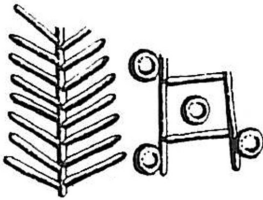# Population Aggregation and Early Urbanization from a Comparative Perspective

An Introduction to the Volume

Attila Gyucha

"The technological developments in transportation and communication which virtually mark a new epoch in human history have accentuated the role of cities as dominant elements in our civilization and have enormously extended the urban mode of living beyond the confines of the city itself" (Wirth 1938:4–5). Wirth's note penned 80 years ago is still just as valid today. Similarly to many others—particularly economists, such as Jacobs (1969)—Wirth called the growth of cities and worldwide urbanization as "one of the most impressive facts of modern times" (Ibid., 2), and states that "what is distinctively modern in our civilization is best signalized by the growth of great cities" (Ibid., 1). Yet, in the same paper, he goes on to describe the negative effects of urban life on humans by using one of the most extensive and eloquent vocabularies ever published to portray the calamitous impacts of urbanism. But if cities have such a miserable and devastating influence on the social and mental life of urban dwellers—as Simmel (1903) and others also so vividly described—why do people keep deciding to give up on living in small, dispersed communities and have moved into large settlements time and again for thousands of years? What do these "products of human nature" (Park 1925:1) offer that have always been so irresistibly desirable for people?

Wirth (Ibid., 10) argued that cities bring together people because they are different, and as a result, they are beneficial to one another. Likewise, Morris (2008:319) defined cities as sociopolitical mechanisms that produce human interaction, and Glaeser (2011:120) emphasized the importance of "connected creativity" that makes cities successful and productive social formations. Smith (this volume) notes that the increasing face-to-face interactions as population number and density grow stimulate a range of positive outcomes, including economic and urban growth as well as community formation. As Newman put it, the attraction of cities "lies in the opportunities that they

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create through networks of people" (2006:278). The dynamic interactions between these spatially condensed informal and formal networks—through individuals, groups, organizations, and institutions as nodal points—glue urban systems together. But why are these networks indispensable for the individuals?

Many sociological and anthropological studies conclude that although integration into multiple social networks may be attractive for several other reasons, it is the expected economic benefits—commonly, by taking advantage of previously established social ties and networks—that play a vital role in individual or group decisions about moving to cities (Bogue 1977; Browning 1971; Schiller and Çağlar 2009; Wang et al. 2015). These benefits are associated with a spatially concentrated population, socioeconomic heterogeneity, and an economy of scales, as cities are not only central places of services and functions for their immediate hinterlands but their external relations many times also include their participation in interregional and transregional networks (Capello and Nijkamp 2004; Hohenberg and Lees 1985; Orum and Chen 2003; Robinson 2005; Taylor and Derudder 2016). In addition to being "primary economic organs" (Jacobs 1969:6) for production, consumption, and circulation of goods, modern cities—partially through these external relations—are powerful and vigorous nodes for innovations and new ideas that give rise to cultural and political transformations at the global scale (Crane et al. 2016; Mumford 1961; Redfield and Singer 1954; Zeng and Greenfield 2015). Urbanization accounts for changes in the environment as well as in social order and practices, and cities are arenas to create, display, and reinforce social and economic inequalities (Colantonio and Dixon 2011; Gottdiener and Budd 2005; Musterd and Ostendorf 1998; O'Connor et al. 2001).

Taken together, the complexity of modern cities derives from a wide range of types and forms of interactions between integrative institutions and diverse social and economic networks of various scales. These interactions result in dynamic, constantly changing entities the rules and conventions of which are being continually challenged, reconsidered, and reconstituted by discovering formerly unexplored directions and introducing novel concepts.

Although this overview is a brief and simplified description of the current, highly urbanized world, some fundamental sociocultural dynamics in the development of past nucleated societies may have been similar. Therefore, in order to answer the question "How did our world become like it is today?" comparative studies between the present and the past must be applied. This conference volume approaches this question from the perspective of the ancient past using data from both prehistoric aggregated villages (*sensu* Birch 2013) and early urban contexts (see Smith 2007, 2016), collectively called "nucleated settlements" in this introduction. The 9th IEMA Visiting Scholar Conference brought together an international group of distinguished scholars to explore three major cross-cultural anthropological questions regarding variations in the trajectories of nucleated sites: (1) What factors and integrative mechanisms brought large populations together?; (2) What social practices and institutions facilitated the development and sustainability of these sites?; and (3) What were the impacts of permanent nucleations on sociocultural

developments in ancient societies? With an overarching range of theoretical perspectives and methodological approaches, the chapters of this volume provide thoughtful insights into these matters through case studies from Europe, the Near East, and North America.

In the rest of this introductory chapter, following the initiatives of the conference listed above, I contextualize the chapters of the volume by discussing several theoretical and methodological issues related to the emergence, development, and sociocultural impacts of ancient nucleated settlements.

Comparative Perspectives in the Study of Nucleated Settlements

Comparative studies in archaeology are significant because they help to identify analogous and divergent patterns in the archaeological record, particularly in regard to cultural, social, political, and economic developments. Moreover, the constantly increasing quantity and quality of data can bring about more coherent explanations and models based on the recognized similarities and differences. As a result, comparative research also is complementary in nature, as this approach expands our interpretive schemes. Scholars agree that the systematic application of cross-regional and cross-temporal approaches results in a better understanding of past and present urban developments (Nijman 2007; Robinson 2015; Smith 2003a; Smith 2010; Smith et al. 2016; Ward 2008). In fact, many researchers convincingly argue for the prerequisite of comparative perspective in urban studies—as McFarlane put it, "When we make a claim about 'the city,' or about a particular form of urbanism, the claim is implicitly—and, crucially, inevitably—to some extent a comparative claim, because our claims and arguments are always set against other kinds of urban possibilities or imaginaries" (2010:725). Furthermore, systematic comparisons between past and present nucleation dynamics provide outcomes that help us understand current, many times pressing issues associated with modern urbanization trends.

