URBAN OPEN SPACES IN HISTORICAL PERSPECTIVE: A TRANSDISCIPLINARY TYPOLOGY AND ANALYSIS[1]

Benjamin W. Stanley[2]
School of Sustainability
Arizona State University

Barbara L. Stark
School of Human Evolution and Social Change
Arizona State University

Katrina L. Johnston
School of Urban Studies and Planning
Portland State University

Michael E. Smith
School of Human Evolution and Social Change
Arizona State University

Abstract: Urban open space provides a unique conduit for the sociospatial study of urban history. We propose seven categories to help scholars historically situate and analyze urban open spaces: food production areas, parks and gardens, recreational space, plazas, streets, transport facilities, and incidental space. We use these categories, and the contrast between grey and green space, to compare examples from archaeological, historical, and recent times across a broad geographical range. Top-down and bottom-up actions dialectically intersect in the establishment, use, and reproduction of urban open space, and many open spaces prove to be particularly flexible in serving the general population. These findings can inform comparative urban analysis, and they help contextualize current debates concerning the socioeconomic, political, and urban ecological functions of open and public spaces. [Key words: open space, public space, urban history, comparative urbanism, urban morphology.]

Urban open spaces have been critical sites of cultural, political, and economic life from early civilizations to the present day. We define open space as *any urban ground space, regardless of public accessibility, that is not roofed by an architectural structure*.[3] From the alleys of ancient Babylon to the culs-de-sac of modern Phoenix, the form and function of open spaces have varied dramatically, based on particular cultural arrangements, yet retaining a host of similar features. As part of a transdisciplinary project comparing ancient

[1]We thank our colleagues in the Late Lessons from Early History, Urban Organization through the Ages project for their continued dialogue and ideas. We particularly acknowledge and thank Sharon Harlan, Jill Grant, and George Cowgill for their useful suggestions to improve the text, but none are responsible for the content. We acknowledge the financial support of the President's Strategic Fund at Arizona State University.
[2]Correspondence concerning this article should be addressed to Benjamin W. Stanley, School of Sustainability, Arizona State University, PO Box 875502, Tempe, Arizona 85287-5502; telephone: 914-589-3265; fax: 480-965-8087; email: bwstanley@asu.edu
[3]In some societies, roof tops and other spaces function as urban open spaces in terms of use, but we do not address these spaces.

Urban Geography, 2012, **33**, 8, pp. 1089–1117. http://dx.doi.org/10.2747/0272-3638.33.8.1089
Copyright © 2012 by Bellwether Publishing, Ltd. All rights reserved.

and modern urbanism,[4] we have drawn from research in several disciplines to construct an open space typology relevant across urban history and to examine its implications.

Our project is guided by the notion that a long-term, transdisciplinary understanding of the history of urbanism can provide valuable perspectives on modern cities while also informing historical and archaeological study. An analysis of the configuration, use, and social import of open spaces provides a counterbalance to an overemphasis on buildings in urban research, although often architecture and open space are designed and used in conjunction, as when merchants or domestic craftsmen utilize street space adjoining their buildings. The current literature about open and public space from geography, planning, and other disciplines provides a starting point, and, through the addition of archaeological and historical data on premodern cities, we seek to transcend many urbanists' preoccupation with 19th and 20th century Western history. Open space, as opposed to public space (which may include enclosed institutional spaces), represents our conceptual conduit between ancient and modern urbanism.

Open spaces are valued by theorists who relate them to the social, political, and physical health of urban residents and communities. Some argue that high-quality, pedestrian-friendly neighborhood spaces can engender beneficial interpersonal connections (Jacobs, 1961; Whyte, 1980; Tibbalds, 1992). Others, taking cues from political theorists like Habermas (1962), describe a spatial ideal of a "public sphere" where the functioning of democracy is strengthened when urban space encourages exchange and understanding among diverse subcultural groups (Carr et al., 1992; Sandercock, 1998; Madanipour, 2003). This public ideal is closely intertwined with controversial arguments emphasizing the "contact hypothesis," that sociospatial contact between different ethnic and class groups generates the healthy psychological, social, and political development of urban citizens (Sennett, 1971, 1990; Hajer and Reijndorp, 2001; Ihlanfeldt and Scafini, 2002). The accessibility of green open spaces has been ideologically linked with positive human health outcomes, from the Garden City movement (Howard, 1898) to more recent discourses concerning urban sustainability (Saunders, 2010) and medical health (De Vries et al., 2003; Bedimo-Rung et al., 2005). Equitable access to public space, especially proximity to parks, is increasingly addressed as an environmental justice concern as well (Talen and Anselin, 1998; Wolch et al., 2005). A broad, comparative perspective on urban history confirms that open space has assumed a tremendous range of forms and functions, with a variety of benefits for urban populations.

In analyzing our findings, we highlight a simple theoretical dialectic between "top-down" and "bottom-up" forces that influence the forms and uses of urban open space. Open spaces can be institutionally planned and play roles in statecraft, where they communicate hierarchical relationships through symbolic public display, but they can also emerge through local initiatives of the general population and accommodate "grassroots" activities. Cities typically exist within complex societies such as states or empires, for which scholars have turned increasing attention to the combined effects of central, elite interests and those of other groups or individuals (e.g., for a theoretical stance, see Giddens, 1984;

[4]The authors are members of the research project, "Urban Organization through the Ages: Neighborhoods, Open Space, and Urban Life." This project is part of a larger set of transdisciplinary research projects, based in the School of Human Evolution and Social Change at Arizona State University, called "Late Lessons from Early History." For more information see http://cities.asu.edu/

for an example, see Blanton and Fargher, 2008). The opposing poles represented by the general population and central institutions (at multiple levels) provide a theoretical window into the construction and uses of urban open spaces that is broad enough to accommodate a transdisciplinary analysis. We emphasize that while open spaces are often planned and controlled by states and lower-level governance institutions or influenced by voluntary associations, they also provide critical venues for populations with limited means and little private space to perform many social, economic, and cultural activities. Furthermore, some open spaces can be appropriated by the general populace for political ends, sometimes overturning their original symbolism in the process.

This paper begins with a review of historical and contemporary categorizations of open and public space, followed by a presentation of a typology oriented toward the comparison of ancient and modern cities across the Western and non-Western world. We select examples spanning human history that particularly highlight the interplay between broad generative processes and state or municipal actions. Our focus is open space within cities, but there is often an unclear transition between urban and rural, and in some instances we note the influence of nearby peri-urban spaces as well. We conclude with the fundamental observation that open spaces, critical for all urban groups, allow a unique historical perspective on urbanism not captured by a singular focus on buildings or political economies.

CRITICAL AND HISTORICAL PERSPECTIVES ON URBAN OPEN SPACE

Open space is often discussed under the rubric of public space because many modern open spaces are freely accessible, but public space includes some roofed space as well, such as civic institutions or religious buildings. Carr et al. (1992) define public space as "open, publicly accessible places" that facilitate the popular activities necessary for community building. Some social scientists have emphasized a more critical perspective on the privatization and management of public space. Smith and Low (2006) focus on commodification and class-based exclusion, arguing that "it is impossible to conceive of public space today outside the social generalization of private space and its full development as a product of modern capitalist society." More neutrally concentrating on management, Carmona et al. (2008, p. 5) find that "public space (narrowly defined) relates to all those parts of the built and natural environment where the public has free access. It encompasses: all the streets, squares and other rights of way … the open spaces and parks; and the 'public/private' spaces where public access is unrestricted." Although public access is common for many types of open spaces, open space does not automatically imply public access.

Although many theorists propose causal effects between open space and sociopolitical outcomes, disciplines such as urban planning, architecture, and archaeology often confine analysis to the form and function of urban space—a simpler perspective we adopt to reconcile the extreme temporal and spatial scales of our study. For example, Al-Hagla (2008) classifies open space by physical form, defining "green space" as vegetated land and "grey space" as hard-surfaced (e.g., paved or packed dirt). This contrast relates to a number of current trends in planning and design. "New urbanist" planning employs the "transect" concept to suggest proportions of green and grey space relative to a progressive scale of built density (Duany et al., 2010), while the emergent notion of "landscape urbanism," rejecting formulaic design, uses open green/grey spaces to contextualize urbanism through the display of ecological infrastructures (Waldheim, 2006). "Ecovillages" designed from

sustainability principles relate to both of these planning trends and emphasize a balance between dense architecture and open space that supports local food production, biodiverse preserves, and communal space (Newman and Jennings, 2008). We employ the green/grey space contrast to categorize open spaces, both to aid our comparative project as well as to contribute a historical perspective to these normative debates.

For historians of urban open space (e.g., Crouch, 1981; Carr et al., 1992; Madanipour, 2003; Carmona et al., 2008), the correspondence between ancient Greek urban spaces and democratic practice often represents the starting point, as the Greek *agora* has become a symbol of the public sphere in modern literature. Roman-planned forums and religious plazas represent other commonly cited ancient spaces (Ward-Perkins, 1974; Wycherley, 1976; Owens, 1991). Historical narratives often abruptly jump from these classical settings to medieval Europe, where plazas, usually paired with Christian churches, hosted a wide variety of socioeconomic and recreational functions (Zucker, 1959; Carr et al., 1992; Carmona et al., 2008). As the Renaissance and Enlightenment increasingly emphasized secular and private values, urban open spaces reflected this shift. Urban squares planned exclusively for surrounding residential use appeared in certain areas, such as the Place des Vosges in Paris, the Bloomsbury squares in London, and downtown areas of Philadelphia and Savannah (Crouch, 1981; Carr et al., 1992; Carmona et al., 2008). Dedicated urban parks, as specialized recreational space, first proliferated in the 19th century (Crouch, 1981; Cranz, 1982; Carr et al., 1992). With the notable exception of Madanipour (2003), with his attention to urban space in ancient Chinese, Iranian, and Islamic cities, historical narratives framing current debates about open and public space usually are confined to the trajectory from Mediterranean antiquity to modern Western cities. Our paper attempts to widen contemporary perspectives by mobilizing a greater wealth of examples.

