# Chapter 10
# Cultural Macroevolution and Social Change

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## Introduction

In this chapter I discuss the macroevolutionist approach to the study of sociopolitical transformations, paying particular attention to how this perspective can help us identify the key manifestations of major social change in the archaeological record. Building upon the framework discussed in Prentiss et al. (2009a), I add some ideas from recent research in evolutionary archaeology as well as from evolutionary biology and even a bit of physics. I then apply this modified macroevolutionist framework to archaeologically documented trajectories of social change. But first, I will review the historical background of the research problem at hand.

## Background: The Research Problem and the Debate

If you drive across the Río Grande into Mexico and keep heading south, you will eventually arrive in the Valley of Oaxaca, the Zapotec homeland, perched a mile above sea level amidst the peaks and ridges of the Sierra Madre del Sur. The archaeological record here is bountiful and has attracted several generations of researchers, whose discoveries add up to a thrilling tale of cultural evolution (Flannery and Marcus 1983a; Marcus and Flannery 1996). The evidence is reported in numerous publications but can also be seen, firsthand, in the archaeological sites themselves. Consider just two landmarks on this evolutionary path. The first is Guilá Naquitz (Fig. 10.1), a small cave in the thorn forest above the town of Mitla, in the eastern or Tlacolula subvalley of the Oaxaca Valley. Guilá Naquitz is one of several sites that seasonally nomadic hunter-gatherers occupied during the Archaic Period in Oaxaca (ca. 8000–2000 B.C.). The cave floor of Guilá Naquitz measured about 9 m by 4 m. Excavations directed by Kent Flannery indicated that the cave was occasionally occupied during the dry season (November–April) by a microband of perhaps 4–6 people, who exploited the agave or century plant (*Agave* spp.), hunted deer, peccary, and cottontail rabbit and cultivated early forms of domesticated maize and squash (Flannery 1986; Marcus and Flannery 1996, pp. 54–57; Piperno and Flannery 2001; Smith 1997). During the wet season (May–October), the Guilá Naquitz occupants probably aggregated with other microbands at a macroband site such as Gheo-Shih, an open-air camp

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**Fig. 10.1** Guilá Naquitz cave, a hunter-gatherer camp of the Archaic period (8000–2000 B.C.), in the eastern branch of the Oaxaca Valley, Mexico

site covering 1.5 ha in the alluvial zone of the Río Mitla, a prime habitat for mesquite trees whose nutritious pods were ready for harvest between July and September. Gheo-Shih not only was the largest site of its time but also has produced the only evidence (so far) of Archaic Period public architecture in Oaxaca, consisting of two parallel lines of boulders, 20 m long and 7 m apart. The 140-$m^2$ enclosure between the boulders had been kept relatively clean, even though artifacts were abundant on either side of the enclosure. To the excavators, this feature "most resembled a cleared dance ground, like the ones laid out by some Indians of North America at their macroband camps" (Marcus and Flannery 1996, p. 59).

Now let us leap forward in time to 100 B.C. At this point, human habitation in Oaxaca was stunningly different. The largest occupation was Monte Albán (Fig. 10.2), a city of 15,000 that sprawled across 440 ha on a hilltop overlooking the junction of the three radiating subvalleys (Etla-Central, Tlacolula, and Ocotlán-Zimatlán) that comprise the entire Oaxaca Valley (Blanton 1978; Blanton et al. 1982; Kowalewski et al. 1989). Survey archaeologists have determined that Monte Albán was one of 745 habitation sites in the Valley by 100 B.C., the temporal division between the Late Monte Albán I phase (300–100 B.C.) and the Monte Albán II phase (100 B.C.–A.D. 200). These sites were permanent, year-round settlements, home to agriculturalists whose diet emphasized domesticated maize, beans, chiles, and squash. By the Monte Albán II phase, a diverse array of some two dozen public/institutional buildings had been constructed in and around Monte Albán's Main Plaza, which measured 300 m by 200 m and was laid out by leveling rock outcrops and filling deep crevices, a massive construction effort (Acosta 1965, pp. 817–824). These public buildings included several multiroom temples, an I-shaped masonry ballcourt, an arrowhead-shaped structure

**Fig. 10.2** The ancient city of Monte Albán; by the Monte Albán II phase (100 B.C.–A.D. 200) numerous public/institutional buildings had been constructed around the city's Main Plaza

(Building J) with carved "conquest slabs," and a number of altars or adoratories (Flannery 1983, pp. 103–104). Excavations at other sites in the Oaxaca Valley have recovered the remains of royal palaces and multiroom temples dating to the Late Monte Albán I and Monte Albán II phases (Flannery and Marcus 1976, 1983b, c, d; Redmond and Spencer 2013, 2017; Spencer and Redmond 2004a). The quantity and diversity of institutional buildings at this time are viewed as evidence of an administration that was both centralized and internally specialized—in short, a state form of government (Flannery and Marcus 1976; Spencer and Redmond 2004b; Wright 1977). Also, for both the Late Monte Albán I and Monte Albán II phases, one can detect a four-tier regional settlement hierarchy based on site size, another trait considered to be diagnostic of state organization (Flannery and Marcus 1983b, p. 82; Marcus and Flannery 1996, p. 162; Spencer and Redmond 2004b; Wright and Johnson 1975). Furthermore, there is archaeological evidence that Monte Albán had expanded its political domain far outside the Oaxaca Valley by this time, to include regions that lay up to 100 km distant from Monte Albán, such as the Sola Valley and the Cañada de Cuicatlán (Balkansky 2002; Spencer and Redmond 1997, 2001a). This evidence, dating to the Late Monte Albán I and Monte Albán II phases, is consistent with contemporaneous inscriptions of conquest on Building J, in Monte Albán's Main Plaza (Caso 1947; Marcus 1976, 1980). In sum, by 2000 years ago, the Monte Albán polity was a centralized, internally specialized state whose domain included not only the surrounding Oaxaca Valley but also some territories that lay well beyond a day's round-trip travel from the capital city. It has been argued that Monte Albán was the earliest state to emerge in Mesoamerica and that its successful strategy of territorial conquest was a key factor in the emergence of state organization here (Spencer 2003; Spencer and Redmond 2004b).

What lies between Guilá Naquitz and Monte Albán is not merely time or the conspicuous growth in human population, but rather a profound change in how society was *organized*. Multiple generations of Zapotec speakers were the actors in this process of increasing social and political complexity

(Flannery and Marcus 1983a), which can reasonably be considered an example of Darwinian social evolution, i.e., descent with modification mediated by selection or "what worked better than what" (Eldredge 1995, p. 34). Yet, we should also bear in mind that Darwin's framework (Darwin 1859), strictly speaking, can account for inter-generational persistence (or lack thereof) but harbors no necessary expectation of increasing complexity over the long term (Spencer 1997). In our Oaxaca case, it is significant that we observe not just change but directional and progressive change, from small and simple to big and complex. And therein lies the intrigue, which only deepens when one realizes that broadly similar—though completely independent—trajectories of major social change have been documented by archaeologists in at least five other parts of the world: coastal Peru, Egypt, Mesopotamia, the Indus Valley, and northern China (Flannery and Marcus 2012; Service 1975; Spencer 2010). These are cases where complex human societies, including those managed by state governments, emerged from simpler antecedent societies in a pristine fashion, without the assistance of organizational "blueprints" gleaned through contact with other preexisting complex societies (Spencer 2014). The question they pose for the researcher is perhaps the most fundamental and significant in all of anthropology: how and why did social change lead in certain cases to profound transformations of human society?

Taking note of the similarities exhibited by such widely separated developmental trajectories, researchers have wondered whether they could be analyzed from a comparative perspective and eventually understood as variant manifestations of some general, underlying evolutionary process—or, alternatively, whether each trajectory should be analyzed on its own terms, as a unique phenomenon best understood from a strictly historical viewpoint. This debate was already underway in the early years of anthropology. In *Ancient Society*, Lewis H. Morgan (1877) embraced the comparative, generalizing approach and proposed his Savagery/Barbarism/Civilization scheme of progressive evolutionary development, in which the primary organizing principle was a series of technological innovations, accompanied by social and political developments. His assessment of the available evidence led him to conclude: "Progress has been found to be substantially the same in kind in tribes and nations inhabiting different and even disconnected continents, while in the same status, with deviations from uniformity in particular instances produced by special causes" (Morgan 1877, p. 18). Edward B. Tylor also saw an overall direction in human history from simple to complex: "not a history of a course of degeneration, or even of equal oscillations to and fro, but of a movement which, in spite of frequent stops and relapses, has on the whole been forward" (Tylor 1870, p. 193, cited in Carneiro 2003, p. 28).

Shortly after, Franz Boas took a critical stance in *The Limitations of the Comparative Method of Anthropology*: "we must consider all the ingenious attempts at the construction of a grand system of the evolution of society as of very doubtful value, unless at the same time proof is given that the same phenomena could not develop by any other method. Until this is done, the presumption is always in favor of a variety of courses which historical growth may have taken" (Boas 1896, p. 905). As an alternative, Boas offered the "historical method," the objective of which would be to record "the histories of the cultures of diverse tribes" (Boas 1896, p. 907). Although Boas is credited with fathering the *historical particularist* school of anthropology (e.g., Harris 1968), it is not as widely recognized that he gave himself some cover on the issue of comparative analysis and generalizing theory: "When we have cleared up the history of a single culture and understand the effects of environment and the psychological conditions that are reflected in it we have made a step forward, as we can then investigate in how far the same causes or other causes were at work in the development of other cultures. Thus by comparing histories of growth general laws may be found" (Boas 1896, p. 907). But more strident views were expressed by other advocates of the historicist approach: "The theory of cultural evolution, to my mind, the most inane, sterile, and pernicious theory ever conceived in the history of science (a cheap toy for the amusement of big children), is duly disparaged . . . All the practical investigator can hope for, at least for the present, is to study each cultural phenomenon as exactly as possible in its geographical distribution, its historical development, and its relation or association with other kindred ideas" (Laufer 1918, pp. 90–91).

Although evolutionism fell out of favor in early twentieth century anthropology, it was making a comeback by mid-century, nurtured by archaeologist V. Gordon Childe and ethnologist Leslie White. In 1936, Childe published *Man Makes Himself*, in which he made the case for "an analogy between organic evolution and progress in culture. Natural history traces the emergence of new species each better adapted for survival, and more fitted to obtain food and shelter, and so to multiply. Human history reveals man creating new industries and new economies than have furthered the increase of the species and thereby vindicated its enhanced fitness" (Childe 1983, p. 12). Childe presented a scheme that saw all cultures evolving through a series of general developmental stages, from food-gathering societies through a Neolithic revolution to village farming societies, and then through an urban revolution to civilization (Childe 1950, 1951, 1983). White advocated the study of cultural evolution and proposed that the evolution of more complex forms of culture will be associated with major increases in the energy harnessed by the evolving social system (White 1949, 1959)—what some have called "White's Law" (Carneiro 2003, p. 192).

The evolutionist approach gained support from archaeologists and ethnologists over the ensuing decades (Carneiro 1970, 1981; Flannery 1972; Flannery and Marcus 1983a; Fried 1967; Sanders and Price 1968; Service 1962, 1975; Steward 1949, 1955). Yet, such efforts have drawn criticism from some researchers (Feinman and Neitzel 1984; McGuire 1983; Upham 1987; Yoffee 1979, 1993, 2005). Feinman and Neitzel (1984) aimed to assess stage-like schemes like Service's (1962) Band/Tribe/Chiefdom/State model or Fried's (1967) Egalitarian Society/Ranked Society/Stratified Society/State framework by analyzing a sample of 63 New World societies from the ethnographic and ethnohistoric literature. They selected their sample to represent just the Tribe/Chiefdom (or Egalitarian/Ranked) portion (the "middle range") of the Service or Fried schemes (Feinman and Neitzel 1984, pp. 45–46). After studying the patterns of covariation among leadership functions, social differentiation, political complexity (number of administrative levels), and population sizes of the major community and the polity as a whole, they concluded: "The continuous distribution of each examined attribute and the complexities of the relationships among them indicate that serious inadequacies characterize the typological approach to societal diversity" (Feinman and Neitzel 1984, p. 72). At the same time, they also acknowledged the essentially synchronic nature of their cross-cultural analysis, noting that "Synchronic studies can only demonstrate correlations and cannot reveal the historical or causal processes responsible for societal variation . . . Long-term processual studies are necessary" (Feinman and Neitzel 1984, p. 78).

