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# 1

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This volume presents core issues and recent advances in the archaeology of the Jornada branch of the Mogollon culture located in south-central and southeastern New Mexico, western Texas, and northern Chihuahua, Mexico (figure 1.1). This region is an ecological and cultural border of the US Southwest. It is an area whose archaeological record displays periods of markedly “Southwestern” puebloan cultural patterns at certain times and places, but also shows substantial interaction and shared cultural patterns with peoples bordering the Southwest on the Southern Plains to the east and in the area of modern northern Mexico to the south. The “Jornada” concept most unambiguously applies to the Formative (starting in the early centuries of the current era), when pottery and housing styles highlight inter-regional variation in the Southwest, and this period is the focus of this volume. However, some chapters consider the broader developmental context and cover periods extending from the Late Archaic through the end of the Formative. Combined, the chapters address topics of interest beyond the Jornada and the American Southwest, such as mobility, forager adaptations, the transition to farming, responses to environmental challenges, and patterns of social interaction.

The significance of the Jornada area has been recognized since at least the 1930s and its formal status as a named culture “branch” dates to the 1940s (Lehmer 1948), but parts of the area have remained understudied and underreported beyond the limited distribution

## *Diversity and Change in a “Marginal” Region and Environment*

THOMAS R. ROCEK AND  
NANCY A. KENMOTSU

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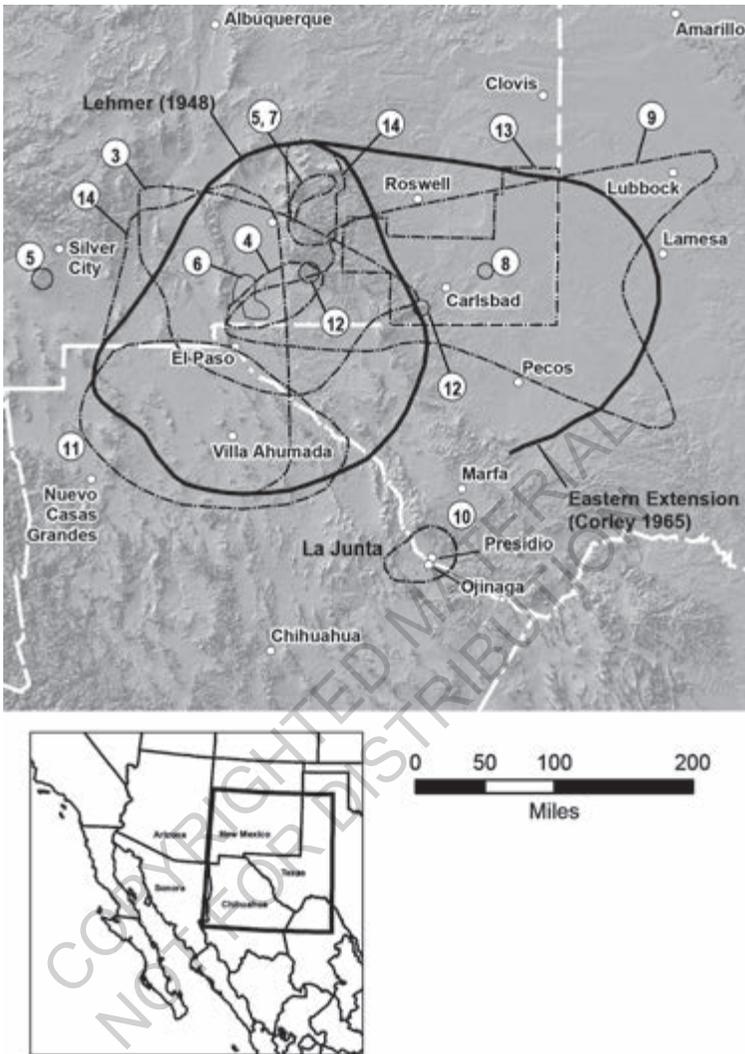


FIGURE 1.1. Regions of the Jornada Mogollon discussed in each chapter of the text. Short outlines are shown as continuous (rather than interrupted) lines to make them easier to see. Chapters 1 and 2 (dark continuous lines) address issues for the whole Jornada. Chapters 5 and 14 each focus on two separate regions, indicated by two separate outlines. The northeastern of the two regions discussed in chapter 5 is also the area discussed in chapter 7, as indicated by both a 5 and a 7 labeling the outlined area. Figure by Sandra L. Hannum.

of Cultural Resource Management (CRM) reports and regional conference proceedings. However, recent large-scale CRM work in parts of the Jornada have amassed one of the largest data sets in the Southwest with up-to-date chronological, architectural, faunal, ceramic, obsidian sourcing, and other specialized studies. Other portions of the Jornada, while remaining much less researched, nevertheless are now well-enough understood to demonstrate tremendous variation and complexity in economic and social adaptations. The volume draws together results from these materials with chapters by some of the researchers currently most active in the area.

The concept of the “Jornada branch of the Mogollon culture” was an outgrowth of the gradual recognition of regional variation in the archaeology of the Southwest. The earliest syntheses of Southwestern prehistory were centered in the Colorado Plateau country of northeastern Arizona, northwestern New Mexico, southwestern Colorado, and southeastern Utah, and summarized in the “Pecos Classification” developed under the leadership of A. V. Kidder (1927). Although Kidder and others were well aware of regional variation in Southwestern prehistory (e.g., Kidder 1924), subsequent decades of research formally recognized this variation through taxonomic definitions that distinguished the northern “Anasazi” (or more recently “Ancestral Pueblo”) cultural area from the southern Arizona Hohokam, the Mogollon of eastern Arizona and western New Mexico, and eventually the Colorado River–region Patayan. Over the decades, further subdivisions and transitional areas were identified among these large regional archaeological taxonomic divisions (e.g., Cordell 1984, 1997; Cordell and McBrinn 2012; McGregor 1941, 1965; Roberts 1935).

As these regions were delineated, an association between the major archaeological cultures and geographical ecological zones was often explicitly or implicitly noted: the Anasazi with the Colorado Plateau highlands, the Hohokam with the Sonoran Desert of southern Arizona, the Patayan with the Colorado River valley and adjoining highlands, and the Mogollon with the mountainous environment fringing the southeastern end of the Colorado Plateau. But each of these cultural areas was also recognized to subsume substantial environmental and cultural diversity as well.