The first attempts to formulate open space typologies in modern urban studies concentrated on morphology, as have approaches in archaeology (e.g,, Moore, 1996; Cavanagh, 2002). Sitte (1889) famously classified and designed urban squares, and Zucker (1959) expanded this effort, delineating five types: closed, dominated, nuclear, grouped, and amorphous. Krier (1979) consigned all urban open space to two types—the street and the square—and cross-referenced them with basic geometric shapes. Other strictly functional approaches emerged thereafter, such as Carr et al.'s (1992) delineation of 11 functional types of city space and Gehl and Gemzoe's (2001) five categories of urban plazas. Carmona's (2010a, 2010b) detailed review also addresses morphological concepts. Carmona (2010b) reviews typological approaches arising from disciplines such as sociology and political science, which diverge from the design literature to focus on the relation between urban spaces and social relationships, cultural norms, class formation, and political-economic power. Carmona concludes by presenting a public space typology intended to reconcile these diverse perspectives in a single classificatory vision oriented around issues of management and privatization. Twenty types of spaces are carved from four categories—positive, negative, ambiguous, and private—representing continuums from public to private and from form/function to sociocultural values. Carmona's typology is difficult to apply in multiple cultural contexts across history because of the proliferation of types coupled with a particular interpretive agenda. For this reason, we employ a simpler nominal typology and stress the interpenetration of categories and their variation across sociospatial scales.

A HISTORICAL TYPOLOGY OF URBAN OPEN SPACE

Our typology is constructed around the conceptual tension between form and function.[5] Archeologists tasked with reconstructing the past with extant physical data are predisposed to focus on form; modern urbanists, in contrast, emphasize the purposes and uses of open spaces to explore the complexities of urban experience. In a comparative project it is tempting to privilege form as a more objective way to classify and compare spaces. Yet function is unavoidable if we wish to employ ancient data to better understand modern cities; furthermore, for some open spaces (such as food production areas), it is impossible to fully divorce function and form. Thus our types represent a mix of form and function, including both functionally specific and multi-purpose categories.

Our typology (Fig. 1) delineates seven major types of open space: (1) food production areas; (2) parks and gardens; (3) recreational space; (4) plazas; (5) streets; (6) transport facilities; and (7) incidental space. Open spaces within each are further categorized by a spatial scale continuum: city-wide, intermediate, and individual building. By city scale we refer to open spaces associated with major institutions that are nationally or municipally symbolic or oriented to large segments of the population. The intermediate scale refers to spaces that serve multiple residences in a more localized portion of the city, such as a district or neighborhood. Given the large variety across urban places compared in this paper and the methodological issues associated with classifying neighborhoods defined by multiple variables (Reibel, 2011), the intermediate scale described here is intended to be flexible in terms of areal extent. Authors describing localized city areas have used a rough distinction between smaller neighborhoods and larger encompassing districts in both premodern (Smith, 2010) and modern (Jacobs, 1961) contexts without establishing uniform populations or areal extents for either. Some facilities that provide associated open space, such as schools and religious buildings, recur across cities to serve neighborhoods or districts at different scales, helping to define them in the process. Finally, at the smallest scale individual buildings or residences may have open space for occupants, such as a yard or enclosed courtyard. Actions and regulation (formal and informal) can initiate at varied levels across the scale continuum.

The typology accommodates a third dimension of analysis (indicated by a sliding scale across the categories) oriented around Al-Hagla's (2008) differentiation between "green space" and "grey space." In Al-Hagla's scheme (2008, p. 164), green space represents "a subset of open space, consisting of any vegetated land or structure, water, or geological feature within urban areas," and grey space refers to more civic-oriented spaces such as "urban squares, market places and other paved or hard landscaped areas." This distinction applies across the seven types of open space and represents an important variable in planning research as well as urban ecology and human-environmental relations (Jenerette et al., 2011).

[5]The issue of classifying urban spaces by form and by function relates to long-standing themes in geography that we do not have space to fully explore. Our approach has roots in early work on the classification of regions (e.g., Grigg, 1965). Form-based categories of open space can be seen as analogous to regions defined from homogeneous or uniform characteristics, whereas function-based categories are analogous to functional or nodal regions (Richardson, 1979, pp. 19–22).

Form \ Scale	City	Intermediate	Residence
Transport Facilities	Harbors, Airport and Train Station Parking	Transit Stations, City Gate Areas	Driveways, Parking Areas
Streets	Central Boulevards	Street Space	Pedestrian Alleys, Paths
Plazas	Large Formal Plazas	Smaller Neighborhood Plazas	Interior Courtyards
Recreational Space	Stadiums, Greenbelts, Beaches	Sports Facilities, Playgrounds	Houseyard Playspace
Incidental Space	Natural Features and Semi-Wild Areas	Empty Lots, Transit Borders	Marginalized Space Between Buildings
Parks and Gardens	Major Formal Park and Garden Space	Institutional Gardens, Small Parks, Cemeteries	Household Gardens
Food Production	Orchards, Agricultural Fields	Grazing Commons, Community Gardens	Kitchen Gardens, Small Horticulture

Grey space
Green space
Grey/Green space

Fig. 1. A transdisciplinary typology of urban open spaces spanning ancient and modern history.

The spatial scale of any specific open space is clearly related to its size, function, and urban context, but it is also defined here in terms of cultural importance; for example, although the gardens around a particular shrine may be small in size, they may be pertinent at the city scale due to the society-wide importance of the sponsoring institution. Likewise, private elite gardens associated with palatial residences may be extremely large, but only serve one family and function at the building scale. The size and social implications of urban open spaces constitute a fluid continuum between large and small, best described in the historical context of specific cities and cultures. Our typology is limited

as an analytical distinction because many places represent a mix of open space types and are culturally valued for their multi-purpose nature. For example, New York City's Central Park would seem to match neatly with the Parks and Gardens category at the city-wide scale. Upon closer examination, Central Park is home to a wide diversity of spaces: institutionally landscaped gardens, recreational ball fields and courts, streets used for transportation and recreation, semi-wild forested areas, parking lots, grey space plazas, and marginalized space alongside fences. Even small-scale open spaces like house yards can represent different typological categories at once because they can be utilized for food production, recreation, or garden landscape display.

Our typology—organized by the form, function, scale, and land cover of open spaces—is intended as a versatile framework for making broad comparisons across extremely diverse time periods, spatial scales, and human cultures. Although we recognize that there are many potential ways to structure such a typology, such as privileging scale, land cover, or public accessibility over form/function–based types, we believe this structure provides the most clarity and flexibility in historical perspective. We offer the typology both to encourage and improve comparative urban scholarship as well as contextualize future urban planning. Much of the theoretical work on the social significance of open spaces suffers from a lack of specificity on the spatial configurations, scale, and functions of different kinds of urban spaces and is confined to a narrow historical framework. These limitations characterize the literature outlined above, as well as work on contentious politics (Sewell, 2001; Tilly and Tarrow, 2006) and research on cooperation, governance, and public display (Bowles and Gintis, 2002). Our scheme is intended not as a rigid framework to be imposed on urban data, but rather as a tool for comparative research that can help generate insights about urban social dynamics. The remainder of the paper elaborates upon our open space typology by providing historical examples for each type—morphological cases that represent "illustrative comparisons" across urban contexts (Conzen et al., 2012)—and relating them to the top-down and bottom-up processes that shape their form and functions. By comparing urban spaces among civilizations, it is our intention to both buttress and challenge our categories.

Food Production Areas

Food production areas are green spaces utilized predominantly for crops and livestock. Such areas can be important for their subsistence contributions and condiments. This seemingly straightforward category blends with the next one, parks and gardens, where a mix of comestibles and aesthetic plantings are common in antiquity and many modern houselots (e.g., Ming China, Clunas, 1996; houselots, Kimber, 1973; WinklerPrins and de Suza, 2005; Alayon-Gamboa and Gurri-García, 2008). Nevertheless, the divergent functions and origins of food production areas warrant a separate category.

City level. In 19th and 20th century North American cities, patterns of "leapfrog development," driven by rapid urban growth, often create unplanned mosaics of older farmland and newer residential developments within metropolitan boundaries (Boone and Modarres, 2006). This low-density, mixed green and grey space is often referred to as peri-urban (Simon, 2008). Comparative urban analysis of "fringe belts," scattered open spaces produced by sequential periods of urban growth, shows that peri-urban zones often represent a mix of food production, institutional garden, transport, and incidental spaces

(Conzen et al., 2012). Some premodern cities contained major food production zones. Private orchards within city walls provided food for residents in Arab-Islamic cities (Bianca, 2000), and the walls of Tang-period Chang'an enclosed large areas of food production (Seo, 1986). From early modern England to colonial New England, town commons have provided large communal green spaces specifically designated for livestock, horticulture, and foraging (Bowden et al., 2009).

Intermediate level. At the scale of the urban neighborhood, community gardens are common in many contemporary cities (Carr et al., 1992). Newer movements focused on urban sustainability, local farming, and organic foods have advocated the continued expansion of community gardens. In lower-income neighborhoods in developing countries, such as in Nairobi, local food production at the intermediate and residential scales often represents a critical addition to household income and nutrition rather than an ideological pursuit (Freeman, 1991; Castillo, 2003), a situation that may have arisen in ancient low-density urbanism as well (e.g., Stark and Ossa, 2007; Fletcher, 2009).

Urban farms in premodern low-density tropical cities can be seen as a special case of intermediate-level food production. Housing in lowland Maya cities, for example, was dispersed in spatial clusters, with considerable open area between and within the clusters. Chemical analyses of soils have shown that this land was cultivated (Isendahl and Smith, 2012). These urban fields were of considerable size and difficult to match up with individual houses, but they probably pertained to the residents of the neighborhood clusters. A similar pattern may have characterized ancient Angkor and other early tropical cities as well (Fletcher, 2009).

Residence level. In modern Western cities, household gardens often have been replaced by aesthetic foliage, recreational space, or built structures because extensive food distribution systems have developed around fossil fuel–driven capitalist economies. Yet vegetable gardens intended to supplement the urban food supply have been plentiful in times of crisis, such as in the 1890s and 1930s, and they assumed the famous moniker of "victory gardens" during World War II (Carr et al., 1992).

Throughout history, household food production has been a critical component of urban life. For example, Kerala, India, is home to a 4,000-year-old tradition in which many individual households maintain one-acre backyard gardens, which has created a distinctly sprawled semi-urban area characterized by decentralized agricultural production (Chandrashekara and Sankar, 2008). Another example derives from 1st century C.E. Pompeii, where nearly every house, regardless of type or size, had an open area with a kitchen garden or fruit trees to supply family needs (Jashemski, 2008). House plots in late medieval Chester, England similarly supported vegetable growing, fruit orchards, and livestock (Laughton, 2008). Archaeologists are now refining methods to identify house-level gardens, even at lowland tropical sites with poor architectural preservation (Killion et al., 1989; Smyth et al., 1995).

General observations. From a broad comparative perspective, urban agriculture is not new, and city life divorced from urban food production is a recent development. Many urban residents throughout history maintained small-scale food plots, and in some cases the extent of urban cultivation was extensive. Premodern, low-density tropical cities provide an extreme example, in which large expanses of land were dedicated to the production of food and other useful crops. Peri-urban areas are often active in food production and

accessible via day trips, in some cases no farther than some urban installations across the city, so this topic is particularly sensitive to the urban context.