In a paper on the chiefdom concept (Spencer 1987), I concurred with Feinman and Neitzel's call for more diachronic studies: "the essential evolutionary issue here seems to be whether the overall tempo of cultural evolution is always gradual and continuous or whether times of continuous change have been punctuated on occasion by periods of very rapid, transformational change. A stage-wise approach to cultural evolution would imply, for instance, that the transition from egalitarian society to chiefdom and from chiefdom to state in any particular developmental sequence ought to be more punctuational in character than the processes of growth and/or decline within the chiefly *Bauplan* . . . Questions concerning the tempo and mode of cultural evolution will be best approached, I think, through the diachronic examination of specific cultural system trajectories" (Spencer 1987, p. 381). My use of the term *Bauplan* (Mayr 1982, p. 468) was based on an analogy between cultural and biological evolution and particularly upon the recognition by biologists that "a relatively meager number of fundamental patterns underlie a great animal diversity" (Frazetta 1975, p. 237). As Prentiss et al. (2009b) have more recently pointed out, *Bauplan* (*Bauplane*, pl.) is a German term that can be translated as "ground plan" or "engineering design" and is used "to define a basic organizational structure for entire monophyletic clades" (Prentiss et al. 2009b, p. 10). A similar analogy between biological and social evolution was drawn by Flannery (1995, p. 4): "In both fields, scholars have defined *stages of evolution*, mutually-agreed upon units which allow researchers to discuss common problems." He suggested that the biological-evolutionary sequence of bony fishes, amphibians, reptiles, birds, and mammals is analogous to such social-evolutionary sequences as bands, tribes, chiefdoms, and states—or, in his phrasing, band societies, autonomous village societies, rank societies, and archaic states.

I contend that we can distinguish between the chiefdom and state *Bauplane* as follows: a chiefdom is a regional polity consisting of a number of villages under the rule of a paramount chief, whose administrative authority is centralized but not internally specialized; by contrast, a state has an administration that is both centralized and internally specialized, which allows the state to effectively delegate partial authority to specialized administrators and thus integrate a much larger territory and population than a chiefdom (Wright 1977; Spencer 1990). I have argued that the lack of internal administrative specialization in a chiefdom inhibits its ability to delegate partial authority, and this, in turn, places a limit on the size of the political territory it can integrate; that limit may lie in the vicinity of about 1-day round-trip from the chiefly center, which would be a radius of roughly 25 km for pedestrian travel (Spencer 1987, 1990). I join others in postulating that chiefdom organization is a necessary precursor of the state in any evolutionary trajectory (e.g., Carneiro 1981; Flannery 1995; Earle 1987; Wright 1977); before a regional administration can be both centralized and internally specialized, it must first be centralized (Spencer 1990). The potentially larger size of the nascent state would be expected to give it a selective advantage over smaller polities in most competitive situations; consequently, over the long term, a directional trend will be imparted to cultural evolution (Carneiro 1992; Kosse 1994). This does not mean, however, that the evolution of the state is inevitable. Both chiefdoms and states are dynamic entities and are capable of exhibiting considerable variation while adhering to the basic design of their respective *Bauplane*. For example, chiefdoms are especially prone to recurring cycles of political growth, signaled by an increase on the power and resources controlled by the central chiefly authority, followed by decline (Anderson 1994, 1996; Menzies and Haller 2012; Redmond et al. 1999). The growth part of this cycle is ultimately limited by the aforementioned territorial constraints on effective political-economic management that result from the centralized but not internally specialized nature of chiefly decision-making.

Whether we should expect the emergence of new sociopolitical *Bauplane* to come about gradually or punctuationally was the focus of Spencer (1990), in which I used archaeological data as well as diachronic ethnohistoric data to analyze the tempo and mode of several cases of early state formation, some of which were successful over the long term while others were not. For example, in Tonga between A.D. 950 and A.D. 1610 there were two attempts by the paramount chief of the time to establish the centralized and internally specialized administration characteristic of state organization (Wright 1977). In both cases, central authority was shared with just one new administrative official, who soon usurped the chiefly leadership. A more successful attempt at state formation occurred in Hawai'i toward the end of the sixteenth century A.D., when Umi-a-Liloa brought the entire Big Island under unified control for the first time, dividing it into six administrative districts that were run by appointed lesser chiefs and promoting widespread specialization of religious, political, and economic roles. This early state was short-lived, however. Upon Umi's death, he was succeeded by his eldest son who was not as adept at rulership, and the administrative system built by Umi soon disintegrated. The next episode of state formation in Hawai'i took place in the nineteenth century and enjoyed longer-lasting success: Kamehameha I's access to European firearms and political advice helped him overcome opposition and establish his authority over not only the entire Big Island but also over most of the other large islands of the chain as well (Kirch 2010).

Turning to two archaeological cases of early state formation, Teotihuacan and Monte Albán, I highlighted these contextual differences: (1) surrounding the Oaxaca Valley were a series of lightly populated but fertile canyons and valleys that were tempting prey for a Monte Albán leadership that chose interregional conquest as a way to advance its political-economic agenda, but had to develop state institutions in order to carry out this expansionist strategy successfully; and (2) Teotihuacan's rise to political dominance in the Basin of Mexico was surely aided by the volcanic eruption leading to the abandonment of Cuicuilco, its greatest competitor in the period just prior to its dramatic ascendance. Yet, these differences notwithstanding, I concluded: "in both cases, state emergence involved a process of internal differentiation of central authority that came about at a relatively rapid pace. These archaeological cases, like the ethnohistorical ones discussed earlier, are consistent with

a transformationalist view of state development, which suggests that we should look with renewed interest at the stepwise frameworks of neoevolutionism" (Spencer 1990, p. 23).

It is fair to say that this suggestion was not widely followed and the evolutionist approach has been subjected to continuing criticism for, among other things, being excessively "top-down" in its focus on leadership and administration while ignoring other dimensions of cultural variability (Blanton and Fargher 2008; Blanton et al. 1996; Feinman 2012) and using a flawed comparative method that neglects the unique histories of different societies (Pauketat 2007, 2010; Yoffee 2005). Criticizing the chiefdom concept in particular, Pauketat (2010, p. 168) argued that scholars should "dispense with those naïve, delusional constructs derived from ethnographic readings of 'documentary history' that, by projecting a societal analogy derived from one time or place onto another in the distant past, block the way forward." His preferred "historical-processual" method (Pauketat 2000, 2001a, b) emphasizes the study of "traditions" as "continuous and historically contingent enactments or embodiments of . . . attitudes, agendas, and dispositions" (Pauketat 2000, p. 115), an approach that brings to mind the culture history school in American archaeology (Willey and Sabloff 1974). In response, I would point out that a focus on each trajectory as unique will inevitably preclude the recognition of broadly shared patterns and processes.

Meanwhile, other archaeologists have been engaged in comparative analyses (Drennan and Peterson 2006, 2012; Smith 2012), some of which have lent support to the evolutionist position. For example, utilizing data in the electronic Human Relations Area Files Collection of Archaeology, Peregrine et al. (2004) applied a Guttman Scale analysis to test for universal patterns in cultural evolution. They examined a dataset of 15 variables coded for 8 regional evolutionary sequences (Yellow River Valley, Indus River Valley, Nile River Valley, Mesopotamia, West Africa, Highland Peru, Lowland Mesoamerica, and Highland Mesoamerica). The analytical results led them to conclude: "there are universal patterns in cultural evolution. Cultural traits evolve in regular ways and some traits appear to co-evolve in punctuated evolutionary events that may parallel the typologies through which anthropologists frequently classify the cultures of the world" (Peregrine et al. 2004, p. 149). There is little doubt that the debate between the historicist and evolutionist views of social change—a fundamental tension that dates back to the earliest years of anthropology—is still with us. To move forward, it is more important than ever for evolutionists to present their ideas in ways that are not only theoretically grounded but also verifiable with empirical data, a goal toward which I will take some steps in the next section.

## Microevolutionary Variation and Macroevolutionary Transformations

Underlying the various contributions in Prentiss et al. (2009a), I suggest, was an assumption of intellectual consilience between evolutionary anthropology and evolutionary biology (sensu Wilson 1998). In the volume's introduction the editors noted: "microevolutionary and macroevolutionary processes combine to produce evolution in the long term. This is an inclusive view of the evolutionary process that is at odds with programs that exclude action at higher levels of cultural organization" (Prentiss et al. 2009b, p. 11). The interplay between microevolution and macroevolution is a concern for contemporary biologists as well (Arnold et al. 2001; Cooney et al. 2017; Reznick and Ricklefs 2009; see also Chap. 1 by Prentiss in this volume). Moreover, the cultural-macroevolutionist perspective is consistent with recent investigations in evolutionary biology that are attributing increasing importance to convergence—when unrelated species pursue similar adaptive solutions to similar problems—in shaping the world's array of evolutionary outcomes (Conway Morris 2003; Losos 2017; McGhee 2011). The growing interest in convergence represents a noteworthy change from previous views that emphasized historical contingency and the quirky unpredictability of evolution (e.g., Gould 1989; Gould and Lewontin 1979). Theorists of cultural evolution also recognize convergence as a key feature

of cultural evolution: "out of the hundreds of possible ways that human societies could be organized, certain types of organization work so well that they show up over and over again throughout the world" (Flannery 1995, p. 21).

The macroevolutionary perspective is based on an explicit recognition of the "scalar hierarchy" of cultural organization—comprising the individual, household, village, region, and macroregion—a framework that invites the researcher to conceive of long-term change as the product of evolutionary mechanisms that operate on multiple organizational levels (Crumley 1995; Spencer 1997). Accordingly, a major research focus is the emergence of more inclusive forms of political organization (Crumley 1995). One example of this approach is the mechanism that Flannery (1972) termed *promotion*, through which centralized leadership appears on a higher level than had previously been the case, such as when a village headman becomes a regional paramount chief, or when a paramount chief becomes a state ruler whose domain includes more than one region. I have suggested that promotion, and the more inclusive control hierarchy it signals, are the products of *extrapolation*, defined as: "an extension or projection of the internal model of authority from one social unit to others on the same level of the scalar hierarchy" (Spencer 1997, p. 239). In the context of autonomous villages, an extrapolation attempt would involve a village headman attempting to extend his internal (villagewide) authority to other villages, which, if successful, can lead to the emergence of a centralized regional polity: the chiefdom (Spencer 1994). Another example would be when the chiefly leadership of one of several regional chiefdoms uses successful military force to expand the range of its intrapolity authority, linking the previously autonomous chiefdoms into a more inclusive state (Spencer 1998, 2010).