Comparative research has documented common planning principles as well as regularities in social, economic, political, and religious mechanisms and practices in premodern urban settlements across the world. These studies, however, also pointed out a great deal of variation even in local and regional developments (e.g., Adams 1966; Blanton et al. 1993; Creekmore and Fisher 2014; Fernández-Götz and Krausse 2016; Smith 2003b; Storey 2006a). This dichotomy has been addressed and discussed from different angles. With regard to preindustrial urbanism, Storey concluded that it "is uniform throughout the world. Similar numbers of people could be fed and housed given the existing technology, transport system, hinterland productivity, and administrative structures available in the preindustrial era, which despite local variations, were similar all over the world" (1992:119). Renfrew (2008:36) noted that shared characteristics revealed in urban settlements are associated with the need to accommodate a range of similar functions. In addition to these functional approaches, others—such as Fletcher (1995) and Trigger (2008)—argued that cross-cultural regularities in the built environment of ancient cities indicate similarities in human behavior and thinking that may require various explanations. However, they may also act as launching platforms for comparative investigations.

Comparisons between ancient and modern cities had occurred in past urban stud-
ies, particularly with respect to architectural design (e.g., de Souza Briggs 2004; Kostof
1991; McIntosh 1991; Scargill 1979). The past 10 years, however, have witnessed the
systematic application of a transdisciplinary approach based on, as Stanley and his col-
leagues (2015:122) stated, "the notion that urban areas throughout world history share
commonalities" and "the guiding principle that present-day urbanism is better understood
in the context of deep urban history." New comparative studies of premodern and modern
cities—using theories and methods borrowed from multiple disciplines—illustrate "how
different societies developed analogous suites of solutions to related problems" (Carballo
and Fortenberry 2015:542). These studies already have yielded encouraging results in
the investigations of timeless urban principles and characteristics (Dennehy et al. 2016;
Smith 2010; Vis 2014; York et al. 2011).

Previous research commonly linked the emergence of cities to state-level politi-
cal configurations (e.g., Adams 1966; Childe 1950; Manzanilla 1997; Trigger 1972).
Nevertheless, recent archaeological investigations—largely based on comparisons between
different trajectories across the globe—have stimulated arguments for decoupling urban-
ization and state formation processes. These studies have triggered the notion that urban
settlement forms preceded the rise of states, and cities occurred within a broad range
of sociopolitical contexts in many parts of the world (Cowgill 2004; Jennings 2016;
Jennings and Earle 2016; Smith 2003a; Wengrow 2015). These findings further reinforce
the efficacy of approaches to trajectories toward social complexity that go beyond uni-
linear evolutionary typologies (Fried 1967; Morgan 1877; Service 1962; Spencer 1990).
A growing body of alternative perspectives addresses societal development and power
relations in more complex societies through archaeological and ethnohistoric studies.
The outcomes imply nonlinear social trajectories as well as tremendous variation in
political structures, ranging from collective and corporate systems to rigidly hierarchical
and autocratic political formations, sometimes even occurring in neighboring, contem-
poraneous polities (Blanton et al. 1996; Drennan and Peterson 2012; Ehrenreich et al.
1995; Fargher et al. 2011a; Feinman and Neitzel 1984; Feinman and Price 2010; Neitzel
and Earle 2014). A particularly valuable finding of these studies is that the data from
nucleated settlements indicate a great range of variation in the potential combinations of
settlement form and political organization. These recent, interrelated theoretical advances
underscore the importance of analyzing local- and regional-scale trajectories in their own
cultural and historical settings when various pathways to social complexity are studied as
they relate to ancient settlement dynamics (Falconer and Savage 1995; Smith 2016; see
also Gaydarska, Harrison, and Bilgen, and Sastre and Currás this volume).

Another paradigmatic shift has emerged in the past few years that has placed
the comparative investigations of ancient and modern aggregated settlements in a new
dimension. In addition to mutual qualitative properties revealed by transdisciplinary
studies, settlement scaling research has demonstrated that several quantitative attributes
and patterns shared by recent urban settings also commonly occurred in ancient cities
(Bettencourt 2013; Bettencourt et al. 2007; Cesaretti et al. 2015; Ortman et al. 2014).

Moreover, other related investigations indicate that sites classified as villages also tend to produce identical regularities (Ortman and Coffey 2015; Ortman et al. 2016; see also Smith this volume). Thus, scaling studies have provided empirical evidence for the operation of similar principal dynamics and mechanisms in the social development of nucleated settlements throughout human history to a considerable extent.

Apart from verifying the applicability of comparative studies into past settlement developments, the advances summarized briefly above have opened novel opportunities to explore prehistoric aggregated settlements and early urban sites using the same theoretical approaches. As previously urged by a number of scholars (e.g., Butzer 2008; Cowgill 2004; Smith 2003a; Storey 2006b), these advances also support the redirection of research focus from the threshold- and checklist-based separation of urban and non-urban sites—as well as related settlement typologies—to underlying principles and social processes in ancient settlement dynamics toward nucleation. An essential inspiration of this volume, these improvements also facilitate studies to model social, political, and cultural transformations generated by the coresidence of large populations in past societies.

This book is unusual in the sense that the aforementioned research questions are scrutinized through investigations of both prehistoric aggregated and early urban settlements. The nucleated settlements explored in the case studies encompass more than 7,500 years, representing tribal to state-level societies, and range from approximately one to several hundreds of hectares and from ca. 100 to possibly tens of thousands of inhabitants. As the chapters illustrate, the applications of different approaches permit us to assess the archaeological record from varying perspectives, contributing to a more sophisticated understanding of the developments of early demographic and political centers.

Methodological Perspectives in the Study of Nucleated Settlements

Although they profoundly affect which research questions can productively be studied and, along with those questions, what and how data can and must be collected, analyzed, and interpreted, the methodological opportunities and difficulties of nucleated settlements are rarely discussed in a systematic manner in the archaeological literature.

The horizontal extent of nucleated sites alone is commonly a major limiting factor that influences research for several reasons, including funding and time constraints. Even sites subject to intensive fieldwork for decades or sometimes centuries have been excavated only partially—for instance, approximately 67 percent of Pompeii has been recovered since the beginning of its official excavations in the middle of the eighteenth century (Laurence 2007:3). Nevertheless, as several chapters in this volume illustrate—including particularly Harrison and Bilgen's, and Kaiser's chapters—the unambiguous benefit of extensively excavated sites is that the available data allow us to explore specific aspects that cannot be addressed at sites investigated by small-scale archaeological fieldwork. This matter also relates to a frequently ignored area in scientific studies: the outcomes of cultural resource management (CRM) archaeological projects. Although the quick

recovery and documentation of endangered sites characterize these field activities, the results from nucleated sites regularly provide valuable sets of information, particularly regarding settlement patterns, layout, and use (see especially Harrison and Bilgen, Kelly, Raczky, and Ryan this volume).

