

## Recent Issues in the Archaeology of the Mimbres Region of the North American Southwest

Michelle Hegmon<sup>1</sup>

---

*Archaeological research in the Mimbres region (southwestern New Mexico) has focused on the post-A.D. 500 ceramic/agricultural occupations, especially the Mimbres Classic period (1000–1130). This work has advanced general anthropological issues regarding mobility, land use and human impact, and the concept of “abandonment.” Deeper understandings of some of these issues require more detailed demographic estimates, which in turn are dependent on methodological advances, particularly studies of site use life. Research on the production and distribution of Mimbres pottery—famous for its naturalistic black-on-white designs—is advancing rapidly. Although the designs have been well illustrated and much discussed, more systematic anthropological research on Mimbres design style is badly needed. Various aspects of Mimbres social and ideational realms (e.g., household and community organization, social hierarchy, the symbolism of the pottery designs) have received some attention but await new perspectives derived from current social theory.*

---

**KEY WORDS:** Mimbres; US southwest; pottery designs; land use.

### INTRODUCTION

The Mimbres region in southwestern New Mexico is famous for its spectacular pottery with naturalistic designs. As a result, the region also is infamous for the commercial looting of sites, including a well-documented case in 1999–2000 (Turnbow, 2001). Recently, and more encouragingly, the region is becoming well-known for studies of a number of general anthropological issues, including land use and mobility (Nelson, 2000), environmental impact (Sandor, 1992), and gender (Crown, 2000). In preceding decades much research in the region focused on

<sup>1</sup>Department of Anthropology, Arizona State University, Tempe, Arizona 85287-2402; e-mail: michelle.hegmon@asu.edu.

interpretations of social organization and ideology—based primarily on studies of architecture, pottery designs, and mortuary patterns—and there is great potential to advance these earlier studies through recent theoretical approaches.

To set the stage for discussing these and other related issues, I begin with a review of the culture history of the region and the general nature of the archaeological research that has been done. The bulk of the paper comprises five sections; four organized around recent issues in archaeological research, and one focused on a particular class of material culture, pottery. Pottery is the only material to receive this focus, partly because it is a cornerstone of Mimbres fame but especially because it bridges a gap between the third and fourth sections—how people lived on the Mimbres landscape, and the last two—how people dealt with each other and the cosmos. Specifically, in the third section, I consider issues of human–environmental interactions, including demography and human impact. Next I focus on how people organized themselves in and as part of the environment, including issues of mobility, land use, and abandonment or regional reorganization. Then I discuss pottery, including its production and use as well as studies of designs. This leads to consideration of the social and ideational realms, including gender, hierarchy, and regional interaction as well as interpretations of cosmology. In general, I emphasize research questions that have been advanced or answered with Mimbres material; I also emphasize work that needs to be done. Other reviews of Mimbres archaeology include widely circulated but unpublished book-length manuscripts by LeBlanc and Whalen (1980) and Lekson (1992). Published reviews, which focus on certain aspects or periods of Mimbres region archaeology, include Anyon *et al.* (1981), Hegmon *et al.* (1999), LeBlanc (1983, 1989), and Nelson (1999).

## BACKGROUND AND TIME–SPACE SYSTEMATICS

The Mimbres region (Figs. 1–3) encompasses the southwestern corner of New Mexico and small portions of surrounding states in the United States and Mexico. “Mimbres,” from the Spanish *mimbres* meaning “little willow,” is the name of the river in the center of this region and a small town along its banks. Archaeologically, Mimbres is the name given to the distinctive black-on-white pottery found in the region; the label is often extended to the people who made this pottery (sometimes called *Mimbrenos*). In this review I try to avoid the equation of peoples and pottery and instead use the term Mimbres to refer to the archaeological region.

The Mimbres region is generally considered part of the larger Mogollon area of the North American Southwest. Early researchers devoted considerable attention to distinguishing Mogollon from other archaeological cultures, and especially to the distinction between Mogollon and “Anasazi” (now called Ancestral Pueblo) (especially Haury, 1936; Martin, 1979; Wheat, 1955). Mogollon is now often only applied to the pre-A.D. 1000 period. In general, Mogollon is characterized by pit

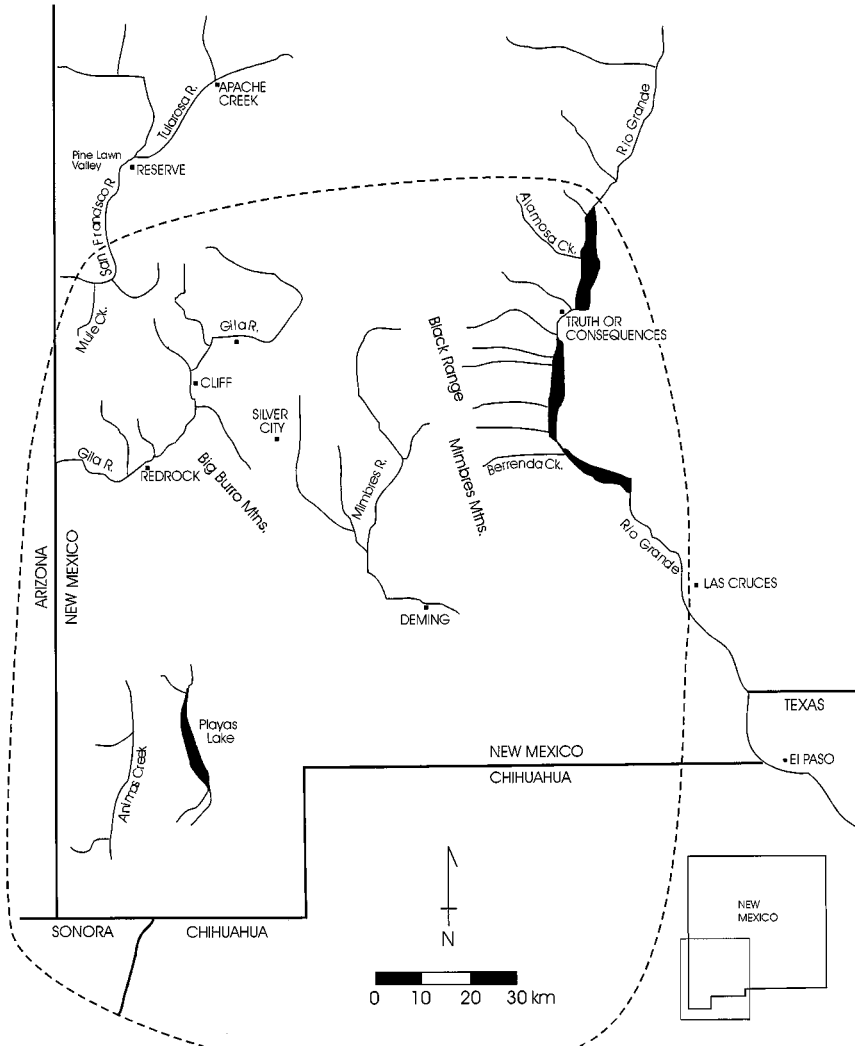


Fig. 1. The Mimbres region as delineated by the distribution of Classic Mimbres Period remains (after Hegmon *et al.*, 1999, Fig. 1).

houses and by red and brown pottery, whereas Ancestral Pueblo is characterized by aboveground structures (pueblos) and black-on-white and gray pottery. However, Mimbres also has aboveground architecture and black-on-white pottery. Thus, although the Mimbres region is clearly geographically part of the greater Mogollon area, it has some seemingly Puebloan characteristics, prompting research

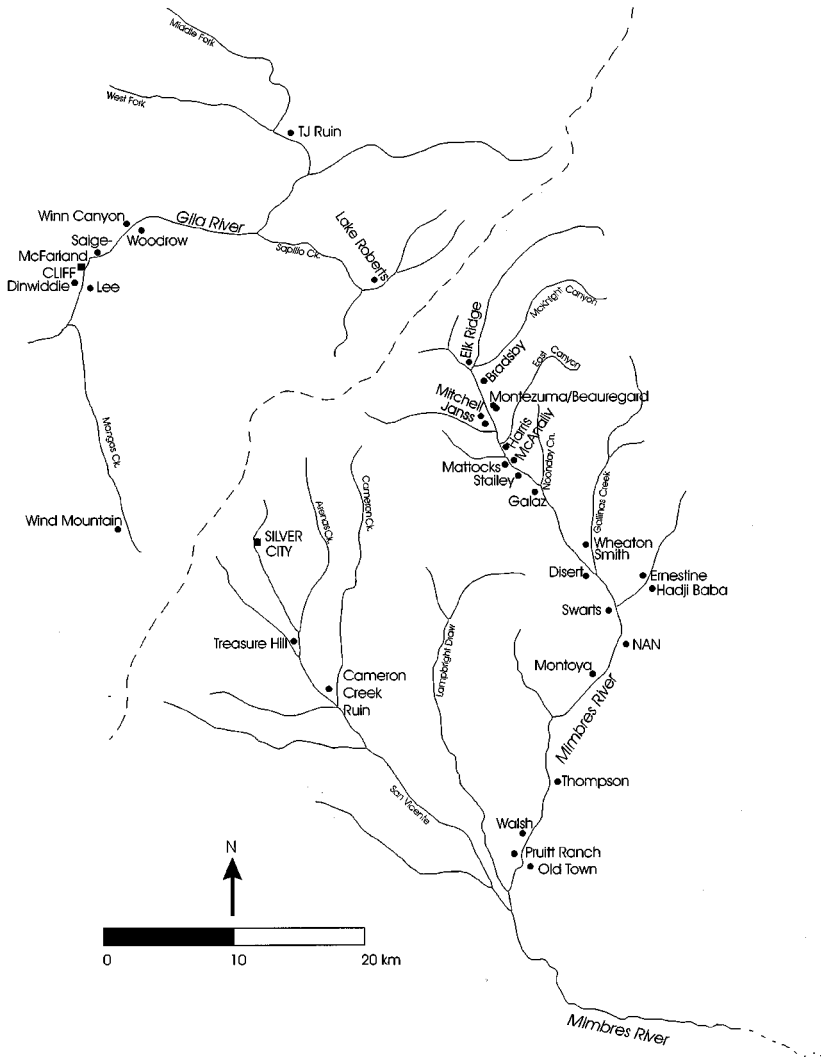


Fig. 2. Detail of the western portion of the Mimbres region, showing the Mimbres and Gila drainages and the locations of sites mentioned in text and Table I. The dotted line indicates the continental divide.

demonstrating that Mimbres styles represent indigenous developments and not a Puebloan incursion (e.g., Anyon *et al.*, 1981; Shafer and Taylor, 1986). For the most part, terms such as Mogollon and Mimbres are today used simply as convenient labels for research areas, although Lekson (1993) has continued to note many similarities between Mimbres and Anasazi/Ancestral Pueblo adaptations.

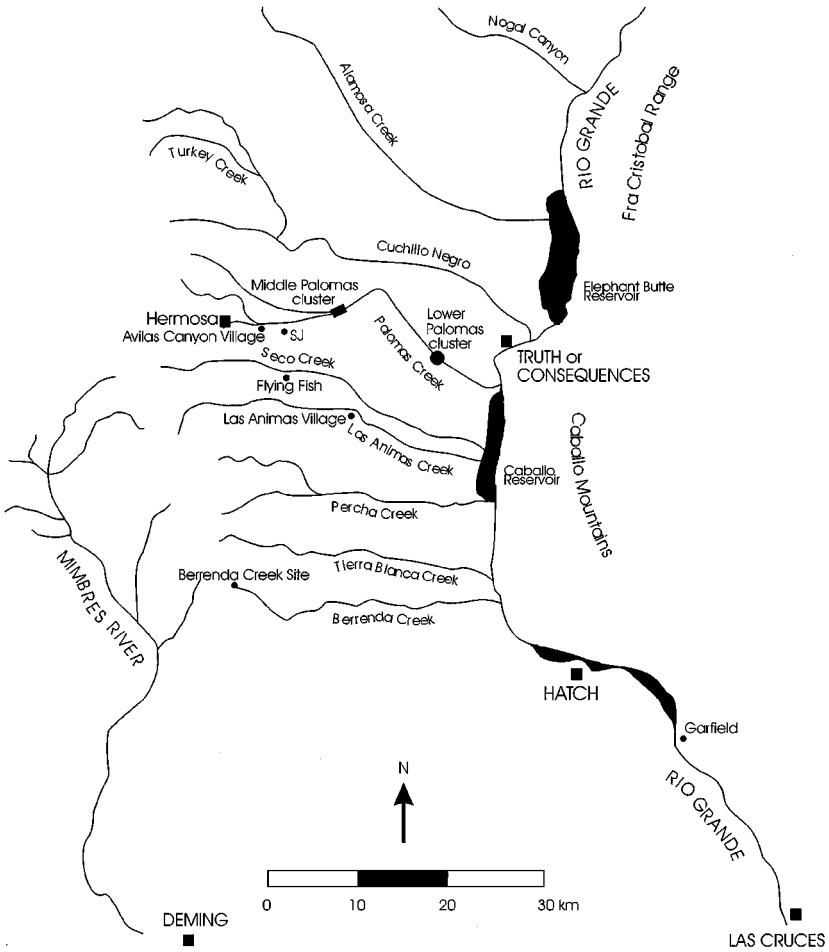


Fig. 3. Detail of the eastern portion of the Mimbres region, showing the eastern Mimbres area and the locations of sites mentioned in text and Table I. The Lower Palomas cluster includes Lee, Buckaroo, and Ronnie Pueblos. The Middle Palomas cluster includes Lizard Terrace, Mountain Lion, Phelps, and Anderson.

### Culture History

In 1981 Anyon *et al.* synthesized then current data on the Mogollon–Mimbres sequence; most of their conclusions have stood the test of the last 20 years (the current chronology is summarized in Table I). The Early Pithouse period

**Table 1.** Chronology of Mimbres Region Archaeology, Partly After Anyon *et al.* (1981) and Hegmon *et al.* (1999)

Period	Phase	Dates (A.D.)	Areas	Description
Postclassic	Cliff	1300–1450+	Western Mimbres region and southern Arizona	Salado polychrome pottery; mostly small sites in Mimbres region
	Black Mountain	1200–1300/1400	Southern Mimbres region and areas to south	Casas Grandes-like aggregated villages; end of Mimbres pottery
	Mimbres reorganization	1150–early 1200s	Eastern Mimbres area	Small dispersed hamlets; Mimbres + diverse pottery
	Terminal Classic Mimbres	1130–late 1100s	Southern Mimbres Valley	Continued settlement in some villages; new pottery styles
Classic Late Pithouse	Classic	1000–1130	Across Mimbres region	Shift to pueblos, same site locations
	Three Circle	750–1000	Across mountain Mogollon area	Black-on-white pottery
	San Francisco	650–750	Across mountain Mogollon area	Pottery with painted designs
	Georgetown	550–650	Across mountain Mogollon area	Pithouse villages on floodplains; polished red pottery
Early Pithouse	Cumbre	200–550	Across mountain Mogollon area	Pithouse sites on hilltops

(A.D. 200–550) is typified by sites on hilltops and the first systematic use of pottery in the region. A settlement shift to lower locations near floodplains and new ceramic styles signal the beginning of the Late Pithouse period (A.D. 550–1000). The Mimbres Classic period began around A.D. 1000 with the construction of aboveground pueblos and continued until the depopulation of some of the larger villages at around A.D. 1130. The delineation of the Mangas phase, transitional between the pithouse and pueblo occupations, has been subject to considerable debate. Lekson (1988a, 1990) strongly argued for a Mangas phase, primarily on the basis of his work in the Upper Gila. Others (Anyon *et al.*, 1981), who focused on the Mimbres Valley, argued that the transition was quite abrupt and that the Mangas phase should be dropped from Mimbres systematics. Shafer (1995) found some evidence for a transition at the NAN Ranch Ruin in the Mimbres Valley, but he argued that the continuum of changes should not be defined as a clear-cut phase. Finally, Nelson and Anyon (1996) reasonably suggested the sequences might be different in the Gila and Mimbres Valleys (see also Dycus, 1997).

The Early Pithouse to Classic period sequence is otherwise relatively straightforward, in large part because the same general patterns are seen across the entire Mimbres region (Fig. 1). However, beginning around 1130, major areal differences emerged, and the concept of a “regional” sequence is no longer germane. Details of these later systematics are summarized in Hegmon *et al.* (1999); Nelson and Anyon (1996) provide an example of the changing social landscapes and how scale affects archaeological conceptions. For purposes of this review, five post-1130 phase/period names are relevant and applicable to different parts of the region. What has been called the *Postclassic Mimbres* refers to the occupation of small residential hamlets so far known only in the eastern Mimbres area. Although Postclassic Mimbres has been defined several times (e.g., Hegmon *et al.*, 1998, p. 150, 1999, pp. 155–157; Nelson, 1999), the term also is often used to refer to everything after the Classic. I therefore suggest that the post-A.D. 1130 occupations be considered part of the Postclassic *period* and that the distinctions recognized by Hegmon *et al.* (1999) be considered phases within that period. Specifically, the occupation of small residential hamlets (previously called Postclassic Mimbres) should be called the *Mimbres Reorganization phase* (1150–early 1200s). The *Terminal Classic Mimbres phase* (1130–late 1100s) refers to occupations that continued after 1130 at some large Classic Mimbres villages in the southern part of the Mimbres Valley. The *Black Mountain phase* (A.D. later 1100s–1300+) refers to an occupation with new kinds of architecture and ceramics bearing some similarities to Paquimé (Casas Grandes) and seen across much of the southern Mimbres region and beyond. Finally, the *Cliff phase* (late 1300s–early 1400s) is the local manifestation of the Salado phenomenon, indicated by the presence of Gila Polychrome (Nelson and LeBlanc, 1986). Cliff phase occupations are most extensive in the upper Gila (Lekson, 2002) but also are known in the Mimbres Valley, including three sites described by Nelson and LeBlanc and several others in the southern

part of the valley (Creel, personal communication, 2001). Manifestations of these phases appear to be somewhat different and perhaps more complex in the eastern Mimbres. Gila Polychrome is rare (although not unknown (see Lekson, 1989, pp. 64–65)) in the eastern Mimbres, and at least one excavated site (Las Animas Village) with Black Mountain phase characteristics has post-1300 dates. Thus Hegmon *et al.* (1999, pp. 161–162) suggested the Black Mountain phase lasted longer in the eastern Mimbres and was contemporary with the Cliff phase to the west. In addition, several apparently post-1300 sites in the eastern Mimbres have a type known as Magdalena Black-on-White, which (unlike all Mimbres Black-on-White types) has organic paint and is considered to indicate connections with, or even migration from, the Mesa Verde region in southwestern Colorado (Lekson, 1986).