Whether such an extrapolation effort ultimately succeeds will of course be determined by selection: the newly created chiefdom (or state) must be able to deal with competitors and other challenges in order to reproduce itself and persist over the long term. Furthermore, as I have noted, "the act of extrapolation itself changes the relative impact of selection among levels of the scalar hierarchy" (Spencer 1997, p. 239). In the case of autonomous villages, selection on the inter-family and intervillage levels will tend to be stronger than selection on the multivillage (or regional) level. But, if the leadership of one of these villages embarks upon an extrapolation strategy, with the aim of extending its internal (intravillage) authority to other villages and establishing a regional chiefdom, this will increase the relative impact of selection on the multivillage level; the survival of the more inclusive social unit depends on withstanding challenges to its persistence. In analogous fashion, when the leadership of a chiefdom seeks to extrapolate its centralized regional authority to link other regional chiefdoms into a nascent state, there is a consequent increase in the relative importance of selection on the level of that new multiregional polity. This viewpoint is compatible with the ongoing resurgence of interest in multilevel selection models in biology, which recognize the crucial role played by shifts in the scale of selection to more inclusive levels as a key driver of macroevolutionary change (Wilson and Wilson 2007).

The transition from chiefdom to state, I would argue, can be conceptualized as a shift from one peak to another on an adaptive landscape; the chiefdom and state in this framework are seen as stable but also dynamic forms, capable of continuous microevolutionary variation around the adaptive peaks (Spencer 2009; see also Chap. 7 by Laue and Wright in this volume). We can expand this visualization to include the transition from autonomous village society to chiefdom (Fig. 10.3). A shift from one adaptive peak to another will involve not only quantitative but also discontinuous, qualitative change (Spencer 2009). Moreover, we should expect substantial energy costs to be involved in such a shift, in line with "White's Law" (White 1959). An attempted transition from autonomous village to chiefdom, for example, will have a greater chance of success if the emergent centralized (though nonbureaucratic) regional authority is reinforced through the simultaneous appearance of changes in sanctification of authority, institutionalized social differentiation, and novel forms of prestige-good exchange and elite-directed warfare (Johnson 1982; Spencer 1987). Since additional resources will be needed to meet the costs of these institutional changes, the transition will be unlikely to succeed unless

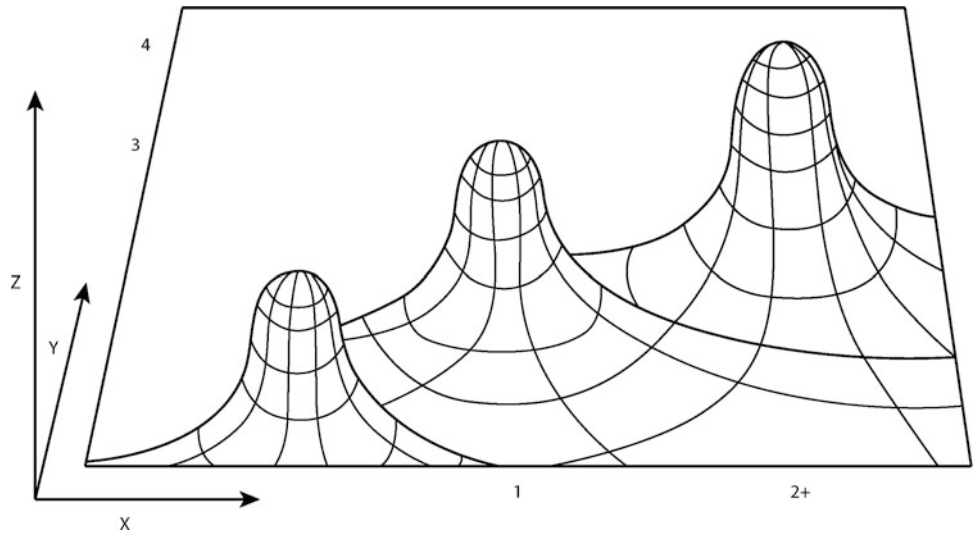


**Fig. 10.3** Model of the macroevolutionary transition from autonomous village (tribal) society (*left*), to chiefdom (*middle*), to primary state (*right*), as depicted by a triple-peaked adaptive landscape. X = polity size, expressed in days of round-trip pedestrian travel from the first-tier center to the farthest edge; Y = administrative complexity, expressed in tiers in the polity's regional settlement hierarchy; Z = relative adaptedness

the emergent chiefly leadership can harness additional forms of energy. Infrastructural development aimed at generating increased surplus production (e.g., irrigation or other forms of agricultural intensification) can be an important strategy for meeting such energy needs (Spencer 1993; Spencer et al. 1994).

Parallel considerations also apply to the transition from chiefdom to state. My territorial expansion model of primary state formation attributes the emergence of bureaucracy to the novel administrative adjustments that need to be made when a regional chiefdom attempts to expand its political-economic territory to distant territories, those lying more than a day's round-trip travel from the political capital of the expanding polity (Spencer 1998). In order for such a strategy to enjoy long-term success, the expanding polity will have to develop the capacity to delegate partial authority to specialized military and civil administrators who can be dispatched to carry out the conquest or annexation and the long-term management of the target territories. Financing these developments obviously presents a challenge, but the effective mobilization of resources in the form of tribute will do much to defray the costs (Spencer 1982, 1990, 1998).

I also hypothesize that these transitions—from autonomous village to chiefdom or from chiefdom to state—will be more likely to persist if the strategic adjustments take place both rapidly and extensively; in short, we should expect a successful macroevolutionary transformation to be a more punctuational process than microevolutionary change (Spencer 1990, 1998). An analogous conclusion was reached by Cooney et al. (2017) in their recent study of the macroevolutionary dynamics of avian evolution. They conducted a global analysis of bill morphology in more than 2000 species of birds and found that after initial diversification the rates of bill evolution have been comparatively stable over time within and between clades. On rare occasions, however, they do observe major discontinuities in phenotypes that emerge in the context of rapid increases in evolutionary rate in a single clade, sometimes resulting in the establishment of new clades with novel morphological features. They conclude: "macroevolutionary processes underlying global-scale adaptive radiations support Darwinian and Simpsonian ideas of microevolution within adaptive zones and accelerated evolution between distinct adaptive peaks" (Cooney et al. 2017, p. 344).

How tempo and mode work together to generate major directional change has been explored by McShea (1994), who offered a useful distinction between *passive* and *driven* evolutionary trends, the latter of which are instrumental in macroevolutionary processes. McShea considered simulation studies as well as paleontological data pertaining to evolutionary trends and concluded: "the significance of the passive-driven distinction lies in the independence among hierarchical levels implied by the passive mechanism" (McShea 1994, p. 1761). In the case of a passive trend, there is a lack of correlation between adaptive fitness on different levels of the evolving system; selection processes are operating independently on each level. The converse of this, of course, is that "driven evolutionary trends should be associated with interdependent relationships among the hierarchical levels of evolving systems," a proposition with important implications for the study of cultural macroevolution (Spencer and Redmond 2001b, p. 201). When we examine an archaeological sequence, we would expect a macroevolutionary transformation—involving a shift from one major adaptive peak (*Bauplan*) to another—to be associated with *concordant changes on multiple levels of the system's scalar hierarchy*. The emergence of a chiefdom from antecedent autonomous villages, or the state from the preexisting chiefdoms, should be associated with concurrent changes on the level of the individual, household, community, and region, the evidence of which we would expect to observe in the archaeological record.

For instance, if we examine chiefdom emergence as a driven trend in a cultural sequence, we should expect to find evidence of political centralization and social differentiation evolving hand-in-hand (Johnson 1982); the appearance of a settlement hierarchy focused on a single large regional settlement ought to be accompanied by evidence of increased social inequality between communities and residential units. In analogous fashion, when a chiefdom transforms itself into a state by extending its political authority over previously independent chiefdoms, certain administrative changes will be necessary for this strategy to succeed, most notably the development of internal specialization of central authority (i.e., bureaucratization) and the concomitant capacity to delegate partial authority to military and civil subordinates who can be sent to manage the initial conquest and long-term control of distant territories (Spencer 1990, 1998, 2010). Thus, we would expect to find evidence of a concurrence between the appearance of an internally specialized administration and the expansion of political control to distant regions, with profound consequences for the inhabitants not only of the annexed regions but also the core area of the expanding polity. This would include evidence of the state's capacity to delegate authority and engage in direct intervention down to the local level—what Flannery (1972) called "linearization."

These expectations regarding driven evolutionary trends are consistent with an even more general view of change, the *Renormalization Group Theory* (*RGT*) of physicist Kenneth Wilson (1971a, b, 1979, 1983). Wilson originally applied RGT to phase transitions in physical systems, such as the transition between liquid and solid states, but his ideas are thought to be applicable to a broad range of phenomena (Kadanoff 2013). I suggest we draw an analogy between the tribe/chiefdom or chiefdom/state transitions and Wilson's phase transitions and then apply elements of RGT to the study of cultural macroevolution. In doing so, I will be assuming that the main value of any analogy lies in its heuristic utility: "finding new ways of thinking about old problems, finding linkages between what had previously looked like unconnected factors of lines of evidence, finding novel ways to bring data to bear on ideas" (Spencer 2009, p. 140). Analogy can help us generate the hypotheses or expectations with which we test theories against the empirical record. A key expectation of RGT is that, when an evolving system crosses the critical point of a major phase transition, it will exhibit *scale invariance*, that is, the transitioning system will show *self-similarity* at all scales of measurement, expressed as coordinated, directional variation on multiple scales or levels of organization (Altenberger and Dahler 2002). Applying this insight to cultural evolution, I suggest, leads to the expectation that *macroevolutionary transformations will be linked to a high degree of multiscalar concordance of microevolutionary variation.* This expectation of RGT is consistent with McShea's (1994) view

that driven evolutionary trends are a consequence of interdependent selection among the various levels of a system's scalar hierarchy. The combination of McShea's and Wilson's perspectives strengthens the theoretical foundations—and shows the way for an empirical test—of cultural macroevolutionism.

## Empirical Assessment of Cultural Macroevolutionism

In this section I assess the utility of cultural macroevolutionism by applying it to the empirical record of transformational social change. As a guidepost for the discussion, I offer a summary of the key expectations of the macroevolutionist framework and also, by way of comparison, the corresponding expectations from the culture-historicist perspective in terms of tempo, mode, convergence, transitions, energy mobilization, and sociopolitical taxonomy (Fig. 10.4).

While recognizing the considerable historical and contextual variation exhibited by cultures on a global scale, the macroevolutionist perspective would nonetheless expect us to observe *convergent patterns* in the long-term record of major social transformations, while the historicist perspective would not. In Spencer (2010), I addressed the convergence issue by carrying out a comparative assessment of what I called the territorial-expansion model of primary state formation, which argued that bureaucratization was required for the success of long-distance expansion that, in turn, would have generated the revenues necessary to finance the administrative transformation (Spencer 1998). I examined six major cases of first-generation state formation: Oaxaca, Peru, Egypt, Mesopotamia, the Indus Valley, and China. In each of the six cases, the first appearance of state institutions was contemporaneous with the first signs of long-distance territorial expansion of state control (often through aggression) to places much more than a 1-day round-trip from the capital, in line with the territorial-expansion model.