In the case of the Mogollon, internal divisions were formalized with the definition of a series of geographical “branches” delineated over more than a decade of research (Wheat 1955:8). One of the last major subdivisions added was the Jornada branch of the Mogollon (hereafter Jornada),<sup>1</sup> defined by Lehmer (1948) as a broad swath that extended the Mogollon over much of the basin-and-range as well as the mountainous highlands of south-central New Mexico, a small part of Trans-Pecos Texas, and a section of north-central

Chihuahua. A more recent proposal by Corley (1965) roughly doubled the Jornada and extended it further into western Texas (figures 1.1, 1.2), that is, well into the fringes of the area commonly considered the “Southwest” of the United States. Identifying the Jornada’s cultural links in additional areas to the south and east remain topics of research (see Kenmotsu, chapter 10, and Cruz Antillón et al., chapter 11, both in this volume).

The net result is that in many ways, the Jornada Mogollon with its eastern extension is both the largest and arguably the most “peripheral” of the divisions of the major archaeological areas of the Southwest. The Jornada is often regarded as marginal with limited relevance to the Southwest in general and to the Mogollon in particular. It is frequently viewed as a monotonous extension that is of minimal research interest compared to the dynamic Mogollon core area in the mountains of western New Mexican and eastern Arizona (Lekson et al. 2004). This volume is intended to counter this imbalance both in the attention and understanding afforded the region. The large data sets that have been, and continue to be, collected from across the Jornada illustrate that cultural processes demonstrated in other regions of the Southwest—changes in subsistence, technology, mobility, and land tenure, among others—align with the developmental trends in the Jornada. Specifically, contributors to the volume use their data to highlight three major topics: the Jornada’s environmental and cultural diversity; the region’s developmental trends that parallel those elsewhere in the Southwest; and, issues of broad anthropological interest.

## THE ENVIRONMENT OF THE JORNADA

The Jornada is anything *but* monotonous, encompassing almost the full range of environments encountered in the Southwest (figure 1.2). Dry desert lowlands prevail in Chihuahua and the Basin Lowlands of southern New Mexico and in the vicinity of El Paso, Texas (hereafter referred to as the Western Jornada).<sup>2</sup> The transition to a xeric environment in these lowlands was well underway by 9,000 years ago as desert scrub and succulents began to dominate the vegetation (Abbott et al. 2009:2–52). Broad-valley riverine habitats are found along the Rio Grande as it cuts through the region from the lowlands around Las Cruces, New Mexico, flowing southeast to demarcate the border between Chihuahua, Mexico, and Texas. The Pecos River, east of the area included in Lehmer’s original map, is another significant riverine habitat of the Jornada flowing past Roswell, New Mexico, in the north, then southeast through New Mexico and delimiting Trans-Pecos Texas. In contrast to the relatively narrow Rio Grande valley, the Pecos valley is broad and

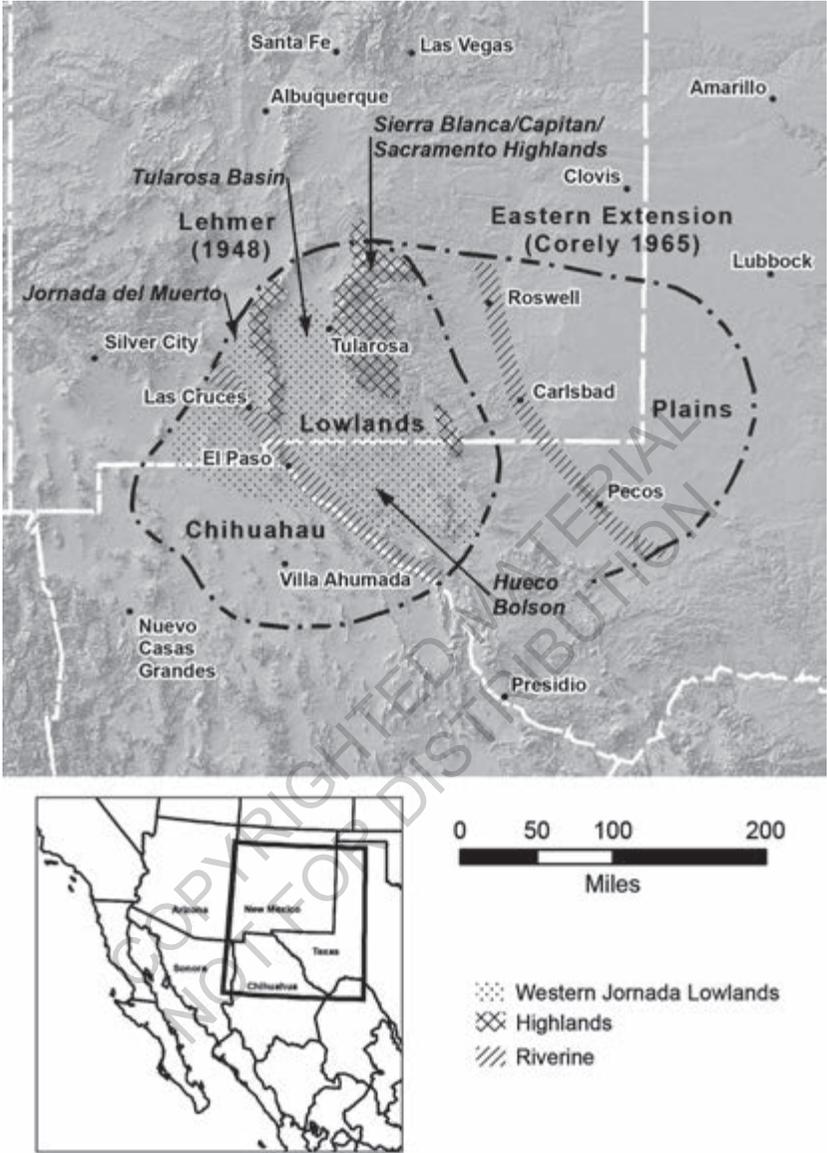


FIGURE 1.2. Schematic outlines of the major subdivisions of the Jornada Mogollon region discussed in the text. Figure by Sandra L. Hannum.

gently slopes west to highland foothills; to the east it also slopes gradually through areas of sand hills, including the area known as the Mescalero Plain (see Railey, chapter 13, this volume) to the escarpment marking the edge of the Southern Plains. The Pecos is also characterized by several major western tributaries, notably the Rio Peñasco near Artesia, New Mexico, and particularly the Rio Hondo, which creates what Wiseman (2013) characterizes as the “Roswell Oasis” near Roswell, New Mexico.