Chronological control for this sequence is based on a variety of dating techniques. In the Mimbres Valley the Early Pithouse period is dated primarily with radiocarbon. A reasonable number of tree-ring dates are available for the Late Pithouse and Classic periods, but Postclassic occupations are much less securely dated (Anyon *et al.*, 1981; Hegmon *et al.*, 1999). Only a few chronometric dates are available for the Upper Gila (Lekson, 1990, pp. 88–90). Only one eastern Mimbres site (SJ Hamlet (Hegmon *et al.*, 1999, p. 159)) has produced tree-ring dates; thus, various other methods have been used. Mauldin *et al.* (1996) drew on a combination of dendrochronology, radiocarbon, archaeomagnetism, and obsidian hydration to better understand the occupation of Mogollon Village (a Late Pithouse site with a possible earlier occupation northwest of the Mimbres region). Nelson and Hegmon (2001) discussed how radiocarbon and obsidian hydration dates, although less precise than dendrochronology, can provide information on the history of occupation at Classic and Postclassic sites in the eastern Mimbres.

Mimbres painted pottery provides the basis for general chronological control; Shafer and Brewington (1995), using the well-dated materials from NAN, studied microstylistic changes and developed a more detailed chronology that sometimes allows the recognition of 30-year periods. Shafer and Brewington's microstyle chronology is widely applied (Shafer and Brewington, 1995) and generally applicable across the region (e.g., Nogue, 2001; Stokes, 1999b, 2000), although it has not been anchored with absolute dates in any contexts other than NAN. Mimbres ceramic chronologies rely primarily on the presence or absence of certain styles and types; no quantitative frequency seriation has been published. Research that specifically considers the co-occurrence of several types or wares include Mills (1986) and Hegmon *et al.* (1998).

Most recent research in the Mimbres region has focused on the Late Pithouse, Classic, and Postclassic periods, and on the Mimbres Valley and eastern Mimbres area. Therefore, these times and places are given the greatest attention in this review.



## History of Research

Beginning in the late nineteenth century and continuing into the 1930s, professionals and skilled amateurs conducted excavations at a number of large Mimbres and nearby Mogollon sites (Bradfield, 1929; Bryan, 1927; Cosgrove and Cosgrove, 1932; Fewkes, 1989; Haury, 1936; Hough, 1907; Jenks, 1928; Nelson, n.d.; Nesbitt, 1931) (Table II; for more details on history of research see LeBlanc, 1983, pp. 28–31, LeBlanc, 1986). In the 1930s through 1950s Martin and colleagues (especially Bluhm, 1957; Martin, 1940, 1943; Martin *et al.*, 1952, 1957; Martin and Rinaldo, 1947, 1950) worked intensively in Pine Lawn Valley and other areas around Reserve, northwest of the Mimbres region, and their research helped establish the basic Mogollon sequence. Professional archaeological interest in the Mimbres region waned, but looting became increasingly popular; by the late 1960s looters were mining the sites, often using heavy equipment, to procure vessels for the art market. In response, LeBlanc established the Mimbres Foundation, funded in part by collectors who were gaining an increased appreciation of the archaeological context behind the pottery. Beginning in 1974 the Mimbres Foundation did survey (Blake *et al.*, 1986) and excavated a number of sites in the Mimbres Valley, sometimes working in well-preserved contexts but often attempting to make sense of looted areas and synthesizing disparate notes from much earlier projects (e.g., Anyon and LeBlanc, 1984). Analysis and write-up of Foundation materials are ongoing (e.g., Anyon, personal communication, 2001; Diehl and LeBlanc, 2001; Gilman, personal communication, 2001). Other recent projects that focus on large Mimbres Valley sites include Shafer's work at NAN and Creel's work at Old Town. Lekson (1990) summarized the more limited work that has been done in the Upper Gila, including Fitting's work in the 1970s. Margaret Nelson has worked in the eastern Mimbres since 1982, and since 1993 we have codirected the ongoing Eastern Mimbres Archaeological Project (EMAP). New Mexico State University and Human Systems Research (HSR) (recently in collaboration with Steve Lekson, at the University of Colorado) also have conducted research in the area. Most cultural resource management work in the Mimbres region has involved survey (reviewed below), but CRM excavation projects include work by the New Mexico Highway Department (Turnbow *et al.*, 2000), the Museum of New Mexico (e.g., Bussey, 1972) and the University of New Mexico's Office of Contract Archaeology (Schutt *et al.*, 1994), as well as work around the Continental Mine (Brown, 1998, 1999a,b).

## PEOPLE ON THE MIMBRES LANDSCAPE

### Environment and Settlement

The Mimbres region includes portions of three major drainage systems. To the west are the upper reaches of the Gila River, which is joined by the Salt River near

**Table II.** Summary of Professional and Other Major Excavation and Site Mapping Projects in the Mimbres Region, Focusing on Pithouse Periods and Later Occupations

Sites and descriptions	History of research and references <sup>a</sup>
<i>Mimbres Valley and tributaries</i>	
Cameron Creek Village: Large Late Pithouse and Classic site on Cameron Creek (a western tributary)	Excavated by Bradfield (1929)
Elk Ridge: Late Pithouse and Classic site	Parts owned by William Russell have been systematically excavated (Sechrist and Russell, 1995). Burial report on file at New Mexico Historic Preservation Division
Galaz Ruin (LA635): Large Late Pithouse and Classic site with some later occupation. Completely destroyed by bulldozing	Excavated in 1920s and 1930s (Bryan, 1927; Jenks, 1928), then by Mimbres Foundation in 1970s. Comprehensive report by Anyon and LeBlanc (1984)
Harris Village: Large Late Pithouse site	Haury (1936)
McAnally (LA12110) and Thompson (Z:5:35): Early Pithouse sites	Excavated by Mimbres Foundation in 1970s (Diehl and LeBlanc, 2001; LeBlanc, 1975)
Mattocks Site (LA676): Large Classic Village, minimal pithouse component	Excavated by Nesbitt (1931) then Mimbres Foundation (Gilman, 1990, in preparation; LeBlanc, 1983, chap. 8)
NAN Ranch Ruin (LA2465): Large Late Pithouse and Classic site	Early work by Cosgroves. Shafer (1982, 1990a,b, 1991a,b,c,d, 1995) excavated main ruin and surrounding small sites; final report in preparation
Old Town (LA1113): Southernmost large Classic site with Late Pithouse, Classic, and Black Mountain Phase components; Pruitt Ranch Ruin (LA1117): Probably large Late Pithouse and Classic occupations	Ongoing work by Creel (1999b) focusing on Pithouse occupation. He is also beginning preliminary investigations at Pruitt Ranch Ruin
Swarts Ruin (LA1691): Large Late Pithouse and Classic site	Excavated by Cosgrove and Cosgrove (1932). Summarized in Brody (1977, pp. 37–56). See also Shafer (1991f)
Three Circle Site: Late Pithouse village with possible Early Pithouse occupation in upper Mimbres Valley	Excavated by Bradfield in 1928 (n.d.). Restudied and reported by Everett (1992)
Treasure Hill (LA16241): Large Late Pithouse and Classic site on the Arenas Drainage (a Western tributary)	Excavated by Cosgrove and Cosgrove (1923); records and collections maintained by Treasure Hill Foundation (Herrington and Creel, 1991)
Walsh (Z:5:80) and Montoya (Z:5:112): Black Mountain Phase sites, U-shaped with plazas with (respectively) 100 and 20–40 rooms	A few rooms excavated by Mimbres Foundation (LeBlanc, 1977; Ravesloot, 1979)
Bradby (Y:4:35), Mitchell (LA12076), Montezuma (LA18890), Wheaton-Smith (Z:1:46): Late Pithouse and Classic sites; Beaugard (Z:1:27): Late Pithouse site; Ernestine (Z:1:203) and Hadji Baba (Z:1:126) Classic sites	Limited excavations by Mimbres Foundation (Anyon, in preparation; LeBlanc, 1975, 1976, 1977)
Disert (Z:5:10), Stailey (Z:1:78), and Janss (LA12077): Salado (Cliff Phase) sites	Excavations by Mimbres Foundation (Nelson and LeBlanc, 1986)
LA 12109: Small Classic site interpreted as fieldhouse	Excavated by Mimbres Foundation (Nelson <i>et al.</i> , 1978)

Table II. (Continued)

Sites and descriptions	History of research and references <sup>a</sup>
Jackson Fraction (LA 111413), Badger Ruin (LA 111395): Classic; LA111403: Late Pithouse and Classic (also prohistoric/historic)	Testing and excavation by Western Cultural Resource Management around Continental Mine, northeast of Silver City (Brown, 1999a,b)
<i>Upper Gila</i>	
Lee Village: Late Pithouse site; Dinwiddie Village: Late Pithouse and Classic site	Excavations in 1960s by Museum of New Mexico, reported Bussey (1972)
Wind Mountain: Early and Late Pithouse and Classic site	Major excavations by DiPeso in 1970s. Report by Woosley and McIntyre (1996)
Saige McFarland (LA5421): Late Pithouse and Classic site	Excavated by Fitting in early 1970s. Report by Lekson (1990)
MC110: Late Pithouse and Classic in Burro Mtn. foothills; Winn Canyon Site: Early Pithouse site; Burro Springs #1: Classic; Burro Springs #2: Late Pithouse; Willow Creek Site: Classic and Salado; CF Spring Site: Animas/Black Mountain Phase	Excavations by Fitting in the 1970s (Fitting, 1971, 1973a,b)
Lake Roberts Vista Site: Late Pithouse and Classic site	Excavations directed by Roth and Bettison in 1990s. Discussed by Stokes and Roth (1999, pp. 429–431) and Stokes (2000)
TJ Ruin (LA54955): Pithouse and Classic site with later Tularosa Phase occupation	Mapped with some surface sampling (McKenna and Bradford, 1989)
Villareal II, and Dutch Ruin: Small (5-room) and large Cliff Phase sites	Lekson (2002) reports on Villareal II and on the collection of vessels from Dutch Ruin
<i>Eastern Mimbres area</i>	
Berrenda Creek Site (LA12992): Classic hamlet with some late dates (see Hegmon <i>et al.</i> , 1999, pp. 157–158)	Excavated by New Mexico State University (Gomolak and Ford, 1976; Laumbach, 1982)
Buckaroo Site (LA70259), Ronnie Site (LA45103), Lee Pueblo (LA70258), Phelps Site (LA37691), Mountain Lion Hamlet (LA37726/37727), Lizard Terrace Pueblo (LA37728): Reorganization phase hamlets, almost all underlain by Classic fieldhouses	Excavated by Nelson in early 1980s and EMAP in 1990s (Nelson, 1993, 1999). Comprehensive report in preparation
Cuchillo Site (LA50548): Late Pithouse and Classic; Ocotillo Site (LA75757): Late and possibly early Pithouse occupations; both along Cuchillo Negro Creek	Excavations by Office of Contract Archaeology, UNM, as part of the Cuchillo Project (Schutt <i>et al.</i> , 1994)
Las Animas Village (LA3949) Classic Village with Black Mountain Phase occupation (on Las Animas Creek)	Excavated by EMAP (Nelson and Hegmon, 1998). Comprehensive report in preparation
Flying Fish Village (LA37767/37768) and Avilas Canyon Village (LA44997/45000): Classic sites on Seco and Palomas drainages; Flying Fish has two occupations	Excavated by EMAP, 1997–2001 (Nelson and Hegmon, 1998). Work on Flying Fish is ongoing
SJ Hamlet (LA45028): Classic hamlet on tributary to Palomas Creek; has some late dates (see Hegmon <i>et al.</i> , 1999, 158)	Excavated by EMAP 1998 (Nelson and Hegmon, 1998). Comprehensive report in preparation
Anderson Site: Late Pithouse and Classic site on Palomas Creek	Test excavations by Nelson (1984)

(Continued)

Table II. (Continued)

Sites and descriptions	History of research and references <sup>a</sup>
Garfield Site, AKA Rio Vista Village (LA1082): Large Classic Village on Rio Grande	Badly destroyed by looting. Test excavations reported by Mayo (1994); see also O'Laughlin (1985)
Montoya Site: Classic site; Victorio Site (LA88889); Large Tularosa Phase site; Pinnacle Ruin (LA2292): Magdalena Phase sites, all on Alamosa Creek	Mapping and test excavations ongoing by Cañada Alamosa Institute involving Lekson (University of Colorado) and Laumbach (Human Systems Research) (Laumbach, 1992; Laumbach and Wakeman, 1999)
Winston Site (LA923): Tularosa Phase Site with considerable Classic Mimbres material on Cuchillo Negro Creek	Excavated by New Mexico State in late 1960s/early 1970s. No report

<sup>a</sup>Preliminary reports or reports on recent excavation seasons are referenced in cases where the final report is still in preparation.

Phoenix and eventually drains into the Pacific. The Upper Gila area is relatively high, cool, and moist. Just east of the Gila is the continental divide, and on the other side of the divide, in the center of the region, is the Mimbres River, which is relatively manageable and creates a rich but moderate-sized floodplain. Use of the river for historic and possibly prehistoric irrigation was extensively discussed by Ackerly *et al.* (1993). At its southern end, the Mimbres River flows underground and into the water table; it does not drain into any other major water course. To the east are a series of small intermittent drainages that flow east from the Mimbres Mountains and Black Range into the south-flowing Rio Grande and eventually into the Gulf of Mexico. Because the mountains block the east-moving storm track, the eastern Mimbres area is relatively dry. The Rio Grande is difficult to manage and its floodplain is subject to large and sometimes violent floods; thus, it would have been difficult for prehispanic farmers to use its waters effectively (Ackerly, 1992).

Information on site locations and other settlement characteristics is uneven across the Mimbres region. Nels Nelson's unpublished 1920 survey provides an important baseline (Nelson, n.d.). Some of the largest sites, although not a complete inventory, are included in Adler's compilation of the post-1150 Southwest (Adler, 1996; Lekson, 1996). For the eastern Mimbres area, Margaret Nelson (1999, pp. 48–49) provides detailed information on many survey projects; emphasis here is on additional citations. Full coverage survey has been completed along the entire course of Palomas Creek and portions of Las Animas and Seco Creeks (Brady, 1999b, 2001a; Huntley, 1998; Mayo and Hegmon, 1993). Upland areas around these drainages were sampled as part of these full coverage surveys, and reconnaissance surveys provide information about the Rio Grande Valley and many other portions of the area (Laumbach and Kirkpatrick, 1983; Lekson, 1989). Much of the Mimbres Valley and some of the surrounding uplands and tributaries were surveyed by the Mimbres Foundation (Blake *et al.*, 1986), although access

problems precluded either complete coverage or regular probabilistic sampling. Herrington (1979, 1982) conducted survey along the Arenas and other western and northern tributaries. Full coverage survey of Gavilan Canyon, which flows into the Mimbres River near NAN, also has been completed (Shafer and Creel, 1999). Stokes (1999a) summarizes information on settlement in some of the higher (peripheral) drainages of the Mimbres. Along the upper drainages of the Gila, Stokes (1995) completed a sample survey of the Sapillo Valley, and Lekson (1990, chap. 5) summarizes data from four earlier surveys along the Upper Gila, including Fitting's work.

### Demography and Human Impact

Settlement and environmental data provide a critical baseline for studies of human impact. Specifically, settlement and architectural data from the Mimbres Valley provided the basis for population estimates, beginning with work by Blake *et al.* (1986), who calculated a population increase from 830 to 3200 through the course of the Late Pithouse period and a peak of 4021 during the Classic. If these estimates are accurate, the population might have exceeded the carrying capacity of the Mimbres Valley (Minnis, 1985), a conclusion that has been the basis for much important research. However, as Nelson and Anyon (1996, pp. 288–289) noted, these estimates assume site contemporaneity and a 75-year use life for pit houses. In contrast, Cameron (1990; drawing on studies by Ahlstrom (1985) and Schlanger (1985)) argued that pithouse use life was closer to 15 years and thus Blake *et al.*'s population estimates for the Pithouse periods should be reduced by about 75%. Although Cameron's general points are valid, her corrections may be too extreme, at least for the later portions of the sequence. Three well-dated (Three Circle phase) pit structures at Old Town, one with coursed adobe and two with masonry walls, have use lives of perhaps 50 years (Creel, personal communication, 2001; Lucas, 1996); large burial populations also provide some support for the fairly large population estimates (Anyon and LeBlanc, 1984, p. 190; although see Lekson, 1988b). On the other hand, on the basis of her analysis of residential architecture (discussed below), Gilman (1989) argued that Classic population levels were far below the 4021 peak suggested by Blake *et al.* (1986); the lower range of Gilman's estimate is 594. A better understanding of structure use life, and ultimately of site use life and of how use life changes over time is needed to resolve this critical issue. Methods for assessing site use life in the northern Southwest (e.g., Varien and Mills, 1997; Varien and Potter, 1997) may not work well in the Mimbres region because Mimbres middens are inconsistently preserved (trash was apparently often deposited in water courses and thus washed away). However, the analysis of structure use and burial populations discussed above (see also Swanson, 2002) suggest that other methods may be fruitful for providing insights into use life and ultimately population.