In Oaxaca, a four-tier regional settlement hierarchy (an indicator of state organization) appeared for the first time in the core area of the Monte Albán polity in the Late Monte Albán I phase (300–100 B.C.), contemporaneous with the earliest evidence of Monte Albán's conquest of the Cañada de

**Fig. 10.4** Differing empirical expectations for cultural historicism versus cultural macroevolutionism

| | CULTURAL HISTORICISM | CULTURAL MACROEVOLUTIONISM |
|---|---|---|
| **TEMPO** | Gradual, accretionary, continuous change | Continuous change punctuated by sociopolitical transformations |
| **MODE** | Scale-variant change; independent, non-concordant change across scales | Scale-invariant change; interdependent, concordant change across scales |
| **CONVERGENCE** | Unique histories for cases; no significant developmental parallels among different cases | Significant evolutionary parallels among different cases, in spite of contextual differences |
| **TRANSITIONS AND ENERGY** | Indistinct, gradual transitions not necessarily associated with changes in harnessed energy | Major evolutionary transformations associated with major increases in harnessed energy |
| **TAXONOMY** | Sociopolitical "types" are spurious, arbitrary constructs imposed upon a continuum of complexity | Sociopolitical "types" are useful though imperfect descriptors of the products of major evolutionary transitions |

Cuicatlán, a separate region lying some 80 km north of Monte Albán and more than 40 km across mountain ridges from the northernmost end of the Oaxaca Valley (Spencer and Redmond 1997, 2001a). In Peru, there is evidence that an outpost of the early Gallinazo state was established at Huaca Prieta, located 80 km north of the state capital at the Gallinazo Group in the Virú Valley. A series of recently obtained radiocarbon dates place the Virú-Gallinazo presence at Huaca Prieta in the first century B.C, concurrent with the very early years of the Gallinazo state (Millaire 2010; Millaire et al. 2016). In Egypt, Hierakonpolis emerged as an urban center and a state capital around 3400–3200 B.C.; at the same time, it expanded its control over much of Upper Egypt, to places like Naqada and Abydos, 80 km and 140 km away (Bard 1994; Hoffman et al. 1986). In Mesopotamia, the site of Uruk (or Warka) emerged around 3500 B.C., with large and diverse temples and administrative buildings. There is evidence of Uruk outposts in the Susiana plain, some 250 km away, and even farther to the north (Algaze 1993, 2004; Johnson 1973). In the Indus Valley, the site of Mohenjo-daro emerged around 2500 B.C. as a state capital with diverse public buildings; this development was associated with evidence of the establishment of outposts as far as 400 km away, in the Kutch and Gujarat regions (Kenoyer 1991, 2008; Lawler 2008). China's first state was probably the Erlitou state, whose capital was the site of Erlitou, which grew by 1700 B.C. to urban proportions, with impressive institutional buildings, including at least two large palaces and specialized temple structures. There is contemporaneous evidence of Erlitou expansion to places as distant as Donglongshan, 250 km away (Liu 1996; Liu and Chen 2003). In each of these cases, the emergence of the state was concurrent with the expansion of its political-economic territory to areas that lay well beyond a day's round-trip from the home region. Moreover, the pattern of territorial growth in each case was notably asymmetric, probably because of variable relationships of acquiescence and resistance between the expanding polity and its neighbors (Spencer 2010).

The comprehensive comparative analysis by Flannery and Marcus (2012) also noted numerous evolutionary parallels among different cultural sequences from an array of regions around the world. And convergent patterning was discovered in the cross-cultural analysis carried out by Turchin et al. (2017), who concluded that "different characteristics of social complexity are highly predictable across different world regions. These results suggest that key aspects of social organization are functionally related and do indeed coevolve in predictable ways" (Turchin et al. 2017, p. E414).

There are salient differences between the expectations of the culture-historicist and macroevolutionist frameworks regarding the *tempo* and *mode* of major social change within a given developmental trajectory. From the culture-historicist framework, one would tend to view the development of increasing complexity as a continuously ramifying process; emphasis would be placed on the enormous amount of cultural variability and the alleged futility of trying to pigeonhole it into broad categories. By contrast, the macroevolutionist perspective would acknowledge this abundant variability but would tend to view cultural descent as a process characterized by periods of relative stability or gradual change that are punctuated by relatively rapid episodes of transformational, stepwise change, leading to new cultural forms that are both quantitatively and qualitatively more complex. We can evaluate the two alternative frameworks by examining how well their expectations match the empirical record of major social change. I now turn to two archaeological sequences of major social change; the first pertains to chiefdom formation in Venezuela, which occurred around A.D. 500–600; the second focuses on primary state formation in Oaxaca, Mexico, which took place around 300 B.C.

The Venezuelan research was conducted by Elsa Redmond and me in a study area that overlapped portions of the Andean piedmont and adjacent llanos (or savanna grasslands) in the state of Barinas (Redmond and Spencer 2007; Spencer and Redmond 2014). We documented cultural developments over some eight centuries of occupation, divided into two phases that are relevant to the problem of chiefdom formation. The first was Early Gaván phase (A.D. 300–550), during which there were three small occupations (3–5 ha each) with no earthen mounds, which we concluded were consistent with an uncentralized regional polity. The next period was the Late Gaván phase (A.D. 550–1000), which had 34 habitation sites of widely varying size and two drained-field agricultural sites (Fig. 10.5).

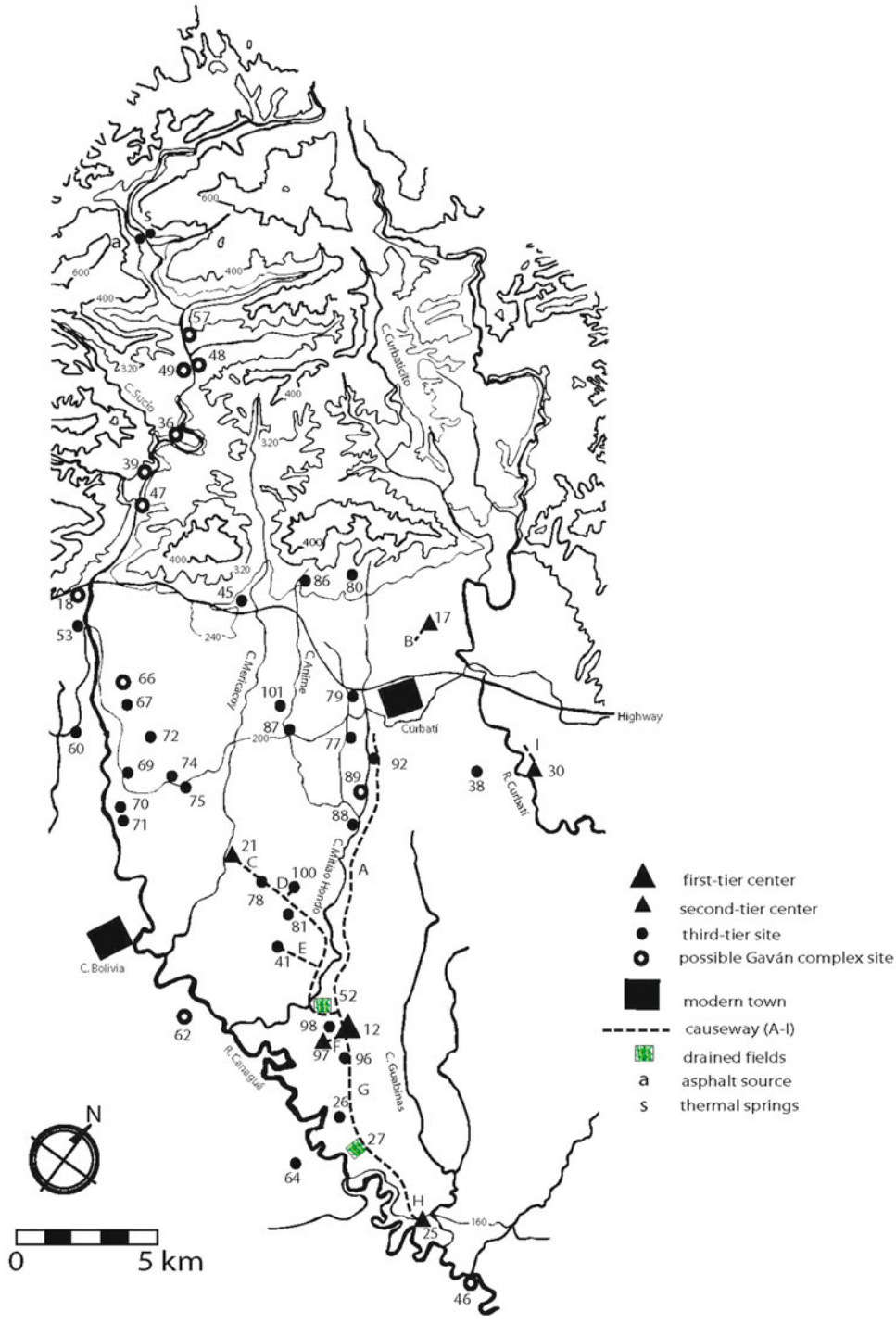


**Fig. 10.5** Settlements of the Late Gaván phase (A.D. 550–1000), Barinas, Venezuela; adapted from Spencer and Redmond (2015, Fig. 2)

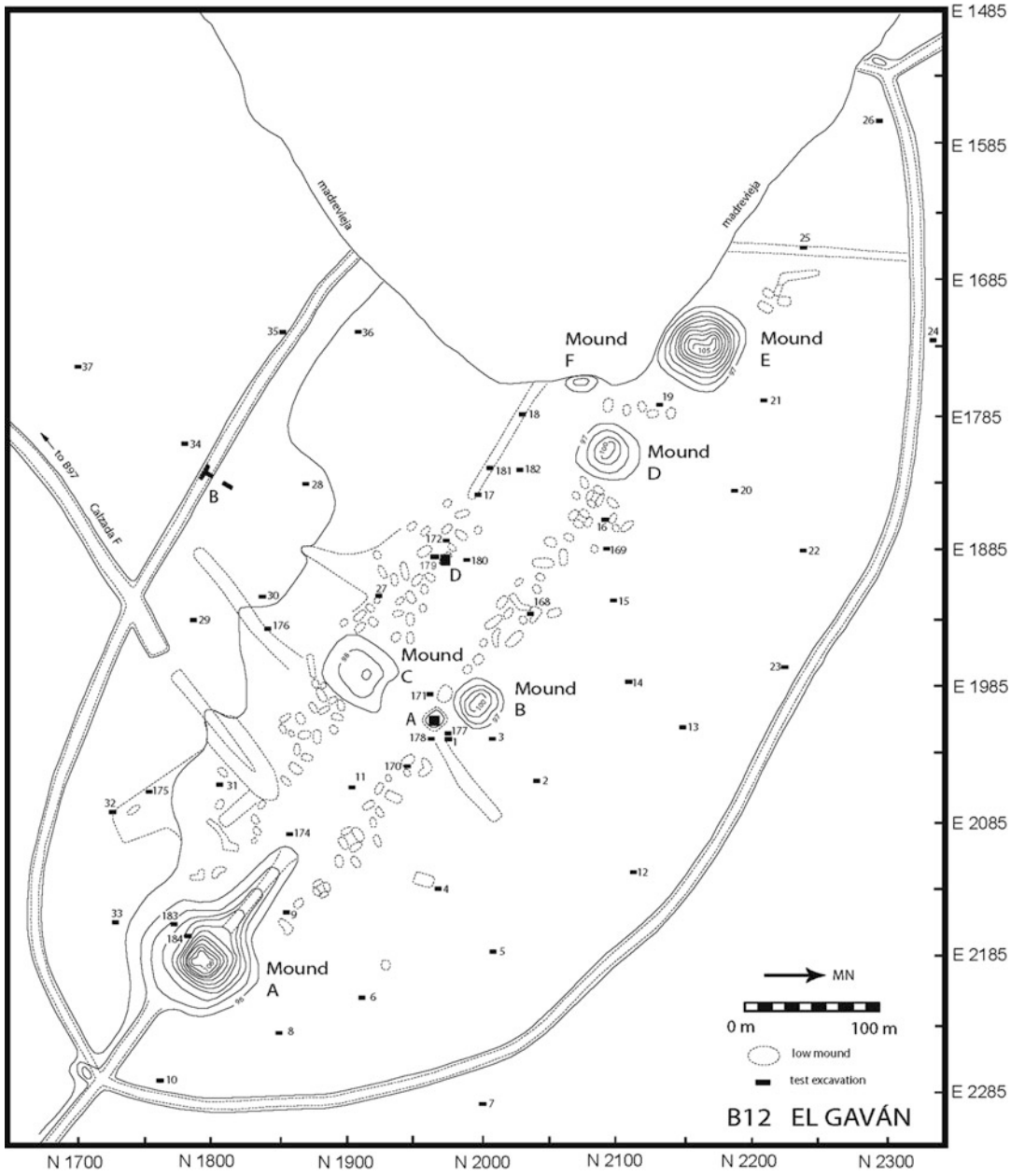


**Fig. 10.6** Map of the Gaván site (B12), showing locations of the two major mounds (A and E), house mounds, causeways (*calzadas)*, the circumscribing earthwork, test pits, and block excavations; adapted from Spencer and Redmond (2015, Fig. 3)

A histogram of Late Gaván site sizes revealed a bimodal distribution: B12 covered an estimated 33 ha and was much larger than the others, which ranged in size from 0.5 to 9.4 ha (Redmond and Spencer 2007, Table 5.2, Fig. 5.2). B12 also had the largest earthen mounds in the El Gaván region; two mounds, measuring 10 m and 12 m in height, faced each other from opposite ends of an avenue or elongated plaza 500 m long (Fig. 10.6). At B12 we also recorded four other mounds 1–4 m in height and 130 other mounds 1 m or less high. Only the two largest mounds show signs

of having been public/institutional in function; the other mounds seem to have supported residences (Spencer and Redmond 1998). All the mounds at B12 lie within an oval earthwork that circumscribes the site (Fig. 10.6). B12's large size and impressive mounds would appear to reflect a centralized regional political organization; at the same time, the low quantity and diversity noted in B12's public architecture (just two large mounds) would be consistent with chiefdom organization (Spencer 1987). To draw a contrast, the internally specialized administration of the state is typically associated with much more diversity in public architecture at its political capital than we see at B12 (Flannery and Marcus 1976; Spencer 1990).

