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Post-print

Jane Jacobs' "Cities First" Model and Archaeological Reality

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Abstract. In *The Economy of Cities*, Jane Jacobs conjectured that the world's first cities preceded the origins of agriculture, a proposition that was most recently revived by Peter Taylor in the pages of this journal. The repeated resurrection of Jacobs' idea was out of line with extant archaeological findings when first advanced decades ago, and it is firmly contradicted by a much fuller corpus of data today. After a review of how and why Jacobs formulated her "cities first" model, we review current archaeological knowledge from the Near East, China, and Mesoamerica to document the temporal precedence of agriculture before urbanism in each of these regions. Contrary to the opinions of Jacobs and Taylor, archaeological data in fact are sufficiently robust to reconstruct patterns of diet, settlement, and social organization in the past, and to assign dates to the relevant sites. Our response illustrates how generations of archaeological discoveries have yielded solid empirical foundations for the evaluation of wider social scientific debates.

Do archaeological data provide accurate and reliable information about social processes and historical events in the distant past? As practicing archaeologists, we answer this question in the affirmative. Geographer Peter Taylor, on the other hand, would apparently answer the question in the negative. In his recent paper in this journal (Taylor, 2012) and other works (Taylor, 2009, Taylor *et al.*, 2010), he ignores or discounts archaeological data to argue that the earliest cities developed prior to the advent of agriculture. His support for this notion does not come from the archaeological record of these processes. Rather, Taylor is only the latest in a line of scholars who have based their argument on the opinions of planner Jane Jacobs.

Jane Jacobs proposed that cities preceded farming in chapter one of her book, *The Economy of Cities* (Jacobs, 1969). She offered no empirical data in support of this assertion, and she failed to cite the relevant archaeological literature. Jacobs was a passionate and charismatic observer of cities, and seven years after her death she remains a renowned scholar on planning and urban studies. Her work is held in almost universal approval, and it appears that subsequent authors have adopted her erroneous "cities first" model in part because of her reputation as an original thinker.

Jacobs' model is so completely contrary to archaeological data that archaeologists have never bothered to mount a targeted attack on the notion. The authors of this comment have spent decades conducting fieldwork on early urban settlements in the Near East, Mesoamerica (southern Mexico and northern Central America), and China and writing about early urbanism, but it had never occurred to us that archaeological data would need defending against a model as contrary to fact as that of Jacobs. Now that this model not only infects a number of urban textbooks but has also found expression in a major scholarly journal, we believe that a response is required.

In this paper we first review the intellectual context of Jacobs' original model and its appearances through the decades. We then summarize the relevant archaeological evidence for the Near East (location of the earliest agriculture and cities) and quickly review other parts of the world. For the most part we limit our consideration to the narrow question of whether the earliest agriculture preceded or post-dated the earliest cities within individual world regions. The fact that Jane Jacobs made a basic and elementary error on this question (a relatively minor part of her overall output) has no bearing on the validity or usefulness of her other work.

Jane Jacobs' "Cities First" Claim: The Initial Error

Chapter one of *The Economy of Cities* (Jacobs, 1969) is titled, "Cities First—Rural Development Later." It begins as follows: "This book is an outcome of my curiosity about why some cities grow and why others stagnate and decay" (p. 3). Jacobs goes on to claim that "our understanding of cities, and also of economic development generally, has been distorted by the dogma of agricultural primacy" (p. 5). This "dogma" refers to the notion that people domesticated plants and began practicing agriculture long before the first cities developed. Jacobs cites a few examples of agricultural innovations that originated in cities in modern and medieval times (pp. 11-18) and then asserts, "The logical inference is that in prehistoric times, also, agriculture and animal husbandry arose in cities. But if this is so, then cities must have preceded agriculture" (p. 18).