No overall population estimates have been published for other parts of the Mimbres region. General estimates made by EMAP researchers (see Nelson and Hegmon, 2001; Nelson and Schollmeyer, 2001), however, suggest that population levels in the east were lower than those in the Mimbres Valley. In contrast, some of the largest Mimbres sites, including TJ Ruin (McKenna and Bradford, 1989) and Woodrow Ruin are in the western portion of the Mimbres region, but (other than Nogue's regionwide study (Nogue, 2001), discussed below) no population estimates have been made for this portion of the region. Data that could be used to analyze and compare population levels at a regional scale are available in Lekson's overview (Lekson, 1992), but Mimbres demography and variation in population sizes through time and across space remain understudied.

In 1985 Minnis published an extensive study of population growth, agriculture, and climate in the Mimbres Valley. Using figures reported by Blake *et al.* (1986), he concluded that during a relatively wet period, population grew to the point that floodplain fields would have been insufficient and people would have come to depend on riskier fields in other areas. This strategy would have been vulnerable to a decrease in moisture in the early 1100s, a climatic change that may have contributed to food shortages. Minnis also documented heavy human impact on floodplain vegetation over the course of the Classic period. Similarly, Cannon (2000) found evidence of human harvest pressure on large mammals, Shaffer and Schick (1995) found evidence of impact on lagomorphs, and Ellis (1990) found evidence for downstream silting. Although questioned by Ellis (1998), Minnis's research has become the basis for myriad interpretations, and it raises a number of issues for further research (Minnis, 1985).

The degradation of riparian vegetation that Minnis documented lessened after the Classic period. Classic farming strategies, however, also had a more lasting environmental impact. Sandor (1992; Sandor *et al.*, 1990) found evidence of depletion (still apparent in the late twentieth century) of soils in small Mimbres farming terraces. In contrast, Nelson (1999) and Schollmeyer (2000) found little evidence of impact in the drier eastern Mimbres area, although ubiquity indices indicate that farming was equally important. Schollmeyer (2000) did find some depletion of riparian vegetation during the Classic period (but not during the Reorganization phase), although lagomorph ratios indicated that depletion was much less than that in the Mimbres Valley (see Sanchez (1996) regarding the complex relationship between microenvironmental variability and studies of lagomorph ratios). Research is ongoing (Hegmon and Nelson, 2000) to try to understand if the difference in impact in the eastern Mimbres was merely a result of a much lower population density, or if it also may result from different strategies of settlement and mobility.

Minnis's climatic data are based primarily on what is called the Reserve tree-ring sequence (derived from the Upper Mimbres Valley, not the town of Reserve), which he was able to correlate with the flow in the Mimbres River. More recently,

Grissino-Mayer *et al.* (1997) compiled a tree-ring-based reconstruction of precipitation dating back to A.D. 622. Their focus was on areas east of the Rio Grande, but they also included data from Classic Mimbres sites. They found strong evidence for the severe A.D. 1125–1140 drought often discussed by archaeologists. They also discuss longer term trends including low rainfall from A.D. 940 to 1040 and a generally (with the exception of the severe 15-year drought) wet period from A.D. 1040 to 1210. This unpublished report is circulating among archaeologists, but the valuable data it contains have not yet been subjected to detailed archaeological analysis. Shaw also used tree-ring-based precipitation reconstructions to suggest a drought period in the early to middle 1100s in the Mimbres Valley, but he indicated that precipitation remained higher in the Pine Lawn-Reserve area to the north, where a degeneration cycle did not begin until after 1150 (1993, pp. 185–191). No other research has been done to investigate to what degree rainfall or climatic changes in different parts of the region are correlated and how they might be related to interactions and settlement changes (for similar research in areas further to the east, see Rautman, 1993).

Finally, Minnis estimated agricultural productivity, using the most advanced techniques of the early 1980s (i.e., no GIS). Although his conclusions regarding the Mimbres Valley have not been reevaluated with recent technologies, Nelson and Schollmeyer (2001) and Brady (1999a) are beginning research on soils and the productivity and availability of crops and wild foods in the eastern Mimbres.

Several bioarchaeological analyses have provided a different perspective on Mimbres populations. Work by Marek (1990), Olive (1989), and Holliday (1996) generally found no marked health differences among Mimbres populations or between Mimbres and other southwestern populations, although Lippmeier (1991) found that Classic populations were slightly less healthy than Postclassic populations. Finally, in a bioarchaeological study of Mimbres remains, Turner (1993, 1999) found that Mimbres populations (represented by a sample from NAN Ranch Ruin) were more closely related to populations from northern Mexico than to Puebloans.

In summary, archaeological research in the Mimbres region has produced significant studies of human environmental impact and its sociocultural repercussions (especially Minnis, 1985; Sandor *et al.*, 1990) that have been used in broad synthetic accounts and worldwide comparisons (Sandor, 1992). New, often detailed data and analyses of the Mimbres environment and subsistence are accumulating (e.g., Cannon, 2000; Grissino-Mayer *et al.*, 1997). Currently, interpretations are hindered by highly variable demographic estimates, but if some of these problems can be resolved—ideally with better understandings of site use life—there is great potential for the archaeology of the Mimbres region to contribute to new and refined understandings of human adaptation to arid landscapes. Such adaptation clearly involves flexible organizational strategies and various forms of mobility, topics addressed in the following section.

## CONCEPTUALIZING MOBILITY, ABANDONMENT, AND REORGANIZATION

In recent years archaeologists working in many areas of the world have developed an increasingly nuanced understanding of the relationships among subsistence, mobility, and land use strategies, in part based on research in the Mimbres region. For example, although there is a general association between a decrease in residential mobility and an increase in dependence on farming in the Mogollon pithouse period, the most dramatic architectural changes (the pithouse-to-pueblo transition) seems more indicative of organizational than subsistence changes (Diehl, 1997; Diehl and Gilman, 1996; Hard, 1990). Research in the Mimbres region provides important examples of residential mobility by farmers (Nelson, 1999) and also contributes to reconceptualizations of the problematic term "abandonment," demonstrating that movement out of large villages is better understood as a shift in land use strategies, a form of regional reorganization, than as cultural collapse (Hegmon *et al.*, 1998).

The overall sequence of prehispanic developments in the Southwest (as set forth in the 1927 Pecos Conference) was based primarily on Ancestral Puebloan material, and it generally assumed a progression involving increasing dependence on agriculture and sedentism, aboveground puebloan architecture, and increasingly large residential sites. Although Mogollon was defined in terms of its distinctiveness from Ancestral Pueblo, the same general progressive sequence was assumed to apply (e.g., Lehmer, 1948; Martin, 1979; Wheat, 1955; see discussions by Carmichael (1990, p. 124) and Upham (1984)). Much recent research across the Mogollon area has questioned the applicability of this progressive sequence, and this research has contributed to refinements in general concepts of mobility, especially in relation to farming (for a general overview, see Rocek, 1996; for related research in the northern Southwest, see Powell, 1983; Preucel, 1990; Varien, 1999).

It is now clear that mobility is a multidimensional concept and that "sedentary" (i.e., year-round habitation (cf. Rice, 1975)) occupations involve some kinds of mobility. I divide discussion of these issues into two parts, distinguished both chronologically and conceptually. The first involves increasing dependence on agriculture, decreasing mobility, and associated technological and subsistence changes including the development of pueblo architecture around A.D. 1000. For the most part, mobility is treated as a unidimensional variable (i.e., in contrast to sedentism) in discussions of this period. The second part focuses on later developments including a shift away from large sedentary pueblos. Consideration of these developments often involve nuanced discussions of mobility as a multidimensional concept.

### Pithouses, Settlement, and Agricultural Dependence

Corn (*Zea mays*) and other domestic crops including squash (*Curcubita pepo*) and gourd (*Laginia* sp.) originated in Mesoamerica were present across



much of the Southwest by at least 1500 B.C. (Archaeology Southwest, 1999; Gregory, 2001; Mabry, 1997; Wills, 1988b). Some of the earliest research on early agriculture in the Southwest was based on sites in the Mogollon region, including Bat Cave (Dick, 1965; Wills, 1988a) and Tularosa Cave (Martin *et al.*, 1952). Nearly all researchers, drawing on myriad lines of evidence, agree that Early Pithouse dwellers cultivated corn and other domestic crops, that a more productive and easier-to-grind variety of corn (*maiz de ocho*) was introduced sometime after A.D. 500, and that the degree of reliance on farming increased markedly by A.D. 1000. Earlier accounts assumed that pithouses were associated with sedentism, whereas most researchers now assume that there was some (or much) residential mobility during the Pithouse periods (perhaps analogous to an Apache settlement system (Lekson, 1988b)). Recent research questions focus on the timing and pace of change in mobility and agricultural dependence and links with architectural changes. Research focuses on different lines of evidence encompassing overlapping but different time periods and/or areas, and addressing similar but not identical issues. Thus thorough synthesis is not possible; instead, I attempt to point out commonalities and contrasts. Following many published accounts on this topic, I discuss Mimbres as part of the larger Upland Mogollon region (i.e., west of the Rio Grande).

A general decrease in mobility and increase in agricultural dependence through the course of the pithouse and early Classic periods is indicated by most analyses, including Brady's analysis of ceramics and studies of architecture and settlement discussed in more detail below (Brady, 1996). At issue is the timing and pace of change, and the question of when people began to practice year-round sedentism. Drawing on cross-cultural ethnographic data, Gilman (1987) used architecture as an indicator of seasonality and subsistence strategies. Specifically, she argued that pit structures were used seasonally, primarily in the winter, and were associated with relatively limited dependence on agriculture (see also Rice, 1975). Archaeologically, her study focused primarily on material from Black Mesa (northeastern Arizona), although it is frequently cited as supporting the argument that Mogollon year-round sedentary occupations and substantial dependence on maize agriculture did not appear until the shift to pueblo architecture at around A.D. 1000. This transference of the argument is problematic, in large part because the architectural categories (i.e., pithouse and pueblo) are not precisely equivalent in the two areas of the Southwest. One of the major changes Gilman discusses is the development of more permanent, secure, and larger private storage facilities (1987, p. 555), which do seem to be associated with the pithouse-to-pueblo transition in much of the Ancestral Pueblo region (see also Hegmon, 1996). In contrast, in parts of the Mogollon region private storage was already present in at least some Early Pithouse occupations, such as the SU site (Wills, 1989; see Martin, 1940, 1943; Martin and Rinaldo, 1947). This does not imply that the SU site was a year-round sedentary occupation, but it does suggest that Mogollon pithouse occupations

represent a different kind of residential mobility than those of the Ancestral Pueblo area.

Several recent studies suggest that year-round sedentism might have preceded pueblos in the Mimbres region. On the basis of architectural analyses (Diehl, 1997; Diehl and Gilman, 1996), people became increasingly sedentary over the course of the Late Pithouse period. Stokes and Roth (1999) used settlement and architectural data to argue that sedentism in the uplands increased sharply in Three Circle phase, and Stokes (2000) suggested that uplands settlement across the Mimbres region in general increased at this time. The Three Circle phase also seems to have been a time of ritual changes, as is discussed further below. Thus the transition to pueblo architecture around A.D. 1000 is indicative of organizational changes but not a major change in subsistence or settlement. Most of these studies regarding sedentism and mobility rely on architectural variables specific to pithouses; further work with different but possibly comparable variables that can be applied to pueblo architecture would be extremely useful.

Related subsistence changes are indicated by groundstone and ethnobotanical analyses. Hard *et al.* (1996) reviewed the general issues, although they did not discuss Mimbres or Upland Mogollon data. Using mano length as a relative index of maize dependence in several areas across the Southwest, Hard (1990) concluded that in some Upland Mogollon areas (including Mimbres) there was substantial dependence on maize by A.D. 500–700. He also found that the subsequent shift to pueblo architecture was associated with an increase in the use of cultigens. Hard (1990) found less evidence of Pithouse period agricultural dependence in Pine Lawn Valley (north of the Mimbres region), a finding consonant with that of Mauldin (1993). Diehl (1996) considered ethnobotanical data as well as analyses of both manos and metates from 15 Mimbres and other Upland Mogollon sites, spanning the Early and Late Pithouse periods; his study area overlaps substantially with Hard's (Hard, 1990). Diehl concluded that reliance on maize remained fairly stable and low until about A.D. 700, when it began to increase. He did not include data that span the pithouse-to-pueblo transition, but he generally argued that major shifts to increased reliance on maize occurred prior to the architectural transition. Although the conclusions vary, the various studies involving groundstone are generally complementary. That is, Diehl (1996) as well as Hard (1990) found evidence for increased processing of maize in the early part of the Late Pithouse period; Hard (1990) also suggested another shift towards possibly even more dependence on maize associated with the development of pueblos around 1000, a conclusion compatible with Gilman (1987).

Only a few studies offer explanations for Mimbres subsistence and settlement changes. Specifically, Diehl (1996) and Stokes and Roth (1999) argued that the changes were prompted by population increases. Diehl, as well as Creel and Anyon (2001), also noted that increased reliance on cultivation was associated with the introduction of a more productive variety of corn, *maíz de ocho*.

The myriad studies summarized above variously focus on the timing and interrelationship of dependence on maize, seasonality, residential mobility, and storage. The pithouse-to-pueblo transition certainly seems to be associated with some kinds of organizational changes. However, there also are strong indications that major changes in subsistence and settlement strategies and agricultural intensification preceded this transition, possibly by centuries. If this implication is correct, it would not be unprecedented (see Matson and Chisholm (1991) and Minnis (1989) on the northern Southwest). However, before this implication is accepted for the Upland Mogollon area, more work is needed to better understand the spatial and temporal relationships among the various processes and measures across the entire period of interest, in particular, through the pithouse periods and across the pithouse-to-pueblo transition.

### Dimensions of Classic Period Mobility

Recent research focusing on post-1000 Mimbres occupations has drawn on newly developed conceptions (e.g., Rocek, 1996; Varien, 1999) of the multiple dimensions of mobility that leave various archaeological signatures (Diehl, 1992). Most relevant is the recognition that even residentially stable (i.e., sedentary) farmers are mobile in some respects (e.g., Horne, 1993), the degree of residential stability varies (i.e., short-term sedentism (Nelson and Anyon, 1996; Nelson and LeBlanc, 1986)), and not all farmers are residentially stable (e.g., Hard and Merrill, 1992).

In the Mimbres Valley, most large Classic villages are underlain by large Late Pithouse occupations and thus were used for centuries. Such a long-term use is indicative of community stability and a kind of deep sedentism. Detailed occupational histories are not known, however, and it is possible that there were gaps in the occupations that cannot be perceived with the available evidence. Some populations may have moved or dispersed at the end of the Late Pithouse period (Stuart and Gauthier, 1984, p. 198). Furthermore, settlement data indicate several dimensions of mobility associated with farming.

Based on the presence of field houses, mobility was part of a farming strategy. One issue is the variable nature of what are called field houses. In the Mimbres Valley, a six-to-ten-room structure with relatively small rooms and insubstantial construction was classified as a field house (Nelson *et al.*, 1978). Stokes (1999b) applied the term to fairly substantial multiroom structures located on higher tributaries. In contrast, in the eastern Mimbres, a site of the same size but with more substantial construction was argued, based on the diversity of artifacts, to have been a permanent occupation (Laumbach, 1982; see also Brown, 1999a). Smaller sites, often with just a few rooms and mostly insubstantial construction, were identified as field houses in the eastern Mimbres (Nelson, 1993, 1999, chap. 4). Research is

needed to determine whether the apparently variable nature of these “field houses” is real and represents variable land use strategies, or whether the variability is a result of inconsistently applied terminology. Still, some form of field house does seem to have been used as the basis for short-term residential mobility during the Classic period.

Although large villages, usually located near the best arable land, may have been occupied for centuries, other habitation sites were occupied for shorter periods, as is typical across much of the Southwest. Minnis (1985) originally suggested that the eleventh century population growth forced people to practice (relatively unreliable) dry farming in the uplands. Similarly, Stokes (1999b, 2000) suggested that occupations expanded into less desirable side drainages around A.D. 1020, when the climate was particularly favorable, and that these areas were depopulated prior to the depopulation of the larger villages. Shaw made a similar argument for the Pine Lawn-Reserve area (1993, pp. 185–191). Finally, Shafer and Creel (1999) found that another side drainage (Gavilan Canyon) was occupied in the Pithouse periods as well as the Classic, but that there also was a population influx at a time of poor conditions (i.e., low rainfall). It is certainly possible that different processes occurred in different parts of the region, and the overall picture is confounded by an incomplete understanding of what constitutes favorable conditions in any particular area. In all cases, however, expansion into some areas constitutes a form of residential mobility, especially during the Classic period.

At a larger scale, there was a demographic shift across the overall Mimbres region, from west to east, possibly beginning by the Late Pithouse period and continuing through the Classic. Lekson (1990) documented a shift in settlement on the basis of survey data and room counts, and Nelson (1999) used his results to examine demographic changes. Finally, Nogue (2001) confirmed and refined these conclusions through a chronological analysis of ceramics from excavated and survey contexts. Overall, in the western part of the region the most intensive occupation was during the Late Pithouse and early Classic periods; there is little evidence of late Classic or early Postclassic settlements (although there was a substantial post-1300 Salado occupation). In contrast, in the eastern Mimbres, Pithouse occupations are light, and population increased in the post-1130 Reorganization phase.

Overall, although some Mimbres sites may have been occupied (more or less continuously) for centuries, there also is evidence for considerable residential mobility: People moved to field houses for short periods, some areas were settled for only a few decades and perhaps only during certain climatic regimes, and the overall density of settlement shifted over the course of the Classic period. Additional work would provide a clearer and more detailed understanding of these processes, yet it is clear that locational stability (Horne, 1993) and residential mobility were both part of the Mimbres Classic occupation, as they were in other times and places in the Southwest (e.g., Varien, 1999).