Traditionally, most urban agriculture has been carried out by individual families, organized on either a household or neighborhood level. We have found no examples in which civic authorities organized urban agriculture on a large scale, although it is possible that this happened in Chang'an because much of the city's spatial organization was dictated by officials (Seo, 1986). Likely more common are cases in which governmental authorities designated areas that could be used for cultivation by individuals and families, a pattern found in many contemporary western cities. Today, small-scale urban farming in some cities represents a grassroots effort to oppose large industrial farming practices, and some community garden groups appropriate vacant private land. The local genesis of most urban agriculture contrasts strongly with the institutional influences on the next category, parks and gardens.

Parks and Gardens

Parks and gardens are defined as partly landscaped, mostly green areas intended for social and recreational activities as well as aesthetic or display purposes, although historically these functions have been intertwined with food production. Parks are usually larger than gardens and entail less management of plants, but usage of these terms varies by country. While some parks and gardens are highly specialized and institutionally designed for specific cultural functions, others have operated as multi-purpose spaces of social interaction, recreation, and ritual.

City level. Gardens, parks, and landscaped grounds surrounding central state institutions have been significant sources of open space in urban history, ranging from secluded, even sacred spaces to fully public spaces serving as central points of social interaction and recreation. In central Tokyo, the Imperial Palace features ornate gardens, intended as representations of religious metaphysics, which historically remained inaccessible to the public (Trancik, 1986). Only after Japan's Meiji Restoration did gardens become available to the public and include other functions, such as recreation (Brosseau, 2008). A similar transformation occurred during the European colonization of China, where institutional gardens slowly became more publicly accessible after nearly 2,000 years of traditional private or semi-public use (Hammond, 2008; Métailié, 2008). In fact, there are many instances in which public parks at the city scale have been established when state authorities assumed control of large estates formerly occupied by elites or royals (Carr et al., 1992); Mexico City's Chapultepec Park and Berlin's Tiergarten represent two of many examples.

In ancient cities like Nimrud, Khorsabad, and Nineveh, royal gardens were famed and established a long-lived tradition of garden design for royal and other gardens (Stronach, 1990; Foster, 2004). Marrakech in Morocco was actively planned around garden spaces and for centuries maintained irrigation infrastructure to supply orchards, parks, and temple gardens, many of which were publicly accessible (Faiz, 2008). In 19th century Nigeria, Yoruba planning usually placed the palace of the *Oba* (king) in a central urban location and included ample green space for public use (Mabogunje, 1968).

Large urban cemeteries also function as city-scale green space and are common in American cities, such as Woodlawn Cemetery in Brooklyn, as well as ancient cities. A large Viking cemetery site in Birka, Sweden, contains over 1600 graves and burial mounds

close to the island settlement (Ambrosiani and Clarke, 1988), while the peri-urban roads leading away from Roman cities were lined with tombs, some surrounded by lush gardens (Farrar, 1998; Jashemski, 2008).

Intermediate level. In many cities, smaller parks and gardens at the neighborhood scale have surrounded religious buildings or civic institutions. In predominantly Christian cities of Europe and North America, neighborhood churches often have a mix of cemetery and garden space surrounding the building, such as Trinity Chapel in Manhattan. In Islamic cities, mosques often provide courtyard space to accommodate peak assemblies (Revault, 1983). Government-designated neighborhood parks, ubiquitous in many modern cities, are a relatively recent phenomenon in world history. Specialized parks first became common in 19th-century North American and European cities due to reformist movements aimed at improving the cultural refinement or physical health of city residents (Carr et al., 1992). Park planning has occasionally been intended to offer specific opportunities for social interactions. Institutional gardens in 17th- and 18th-century Paris became places where upper-class men and women could interact without the usual formality (Conan, 2008); parks established in 19th-century Birmingham, England, were conceived as spaces for contact across social divisions, where working classes could learn "civility" (Bramwell, 1991).

Residence level. The degree of emphasis on green space associated with residences is quite variable among societies, but kitchen gardens providing foods, condiments, and medicines have a long history (Cooper, 1983). Despite the emphasis on gardens in ancient Rome and the idealization of villa life and gardens in Renaissance Italy, European urbanization led to crowding, and gardens attached to residences were sometimes supplanted by new residential units (Garrioch, 1986). In the British Victorian era, increasing cultural preferences for private domestic spaces reversed this trend and generated more residential garden space. Autonomous townhouses with green yards began to replace tenement apartments, and "outdoor life was ceasing to be a social life and disappearing from view behind the garden hedge or the yard walls" (Daunton 1983, p. 218). Today, fringe development in some sprawling urban areas is planned to include generous private household yards. Yet the link between new suburban construction and expanding provision of private greenspace is by no means ubiquitous; cities like Phoenix, for example, have seen reductions in the sizes of suburban lots and residential open space in new construction on the urban fringe, due to market demand for bigger houses and limits on using water to support green landscaping (Gober, 2006).

When competitive garden aesthetic display and multifaceted garden activities were common, such as in Renaissance Italy or Ming China, a combination of emulation and cultural values led to gardens associated with residences up and down the social hierarchy (Coffin, 1979; Smith, 1992; Clunas, 1996). As noted previously, in low-density cities such as Angkor (Evans et al., 2007) or in lowland Maya and Gulf cities (Stark and Ossa, 2007) where open space separated residences, kitchen gardens and sometimes infields could be close to houses.

General observations. Today, large urban parks and gardens originate primarily from municipal or state planning and associated zoning laws, or from the initiative of institutions with large landholdings, such as churches, schools, and corporations, covering a range of public, semi-public, and private settings. Parks and gardens in many cultural contexts have been constructed as sites of aesthetic reflection or for specific social practices,

and the intentionality inherent in these uses tends to require such "top-down" planning. In ancient states, large gardens and parks were usually royal or elite installations and had only sporadic or selective public access (e.g., to upper classes). In recent centuries, elite estates have often been appropriated by authorities and converted to public use. The transition of some parks and gardens in imperial Rome to public access (Farrar, 1998; Jashemski, 2008) reveals that this process has extensive time depth. In both ancient and modern times, house yards or courtyards can provide opportunities for the general population to create and use garden spaces for their own purposes, but on a modest scale reflecting the economic means of inhabitants. In wealthy capitalist economies, the provision (or lack) of residence-level garden space is often dictated by market forces, and the degree to which this trend accurately reflects popular preferences is debatable.

Recreational Space

Recreational space involves functionally specialized green and grey spaces designed or used for leisure activities, such as sports or exercise. In many cases, spaces defined solely in terms of recreation are modern in origin.

City level. The planning of urban greenbelts, often semi-wild, represents one of the largest scales of recreational space. In the city of Chandigarh, India, built upon vacant agricultural land in the 1950s to serve as the Punjab state capital, almost 3,000 acres of greenbelt surrounding the city were reserved (D'Souza, 1968). In the Soviet Union, city planners designing large industrial cities, virtually from scratch, often established greenbelts, both for recreation and as buffers between residential and industrial zones. Soviet cities such as Magnitogorsk, Novosibirsk, and Volgograd were all designed with industrial greenbelts (French and Hamilton, 1979; Bernhardt, 2005). Greenbelt and semi-wild park planning was also employed in certain American cities in the 19th and 20th century, sometimes along abandoned rail corridors. The master plan for Chicago designed by Daniel Burnham called for a massive greenbelt surrounding the city that was only partially completed (Burnham and Bennett, 1909). Beaches in many world cities represent a particular type of recreational open space.

Stadiums utilized for the public viewing of ceremonial, sporting, or other cultural events are common to various historical urban cultures. Such spaces are delineated separately from parks or large formal plazas because they are functionally specialized for recreation and viewing. For example, coliseums and theaters in the Roman Empire were important cultural and political spaces (MacDonald, 1986). Mesoamerican ball courts combined sport, symbolic, and ritual dimensions (Scarborough and Wilcox, 1991). In the 20th century, cities all over the world have constructed specialized stadia to host sports, music, and conventions. Today, these spaces include not only stadium seating and field space, but also expanses of parking used not only for vehicles but also other socioeconomic activities, such as "tailgating," farmers' markets, fairs, and swap meets.

Intermediate level. In most historical and ancient cases, recreation for the general population has been conducted in multi-purpose neighborhood places, such as streets, plazas, and empty lots. We have located little information on special recreational spaces at the neighborhood level in ancient cities, although some Mesoamerican cities have multiple ball courts that suggest neighborhood functions (e.g., for Cantona, García Cook, 2003).

Girouard (1985) notes that many European cities in the Middle Ages had informal, peripheral open spaces commonly used for recreation.

In Western cities during the late 19th and 20th centuries, the Garden City reform movement influenced a Progressive Era effort to provide smaller, specialized recreational space at the neighborhood level. First advocated under the guise of encouraging healthy, moral behavior in children, playground spaces proliferated in American cities by the 20th century (Abercrombie, 1981). New types of recreational space arose in the 20th century, like "adventure playgrounds" emerging from Sweden and adopted in many cities (Andersson, 2008). Despite their top-down origins, contemporary Western municipal park spaces are increasingly supported financially by local nonprofit organizations, as neoliberal reforms to urban political economies reduce city recreation budgets. As a result, parks in upper-income areas are sometimes maintained to a higher standard than those in lower-income areas (Rosenzweig and Blackmar, 1992; Joassart-Marcelli et al., 2011).

Residence level. Courtyards (in the next section) and residential gardens (preceding section) tend to be multi-purpose spaces that accommodate family recreation. Specialized recreational open space at the residence level is generally confined to upper-class properties, especially in historical and ancient times, where some gardens accommodated theatricals, polo, or archery (e.g., in China, Smith, 1992; in Iran, Alemi, 2007) and grounds at some elite villas contained racetracks (Coffin, 1991). In modern cities, it is not uncommon to find upper-class houses with swimming pools, graded grass lawns, and other recreational facilities. In the United States, backyard lawns and patios have been increasingly emphasized in suburban settings, to the detriment of front yard space, because the backyard is culturally elevated as the primary recreational space for families (Ford, 2000).

General observations. Dedicated recreational spaces with wide access are quite recent urban phenomena emerging from sociopolitical responses to the urban problems of the industrial era. Large-scale recreational spaces tend to be top-down products sponsored by government, wealthy patrons, and public-private partnerships, due to the associated costs and land requirements. Institutional control of recreational space is especially prevalent when activities require special facilities and maintenance, such as stadia and golf courses, and these requirements may translate into reduced accessibility across socioeconomic classes or uneven quality of facilities. Specialized recreational spaces at the intermediate and residence levels are also recent phenomena (except in the case of royals and urban elites), despite the fact that they are now amenities supported by municipal institutions in most developed countries. In contrast, less specialized recreation is common throughout urban history, conducted in a variety of city spaces (including most of our typological categories), a process that is "bottom-up" by nature.