In the original definition (Lehmer 1948), the Jornada extended only as far east as the eastern foothills of the Sierra Blanca and Capitan Mountains, but the subsequent eastward extension of the Jornada culture area (Corley 1965) encompasses portions of the Southern Plains and prominent sandhills in west Texas and extreme southeastern New Mexico. Many archaeologists do not consider this part of the Jornada, and the nature of this region’s cultural pattern in relation to other parts of the Jornada remains an important topic of research. In this volume we refer to this area simply as the Eastern Extension. In addition to these ecosystems, the Jornada includes piñon–juniper as well as ponderosa forest and subalpine highland ecosystems. These include (from west to east) the Organ Mountains separating Las Cruces and the Tularosa Basin, Otero Mesa, the Sacramento Mountains, Sierra Blanca, the eastward-extending finger of the Capitan Mountains, and the Guadalupe Mountains that straddle the New Mexico–Texas border. For the purposes of this volume we refer to these mountain systems collectively as the *Sierra Blanca/Capitan/Sacramento Highlands*, though environmentally and culturally they encompass substantial variation that warrants finer subdivision.

Finally, a basin-and-range desert environment of internally drained valleys interspersed by northwest–southeast trending low mountains (similar to parts of the Western Jornada Lowlands and the low-lying parts of the Eastern Extension) characterizes northern Chihuahua. This region encompasses a substantial part of the Jornada culture area, which we refer to simply as the Southern Jornada Mogollon.

## GENERAL OUTLINE OF CULTURAL HISTORY IN THE JORNADA

Cultural patterns among the distinct microenvironments of the Jornada and across time range from highly mobile hunting-and-gathering groups with limited archaeological visibility to aggregated and relatively sedentary agricultural communities. Multiple prehistoric ethnic groups are also probably represented (see Wiseman, chapter 14, this volume). Various regions of the Jornada exhibit much of the same range of cultural developments seen elsewhere in

the Southwest, as well as unique ones. In the review of the Jornada's culture history that follows, we begin with the Late Archaic period and then broadly describe the Formative period (AD 200–1450) across the area—including trends in architecture, settlement systems, land use, and subsistence—to present the context for the subsequent chapters.

The material cultural variability characteristic of the Formative-period Jornada was not yet notably developed during the Late Archaic period (1800 BC–AD 200) and many regions share similar trends. Across the Jornada there was an increase in the number of sites and features in those sites, suggesting a rising population. In contrast to earlier periods, Late Archaic sites are also found in all environmental zones whether in the Tularosa Basin Lowlands, Otero Mesa, the Sierra Blanca/Capitan/Sacramento Highlands, the Southern Jornada Mogollon, southeastern New Mexico, or the Texas Trans-Pecos (Cruz Antillón et al., chapter 11, and Railey, chapter 13, both this volume; Kelley 1984; Mauldin and Miller 2009; Miller and Kenmotsu 2004:229; Phelps 1998). Structures commonly consisted of small, shallow, basin-shaped depressions (Dering et al. 2001; Miller and Kenmotsu 2004), often surrounded by hearths and pits (Graves et al. 2014:197). In some areas, such as the Sierra Blanca/Capitan/Sacramento Highlands, no structures are known, either due to contrasting settlement patterns or, more likely, limited research. Where found, sites usually contain no more than one or two structures and researchers believe they represent the remains of extended family encampments. However, as a departure from this model, recent excavations at site LA 91759 in the Western Jornada revealed a “dense cluster of pithouses and pits with a common extramural activity area to the east” radiocarbon dated between 50 BC and AD 150 (Graves et al. 2014:197), indicating that in this portion of the Jornada Late Archaic settlement patterns were undergoing changes that have not been detected in other regions.

Subsistence continued to focus on hunting and gathering throughout most of the Jornada. Rockshelters with Late Archaic components have yielded large quantities of deer and other large-mammal bone; fauna at lower-elevation sites are dominated by rabbit and hare (jackrabbit) species. Dart points changed to smaller corner- and side-notched forms in the latter portion of the period. Data from the Sierra Blanca/Capitan/Sacramento Highlands and their edges provide conclusive evidence that cultigens (maize and beans) also were a part of Late Archaic subsistence in and around the highlands near the Western Jornada (Campbell and Railey 2008; Railey and Turnbow, chapter 5, this volume; Wiseman 1996b)—see data from two rockshelters overlooking the Tularosa Basin Lowlands, Fresnal Shelter (LA 10101; Tagg 1996) and Tornillo

Shelter (LA 71687;<sup>3</sup> Upham et al. 1987), as well as the Sunset Archaic site (LA 58971) and several other Late Archaic sites located in the Hondo Valley further north and east. Several of these sites had multiple large, bell-shaped storage pits suitable for crop storage (Railey and Turnbow, chapter 5, this volume; Campbell and Railey 2008; Wiseman 1996b). To date, other regions of the Jornada do not exhibit this same early adoption of cultigens.