### Post-1150 Mobility

The Mimbres Reorganization phase (1130–late 1100s), so far known only in the eastern Mimbres area, is characterized by settlement in hamlets that have Classic Mimbres materials and styles in addition to later materials and styles from surrounding areas. Classic subsistence (i.e., farming) continued, although Nelson (1999, chap. 4) found that settlement changed substantially. Analyses of artifact assemblages and architectural details indicate considerable residential mobility in that the sites were occupied repeatedly, but not intensively. For example, some rooms were remodeled as roofs and walls sagged, but their floors were scarcely worn. Residents may have moved among several dwellings over the course of a year (as do the Tarahumara (Hard and Merrill, 1992)) or may have shifted residences every few years, or both.

In the western part of the Mimbres region, Nelson and Anyon (1996) see another kind of mobility called a fallow-valley strategy (see also Nelson and LeBlanc, 1986, on short-term sedentism). Comparisons of post-1150 sequences from several river valleys showed that nearly every area has a slightly different sequence or has apparent gaps in the sequence, and at least some sites lack evidence—such as deep middens—of long-term use. Nelson and Anyon suggested this archaeological pattern resulted from the movement of people among valleys, with valleys occupied for a few years and then left fallow for a few years. Lekson, however, on the basis of data published in his synthesis (1992), argues (personal communication, 2001) that this model is not supported by evidence from the Upper Gila, where sites were occupied for longer periods (see also Lekson, 2002).

Overall, it is clear that residential mobility increased after A.D. 1150. Different forms of mobility were present in different parts of the region, specifically frequent residential moves within a drainage system in the east and slightly less frequent moves between valley systems in the west. It also is possible that both forms of mobility were utilized in both areas. In either case, the Postclassic mobility across the Mimbres region provides important examples of residential mobility by farmers, indicating that a movement out of large villages does not necessarily imply a shift to greater dependence on wild foods (Nelson, 1999; contra Carmichael, 1990, and Upham, 1984).

### The Question of Abandonment

At around 1130, many large Mimbres villages were depopulated, although remnant populations remained in a number of villages, particularly in the southern Mimbres Valley. Earlier accounts interpreted this depopulation as a collapse of Mimbres civilization and abandonment of the region (e.g., Anyon *et al.*, 1981; LeBlanc, 1989; Shafer, 1990a). Later occupations were considered the remains of

new peoples who moved into an empty area. Recent research paints a different picture.

First, at an empirical level, it is now clear that the region was not completely emptied, much less “abandoned” at the end of the Classic Mimbres period. Although some sites (especially in the northern Mimbres Valley and Upper Gila) were depopulated, occupation continued at portions of some large villages in the southern Mimbres Valley (Creel, 1999a; Hegmon *et al.*, 1999, pp. 154–155) and at some of the large villages along the Rio Grande (Lekson, 1988b). Also, in the eastern Mimbres area, small sites continued to be occupied. Specifically, Classic field houses were remodeled, expanded, and turned into farming hamlets that were occupied through the 1100s (Nelson, 1993, 1999; Nelson and Hegmon, 2001).

Second, research in the Mimbres region has led to reconceptualizations of abandonment (Hegmon *et al.*, 1998; Nelson, 1999, 2000; Nelson and Schachner, 2002). That is, movement out of (some) large sites should not necessarily be equated with failure and collapse, nor should it be assumed to signal abandonment of a region. Rather, Postclassic changes are now being interpreted as a reorganization—a change in land use strategies that allowed (at least some) people to stay in the region—and recent research focuses on understanding the reorganization. Settlement and architectural data (as discussed above) indicate an increase in residential mobility (Nelson, 1999). Architectural and ceramic styles became increasingly diverse and ceramic movement increased, indicating an expansion of social networks and some in-migration (Ennes, 1999; Hegmon *et al.*, 1998, 2000b). Furthermore, analyses of technological styles show a mix of local and northern techniques, suggesting close ties with the areas to the north and some mixing of populations.

There were major changes in the Mimbres region at the beginning of the Postclassic period. However, as earlier scenarios of collapse and abandonment are increasingly replaced by more nuanced interpretations of partial depopulation, continuity, and reorganization, interpretations of causality also are becoming increasingly complex. Clearly the changes coincided with a period of climatic downturn, but the extent to which a drought would have affected the ability of people in the Mimbres Valley to produce enough food depends on the population levels (Minnis, 1985), which are poorly understood. The social climate in the Mimbres Valley might have become increasingly oppressive (Hegmon *et al.*, 1998), as is indicated by the homogeneity in material culture and imagery on some bowls (including a beheading scene with a feathered serpent) reminiscent of repressive Mesoamerican civilizations. Both of these interpretations focus on “push” factors, which are probably only partial explanations. Possible pull factors include the alternative conditions elsewhere, including small Reorganization phase hamlets where great material diversity suggests social flexibility (Hegmon *et al.*, 1998) and where resources may have been less depleted (Schollmeyer, 2000). Another possible pull factor is the rise of Paquimé at around 1150, although recent work indicates that the height of developments there postdate 1200 (Dean and

Ravesloot, 1993). Finally, recent work makes it clear that the phenomena to be explained are quite complex. At one level, the reorganization is seen as a shift in land use strategies that is part of a long tradition of mobility strategies (Nelson, 1999, 2000). This means that Postclassic characteristics—increased mobility, material culture diversity, and interregional interaction—were not new, but rather involve a shift in emphasis, and thus need to be understood in a broad temporal and spatial context.

## MIMBRES POTTERY

Mimbres pottery is best known for its painted, sometimes naturalistic designs. Recent research, however, has primarily advanced our understanding of Mimbres pottery production and distribution. Mimbres pottery provides an important example of production by small-scale specialists who were dispersed in a number of villages (in contrast to village specialization seen in many other areas of the Southwest; see Bayman, 1999). Despite many analyses focusing on various details of Mimbres design, a large-scale systematic stylistic analysis is lacking.

A number of ceramic analyses that were part of research on settlement and regional interaction have already been discussed (Ennes, 1999; Hegmon *et al.*, 1998, 2000b; Nogue, 2001). Here I focus on the production, decoration, and to some extent use and distribution of Mimbres pottery, primarily post-1000 Mimbres Black-on-White. Only a limited amount of work has been done on earlier types or on the plain and corrugated wares (e.g., Chandler, 2000; Ennes, 1995, 1999; Hegmon *et al.*, 2000b; Powell, 1996). A long sequence of brown ware pottery is documented in the Mimbres region. The earliest painted type (Mogollon Red-on-Brown) is widely distributed. Beginning around A.D. 750, most painted pottery is covered with a white slip and decorated with red or black paint. This white-slipped brown ware is somewhat awkwardly called “Mimbres Black-on-White” because it is not actually a *white* ware. The basic ceramic typology and chronology are summarized in Anyon *et al.* (1981) and Scott (1983). The black-on-white types are referred to as Style I or Boldface (A.D. 750–950), Style II or Transitional (A.D. 880–1020), and Style III or Classic (A.D. 1010–1150+); Early, Middle, and Late forms of Styles II and III can sometimes be distinguished (Scott, 1983; Shafer and Brewington, 1995).

### Production

The production of Mimbres pottery has been the subject of considerable research. Several (unpublished) petrographic analyses concluded that Mimbres pottery (both black-on-white and plain) was made in a number of locations, including outside of the Mimbres region (summarized in Gilman *et al.*, 1994, p. 698). Neutron activation analysis (NAA) of Mimbres Black-on-White pottery (Gilman

*et al.*, 1994; James *et al.*, 1995; Powell, 2000) confirmed this pattern and found evidence for local production at a number of sites in the Mimbres Valley and elsewhere. In the past decade researchers (see Creel *et al.*, 2002; James *et al.*, 1995) have amassed a considerable NAA database of Mimbres Black-on-White and other wares found in and around the Mimbres region, although work is still ongoing and results have not yet been synthesized.

The organization of pottery production has been a major focus of recent research in the Southwest (Bayman, 1999; Mills and Crown, 1995). A number of studies have documented various forms of village or regional specialization in which large quantities of a good were produced in one area and widely distributed (e.g., Abbott, 2000; Graves and Spielmann, 2000, p. 47; Hegmon *et al.*, 1997). In contrast, it seems clear that Mimbres Black-on-White pottery was not centrally produced but rather was made in a number of locations. On the basis of a detailed analysis of painting techniques, LeBlanc (1983, pp. 138–139) argued that some of the finest designs were produced by one or a few painters. Recent calculations by LeBlanc and Ellis (2001) suggest that just a few potters, making only 50–100 bowls per year, could account for all Mimbres Black-on-White ceramic production. If they are correct, then the Mimbres case provides an important example of a different kind of craft production, in which specialists were distributed among numerous villages, rather than concentrated in one area.

Researchers continue to debate who, specifically what gender, made and/or painted Mimbres pottery. A female burial (Shafer, 1985) found with pottery-making tools and a painted scene of a woman forming a pot (Moulard, 1984) both indicate that women made the pottery. However, the presence of ritual and/or exotic motifs in some pottery designs led some (e.g., Brody, 1977, p. 116; Jett and Moyle, 1986) to argue that men painted the designs. In what has proven to be an extraordinarily unpopular paper, Hegmon and Trevathan (1996, 1997; see Espenshade, 1997; LeBlanc, 1997; Shaffer *et al.*, 1997) noted apparent anatomical errors in birth scenes and thus suggested that the scenes were painted by people uninformed about the details of birth, that is, by men. Finally, Mills (1995) suggested that economic stress and the possibly increasing importance of Mimbres pottery might have resulted in production by many members of households, including women and men. Clearly it is possible that different persons/genders formed and decorated the pots, or that different persons decorated different kinds of pots, and so no simple resolution of this debate is likely to be forthcoming.

Dates for the last type of Mimbres Black-on-White (Style III) are traditionally given as A.D. 1000–1150 (e.g., Anyon *et al.*, 1981; Scott, 1983). However, Style III pottery is frequently found in post-1150 Terminal Classic Mimbres and Mimbres Reorganization phase contexts (Creel, 1999a; Nelson and Hegmon, 2001). Although it is likely that a type would continue to accumulate in the archaeological record for several decades after its production ceased, the frequency and context of Style III pottery in Reorganization phase occupations suggests that its production



may have continued after 1150. Detailed compositional and attribute analyses might be helpful in resolving this issue, which is relevant for characterizing the early Postclassic and for perceptions of cultural continuity (Nelson and Hegmon, 2001).

### Use and Form

The extraordinary paintings on Mimbres bowls and their placement in burials suggest the possibility that the black-on-white pottery was not made for daily or domestic use. Bray (1982) examined the use wear on painted bowls and concluded that most were used for serving and eating. She also made the tantalizing suggestion that a few of the most finely painted vessels, which have little or no wear, were made specifically for mortuary ritual. Lyle's more recent research on the assemblage from NAN, however, found no support for Bray's latter suggestion (Lyle, 1996), and Lyle argued that the use of the pottery in mortuary rituals was a secondary function.

In much of the Puebloan Southwest, jars (including unpainted cooking vessels as well as decorated ollas) are far more common than bowls, which are generally painted. A different pattern is seen in the Mimbres region, where unpainted (but sometimes elaborately corrugated, smudged, and polished) bowls are common and bowls are more common than jars. Specifically, Lyle (1996) concluded that bowls are two to three times more common than jars in the Classic assemblage from NAN. Nelson (1999, pp. 119–121) summarized what appear to be intact assemblages from two Reorganization phase rooms, and bowls are slightly more numerous than jars. On the basis of her functional analysis of vessel form, Lyle (1996) also concluded that bowls were used for more varied purposes than jars. Gilman (1989) found that bowl diameters are normally distributed and that there is no indication of nesting that would suggest long-distance distribution. Arthur (2001) considered the technological characteristics of Pithouse period undecorated pottery. Otherwise, there have been few studies of the morphology and use of Mimbres pottery.

### Style and Decoration

A large number of studies document and illustrate the stunning designs on Mimbres bowls (Brody, 1977; Brody *et al.*, 1983; Brody and Swentzell, 1996; Fewkes, 1989; Kobotie, 1982; LeBlanc, 1983; Moulard, 1984; O'Bagy Davis, 1995). An archive of photographs of Mimbres pottery, established by the Mimbres Foundation (LeBlanc, 1983, p. 17), also is available in the Maxwell Museum. In this section, I focus on the ways that the designs have been analyzed. Studies that draw on designs to address the various issues reviewed in this paper have already

been (Hegmon and Trevathan, 1996) or will be (Munson, 2000; Shaffer *et al.*, 1999) discussed in the sections that deal with those issues.

The vast majority of studies of Mimbres pottery decoration focus on the images portrayed in the naturalistic designs. Other than work concerned with typological or chronological issues (Scott, 1983; Shafer and Brewington, 1995), technological details of several wares (Hegmon *et al.*, 1998), one study of the early type Mogollon Red-on-Brown (Powell, 1996), and one study of the symmetry of bowl designs found at two sites (Washburn, 1992), *there is no published study* that systematically or quantitatively analyzes various attributes of Mimbres designs. In other words, although Mimbres style has been analyzed from an art historical perspective (Brody, 1977; Moulard, 1984), it has not been the subject of archaeological stylistic analysis (*sensu* Conkey and Hastorf, 1990; Hegmon, 1992; Plog, 1983). The only other exceptions are unpublished M.A. theses by Stoffel (1991) and Ruth (1996). Stoffel considered a number of variables (e.g., eye shape, leg shape, body pattern) on whole or mostly whole vessels to examine hypotheses regarding the transformational meaning of the designs. Ruth compared design attributes from Mimbres Valley and Upper Gila sites and found that stylistic similarity, indicative of social integration or interaction, changed in complex ways through the Late Pithouse and Classic periods.

Numerous studies have focused on certain categories of images to better understand exactly what is being portrayed. LeBlanc (1983, chap. 10) discusses possible meanings, drawing in part on interpretations by Hopi people (see also Kabotie, 1982). Creel and McKusick (1994) considered the parrot-like birds and found that most are scarlet macaws (*Ara macao*), which are native to southern Mexico and central America. Jett and Moyle (1986) concluded that many paintings of fish depict salt-water species for which the closest source was probably the Gulf of California, approximately 640 km from the Mimbres Valley (although see Bettison *et al.*, 1999). Other studies in this category include Hegmon and Trevathan (1996), Munson (2000), Shaffer *et al.* (1995, 1999), Short (1998), and Thompson (1994, 1999a,b).

Many authors have made general statements about the frequencies or various motifs: There are many many rabbits, many animals in general, some people, some “ritual” scenes, and very few plants. Brody’s statements in this regard are probably the most systematic (Brody, 1977). Powell (2000), Short (1998), Stoffel (1991), and Bettison *et al.* (1999) tabulated the kinds of animals and other images depicted in the samples they analyzed. However, *there is no published study* that systematically or quantitatively considers the frequencies of various kinds of images across a large or representative sample of Mimbres pottery.

Many Mimbres vessels are unprovenienced, and many have only site-level provenience, but many others do have detailed provenience information, which is often used in interpretations of stratigraphy or chronology. Catherine LeBlanc, in a widely cited SAA paper (1977), found that different animals and design themes are associated with different sites or parts of the Mimbres Valley; Powell (2000)

similarly found that certain motifs seem to be associated with groups of sites (see also Short, 1998). To my knowledge, however, *there is no published study* of Mimbres pottery designs that makes systematic use of provenience information.

There is a theme here. *There is no published study* that systematically deals with a number of issues relating to one of the most famous pottery types in the Southwest. We know a great deal about what is depicted in Mimbres paintings, in general. But these general impressions have yet to be substantiated with detailed, systematic, quantitative analyses that consider stylistic attributes, provenience information, and the full range of designs.

## THE SOCIAL REALM

In the decades following the debut of the New Archaeology, a number of researchers offered interpretations regarding Mimbres social organization, particularly during the Classic period. Shafer identified Mimbres household suites (e.g., Shafer, 1982), Gilman (1989, 1990) discussed community organization and political structure, and Anyon and LeBlanc (1980) discussed ritual organization. In the past decade, some Mimbres data have been drawn into broad syntheses such as the chapters in Crown (2000) on gender in the prehispanic Southwest. Otherwise, although data relevant to understanding the Mimbres social realm have been accumulating, in the past decade most research in the Mimbres region has focused on other subjects, and the few discussions of social relations have been subsumed into investigations of other issues, such as land use (e.g., Hegmon *et al.*, 1998; Nelson, 1999). Although there is great potential, there are a few published studies that apply recent developments in social theory to Mimbres archaeology. For example, in a recent volume on alternative leadership strategies in the Southwest (Mills, 2000a), there is no detailed discussion of Mimbres material. An edited volume in preparation by Patricia Gilman and Valli Powell (personal communication, 2002) may provide a welcome remedy to this situation.

Most discussions of Mimbres social relations and organization are based on studies of architecture and mortuary remains, and most focus on the Classic period, primarily as it is known in the Mimbres Valley. Artifactual and stylistic analyses are used primarily in studies of regional or interregional interaction. Here I review evidence regarding various scales of organization as well as the nature of organization. Much of the research relevant to these topics focuses on describing patterns in the data; thus, I organize this section by summarizing research that has noted these patterns and then suggesting interpretations.

### Household and Community

In the Mimbres region, as well as elsewhere in the Southwest, pithouses are generally interpreted as household residences, although some late (i.e., Three Circle phase) pithouses seem to be organized into courtyard groups analogous to

those seen in the Hohokam area (Wilcox *et al.*, 1981). Such courtyard groups may have served as the residence for a kin-based corporate group (Creel and Anyon, 2001; Lucas, 1996). It is likely that only a fraction of the many pithouses on large sites were occupied simultaneously (Cameron, 1990; Diehl, 1998; Swanson, 2002). In the Reorganization phase there seems to have been one room per household, as almost all rooms have a similar suite of features. Nelson (1999) has examined Reorganization phase household assemblages, but otherwise there has been little discussion of the nature of households, except during the Classic period.