The past decades also have brought innovative field and analytical methods that let researchers overcome many of the challenges associated with the exploration of large sites. The application of noninvasive remote sensing techniques—including airborne (e.g., LIDAR) and satellite technologies (e.g., hyper- and multispectral imaging), as well as ground-based geophysical surveys (e.g., magnetometric gradiometry, ground-penetrating radar, electric resistivity tomography)—in combination with systematic field surveys, targeted excavations, and well-designed sampling techniques can facilitate in addressing specific research questions in a cost- and time-efficient way. Advances in multisensor systems in geophysical surveys enhance the speed of data acquisition in the field. In addition to outstanding examples such as research at Angkor Wat and numerous early urban sites in Greece (Donati and Sarris 2016; Stark et al. 2015), the productivity of large-scale geophysical studies is best illustrated by surveys conducted at prehistoric megasites in Ukraine (Chapman et al. 2014; Müller et al. 2016; Ohlrau 2015; see also Gaydarska this volume). Remote sensing techniques also have yielded groundbreaking outcomes in the assessment of site layout and organization at the local scale as well as settlement patterns and land use at the regional scale by using airborne LIDAR technology in areas where ground-based archaeological methodologies cannot or limitedly can be employed (Chase et al. 2011; Evans and Fletcher 2015; Fisher et al. 2016). Furthermore, geophysical techniques are beneficial tools in those cases where ancient nucleated sites are covered by modern settlements (Basile et al. 2000; Papadopoulos et al. 2009; Paz-Arellano et al. 2016; Tsokas et al. 2008).

The horizontal layout of settlements recorded by noninvasive techniques reflects the sum of archaeological features detectable through these methods. Thus, the resulting overall pattern manifests a palimpsest of the entire occupational history at nucleated sites—that is, a static image of many times hundreds or, on several occasions, thousands of years. When typochronologies of particular segments of material culture (e.g., architecture, ceramics) are available, they allow for pairing specific features and materials, as well as their spatial distributions, documented over the course of noninvasive surveys with chronological phases. In the majority of cases, however, a dynamic view of settlement development must be achieved by means of additional investigations. These investigations must focus on the temporal and functional relations between the recognized spatial units of any sorts—from individual features to the entire settlement—through the application of invasive archaeological methods.

The study of vertical stratigraphical sequences developed during long-lasting, continuous habitation within specific areas or across entire sites constitutes a major challenge in archaeological fieldwork. In regard to the latter, tell sites offer the most relevant examples (Hodder 2006; Kenyon 1981; Tasić et al. 1990; see also O'Shea and Nicodemus, and Raczky this volume). In addition to stratigraphic excavations, several geophysical

techniques—including the use of ground-penetrating radar and electric resistivity tomography—and the analyses of systematically collected samples vitally can assist in the interpretation of social, political, economic, and cultural developments of the settlements. Recent advancements in radiocarbon dating (e.g., Bartůněk et al. 2017; Bronk Ramsey 2008, 2009)—in conjunction with increasing affordability that permits running longer series of samples—and sequences of tree-ring dates in some regions (e.g., Lipe et al. 1999) have resulted in the opportunity for more comprehensive and high-precision chronological assessments. This, in turn, brought about more sophisticated interpretations of long-term developments at nucleated sites.

Preservation matters also significantly impact the research possibilities and understanding of prehistoric aggregated and ancient urban sites. In many parts of the world, perishable materials were used for construction and since architectural features and the spatial organization of structures are among the most important sources for settlement studies, sites with non- or less perishable construction materials have better potentials to provide more precise and valuable data to evaluate settlement dynamics (see Kaiser, Pullen, and Ryan this volume). In addition, many major nucleated sites have partially or completely been destroyed or superimposed by later construction activities. For example, at the Aztec capital of Tenochtitlan or the Roman Age London (Londinium), research opportunities are profoundly limited, and only puzzles revealed by scientific programs and rescue operations can be used to make inferences regarding their evolution (Mundy 2015; Perring 1991a). As in the case of these two major sites, contemporary written accounts, as well as ethnographic and ethnohistoric sources, can contribute greatly to the study of the development of many nucleated centers (see Birch, Kaiser, Osborne, Pullen, and Sastre and Currás this volume).

Social scientists agree that the developments of past and present demographic and political centers cannot be explored without considering their broader social, cultural, economic, and political contexts in a diachronic framework. At the regional scale, analyses of the spatial distribution of sites—with strong emphases also on environmental variables—have brought about important outcomes regarding the origins of aggregation and dispersal processes as well as concerning variations and shifts in political structures both within and between individual regions over time (Drennan et al. 2015; Johnson 1987; Kantner and Kintigh 2006; McIntosh 2005; Peterson and Drennan 2012; Savage and Falconer 2003). The majority of chapters employ regional and diachronic perspectives in the present volume.

Finally, fundamental advances have occurred lately in computer-based analytical methods for studying settlement dynamics. A range of analyses on different software platforms are utilized to explore human–environmental and social interactions, political organizations, and behavioral characteristics as they relate to spatial patterns at the local, regional, and macroregional scales (Brughmans 2010; Cutting 2003; Golitko et al. 2012; Kantner and Hobgood 2016; Knappett 2013; Kosiba and Bauer 2013; Shapiro 2005; see also Harrison and Bilgen, and Kaiser this volume). Furthermore, mathematical and statistical techniques to assess qualitative and quantitative properties and regularities in

datasets facilitate in modeling a plethora of aspects related to the development of nucleated settlements. These aspects include environment, demography, movement of people and goods, and chronological sequences (e.g., Contreras and Meadows 2014; Davies et al. 2014; Diachenko and Zubrow 2015; Griffin 2011; Johnson 1987; Rosenstock 2012; Walanus 2009). Several novel laboratory techniques also contribute to the study of population dynamics, economy, and health issues at these sites (Drake et al. 2014; Papagrigorakis et al. 2006; Price et al. 2007; White et al. 2009).