#### THE FORMATIVE IN THE JORNADA

As elsewhere in the Southwest, hallmarks of the Jornada's Formative period are typically the manufacture of ceramics, the increased presence of substantial houses, and the use of the bow and arrow. The exact timing of the appearance of these new technologies remains imprecisely known and probably varied across the region, with the earliest-dated pottery in the Western Jornada around AD 200, followed in the eastern portion of the region around AD 500 (Campbell and Railey 2008:17; Miller 2005a; Railey 2011:13–14; 2015:30; Wiseman 1996b:188) (figure 1.3). The number of ceramic types found across the region led to Lehmer's division of the ensuing Formative archaeological sequence in the Jornada (within his 1948 boundaries) along a north–south split into two phase sequences (figure 1.3). In the Sierra Blanca/Capitan/Sacramento Highlands, he proposed a northern sequence of the Capitan, Three Rivers, and San Andres phases;<sup>4</sup> the ceramic types manufactured in that region are (from earliest to most recent) Jornada Brown, Broadline Red-on-terracotta, Three Rivers Red-on-terracotta, Chupadero Black-on-white (thought by Lehmer to be intrusive, but now known to be locally manufactured), Corona Corrugated, and Lincoln Black-on-red, as well as types associated with Lehmer's southern (our “Western Jornada Lowlands”) sequence described below, and intrusive from distant regions such as Mimbres and northern Chihuahuan types. Jane Kelley (1984 [original 1966]) divided this highlands region (with an extension northward into the Jicarilla Mountains) into two additional parallel Formative-phase sequences (Early and Late Glencoe phases in the south, and Corona and Lincoln phases in the north), with her southern sequence associated particularly with the persistence of pithouse architecture and high percentages of brownwares in contrast to the development of pueblo architecture and prevalence of more-decorated wares in the north. Although Kelley (1984) originally dated the start of both highland sequences ca. AD 1100, subsequent research has extended the Formative in this region to about AD 500.

In the Western Jornada Lowlands, Lehmer proposed his southern sequence of the Mesilla, Doña Ana, and El Paso phases; Miller (2005a) modified the

Date	Western Jornada (generic periods)	Western Jornada	Sierra Blanca/Capitan/ Sierra Blanca Highlands		Eastern Extension	Eastern Extension (generic periods)	Date
			South	North			
	Late Prehistoric	Late Prehistoric	Late Prehistoric	Late Prehistoric	Late Prehistoric	Late Prehistoric	
A.D. 1450	Formative	El Paso	Late Glencoe	Lincoln	Ochoa	Late Formative	A.D. 1450
A.D. 1275/1300		Late Doña Ana	Middle Glencoe	Corona	Maljamar		A.D. 1150/1100
A.D. 1150			Early Glencoe				
A.D. 1000		Early Doña Ana	unnamed Early Formative		Querecho	Early Formative	
A.D. 650		Late Mesilla			Hueco		A.D. 500/550
A.D. 200/400		Late Archaic	Hueco (Archaic)	Late Archaic		Late Archaic	

FIGURE 1.3. Major Jornada regional chronologies; dates approximate. Not all local phase sequences are listed. After Kelley (1984 [originally 1966]), Miller (2005a), Miller et al. (2016); Railey (2015, 2016); Whalen (1981a, 1994b); Wiseman (1985b, 2014, 2016b).

sequence by defining an Early Doña Ana phase (AD 1000–1150) and a Late Doña Ana phase (AD 1150–1300). The local ceramics for this sequence are El Paso Brownware, El Paso Bichrome, and El Paso Polychrome; instrumental neutron activation analysis (INAA) has shown all were manufactured in the Tularosa Basin (Miller and Ferguson 2010) and the polychrome vessels were widely traded to other regions of the Jornada and other regions of the Southwest (see Hill, chapter 9, this volume; Kenmotsu, chapter 10, this volume; and Cruz Antillón et al., chapter 11, this volume). The phase sequence for the Western Jornada Lowlands is also used in the Southern Jornada Mogollon region in north-central Chihuahua. In the eastern portions of the Jornada, including the Texas Trans-Pecos east of the Tularosa Basin, a number of phase names have been proposed over the decades (Collins 1968; Corley 1965; Jelinek 1967; Leslie 1979). Recently, Railey (2015) proposed a simplified temporal scheme for far southeastern New Mexico: Early Formative (AD 500–1150) and Late Formative (AD 1150–1450). That temporal scheme for southeastern New Mexico and the Trans-Pecos in Texas is used in this volume.

As noted, the hallmarks of the Formative—the appearance of ceramics, substantial houses, and the bow and arrow—indicate changing adaptations across the Jornada. In turn, they initiated a trend toward sedentary or semisedentary settlements, varying degrees of agricultural dependency, and social integration. These changes are associated with changes in settlement size, land tenure, and technology (coarse- versus fine-grained lithics, vessel size and shape, etc.)

(Bogges et al., chapter 8, this volume; Hogan 2006; Miller and Kenmotsu 2004; Railey 2015). This trajectory, which played out in the Jornada between AD 200 and 1450, was a pattern that has been identified, with differing forms, timing, and emphases, throughout the American Southwest. Below we provide more detail on specific aspects of the changes in the Jornada related to architecture, settlement patterns, land use, and subsistence during the Formative.

### *Architectural and Settlement Changes*

Throughout the Jornada, architectural forms began with small, shallow, basin-shaped huts of the Late Archaic (Hogan 2006; Miller and Kenmotsu 2004; Railey 2015). These types of structures are quickly built and imply they were used for a limited time by mobile residents (Gilman 1987). In the Western Jornada they began around AD 200, but by AD 500/600 these types of structures or slightly more substantial ones, associated with ceramics and arrow points, have been identified throughout the Jornada (see Rocek, chapter 2, this volume, for a discussion of variation in these patterns). The one to three structures present at the sites suggest they housed a small number of seasonally mobile households. By the eighth century, round and rectangular pithouses replaced the huts in most regions. The pithouses were more formally constructed and often larger, requiring greater labor effort to build them. Such structures suggest an increased length of stays and a lower level of mobility. Some sites in the Western Jornada have notably large pit structures that are inferred to have a communal function (e.g., Lehmer 1948; Whalen 1994b). Around AD 1000, formal pit rooms—square in shape, shallower than the pithouses, often containing prepared caliche or adobe-plastered floors, and hearths with raised plastered collars—began to replace the pithouses. In the Western Jornada Lowlands and in the Late Glencoe phase of the Sierra Blanca/Capitan/Sacramento Mountain Highlands, these pit rooms are often found in one or more parallel rows (Kelley 1984; Miller et al. 2010). The energy expenditure to construct these rooms and their more formal features indicate they were occupied for yet greater periods of time. Moreover, the presence of several pit rooms at any one site argues that settlement size was increasing.

Settlement changes in the Early Formative in southeastern New Mexico and Trans-Pecos Texas differed in some regards from the other regions. In southeastern New Mexico, Railey (chapter 13, this volume) presents evidence of population abandonment of some areas due to drought conditions but a few sites contained nucleated settlements around oases. In the Texas Trans-Pecos, the evidence is meager outside of the Tularosa Basin. The few substantial investigations of Formative sites there indicate a continuation of small

family groups living in small huts as they had during the Archaic (Hines et al. 1994). Nonetheless, they too used bows and arrows and their sites contained potsherds from the Western Jornada and goods from regions to the south or southwest, indicating they were aware of the developments in these areas.

