare or despotism, present cities as the product of refugee movements, as responses to environmental disasters, or to the demands of hydraulically challenging environments. It has been argued that population increase alone might lead a community to cross a tipping point beyond which urban institutions become a necessity. Similar arguments see urbanism as consequential on economic or political growth. It looks extremely unlikely that any single proximate cause will be found that accounts for all inventions of urbanism. More profitably it has been suggested that the city is an equifinal solution that was applied to a range of problems during the Holocene (Clarke, 1979).

It has also been argued that urbanisation is simply one dimension of a more general rise of complexity which also includes state formation, the use of symbols, writing, and money (Smith, 2009). The interconnection of these processes is often evident but the general position has come under sustained critique. Numerous cities have been identified in societies without much sign of state-



David Stanley

Spatial organization within cities varied from culture to culture. Some devoted major areas of space to temples and the residences of rulers; others seem to have been more egalitarian. In the picture, the remains of the fourth millennium BCE Sumerian ziggurat (a temple with a pyramid-shape structure) at the ancient city of Uruk (also known as Warka), 39 km of Samawah (Iraq).

«Cities have been invented dozens of times over the last millennia»

level institutions (Graeber & Wengrow, 2018, 2021; Morris, 1991). Not all states were characterised by urbanism, and some early cities seem more like egalitarian ventures than manifestations of a more hierarchical order. Complexity is in any case a problematic measure: many gatherer and hunter societies were complex in different ways, and some operated, at least periodically, at large scale. Many non-urban agriculturalists were capable of organizing formidably complicated projects, including hydraulic work and monument building. For these reasons it seems preferable to begin by keeping urbanism as analytically separate, and to consider its relations with state-formation at a later stage.

Evolutionists might consider the urban question in two parts. First, what were the factors that made city-foundation a possible strategy from the middle of the Holocene? Second, what made this particular set of social experiments so successful relative to their alternatives?

■ THE POSSIBILITY OF URBANISM

Early urbanism was dependent on no single environmental niche. Cities have been created on floodplains and steppe, in major river valleys and





on maritime littorals, and even at high elevations such as the Andes. Before the industrial age they have been rare in taiga, tundra or desert. Until recently we might have added tropical forests to that list, but recent work using LiDAR remote sensing in Central America and Amazonia suggests that gap may be illusory (Iriarte et al., 2020). Major settlements in the Ukraine were created in the fourth millennium BCE where steppe and temperate forests converged. It is likely there are more early urban societies still to be found. Most of these environments have at times supported non-urban societies too, and few regions have completely continuous urban histories. Groups of cities have come into existence, and subsequently passed away throughout much of the late Holocene.

One clear precondition for urbanism is agriculture. This is likely the main reason that city building was apparently not attempted earlier. The domestication of first crops and then animals occurred many times around the globe and in most regions preceded urbanism by several thousand years. While some hunter-gatherer societies in trophically rich environments did adopt sedentary ways of life, and a few created impressive monuments, none built cities as defined above. Most likely this relates to energetics. City building is an expensive process in terms of time and of energy, and sustaining urban life also requires access to surplus production. But if farming was a necessary condition of urbanism, it was not a sufficient one. Many agricultural societies did not attempt to create cities.

Another set of necessary preconditions relate to a range of features that distinguish the human animal from many other species (Woolf, 2020). Humans are notoriously tolerant of a range of diets, including those in which adequate calories are combined with a carbohydrate rich and vitamin poor diet. Equally humans have proved capable of surviving with a range of endemic conditions produced by living close to each other, to domestic animals and the waste that both create. These conditions certainly characterised many early cities (Hassett, 2017).

More positively, human sociality allowed sustained cooperation in large groups. Cities offer humans some of the same advantages that hives and colonies offer eusocial animals. Unlike social insects or fish, these collaborations and complementary roles depended on complex communication of the sort no other species can manage. This was not new in the Holocene. Humans already had the capacity to live and work together in large groups well before they created cities. Indeed it has been suggested that large collaborative



Kathleen Flickr

Some early cities were characterised by walls or citadels and so are plausibly understood as refuges in warfare-dominated contexts. Even when circumstances changed, new uses were found for old cities: in the ancient Mediterranean region, the expansion of the Roman empire reduced inter-city conflict and increased security. Still, fortified cities were not abandoned. In the image, view of the modern city of Amman (Jordan) from the old Roman citadel.