Plazas

Plazas are defined as intentionally established open space framed by buildings on most sides and usually hard surfaced. Plazas can host a diversity of civic activities and tend to be multi-purpose. At the city and intermediate levels they normally are open to public access.

City level. Large plazas, often planned by government or religious authorities, have been common in a wide variety of urban contexts through history. Such plazas are distinctive at the city scale due to their centralized position, large size, and association with major civic or religious buildings, and they play a critical political and symbolic role. These

spaces typically are used for multiple purposes, such as cultural events, military assembly, local trade, and social interaction.

For example, the central urban plaza in Ottoman Isfahan was a highly diverse space in the 16th century and remained the largest plaza in the world until the 20th century. Ringed by religious, governmental, and educational buildings and home to large markets and recreational activities, the plaza today hosts a similar mix of functions and is occasionally used for political expression (Madanipour, 2003). In 17th- and 18th-century France, grand *places royales* intended to symbolically glorify the king were constructed or proposed in over 25 French cities (Cleary, 1999). In the era of European colonization, large monumental plazas were often planned in conjunction with political and military goals. During the 19th-century French colonization of Algiers, for example, buildings were demolished for a wide plaza close to the harbor for the purposes of military assembly and political symbolism (Çelik, 1997). Plazas in Latin American cities were influenced as much by indigenous as by colonial traditions. This "central square of space, ringed by the cathedral, administration buildings, arsenal and customs house, and later the residences of the social elite, represented the double hierarchy of church and state" (Low, 1993, p. 76).

Twentieth-century states have continued planning city-level plazas with political symbolism. Large formal plazas were common features of Soviet cities from Eastern Europe to Central Asia. Plazas like Red Square in Moscow became important symbols of the socialist state and were often home to political gatherings and propaganda events (Castillo, 1994). In modern Chinese cities, undergoing rapid redevelopment by state authorities, the construction of monumental plazas continues to represent state power (Ma and Wu, 2005). This sort of autocratic state planning is common throughout Chinese history, as many historic dynasties used urban space to project symbolic political order (Abramson, 2007)—a function found in many ancient contexts.

In the absence of textual data on the actual uses of civic plazas, archaeologists have by necessity concentrated on formal attributes, such as size and associated architecture, to infer uses and significance. Moore (1996) analyzed city-level plazas at archaeological sites on the coast of Peru using five variables. Two relate to the position and occurrence of plazas within a settlement—centrality and ubiquity (the occurrence of plaza types at different spatial scales)—whereas three variables concern the plazas themselves—permanence (ephemeral to multi-generational), scale or size, and visibility. These plazas were settings for periodic gatherings to witness ceremonies and other events carried out on large adjacent platforms.

Formal plazas or large courtyards within or adjacent to royal palaces form a distinctive subcategory of city-level plazas in some pre-modern cities. These features are historically documented for palaces in Bali (Geertz, 1980) and various Yoruba cities (Ojo, 1966). Cavanagh (2002) employs a similar approach to Moore's to reconstruct the activities that took place in palace courtyards of Mycenaean towns. By studying eight physical and spatial attributes (access, size, orientation, focus, perspective, visibility, appointment, and frontage), Cavanagh shows that these spaces were used for political assemblies, including formal occasions in which the ruler met subjects.

Intermediate level. Intermediate-scale plazas are qualitatively different because of their smaller scale, relative abundance, and more localized uses. Neighborhood plazas are quite common in a variety of cultures, but relative sizes and positions are contextually different in each case. Local European plazas, shaped by both generative and state-driven processes

in the medieval and Renaissance eras, represent some of the most commonly cited open spaces. In 16th- and 17th-century London, state authorities often cleared and redeveloped neighborhoods to include open public squares (Harding, 2004). In 15th-century Florence, the prevalence of smaller neighborhood plazas paired with churches—estimated at over 50—indicates both a lack of formal state planning and their importance for the social, cultural, and economic life of Florence's neighborhood parishes (Weissman, 1982). Neighborhoods in Bhaktapur, Nepal, are similarly oriented around plazas, spaces that in history have simultaneously supported food and craft production, markets, communal wells, and social interaction (Levy, 1990). In urban and rural areas of Latin America, the ubiquitous neighborhood plaza is intertwined with the sociocultural structure of urban society (Low, 1993).

Twentieth-century residential planning ideals, deployed in different ways across the world, significantly influenced the current provision and nature of neighborhood plazas. In the Soviet Union, the *microraion* model of new community development was intended to provide a full community unit—including block apartment housing, services, and recreation—and most included generous amounts of parks and plazas (French and Hamilton, 1979). Soviet authorities exported this modernist, socialist model to client countries in Europe and Asia, such as Vietnam. In a different context, the planned city of Chandigarh, India—created in the 1950s by Le Corbusier as the new capital of Punjab—also included modernist plazas framed by concrete-based apartment blocks (Shaw, 2009). The city was planned in 29 neighborhood sectors, some of which feature a centrally planned grey space around which apartments and services are oriented (D'Souza, 1968).

Neighborhood level plazas are not commonly identified in ancient cities, likely reflecting the limitations of mapping entire cities in detail. One example might be the plazas associated with three-temple groups at Teotihuacan, Mexico (Cowgill et al., 1984).

Residence level. Courtyards are the smallest plazas, normally private or semi-private areas for residents. Arab-Islamic urban residences often conformed to courtyard-based planning (Bianca, 2000). Such cities exhibit a nested structure of private domestic spaces, in which residential culs-de-sac, family compounds, and individual houses all represent incrementally more segregated and private spaces. In tandem with certain aspects of Islamic and Arab cultures, these spaces tend to be segregated by ethnicity, clan, and gender to ensure privacy, and many Arab-Islamic homes are designed around courtyards fully shielded from public view.

In European and Western cities, courtyards also have played a significant role in social life, although in these contexts the courtyard is a much more "public" zone. In 18th-century Paris, rapid urban growth led many property owners to build residential units in house yards, and often small courtyard spaces were carved out to provide housing access. These courtyards, open to the street, were the site of daily social interaction between residents and other citizens (Garrioch, 1986). By the middle of the 19th century, large tenement apartment buildings in cities such as Birmingham, New York, and Sydney included planned courtyard entries. These shared spaces, again semi-public but informally "defended" by local residents, were important for tenement residents with little home space and few domestic amenities. In Birmingham, communal toilets, water supply, trash deposits, and the production of goods all co-existed in such courtyard spaces; not surprisingly, these zones engendered dense social networks among residents (Bramwell, 1991).

In West African cities such as Lagos, some residential districts have been constructed as superblocks with large courtyards behind apartment structures (Mabogunje, 1968). In informal settlements surrounding Latin American cities, courtyard spaces are sometimes reserved by residents. For example, in an informal Mixtec neighborhood in Mexico City, migrants clustered according to common village origins and adapted rural building styles to the new urban context. This style, traditionally featuring a central patio surrounded by one family's residential compound, was transformed to include central courtyards surrounded by the homes of multiple families (Butterworth, 1980). Similar plazas in informal settlements have been observed elsewhere, such as Lima (Lloyd, 1979).

Houses arranged around a common patio represent a recurrent residential pattern in pre-modern cities. In the so-called "Mediterranean-style" house, found from ancient Mesopotamia to the Incas of Peru, the patio is completely enclosed by the residence (Hyslop, 1990; Bergmann, 2007). Aztec and Maya cities had a variant in which individual house structures surrounded a small patio, which could be easily entered from the outside between the structures (Isendahl and Smith, 2012).

General observations. Many large plazas reflect state or municipal investments with marked political or civic symbolism and fulfill state functions such as commemorative events and proclamations. Yet often these spaces are appropriated by ordinary citizens for their own purposes of trade, recreation, interaction, and political mobilization (acts variously supported, tolerated, or suppressed by authorities). At the other end of the scale, residential and neighborhood plazas or courtyards are flexible space for the ordinary population, and some are produced and reproduced through local initiative. For the numerous urban poor, plazas and courtyards offer arenas for activities and interactions that are inhibited by scant private space. The greater frequency of plazas compared to parks and gardens in many cities makes plazas and streets, discussed next, critical socioeconomic resources for urban inhabitants.

Streets

Among the earliest written descriptions of cities, cuneiform inscriptions from Babylonian cities mention three kinds of streets: (1) "broad street, way of the gods and king," (2) "narrow street, way of the people," and (3) "blind alley" (Baker, 2009, p. 95). This ancient three-part classification matches our three urban scales, suggesting continuity in the significance of streets from the earliest cities to the present. In ancient as in modern cities, streets functioned as pedestrian and vehicular corridors as well as crucial locales of social interaction, political demonstration, ritual, recreation, economic production, and trade.

City level. A wealth of archaeological examples shows the planning of monumental boulevards for symbolic meaning, political display, and economic activity. The Romans constructed boulevards through the city for triumphal military parades, even though these spaces were rarely used for other purposes (Favro, 1994). Chinese streets in Chang'an, during the transition from the Tang (618–906 AD) to the Song period, morphed from highly regulated space in which most activities were prohibited to informally regulated places allowing diverse activities, including commerce (Heng, 1994). Teotihuacan in Mexico had a long north-south open axis (today named "Street of the Dead") lined by major buildings and segmented by low, stepped, wall-like platforms. At the Aztec capital of Tenochtitlan, key east-west avenues extended from the central precinct (Calnek, 1976, 2003). Roads

at Xochicalco, Morelos, continued into the countryside to project state dominance even though human porters did not require them for transport (Hirth, 2003).

Modern monumental boulevards indicate the durability of this urban form throughout human history. In Haussmann's mid-19th century Parisian redevelopment, many new, straight boulevards were constructed through previously dense, twisting neighborhoods dating to the medieval era (Vidler, 1978). Haussmann's reforms in Paris were ostensibly guided by traffic and sanitary concerns, but it has become clear that this redevelopment had political and commercial motives as well (Kostof, 1994; Harvey, 2006). By breaking up dead-end streets considered breeding grounds of grassroots political resistance, the government was better able to mobilize security forces and patrol lower-income neighborhoods—an example of a state effort to improve "legibility" and government order (Scott, 1998). Many Soviet bloc cities featured monumental boulevards which, alongside state-planned plazas and buildings, projected government power (French and Hamilton, 1979; Bernhardt, 2005)—for example, the 1930s rehabilitation of Moscow's Gorki Street (Castillo, 1994). Modern Chinese cities have continued the trend towards monumental boulevards in the intensive redevelopment of most urban cores (Abramson, 2007).