Coming Together: Origins and Processes

Throughout human history, large settlements have occurred primarily through the agglomeration of individuals and groups, while internal population growth has typically contributed to their genesis to a lesser extent. Growth in the number and density of population at the regional scale regularly precedes the emergence of these sites. These demographic processes—as, for example, several recent studies on the Neolithic Demographic Transition (Bocquet-Appel and Bar-Yosef 2008) as well as Birch's and Kelly's chapters in this book exemplify—frequently are associated with shifts in subsistence and dietary practices. Additionally, the archaeological record indicates that the immigration of groups also could have contributed to regional transformations toward nucleation in both prehistoric and historic times (Álvarez-Sandoval et al. 2015; Manzanilla 2017; Wilshusen and Ortman 1999; see also Birch, Kelly, and Osborne this volume).

Major anthropological questions related to population aggregations in specific regions and periods include what pressures or opportunities triggered these processes and how agglomerations unfolded. In respect to these matters, Adler, van Pool, and Leonard (1996) have provided one of the most exhaustive overviews in the archaeological literature. The authors discussed push and pull models for aggregation and abandonment among ancestral Pueblo populations, considering potential exogenous and endogenous causal agents. Social scientists studying contemporary urban dynamics commonly view these same questions from the perspective of the participant groups and individuals, exploring the costs and benefits of aggregation (e.g., Abu-Lughod 1969; Body-Gendrot and Martiniello 2000; Brown and Wardwell 1980). Although the spectrum of potential causal agents that contributed to population aggregation in various past societies is broad, most of the relevant studies conclude that models for population aggregation and dispersal must consider the interplay of multiple push and pull factors (Algaze 2008; Kelly and Brown 2014; Leonard and Reed 1993; Smith 2014). Nevertheless, one of the common grounds that many scholars share with regard to both past and present societies is that the increased level and low cost of a large number of interactions is a major driver, as well as a benefit, of population nucleation (Gaspar and Glaeser 1998; Martín and Herrera 2014; Ortman et al. 2014; Tilly 1974; see also Smith this volume). The introduction of more regular and more intensive interactions is an adaptive, and productive, response to social, economic, and political challenges. These challenges may be associated with numerous endogenous and exogenous forces in a society, such as changes in trade

networks, intensification of conflicts, an elevated level of social stress, or environmental pressures. This scenario holds equally for demographic and political centers that emerged through bottom-up and top-down mechanisms (for the former, see Birch, for the latter, see Kaiser and Pullen in this volume).

In this book, a particular stress is placed upon the study of *how* aggregation developed. Concerning this question, the relationship between places and people particularly must be explored. Several theoretical models and analytical approaches have been proposed to investigate why and how certain locations in the natural and social landscape become more prominent than others during the course of the formation of nucleated settlements. For example, the extended concept of central place theory, borrowed originally from geography (Christaller 1933; see also Mulligan et al. 2012), describes how functions—such as trade or exchange of information—supplying the members of a given polity bring about demographic, economic, and political centers at specific locations in order to minimize energy and time costs of travel (Blanton 1976; Crissman 1976; Smith 1979). Location theory and gateway theory—along with central flow theory used principally in urban geography—share the view of the presence of spatial patterns in the different placements of nucleated settlements in order to supply different functions as these functions relate to different scales and types of social interactions in a given polity (Johnson 1975; Kelly 1991; Portugali 1984; Taylor et al. 2010). Additionally, spatial interaction entropy maximization (SIEM) simulations address intra- and interregional causal factors in the growth or contraction of settlements in their geographic and sociopolitical settings (Bevan and Wilson 2013; Palmisano and Altaweel 2015; Wilson 1970, 2012). Regardless of how models based on these approaches explain the occurrence of demographic centers in past societies, all of them consider a geographic scope broader than the local scale in the study of the origins and processes of population nucleation.

Concerning environmental variables, in addition to the significance of proximity of specific, valuable raw materials, analyses regarding the placement of nucleated sites commonly have pointed out the importance of the density and diversity of natural resources to supply large populations in line with the available technology and possibilities of intensification in production (Read and LeBlanc 2003; Simmons et al. 1988; see also Kelly, Osborne, O'Shea and Nicodemus, and Sastre and Currás this volume). Yet, data on outsourcing of subsistence resources as a form of tribute regularly occur in historic documents of early cities in state-level contexts (e.g., Boardman 1999; Goodchild 2006) and also may have been present in prehistoric nonstate societies (Earle 1997; Kristiansen and Larsson 2005; see Gaydarska this volume). Furthermore, landscape features promoting social and economic interactions—such as major channels, bays, and valleys near passages—constituted fundamental settlement factors as well (Palmisano and Altaweel 2015; see Ault, Pullen, and Raczky this volume).

The social value of places prior to the emergence of nucleated sites is proposed in several papers in this volume (see chapters by Fernández-Götz, Gaydarska, and Kelly). In these schemes, sites subject to periodical communal gatherings, ritual ceremonies, or pilgrimages by multiple groups sharing common ideologies become settlements through

permanent aggregation. In addition, the history and practices of the first occupants might decisively have influenced the settlements' appeal to immigrants (see O'Shea and Nicodemus, Raczky, and Ryan this volume). In these cases, similarly to sites that achieved their attraction through economic development, the place value was increased by social memory relating to the actual or imaginary transformative activities of the initial settlers.

Although the archaeological record indicates that in ancient societies aggregation tended to have been the outcome of a multistep, gradual development in which environmental conditions and the history of specific places played important roles, other processes that led to rapid aggregation also occurred. These processes affected both the location and the initial demographic composition of nucleated settlements and included the agglomerations of groups due to immediate threat (Kowalewski 2006; O'Shea 1989) or the establishment of relatively large settlements for economic or militaristic reasons (Stambaugh 1988; Tsetskhladze 2006). This latter example highlights that bottom-up and top-down mechanisms governed by sociopolitical organization also may have given rise to differences in the origins of centers. More hierarchical and centralized political structures commonly produced multitiered settlement systems in which an absolute (primary) center dominated subordinate, lower-level (secondary and tertiary) centers that supplied and coordinated special functions (Bard 2008; Fox 1977; Hansen 2008; Stone 1997; see also O'Shea and Nicodemus, and Pullen this volume). During the development of these sites, however, functional properties may have shifted by altering the initial or incorporating additional functions.