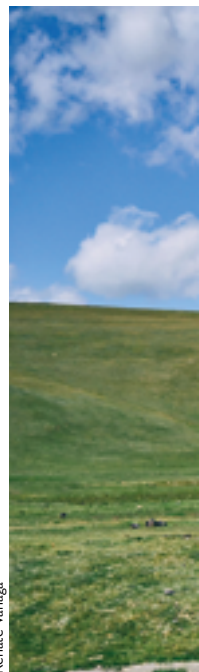
«Cities offer humans some of the same advantages that hives and colonies offer eusocial animals»

hunting expeditions and even monument building provided humans with templates for cooperative activity that facilitated both the development of farming and city life. Agricultural and urbanistic projects both required not just complex planning but also a collective will to invest in projects of long duration.

A provisional conclusion is that a range of physiological and cognitive features of humans proved cooptable to city building, and that once farming had led to sufficient surpluses of energy and food, those projects became a possibility.

■ URBANISM AND ITS ALTERNATIVES

Urbanism was not the only social innovation of the Holocene. It remains to ask why it turned out to be so successful relative to others.



Renate Vanaga



It is impossible now to document the full range of social experiments attempted by societies of agriculturalists but we can identify a few. Most evident in the archaeological record are regions characterised by village agriculturalists, sedentary communities with little social differentiation. A second set of options was opened up by animal domestications, including a range of nomadisms. Many regions from northern Mesopotamia to the Eurasia steppe saw the development of symbiotic relations between agriculturalists and herders. Finally we might note the existence of various groups of Holocene hunters and gatherers, many (like the circumpolar populations) using a much more advanced tool-kit than their Pleistocene predecessors. The question to be answered is why urban experiments out competed these others in the long term.

It should be admitted at once that this was not a smooth process. In some regions village agriculturalists replaced urbanizers for centuries. The Indus Valley is a case in point. Forest cultivators occupied many areas of south and Central America previously occupied by urbanizers well before the Columbian Exchange. The development of «nomad empires» on the Eurasian steppe was a feature of the last and first millennia: in many cases urban societies survived as vassals of nomad states, but in some case cities shrank or disappeared. The end of the Western Roman Empire led to the disappearance of cities from parts of northern Europe.

«Global population growth is increasingly making non-urban residence an option only available to the privileged»



Nomadic groups have typically had poor relations with centralizing states, from the early caliphate to the Soviet Union. Smaller scale forms of social organization have (with some exceptions) proved less compatible with the aims of larger political entities than have cities. In the picture, a nomad family near the Song-Köl lake, in Kyrgyzstan.

«The domestication of first crops and then animals preceded urbanism by several thousand years»

In a few cases environmental changes may have been a factor. Desert fringe cities may have become less viable; silting up certainly forced some urban abandonments, and a range of environmentally driven accounts have been offered for the so-called Classic Maya Collapse. Recently it has become fashionable to stress anthropogenic factors. This was certainly true in some cases, such as the end of Mississippian urbanism shortly after the European arrival in North America. But it fails as a general explanation. An unexplored assumption of many of these discussions is that urbanism (or civilization) is an undisputed good, and that any society able to sustain it would have done so (McAnany & Yoffee, 2010). It is also possible that, at certain times and places, populations simply chose one of the alternative options available over urbanism.

It is probably correct to say that this sort of choice is now less feasible than in the past.

Global population growth is increasingly making non-urban residence an option only available to the privileged. Reductions in biodiversity generated by commercial agriculture make it increasingly difficult to live from gardening, hunting or gathering. But the lack of alternatives to urbanism is a very recent phenomenon, perhaps dating back less than two centuries in some parts of the world. It remains to be explained why urbanism did succeed in crowding out alternative lifeways in the first five and a half millennia of its existence.



■ THE COMPARATIVE SUCCESS OF URBANISM

Clarke's notion of urbanism as an equifinal solution to a range of problems provides a starting point. In many cases, urbanism must have solved or mitigated an immediate problem. Urban persistence is less difficult to explain in such cases, at least for as long as the problem itself persisted.