Jacobs developed her claim of "cities first" through a lengthy fictionalized vignette of the development of an early, pre-agricultural city she called New Obsidian. In New Obsidian, hunting peoples congregated to pursue craft production, and two economic processes—the export multiplier effect and the import replacement effect—generated urban growth prior to agriculture. Jacobs goes on to discuss James Mellaart's then-recent excavations at Çatalhöyük (Mellaart, 1967), of which she claims erroneously,

"Catal Hoyuk is both the earliest city yet found, and the earliest known settlement of any kind to possess agriculture" (Jacobs, 1969:32).

Jacobs seemed to believe that if she could overturn the "dogma" of archaeologists and show that cities preceded agriculture historically, this would add greater force to her model of the primacy of economic production in urban growth. The latter model occupied Jacobs for decades, finding expression in several of her later books (Jacobs, 1984, 2000). This attempt to bolster her economic model provides an explanation for why Jacobs would promote her erroneous claim of "cities first." David Hill (1993) shows that her claim was part of a larger argument with Lewis Mumford and others about the value of large, dense cities in society (see also Hill, 1988, Mellon, 2009).

Jacobs provides no empirical evidence for her "cities first" claim beyond a brief description of Çatalhöyük (which in fact is not a supportive case at all; see below). Had she consulted the basic textbooks in world prehistory of the 1960s (Braidwood, 1961, Piggott, 1961), she would have found that what she called the "dogma" of agricultural primacy was instead an empirically supported archaeological model. Robert Braidwood was quite clear; his popular textbook includes a section titled "Civilization Impossible without Food Production" (Braidwood, 1961). Jacobs also failed to consult the synthetic archaeological publications of the time (e.g., Kraeling and Adams, 1960, Braidwood and Willey, 1962, Adams, 1966).

Instead of citing the relevant literature, Jacobs makes the following claim:

> I have asked anthropologists how they know agriculture came before cities. After recovering from surprise that this verity should be questioned, they tell me the economists have settled it. I have asked economists the same thing. They tell me archaeologists and anthropologists have settled it. It seems that everyone has been relying on somebody else's say-so. At bottom, I think, they are all relying on a pre-Darwinian source, Adam Smith (Jacobs, 1969:44).

This scenario is highly unlikely. Few if any anthropologists in the 1960s were unaware of the archaeological evidence. Also, it is difficult to imagine anthropologists suggesting that economists had settled an empirical question about prehistory. But this kind of sloppiness is in line with recent analyses of the scholarship of Jacobs. Writers have said that she would "push her insights too far" (Fishman, 1996:8); she engages in "crucial misrepresentation" (Mellon, 2009:42); some of her writing is "unambiguously inaccurate" (Mellon, 2009:44); and her work is plagued by a "lack of scholarly documentation" (Hill, 1988:312). Richard Harris argues that in an interview two years before her death, Jacobs seemed almost ready to recant her "cities first" claim. "She seemed to be open to the possibility that such stories [new archaeological research in the Near East] might disprove her controversial hypothesis" (Harris, 2011:78).

The Perpetuation of a Faulty Model

Jacobs did not continue to write about New Obsidian or archaeology. The 1970s and 1980s saw an explosion of archaeological research around the world, and the precedence of agriculture over urbanism was strengthened by overwhelming empirical support (see below). Several archaeologists applied aspects of Jacobs' urban economics model, ignoring the "cities first" claim (Kurtz, 1987, Algaze, 2008), and historians refuted the claim (Van De Mieroop, 1997:24-27, Hansen, 2000). Although economic historian Paul Bairoch (1988) found Jacobs's argument "extremely unconvincing," he went on to claim that "the margin of uncertainty around that period is such that the hypothesis cannot be rejected outright" (p.17).

Starting in the 1990s, the "cities first" claim was resuscitated by urban scholars, primarily in geography. We have found three textbooks that accept as fact Jacobs' faulty claim. John Rennie Short (1996) spends several paragraphs on Jacobs' idea, calling it "a persuasive argument" (p. 15). E. Barbara Phillips (1996)

discusses the notion approvingly and concludes confidently that "agriculture developed because of cities" (p. 88). And Malcolm Miles (2007) asserts that "the archaeological evidence supports a model of an agricultural revolution driven by the city's expansion (not its cause)" (p. 23). It is distressing that students are being taught false information, both about prehistory (agriculture and cities) and about the ability of archaeological evidence to reconstruct social processes in the past.