Construction of pit rooms continued throughout the Formative, but around AD 1300 construction of contiguous-room pueblos began in most regions of the Jornada and continued until AD 1450. The El Paso-phase pueblos of the Western Jornada have received greater attention due to the quantity of CRM work at federal installations in the Tularosa Basin. These pueblos are largely found along the alluvial fans at the base of the Organ Mountains or near large playas that periodically fill with water (Carmichael 1986; Whalen 1977, 1978). The majority are small- or intermediate-size linear roomblocks of fewer than 20 rooms, but three have 100 rooms or more, and two others have over 50 (Miller et al. 2010:5–10, 36). Seventeen have plazas, and those with seven or more rooms contain large communal rooms; both the communal rooms and plazas are thought to have functioned as integrative facilities (Miller and Graves 2009:357). A particularly well-studied example is Madera Quemada Pueblo (LA 91220), a 13-room pueblo near Coe Lake Playa, occupied for only four or five years between AD 1300 and AD 1350. Like many other El Paso-phase pueblos, it was ritually burned upon abandonment (Miller and Graves 2009).

In the southern (Glencoe phase) sequence of the Sierra Blanca/Capitan/Sacramento Highlands, true pueblo architecture is not apparent but dense clusters of subrectangular to rectangular abutting pithouses (exemplified by the Bonnell Site, LA 612 [Kelley 1984]) appear to fulfill a similar settlement function. Larger, apparently communal rooms are present. In the northern (Lincoln phase) Highland sequence, pueblos did develop, often plaza-oriented or linear in form, typically consisting of around a dozen to over a hundred rooms (Kelley 1984; Natker 2016; Wiseman 2016b). Few of these have been excavated, but examples offering some data include the Hiner Site 1 Pueblo near the northern end of the highlands; this site consisted of three pueblos, two of which were square buildings with a central plaza; the third was a linear room block (Kelley 1984:43, 185–194). Five contiguous rooms were excavated in the largest structure, which was estimated to have had 120 rooms. Earlier components underlay the excavated rooms. The Robinson site (LA 46326) is similarly constructed around a large central plaza and contains perhaps 150 contiguous rooms as well as some outlying roomblocks (Kelley 1991). Limited excavation at Robinson failed to identify a communal room, but some other Lincoln-phase pueblos such as the Block Lookout site (LA

2112) have them. Unlike their placement in El Paso-phase pueblos, these structures tend to be offset from the roomblocks or be inside the plaza areas (Wiseman 1996a, 2016b).

Pueblos or other aggregated sites were also constructed in the Jornada's Eastern Extension (Miller et al. 2016; Railey 2016). Prior to the Late Formative, the archaeological data suggest this region "was peripheral to—but not unaffected by—demographic and subsistence changes" elsewhere in the Jornada (Miller et al. 2016:21; see Railey, chapter 13, this volume, for a detailed analysis). Here the settlement, subsistence, and social developments between AD 1300 and 1450 in part parallel those taking place to the west, with aggregation into larger settlements of multiple rooms. These, however, show rapid change and a diversity of architectural forms ranging from substantial pueblos near Roswell, New Mexico (generally included in the Lincoln-phase taxon of the highlands to the west), to less-compact linear arrangements of surface rooms, to collections of pit structures found over a broader portion of the Eastern Extension. The best-known examples of the former pattern fall toward the end of the Late Formative and include the fourteenth- to early fifteenth-century Henderson (LA 1549) and Bloom Mound (LA 2528) pueblos; examples of the latter include the mid-thirteenth- to early fourteenth-century Rocky Arroyo (LA 25277) and Fox Place (LA 25277) sites in the "Roswell Oasis" (Wiseman 2013) on the west edge of modern Roswell (Speth 2004b, 2008; Speth and LeDuc 2007; Wiseman 2002, 2013). In the Eastern Extension of far southeastern New Mexico, the Merchant site (LA 43414) combines linear room alignments with slab "*cimiento*" foundations and a few isolated rooms, for a total of at least 21 surface rooms (Miller et al. 2016). This site is classified as part of the fourteenth- to early fifteenth-century Ochoa phase of the Eastern Extension region chronological sequence (figure 1.3), and is part of a broader scatter of relatively little-studied Late Formative village sites in this area (Railey 2016).

Some Eastern Extension sites had communal or ceremonial architecture or other features. Bloom Mound had a deep pit structure with a presumed ceremonial function (Speth 2008). A deep kiva at Fox Place had a horned serpent plastered on its walls (Wiseman 2002). Henderson Pueblo, with an estimated 130 rooms, had a large earth-oven complex that "served as the principal communal and ritual focus" for the village of some 80 individuals (Speth 2004a:421), though excavation identified no communal architecture. In addition to its surface rooms, the Merchant site had two pit rooms, dug through hard-pan caliche, that probably served communal and ceremonial functions (Miller et al. 2016:21, 405).

### *Subsistence Patterns in the Jornada*

Reliance on cultivated crops versus the collection and hunting of wild plants and animals is clearly tied to changes in settlement intensity, architectural forms, and social organization. The extant archaeological record for the various regions of the Jornada illustrate a general increase in the importance of cultivated plants (specifically maize and beans) over the Late Archaic and Formative sequence, but non-domesticated foods remained important in many cases.