The Classic period is more difficult to interpret. It appears that Classic residential architecture was considerably more variable than contemporary household architecture in parts of the northern Southwest, particularly the northern San Juan region (where redundant unit pueblos, each with one kiva, were common (Lipe, 1989)). Working with data from NAN, Shafer (1982) identified suites of rooms interpreted as household residences; his subsequent work revealed as many as six household suites in the large east roomblock. In contrast, Gilman (1989) argued that roomblocks at the Mattocks site were occupied by only one or two households, each using about four rooms. Specifically, she suggested that not all rooms were used as residences at any one time and that earlier rooms were sometimes converted into mortuary chambers as later rooms were added. There is considerable variability in Mimbres residential architecture; for example, room suites are clear-cut at some sites (in all parts of the region) but apparently absent at others, including the large Galaz Ruin (Hegmon *et al.*, 2000a). Household organization is germane to several other issues discussed elsewhere, including gender, demography, and leadership.

Organization at a larger (interhousehold and/or village) level has been interpreted primarily in terms of the distribution of communal/ceremonial architecture. Most Late Pithouse sites have one communal structure (sometimes called a great kiva); there is no known case of more than one contemporary communal structure per pithouse site (Anyon and LeBlanc, 1980, p. 261). By the end of the Late Pithouse period some communal structures were quite large and elaborate, and their size seems to correlate with site size (Anyon and LeBlanc, 1980, p. 264). These large communal structures may be examples of high-level specialized integrative facilities (Adler and Wilshusen, 1990; Creel and Anyon, 2001). Creel and Anyon (2001) suggested that the larger Late Pithouse sites have evidence of three levels of organization: households, interhousehold groups (indicated by courtyard clusters), and communities (which shared a communal pit structure).

Evidence of several scales of organization is even more pronounced in the Classic period. In the Mimbres Valley and Upper Gila, three kinds of special or ritual structures were present: semisubterranean kivas, large surface rooms, and walled plazas or courtyards (Anyon and LeBlanc, 1980, pp. 270–271). Not all roomblocks have one of these special structures, but those that do generally have only one (the several in the large east roomblock at NAN were probably not in

use simultaneously). Shafer (2001) suggested this pattern is indicative of corporate groups who occupied distinct roomblocks and controlled the ceremonies in associated structures. Evidence of site-level communal activities in the Mimbres Valley and Upper Gila is limited to partially enclosed areas interpreted as extramural and unwalled plazas, although these are not as formal as the fully enclosed plazas of the post-1300 northern Southwest. At some sites, Classic plazas are adjacent to earlier communal pit structures, indicative of the long-term use of important or ceremonial places (Creel and Anyon, 2001).

The distribution and form of ceremonial structures is different in the eastern Mimbres area, where no kivas have been identified and the only possible Classic ritual structures are a few large rooms. In contrast to the pattern described above, however, these rooms are not associated with roomblocks, but are often on the periphery of larger sites and thus might have been used at a community level.

There has been little discussion of Postclassic intrasite organization, but changes in the existence and distribution of ritual and/or communal architecture suggest it was quite different than that during the Classic. Specifically, despite intensive work on six sites, no special or ceremonial structures or clearly defined plaza areas have been identified on Reorganization phase sites. Black Mountain phase sites have enclosed plazas and a range of room sizes, although no special ceremonial or ritual structures have been identified in the limited amount of excavation. Finally, no special ceremonial rooms or areas have been found on Cliff phase sites, although the artifact assemblage in one room at the Janss site led Nelson and LeBlanc (1986, p. 101) to suggest it might have been used, temporarily, for ceremonies.

The word "community" is commonly used in Mimbres archaeology, usually simply as a synonym for "village." Swentzell (Brody and Swentzell, 1996, p. 16) asserted that large Mimbres villages were self-contained communities much like modern pueblos. Gilman warned against automatically equating community and site, although she noted that the similarities among the larger Classic sites in the Mimbres Valley suggests that each was a community (Gilman, 1989, p. 223). Stokes (1999b), working in the uplands and tributaries, treated clusters of Classic sites as communities, specifically a large site surrounded by a number of smaller sites. From this perspective, in the Mimbres Valley most Classic communities comprise one large site and various surrounding smaller sites. In the eastern Mimbres, clusters of sites, each comprising one or two larger (40–50-room) sites and a number of smaller hamlets, and separated from other clusters by several kilometers, are interpreted as communities. In the northern Southwest, Varien (1999) argued that communal ritual architecture can be used as an indication of community centers. Applying this criterion, it appears that many clusters of Mimbres sites can be interpreted as both residential and ritual communities.

Despite a few gaps, there is fairly good documentation of Mimbres residential and ceremonial architecture across time and space. However, much more work is

needed to better understand the variability and distribution. For example, it is not entirely clear to what extent different descriptions of residential architecture (such as household suites) reflect different interpretations or true differences in archaeological remains. If the differences are real, it is not clear whether or how they pattern across time and space. Furthermore, the association of different kinds of residential and ceremonial architecture is not well known, although the sequence as a whole might provide considerable insights into the relationship between household and community organization.

### Leadership and Political Organization

In a detailed study of Classic Mimbres mortuary remains Gilman (1990) found no evidence of elites or vertical social differentiation. Specifically, she argued that there were no burials with goods or treatment indicative of special status. Most burials have pottery (most commonly one bowl) and/or a small amount of jewelry (Gilman, 1990, Table 1). Many other researchers (cited by Gilman, 1990, p. 461) reached similar conclusions. As further evidence for her interpretation, Gilman (1989) noted the absence of specialist production and relatively limited population size. Bioarchaeological research by (Holliday, 1996) also found no strong indications of intrasite differences that might indicate differential access to resources.

Although I know of no Mimbres researchers who question Gilman's basic argument (i.e., there was no hereditary class of elites in Classic Mimbres society), several lines of evidence are suggestive of more subtle forms of differentiation. Some burials have substantially more grave goods than do others. These include three with more numerous and diverse nonpottery artifacts at Mattocks, a child at Galaz with 20 pottery vessels and other goods, and an adult at Saige McFarland with 21 vessels (Gilman, 1990, p. 463). Some burials (e.g., Burials 18 and 19 at Old Town) also were accorded special treatment in that they were associated with communal pit structures (Creel and Anyon, 2001). Relatively rich burials (i.e., those with more than just one vessel) are distributed unevenly across sites. Specifically, the 400-room block at Mattocks and the south room block at NAN both have generally richer burials than do other areas of the sites, and the NAN south room block also has more elaborate and substantial construction (see Shafer, 1991e). Neitzel (2000) also noted a hierarchical distribution of grave goods for males at Galaz. Similarly, there are indications that sites outside the Mimbres Valley have less rich graves. Finally, while most Classic burials are inhumations, there are a few cremations; Creel (1989) found that cremations are more likely to be interred in special places and to have projectile points.

Gilman's analyses were done at a time when many Southwest archaeologists were arguing (often vehemently) about the *presence* or *absence* of elites in the Prehispanic Southwest. However, more recent work is investigating alternative

forms of leadership strategies and power that can be exercised by persons or groups who are not necessarily elites (Mills, 2000a). Creel and Anyon (2001) suggested religious leaders (i.e., individuals buried in contact with communal structures) may have been partly responsible for monitoring astronomical functions and the calendar. Otherwise, new concepts of leadership have not yet been explicitly considered in Mimbres research, and a recent volume (Mitchell and Brunson-Hadley, 2001) on burial practices in the Southwest has virtually no mention of Mimbres material other than pottery designs.

Several other lines of evidence are relevant to issues of leadership and political organization. Many room blocks were built by accretion, and the earliest core rooms sometimes held numerous burials (LeBlanc, 1983). These localized burial areas might have served to symbolize long-term ties to the place. Shafer (1999) also suggested that some households, particularly those that founded room blocks, might have had special claims to the surrounding farmland.

Second, Hegmon *et al.* (1998, pp. 148–149) recently suggested that “fairly stringent social control” was prevalent during Classic Mimbres times. Such control, involving pressure to conform, even in the absence of hierarchical relations, might have resulted from the density of settlement in the Mimbres Valley and the pressures of aggregation, coupled with agricultural intensification and subsistence stress.

Finally, although the Classic Mimbres villages in the Mimbres Valley are generally similar to one another, there also are some intersite differences. Specifically, Galaz was the largest village, and it was located near the convergence of a side drainage and the Mimbres River at a natural corridor for east–west travel across the valley. Gilman (1990, Table 7) noted that Galaz had slightly more burials with pottery and more vessels per burial than did other Mimbres Valley villages. Also, in contrast to other villages, Galaz had no obvious room suites and relatively fewer storage rooms (Anyon and LeBlanc, 1984, pp. 112–113; Hegmon *et al.*, 2000a). Galaz also may have had a central role in intersite exchange, as is discussed below (Powell, 2000), and Galaz has the most known macaw remains (Creel and McKusick, 1994), although the magnitude of the difference is difficult to assess because of sampling problems. Finally, Galaz is so far the best reported Mimbres Valley Classic village (Anyon and LeBlanc, 1984). As a result, Galaz is often the only Mimbres site to be included in broad syntheses (e.g., Neitzel, 2000), and it tends to be treated as typical rather than possibly exceptional. Creel and Anyon (2001) discussed the exceptional nature of Galaz and also Old Town. There is no published discussion, however, that considers the organizational implications of intersite differences.

## Gender

Pottery designs that depict figures with sexual characteristics facilitate detailed interpretations of gendered representation and activities in Mimbres society.

Munson (2000; see also Shaffer *et al.*, 1999) concluded that there was a gendered division of labor (a conclusion also supported by the few toolkits found in graves (Mills, 2000b, p. 231)), but also considerable organizational flexibility. For example, although more men than women are depicted in what appear to be ritual activities, women are consistently shown with macaws, which are thought to have been ritually important (see Creel and McKusick, 1994). Munson (2000, p. 139) noted, and I would emphasize, that the depictions are not necessarily direct reflections of reality or the economic importance of various activities, but rather *representations* (see Pollock, 1991) of what the painters considered to be important. For example, corn was a staple food but it is rarely depicted. Similarly, faunal remains suggest that rabbits were the most common prey, and while rabbits are commonly depicted, hunting scenes almost always show men in pursuit of larger game. Thus mundane activities (possibly including many typically done by women) are underrepresented in Mimbres paintings.

Other lines of evidence also indicate important roles for women and some flexibility in gender relations, although less so in the Classic. Hegmon *et al.*, (2000c) argued that in the Pithouse period and Reorganization phase there was a basic unit of residence, consumption, and to some degree storage, and thus that decision making was probably inclusive at the household level. Residential mobility during these periods also would have facilitated individuals' (including women's) autonomy. The variable locations and forms of grinding tools and features also are indicative of flexibility in the organization of (presumably women's) labor.

Interpretation of Classic data is more complex. On the one hand, the variable household architecture discussed above might be indicative of individual and household autonomy. On the other hand, if many activities were organized at a suprahousehold level, leadership would be more exclusive to the detriment of women. Neitzel's analysis of Galaz mortuary remains revealed evidence of a male hierarchy but no female hierarchy (Neitzel, 2000), suggesting that women might have been excluded from some prestige systems. However, Ham (1989) found that female graves at NAN were relatively richer than male graves, and she thus suggested the society was matrilineal.

Finally, if pottery was primarily made and distributed by women, then the changes in pottery styles in the Reorganization phase might be indicative of a new role for women in interregional interaction (see Spielmann, 2000, p. 372). That is, the existence of a hybrid style and the adoption of new technological styles (Hegmon *et al.*, 1998, 2000b) indicate that local potters (women?) were interacting intensively with potters to the north. It also might indicate in-migration of some women from the area around Reserve (to the north and west), either through the movement of households or other small groups or through some kind of intermarriage that involved the movement of women.

It is encouraging for me to see that Mimbres material has been incorporated into research on gender issues in general (especially the chapters in Crown,



2000; see also Mills, 1995). In part, I expect the apparently inconsistent patterning described above is a product of equally inconsistent and contradictory gender relations. More work is needed, however, to better understand the apparent patterns and contradictions and to determine if the different results reported from different sites (e.g., richer female graves at NAN, a hierarchy of male graves at Galaz) represent real differences in the archaeological record or different research questions and analytical techniques.

### Regional and Interregional Exchange and Interaction

In 1985 Minnis (chap. 6) summarized the then current evidence for Mimbres exchange, focusing on the Mimbres Valley. His study provides an important baseline, although more recent ceramic analyses are beginning to refine our understanding of the movement of goods within the region. Furthermore, several researchers working through the University of Missouri Research Reactor and the reactor at Texas A&M University are currently amassing a considerable NAA database that will be useful for studying exchange at various levels and in much greater detail (see Creel *et al.*, 2002; James *et al.*, 1995).

It is clear that some goods, including locally made pottery and locally procured obsidian and turquoise, were moved—probably through exchange—within the Mimbres region, and there are some indications that the distribution became more regular in the Classic period (Minnis, 1985, pp. 172–181). Powell (2000) argued, on the basis of NAA data, that groups of villages in the Mimbres Valley were linked through exchange networks and that Galaz, which was linked to more than one group, played a central role (see also James *et al.*, 1995). Powell found some, but much more limited, movement of pottery between the Saige McFarland Site in the Upper Gila and villages in the Mimbres Valley. Similarly, a pilot study by Brady (2001b) indicated that some Mimbres Classic ceramics in the eastern Mimbres area matched Mimbres Valley sources but others seem to have been locally made.

Several classes of material provide evidence of interregional exchange prior to 1130. Researchers have long noted the presence of some of Hohokam materials and styles in Pithouse period occupations and the waning of this interaction by Classic times (e.g., LeBlanc, 1983; Minnis, 1985). In contrast, exotic materials from Mesoamerica (i.e., macaws and copper bells) are slightly more common in Classic than earlier occupations, although they are always quite rare. Otherwise, there are few materials or styles from outside the region, and the Classic period in particular is often discussed as being somewhat inward focused and isolated. In these respects, it is not dissimilar to the northern San Juan region just prior to its depopulation in the late 1200s (Lipe, 1995). Data from Mimbres sites have been included in extensive analyses of the distribution of shell (Bradley, 2000) and copper (Vargas, 1996). There are a few analyses, however, that consider the intraregional distribution of nonlocal materials.

Interpretations of the Postclassic rely heavily on information regarding changing patterns of interregional interaction (Hegmon *et al.*, 1998), because many occupations have a much greater diversity of styles and materials than do preceding Classic occupations. Specifically, eastern Mimbres Reorganization phase occupations have diverse domestic features (hearths and mealing areas), relatively large numbers of nonlocal ceramics, and ceramics that appear to be hybrids of local and extraregional styles (see also Hegmon *et al.*, 2000b). One component of the reorganization probably involved the development of more extensive extraregional ties, particularly with areas to the north. The roughly contemporaneous Black Mountain phase occupations in the southern part of the region evidence similar kinds of extraregional ties, although with more southerly linkages.

The overall picture, based on the presence of imported material found in the Mimbres region, is of more interaction to the west prior to 1000, relative isolation during the Classic, and more interaction with the north and south in the Reorganization and Black Mountain phases. To examine the apparently changing nature and direction of regional interaction, Nogue (2001) mapped the distribution of Mimbres Black-on-White ceramics across the southern Southwest. She found some support for the west-to-east shift (she did not consider the Black Mountain phase), but she found a weak association between imports and exports. For example, during the Late Pithouse period, when Hohokam influence in the Mimbres region seems to have been fairly strong, there were few Mimbres ceramics on Hohokam sites; during the Classic period, when there were few imports from other areas, considerable quantities of Mimbres Black-on-White were distributed beyond the Mimbres region. Thus it is clear that although archaeologists are increasingly able to document the movement of goods, more work is needed to understand the underlying social processes.

Another form of regional interaction is warfare, which has been little discussed for the Mimbres region. LeBlanc (1999) notes that the placement of Early Pithouse sites (on hilltops) is defensive, but no Mimbres and few or no Mogollon Early Pithouse sites have other evidence of violence. A few later Mogollon (although not Mimbres) pithouse sites have possible evidence of violence (especially burning), but the pattern is not robust. There is little clear evidence of warfare during the Mimbres Classic period, despite the possible crowding and the depictions of decapitation scenes on Mimbres bowls. LeBlanc (personal communication, 2001) noted that later Postclassic aggregation in the Mimbres region is consistent with his interpretations for increasing warfare across the Southwest beginning around A.D. 1300, but this proposition has not been examined systematically.

### THE IDEATIONAL REALM

Mimbres pottery designs and the attention they have received from art historians and others have contributed to considerable interest in Mimbres cosmology.

Probably the most popular issue has to do with the meaning (more likely *meanings*) of the naturalistic pottery designs. Although Mimbres materials are rarely discussed in general accounts of symbolism and meaning in archaeology (e.g., Robb's recent review (Robb, 1998)), the potential is great.

Mimbres bowls are often found in burials, and some depict scenes from what appears to be the Puebloan World of the Dead. Thus Brody (1977) posited the existence of a Mimbres "cult of the dead" (see also Crown, 1994). However, he more recently emphasized a broader perspective, arguing that the images have to do with "the unity of man and the cosmos, the living and the dead, and of the structure of harmony" (Brody and Swentzell, 1996, p. 38). Moulard (also an art historian) reached a similar conclusion, arguing that much of the iconography symbolizes transformations, from life to death or from childhood to maturity (1984). She suggested that the mortuary vessels are metaphors for the sky dome (from Pueblo ethnography) and the hole that is generally punched in the burial vessels is for emergence into the Otherworld. The concept of emergence also was developed by Brody, who noted that the common quadrant design layout may represent a multi-layered universe, with contemporary life on the uppermost Fourth World (Brody, 1977, p. 200). These conclusions regarding transformations were supported by Stoffel's analysis (Stoffel, 1991).