A number of more technical works in urban studies explicitly accept Jacobs' "cities first" claim; these include Cortright (2001:23), Callahan and Ikeda (2003), Reader (2005:24), and Aguiar (2010). The most extensive discussion is that of Edward Soja in his book *Postmetropolis* (Soja, 2000) and several articles (Soja, 2003, 2010). Soja was clearly inspired both by Jacobs' "cities first" claim and by the more recent excavations at Çatalhöyük directed by Ian Hodder. Soja looked at the data and realized that Jacobs' assertion did not stand up, but that did not stop him from promoting the idea:

> While all of her claims probably cannot withstand the most rigorous evidential criteria of the ancient historians and archaeologists, the core argument is sufficiently powerful and insightful to deserve serious attention here, especially for its demonstration of the geohistorical as well as contemporary significance of putting cities first (Soja, 2000:42).

Whereas Jacobs seems to have been genuinely unaware of the relevant archaeological evidence, Soja chooses to discount it. Peter Taylor (2012) follows this same line of thought although he is less explicit about how he draws on archaeological evidence. In promoting Jacobs' "cities first" claim, Taylor's major sources are Jacobs, Soja, and some works by journalists. His view of archaeological evidence is expressed as follows: "In such situations of knowledge uncertainty, it is the plausibility of theoretical positions that matter" (Taylor, 2012:425). He takes a journalist to task for being "seemingly unaware of her [Jacobs'] social science status as an important urban theorist" (p. 423). We now turn to the archaeological record to convince readers that archaeologists are indeed able to reconstruct processes like the origins of agriculture and the establishment of cities, and that in the particular question of which came first the answer is unequivocal: agriculture preceded cities.

Agricultural Origins and First Cities in the Near East and Elsewhere

As archaeologists, we would be the first to admit that there is still much to be learned about humanity's deep past. Nevertheless, the basic outlines of agriculture and cities in prehistory have been known since the early twentieth century. Gordon Childe (1936) coined the terms "Neolithic Revolution" and "Urban Revolution" to describe the two most far-reaching changes in prehistory: the domestication of crops and the advent of state level societies, and his terms are still used today (Smith, 2009; Watkins, 2010).