With the exceptions when immigration occurred from other areas (see Birch, Kelly, and Osborne this volume) or top-down political decisions determined the foundation of a site (see Pullen this volume), aggregation in ancient societies regularly unfolded through the agglomeration of multiple groups that previously had lived in smaller and more dispersed sites across the surrounding region (e.g., Birch 2012; Weiss 1986; see also Ault and Fernández-Götz this volume). Preexisting relations—based on common origins, history, and culture, as well as shared organizational structures—that had facilitated cooperation and perception of unity provided the sociocultural foundation to bring and bind these aggregates together (Jennings and Earle 2016; Kowalewski 2006; Ur 2014). Nevertheless, *synoikismos* resulted in substantial transformations, stimulating an increased degree of social, economic, and political integration through the introduction of novel institutions and practices (see Ault, Raczky, and Ryan this volume). These shifts gave rise to new concepts of community rationale and values, a sense of place and space, property and ownership, and identity (Düring 2013; Hutson et al. 2008; Isbell 2000; Kuijt and Finlayson 2009; Oosthuizen 2013; Yaeger and Canuto 2000). In those cases when aggregation unfolded through the coalescence of multiethnic and/or socially and culturally diverse groups with moderate or no preexisting affiliation (Birch 2012; Brett Hill et al. 2004; Manzanilla 2017; see also Birch and Kelly this volume), the achievement of a high degree of integration required fundamental changes in decision-making mechanisms and political structures.

The archaeological record frequently indicates constant or multiple periods of population influx to nucleated sites over a longer period of time, resulting in the spatial expansion and reconfiguration of these settlements (see Birch, O'Shea and Nicodemus, and Raczky this volume). These successive movements of people imply that—especially when immigration was generated by bottom-up mechanisms—integration, community building, and other developments during their initial phases rendered these settlements oftentimes successful social, economic, and political configurations.

Pathways to Sustainability: Challenges and Resolutions

Regardless of geographic and temporal contexts, the overarching and enduring tasks that each nucleated community encounters include the organization of settlement to create and maintain a single socioeconomic unit and to resolve challenges related to population number and density—as well as social and occasionally cultural heterogeneity—that frequently increase over time. Accordingly, nucleated settlements are characterized by multiple horizontal and vertical decision-making (i.e., structural) units that secure required actions at various levels, from single households to the entire site. These units commonly comprise kin-based structures of immigrant groups as well as institutions intersecting these structures. These developments result in a significant increase in structural complexity compared to preceding, more independent, smaller communities featured by spatially more dispersed settlements. Cross-cultural research revealed a high degree of correspondence between population number and the degree of structural complexity. These studies demonstrate that larger amounts of inhabitants correlate with greater numbers of decision-making levels (Blanton and Fargher 2008; Carneiro 1967; Dunbar 2011; Feinman 2013; Fletcher 1995; Lekson 1985).

Social relations between structural units at nucleated settlements are channeled through interactions that bring about the formation, maintenance, and perception of community (Kosse 2001; Marcus 2000; Roberts 2010; see also Smith this volume). As population size and, in turn, structural complexity increases, an increased degree of interaction administered by more intricate rules and mechanisms must be introduced in order to maintain settlement organization and community integrity. This suggests that an increased level of social interaction leads to a higher degree of organizational complexity at large settlements than at small sites.

Preexisting ties among aggregated groups tend to facilitate the development of the required degrees of structural and organizational complexities at nucleated settlements. When sites emerge abruptly, organizational principles encoded in the social structure of a given society, as well as shared ideology, social norms, and rules of conduct, commonly regulate the aggregation process (Kowalewski 2006). In some of these cases, latent social structures become actualized to ensure social and economic mechanisms toward community cohesion and economic productivity (O'Shea 1989; Parkinson 2006). Yet, when early nucleated centers emerged as a result of the steady or periodic influx of people,

reconfiguration processes might have included recurring shifts in internal socioeconomic dynamics to counteract the close physical but gradually more distant social connections between residents (see Wirth 1938:14). After all, these reconfigurations aim to maintain constant levels of integration and interaction between structural units of different size and levels within the nucleated settlements.

The development and the achieved degrees of structural and organizational complexities—and, thus, community formation and transformation—may largely be driven by immediate local-scale dynamics. These processes result in the great deal of variability documented in settlement trajectories both in prehistory and history. Regardless of contexts, though, expected and actual sociopolitical challenges associated with population size, density, and sociocultural heterogeneity at nucleated sites are overcome through social innovations. The concept of social innovation in the context of ancient nucleated settlements denotes novel solutions specifically designed for and employed in a particular community in order to develop, sustain, or restructure sociopolitical organization and community integrity. Social innovations may be proposed by individuals or groups, but their introduction is approved by higher-order structural units at these settlements. A benefit of the social innovation approach is that it permits us to focus on specific, local-scale transformative forces and mechanisms in the developments of nucleated sites, even in those cases where sociopolitical configurations are dominated or largely influenced by top-down political mechanisms.

A majority of studies on the development of prehistoric aggregated and early urban sites explore the built environment, based on the commonly shared argument in social sciences that the organization and design of a physical space is the product of a dynamic interplay between cultural, social, economic, and political actions, practices, and processes (Hillier 2008; Hillier and Hanson 1984; Lynch 1981; Parker Pearson and Richards 1994; Rapoport 1994; Saunders 1981; Tonkiss 2013). Research on the relationships between the built environment, political configurations, and social interactions has resulted in numerous theoretical perspectives and methodological approaches to reveal, interpret, and compare spatial patterns both within and between ancient nucleated sites (Arnold and Ford 1980; Fisher 2009; Fletcher 1981; Kent 1990; Smith 2007, 2011a; Vis 2014; see also Ault, Harrison and Bilgen, Kaiser, Ryan, Sastre and Currás, and Smith this volume). Through spatial units, such as overall layout, sectors, boundaries, and communal places, these studies aim to identify structural units related to internal social interactions, power structures, and community building (Ashmore and Sabloff 2002; Keith 2003; McIntosh and McIntosh 2003; Morton et al. 2014; Perring 1991b). Transformations in the spatial organization and architectural design at nucleated sites over time manifest the materialization of social innovations stimulated by shifts in ideology and/or sociopolitical organization. Thus, diachronic archaeological data must be used to recognize and explain changes in these dimensions at the site level. For example, communal facilities through regular gatherings promote community integrity and sense of collective identity (e.g., Adler 1989; Moore 1996; Rautman 2013; see also Ault, Fernández-Götz, Harrison and Bilgen, Kaiser, O'Shea and Nicodemus, and Ryan this volume), and their size, structure, architectural

properties, number, and locations can alter multiple times over the course of settlement development. These modifications may indicate subsequent innovations proposed and introduced to address recurring challenges in sociopolitical organization. Although sometimes the physical properties of these innovations alone may be indicative of the specific social demands that resulted in their introduction, more frequently additional components of the archaeological record must be consulted to single out causal factors.