Intermediate level. In many historical contexts, secondary streets have been the cultural and functional heart of urban open space, home to a wide diversity of uses. In "Arab-Islamic" cities, generally lacking in other open public spaces, primary streets functioned as critical transportation corridors between extra-mural trading plazas and urban storefronts as well as marketplaces (Bianca, 2000). Under the Islamic tradition of generative building, streets can become progressively narrower over time; Cairo's Bayn al-Qasrayn, for example, began as a notable plaza in the 11th century but shrank to street width due to political manipulation and the consistent encroachment of residential buildings and shops (AlSayyad, 1994). In medieval European cities, streets often represented extensions of working households and became sites of economic production, sales, play, and social interaction (Mumford, 1961; Schlumbohm, 1980).

Beginning in the 19th century, Western urban planners sought to establish order by imposing open, grid-like streets in dense urban zones or in newly planned districts, a phenomenon culminating in the modernist emphasis on streets as monofunctional vehicular corridors, backed by standardized codes (Trancik, 1986; Southworth and Ben-Joseph, 1997). Informal settlements in modern developing countries, representing much of the world's newly created urban space, have trended in the opposite direction—the lack of planned open space forces transportation to share streets with a wide variety of social, recreational, and economic activities (Habitat, 1982). Housing in many ancient cities was probably constructed informally (Smith, 2010), suggesting similar patterns in many but not all pre-modern cities. Cantona, in Mexico, had a network of built streets and passageways, some converging on the main precinct but most serving neighborhoods (García Cook, 2003). Aztec Tenochtitlan was honeycombed with canals and streets serving residences (Calnek, 2003).

Residence level. Alleys and pedestrian pathways differ from streets in their scale and function. Alleys include all paths too small for large vehicular transportation or multipurpose commercial activity. In many contexts, alleyways become a sort of transition zone between the private sphere of the household and the public sphere of the street, where neighborhood interactions can occur on a more intimate social scale and access is dictated by informal social norms (Madanipour, 2003). In other, more legalized contexts, alleys

between buildings can become fully private, gated spaces that become underused or marginalized (Trancik, 1986; Ford, 2000).

The nested hierarchy of streets and alleys in many Arab-Islamic cities provides an example of these scalar differences. Whereas main streets tend to be critical transportation and economic corridors, open to all ethnicities and clans, a successive array of smaller cul-de-sac alleys leading to family compounds and individual households are progressively restricted by gates and social surveillance, increasingly the sites of more intimate social interaction within the same ethnicity or extended family (Abu-Lughod, 1987; Bianca, 2000). In Japanese cities, Nagaya lanes form short passageways, much like a shared driveway, leading to multiple small dwellings, although these spaces do not have the same level of physical exclusion and social control as in Arab-Islamic cities (Shelton, 1999). In contrast, American urban alleys—traditionally a product of planning doctrine popular between the late 19th century and 1930—were conceived as corridors for transportation access and waste management (Ford, 2000).

In Indonesian cities of the 19th and 20th century, a similar dichotomy between public streets and semi-private alleys is manifest in a culturally distinct manner. Main thoroughfares lined with permanent storefronts and residences host a variety of economic, cultural, and transportation uses, but intersecting paths leading to traditional *kampong* behind the street frontage plunge visitors into a maze of narrow alleyways. Residents rely on these spaces for work and social interaction; the spaces are managed according to both state direction and informal governance. Significant cultural and class-based distinctions between *kampong* residents and "streetsiders" are reflected in the urban geography of these peculiar street patterns (Sullivan, 1980, 1992; Guinness, 2009). At prehispanic Cantona, elite walled residences had a passage or private alley to reach a street, but commoner compounds had only a stair to reach adjacent passages (García Cook, 2003).

General observations. Boulevards, streets, and alleys in urban history reflect a range of origins, from intensive state projects of development to passageways slowly carved out by local initiative. Modern planning intended to accommodate fossil fuel–based vehicles has drastically increased the functional specialization and top-down control of many streets and boulevards, culminating in expressways that are completely inhospitable to pedestrians. This drive towards transportation efficiency and increased city size represents a break from the multi-purpose use of streets in most historical urban cultures. Clearly, technology can transform the form and function of open spaces. Yet regardless of technological level, streets have been historically critical sites of grassroots social and economic activity for urban classes lacking much private enclosed space; recent functional specialization threatens these resources. The historical dichotomy between institutional and "plebian" planning is manifest in the newly developed, peri-urban areas of Western and Global South cities: whereas wealthy suburban streets are meticulously planned for transport, based on institutional safety codes, streets in informal settlements are often irregular, multi-purpose spaces that do not accommodate automobiles.

Transport Facilities

Transportation areas represent spaces in which the transfer and distribution of goods is conducted close to forms of transport. This is a specialized functional category, and these

areas vary based on the mode of transport. These spaces may include some marketplace functions, but marketplaces and shops may exist separately in plazas or buildings.

City level. City-scale facilities today include airport, train, and bus station parking, where shipped goods are transferred to vehicles for further distribution, or passengers transfer themselves and their bags. Likewise, some cities have docks and associated parking. The Mesopotamian city of Ur had two large harbors located within the city walls that were undoubtedly areas of exchange as well (Woolley, 1963). In Middle Eastern and Central Asian cities with Islamic influence, spaces of trade and unloading of wholesale merchandise were common at select gates in city walls (Giese, 1979; Bianca, 2000). In Ottoman Algiers, dock space near the harbor and open space outside the Bab Azoun Gate were critical sites of economic transfer as well as spaces of diverse social interaction and recreational meditation (Çelik, 1997; Clancy-Smith, 2009). Trading zones on the urban fringe were also found outside the walls of medieval European cities (Mumford, 1961; Laughton, 2008). The Aztec capital of Tenochtitlan had docks for canoes at varied locations in a web of urban waterways, including a location near the central precinct that may have been used for the transfer of goods (Calnek, 1976, 2003).

Intermediate level. In automobile-oriented cities of the 20th century, mall parking lots represent transport facilities. Large parking areas accommodate the critical holiday shopping season, constantly turning over vehicles and their "cargo." Smaller strip malls with parking may serve either a reduced economic district or a neighborhood. With other transport modes, such as animal-drawn vehicles or mounts, stables and corrals are a specialized, sometimes open-air facility. In cities oriented around mass transit, such as Osaka, Japan, underground rail stations can generate intense pedestrian activity in the spaces above as people transfer to buses, elevated rail, taxis, and cars (Treib, 1994). Other examples clearly influenced by modern technology include trucking distribution facilities.

Residence level. In modern suburban areas developed around the automobile, front-facing garages with paved driveway parking are common features of single-family homes, and driveways are used for the transfer of goods from vehicles to dwellings. When animal transport was common, barns were typically located deeper within the property unless animals were kept at separate stables. In ancient Mesoamerica, the lack of pack animals led to reliance on human portage and few transport facilities, but the Aztec capital of Tenochtitlan had docks and canals for canoe transport (Calnek, 1976, 2003).

General observations. Transportation technology is a major determinant of the form and function of transport facilities at diverse scales. Some transport spaces represent governmental or institutional installations, whereas others reflect residential choices or informally designated transfer points; the degree of state or local influence is predicated upon a city's specific political economy. Transport facilities are often break-of-bulk points and linked to locations of market exchange, which may be roofed, exist in other open spaces, or overlap with the transport facilities.

Incidental Space

Incidental space, also referred to as marginalized or amenity space, is defined here as any green or grey space located on the margins of other spaces or buildings that is either ignored or not intended for a specific use other than safety, visual amenity, or physical

separation (Garde, 1999; Al-Hagla, 2008). These spaces are not easily amenable to either formal or functional classification.

City level. Semi-wild and "natural" open spaces—whether planned or unplanned—represent the largest scale of incidental space. Semi-wild areas are sometimes conceived as wildlife habitats or green buffers offering a connection to "nature" in an otherwise urbanized environment. These areas easily become dumping grounds for waste or spaces of social deviance. In many 19th- and 20th-century colonial cities in South Asia and Africa, colonial planners segregated native urban areas from the homes of colonists with greenbelts, citing the miasmic theory of disease transmission which posited that intermediary vegetation and physical distance would arrest the spread of "foreign" diseases (King, 1976). In Soviet cities, the buffer function of planned greenbelts distanced industrial pollution instead of specific ethnic groups (French and Hamilton, 1979). We have not located information on city-level incidental space in ancient cities, in part because of an archaeological bias toward investigating architecture. In contrast to modern contexts, we suspect that fields, gardens, groves, and parks would have accounted for most large-scale green spaces.

Intermediate level. Smaller-scale incidental space has been traced to the transportation revolution, explosion of city size, and decline of the walking city during the 20th century. Underused paved spaces have been generated by modernist planning and zoning ordinances mandating separations between large buildings, like New York City's 1961 zoning law (Southworth and Ben-Joseph, 1997; Garde, 1999). Trancik (1986, p. 4) describes these as "lost spaces . . . the leftover unstructured landscape at the base of high-rise towers or the unused sunken plaza away from the flow of pedestrian activity." The idea of "lost space" is normative, inasmuch as incidental spaces exist for particular reasons. For example, some planned incidental spaces are found along linear borders, such as transportation corridors like highways and railroads, or landscaped fringes surrounding institutions and parking lots. While these spaces derive from safety concerns or aesthetic reasons related to property values and cultural symbolism, they are clearly incidental byproducts of socioeconomic processes based in other city spaces.

Empty lots in urban areas, present at both intermediate and residence scales, have rarely been a focus of academic study but constitute another form of incidental space influencing the economic functioning of the city. Empty residential lots—whether overgrown with vegetation, bare packed dirt, filled with trash, or reused as a community garden—have been both used and ignored. Garde (1999) argues that because open space is now over one-third of neighborhood space, marginal spaces deserve serious urban study and productive re-use. In fact, large empty lots are surprisingly common in some developed, growth-oriented cities, where they may be a byproduct of capitalist land speculation and development. For example, the Phoenix metropolitan area is home to a number of municipal "downtowns," including Phoenix, Tempe, and Mesa, and all have featured significant clusters of empty, packed dirt lots in both recessionary and boom periods.

Archaeologists can detect abandoned residences and their lots when they serve as trash dump locations or because floor surfaces show weathering from the elements. However, study of this form of incidental space is usually part of an examination of sequences of residential occupation, reoccupation, and rebuilding rather than part of broader urban study. In one exception, Baker (2009) uses textual data from ancient Babylonian cities to show that unbuilt, privately owned residential lots existed.