In the Western Jornada, maize, and to a lesser extent beans, were part of the subsistence foods as early as AD 200 but ubiquity ratios show that these domesticates were far from the primary dietary staples (Miller and Kenmotsu 2004; see Miller and Kenmotsu, chapter 3, this volume, and Condon and Vasquez, chapter 4, this volume, for detailed explorations of the Western Jornada subsistence sequence). As in the Late Archaic, rabbit species were the primary protein staple in the small sites in the basin while larger mammals served that purpose in the rockshelters and uplands. Several dozen wild plant taxa have been identified in pits, hearths, and structure remains from the small sites dating to the Mesilla phase. A continuing concern with understanding the subsistence patterns of the Mesilla phase in the lowlands is the often uneven recovery of plant remains, especially from sites in the basin proper, where preservation rates are quite low (Miller and Kenmotsu 2004). By the Early Doña Ana phase (AD 1000–1150), however, settlement moved from the basin to the alluvial fans that ring the edge of it. Recovery of plant remains at those sites is higher and shows that while the ubiquity of cacti/succulents continues to increase, so do maize and beans. In the subsequent Late Doña Ana and El Paso phases, the ubiquity of maize continues to increase. Beans and cacti/succulents, however, decrease (see Miller and Kenmotsu, chapter 3, this volume, for a discussion of the reasons for this decrease and how they are linked to architectural forms and settlement intensity; see Miller and Montgomery, chapter 12, this volume, for an exploration of burnt-rock middens and the role of pit-baked cacti/succulents from the Archaic through the Formative and into the historic period).

Unlike the Western Jornada Lowlands, early Formative evidence from the Sierra Blanca/Capitan/Sacramento Highlands begins around AD 500 and indicates that maize ubiquity was much higher than it was in the lowlands, despite substantial residential mobility (Campbell and Railey 2008; Railey and Turnbow, chapter 5, this volume; Rocek 1995, 2007a). Large bell-shaped pits at Late Archaic (see discussion above) and Early Formative sites also reflect the early importance of agriculture in this region. This carries over into

later periods with significant evidence of farming in the Late Formative. At a number of later sites in the Roswell Oases, however, this evidence is combined with large numbers of bison bones, suggesting that bison hunting and/or trade onto the Southern Plains was part of a broader regional pattern (see below) (Speth 2004b; Wiseman 2013).

Southeast of the highlands, beyond the Roswell area, evidence of farming is evident in the recovery of maize as well as possible agricultural features at the Late Formative Merchant site. Finds of maize occur at a few other sites in this region but wild-plant resources are clearly important (Miller et al. 2016). Evidence of bison hunting increased across the area and in the broader Southern Plains after about AD 1250 (Miller et al. 2016; Railey 2016:111). The degree of reliance on agriculture in the Late Formative villages of the Eastern Extension remains a topic of research.

In the Eastern Extension of western Trans-Pecos Texas, ceramics have been recovered, but evidence of subsistence other than hunting and gathering is lacking, although it should be noted that few subsurface investigations have been undertaken. Demographic fluctuations described by Railey (chapter 13, this volume) suggest potential shifts back and forth between settled and mobile communities over time, and the movement of ceramics and other resources show substantial connections between mobile populations in the Eastern Extension and village groups in the highlands and basins to the west and northwest, as well as movement within individual regions as well (in this volume, see Miller et al., chapter 6; Lynch and Rocek, chapter 7; Boggess et al., chapter 8; and Hill, chapter 9).

The Southern Jornada Mogollon of northern Chihuahua is by far the least-explored region. As outlined by Cruz Antillón et al. in chapter 11, the region's architecture, ceramics, and presumably subsistence show strong ties to patterns seen in the Western Jornada Lowlands, though they also show a broad pattern of interaction with and influence by the Casas Grandes culture to the west. Currently most information for this area is based on surface data and excavations of a few pueblos resembling those of the El Paso region.

### *Abandonment and the End of the Formative*

The end of the Formative period across the Jornada is marked by the disappearance of settled aggregated communities. The timing of this remains imprecisely known, but across much of the region it seems to fall in the early to mid-fifteenth century AD, suggesting a broad pan-regional environmental factor, a cascade of interacting social and/or economic changes, or, most likely, a combination of these. The same period is marked by the disappearance

of occupation at Paquimé and at substantial sites in other portions of the southern Southwest within and beyond the Mogollon (Phillips and Gamboa 2015; see also chronometric analysis in Railey, chapter 13, this volume). A few Late Formative sites on the edge of the northern Sierra Blanca/Capitan/Sacramento Highlands have evidence of violence (Speth 2008; Wiseman 1997), though this cannot account for the full scale of the abandonment. By the time of Spanish contact, the Jornada area was occupied by relatively dispersed and mobile groups, but the villages of the Late Formative were no longer occupied.

In sum, a sequence from Archaic hunting and gathering through early agriculture, early pithouse settlements, and later pueblos is found across the Jornada, but some regions retained hunting and gathering adaptations, with persistent ephemeral or pithouse architecture (see figures 1.1 and 1.3). The data now show numerous, and sometimes quite abrupt, transformations occurred *within* any one of these broader patterns; the hunting-gathering manifestations as well as the agricultural populations display a dynamic range of shifting adaptations. The Jornada has a large and still-growing data set offering important insights into the range of “big issues” of central anthropological interest. As noted above, the adoption of agriculture (as well as variation in the rate of its adoption or rejection), shifts in mobility, and patterns of aggregation as well as social and political organization all play out in the regional archaeological sequence. Furthermore, the Jornada’s geographic position makes it ideal for studying additional issues, such as those of interaction at both the local and interregional scale (for instance, Plains–Southwest, Southwest–Mesoamerican), ecological complementarity (for instance, farmer–hunter-gatherer, lowland–highland), ethnic diversity, and shifts in economic adaptation beyond the adoption of agriculture (such as the apparent shift away from agriculture in a variety of environments in the Jornada over the last half millennium).

## ORGANIZATION OF THE VOLUME

The chapters in this volume are organized to explore some of these broader issues. Figure 1.1 helps readers orient themselves to the geographic focus of each chapter, figure 1.2 shows some of the major geographical features referred to throughout the text, and figure 1.3 provides chronological cross-references.

The volume is divided into four sections. In the first, introductory section (Part I), the present chapter as well as chapter 2 by Rocek introduce the environmental and cultural diversity of the Jornada and describe major geographical and environmental divisions. Rocek uses variation in architecture to demonstrate some of the cultural variation within and among these regions,

exploring the multivariate underlying causes of the differences (environmental, social, economic, etc.) and showing how the history of research in the Jornada has resulted in a biased perception that oversimplifies and underestimates this diversity.