Diachronic analyses of the built environment at the supralocal scale fundamentally contribute to the identification of social innovations and the assessment of their sociopolitical impacts. Through its temporal and geographic distribution, inferences can be made whether a given innovation ended up being a long-term resolution to specific organizational challenges in a particular settlement community, and was adopted also at other sites across a larger area as a response to similar problems, or whether the innovation in question failed relatively quickly. For example, the presence of a standardized architectural inventory at multiple coeval settlements implies the success and spread of social innovations at the supralocal scale (see Gaydarska, Pullen, and Ryan this volume). Thus, similarly to the spatial distribution of technological novelties, the adaptation of social innovations with respect to organizational principles—manifested by various features at and spatial properties of sites in the archaeological record—may have occurred at ancient nucleated settlements. Furthermore, these adaptations could have emerged through intercultural contacts as well (see Ault, Fernández-Götz, and Sastre and Currás this volume).

Based on recent scaling studies, Smith (this volume) notes that the larger the settlement the more per capita social outputs, both positive and negative ones, evolve. The advantages of increased social interactions include community formation, however, scale-related social problems associated with the given degree of structural and organizational complexities frequently occur in large settlements. This group of social phenomena—most commonly defined as "scalar stress" (Bandy 2004; Johnson 1982, 1987), and also labeled with similar meaning as "social stress" (Düring 2013), "communication stress" (Fletcher 1995), "intracommunity conflict" (Ur 2014), and "density-dependent conflict" (Birch 2013)—constituted major managerial challenges to secure daily operation and community integrity in both prehistoric aggregated and early urban contexts. Smith (this volume) extends the definition of scalar stress to incorporate all the negative effects related to growth in population size and density. Although significant variations occurred in ancient trajectories, scalar stress was resolved through two basic processes: fission or internal reorganization (see for example Birch, Fernández-Götz, Osborne, and Sastre and Currás this volume). As for the latter, measures through the introduction of social innovations to regulate structural and organizational complexities were major tools. Most commonly, these measures might have included the reconstitution of structural units as well as the development of new mechanisms and institutions to enhance social cohesion by means of shifts in the degree of social interaction; both increase and reduction in the degree of structural and organizational complexities could have occurred. In this scenario, the development or reorganization of social hierarchies—as one of the potential techniques to reduce scalar stress (see Bandy 2004)—may be related to the required degree of structural complexity.

Innovations to avoid or counteract social tensions and foster community cohesion through the management of social interactions among structural units in nucleated sites included novel, circumstantial initiatives and also ones that already had roots in past developments. In these latter cases, preceding resolution techniques were reconfigured and reinterpreted in new, nucleated contexts (see Raczky, Ryan, and Sastre and Currás this volume). The formation and manipulation of settlement layout are fundamental, cross-cultural and cross-temporal human behavioral mechanisms to override social challenges related to population number, density, and heterogeneity (Arnauld et al. 2012; Bray 2005; Hillier and Hanson 1984; Nishimura 2014; Rapoport 1977, 1990; York et al. 2011; see also Smith this volume). These spatial techniques include various configurations of spatial compartmentalization of structural units (i.e., house clusters, neighborhoods, quarters, districts, zones), as well as the construction and reconstitution of exclusive and inclusive settings. Many times, the intermediate structural units documented in ancient nucleated settlements—neighborhoods in particular—were equivalents of smaller-scale social units that previously had formed across the region and permanently aggregated at these sites (Rodning 2002; Smith 2011b; see also Ault, Fernández-Götz, Gaydarska, Kelly, and Ryan this volume).

Although context-dependent mechanisms to prevent and resolve intrasettlement conflicts were essential, growth in population number, density, and heterogeneity in nucleated sites also required an increased level of cooperation to promote social cohesion. In addition to regular public ceremonies, norms and measures to secure a certain degree of conformity in practices (see Osborne and Ryan this volume) and large-scale communal projects—such as the construction and maintenance of defensive and ritual structures—are among the most important and archaeologically best detectable social innovations that developed and advanced community integrity and group identity through collective actions (Adler and Wilshusen 1990; Carballo 2013; Carballo et al. 2014).

As this brief discussion above illustrates, although scalar stress could have resulted in crisis and decay at nucleated settlements, when immediate and complete fission as a response to internal pressures did not occur, these challenges encouraged the development and introduction of new social innovations to foster social cohesion through transformations in community organization. To a certain extent, scale-related tensions and pressures might have been beneficial social phenomena in the long run, constituting a major driver of sociopolitical transformations in past societies. Moreover, successful social innovations were incorporated into the organizational repertoire of these societies as potential techniques in the management of internal conflicts, and may have been spread as know-hows through supralocal social networks.

Transformative Effects: Social, Political, and Cultural Change

Studies of nucleation in past societies are remarkably important for understanding pathways to cultural change and the emergence of complex social and political configurations. Although aggregation processes could have been triggered by profoundly different causal

factors and developments tended to take radically diverse courses, prehistoric and historic nucleated settlements were both products and producers of major social, political, economic, and cultural transformations. Moreover, a mutual characteristic of nucleated settlements in the past and present is that their trajectories vitally impacted developments in broader geo- and sociopolitical contexts (Cronon 1991; Redfield and Singer 1954; Wheatley 1972).

Sociopolitical organization is subject to continual negotiation and transformation in human societies. Growth in population number and density at the regional and local scales frequently has been considered as the preeminent impetus for fundamental shifts in sociopolitical configurations, including the genesis and evolution of social inequality and hierarchical political structures (MacSweeney 2004; Müller 2016; Roscoe 1993; Trigger 2003; Whitelaw 2001). When spatially dispersed groups decide to fuse with large settlements, social and political dynamics that previously regulated their more segmentary relations may alter radically. As the previous section exemplifies, when compared to preceding periods, aggregation in ancient societies commonly coincided with an increased degree of structural and organizational complexities that resulted in novel sociopolitical formations. Over time, more intensive, more regular, and more sophisticatedly structured interactions among individuals and subgroups within the sites, as well as processes and challenges associated with internal social dynamics and external forces, gave rise to additional, recurring renegotiation and reconstruction of the sociopolitical organization of these nucleated settlements. These modifications may have affected structural units of all levels represented at a given site, but alterations in higher-order structural units led to more substantial transformations.