Residence level. Given the varied uses of the space around dwellings and commercial buildings, it is hard to determine where purposive space stops and incidental space begins. Ford (2000) notes this dilemma but still highlights how planning measures have created "fragments of anonymous space" around buildings in contemporary American cities. The standard deployment of planning templates where buildings are constructed in rectangles (regardless of lot shape), along with fire codes and other municipal regulations, tends to generate slivers of unused space—a practice in American cities that contrasts with many others throughout history. Clay (1973) termed this process "fragging," where marginalized spaces between buildings can house long-term "stacks" of materials or "sinks" for urban refuse. Ford (2000, p. 24) ultimately linked these spaces to the broad American trend "away from urban spaces tightly surrounded and defined by buildings and toward the proliferation of free-standing structures lost in space."

In premodern states, governmental regulation was often limited to the central civic sectors, leaving individuals and families freer to use residential lots. Cultural or religious codes have sometimes provided strong land use principles that tend to minimize wasted space, as in the case of Islamic cities (Hakim, 1986). Occasionally, as in the building of apartment compounds at Teotihuacan (likely partly state-directed; Millon et al., 1973; Murakami, 2010), a particular residential form was established that subsequently changed the nature of adjacent open spaces, although we have scant archaeological data concerning the functions of spaces among compounds.

General observations. The rise of industrial and post-industrial capitalist societies and the dramatic spatial city growth related to advances in transport technology both seem causally related to the amount and variety of incidental spaces. Incidental space appears inseparable from the highly organized planning of state and institutional entities, arising when city zoning ordinances are applied *en masse* to a diversity of neighborhoods, lots, and uses, or when large-scale transportation planning displaces previous uses. The functional specialization of urban open space, perhaps emphasized more in modern than ancient cities, clearly helps create marginalized space. In ancient cities, empty lots may reflect family decisions and neighborhood activities more than state or municipal projects.

DISCUSSION: INSTITUTIONAL AND POPULIST INFLUENCES ON THE (RE)PRODUCTION OF URBAN OPEN SPACE

We identify urban open-space types that vary greatly in prominence according to technological, social, and cultural conditions, yet have relevance across a broad range of cities and urban contexts. Noteworthy is the flexibility of open-space uses among ordinary urbanites; in fact, the flow of information and material among people interacting in open spaces represents a fundamental dimension of urban life. Many open-space roles are poorly attested in historical documents that favor the concerns and actions of literate upper classes. In archaeology, many open spaces are under-investigated compared to buildings and artifacts. Thus, we stress not only the utility of a broad historical and spatial comparison, but also the research potentials of urban open spaces.

Urban open spaces differ dramatically in their ecological, social, and symbolic roles, which we have scarcely touched upon in the scope of this paper. They are the cultural products of the settings in which they develop and have always projected complex social and political meanings to a great variety of people. Their symbolic significance is

continually produced and reproduced in the practice of everyday life and through political and economic machinations. Furthermore, their relative degree of public accessibility and the often intricate connections to public and private roofed spaces can closely determine their cultural and economic functionalities. Thus, our open-space typology should not be divorced from architecture-based analyses of urban history. It is difficult to identify common patterns or general conclusions about urban open spaces among the broadest variety of urban histories, and our open-space typology is intended to organize this search rather than suggest rules governing urban form and processes. One simple dichotomy represents a starting point: the interplay between generative, local actions and those of powerful authorities in major central institutions (which may operate at the city or state levels).

Although major plazas and boulevards can project important messages from dominant elites, frequently such open spaces are not so stringently regulated as to prevent the emergence of a range of flexible uses. Neighborhood and residential open spaces play important roles in social life for ordinary inhabitants, whether categorized as poor or middle class, whether homogeneous or diverse in gender and ethnicity. Our review of case materials suggests that open space in cities is a more versatile resource for the majority of inhabitants than roofed space, which is more susceptible to institutional restrictions, specialization, and exclusion. As places of flexible appropriation by those with limited means, open spaces represent key political junctures between top-down and bottom-up interests at multiple scales. As the burgeoning literature on public space attests, public access to urban open spaces is unavoidability political, and human rights continue to be negotiated in place-based conflicts between institutional and grassroots interests (Mitchell, 2003). This dynamic also enters into debates about the nature of premodern urban life. For example, in collective action theory (Levi, 1988), one comparative issue is the source of state revenues (whether largely obtained internally or externally) and the extent of governmental responsiveness to collective actions and demands from the populace. The varied construction and uses of open space help indicate the efficacy of collective action in states. We suggest that the morphology, distribution, and contexts of open space can be an important addition to the repertoire of collective action indices examined by Blanton and Fargher (2008), which includes transportation infrastructure, public water supplies and control, public safety, redistribution, and other public services. In other words, urban open spaces, because of their importance for the mass of inhabitants, provide an opportunity to investigate not only details of urban life and urban form, but also the broader political fabric of society.

Open spaces are versatile sites of action across both daily and longer temporal scales, and even specialized, institutionally controlled spaces can be transformed by grassroots action. Spaces initially constructed in the interests of dominant classes can quickly assume new political meanings in the face of social unrest. Tiananmen Square, the site of the founding of the Communist People's Republic, became a worldwide democratic symbol when student protests in 1989 led to violent government repression (Lees, 1994). The political and symbolic importance of city-scale plaza and street space is underlined by the political tumult that exploded in North African and Middle Eastern cities beginning in 2011. Mass protests in Cairo's Tahrir Square and the central city streets of Tunis provided striking imagery for media representations, strongly influencing the protests' momentum and world opinion. Although the cyberspaces of social media were often lauded as the deciding force in these struggles, it is important to recognize that traditional open spaces

were utilized in conjunction with electronic communication and became the ultimate arenas for political contestation. Such events lend credence to critics of modernist cities that lack traditional open spaces (Trancik, 1986; Lofland, 1998); for example, Lees (1994, p. 455) has argued that "the lack of civic space in Los Angeles means that people have no central place to occupy to attract attention; no square to seize to assert symbolic power." Thus we emphasize the enduring importance of urban open space for flexible sociopolitical practice—an importance that has been shared across ancient and modern urbanism and that should be understood in a broadly comparative, historical perspective.

REFERENCES

Abercrombie, S., 1981, Places for play. In L. Taylor, editor, *Urban Open Spaces*. New York, NY: Rizzoli, 39–41.

Abramson, D. B., 2007, The dialectics of urban planning in China. In F. Wu, editor, *China's Emerging Cities: the Making of New Urbanism*. London, UK: Routledge, 66–86.

Abu-Lughod, J. L., 1987, The Islamic city: Historic myth, Islamic essence, and contemporary relevance. *International Journal of Middle Eastern Studies*, Vol. 19, 155–176.

Al-Hagla, K., 2008, Towards a sustainable neighborhood: The role of open spaces. *International Journal of Architectural Research*, Vol. 2, 162–177.

AlSayyad, N., 1994, Bayn al-Qasrayn: The street between the two palaces. In D. Favro, Z. Çelik, and R. Ingersoll, editors, *Streets: Critical Perspectives on Public Space*. Berkeley, CA: University of California Press, 71–82.

Alayón-Gamboa, J. and Gurri-García, F., 2008, Home garden production and energetic sustainability in Calakmul, Campeche, Mexico. *Human Ecology: An Interdisciplinary Journal*, Vol. 36, 395–407.

Alemi, M., 2007, Princely Safavid gardens: Stage for rituals of imperial display and political legitimacy. In M. Conan, editor, *Middle East Garden Traditions: Unity and Diversity: Questions, Methods, and Resources in a Multicultural Perspective*. Washington, D.C.: Dumbarton Oaks Research Library and Collection, 113–137.

Ambrosiani, B. and Clarke, H., 1988, *Birka on the Island of Björkö*. Stockholm, Sweden: Central Board of National Antiquities.

Andersson, T., 2008, Swedish mid-century utopia: Park design as a tool for societal improvements. In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture: A World Tour*. Washington, DC: Dumbarton Oaks Research Library and Collection, 157–172.

Baker, H. D., 2009, A waste of space? Unbuilt land in the Babylonian cities of the first millennium BC. *Iraq*, Vol. 71, 89–98.

Bedimo-Rung, A., Mowen, A., and Cohen, D., 2005, The significance of parks to physical activity and public health: A conceptual model. *American Journal of Preventive Medicine*, Vol. 28, 159–168.

Bergmann, B., 2007, Housing and households: The Roman world. In S. E. Alcock and R. Osborne, editors., *Classical Archaeology*. Malden, MA: Blackwell, 224–243.

Bernhardt, C., 2005, Planning urbanization and urban growth in the socialist period: The case of East German new towns, 1945–1989. *Journal of Urban History*, Vol. 32, 104–119.

Bianca, S., 2000, *Urban Form in the Arab World: Past and Present*. London, UK: Thames and Hudson.

Blanton, R. E. and Fargher, L. F., 2008, *Collective Action in the Formation of Pre-Modern States.* New York, NY: Springer.

Boone, C. G. and Modarres, A., editors, 2006, *City and Environment*. Philadelphia, PA: Temple University Press.

Bowden, M., Brown, G., and Smith, N., 2009, *An Archaeology of Town Commons in England*. London, UK: English Heritage.

Bowles, S., and Gintis, H., 2002, Social capital and community governance. *The Economic Journal*, Vol. 112, F419–F436.

Bramwell, B., 1991, Public space and local communities: The example of Birmingham, 1840–1880. In G. Kearns and C. W. J. Withers, editors, *Urbanising Britain: Essays on Class and Community in the Nineteenth Century*. Cambridge, UK: Cambridge University Press, 31–54.

Brosseau, S., 2008, The promenades and public parks of Tokyo: A tradition permanently reinvented. In M. Conan and C. Wangheng, editors, *Gardens, City Life, and Culture: A World Tour*. Washington, DC: Dumbarton Oaks Research Library and Collection, 229–245.

Burnham, D. H. and Bennett, E. H., 1909 [1970], *Plan of Chicago*. New York, NY: Da Capo.

Butterworth, D. S., 1980, A study of the urbanization process among Mixtec migrants from Tilantongo in Mexico City. In I. Press and M.E. Smith, editors, *Urban Place and Process: Readings in the Anthropology of Cities*. New York, NY: Macmillan, 241–256.

Calnek, E. E., 1976, The internal structure of Tenochtitlan. In E. R. Wolf, editor., *The Valley of Mexico: Studies of Pre-Hispanic Ecology and Society*. Albuquerque, NM: University of New Mexico Press, 287–302.

Calnek, E. E., 2003, Tenochtitlan-Tlatelolco: The natural history of a city. In W. T. Sanders, A. G. Mastache, and R. H. Cobean, editors, *El Urbanismo en Mesoamérica/Urbanism in Mesoamerica.* Mexico City, Mexico: Instituto Nacional de Antropología e Historia and the Pennsylvania State University Press, 149–201.

Carmona, M., 2010a, Contemporary public space: Critique and classification, Part One: Critique. *Journal of Urban Design*, Vol. 15, 123–148.