Our field program at B12 included the horizontal excavation of two Late Gaván housemounds, Area A and Area D, lying on opposite sides of the site's central avenue (Fig. 10.5). In Area A, atop a 1-m-high housemound, we exposed a pattern of postmolds that defined a house covering about 28 $m^2$. On the Area D housemound, which was about half as high as the Area A housemound, we excavated the postmolds of a house measuring just 17 $m^2$. We inferred that the Area A house was of higher social status, an interpretation that was supported by the higher relative frequency of status-related artifacts, such as elaborate pottery and imported chert, found with the Area A house (Spencer and Redmond 2014, pp. 352–355). In short, Areas A and D show social status differentiation on the household level in Late Gaván times.

We also detected evidence of status differences on the individual level in the Late Gaván phase. Burial 6 was an adult who had been interred within the Area A housemound and beneath the floor of the Area A house. Burial 6 was accompanied by three ceramic vessels (Spencer and Redmond 2014, pp. 267–275). By contrast, Burial 5 was an adult buried beneath the floor of a house that was not upon a housemound at a separate, smaller site; Burial 5 had no funerary accompaniments (Spencer and Redmond 2014, pp. 562–563).

We have argued that the two sectors of housemounds at B12, divided by the central avenue, represented two exogamous moieties, i.e., two components of the village that intermarried (Spencer and Redmond 2015). We found evidence that this bilateral pattern existed in the earliest occupation of B12, when it covered no more than 5 hectares. Using data from our test-pit program, we analyzed the distribution of imported chert over time, and we found that the two moieties (which we labeled A and D) showed no evidence of social status differences in the Early Gaván phase. By contrast, a clear difference had developed by the Late Gaván phase (Fig. 10.7). Thus, we observe status differentiation on the moiety level at this time, just as we saw on the household and individual levels.

A parallel shift toward increasing differentiation also took place on the regional level. The three sites of the Early Gaván phase, all lacking mounded architecture and ranging from 3 ha to 5 ha in size, were succeeded by the 34 habitation sites of the Late Gaván phase, ranging from less than 1 ha to 33 ha in size. Our regional survey located five other sites that we interpret as possible second-tier settlements in the El Gaván region (B97, B21, B25, B17, and B30); these sites vary in size from 4.6 to 9.4 ha and have two to four mounds that reach 2–6 m in height. A third settlement tier is represented by the remaining 28 sites, which range in size between less than 1 ha up to almost 5 ha and had no mounds detectable by surface survey (Redmond and Spencer 2007, Table 5.2). But, whether we interpret the regional settlement hierarchy as having two or three tiers, the Late Gaván settlement system would be consistent with chiefdom political organization (Redmond and Spencer 2007, pp. 323–324; Spencer and Redmond 1992, 1998, 2014, pp. 754–755).

B12 was linked by a *calzada* (earthen causeway) network to four and perhaps all five of the proposed second-tier sites, as well as to many of the smaller sites (Fig. 10.5). Three inter-site *calzadas* approached B12 from the northwest, southeast, and southwest (Fig. 10.6). We have estimated that the *calzada* network would have linked together some two-thirds of the total population of the El Gaván regional chiefdom (Spencer and Redmond 1998, p. 107). It is significant, we think, that the two drained-field agricultural sites we recorded (B27, B52) were both located alongside *calzadas* (Fig. 10.5). The results of our survey and excavation at one of them (B27) revealed that maize was the primary crop, which we suspect was cultivated by farmers who lived at the nearby village of

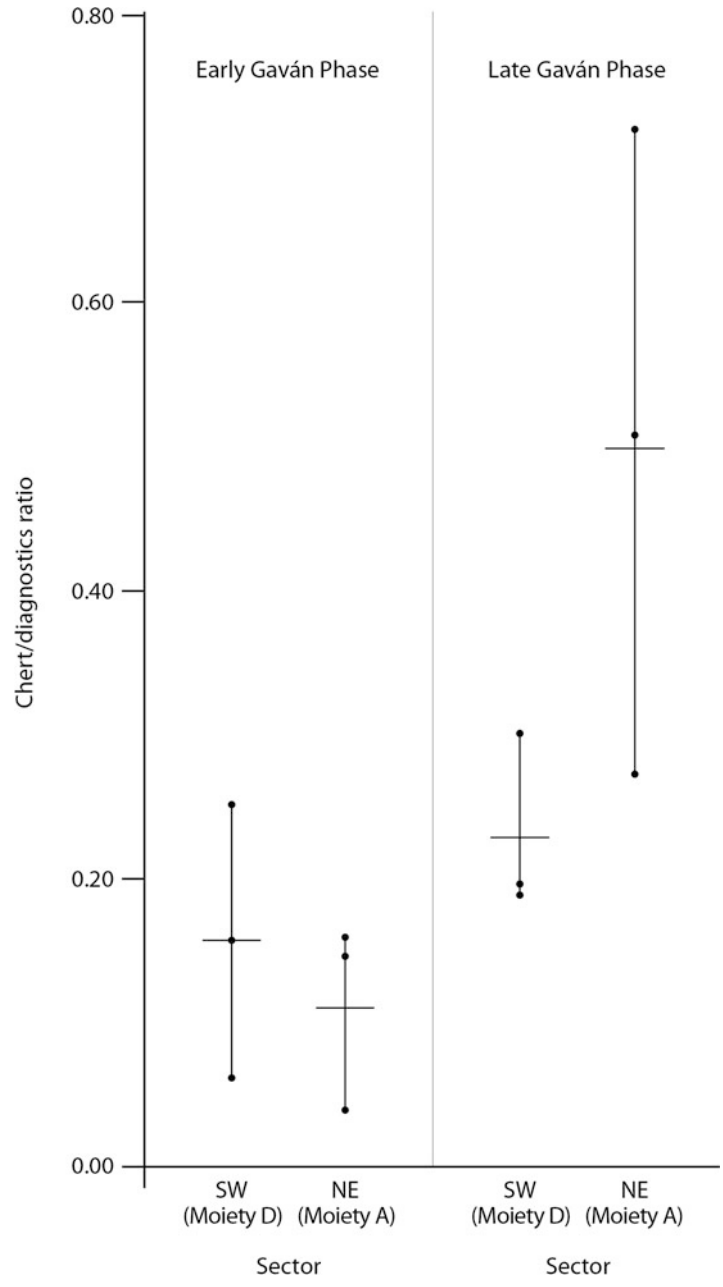


**Fig. 10.7** Sample distributions of the ratio of chert fragments to total ceramic diagnostics for the Early Gaván phase and the Late Gaván phase; horizontal bars indicate sample averages; adapted from Spencer and Redmond (2015, Fig. 16)

B26 (Spencer et al. 1994). We have calculated that the B27 fields were capable of substantial surplus production well beyond the needs of these local cultivators. Such surplus was probably transported along the *calzada* network to B12, where the regional chiefly leadership would have coordinated its mobilization, storage, and utilization (Spencer et al. 1994). Based on the extent of the regional *calzada* network and the associated pattern of settlement, we estimated that the El Gaván regional chiefdom extended over a territory of approximately 290 $km^2$ in the Late Gaván phase (Redmond et al. 1999, p. 117). We have concluded that all of the Late Gaván habitation sites would have lain within a 1-day

round-trip by foot from the regional center of B12, a distance compatible with the centralized but not internally specialized nature of chiefdom political organization (Spencer and Redmond 2014, p. 761).

Where did the first inhabitants of our study region come from? The earliest sedentary agricultural villages known in Venezuela were established around 2000 B.C. in the Parmana area in the middle Orinoco (Roosevelt 1980). The number and size of villages in Parmana grew between 2000 B.C. and A.D. 100, according to Roosevelt's data. But, there is no evidence of a settlement hierarchy in Parmana until A.D. 1100, which is much later than we saw for Barinas. We have proposed that, as population grew after 1000 B.C., some people emigrated from the middle Orinoco and founded new daughter villages, a process that repeated itself successively, moving in a westward direction, higher and higher upstream (Spencer and Redmond 2014, p. 789). By about A.D. 300, the demographic expansion reached the foot of the Venezuelan Andes. At this point, the good alluvial land was increasingly restricted; moreover, it has been established that there were people already living in the Andes by this time (Tarble 1977; Wagner 1967, 1972, 1973a, b). So, it would appear that conditions of environmental and social circumscription were both developing (Spencer and Redmond 2014, p. 790). As Carneiro (1981, 1998) has argued, such a context is favorable for the formation of chiefdoms, and that is what we observe in our study region around A.D. 550. After chiefdoms first emerged here, we hypothesize that a chain reaction of chiefdom formation set in, eventually reaching the Parmana area by A.D. 1100 (Spencer and Redmond 2014, p. 791).

What can we conclude about the tempo and mode of chiefdom formation in Venezuela? Although our data are not as complete as we would like, especially for the pre-A.D. 550 time period, I can offer a provisional assessment. First, consider the tempo of change. I suggest that one rough measure of political centralization in a society is the maximum number of villages integrated within the regional polity. If we combine the Parmana and Barinas data and graph this measure over time, we see a punctuational increase in the number of villages within a given region around A.D. 550 (Fig. 10.8). This graph, of course, can be considered a reflection not only of population growth but also of organizational change; regional integration among separate villages was undoubtedly much weaker before A.D. 550 than after, when a clear regional settlement hierarchy existed. It is reasonable to conclude that the tempo of social change in the El Gaván region around A.D. 550 was markedly punctuational. As far as the mode of change is concerned, I have discussed the appearance around A.D. 550 of inequality on multiple scales, including the community, moiety, household, and individual levels. Moreover, there is tangible evidence (the drained fields and causeway system) that this multiscalar social transformation was associated with a substantial increase in the energy-mobilizing potential of the regional political system.

Now let us shift our attention to the early Zapotec state, which emerged around 300 B.C. in the Oaxaca Valley. Earlier I referred to Zapotec state formation as one of several examples of convergent evolution in the world at large. In this section I focus on the tempo and mode of change in the Oaxaca case, i.e., whether early state formation here was a punctuational process and whether it involved concurrent major changes on multiple scales or levels of cultural organization.