From the emergence of the earliest permanent nucleated settlements onward, interactions between structural units assured that decisions were made and measures were taken to meet community requirements. Therefore, centralized management and political control of some sorts through higher-order structural units were present to a certain degree even in the earliest prehistoric nucleated sites (Billman 2002; Hayden 2001). Nevertheless, centralization did not necessarily correspond with profound shifts in preceding social configurations toward increased levels of social inequality and permanent hierarchies (see Ault, Birch, and Ryan this volume). In societies where institutionalized, hereditary social hierarchies did not emerge, bottom-up social mechanisms through distributed political power and consensual decision-making processes likely prevailed. Corporate political structures based on egalitarian ideologies assisted the achievement of community goals and ensured social cohesion in these contexts. However, the maintenance of egalitarian sociopolitical systems requires considerable community effort and necessitates an increased degree of organizational complexity through more collective political institutions and, as a result, their per capita social costs are high relative to more autocratic structures (Feinman 2011). Archaeological and ethnographic data from nonstate societies characterized by diverse sociopolitical organizations demonstrate that oftentimes direct leveling and limiting mechanisms were employed to impede the development of hereditary social inequalities and permanent social hierarchies (Boehm 1993;

Jennings and Earle 2016; Mitchell 1988; see also Ault this volume). Social innovations to regulate economic growth and prevent wealth differences also could have been used to counteract the constant claim for and the manipulation of individual and group privileges and statuses (see Fernández-Götz, and Sastre and Currás this volume). These mechanisms, developed specifically in the crowded and congested social arena of nucleated settlements, might have persisted to assure more collective forms of control over sociopolitical transformations and power relations even after the dispersal of nucleated sites in ancient societies.

By contrast, in many cases, aggregation coincided with the intensification of sociopolitical processes toward a pronounced increase in vertical social differentiation and the introduction of highly centralized power structures (see Fernández-Götz, and O'Shea and Nicodemus this volume). At these sites—and certainly also across their polities—varying forms and degrees of political authority and social inequality could have evolved. Interestingly, even in societies with rigid social ranking, stress resolution techniques to reduce the potential of wealth inequalities as well as various forms of resistance to dominance occurred (e.g., Fox 1977; Paynter and McGuire 1991). In other contexts, opportunities for the nonelites for personal advancements to integrate and overcome socioeconomic inequality were provided so as to avoid social tensions, violent conflicts, and outmigration (see Kaiser this volume).

Settlement duration may be one of the important variables in the development of social inequality, as differential access to power and resources may have occurred more frequently at nucleated sites where habitation was longer (Adler et al. 1996). However, as long-term occupation without the formation of institutionalized social hierarchy at sites such as Çatalhöyük illustrates (Hodder 2006, 2011), a great deal of variation must be considered in this regard. As many chapters in this volume imply (see for example Birch, Gaydarska, and Harrison and Bilgen), in addition to mortuary and dietary studies, the built environment is consulted most commonly to obtain relevant data to explore wealth and status differences among individuals and subgroups in nucleated settlements. These analyses are based on the premise that the location, function, construction properties, and spatial organization of structures and other features, as well as their transformations over time, provide information about social relations and political structure (Lawrence and Low 1990; Rapoport 1982). Yet, as Harrison and Bilgen's, and Kaiser's studies of visibility—as a tool to generate or claim shifts in social status—signify in this volume, research opportunities to investigate the emergence of social inequality are constantly developing, due to advances in theory and methods (see also Paliou et al. 2014).

Regional-scale, diachronic studies are productive instruments not only for reconstructing the dynamic relationships between population centers and their hinterlands regarding the origins and maintenance of nucleated settlements but also for making inferences about long-term social and political developments (see Drennan et al. 2015; Kowalewski 2008). Several processes may account for regional site size hierarchies, and the interpretation of these patterns in regard to the degree and nature of political centralization may be difficult for multiple reasons (see Duffy 2015). However, site size distribution

properties in a particular polity tend to provide useful information about the regional political landscape and its transformations over time as they relate to the developments of centers (Altaweel 2015; Drennan and Peterson 2004; Falconer and Savage 1995; see Kelly, Osborne, O'Shea and Nicodemus, and Raczky this volume).

Recent research on the evolution of social complexity in ancient, particularly state-level, societies suggests convoluted processes. By consulting data from nucleated societies to a great extent (e.g., Blanton et al. 1996; Blanton and Fargher 2012; Fargher et al. 2011b; Feinman 2012; Liu 2004), these studies indicate that when changes in sociopolitical structures occurred, they did not always develop in a linear fashion through consecutive stages from less to more hierarchical and more centralized political formations. Instead, the degree of sociopolitical complexity may have fluctuated over time even during the life span of ancient nucleated settlements. Moreover, egalitarian and more hierarchical power structures may have co-occurred at both the local and regional scale (Gearing 1958; Kuijt 2002; Leach 1954). Numerous chapters in this book illustrate a wide range of trajectories with repeating transformations in integrative mechanisms and sociopolitical organizations over time (for example, see the chapters by Fernández-Götz, Osborne, O'Shea and Nicodemus, and Sastre and Currás).

Shifts in sociopolitical structures frequently coincide with substantial changes in cultural traditions (Binford 1962; Hodder 1982). As permanent population aggregation increases the intensity and frequency of social interactions, nucleated centers become important settings for cultural transformations. In conjunction with shifts in social and political dynamics, ideologies, norms, and cultural practices shared by these communities also may alter. These changes are manifested in various, recurring elements of the material culture—ranging from architectural and spatial principles to decorative style—to express group membership and identity (Carr and Neitzel 1995; Hegmon 1992; Rapoport 1982; Riebe 2016; Schortman et al. 2001). Furthermore, the relationship between sociopolitical and cultural change is reciprocal, as modifications in ideologies and related practices also can account for transformations in sociopolitical configurations. For example, with a shift to cosmological principles that promote monumentality in architecture—a phenomenon frequently associated with the development of ancient nucleated settlements—managerial requirements, including design, organization, and mobilization of labor, offer opportunities to create and manipulate the status of individuals and groups within a society (Adler and Wilshusen 1990; Clark and Martinsson-Wallin 2007; Osborne 2014; Trigger 1990). Through social interactions within and between polities, the proposed alterations in cultural norms and practices may spread beyond the confines of nucleated settlements, and a great deal of them become approved and dominant over a larger geographic area, perceived as the spatial unit of "culture" in archaeology.