Carmona, M., 2010b, Contemporary public space, Part Two: Classification. *Journal of Urban Design*, Vol. 15, 157–173.

Carmona, M., De Magalhaes, C., and Hammond, L., 2008, *Public Space: The Management Dimension*. London, UK: Routledge.

Carr, S., Francis, M., Rivlin, L. G., and Stone, A. M., 1992, *Public Space*. Cambridge, UK: Cambridge University Press.

Castillo, G., 1994, Gorki Street and the design of the Stalin revolution. In D. Favro, Z. Çelik, and R. Ingersoll, editors, *Streets: Critical Perspectives on Public Space*. Berkeley, CA: University of California Press, 57–70.

Castillo, G. E., 2003, Livelihoods and the city: An overview of the emergence of agriculture in urban spaces. *Progress in Development Studies*, Vol. 3, 339–344.

Cavanagh, W., 2002, Empty space? Courts and squares in Mycenaean towns. In K. Branigan, editor, *Urbanism in the Aegean Bronze Age; Sheffield Studies in Aegean Archaeology, Vol. 4*. Sheffield, UK: Sheffield Academic Press, 119–134.

Çelik, Z., 1997, *Urban Forms and Colonial Confrontations: Algiers under French rule*. Berkeley, CA: University of California Press.

Chandrashekara, U. M. and Sankar, S., 2008, Ecological and socioeconomic dimensions of homegardens of Kerala, India. In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture: A World Tour*. Washington, DC: Dumbarton Oaks Research Library and Collection, 248–259.

Clancy-Smith, J., 2009, Exoticism, erasures, and absence: The peopling of Algiers, 1830–1900. In Z. Çelik, J. Clancy-Smith, and F. Terpak, editors, *Walls of Algiers: Narratives of the City Through Text and Image*. Los Angeles, CA: Getty Research Institute, 19–61.

Clay, G., 1973, *Close-Up: How to Read the American City.* New York, NY: Praeger.

Cleary, R. L., 1999, *The Place Royale and Urban Design in the Ancien Regime*. Cambridge, UK: Cambridge University Press.

Clunas, C., 1996, *Fruitful Sites: Garden Culture in Ming Dynasty China.* London, UK: Reaktion Books.

Coffin, D. R., 1979, *The Villa in the Life of Renaissance Rome*. Princeton, NJ: Princeton University Press.

Coffin, D. R., 1991, *Gardens and Gardening in Papal Rome.* Princeton, NJ: Princeton University Press.

Conan, M., 2008, Royal gardens and city life in Paris (1643–1789). In M. Conan and C. Wangheng, editors, *Gardens, City Life, and Culture: A World Tour*. Washington, DC: Dumbarton Oaks Research Library and Collection, 73–87.

Conzen, M. P., Gu, K., and Whitehand, J. W. R., 2012, Comparing traditional urban form in China and Europe: A fringe-belt approach. *Urban Geography*, Vol. 33, 22–45.

Cooper, M. P., 1983, *The Early English Kitchen Garden.* Nashville, TN: Trinity.

Cowgill, G. L., Altschul, J. H., and Sload, R. S., 1984, Spatial analysis of Teotihuacan: A Mesoamerican metropolis. In H. J. Hietala, editor, *Intrasite Spatial Analysis in Archaeology*. Cambridge, UK: Cambridge University Press, 154–195.

Cranz, G., 1982, *The Politics of Park Design: A History of Urban Parks in America*. Cambridge MA: MIT Press.

Crouch, D. P., 1981, The historical development of urban open space. In L. Taylor, editor, *Urban Open Spaces*. New York, NY: Rizzoli, 7–8.

D'Souza, V.S., 1968, *Social Structure of a Planned City: Chandigarh*. Bombay, India: Orient Longmans Limited.

Daunton, M., 1983, Public space and private space: The Victorian city and the working class household. In A. Sutcliffe and D. Fraser, editors, *The Pursuit of Urban History*. London, UK: Edward Arnold, 212–233.

De Vries, S., Verheij, R. A., Groenewegen, P., and Spreeuwenberg, P., 2003, Natural environment—healthy environment? An exploratory analysis of the relationship between green space and health. *Environment and Planning A*, Vol. 35, 1717–1731.

Duany, A., Speck, J., and Lydon, M., 2010, *The Smart Growth Manual*. New York, NY: McGraw Hill.

Evans, D., Pottier, C., Fletcher, R., Hensley, S., Tapley, I., Milne, A., and Barbetti, M., 2007, A comprehensive archaeological map of the world's largest preindustrial settlement complex at Angkor, Cambodia. *Proceedings of the National Academy of Sciences*, Vol. 104, 14,277–14,282.

Faiz, M. E., 2008, Marrakech: An ecological miracle and its wanton destruction (1071–2000 A.D). In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture:*

A World Tour. Washington D.C.: Dumbarton Oaks Research Library and Collection, 193–201.

Farrar, L., 1998, *Ancient Roman Gardens.* Stroud, UK: Sutton.

Favro, D., 1994, The street triumphant: The urban impact of Roman triumphal parades. In D. Favro, Z. Çelik, and R. Ingersoll, editors, *Streets: Critical Perspectives on Public Space*. Berkeley, CA: University of California Press, 151–164.

Fletcher, R., 2009, Low-density, agrarian-based urbanism: A comparative view. *Insights*, Vol. 4, article 2. Retrieved from https://www.dur.ac.uk/resources/ias/insights/Fletcher16Jan.pdf

Ford, L. R., 2000, *The Spaces Between Buildings*. Baltimore, MD: Johns Hopkins University Press.

Foster, K. P., 2004, The hanging gardens of Nineveh. *Iraq*, Vol. 66, 207–220.

Freeman, D. B., 1991, *A City of Farmers: Informal Urban Agriculture in the Open Spaces of Nairobi, Kenya.* Montreal, Canada: McGill-Queen's University Press.

French, R. A. and Hamilton, F. E. I., 1979, Is there a socialist city? In R. A. French and F. E. I. Hamilton, editors, *The Socialist City: Spatial Structure and Urban Policy*. Chichester, UK: Wiley, 1–21.

Garde, A. M., 1999, Marginal spaces in the urban landscape: Regulated margins or incidental open spaces? *Journal of Planning Education and Research*, Vol. 18, 200–210.

García Cook, A., 2003, Cantona: The city. In W. T. Sanders, A. G. Mastache, and R. H. Cobean, editors, *El Urbanismo en Mesoamérica/Urbanism in Mesoamerica.* Mexico City, Mexico: Instituto Nacional de Antropología e Historia and the Pennsylvania State University Press, 311–343.

Garrioch, D., 1986, *Neighbourhood and Community in Paris, 1740–1790*. Cambridge, UK: Cambridge University Press.

Geertz, C., 1980, *Negara: The Theatre State in Nineteenth Century Bali*. Princeton, NJ: Princeton University Press.

Gehl, J. and Gemzoe, L., 2001, *New City Spaces*. Copenhagen, Denmark: The Danish Architectural Press.

Giddens, A., 1984, *The Constitution of Society: Outline of the Theory of Structuration*. Berkeley, CA: University of California Press.

Giese, E., 1979, Transformation of Islamic cities in Soviet Middle Asia into socialist cities. In R. A. French and F. E. I. Hamilton, editors, *The Socialist City: Spatial Structure and Urban Policy*. Chichester, UK: Wiley, 145–165.

Girouard, M., 1985, *Cities and People: A Social and Architectural History*. New Haven, CT: Yale University Press.

Gober, P., 2006, *Metropolitan Phoenix: Place Making and Community Building in the Desert.* Philadelphia, PA: University of Pennsylvania Press.

Grigg, D., 1965, The logic of regional systems. *Annals of the Association of American Geographers*, Vol. 55, 465–491.

Guinness, P., 2009, *Kampong, Islam, and State in Urban Java*. Honolulu, HI: University of Hawai'i Press.

Habermas, J., 1962, *The Structural Transformation of the Public Sphere* [translated by T. Burger and F. Lawrence, 1989]. Cambridge, MA: MIT Press.

Habitat, United Nations Centre for Human Settlements, 1982, *Survey of Slum and Squatter Settlements*. Dublin, Ireland: Tycooly International.

Hajer, M. and Reijndorp, A., 2001, *In Search of New Public Domain*. Rotterdam, Netherlands: NAI.

Hakim, B. S., 1986, *Arab-Islamic Cities: Building and Planning Principles*: London, UK: Routledge.

Hammond, K. J., 2008, Urban gardens in Ming Jiangnan: Insights from the essays of Wang Shizhen. In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture: A World Tour*. Washington D.C.: Dumbarton Oaks Research Library and Collection, 41–53.

Harding, V., 2004, Recent perspectives on early modern London. *Historical Journal*, Vol. 47, 435–450.

Harvey, D., 2006, The political economy of public space. In S. M. Low and N. Smith, editors, *The Politics of Public Space*. New York, NY: Routledge, 17–34.

Heng, C. K., 1999, *Cities of Aristocrats and Bureaucrats: The Development of Medieval Chinese Cityscapes*. Honolulu, HI: University of Hawai'i Press.

Hirth, K. G., 2003, Urban structure at Xochicalco, Mexico. In W. T. Sanders, A. G. Mastache, and R. H. Cobean, editors, *El Urbanismo en Mesoamérica/Urbanism in Mesoamerica.* Mexico City, Mexico: Instituto Nacional de Antropología e Historia and the Pennsylvania State University Press, 257–309.

Howard, E., 1898 [1965], *Garden Cities of To-morrow* [edited by Frederic James Osborn]. Cambridge, MA: MIT Press (first published, 1898, as *Tomorrow: A Peaceful Path to Real Reform*).

Hyslop, J., 1990, *Inca Settlement Planning*. Austin, TX: University of Texas Press.

Ihlanfeldt, K. and Scafidi, B., 2002, The neighborhood contact hypothesis. *Urban Studies*, Vol. 39, 619–641.

Isendahl, C. and Smith, M. E., 2012, Sustainable agrarian urbanism: The low-density cities of the Mayas and Aztecs. *Cities*, in press (http://www.sciencedirect.com.ezproxy1.lib.asu.edu/science/article/pii/S0264275112001382).

Jacobs, J., 1961, *The Death and Life of Great American Cities*. New York, NY: Random House.

Jashemski, W., 2008, Gardens and garden life in Pompeii in the first century A.D. In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture: A World Tour*. Washington D.C.: Dumbarton Oaks Research Library and Collection, 15–28.

Jenerette, G. D., Harlan, S. L., Stefanov, W. L., and Martin, C. A., 2011, Ecosystem services and urban heat riskscape moderation: Water, green spaces, and social inequality in Phoenix, USA. *Ecological Applications*, Vol. 21, 2637–2651.