The second section (Part II) focuses on subsistence and the development of the farming economies that were fundamental to the Formative adaptation. In chapter 3, Miller and Kenmotsu synthesize subsistence data from the best-known region of the Jornada, the Western Lowlands and the adjoining mountain foothills to the east. They demonstrate a highly dynamic mixture of strategies that included intensified acquisition of *both* gathered foods and domestic crops in the early second millennium of the current era, followed by (in some areas) a shift to more-focused agricultural intensification by the fourteenth century. Within that broader set of patterns, settlement systems remained dynamic and both economic and social patterns varied locally; the diversity also reflects interaction with groups from beyond the Jornada, such as in the Mimbres region to the west and in modern Chihuahua to the south.

In chapter 4, Condon and Vasquez focus more narrowly on subsistence and geographically on a smaller area within the Tularosa Basin, while extending the analysis back into the Archaic. Their results complement those of chapter 3, confirming the relatively late increase in agricultural reliance, but also finding increased wild-plant diversity early in the Formative and suggesting the continued importance of wild resources even in the later periods, when Miller and Kenmotsu's data suggest a narrower focus on agriculture. The combination of the two chapters confirms the diverse and dynamic nature of adaptations, even within the Western Jornada.

Then, in chapter 5, Railey and Turnbow summarize evidence demonstrating one particular dimension of subsistence variation within the Jornada: the contrast between the process of slow and gradual commitment to agriculture in much of the Western Jornada, documented in the previous two chapters, versus the relatively abrupt shift to agriculture several centuries earlier in the highlands. They draw on comparative data from the Mimbres highlands west of the Jornada region to show that this contrast may be part of a broader pattern of early agricultural reliance in the highlands of southern New Mexico. These results confirm other data that suggest both subsistence and social contrasts between the highlands and lowlands, and contradict a perception that groups in southern New Mexico lagged in the adoption of agriculture behind adjacent regions.

The third section (Part III) explores mobility, sedentism, and integration. In chapter 6, Miller and his coauthors describe a major payoff of CRM

investment in a non-site survey strategy (“transect recording units,” or TRUs) that allows artifact distributions to be studied across landscapes without the prohibitive cost of mapping each individual item. Analysis of large-scale distributions of sherds across a section of the Tularosa Basin has identified a series of previously unrecognized prehistoric trails. While some may reflect local trips for water and other resources, Miller et al. demonstrate that a disproportionate number of the ceramics found along these trails were not locally produced, suggesting movements across the basins linking to settlements in more distant parts of the Jornada. They also document the diversity of these trails and their likely functions ranging from local resource procurement to visits between settlements within and perhaps beyond the Jornada, and perhaps travel associated with ritual activities.

In chapter 7, Lynch and Rocek examine the degree of mobility by the “settled” farmers of the Capitan Highlands in the Early Formative period compared to both the Archaic and the Late Formative. Shifts in the procurement of lithic materials suggest that mobility was already limited by the Late Archaic and it appears to have decreased further in the Formative, with the greatest emphasis on local resources in the second millennium AD after pueblo architecture became common in many parts of the area. Despite the evidence of agricultural dependence among highland Early Formative pithouse sites described above, the lithic data imply that they exhibited a transitional degree of movement, with a gradual trend toward reduction that culminated with the greatest curtailment in mobility after the transition to pueblo occupations.

In chapter 8, Boggess et al. show a direct example of mobility through analysis of a late twelfth or early to mid-thirteenth century AD ceramic vessel at an ephemeral site in the Eastern Extension, east of the Pecos River. They demonstrate that the vessel was made in the Sierra Blanca/Capitan Highlands some 200 km to the northwest and that its use history included exposure to a broad array of foods, including locally available plants such as grass seeds and *Commelina* (dayflower, a weed often found infesting agricultural fields that might have existed in the area), but also hints of starchy foods such as acorns or agave as well as a range of others. Chemical indications of aquatic resources, likely fish, suggest a stop at the Pecos River as well. Thus, the chapter indicates either that individuals in the highlands traveled far into the lowlands to the east, or perhaps more likely, interacted with groups in that region who used highland-produced pottery as they followed a complex, highly mobile lifestyle.

In chapter 9, Hill synthesizes ceramic data over a wide region of southeastern New Mexico and west Texas, covering a good portion of the Eastern Extension and the eastern fringes of the Western Jornada. Consistent with

the vessel described by Boggess et al. in the preceding chapter, he finds that the vast majority of the ceramics were imported either from the Sierra Blanca/Capitan/Sacramento Highlands or from the Western Jornada Lowlands. This reinforces the evidence of long-distance eastward mobility by the agricultural and relatively settled groups in the highlands and Western Jornada and/or interaction between them and more mobile groups to the east. One ceramic type (Ochoa Indented, associated with the Ochoa phase villages described above) does not fit this pattern, but indicates limited ceramic production among the eastern groups.

Finally, the fourth section (Part IV) considers the borders of the Jornada, both in terms of geographical boundaries and lifestyle. In chapter 10, Kenmotsu examines who the occupants of the La Junta del Rios region on the Texas/Chihuahua border were, and what sort of lifeway their sites imply. Consistent with previous chapters, she finds significant indications of interaction with core Jornada regions and the suggestion of an actual migration event into this area. The La Junta population remained distinct and dominated by descendants of the local hunting-gathering populations, however, and a mixed economy and seasonal mobility persisted, along with interaction both to the west with Casas Grandes and to the north with the Jornada. The La Junta communities in fact outlasted both the Casas Grandes and Jornada settlements in whose company they had developed.

In chapter 11, Cruz Antillón et al. examine the question of Lehmer's (1948) inclusion of northern Chihuahuan groups in the Jornada. Their core finding is that Lehmer got it right; while the boundary between the Casas Grandes and Southern Jornada was fuzzy, they represent meaningful, distinct entities, and sites in northern Chihuahua do have distinctly Jornada characteristics. On the other hand, they also describe contact and flux along that border.

Chapter 12 by Miller and Montgomery examines terminal Archaic to Late Formative-period burned-rock middens (BRM), among the least glamorous of archaeological features, and a hallmark of what is often assumed to be ephemeral hunting-gathering occupation patterns restricted to the fringes of the Jornada. They show that the construction of these features varied greatly over time and shifted spatially as well, with use fluctuating in several pulses and showing a trend from intensive processing of foods in Western Jornada Lowland settings to less-intensive logistical use of higher-elevation features in the west and by mobile groups farther east. Most important, they suggest production of these features was not restricted to mobile populations but instead represented an important activity of the farming villages of the Western Jornada and adjoining eastern mountain foothills that likely used them for

production of alcoholic drinks for religious and socially integrative functions.