Archaeologists have suspected for some time that a profound change occurred around 300 B.C. in the way that the Monte Albán polity interacted with other polities. One way to detect this is through certain changes in the carved inscriptions at Monte Albán. In the Early Monte Albán I phase (from 500 B.C., when the site was founded, to 300 B.C.), there were just three public buildings at Monte Albán, and one of them (Building L) had a display of stones carved with what are thought to be the likenesses of sacrificed captives taken through inter-polity raiding, a form of warfare that is highly characteristic of chiefdoms; raiding involves looting and the seizure of captives but not the taking and holding of distant territory (Flannery and Marcus 1983c; Marcus 1974, 1976; Redmond and Spencer 2006). At this time, there were no more than 2–3 tiers in the regional settlement hierarchy, consistent with chiefdom organization (Spencer and Redmond 2001b, 2003, 2004b). But, around 300 B.C. Monte Albán switched to a very different way of interacting with other polities: a shift from raiding to conquest (Redmond and Spencer 2006). We can see glyphic evidence of this shift if we compare

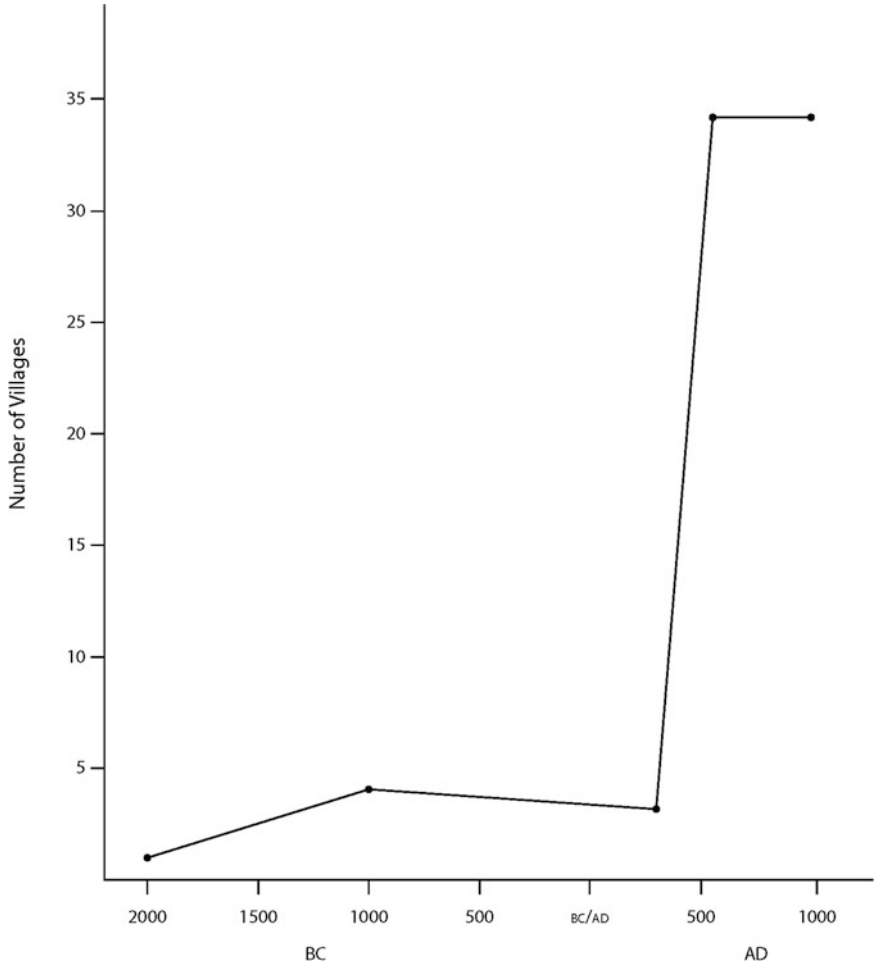


**Fig. 10.8** Change over time in the estimated number of villages in a regional polity, documenting the transition from autonomous village (tribal) society to chiefdom in Venezuela around A.D. 550

Building L with Building J, which was built in the Monte Albán II phase (and perhaps as early as the Late Monte Albán I phase) and has more than 40 stone slabs with inscriptions that were interpreted by Alfonso Caso (1947) as signifying territorial conquest; the inscriptions include place names to specify the regions that were subjugated.

Following up on Caso's pioneering work, Marcus (1976, 1980) sought to identify the actual places to which the conquest inscriptions might be referring. She noted certain similarities between the toponyms (place-name glyphs) on the Building J conquest slabs and the toponyms that appeared (with Spanish glosses) in the Codex Mendoza, a sixteenth-century Aztec document containing a list of places that were paying tribute to the Aztec (Marcus 1976, 1980). One of these tributary places in the Codex Mendoza was Cuicatlán, the toponym of which depicted a face with a flowery speech scroll ("place of song"), and Marcus proposed that a certain Building J conquest slab with a similar speech scroll was referring to a conquest of Cuicatlán by Monte Albán (Marcus 1980, p. 59). As she commented, "such a correlation between a 16th-century Aztec codex and Zapotec glyphs of Period II implies some 1500 years of place-name continuity. Hence, my suggestion is no more than a hypothesis" (Marcus 1980, p. 56).

To test this hypothesis, Redmond and I carried out a multistage field project in the Cañada that included regional survey, intensive site mapping plus controlled surface collecting, and extensive excavation (Redmond 1983; Spencer 1982, 2007; Redmond and Spencer 2006; Spencer and Redmond 1997, 2001a). We concluded that the data provided compelling support for the hypothesis that the Cañada was conquered by the Monte Albán state at the end of the Cañada's Perdido phase (750–300 B.C.) and remained in a subordinate status until the end of the Cañada's Lomas phase (300 B.C.–A.D. 200). The absolute dates assigned to these phases are supported by a series of radiocarbon dates (Spencer and Redmond 2001a).

A dramatic disruption occurred in the Cañada's settlement patterns around 300 B.C. All the pre-300 B.C. sites were abandoned, and new settlements were founded on nearby slopes and ridges (Redmond 1983, p. 83; Spencer and Redmond 1997, p. 600). In the central and southern Cañada, the 11 Perdido phase sites were succeeded by 14 Lomas phase sites, none larger than 5 ha, with a total occupied area of 27 ha, a decline from the situation in the Perdido phase, when the central and southern Cañada had 36 ha of occupation (Spencer 1982, p. 234; Spencer and Redmond 1997, pp. 599–600). A different pattern was observed at the northern end of the Cañada in the Quiotepec locality, where the single small (1.5 ha) Perdido phase site was succeeded by a massive 45-ha complex of seven Lomas phase sites that surrounded the natural pass leading into the Cañada from the Tehuacán Valley to the north. We have argued that these seven Quiotepec sites (some of which showed evidence of fortifications) constituted a military frontier installation, strategically positioned to monitor movement through the northern frontier of the Cañada (Redmond 1983, pp. 9–120; Spencer and Redmond 1997, p. 601). We observed that the Quiotepec locality also marked the northern limit of a distinctive Lomas phase pottery that showed stylistic similarities to contemporaneous pottery at Monte Albán, some 100 km to the south (Redmond 1983, p. 86; Spencer and Redmond 1997, p. 601).

At the southern end of the Cañada, the 2.25-ha Perdido phase village of Llano Perdido on the high alluvium was burned to the ground and completely abandoned; a new Lomas phase settlement (Loma de La Coyotera) was then established on an adjacent ridge (Spencer and Redmond 1997, pp. 505–506, Fig. 9.1). The 3-ha Lomas phase village was not much larger than Llano Perdido, but it differed from the earlier site in several ways. The basic residential unit changed from the Perdido phase pattern of large multifamily compounds to a pattern in Lomas phase of separate nuclear family households, each on its own residential terrace (Spencer 1982, pp. 231–234; Spencer and Redmond 1997, pp. 507–510). The latter resembles the typical household unit that has been reported for the Valley Zapotec (Blanton 1978; Flannery and Marcus 2005). We have proposed that the conquering Zapotec broke up the traditional Cuicatec multifamily compounds in order to disrupt interfamilial ties, which could have strengthened their hold over the subjugated locals (Spencer and Redmond 1997, p. 602).

Associated with the Lomas phase community was an extensive irrigation facility, evidenced by a canal scar and a dozen aqueducts that carried the canal over gullies; our excavation in the largest of these aqueducts dated its construction to the Lomas phase (Spencer and Redmond 1997, pp. 525–529). We were able to trace the canal scar down to the high alluvium, where the earlier Perdido phase village had been located. Since we also found surface evidence of canal irrigation at other Lomas phase sites in the central and southern Cañada, we think it likely that much or all of the 740 ha of high alluvium in the Cañada was brought under cultivation during the Lomas phase. Along with the 997 ha of low alluvium—which could have been farmed with diversionary dam and/or floodwater irrigation techniques—the introduction of canal irrigation to the high alluvium would have greatly increased the overall agricultural potential of the Canãda. It is important to note that the Cañada lies in a severe rain shadow, although it does receive substantial runoff from precipitation in the surrounding mountains; all successful farming in the region today depends on some form of irrigation. Redmond (1983, pp. 123–126) calculated that the Lomas phase population in the central and southern Cañada (i.e., south of the Quiotepec frontier) was well below the carrying capacity of just the low alluvium in both Perdido and Lomas phase times. So we suspect that the evident expansion of agricultural production onto the high alluvium in Lomas phase was primarily a response to tribute demands.

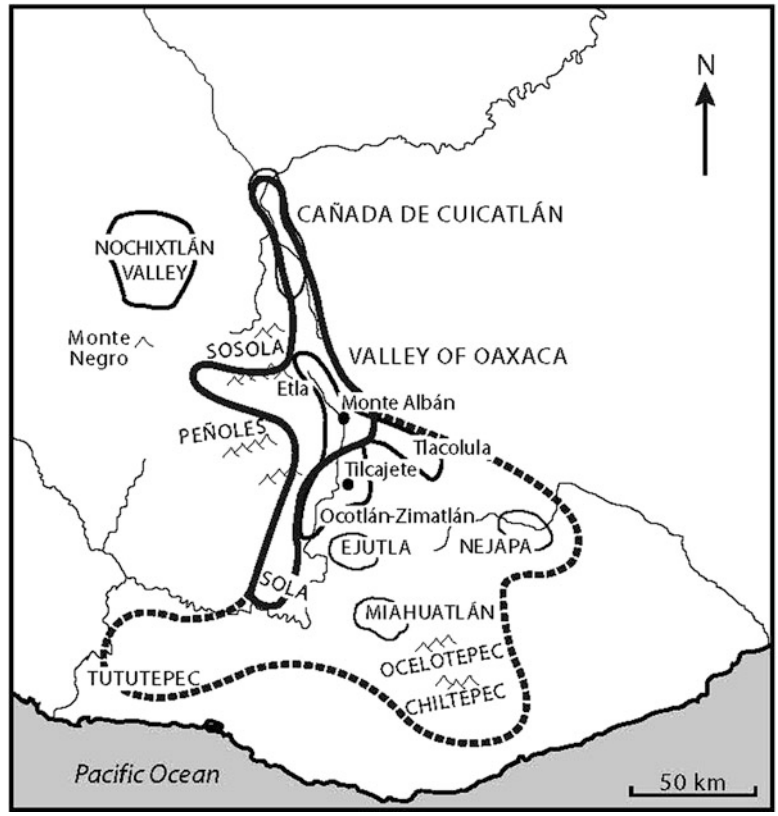


**Fig. 10.9** Proposed territorial extent of the Monte Albán state; solid bold line shows territory during the Late Monte Albán I phase (300–100 B.C.); dashed bold line shows territory added in the Monte Albán II phase (100 B.C.–A.D. 200); adapted from Spencer (2010, Fig. 4)

A two-phase process of territorial expansion by Monte Albán (Fig. 10.9) would be consistent with our research in the Cañada and with the work of researchers in other regions of Oaxaca (Balkansky 2002; Finsten 1996; Sherman et al. 2010; Spencer et al. 2008). In the first phase of this expansion, from 300 to 100 B.C. (Late Monte Albán I phase), Monte Albán extended its domain to the north, west, and southwest. Areas to the east and south—including the eastern (Tlacolula) and southern (Ocotlán-Zimatlán) subvalleys and other areas outside the Valley proper—appear to have resisted successfully for a while (Spencer and Redmond 2001b, 2003; Spencer et al. 2008). Then, in the second phase of Zapotec expansion, from 100 B.C. to A.D. 200 (the Monte Albán II phase), Monte Albán extended its control eastward and southward to annex the eastern and southern subvalleys and beyond, bringing its total political territory to perhaps as much as 20,000 km$^2$ (Marcus and Flannery 1996, pp. 206–207, Fig. 242).