The termination of nucleated settlements and their polities oftentimes appears to have occurred within a remarkably short period of time at the regional and many times also at the macroregional scale (Borić 2015; Possehl 1997; Tainter 1988; Yasuda et al. 2004; see also Gaydarska, Harrison and Bilgen, O'Shea and Nicodemus, and Raczky this volume). Although the discussion of variation in causal forces and processes of settlement

abandonment is beyond the principal scopes of this volume, as several papers illustrate (for example, see Fernández-Götz, O'Shea and Nicodemus, and Pullen) both external factors and internal socioeconomic transformations played vital roles (see also Adler et al. 1996; Buckley et al. 2010; Demarest 2003; Hoggarth et al. 2016; Knappett et al. 2011). More importantly in the context of this book, the abandonment of nucleated settlements and the formation of more dispersed and more loosely integrated village networks frequently is accompanied by a decreased degree of social complexity (see Fernández-Götz this volume), the introduction of new social practices (see Gaydarska this volume), and major transformations in material culture and symbology (see Raczky this volume).

Archaeological research incorporating long-term, diachronic perspectives into the study of sociocultural trajectories commonly identifies cycles of aggregation and dispersal, centralization and decentralization of power, as well as reveals periodic shifts in the degree of social complexity in ancient societies (Arakawa 2012; Gavrilets et al. 2010; Kowalewski 2008; Müller 2012; Parkinson 2002; Ur 2010; see also Fernández-Götz, Raczky, and Sastre and Currás this volume). As a matter of fact, the chapters focusing on ancient Greece in this book by Ault, Osborne, and Pullen illustrate that even in regions recognized as core areas of early urban developments and state formation in the world, urbanization and sociocultural change exhibit a nonlinear evolutionary pattern with cycles between growth and decay, florescence and collapse, and less and more complex sociopolitical configurations (see also Faulseit 2016; Marcus 1998; Schwartz and Nichols 2006; Wilkinson et al. 2014).

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FINAL REMARKS

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The latest edition of the *Global Trends Report*—a strategic document released by the National Intelligence Council of the United States (2017) every four years to assess major trends in the world during the next 20 years—envisions a radical increase in the role of large cities. In addition to a great deal of growth in the importance of metropolises as nodes in global networks, the study predicts that their local governance will have a tremendous impact on the political agendas of national governments. According to the report, innovations, entrepreneurship, and shared knowledge stimulated by "creative connectivity" (Glaeser 2011) and "energized crowding" (Smith this volume) as well as services provided at the local level will further enhance the significance of these centers as "social reactors" (Bettencourt 2013; see also Smith this volume). These predictions indicate the formation of more decentralized and more autonomous power structures, with a remarkable decrease in the degree of political integration. Compared to previous settings, in these systems, large cities' populations will rely heavily on local-scale initiatives and increased regional political power of their leaders, and on the cooperation with other similar centers through interregional networks. Along with these changes, lower-level centers would become economically and politically more dependent on the primary centers. From many points of view, the anticipated trajectory proposed in the *Global Trends Report* might appear to be familiar to archaeologists. Albeit at smaller geographic scales,

analogous developments occurred in numerous cultural and temporal contexts across the globe (Hansen 2000, 2002; Nichols and Charlton 1997; Raczky 2015).

Nevertheless, as previously discussed, the historic pathways of powerful ancient nucleated settlements demonstrate that in addition to macroregional and regional factors, local social processes critically affected their development. A new initiative recently proposed in one of the most dynamically growing, current megacities perfectly exemplifies the significance of timeless, local-scale social challenges in nucleated contexts and provides me with the opportunity to return to my original question, with a bit of twist: What *should* cities offer people, in both the past and present, to make them desirable places of habitation?

In March 2016, the British newspaper *The Guardian* published an article about recent developments in the desert city of Dubai in the United Arab Emirates (Keenan 2016). The article reports that in order to obstruct a decreasing trend in "happiness inequality" in the city, the Emirates appointed its first Minister of State for Happiness, who started collecting data on how government services affect happiness in Dubai. A CEO of an investment holding summarizes the goal of the initiative in the article as follows: "Once we are able to manage and meet people's experiences, we will be able to rise on the happiness index. It is vital because if people are not happy, they don't stick around in the city; they leave." The simultaneous establishment of the Ministry of Tolerance to promote understanding and cooperation among the wide range of religious and ethnic groups in the United Arab Emirates, and particularly in Dubai, reflects the group aspect of social challenges with which large cities face.

These initiatives have occurred within the context of an absolute monarchy featured by autocratic leadership and a lack of general elections—the complete opposite of collective power structures. This example provides us with an important conclusion about the interplay between individual and group motivations and political power both in present and past nucleated societies. Regardless of social, political, and cultural contexts, the long-term and politically predictable participation of individuals and groups influenced by the dynamic relationship between social and economic costs and benefits determine the integrity and, thus, the future of a community. Importantly, this holds true even in societies with highly stratified sociopolitical configurations with domineering power and hegemony over each member of the society. Social innovations—such as the new ministries as structural units in the United Arab Emirates—have been crucial contributions to assure resilience and sustainability in the development of nucleated communities throughout human history.

Undoubtedly, one of the most important lessons that can be learned from the past is that cities are not everlasting entities—they are complex and, therefore, fragile configurations. Cycles of growth and decline reoccur, and the decay—and many times the complete disintegration—of even the most prominent and prosperous cities is just matter of time. As, for example, the Rust Belt cities in the American Midwest demonstrate, although we possess a great deal of tools and techniques to document and also change urban processes, the line between florescence and failure is still remarkably thin.

By presenting approaches, data, and interpretations regarding variation in societal trajectories, archaeology provides another essential dimension, the long-term perspective, to understand social, economic, political, and cultural principles and mechanisms as they relate to population nucleation. Edited volumes such as this are important steps in encouraging interdisciplinary dialogues and sorting out proper solutions to prevent and overcome challenges in modern urban environments.

Acknowledgments

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