Many authors have noted the apparent linkages between Mimbres and Mesoamerican symbolism and/or between Mimbres and Puebloan symbolism (Hays-Gilpin and Hill, 2000; Schaafsma, 1999; Shafer, 1995; Thompson, 1994, 1999a,b). This is clearly not an either-or question, as there are a number of themes common to the Puebloan and Mesoamerican worlds, and the Mimbres region is geographically intermediate. One common theme is the Flower World (Hays-Gilpin and Hill, 2000), which is considered to be the land where the dead go and the living have their spiritual dimension. Flowers (as well as birds, butterflies, and rainbows) are associated with blood, soul, heart, and are generally male. The earliest Flower World imagery is known from Mesoamerica, but Hays-Gilpin and Hill (2000) consider it to be a broad pan-Southwest-Mesoamerican belief system. Shafer (1995) and Thompson (1994, 1999a,b) argued that many themes prevalent in Mimbres imagery (such as a multilayered universe, emergence, the lunar rabbit, the Hero Twins, and the veneration of ancestors) are similarly pan-Southwest-Mesoamerica.

Another theme common to Pueblo and Mesoamerican culture is the religious significance of masking, which also is linked to Tlaloc (an earth-rain god depicted with large eyes) (Schaafsma, 1999). Kachinas are masked dancers and ancestral spirits especially important in the western Pueblos. The earliest evidence of Puebloan Kachina religion (i.e., the depiction of masked figures) dates to just before A.D. 1300 (Adams, 1991; Schaafsma and Schaafsma, 1974). Masked figures, however, were depicted in Mimbres iconography centuries earlier (they also are seen in Jornada style rock art southeast of the Mimbres region). While the complex of beliefs and rituals that comprise the Kachina religion probably developed in the Puebloan world around A.D. 1300, some aspects of those beliefs—possibly with

roots in Mesoamerica—may have been conveyed through the Mimbres region (see Carlson, 1982; Schaafsma and Schaafsma, 1974; Shafer, 1995).

One theme common to these interpretations of the content of Mimbres cosmology is that they indicate a major change at the beginning of the Classic. Some of the earliest known representations of the Flower World complex and masked figures are on Mimbres Classic pottery. Shafer (1995) argued that Mimbres above-ground architecture (which began as early as 900) represents transformation and emergence from the Underworld; the “killing” of mortuary vessels by punching a hole in them also began at this time. It may be that many of these practices appear to be more common in the archaeological record of the Classic period simply because Classic data are better known. The changes in ritual architecture near the end of the Late Pithouse period, however, provide additional evidence of a cosmological change. Most communal structures went out of use at this time, and all known Three Circle phase communal structures were severely burned (although there is no evidence of site-wide burning or violence), suggesting some kind of ritual closure and possibly transformation (Anyon and LeBlanc, 1980, p. 265; Creel and Anyon, 2001).

A number of archaeologists have documented ways in which prehispanic Southwestern peoples established material or symbolic links with their past and perhaps even drew upon past symbols for political purposes (e.g., Fowler and Stein, 1992; Kintigh *et al.*, 1996; Lekson, 1999; Stein and Lekson, 1992); at a broader level these processes are known as archaization (World Archaeology, 1998). One general example, seen across the northern Southwest, is the retention of an earlier form (subterranean pithouses) in later ritual structures (kivas). There is evidence for similar processes in the Mimbres region; although they have been mentioned in the literature, the evidence has not been synthesized. For example, early communal structures have lobes where the ramp entryway comes into the main chamber (they are sometimes described as kidney shaped); later communal structures have what appear to be stylized lobes (such as posts or rocks) in the same positions (Anyon and LeBlanc, 1980, pp. 256–261). Similarly, early communal structures and pithouses are round. This shape was retained for some time in communal structures, although habitation pithouses became square/rectangular by the end of the Late Pithouse period (Anyon and LeBlanc, 1980, p. 261; Haury, 1936, p. 90). Classic kivas are sometimes built in remodeled earlier pithouses. Also, the large center posts of (deliberately) burned Late Pithouse communal pit structures often were removed and may have been reused in later structures (Creel and Anyon, 2001). Finally, pithouses generally have circular basin-shaped hearths, and pueblos generally have square slab-lined ones, but the earlier form was retained in some Classic ritual structures (Anyon and LeBlanc, 1984, p. 137; Shafer, 1995, p. 28).

The Mimbres region, perhaps more than most regions in the Southwest, has produced tantalizing clues about the Prehispanic ideational realm. It is reasonable to think that we know something about what people believed and when those beliefs

might have changed. Given the wealth of evidence, I look forward to additional studies on this topic, particularly analyses that incorporate mortuary data. I also suggest the time is ripe for Mimbres material to be considered with a broad range of theoretical, including Postprocessual, approaches.

## CONCLUSIONS

In conclusion, I outline several topics for which further research either is most vital or could be most fruitful. Despite the destruction it has suffered, the Mimbres record—in museum (and some private) collections, and in publications and unpublished field notes—is rich, and it should continue to contribute to research at many levels. Perhaps the preceding statement could be made about nearly any area, but the untapped potential of Mimbres collections and data is particularly great, and it could be used to address many if not all of the future research directions I outline in the following paragraphs.

First, some of the most important and productive research in the Mimbres region in recent years has concerned humans on the landscape, and especially the growing attention that is being paid to both environmental/ecological factors and to social relations and cultural context. The precedent and background for such work was well established with studies (e.g., Minnis, 1985) that documented environmental impact, and it is being carried forth by more recent work (e.g., Nelson, 1999) that considers various strategies of land use. Given the wealth of new environmental data and techniques becoming available, I look forward to a wealth of analytically detailed and theoretically informed insights.

Second, inferences regarding a wide range of subjects in Mimbres archaeology, from subsistence change to design style, rely either directly or indirectly on the relatively high population estimates proposed by Blake *et al.* (1986). But if the population was substantially lower and thus less susceptible to the twelfth century drought, these inferences would be affected and myriad interpretations would probably have to be changed. The problem is that population estimates are currently based on room counts and only very rough approximations of use life. Additional research in these realms of demography and use life is critical, and it may be possible to develop new analytical methods that work well with Mimbres remains by focusing on architectural dates and remodeling (see Crown, 1991) as well as burial populations.

Third, there are excellent collections of Mimbres ceramics and photographs of the ceramics in a number of museums. We know quite a lot about the Mimbres ceramics, but most of this knowledge is either general or fragmentary. There is huge potential for further work with the ceramics, including systematic study of various aspects of the designs in relation to morphology and technology. Design studies also would be a great complement to the research on ceramic production

and exchange, which has been making rapid advances in recent years. A more comprehensive understanding of Mimbres pottery could contribute to myriad issues regarding everything from subsistence strategies to the social and ideational realms, and such work could contribute to general anthropological research on material culture and interpretations of meaning.

Fourth, throughout this review, I have found myself saying that researcher A found this at Site #1 and researcher B found that at Site #2. Although at some level this could probably be said for most areas, I believe our understanding of variability in the Mimbres region is particularly problematic. More work is needed to better understand the differences between these results—to what extent do they indicate real differences in the past?—and their implications. That is, time–space systematics are fairly well understood at a general level, but we need a more precise understanding of variability across time and space in the Mimbres region and beyond.

Finally, much early research on Mimbres architecture, mortuary practices, and pottery designs was used to make inferences regarding issues such as social organization, hierarchy, and cosmology (what I here discussed as the social and ideational realms). But in the past decade, focus on these issues has waned, and Mimbres material was not discussed in any detail in recent volumes on leadership (Mills, 2000a) and burial practices (Mitchell and Brunson-Hadley, 2001) in the Southwest. I hope that in the near future recently developed theoretical perspectives regarding these issues can be brought to bear on the wealth of Mimbres material. Not only would such work enhance our understanding of the Mimbres region, but the rich Mimbres data might provide a valuable case for comparison, especially for archaeologists interested in the complexity of “noncomplex” societies.

Mimbres archaeology—or at least pottery—is almost always mentioned in texts and summaries of the Southwest; in fact, Mimbres pottery designs are sometimes used on the covers of volumes that have little or nothing to do with Mimbres archaeology, including one edited by me (Hegmon, 1999; see also Gero and Conkey, 1991; Mitchell and Brunson-Hadley, 2001). Thus I have been most encouraged to see Mimbres data of various sorts included in analyses directed towards understanding various issues at a large (interregional or pan-Southwestern scale); this is well illustrated by several chapters in Crown (2000). It is my hope that this review will facilitate access to Mimbres material and thus encourage more researchers to pursue and include it in many realms of research.

### ACKNOWLEDGMENTS

I am grateful to the following friends and colleagues for their input and for sharing references and manuscripts: Roger Anyon, Darrell Creel, Mike Diehl, Karl Laumbach, Steve LeBlanc, Steve Lekson, Karen Schollmeyer, and Harry Shafer. Peggy Nelson contributed immeasurably to this paper in particular and to my

understanding of Mimbres archaeology in general. Gary Feinman, Barbara Mills, Stephen Nash, Jill Neitzel, and an anonymous reviewer provided useful comments on many aspects of an earlier draft. Figure 2 is derived from an effort by Nelson, Jennifer Brady, and myself to gather information on all large Mimbres Classic sites, and I thank researchers who provided us with relevant information.

## REFERENCES CITED

- Abbott, D. R. (2000). *Ceramics and Community Organization Among the Hohokam*, University of Arizona Press, Tucson.
- Ackerly, N. W. (1992). Irrigation Systems in the Mesilla Valley: An Historical Overview, Report No. 710, Center for Anthropological Research, New Mexico State University, Las Cruces.
- Ackerly, N. W., Behr, M., Casaus, M., and Powell, T. L. (1993). Acequia systems of the Rio Mimbres: Floodwater irrigation in Southern New Mexico, Report No. 718, Center for Anthropological Research, New Mexico State University, Las Cruces.
- Adams, E. C. (1991). *The Origin and Development of the Pueblo Katsina Cult*, University of Arizona Press, Tucson.
- Adler, M. A. (ed.) (1996). *The Prehistoric Pueblo World A.D. 1150–1350*, University of Arizona Press, Tucson.
- Adler, M. A., and Wilshusen, R. H. (1990). Large scale integrative facilities in tribal societies: Cross-cultural and Southwestern examples. *World Archaeology* 22: 133–146.
- Ahlstrom, R. V. N. (1985). *The Interpretation of Archaeological Tree-Ring Dates*, Ph.D. Dissertation, Department of Anthropology, University of Arizona, Tucson.
- Anyon, R., Gilman, P. A., and LeBlanc, S. A. (1981). A reevaluation of the Mogollon-Mimbres archaeological sequence. *Kiva* 46: 209–225.
- Anyon, R., and LeBlanc, S. A. (1980). The architectural evolution of Mogollon-Mimbres communal structures. *Kiva* 45: 253–277.
- Anyon, R., and LeBlanc, S. A. (1984). *The Galaz Ruin: A Prehistoric Mimbres Village in Southwestern New Mexico*, Maxwell Museum of Anthropology and the University of New Mexico, Albuquerque.
- Archaeology Southwest (1999). Early maize in the greater Southwest. *Archaeology Southwest* 13(1).
- Arthur, J. A. (2001). A functional analysis of Early Pithouse period ceramics. In Diehl, M. W., and LeBlanc, S. A. (eds.), *Early Pithouses of the Mimbres Valley and Beyond: The McAnally and Thompson Sites in Their Cultural and Ecological Contexts*, Vol. 83, Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, pp. 69–76.
- Bayman, J. M. (1999). Craft economies in the North American Southwest. *Journal of Archaeological Research* 7: 249–299.
- Bettison, C. A., Shook, R., Jennings, R., and Miller, D. (1999). New identifications of naturalistic motifs on Mimbres pottery. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference, Silver City, New Mexico, 1996*, SRI Press, Tucson, AZ, pp. 119–125.
- Blake, M., LeBlanc, S. A., and Minnis, P. E. (1986). Changing settlement and population in the Mimbres Valley, SW New Mexico. *Journal of Field Archaeology* 13: 439–464.
- Bluhm, E. A. (1957). The Sawmill Site: A reserve phase village, Pine Lawn Valley, Western New Mexico, Fieldiana. *Anthropology* 47(1).
- Bradfield, W. (1929). *Cameron Creek Village: A Site in the Mimbres Area in Grant County, New Mexico*, Monographs No. 1, School of American Research, Santa Fe, NM.
- Bradfield, W. (n.d.) *Field Notes of the Three Circle Ruin Excavations*. (Manuscript on file), Laboratory of Anthropology, Museum of New Mexico, Santa Fe.
- Bradley, R. J. (2000). Networks of shell ornament exchange: A critical assessment of prestige economies in the North American Southwest. In Hegmon, M. (ed.), *The Archaeology of Regional Interaction: Religion, Warfare, and Exchange Across the American Southwest and Beyond*, University Press of Colorado, Boulder, pp. 167–187.

- Brady, J. A. (1996). *Mobility and Ceramic Assemblages in the Mogollon Region*, M.A. Thesis, Department of Anthropology, University of Oklahoma, Norman.
- Brady, J. A. (1999a). Agricultural productivity in the eastern Mimbres area. Poster presented at *The 64th Annual Meeting of the Society for American Archaeology*, Chicago.
- Brady, J. A. (1999b). Eastern Mimbres Archaeological Project: 1999 survey of Seco drainage. Report to the Office of Cultural Affairs, Historic Preservation Division, New Mexico.
- Brady, J. A. (2001a). Eastern Mimbres Archaeological Project: 2000 survey of Seco drainage. Report to the Office of Cultural Affairs, Historic Preservation Division, New Mexico.
- Brady, J. A. (2001b). Pottery sourcing in the eastern Mimbres area. Proposal to Sigma Xi, Chapter Grants-in-Aid, Arizona State University, Tempe.
- Bray, A. (1982). Mimbres Black-on-White, Melamine or Wedgwood? A ceramic use-wear analysis. *Kiva* **47**: 133–149.
- Brody, J. J. (1977). *Mimbres Painted Pottery*, School of American Research Press, Santa Fe, NM.
- Brody, J. J., Scott, C. J., and LeBlanc, S. A. (1983). *Mimbres Pottery: Ancient Art of the American Southwest*, Hudson Hills, New York.
- Brody, J. J., and Swentzell, R. (1996). *To Touch the Past: The Painted Pottery of the Mimbres People*, Hudson Hills, New York.
- Brown, G. M. (1998). *Archaeological Data Recovery in the Tailings Pond Enlargement Area at the Continental Mine, Grant County, New Mexico*, Western Cultural Resource Management, Farmington, NM.
- Brown, G. M. (1999a). Rural land-use patterns in the Mimbres region: A view from the uplands in the western periphery. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference, Silver City, New Mexico, 1996*, SRI Press, Tucson, AZ, pp. 107–112.
- Brown, G. M. (ed.) (1999b). *South Waste Rock Expansion: Archaeological Data Recovery in the Buckhorn Gulch Area at the Continental Mine, Grant County, New Mexico*, Western Cultural Resource Management, Farmington, NM.
- Bryan, B. (1927). The Mimbres expedition. *The Masterkey* **1**(3): 21–24.
- Bussey, S. (1972). *Late Mogollon Manifestation in the Mimbres Branch, Southwestern New Mexico*, Ph.D. Dissertation, Department of Anthropology, University of Oregon, Eugene.
- Cameron, C. M. (1990). The effect of varying estimates of pit structure use-life on prehistoric population estimates in the American Southwest. *Kiva* **55**: 155–165.
- Cannon, M. D. (2000). Large mammal relative abundance in pithouse and pueblo period archaeofaunas from southwestern New Mexico: Resource depression among the Mimbres–Mogollon? *Journal of Anthropological Archaeology* **19**: 317–347.
- Carlson, R. L. (1982). The Mimbres kachina cult. In Beckett, P. H., and Silverbird, K. (eds.), *Mogollon Archaeology: Proceedings of the 1980 Mogollon Conference*, Acoma Books, Ramona, CA, pp. 147–157.
- Carmichael, D. L. (1990). Patterns of residential mobility and sedentism in the Jornada Mogollon area. In Minnis, P. E., and Redman, C. L. (eds.), *Perspectives on Southwestern Prehistory*, Westview Press, Boulder, CO, pp. 122–134.
- Chandler, S. L. (2000). *Sourcing Three Circle Phase Ceramics From Old Town (LA 1113), Luna County, New Mexico*, M.A. Thesis, Department of Anthropology, New Mexico State University, Las Cruces.
- Conkey, M. W., and Hastorf, C. A. (eds.) (1990). *The Uses of Style in Archaeology*, Cambridge University Press, Cambridge.
- Cosgrove, H. S., and Cosgrove, C. B. (1923). Two kivas at Treasure Hill. *El Palacio* **15**(2): 19–21.
- Cosgrove, H. S., and Cosgrove, C. B. (1932). *The Swarts Ruin, a Typical Mimbres Site in Southwestern New Mexico*, Papers of the Peabody Museum of American Archaeology and Ethnology **15**(1), Harvard University, Cambridge.
- Creel, D. (1989). A primary cremation at the NAN Ranch Ruin, with comparative data on other cremations in the Mimbres area, New Mexico. *Journal of Field Archaeology* **16**: 309–329.
- Creel, D. G. (1999a). The Black Mountain Phase in the Mimbres area. In Schaafsma, C. F., and Riley, C. L. (eds.), *The Casas Grandes World*, University of Utah Press, Salt Lake City, pp. 107–120.
- Creel, D. G. (1999b). Status report on excavations at the Old Town site (LA 1113), Luna County, New Mexico, summer 1998. Report submitted to the U.S. Bureau of Land Management, Las Cruces District.