In the Oaxaca Valley, there were significant changes in settlement patterns between the Early Monte Albán I phase and the Late Monte Albán I phase within the Etla-Central subvalley, the core area of the Monte Albán polity (Spencer and Redmond 2001b, Figs. 4, 5). Notably, the Late Monte Albán I phase witnessed the first appearance of a four-tier settlement-size hierarchy (an indicator of state organization) in the Etla-Central subvalley, with the top tier occupied by Monte Albán itself (Spencer and Redmond 2001b, 2003, 2004b). Another change in the Etla-Central subvalley was detected through a linear regression analysis of archaeological population (dependent variable) against potential population (independent variable), conducted by Spencer and Redmond (2001b) with data reported by Nicholas (1989). The regression analysis revealed the following: for the Early Monte Albán I phase, the $R^2$ value was 0.081 and the significance value was 0.056; for the Late Monte Albán I phase, the $R^2$ value was 0.158 and the significance value was 0.002, a much stronger significance level than for the Early Monte Albán I phase (Spencer and Redmond 2001b). This outcome reflects

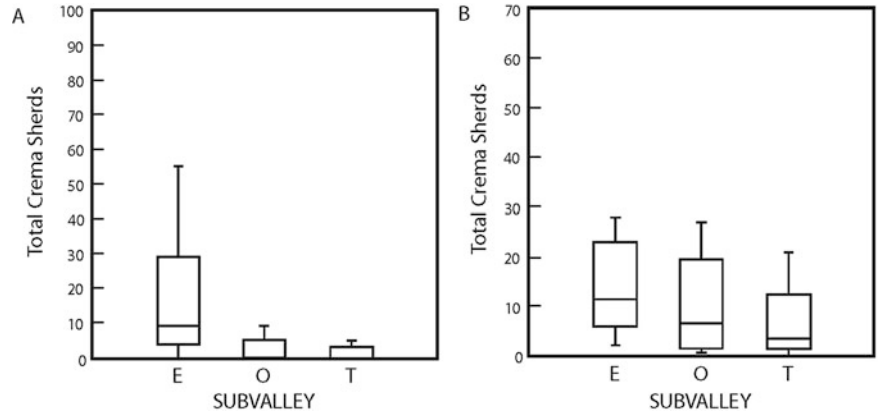


**Fig. 10.10** Distribution of cream ware (Crema) sherds among archaeological sites in the Etla-Central (E), Ocotlán-Zimatlán (O), and Tlacolula (T) subvalleys of the Oaxaca Valley. (**a**) Distribution of sherds of 10 Late Monte Albán I Crema types among 48 sites listed as Late Monte Albán I "central places" by Kowalewski et al. (1989, Table 6.4), of which 22 were in Etla-Central, 12 in Ocotlán-Zimatlán, 14 in Tlacolula. (**b**) Distribution of sherds of 9 Monte Albán II Crema types among 40 sites listed as Monte Albán II "central places" by Kowalewski et al. (1989, Table 7.4), of which 20 were in Etla-Central, 8 in Ocotlán-Zimatlán, 12 in Tlacolula. Ceramic data from Kowalewski et al. (1989, Appendix VI). Adapted from Spencer (2010, Fig. 3)

a shift in village location between the Early Monte Albán I phase and the Late Monte Albán I phase: after 300 B.C., villages were located so that the distribution of population more closely matched the distribution of agricultural resources (expressed in the regression analysis as potential population). Such a settlement shift would have enhanced the overall agricultural efficiency of the core area dominated by Monte Albán, allowing for the more effective mobilization of agricultural surplus to support the state's growing administration and burgeoning capital city. I conclude that by Late Monte Albán I times the nascent Monte Albán state had developed the capacity to intervene significantly into local-level decision-making regarding settlement location in the Etla-Central subvalley.

By the Monte Albán II phase (100 B.C.–A.D. 200), Monte Albán had evidently succeeded in bringing the southern (Ocotlán-Zimatlán) and eastern (Tlacolula) subvalleys under its control; the entire Oaxaca Valley showed a clear four-tier site-size hierarchy with Monte Albán at the top (Marcus and Flannery 1996, pp. 172–175). This political unification was reflected in the changing distribution of cream ware (or Crema) pottery, made from a distinctive clay whose source was near Monte Albán (Minc et al. 2007). Compare the distribution of Crema wares among the three subvalleys of the Oaxaca Valley in the Late Monte Albán Late I phase (Fig. 10.10a, left), with the distribution of Crema wares in the Monte Albán II phase (Fig. 10.10b, right). In Late Monte Albán I, the Etla-Central subvalley had statistically significant higher amounts than the Ocotlán-Zimatlán and Tlacolula subvalleys (Kruskal-Wallis statistic $= 17.954$; $P < 0.001$), probably because the political independence of the latter two subvalleys blocked the free exchange of Crema pottery. However, by the Monte Albán II phase, there was no statistically significant difference in the valley-wide distribution of the Crema wares (Kruskal-Wallis statistic $= 4.829$; $P = 0.089$), probably because all three subvalleys of the Oaxaca Valley were incorporated into the Monte Albán state by that time.

Major changes also occurred after the Early Monte Albán I phase in the architectural ground plans of individual sites. Most prominently, between 300 B.C. and A.D. 200 (the Late Monte Albán I and Monte Albán II phases, inclusive), many new institutional buildings were constructed on Monte Albán's main plaza (Fig. 10.11). They were highly diverse in morphology and likely function, including several kinds of temples, secular public buildings, a royal palace, a formal ballcourt—by my count, a total of approximately two dozen in all, representing an enormous increase from the three public/institutional buildings of the Early Monte Albán I phase (Acosta 1965; Flannery and

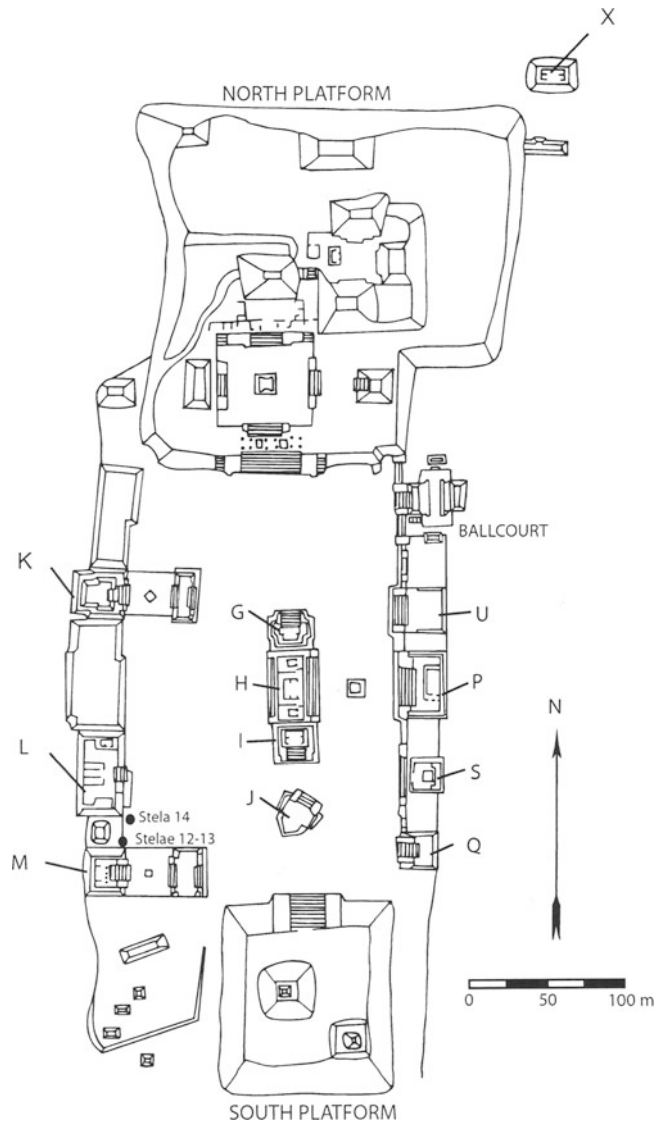


**Fig. 10.11** Main Plaza of Monte Albán; major buildings are identified by upper-case letters (redrawn from Flannery 1983, Fig. 412)

Marcus 1976; Marcus and Flannery 1996). The specific functions of all these buildings have not yet been determined, but it is reasonable to posit that the great increase in the diversity of religious and secular institutional architecture here reflects a comparable diversification of central authority and administrative personnel by the Monte Albán II phase. Unfortunately, construction activities after A.D. 200 at Monte Albán have made it difficult for archaeologists to document with precision the institutional architecture of Late Monte Albán I times. But useful information has resulted from recent fieldwork at the El Palenque site near San Martín Tilcajete, a Late Monte Albán I site located some 25 km south of Monte Albán in the Ocotlán-Zimatlán subvalley. Excavations at El Palenque exposed a palace complex that covered some 2790 $m^2$ on the plaza's north side, as well as a 5000-$m^2$-temple precinct on the plaza's east side, both securely dated by radiocarbon analysis to the Late Monte Albán I phase (Fig. 10.12; Redmond and Spencer 2013, 2017; Spencer and Redmond, 2004a, b).

The Late Monte Albán I palace complex and temple precinct at El Palenque represent major institutional changes from the previous Early Monte Albán I occupation at El Mogote, which lies