For instance, some early cities were characterised by walls or citadels and so are plausibly understood as refuges. The cities of fourth millennium BCE Sumer or first millennium BCE Greece appeared in politically fragmented landscapes in which warfare seems to have been a central concern to judge from their literature and representational art. It is easy enough to see why that shift to urbanism was not reversed as long as those conditions persisted.

Even when circumstances did change, new uses might be found for old cities. The expansion of various imperial states within the ancient Mediterranean region culminating in a long period of unification under Rome reduced inter-city conflict and increased security. The result was not the abandonment of fortified cities. In some regions such as central Italy there was an increase of building and residence in the countryside, in others such as Greece urban populations increased but most cities were not fortified. Cities in general became more important as nodes in exchange systems and as specialised suppliers of services such as justice and religious and cultural events. As a result, the network became more differentiated, with smaller cities often shrinking and larger ones growing. A similar set of processes occurred centuries later in Western Europe as cathedral cities, pilgrimage centres, and ports expanded at the expense of early mediaeval burghs, which had largely provided local security (de Vries, 1984).

The phenomenon of cities persisting while their functions change is so widespread it deserves more consideration. If cities may have been deployed as a solution to many different problems, perhaps we should consider the ease with which they could be repurposed. Like some other technologies – writing for instance or metallurgy – once acquired, urbanism might be used to different ends. The availability of cities may have made them convenient tools, and their wider utility may have helped ensure their persistence even after the original reasons for their creation no longer applied.

A particularly widespread example of this is the use of cities in government. Pre-modern polities arose

from a variety of sources. Competition between kin-groups, conquests by outsiders, factional conflict, and changes in military technology have all played a part. Early empires have been established by monarchies, by nomad groups, and by city-states that succeeded in outcompeting their peer-polities. But the range of governmental options has been more limited. Premodern empires typically depended on alliances with local elites, on imposing military governors, or on generating bureaucracies. The last two solutions were typically sufficiently expensive to require increases in taxation. It is not surprising then, that conquered cities were regularly used by empires of all kinds of origin as instruments of government. The same has been true of national states. Arguably the success of urbanism in the last two millennia has largely been due to its utility to larger political units.

This line of argument brings us back to the

«Cities have created environments in which it is difficult to be non-urban: this too is an unplanned reason for their success»

question of urbanism and the state, and of social complexity. Rather than arguing that city and state are two dimensions or reflections of some larger process, I suggest that cities and states have become increasingly useful to each other. Nomadism by contrast has typically had poor relations with centralizing states, from the early caliphate

to the Soviet Union. Smaller scale forms of social organization – forest cultivators, large agricultural villages, and communities of hunters – have (with some exceptions) proved less compatible with the aims of larger political entities than have cities.

■ URBAN FUTURES

Urbanism, I have suggested, comprises a range of social experiments available to the human species from that point in the Holocene when farming surpluses and the populations they generated reached a certain threshold. For much of the first five thousand of so millennia urban lifestyles competed with alternatives, and numerous cases can be found of societies that for one reason or another fell out of love with the city. Those alternatives have increasingly been ruled out by the dramatic changes of the last two centuries. The Anthropocene, like it or not, belongs to the city and it is difficult to imagine post-urban futures that are not catastrophic.

There is a general issue here about the reversibility of processes like urbanisation and state formation. That issue is familiar to evolutionists working on other



Renate Vanaga



Humans already had the capacity to live and work together in large groups well before they created cities. But agricultural and urbanistic projects both required not just complex planning but also a collective will to invest in projects of long duration. In the picture, a food market in Bologna (Italy).

«The Anthropocene, like it or not, belongs to the city and it is difficult to imagine post-urban futures that are not catastrophic»

problems. Change in response to selective pressures can often be reversed when those pressures change, but there may come a point when that option is no longer possible. For biological evolution this often involves the reduction of genetic diversity, as when a species passes through a bottleneck.

Social evolution operates with different mechanisms. It is true that a loss of biodiversity makes some alternatives to urbanism much more difficult to pursue today. Cities have, collectively, created environments in which it is difficult to be non-urban: this too is an unplanned reason for their success. But there is also a sense in which the city is a solution to so many different problems, that a comprehensive replacement is difficult to imagine. In the end it is the social versatility of urbanism that has ensured its success. ☉

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