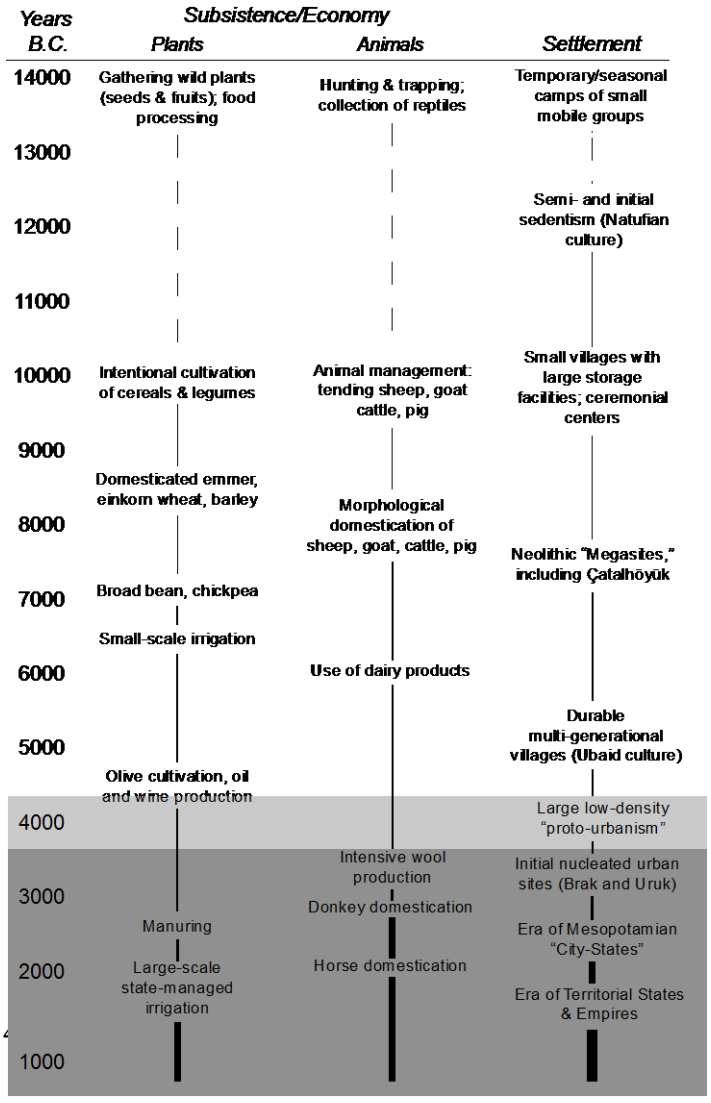
Today, the direct radiocarbon dating of early domesticates from archaeological contexts in conjunction with the genetic fingerprinting of their wild progenitors has yielded an unprecedented level of precision that documents the timing and earliest locations of agricultural origins in at least three widespread settings: the Near East, East Asia, and Mesoamerica. Here, we focus most concertedly on the Near East, since that area figures most directly and heavily in the arguments of Jacobs, Soja, and Taylor, and then take a more global perspective.

Since the primary empirical issue at hand revolves around time, it is worth reviewing how archaeologists date past phenomena. The most common *absolute* method, and the one most relevant for agricultural and urban origins, is radiocarbon or C14 dating. This method operates on the assumption that an unstable carbon isotope (carbon-14) occurs in the environment in a constant ratio with the stable carbon-12, and that it will decay into a stable nitrogen-14 at a constant rate. Therefore the ratio of C14 to C12 in organic remains can be used to calculate the moment at which they ceased to take in carbon (i.e., their time of death). We now know that the C12:C14 ratio fluctuated in the past, but these fluctuations can be

calibrated with reference to dendrochronological (tree ring) sequences. Nonetheless, even calibrated radiocarbon dates still have an uncertainty estimate, reckoned in years (for a solid discussion, see Renfrew and Bahn, 2012:136-145). Radiocarbon dating is especially important for the study of domestication, since the method can be used directly on plant and animal remains.

In other cases, archaeologists must rely on *relative* methods. Most commonly, this is done via the principles of stratigraphy, in which later layers are superimposed atop earlier layers. This method tells us only that one layer is earlier than another, but not how much earlier (or indeed, *when* it was deposited). Relative datings can be made absolute if, for example, an organic object from a particular layer is dated via radiocarbon. It then becomes possible to date the artifacts found in that layer via association. In this manner, archaeologists can date particular styles of artifacts, especially ceramics, to a range of time. Dating of archaeological sites via associated ceramics of known absolute date is a particularly important method for approaching early urban sites. The most effective method for estimating the spatial scale of a site (and by proxy, its population) is systematic and intensive collection of chronologically sensitive artifacts on the site's surface. Barring any major cultural or natural disturbance, the distribution of artifacts of a particular period on the surface will correspond closely to the spatial arrangement of the settlement at that time (Renfrew and Bahn, 2012:71-78).