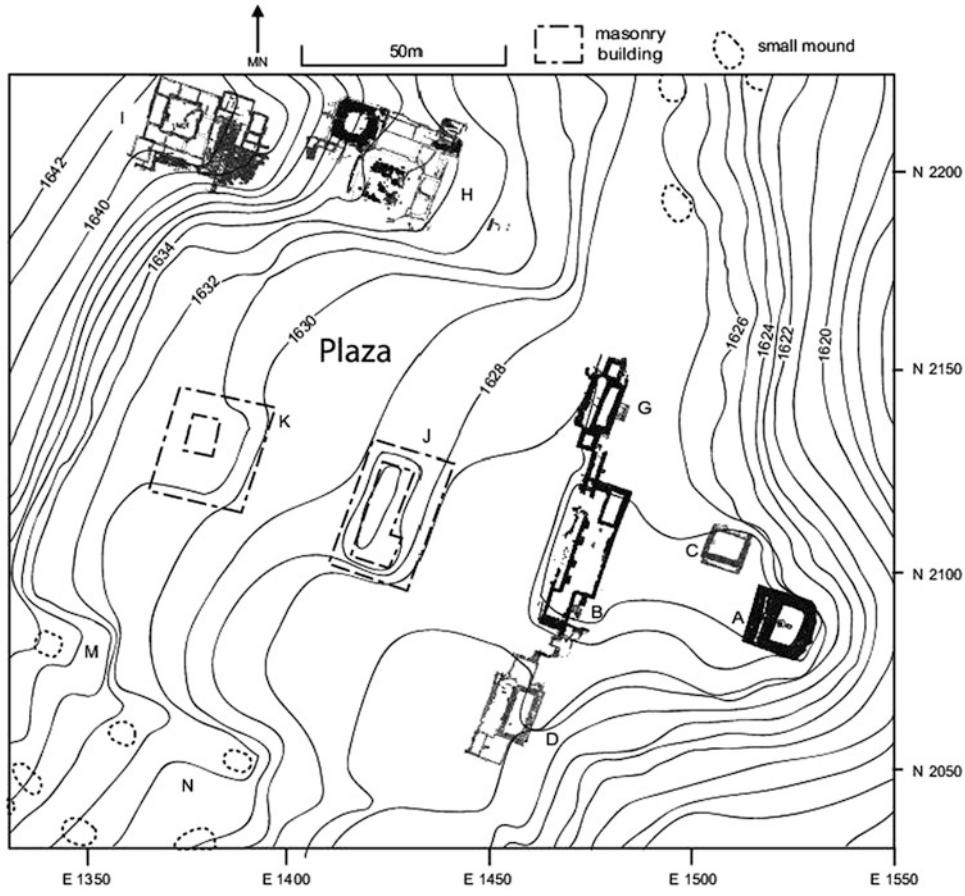


**Fig. 10.12** Plaza of El Palenque showing major buildings dating to the Late Monte Albán I phase (300–100 B.C.), including the palace complex on the plaza's north side and the temple precinct on the plaza's east side (redrawn from Redmond and Spencer 2017, Fig. 3)

across a gulley and less than 1 km to the east (Redmond and Spencer 2017, Fig. 1). Atop a 4-m-high mound on the north side of El Mogote's plaza, we excavated the masonry foundations of a high-status residence that consisted of four rooms arranged around a patio, along with 1–2 small ancillary structures, all dating to the Early Monte Albán I phase (Redmond and Spencer 2017, Fig. S1). By contrast, at the Late Monte Albán I palace complex at El Palenque, we exposed the masonry foundations of a 256-$m^2$ residence (Structure 7) that had 8 rooms surrounding a patio, along with the masonry foundations of 11 additional structures; the entire 2790-$m^2$ complex sprawled across two levels connected by a grand masonry staircase and extended along the entire northern side of the El Palenque plaza (Redmond and Spencer 2017, Figs. 3–4).

On the east side of El Mogote's plaza, we excavated the masonry foundations of a one-room temple dating to the Early Monte Albán I phase (Redmond and Spencer 2008, Fig. 4). At El Palenque, by contrast, the Late Monte Albán I temple precinct consisted of five masonry structures; three of them were multiroom temples and two were specialized priests' residences (Redmond and Spencer 2013). We also conducted limited excavations elsewhere in the plaza area of El Palenque that yielded Late Monte Albán I dates for several other institutional buildings, among them a possible ballcourt (Mounds K and J) in the middle of the plaza (Fig. 10.12). Based on the data from our horizontal excavations, the smaller-scale excavations, and the intensive survey at El Palenque, I estimate there

were 18 public/institutional buildings in and around the plaza during the Late Monte Albán I phase. By comparison, I estimate that the El Mogote had no more than 2–3 public/institutional buildings during the Early Monte Albán I phase, analogous to the situation on the Main Plaza of Monte Albán during the same phase (Flannery and Marcus 1983c).

We have argued that, during the Late Monte Albán I phase, El Palenque was the political capital of an independent state whose territory included all or most of the Ocotlán-Zimatlán subvalley; as such, it succeeded the nearby El Mogote site that was the probable capital of a chiefdom during the Early Monte Albán I phase and perhaps earlier as well (Redmond and Spencer 2006; Spencer and Redmond 2001b, 2003). In the very early years of the Monte Albán II phase, El Palenque was evidently burned and completely abandoned (Redmond and Spencer 2013, 2017; Spencer and Redmond 2001b, 2004a). A new site (Cerro Tilcajete) was founded on a hilltop 1 km to the north (Elson 2007; Spencer et al. 2008, Fig. 2). Based on the results of a surface survey and her extensive excavations, Elson (2007) concluded that Cerro Tilcajete served as a secondary administrative center of the Monte Albán state during the Monte Albán II phase.

Although the evidence at El Palenque of institutional architecture was recovered at the likely capital of an independent state in Ocotlán-Zimatlán and not at Monte Albán itself, we hypothesize that the latter site must have had a similarly diverse array of public/institutional buildings by the Late Monte Albán I phase, a hypothesis that future excavators will hopefully be able to test (Spencer 2003; Spencer and Redmond 2004b). In the meantime, we can use our data from El Palenque as a proxy estimate for the number of public/institutional buildings at the first-tier center of an independent polity during the Late Monte Albán I phase. I suggest that, for the purposes of comparative analysis, such an estimate may serve as a relative measure of the degree of internal specialization in a polity's central administration. We can use this measure to assess administrative complexity at different points of time in a single regional trajectory or to compare different regional polities. Accordingly, I have generated estimates for a series of Valley of Oaxaca phases that bracket the time of state formation, drawing on information in Acosta (1965), Elson (2007), Flannery (1983), Flannery and Marcus (1976, 1983c, 2015), Marcus and Flannery (2004), Redmond and Spencer (2013, 2017), and Spencer and Redmond (2004a, b). Note that the relevant first-tier site is San José Mogote for the phases prior to the Early Monte Albán I phase. El Palenque can serve as a proxy first-tier site for the Late Monte Albán I phase, while Monte Albán itself, of course, is the first-tier site for the remaining phases. While bearing in mind the very approximate nature of these measures, we can graph them against time and can gain an appreciation of the overall tempo of change here (Fig. 10.13). As the graph indicates, around 300 B.C. (the onset of the Late Monte Albán I phase) there was a dramatic, punctuational increase in the number of public/institutional buildings at the first-tier center, most likely a reflection of a corresponding increase in the degree of institutional specialization or differentiation in the political/religious administrative organization that used these buildings, which is a key indicator of state formation. And, as pointed out earlier, this development was contemporaneous with the appearance of a four-tier regional settlement hierarchy and also the annexation through conquest of distant territories, both of which are also characteristic features of state organization (Spencer and Redmond 2004b).

In addition, a growing body of data indicates that significant changes were occurring around 300 B.C. in household-level organization. Based on his excavations in a residential area at Monte Albán, Winter (1974) proposed that the typical household unit shifted from a single rectangular house in the Early Monte Albán I phase to an L-shaped construction composed of two rectangular units in the Late Monte Albán I phase. More recently, Lacey Carpenter (2017) has been conducting a program of horizontal excavations in domestic contexts at both El Mogote and El Palenque. Her initial findings reveal intriguing shifts in household ground plans between the Early Monte Albán I phase and the Late Monte Albán I phase. Carpenter's ongoing research promises to contribute substantially to our understanding of this important transition.

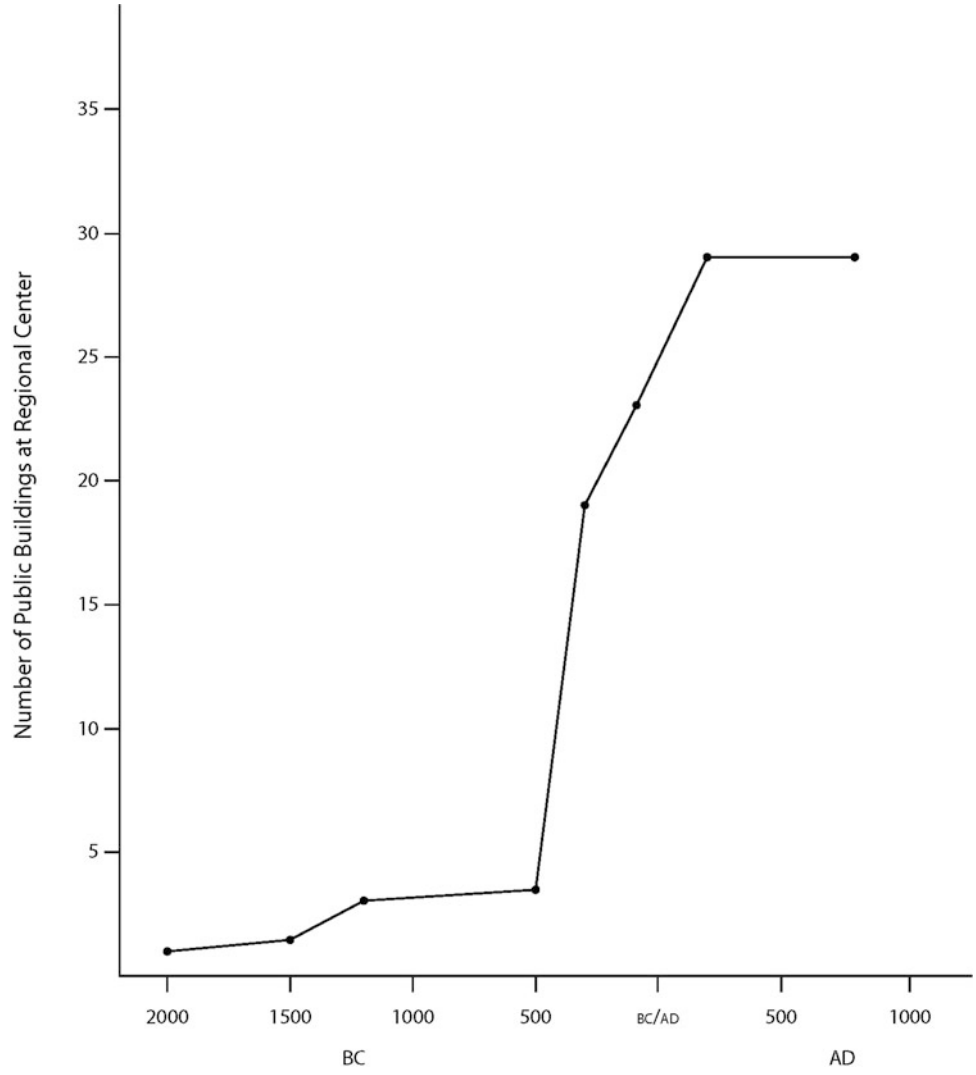


**Fig. 10.13** Change over time in the estimated number of public/institutional buildings in a regional polity's first-tier center, documenting the transition from chiefdom to state in Oaxaca around 300 B.C.

To sum up the data on state emergence in Oaxaca, I conclude that the tempo of change was punctuational while the mode of change was multiscalar and transformational. Between the Early Monte Albán I phase and the Late Monte Albán I phase, major changes occurred simultaneously on multiple scales of system organization: on the interregional level (the shift from raiding to conquest), on the regional level (more complex settlement patterns), on the community level (the emergence of new suprahousehold political and religious institutions), and probably on the household level as well. Moreover, this multiscalar transformation was accompanied by a substantial increase in energy mobilized by the Monte Albán polity, which it accomplished not only through successful interregional conquests and consequent tribute exaction but also through a settlement shift within the nascent state's core area that brought the distribution of the agricultural labor force more efficiently into line with the distribution of agricultural resources.

## Conclusion

Recalling the contrasting empirical expectations for cultural historicism versus cultural macroevolutionism (Fig. 10.4), I submit that the data on chiefdom formation in Venezuela and the data on state formation in Oaxaca are consistent with the macroevolutionist framework. In both cases, major social transformations came about punctuationally, involved concordant changes across multiple organizational levels of the system, and were associated with major increases in mobilized energy. I have also noted comparative analyses that found evidence of convergent patterning among several independent cases of state formation. While I recognize that the long-standing dispute between the historicist and macroevolutionist perspectives can hardly be resolved in a single paper, I conclude that cultural macroevolutionism is still very much on the anthropological table and worthy of further investigation and debate. Hopefully more archaeological trajectories will soon be subjected to detailed diachronic assessments of tempo, mode, sociopolitical complexity, energy mobilization, and convergence, with the goal of facilitating comparative analyses among evolutionary trajectories and the testing of competing theories about long-term social change.

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**Data Sharing Statement** The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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