Joassart-Marcelli, P., Wolch, J., and Salim, Z., 2011, Building the healthy city: The role of nonprofits in creating active urban parks. *Urban Geography*, Vol. 32, 682–711.

Killion, T. W., Sabloff, J. A., Tourtellot, G., and Dunning, N., 1989, Intensive surface collection of residential clusters at terminal classic Sayil, Yucatan, Mexico. *Journal of Field Archaeology*, Vol. 16, 273–294.

Kimber, C. T., 1973, Spatial patterning in the dooryard gardens of Puerto Rico. *Geographical Review*, Vol. 63, 6–26.

King, A. D., 1976, *Colonial Urban Development: Culture, Social Power and Environment*. Boston, MA: Routledge and Kegan Paul.

Kostof, S., 1994, His majesty the pick: The aesthetics of demolition. In D. Favro, Z. Çelik, and R. Ingersoll, editors, *Streets: Critical Perspectives on Public Space*. Berkeley, CA: University of California Press, 9–22.

Krier, R., 1979, *Urban Space.* New York, NY: Rizzoli.

Laughton, J., 2008, *Life in a Late Medieval City: Chester 1275–1520*. Oxford, UK: Oxbow Books.

Lees, L. H., 1994, Urban public space and imagined communities in the 1980s and 1990s. *Journal of Urban History*, Vol. 20, 443–465.

Levi, M., 1988, *Of Rule and Revenue*. Berkeley, CA: University of California Press.

Levy, R. I., 1990, *Mesocosm: Hinduism and the Organization of a Traditional Newar City in Nepal*. Berkeley, CA: University of California Press.

Lloyd, P. C., 1979, *Slums of Hope?: Shanty Towns of the Third World*. New York, NY: St. Martin's.

Lofland, L., 1998, *The Public Realm: Exploring the City's Quintessential Social Territory*. New York, NY: Aldine de Gruyter.

Low, S. M., 1993, Cultural meaning of the plaza: The history of the Spanish-American gridplan-plaza urban design. In R. L. Rotenberg and G. McDonogh, editors, *The Cultural Meaning of Urban Space*. Westport, CT: Bergin and Garvey, 75–93.

MacDonald, W. L., 1986, *Architecture of the Roman Empire, Volume 2: An Urban Appraisal*. New Haven, CT: Yale University Press.

Ma, L. J. C. and Wu, F., 2005, Restructuring the Chinese city: Diverse processes and reconstituted spaces. In L. J. C. Ma and F. Wu, editors, *Restructuring the Chinese City: Changing Society, Economy and Space*. London, UK: Routledge, 1–20.

Mabogunje, A. L., 1968, *Urbanization in Nigeria*. London, UK: University of London Press.

Madanipour, A., 2003, *Public and Private Spaces of the City*. New York, NY: Routledge.

Metailie, G., 2008, Gardens of Luoyang: The refinements of a city culture. In M. Conan and C. Wangheng, editors, *Gardens, City Life and Culture: A World Tour*. Washington, DC: Dumbarton Oaks Research Library and Collection, 31–39.

Millon, R., Drewitt, R. B., and Cowgill, G. L., 1973, *Urbanization at Teotihuacan, Mexico, Volume 1: The Teotihuacan Map, Part 2: Maps*. Austin, TX: University of Texas Press.

Mitchell, D., 2003, *The Right to the City: Social Justice and the Fight for Public Space*. New York, NY: Guilford.

Moore, J. D., 1996, *Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings*. New York, NY: Cambridge University Press.

Mumford, L., 1961, *The City in History: Its Origins, Its Transformations, and Its Prospects*. New York, NY: Harcourt, Brace & World.

Murakami, T., 2010, Power Relations and Urban Landscape Formation: A Study of Construction Labor and Resources at Teotihuacan. Unpublished doctoral dissertation, School of Human Evolution and Social Change, Arizona State University.

Newman, P. and Jennings, I., 2008, *Cities as Sustainable Ecosystems*. Washington, DC: Island Press.

Ojo, G. J. A., 1966, *Yoruba Palaces: A Study of Afins of Yorubaland*. London, UK: University of London Press.

Owens, E. J., 1991, *The City in the Greek and Roman World*. London, UK: Routledge.

Reibel, M., 2011, Classification approaches in neighborhood research: Introduction and review. *Urban Geography*, Vol. 32, 305–316.

Revault, J., 1983, *Palais et Demeures de Tunis* [*Palaces and Mansions of Tunis*]. Paris, France: Editions du Centre National de la Recherche Scientifique.

Richardson, H. W., 1979, *Regional Economics*. Urbana, IL: University of Illinois Press.

Rosenzweig, R. and Blackmar, E., 1992, *The Park and the People: A History of Central Park*. Ithaca, NY: Cornell University Press.

Sandercock, L., 1998, *Towards Cosmopolis: Planning for Multicultural Cities.* New York, NY: John Wiley and Sons.

Saunders, J. C., 2010, *Seattle and the Roots of Urban Sustainability: Inventing Ecotopia.* Pittsburgh, PA: University of Pittsburgh Press.

Scarborough, V. L. and Wilcox, D. R., editors, 1991, *The Mesoamerican Ballgame*. Tucson, AZ: University of Arizona Press.

Schlumbohm, J., 1980, "Traditional" collectivity and "modern" individuality: Some questions and suggestions for the historical study of socialization. The examples of the German lower and upper bourgeoisies around 1800. *Social History*, Vol. 5, 71–103.

Scott, J. C., 1998, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed.* New Haven, CT: Yale University Press.

Sennett, R., 1971, *The Uses of Disorder*. New York, NY: Vintage.

Sennett, R., 1990, *The Conscience of the Eye: The Design and Social Life of Cities*. New York, NY: Knopf.

Seo, T., 1986, The urban systems of Chang'an in the Sui and T'ang dynasties. In M. A. J. Beg, editor, *Historic Cities of Asia: An Introduction to Asian Cities from Antiquity to Pre-modern Times*. Kuala Lumpur, Malaysia: Percetakan Ban Huat Seng, 159–200.

Sewell, W. H., 2001, Space in contentious politics. In R. Aminzade, editor., *Silence and Voice in the Study of Contentious Politics*. New York, NY: Cambridge University Press, 51–88.

Shaw, A., 2009, Town planning in postcolonial India, 1947–1965: Chandigarh Re-examined. *Urban Geography*, Vol. 30, 857-878.

Shelton, B., 1999, *Learning from the Japanese City: West Meets East in Urban Design*. London, UK: E. and F. N. Spon.

Simon, D., 2008, Urban environments: Periurban issues. *Annual Review of Environment and Resources*, Vol. 33, 167–185.

Sitte, C., 1889 [1965]. *City Planning According to Artistic Principles* [translated by G. R. Collins and C. C. Collins]. London, UK: Phaidon.

Smith, J. F. H., 1992, Gardens in Ch'i Piao-chia's social world: Wealth and values in late-Ming Kiangnan. *The Journal of Asian Studies*, Vol. 51, 55–81.

Smith, M. E., 2010, Sprawl, squatters, and sustainable cities: Can archaeological data shed light on modern urban issues? *Cambridge Archaeological Journal*, Vol. 20, 229–253.

Smith, N. and Low, S. M., 2006, Introduction: The imperative of public space. In S. M. Low and N. Smith, editors, *The Politics of Public Space*. New York, NY: Routledge, 1–16.

Smyth, M. P., Dore, C. D., and Dunning, N. P., 1995, Interpreting prehistoric settlement patterns: Lessons from the Maya center of Sayil, Yucatan. *Journal of Field Archaeology*, Vol. 22, 321–358.

Southworth, M. and Ben-Joseph, E., 1997, *Streets and the Shaping of Towns and Cities*. New York, NY: McGraw-Hill.

Stark, B. L. and Ossa, A., 2007, Ancient settlement, urban gardening, and environment in the Gulf lowlands of Mexico. *Latin American Antiquity*, Vol. 18, 385–406.

Stronach, D., 1990, The garden as a political statement: Some case studies from the Near East in the first millennium B.C. *Bulletin of the Asia Institute*, Vol. 4, 171–182.

Sullivan, J., 1980, *Back Alley Neighbourhood: Kampung as Urban Community in Yogyakarta*. Melbourne, Australia: Monash University Press.

Sullivan, J., 1992, *Local Government and Community in Java: An Urban Case-Study*. Singapore: Oxford University Press.

Talen, E. and Anselin, L., 1998, Assessing spatial equality: An evaluation of measures of accessibility to public playgrounds. *Environment and Planning A*, Vol. 30, 595–613.

Tibbalds, F., 1992, *Making People Friendly Towns: Improving the Public Environments in Towns and Cities*. Harlow, UK: Longman.

Tilly, C. and Tarrow, S., 2006, *Contentious Politics*. Boulder, CO: Paradigm.

Trancik, R., 1986, *Finding Lost Space: Theories of Urban Design*. New York, NY: Van Nostrand Reinhold.

Treib, M., 1994, Underground in Umeda. In D. Favro, Z. Çelik, and R. Ingersoll, editors, *Streets: Critical Perspectives on Public Space*. Berkeley, CA: University of California Press, 35–44.

Vidler, A., 1978, The scenes of the street: Transformations in ideal and reality, 1750–1871. In S. Anderson, editor, *On Streets*. Cambridge, MA: MIT Press, 29–112.

Waldheim, C., editor, 2006, *The Landscape Urbanism Reader*. New York, NY: Princeton Architectural Press.

Ward-Perkins, J. B., 1974, *Cities of Ancient Greece and Italy: Planning in Classical Antiquity*. New York, NY: George Braziller, Inc.

Weissman, R. F. E., 1982, *Ritual Brotherhood in Renaissance Florence*. New York, NY: Acadamic.

Whyte, W. H., 1980, *The Social Life of Small Urban Spaces*. Washington, DC: The Conservation Foundation.

WinklerPrins, A. M. G. A. and de Suza, P., 2005, Surviving in the city: Urban home gardens and the economy of affection in the Brazilian Amazon. *Journal of Latin American Geography*, Vol. 4, 107–126.

Wolch, J., Wilson, J. P., and Fehrenbach, J., 2005, Parks and park funding in Los Angeles: An equity-mapping analysis. *Urban Geography*, Vol. 26, 4–35.

Woolley, L. C., 1963, *Excavations at Ur*. London, UK: Ernest Benn Limited and Barnes and Noble.

Wycherley, R. E., 1976, *How the Greeks Built Cities*. New York, NY: W. W. Norton and Company.

Zucker, P., 1959, *Town and Square: From the Agora to the Village Green*. New York, NY: Columbia University Press.