Our knowledge of the beginnings of domestication, both plant and animal, has evolved in recent decades (Zeder, 2011, Arbuckle, 2012, Willcox, 2012). Current understandings are nuanced and suggest complicated processes, but the overall picture is clear (Figure 1). In the Near East, unequivocal cereal domestication (identified on the basis of morphological changes resulting in reproductive reliance on humans) is clearly attested between 8,400 and 7,500 BC for various plant species (Fuller *et al.*, 2012, Willcox, 2012). Such a yardstick obscures, however, what is now recognized as a long and complex process. Long before some plants showed the physical traces of domestication, human communities were managing (cultivating) morphologically wild plants via tilling, seeding, tending, harvesting, and storing (Bar-Yosef, 2011:S181-S182, Zeder, 2011:S224-S226). As early as 10,000-8,700 BC, several signs point to such management: declining use of gathered species, increased exploitation of species that were non-indigenous, increased presence of weeds that prefer cultivated terrain, and an overall increase in the exploitation of cereals generally, to list several such indicators (Fuller *et al.*, 2012:622-623, Willcox, 2012:170-174).



It is now clear that morphological changes to plants and animals are not "leading-edge indicators," but rather the result of less archaeologically visible management strategies for plants and animals that began millennia earlier (around 9,500 BC for animals and before 10,000 BC for plants; see Simmons, 2007:102-106, Zeder, 2011:S226, Fuller *et al.*, 2012:622). These dates derive from hundreds of radiocarbon analyses performed directly on carbonized plant remains and animal bones. Furthermore, domestication processes unfolded across the Near

East, concentrated on local species (Fuller *et al.*, 2012, Willcox, 2012:177). This understanding is portrayed in standard world prehistory textbooks (Crabtree and Campana, 2006, Wenke and Olszewski, 2006, Watkins, 2009:230-231, Chazan, 2011:193-197, Price and Feinman, 2012:178-213), with some fluctuation in dating but generally along these lines.

One Neolithic site in particular –Çatalhöyük (7,500-6,000 BC)–is critical to the arguments of Jacobs, Soja, and Taylor that urbanism preceded agriculture. Despite the sensationalist claims of its initial excavator (Mellaart 1967) and the opinions of Soja (2000:36-49) Çatalhöyük is universally recognized by archaeologists as an important but non-urban center (Simmons, 2007:175-181). Çatalhöyük's current excavator, Ian Hodder, notes, "So all there is at Çatalhöyük are houses and middens and pens. There is none of the functional differentiation that we normally associate with the term 'town'. Çatalhöyük is just a very large village—it pushes the idea of an egalitarian village to its ultimate extremes" (Hodder 2006:98). He continues, "In a modern town we would expect to identify different functional areas and buildings such as the industrial and residential zones, the church or mosque or temples, and the cemetery. At Çatalhöyük all these separate functions occur in one place, the house" (p. 99); see also Hodder (2011).

Ultimately what is "urban" is a matter of definition (for a clear archaeological discussion, see Cowgill 2004), but Çatalhöyük does not meet the criteria of either of the major definitions of urbanism used in archaeology and history. Louis Wirth's (1938) influential demographic definition of urbanism requires a high population size and density, coupled with social heterogeneity. As a relatively homogeneous village of 15 ha, Çatalhöyük does not come close to qualifying as urban. The alternative functional definition (Fox, 1977; Marcus 1983) requires settlements to have activities and institutions—whether economic, political, or religious—that affect a hinterland. Lacking such urban functions, Çatalhöyük does not match this definition either. Taylor is free to define terms as he pleases, but even if Çatalhöyük conforms to his vague and archaeologically unusable "cityness" criteria, it still post-dates the initial stages of cultivation and early morphological domestication by a millennium or more. Proponents of Jacobs' model are therefore still left only with New Obsidian and other imaginary places.