In chapter 13, Railey synthesizes a large body of radiocarbon dates from the Eastern Extension in southeastern New Mexico recently available due to an innovative Bureau of Land Management program that pools CRM resources to fund theory-driven research projects. Railey documents trends from the Early Archaic through the Late Prehistoric, showing how populations fluctuated in response to major environmental changes. Mobile hunting-gathering groups dominated the far southeastern borders of the Jornada, but pockets of reduced mobility, agricultural production, and small-scale aggregation developed in the Ochoa phase in the western and central portions of this region in the second millennium AD. Beyond climate, he notes the impact of regional developments. These included the rise of the Plains bison trade in the mid-thirteenth century followed by the disappearance of the Casas Grandes system and of aggregated villages to the west and northwest across the rest of the Jornada and the broader Southwest.

Finally, Wiseman's discussion in chapter 14 explicitly lays out an argument for ethnic diversity *within* the area currently subsumed under the Jornada. Archaeologists have a history of casually equating material culture variation with distinct "cultures." The diversity in the Jornada as well as ethnographic and historically documented ethnic divisions demands exploration of this issue both in order to understand patterns in the Jornada itself and questions of ethnicity in prehistory generally. Using the distribution of house forms, non-domestic architecture, utility wares, freshwater-shell ornaments, and bone gaming pieces, he suggests that, at least in the Late Formative, the Western Jornada Lowlands, the southern Sierra Blanca/Sacramento Highlands, and the northern Sierra Blanca/Capitan Highlands respectively represent three distinct ethnic groups, and he has argued elsewhere (Wiseman 2000, 2002, 2003b) for additional ethnic divisions within the Jornada. These sorts of ideas are implicit in many taxonomic divisions suggested over the years in the Jornada, the Mogollon more generally, and in many other cases (e.g., Lehmer 1948), but Wiseman offers a clear, explicit argument and data, allowing for future testing and refinement of such hypotheses.

## THE FUTURE OF JORNADA RESEARCH

The last several decades have brought great progress of many sorts to Jornada research: improvements such as a dramatically expanded body of data, innovative survey strategies and CRM research priorities, the clarification of chronological sequences, and the documentation of ceramic-exchange

patterns. An array of critical data gaps remains, but so do exciting topics for future research. The expansion of data and improved methods reveal more about our ignorance of the area, but also makes a range of new research topics accessible.

To cite a few examples regarding the gaps: survey and even more excavation coverage across the highly diverse Jornada country remains tremendously uneven; coverage of the Texas portion of the Eastern Extension and of the Chihuahuan portion of the Jornada is particularly sparse (see discussions in Rocek, chapter 2, and Cruz Antillón et al., chapter 11, both in this volume). This volume describes many parts of the Jornada, but even here we do little justice to many regions, such as only touching on the complexity of the Roswell Oasis cluster of Plains-edge aggregated communities that flourished for a brief few centuries between the Capitan Mountains and the Pecos near modern Roswell, nor covering the Pecos valley to the north.

Beyond filling in the large data gaps, basic questions regarding the Jornada remain unanswered. The sociocultural composition of the Jornada as a whole and the subdivisions within it addressed by Wiseman in chapter 14 are major avenues for further research. A related question concerns the integrity of the Jornada over time; its deep ceramic and artistic traditions (Miller et al. 2012; Miller 2018b) suggest a coherence and an influence on adjacent regions rather than a weak reflection of the “core” Southwest.

More broadly, the question of Jornada identity is linked with two other issues. One is the role of the Jornada in the broader world, not only of the Southwest but the Plains and northern Mesoamerica as well. Several chapters here (see also Rocek and Rautman 2007) show that the Jornada was both at the receiving end of impacts from surrounding regions and an active participant in many of those events. A second related issue concerns the fate of Jornada populations after the mid-fifteenth century. The abandonment of villages raises questions about where descendant populations went and why, and about the origins of mobile groups living in the region in the historical period. Given the Jornada’s diversity there is likely to be more than one answer.

Basic questions of subsistence and settlement (variation in the mode, timing, and pattern of adoption of agriculture, for instance) remain major issues despite the advances described in this volume, as are questions regarding the relations between different economic systems and social groups within the region. The structure of sociopolitical groups such as discussed by Miller et al. in chapter 6 and Miller and Montgomery in chapter 12 have barely been addressed. The environmental impacts considered by Railey in chapter 13 invite more environmental studies across the region.

The Jornada has long been viewed as peripheral, monotonous, and static, in short, not terribly interesting in comparison with surrounding areas. As the chapters in this volume demonstrate, the region is in fact none of these—it is dynamic and complex, and its inhabitants played a significant economic, political, and social role at multiple scales. The oft-cited irony of A. V. Kidder’s account of hearing that the Southwest was a “sucked orange” with no more information to contribute (Givens 1992:150) applies well to the Jornada. Perhaps more than in many other regions of the Southwest, we have barely scratched the surface of a very rich soil.

## NOTES

1. Throughout the volume, the designation *Jornada* applies to the area as a whole. References to portions of the Jornada will use the name(s) of the region(s).

2. We lump the lowlands of the Hueco Bolson with the Tularosa Basin in this volume under the term *Western Jornada Lowlands*, or *Western Jornada*, for simplicity. These are contiguous, graben valleys flanked by block-faulted mountain ranges and highlands (Abbott et al. 2009:2-1 to 2-3). The Tularosa Basin is in New Mexico while the smaller Hueco Bolson is largely in adjacent Texas (Figure 1.2). Together, they form a continuous valley that is oriented primarily north–south. The divide between them consists of a slight topographic rise.

3. The site has also been referred to both in print and in unpublished notes with the first two digits of its Laboratory of Anthropology identification number reversed (that is, as 17687). However, the New Mexico Cultural Resource Information System’s Archaeological Resource Management System Record matches 71687 instead, and identifies LA 17687 as a site in northwestern New Mexico.

4. This phase sequence is not included on figure 1.3 since Wiseman (1985b) proposed its abandonment and few to no researchers in the region continue to use it; Kelley’s (1984) highland-phase sequences described below have largely superseded it.