- Creel, D., and Anyon, R. (2001). New perspectives on Mimbres communal pitstructures. Unpublished manuscript, Texas Archaeological Research Laboratory, University of Texas, Austin.
- Creel, D., and McKusick, C. (1994). Prehistoric macaws and parrots in the Mimbres area, New Mexico. *American Antiquity* **59**: 510–524.
- Creel, D., Williams, M., Neff, H., and Glascock, M. D. (2002). Black Mountain phase ceramics and implications for manufacture and exchange patterns. In Glowacki, D. M., and Neff, H. (eds.), *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementary Mineralogical Investigations*, Costen Institute of Archaeology, UCLA Press, Los Angeles, pp. 37–46.
- Crown, P. L. (1991). Evaluating the construction sequence and population of Pot Creek Pueblo, northern New Mexico. *American Antiquity* **56**: 291–314.
- Crown, P. L. (1994). *Ceramics and Ideology: Salado Polychrome Pottery*, University of New Mexico Press, Albuquerque.
- Crown, P. L. (ed.) (2000). *Women and Men in the Prehispanic Southwest: Labor, Power, & Prestige*, School of American Research Press, Santa Fe, NM, and James Currey, Oxford, England.
- Dean, J. S., and Ravesloot, J. C. (1993). The chronology of cultural interaction in the Gran Chichimeca. In Woosley, A. I., and Ravesloot, J. C. (eds.), *Culture and Contact: Charles C. Di Peso's Gran Chichimeca*, University of New Mexico Press, Albuquerque, pp. 83–104.
- Dick, H. W. (1965). *Bat Cave*, School of American Research Monograph No. 27, Santa Fe, NM.
- Diehl, M. W. (1992). Architecture as a material correlate of mobility strategies: Some implications for archaeological interpretation. *Behavior Science Research* **26**: 1–36.
- Diehl, M. W. (1996). The intensity of maize processing and production in upland Mogollon pithouse villages A.D. 200–1000. *American Antiquity* **61**: 102–115.
- Diehl, M. W. (1997). Changes in architecture and land use strategies in the American Southwest: Upland Mogollon pithouse dwellers, A.C. 200–1000. *Journal of Field Archaeology* **24**: 179–194.
- Diehl, M. W. (1998). The interpretation of archaeological floor assemblages: A case study from the American Southwest. *American Antiquity* **63**: 617–634.
- Diehl, M. W., and Gilman, P. A. (1996). Implications from the designs of different Southwestern architectural forms. In Fish, P., and Reid, J. J. (eds.), *Interpreting Southwestern Diversity: Underlying Principles and Overarching Patterns*, Anthropological Papers No. 48, Arizona State University, Tempe, pp. 189–194.
- Diehl, M. W., and LeBlanc, S. A. (2001). *Early Pithouse Villages of the Mimbres Valley and Beyond: The McAnally and Thompson Sites in Their Cultural and Ecological Contexts, Vol. 83*, Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge.
- Dycus, D. L. (1997). *The Mangas Phase Is Dead, But It Won't Lie Down: An Analysis of LA 6537 and LA 6538, Catron County, New Mexico*, M.A. Thesis, Department of Anthropology, University of Oklahoma, Norman.
- Ellis, G. L. (1990). Cultural and geomorphic formation processes at LA15049. In Shafer, H. J. (ed.), *Archaeology at the NAN Ranch Ruin (LA15049), 1989 Season Investigations*, Special Report No. 10, Department of Anthropology, Texas A&M University, College Station, pp. 62–105.
- Ellis, G. L. (1998). *Epistemology and the Evaluation of Archaeological Theories: An Empiricist Approach, with a Case Study From the Mimbres Region of Southwestern New Mexico*, Ph.D. Dissertation, Department of Anthropology, Texas A&M University, College Station.
- Ennes, M. J. (1995). *Interpreting Mineralogical Variation in Corrugated Ceramics: A Petrographic Study from the Eastern Mimbres Region*, M.A. Thesis, Department of Anthropology, New Mexico State University, Las Cruces.
- Ennes, M. J. (1999). Evidence for migration in the eastern Mimbres region, southwestern New Mexico. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference, Silver City, New Mexico, 1996*, SRI Press, Tucson, AZ, pp. 127–134.
- Espenshade, C. T. (1997). Mimbres pottery, births, and gender: A reconsideration. *American Antiquity* **62**: 733–736.
- Everett, R. (1992). *The Three Circle site: A Late Pithouse Period Settlement in the Upper Mimbres Valley of Southwestern New Mexico*, M.A. Thesis, Department of Anthropology, University of Texas, Austin.
- Fewkes, J. W. (1989). *The Mimbres: Art and Archaeology*, Reprint of three essays published by the Smithsonian Institution between 1914 and 1924, Avanyu Publishing, Albuquerque.

- Fitting, J. E. (1971). *Excavations at MC110, Grant County, New Mexico*, Southwestern New Mexico Research Reports No. 2, Department of Anthropology, Case Western Reserve University, Cleveland.
- Fitting, J. E. (1973a). An early Mogollon community: A preliminary report on the Winn Canyon site. *The Artifact* **11**(1&2): 1–94.
- Fitting, J. E. (1973b). *Four Archaeological Sites in the Big Burro Mountains of New Mexico*, Center for Anthropological Study Monograph No. 1, Las Cruces, NM.
- Fowler, A. P., and Stein, J. R. (1992). The Anasazi great house in space, time, and paradigm. In Doyel, D. E. (ed.), *Anasazi Regional Organization and the Chaco System*, Anthropological Papers No. 5, Maxwell Museum of Anthropology, Albuquerque, pp. 101–122.
- Gero, J. M., and Conkey, M. W. (eds.) (1991). *Engendering Archaeology: Women and Prehistory*, Blackwell, Oxford.
- Gilman, P. A. (1987). Architecture as artifact: Pit structures and pueblos in the American Southwest. *American Antiquity* **52**: 538–564.
- Gilman, P. A. (1989). Households, communities, and painted pottery in the Mimbres region of southwestern New Mexico. In MacEachern, S., Archer, D. J. W., and Garvin, R. D. (eds.), *Households and Communities*, Proceedings of the 21st Annual Conference of the Archaeological Association of the University of Calgary, Calgary, pp. 218–226.
- Gilman, P. A. (1990). Social organization and Classic Mimbres period burials in the SW United States. *Journal of Field Archaeology* **17**: 457–469.
- Gilman, P. A., Canouts, V., and Bishop, R. L. (1994). The production and distribution of Classic Mimbres Black-on-White pottery. *American Antiquity* **59**: 695–709.
- Gomolak, A. R., and Ford, D. (1976). Reclamation of a vandalized prehistoric settlement: Field report and preliminary analysis, Berrenda Creek Project, Report to the National Science Foundation.
- Graves, W. M., and Spielmann, K. A. (2000). Leadership, long-distance exchange, and feasting in the Protohistoric Rio Grande. In Mills, B. J. (ed.), *Alternative Leadership Strategies in the Prehispanic Southwest*, University of Arizona Press, Tucson, pp. 45–59.
- Gregory, D. A. (ed.) (2001). *Excavations in the Santa Cruz River Floodplain: The Early Agricultural Period component at Los Pozos*, Center for Desert Archaeology, Tucson, AZ.
- Grissino-Mayer, H. D., Baisan, C. H., and Swetnam, T. W. (1997). A 1,373 year reconstruction of annual precipitation for the Southern Rio Grande Basin, Report submitted to the Directorate of Environment, Natural Resources Division, Fort Bliss, TX.
- Ham, E. (1989). *Analysis of the NAN Ruin Burial Patterns: An Examination of Mimbres Social Structure*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Hard, R. J. (1990). Agricultural dependence in the mountain Mogollon. In Minnis, P. E., and Redman, C. L. (eds.), *Perspectives on Southwestern Prehistory*, Westview Press, Boulder, CO, pp. 135–149.
- Hard, R. J., Mauldin, R. P., and Raymond, G. R. (1996). Mano size, stable carbon isotope ratios, and macrobotanical remains as multiple lines of evidence of maize dependence in the American Southwest. *Journal of Archaeological Method and Theory* **3**: 253–318.
- Hard, R. J., and Merrill, W. L. (1992). Mobile agriculturalists and the emergence of sedentism: Perspectives from northern Mexico. *American Anthropologist* **94**: 601–620.
- Haury, E. W. (1936). *The Mogollon Culture of Southwestern New Mexico*, Medallion Papers 20, Gila Pueblo, Globe, AZ.
- Hays-Gilpin, K., and Hill, J. H. (2000). The Flower World in prehistoric Southwest material culture. In Hegmon, M. (ed.), *The Archaeology of Regional Interaction: Religion, Warfare, and Exchange Across the American Southwest and Beyond*, University Press of Colorado, Boulder, pp. 411–428.
- Hegmon, M. (1992). Archaeological research on style. *Annual Review of Anthropology* **21**: 517–536.
- Hegmon, M. (1996). Variability in food production, strategies of storage and sharing, and the pithouse-to-pueblo transition in the northern Southwest. In Tainter, J., and Tainter, B. B. (eds.), *Evolving Complexity and Environmental Risk in the Prehistoric Southwest*, Addison-Wesley, Reading, MA, pp. 223–250.
- Hegmon, M. (1999). *The Archaeology of Regional Interaction: Religion, Warfare, and Exchange Across the American Southwest and Beyond*, University Press of Colorado, Boulder.
- Hegmon, M., Allison, J. R., Neff, H., and Glascock, M. D. (1997). The production of San Juan Red Ware in the northern Southwest: Insights into regional interaction in early Puebloan prehistory. *American Antiquity* **62**: 449–463.
- Hegmon, M., Brady, J. A., and Nelson, M. C. (2000a). Home suite home: Classic Mimbres room suite variability. Paper presented at the *XI Mogollon Conference*, Las Cruces, NM.

- Hegmon, M., and Nelson, M. C. (2000). Mobility, population, and environmental impact in the Mimbres region. Proposal to the *National Geographic Society*, Grant # 6980-01, Washington, DC.
- Hegmon, M., Nelson, M. C., Anyon, R., Creel, D., LeBlanc, S. A., and Shafer, H. J. (1999). Scale and time-space systematics in the post-A.D. 1100 Mimbres region of the North American Southwest. *Kiva* **65**: 143–166.
- Hegmon, M., Nelson, M. C., and Ennes, M. J. (2000b). Corrugated pottery, technological style, and population movement in the Mimbres region of the American Southwest. *Journal of Anthropological Research* **56**: 217–240.
- Hegmon, M., Nelson, M. C., and Ruth, S. M. (1998). Abandonment and reorganization in the Mimbres region of the American Southwest. *American Anthropologist* **100**: 148–162.
- Hegmon, M., Ortman, S. G., and Mobley-Tanaka, J. L. (2000c). Women, men, and the organization of space. In Crown, P. L. (ed.), *Women and Men in the Prehispanic Southwest: Labor, Power, & Prestige*. School of American Research Press, Santa Fe, NM, and James Currey, Oxford, England, pp. 43–90.
- Hegmon, M., and Trevathan, W. (1996). Gender, anatomical knowledge, and pottery production: Implications of an anatomically unusual birth depicted on Mimbres pottery from southwestern New Mexico. *American Antiquity* **61**: 747–754.
- Hegmon, M., and Trevathan, W. (1997). Response to comments by LeBlanc, by Espenshade, and by Shafer *et al.* *American Antiquity* **62**: 737–739.
- Herrington, L. (1979). *Settlement Patterns and Water Control Systems of the Mimbres Classic Phase, Grant County, New Mexico*. Ph.D. Dissertation, Department of Anthropology, University of Texas, Austin.
- Herrington, L. (1982). Water-control systems of the Mimbres Classic phase. In Beckett, P. H. (ed.), *Mogollon Archaeology: Proceedings of the 1980 Mogollon Conference*, Acoma Books, Ramona, CA, pp. 75–90.
- Herrington, L., and Creel, D. (1991). Treasure Hill: An agricultural center and type site revisited. In *Mogollon V*, COAS, Las Cruces, NM, pp. 50–61.
- Holliday, D. Y. (1996). *Were Some More Equal? Diet and Health at the NAN Ranch Pueblo, Mimbres Valley, New Mexico*. Ph.D. Dissertation, Department of Anthropology, University of Wisconsin, Madison.
- Horne, L. (1993). Occupational and locational instability in arid land settlement. In Cameron, C. M., and Tomka, S. A. (eds.), *The Abandonment of Settlements and Regions: Ethno-archaeological and Archaeological Approaches*, Cambridge University Press, New York, pp. 43–53.
- Hough, W. (1907). *Antiquities of the Upper Gila and Salt River Valley in Arizona and New Mexico*, Bureau of American Ethnology Bulletin 35, Washington, DC.
- Huntley, D. (1998). The Eastern Mimbres Archaeological Project: 1997 survey along Las Animas Creek, Ladder Ranch, New Mexico. In Nelson, M., and Hegmon, M. (eds.), *EMAP: Mimbres Lives and Landscapes: Archaeological Research on the Ladder Ranch 1997–1998*, Report to the Turner Foundation, Atlanta, GA.
- James, W. D., Brewington, R. L., and Shafer, H. J. (1995). Compositional analysis of American Southwestern ceramics by neutron activation analysis. *Journal of Radioanalytical and Nuclear Chemistry* **192**: 109–116.
- Jenks, A. E. (1928). The Mimbres Valley Expedition, *Bulletin of the Minneapolis Institute of Arts* **17**(31).
- Jett, S. C., and Moyle, P. B. (1986). The exotic origins of fishes depicted on prehistoric Mimbres pottery from New Mexico. *American Antiquity* **51**: 688–720.
- Kabotie, F. (1982). *Designs From the Ancient Mimbresños With a Hopi Interpretation*, 2nd edn., Northland Press, Flagstaff, AZ.
- Kintigh, K. W., Howell, T. L., and Duff, A. I. (1996). Post-Chacoan social integration at the Hinkson site. *Kiva* **61**: 257–274.
- Laumbach, K. W. (1982). Perennial use of late Mimbres small house sites in the Black Range: A reflection of extended economic relationships or a radical shift in settlement–subsistence patterning? In Beckett, P. H., and Silverbird, K. (eds.), *Mogollon Archaeology: Proceedings of the 1980 Mogollon Conference*, Acoma Press, Ramona, CA, pp. 103–109.
- Laumbach, K. W. (1992). Reconnaissance Survey of the National Park Service Ojo Caliente Study Area, Socorro County, New Mexico, Human Systems Research Report 9132, Tularosa, NM.

- Laumbach, K. W., and Kirkpatrick, D. T. (1983). *The Black Range Survey: A 2% Archaeological Sample of State Lands in Western Sierra County, New Mexico*, Cultural Resource Management Division, New Mexico State University, Las Cruces.
- Laumbach, K. W., and Wakeman, J. L. (1999). Rebuilding an ancient pueblo: The Victorio site in regional perspective. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference*, SRI Press, Tucson, AZ, pp. 183–189.
- LeBlanc, C. J. (1977). Design analysis of Mimbres pottery. Paper presented at *The 42nd Annual Meeting of the Society for American Archaeology*, New Orleans, LA.
- LeBlanc, S. A. (1975). *Mimbres Archaeological Center: Preliminary Report of the First Season of Excavation, 1974*, Institute of Archaeology, UCLA, Los Angeles.
- LeBlanc, S. A. (1976). Mimbres Archaeological Center: Preliminary report of the second season of excavation, 1975. *Journal of New World Archaeology* 1(6): 1–23.
- LeBlanc, S. A. (1977). The 1976 field season of the Mimbres Foundation in southwestern New Mexico. *Journal of New World Archaeology* 2(2): 1–24.
- LeBlanc, S. A. (1983). *The Mimbres People: Ancient Painters of the American Southwest*, Thames and Hudson, London.
- LeBlanc, S. A. (1986). Development of archaeological thought on the Mimbres Mogollon. In Reid, J. J., and Doyel, D. E. (eds.), *Emil W. Haury's Prehistory of the American Southwest*, University of Arizona Press, Tucson, pp. 297–304.
- LeBlanc, S. A. (1989). Cultural dynamics in the southern Mogollon area. In Cordell, L. S., and Gumerman, G. J. (eds.), *Dynamics of Southwestern Prehistory*, Smithsonian Institution Press, Washington, DC, pp. 179–209.
- LeBlanc, S. A. (1997). A comment on Hegmon and Trevathan's "Gender, anatomical knowledge, and pottery production." *American Antiquity* 62: 723–726.
- LeBlanc, S. A. (1999). *Prehistoric Warfare in the American Southwest*. University of Utah Press, Salt Lake City.
- LeBlanc, S. A., and Ellis, M. M. (2001). The individual artist in Mimbres culture: Painted bowl production and specialization. Poster presented at *The 66th annual meeting of the Society for American Archaeology*, New Orleans.
- LeBlanc, S. A., and Whalen, M. E. (eds.) (1980). *An Archaeological Synthesis of South-Central and Southwestern New Mexico*, Office of Contract Archaeology, University of New Mexico, Albuquerque.
- Lehmer, D. J. (1948). *The Jornada Branch of the Mogollon*, University of Arizona Social Science Bulletin No. 17, University of Arizona Press, Tucson.
- Lekson, S. H. (1986). Mesa Verde-like pottery near T-or-C, New Mexico. *Pottery Southwest* 13(4): 1–3.
- Lekson, S. H. (1988a). The Mangas phase in Mimbres archaeology. *Kiva* 53: 129–146.
- Lekson, S. H. (1988b). Regional systematics in the later prehistory of southern New Mexico. In Duran, M. S., and Laumbach, K. W. (eds.), *Fourth Jornada Mogollon Conference Collected Papers*, Human Systems Research, Las Cruces, NM, pp. 1–37.
- Lekson, S. H. (1989). An archaeological reconnaissance of the Rio Grande Valley in Sierra County, New Mexico. *The Artifact* 27(2): 1–87.
- Lekson, S. H. (1990). *Mimbres Archaeology of the Upper Gila, New Mexico*, Anthropological Papers No. 53, University of Arizona Press, Tucson.
- Lekson, S. H. (1992). Archaeology overview of Southwestern New Mexico, Report submitted to the New Mexico State Historic Preservation Division, Santa Fe, Human Systems Research, Las Cruces.
- Lekson, S. H. (1993). Chaco, Hohokam and Mimbres: The Southwest in the 11th and 12th centuries. *Expedition* 35(1): 44–52.
- Lekson, S. H. (1996). Southwestern New Mexico and southeastern Arizona, A.D. 900 to 1300. In Adler, M. A. (ed.), *The Prehistoric Pueblo World A.D. 1150–1350*, University of Arizona Press, Tucson, pp. 170–176.
- Lekson, S. H. (1999). *The Chaco Meridian: Centers of Political Power in the Ancient Southwest*, AltaMira Press, Walnut Creek, CA.
- Lekson, S. A. (2002). *Salado of the Upper Gila, New Mexico*, Anthropological Papers No. 67, University of Arizona Press, Tucson.