The conventional understanding of urban origins places the first Mesopotamian city at Uruk (modern Warka, Biblical Erech), now an extensive mound on the fringes of the Euphrates in southern Iraq (e.g., Van De Mieroop, 1997:37-38, Liverani, 2006); for recent prehistory textbooks, see Crabtree (2006:280-281), Matthews (2009:438-442), or Price and Feinman (2012:428-432). Our knowledge of this site stems from a century of meticulous excavation by German archaeologists (Nissen, 2002). Their work uncovered a series of enormous and ornately decorated buildings, several times larger than any structure known from earlier prehistory, and covering a large precinct in the center of the site. In addition to the monumentality of the architecture, the artifacts recovered suggest new forms of social complexity: representational art forms, ceramics and other goods produced at a supra-household scale, and novel record-keeping technologies such as cylinder seals and pictographic tablets. The tablets describe the administration of land, animals, agricultural products, and people in vast numbers, and the iconography of the seal impressions depict elite individuals and warfare in ways not previously known (Nissen *et al.*, 1993). Most of this research was undertaken prior to the development of radiocarbon dating, or in the earliest stages of its development, so datable samples were not retained, and subsequent dating attempts have been problematic (Wright and Rupley, 2001). Nonetheless, similar artifacts have been found at other well-dated sites, and they allow these phenomena to be placed in the range of 3200-3100 BC with confidence. Uruk of the late 4th millennium BC was a large city, covering some 250 ha. It subsequently grew to approximately 400 ha by the early 3rd millennium BC, according to a systematic and intensive surface collection of chronologically sensitive artifacts (Finkbeiner, 1991).

Conventional understanding generally has been that the idea of the city then spread, first to the rest of the Sumerian plain, then a half millennium later to northern Mesopotamia and adjacent parts of Iran, Syria, and Turkey. This understanding has been complicated in recent years by two sites in northern Mesopotamia, presently in northeastern Syria. Excavations at Tell Brak have recovered all the indicators of urban social complexity found at Uruk, with the exception of pictographic tablets. Radiocarbon dating

places these indicators at approximately 3900-3400 BC, that is, centuries earlier than the most reliable estimate for Uruk's urban emergence (Oates *et al.*, 2007). Brak's initial urban development has interesting spatial properties, as revealed by intensive surface survey (Ur *et al.*, 2007). Initially (ca. 4200-3900 BC) the settlement consisted of a central nucleus of about 55 hectares, with discrete small "suburbs" surrounding it at a distance of 400-500 meters. With time, these outer settled areas expanded and grew together with the central nucleus to form a continuous settlement of around 130 hectares (ca. 3900-3400 BC). The growth of the city is reckoned by dating of the surface artifacts, which have been associated with radiocarbon dates in the region (Hole, 2001).

This new picture of urban origins in extensive but low-density settlement finds further support from a second site, Khirbat al-Fakhar. Ceramic material dating to 4400-3900 BC is scattered over an area of 300 ha (Al Quntar *et al.*, 2011). The site had an uneven occupational pattern, with alternating built and open areas. The surface artifacts include enormous quantities of obsidian, a volcanic stone used for tools but originating hundreds of kilometers away. Residents of the site were importing raw material and manufacturing obsidian blades at an intensity unequalled anywhere else (Khalidi *et al.*, 2009). Excavations have been limited, but they have not revealed any monumental architecture, or indeed any other signs that power was concentrated at Khirbat al-Fakhar. This combination of urban traits (demographic concentration, economic specialization) and characteristics not associated with Near Eastern cities (low density, apparent intra-settlement egalitarianism) led archaeologists to call the site "proto-urban" (Al Quntar *et al.*, 2011).

Thus the first cities in the Near East arose in both southern (irrigated) and northern (dry-farmed) Mesopotamia over the course of the fourth millennium BC. These proto- and early urban sites still post-date the establishment of agricultural economies by millennia, despite the earlier dates from recent research.

To summarize, cities in the Near East emerged over more than a millennium, with initial proto-urban agglomerations around 4400-3900 BC, unequivocal cities in northern and southern Mesopotamia between 3900-3100 BC, and ubiquitous urbanism in the era of city-states between 2600-2000 BC (reviewed recently in Ur, 2010, 2012). At the start of this sequence, human communities were using an integrated agricultural economy that was already three millennia old. That economy had its roots in the management of locally available plant and animal species that were millennia older still. This narrative is wholly uncontroversial in its general outlines, even if some details have yet to be incorporated into standard textbook narratives.

Space precludes a detailed review of the archaeological evidence from other regions, but all are equally lacking in empirical support for Jacobs' "cities first" model. Recent findings from south China (Jones and Lui, 2009), where the process of rice domestication began almost as early as the domestication of grains in the Near East, likewise place these shifts clearly well before the advent of cities or even large communities. Along the Lower Yangtze, indisputable evidence (Balter, 2009, Fuller *et al.*, 2009) for domesticated rice, which dates back at least 7000 years, precedes China's earliest cities by several millennia (Liu and Chen, 2003). In North China, the domestication of millets may be even earlier than rice (Zhao, 2011), so that the gap between the first domesticates and the earliest cities may even be longer. Ongoing studies (Yang et al. 2012) offer great prospect to widen further the period between agriculture and urbanism. The case against Taylor's argument is even stronger in highland Mesoamerica. There, domesticated maize and squash predate even the first sedentary villages by up to six millennia (Smith, 1997, 2001a, b), and urban settlements arose still later in time (Blanton *et al.*, 1993). The steps that led to the domestication of these plants were enacted by small groups of mobile hunter-gatherers who for millennia continued to supplement these early domesticates in their diet with wild plant gathering and the hunting of animals as they moved their campsites seasonally. In Mesoamerica, the geographically widespread establishment of more sedentary communities around 4000-3500 years ago coincided with a greater dietary reliance on domesticated plants, in particular maize.

Conclusions

In not one of the recognized global hearths for the origins of agriculture can we make a credible and empirically underpinned case that this process was initiated in an urban context. In each world region a different suite of investigators from several different nations, disciplines, laboratories, and institutions contributed to these findings, making it difficult to question the legitimacy of the results. The authors of contemporary textbooks are even firmer and better grounded in their expressed views that agriculture preceded urbanism than was the case in 1961 (e.g., Wenke and Olszewski, 2006, Fagan, 2009, Price and Feinman, 2012). We now know that the process of domestication occurred independently in each region and was variable in other ways, including the specific species involved in each area and whether the early innovators were mobile or sedentary. The repeated consistency of the documented temporal timeline in which agriculture preceded urbanism is clear in disproving Jacobs' hypothesis (Peregrine *et al.*, 2004).

Agriculture preceded urbanism. They did not, however, evolve independently. Settlement and agriculture developed in tandem, often making it impossible to say whether one was a response to the other. In the Near East, for example, the expansion of durable, multi-generation sedentary villages was roughly accompanied by initial irrigation practices. The expansion of urbanism in the rain-fed north of Mesopotamia occurred simultaneously (in archaeological terms) with the widespread use of manuring. In the latter case, it is not possible to say whether increased demands for agricultural products inspired manuring, or whether increased yields from manuring enabled urban expansion. Past social phenomena are rarely so simple, and we should suppose that a complex and difficult-to-model set of non-linear processes underlie them. These issues are challenging but important, and archaeologists will continue to debate the relationships between, e.g., plant collection and initial sedentism, or irrigation and the state. We cannot, however, envision any scenario in which we debate the chronological priority of cities over agricultural origins, no matter how intellectually prestigious the debaters.

We reiterate that this commentary is not intended to challenge the holistic contributions of Jane Jacobs' scholarship on cities. Her general legacy is not in question. Jacobs' proposal that plant and animal domestication occurred first in urban contexts was inconsistent with all the available data at the time that she first advanced the claim, and her proposition is even more strongly contradicted by the much larger and more precise corpus of knowledge that we have today. Archaeological findings, though often dirt-derived, have much to contribute to historical and social scientific debates (Smith *et al.*, 2012). It is a disservice to Jacobs' outstanding contributions to perpetuate a strikingly incorrect assertion when evidence to the contrary is readily to hand.

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Figure List

Figure 1. Chronological chart of developments in agriculture, animal husbandry, and settlement in the Near East. Dates are based on calibrated radiocarbon analyses and converted into years BC. See text for full explanation of terms.

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