- Lipe, W. D. (1995). The depopulation of the northern San Juan: Conditions in the turbulent 1200's. *Journal of Anthropological Archaeology* **14**: 143–169.
- Lipe, W. D. (1989). Social scale of Mesa Verde Anasazi kivas. In Lipe, W. D., and Hegmon, M. (eds.), *The Architecture of Social Integration*, Occasional Papers No. 1, Crow Canyon Archaeological Center, Cortez, CO, pp. 53–72.
- Lippmeier, H. S. (1991). *A Preliminary Assessment of the Relative Health Status Between Classic and Post-Classic Populations of Southwestern New Mexico*. M.A. Thesis, Department of Anthropology, SUNY, Buffalo.
- Lucas, J. (1996). *Three Circle Phase Architecture at Old Town, a Prehistoric Mimbres Site in Luna County, Southwestern New Mexico*. M.A. Thesis, Department of Anthropology, University of Texas, Austin.
- Lyle, R. P. (1996). *Functional Analysis of Mimbres Ceramics From the NAN Ruin (LA15049), Grant County, New Mexico*. M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Mabry, J. B. (1997). *Archaeological Investigations of Early Village Sites in the Middle Santa Cruz Valley: Descriptions of the Santa Cruz Bend, Square Hearth, Stone Pipe, and Canal Sites*, Center for Desert Archaeology, Tucson, AZ.
- Marek, M. (1990). *Long Bone Growth of Mimbres Subadults From the NAN Ranch (LA 15049), New Mexico*. M.A. Thesis, department of Anthropology, Texas A&M University, College Station.
- Martin, P. S. (1940). *The SU Site: Excavations at Mogollon Village, Western New Mexico, 1939*, Anthropological Series 32(1), Field Museum of Natural History, Chicago.
- Martin, P. S. (1943). *The SU Site: Excavations at a Mogollon Village, Western New Mexico, Second Season, 1941*, Anthropological Series 32(2), Field Museum of Natural History, Chicago.
- Martin, P. S. (1979). Prehistory: Mogollon. In Ortiz, A. (ed.), *Handbook of North American Indians. Vol. 9: Southwest*, Smithsonian Institution Press, Washington, DC, pp. 61–74.
- Martin, P. S., and Rinaldo, J. B. (1947). *The SU Site: Excavations at a Mogollon Village, Western New Mexico, Third Season, 1946*, Anthropological Series 32(3), Field Museum of Natural History, Chicago.
- Martin, P. S., and Rinaldo, J. B. (1950). Sites of the Reserve Phase: Pine Lawn Valley, Western New Mexico. *Fieldiana: Anthropology* **38**(3): 403–577.
- Martin, P. S., Rinaldo, J. B., and Barter, E. R. (1957). Late Mogollon Communities: Four Sites of the Tularosa Phase, Western New Mexico. *Fieldiana: Anthropology* **49**(1).
- Martin, P. S., Rinaldo, J. B., Bluhm, E. A., Cutler, H. C., and Grange, R., Jr. (1952). Mogollon Cultural Continuity and Change: The Stratigraphic Analysis of Tularosa and Cordova Caves. *Fieldiana: Anthropology* **40**: 1–528.
- Matson, R. G., and Chisholm, B. (1991). Basketmaker II subsistence: Carbone isotopes and other dietary indicators from Cedar Mesa, Utah. *American Antiquity* **56**: 444–459.
- Mauldin, R. (1993). The relationship between ground stone and agricultural intensification in western New Mexico. *Kiva* **58**: 317–330.
- Mauldin, R., Gilman, P. A., and Stevenson, C. M. (1996). Mogollon Village revisited: Recent chronometric results and interpretations. *Kiva* **61**: 385–400.
- Mayo, J. E. (1994). *Garfield Revisited: Further Research on a Mimbres Site in the Southern Rio Grande Valley*. M.A. Thesis, Department of Anthropology, New Mexico State University, Las Cruces.
- Mayo, J., and Hegmon, M. (1993). Survey along Las Animas drainage. In Nelson, M., and Hegmon, M. (eds.), *Eastern Mimbres Archaeological Project: Archaeological Research on the Ladder Ranch*, Report to the Turner Foundation, Atlanta, GA.
- McKenna, P. J., and Bradford, J. E. (1989). *The TJ Ruin: Gila Cliff Dwellings National Monument*, Professional Papers No. 21, Southwest Cultural Resources Center, Santa Fe, NM.
- Mills, B. J. (1986). Temporal variability in the ceramic assemblages of the eastern slope of the Black Range, New Mexico. In Benson, C., and Upham, S. (eds.), *Mogollon Variability*, University Museum Occasional Papers No. 15, New Mexico State University, Las Cruces, pp. 169–180.
- Mills, B. J. (1995). Gender and the reorganization of historic Zuni craft production: Implications for archaeological interpretation. *Journal of Anthropological Research* **51**: 149–172.
- Mills, B. J. (ed.) (2000a). *Alternative Leadership Strategies in the Prehispanic Southwest*, University of Arizona Press, Tucson.

- Mills, B. J. (2000b). Gender, craft production, and inequality. In Crown, P. L. (ed.), *Women and Men in the Prehispanic Southwest: Labor, Power, & Prestige*, School of American Research Press, Santa Fe, NM, and James Currey, Oxford, England, pp. 301–344.
- Mills, B. J., and Crown, P. L. (eds.) (1995). *Ceramic Production in the American Southwest*, University of Arizona Press, Tucson.
- Minnis, P. E. (1985). *Social Adaptation to Food Stress: A Prehistoric Southwestern Example*, University of Chicago Press, Chicago.
- Minnis, P. E. (1989). Prehistoric diet in the northern Southwest: Macroplant remains from Four Corners feces. *American Antiquity* **54**: 543–563.
- Mitchell, D. R., and Brunson-Hadley, J. L. (eds.) (2001). *Ancient Burial Practices in the American Southwest: Archaeology, Physical Anthropology, and Native American Perspectives*, University of New Mexico Press, Albuquerque.
- Mouillard, B. (1984). *Within an Underworld Sky: Mimbres Ceramic Art in Context*, Twelvetrees Press, Pasadena, CA.
- Munson, M. K. (2000). Sex, gender, and status: Human images from the Classic Mimbres. *American Antiquity* **65**: 127–144.
- Neitzel, J. E. (2000). Gender hierarchies: A comparative analysis of mortuary data. In Crown, P. L. (ed.), *Women and Men in the Prehispanic Southwest: Labor, Power, & Prestige*, School of American Research Press, Santa Fe, NM, and James Currey, Oxford, England, pp. 137–168.
- Nelson, B. A., and Anyon, R. (1996). Fallow valleys: Asynchronous occupations in southwestern New Mexico. *Kiva* **61**: 275–294.
- Nelson, B. A., and LeBlanc, S. A. (1986). *Short-Term Sedentism in the American Southwest: The Mimbres Valley Salado*, Maxwell Museum of Anthropology and the University of New Mexico Press, Albuquerque.
- Nelson, B. A., Rugge, M. C., and LeBlanc, S. A. (1978). LA 12109: A small Classic Mimbres Ruin, Mimbres Valley. In Ward, A. E. (ed.), *Limited Activity and Occupational Sites: A Collection of Conference Papers*, Contributions to Anthropological Studies No. 1, Center for Anthropological Studies, Albuquerque, NM, pp. 191–206.
- Nelson, M. C. (ed.) (1984). *Ladder Ranch Research Project: A Report of the First Season*, Technical Series No. 1, Maxwell Museum of Anthropology, Albuquerque, NM.
- Nelson, M. C. (1993). Changing occupational patterns among prehistoric horticulturalists in SW New Mexico. *Journal of Field Archaeology* **20**: 43–57.
- Nelson, M. C. (1999). *Mimbres During the Twelfth Century: Abandonment, Continuity, and Reorganization*, University of Arizona Press, Tucson.
- Nelson, M. C. (2000). Abandonment: Conceptualization, representation, and social change. In Schiffer, M. B. (ed.), *Social Theory in Archaeology*, University of Utah Press, Salt Lake City, pp. 52–62.
- Nelson, M. C., and Hegmon, M. (1998). EMAP: Mimbres Lives and Landscapes: Archaeological Research on the Ladder Ranch, 1997–1998, Report submitted to the Turner Foundation, Atlanta, GA.
- Nelson, M. C., and Hegmon, M. (2001). Abandonment is not as it seems: An approach to the relationship between site and regional abandonment. *American Antiquity* **66**: 213–235.
- Nelson, M. C., and Schachner, G. (2002). Understanding abandonments in the North American Southwest. *Journal of Archaeological Research* **10**: 167–206.
- Nelson, M. C., and Schollmeyer, K. G. (2001). Impacts on nature and nature's impact. Paper prepared for the *Ladder Ranch Conference: Mimbres: Lives and Landscapes*, Caballo, NM.
- Nelson, N. (n.d.). Mimbres and Deming region: Sites 1–38. The American Museum of Natural History, New York.
- Nesbitt, P. H. (1931). *The Ancient Mimbrenos, Based on Investigations at the Mattocks Ruin, Mimbres Valley, New Mexico*, Logan Museum Bulletin 4, Beloit College, Beloit, WI.
- Nogue, L. K. (2001). Classic Mimbres demographic shifts and interaction: Precursors to Postclassic regional reorganization, M.A. Paper, Department of Anthropology, Arizona State University, Tempe.
- O'Bagy Davis, C. (1995). *Treasured Earth: Hattie Cosgrove's Mimbres Archaeology in the American Southwest*, Old Pueblo Archaeology Center, Tucson, AZ.
- O'Laughlin, T. C. (1985). Jornada Mogollon occupation in the Rincon Valley, southern New Mexico. *The Artifact* **23**(1/2): 41–57.

- Olive, B. W. (1989). *The Oral Health and Dental Characteristics of a Mimbres Population From Southwest New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Plog, S. (1983). Analysis of style in artifacts. *Annual Review of Anthropology* **12**: 125–142.
- Pollock, S. M. (1991). Women in a men's world: Images of Sumerian women. In Gero, J. M., and Conkey, M. W. (eds.), *Engendering Archaeology: Women and Prehistory*, Blackwell, Oxford, England, pp. 366–387.
- Powell, S. (1983). *Mobility and Adaptation: The Anasazi of Black Mesa, Arizona*, Southern Illinois University Press, Carbondale.
- Powell, V. S. (1996). Regional diversity in Mogollon Red-on-Brown pottery. *Kiva* **62**: 185–203.
- Powell, V. S. (2000). *Iconography and Group Formation During the Late Pithouse and Classic Periods of the Mimbres Society, A.D. 970–1140*, Ph.D. Dissertation, Department of Anthropology, University of Oklahoma, Norman.
- Preucel, R. W. (1990). *Seasonal Circulation and Dual Residence in the Pueblo Southwest: A Prehistoric Example From the Pajarito Plateau, New Mexico*, Garland Press, New York.
- Rautman, A. E. (1993). Resource variability, risk, and the structure of social networks: An example from the prehistoric Southwest. *American Antiquity* **58**: 403–424.
- Ravesloot, J. C. (1979). *The Animas Phase: The Post Classic Mimbres Occupation of the Mimbres Valley, New Mexico*, M.A. Thesis, Department of Anthropology, Southern Illinois University, Carbondale.
- Rice, G. E. (1975). *A Systematic Explanation of a Change in Mogollon Settlement Patterns*, unpublished Ph.D. Dissertation, Department of Anthropology, University of Washington, Seattle.
- Robb, J. E. (1998). The archaeology of symbols. *Annual Review of Anthropology* **27**: 29–46.
- Rocek, T. R. (1996). Sedentism and mobility in the Southwest. In Fish, P., and Reid, J. J. (eds.), *Interpreting Southwestern Diversity: Underlying Principles and Overarching Patterns*, Anthropological Papers No. 48, Arizona State University, Tempe, pp. 17–22.
- Ruth, S. (1996). *Stylistic and Social Change in the Cliff and Mimbres Valleys: A Study of Mimbres Black-on-White pottery*, M.A. Thesis, Department of Anthropology, New Mexico State University, Las Cruces.
- Sanchez, J. L. (1996). A re-evaluation of Mimbres faunal subsistence. *Kiva* **61**: 295–307.
- Sandor, J. A. (1992). Long-term effects of prehistoric agriculture on soils: Examples from New Mexico and Peru. In Holliday, V. T. (ed.), *Soils in Archaeology: Landscape Evolution and Human Occupation*, Smithsonian Institution Press, Washington, DC, pp. 217–245.
- Sandor, J. A., Gersper, P. L., and Hawley, J. W. (1990). Prehistoric agricultural terraces and soils in the Mimbres area, New Mexico. *World Archaeology* **22**: 70–86.
- Schaafsma, P. (1999). Tlalocs, Kachinas, sacred bundles, and related symbolism in the Southwest. In Schaafsma, C. F., and Riley, C. L. (eds.), *The Casas Grandes World*, University of Utah Press, Salt Lake City, pp. 164–192.
- Schaafsma, P., and Schaafsma, C. F. (1974). Evidence for the origins of the Pueblo kachina cult as suggested by Southwestern rock art. *American Antiquity* **30**: 535–545.
- Schlanger, S. H. (1985). *Prehistoric Population Dynamics in the Dolores Area, Southwestern Colorado*, Ph.D. Dissertation, Department of Anthropology, Washington State University, Pullman.
- Schollmeyer, K. G. (2000). *Settlement Size, Environmental Impact and Large Mammal Use in the Mimbres Region, Southwest New Mexico*, M.A. Paper, Department of Anthropology, Arizona State University, Tempe.
- Schutt, J., Chapman, R., and Piper, J. (eds.) (1994). *On the Periphery of the Mimbres Mogollon: The Cuchillo Negro Archaeological Project*, Office of Contract Archaeology, University of New Mexico, Albuquerque.
- Scott, C. J. (1983). The evolution of Mimbres pottery. In *Mimbres Pottery: Ancient Art of the American Southwest*, Hudson Hills, New York, pp. 38–67.
- Sechrist, M., and Russell, W. (1995). Elk Ridge. Paper presented at *The Pecos Conference, Gila National Forest*, NM.
- Shafer, H. J. (1982). Classic Mimbres phase households and room use patterns. *Kiva* **48**: 158–166.
- Shafer, H. J. (1985). A Mimbres potter's grave: An example of Mimbres craft specialization. *Bulletin of the Texas Archaeological Society* **56**: 185–200.
- Shafer, H. J. (1990a). Archaeology at the NAN Ruin: 1984 interim report. *Artifact* **28**(4): 5–27.

- Shafer, H. J. (1990b). Life among the Mimbres: Excavating the NAN Ruin. *Archaeology* **43**(6): 48–51.
- Shafer, H. J. (1991a). Archaeology at the NAN Ruin (LA15049): 1985 interim report. *The Artifact* **29**(1): 1–29.
- Shafer, H. J. (1991b). Archaeology at the NAN Ruin (LA15049): 1986 interim report. *The Artifact* **29**(2): 1–42.
- Shafer, H. J. (1991c). Archaeology at the NAN Ruin: The 1987 season. *The Artifact* **29**(3): 1–43.
- Shafer, H. J. (1991d). Archaeology at the NAN Ruin: The 1989 season. *The Artifact* **29**(4): 1–43.
- Shafer, H. J. (1991e). Classic Mimbres architectural and mortuary patterning at the NAN Ranch Ruin (LA 15049), southwestern New Mexico. In *Mogollon V*, COAS, Las Cruces, NM, pp. 34–49.
- Shafer, H. J. (1991f). Swarts Ruin revisited: An assessment of the 1920s excavation and data potential. *The Artifact* **29**(1): 31–41.
- Shafer, H. J. (1995). Architecture and symbolism in transitional Pueblo development in the Mimbres Valley, SW New Mexico. *Journal of Field Archaeology* **22**: 23–47.
- Shafer, H. J. (1999). The Classic Mimbres phenomenon and some new interpretations. In Whittlesey, S.M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference*, Silver City, New Mexico, 1996, SRI Press, Tucson, AZ, pp. 95–105.
- Shafer, H. J. (2001). Extended families to corporate groups. Paper prepared for the *Ladder Ranch Conference: Mimbres Lives and Landscapes Conference*, Caballo, NM.
- Shafer, H. J., and Brewington, R. L. (1995). Microstylistic changes in Mimbres Black-on-White pottery: Examples from the NAN Ruin, Grant County, New Mexico. *Kiva* **61**: 5–29.
- Shafer, H. J., and Creel, D. (1999). Large sites and small site outliers: A new look at Classic Mimbres settlement patterns. Poster presented at *The 64th Annual Meeting of the Society for American Archaeology*, Chicago.
- Shafer H. J., and Taylor, A. J. (1986). Mimbres Mogollon architectural dynamics and ceramic style change. *Journal of Field Archaeology* **13**: 43–68.
- Shaffer, B. S., Gardner, K. M., and Powell, J. F. (1999). Sexual division of labor in the prehistoric Puebloan Southwest as portrayed by Mimbres potters. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference*, SRI Press, Tucson, AZ, pp. 112–117.
- Shaffer, B. S., Gardner, K. M., and Shafer, H. J. (1997). An unusual birth depicted in Mimbres pottery: Not cracked up to what it is supposed to be. *American Antiquity* **62**: 727–732.
- Shaffer, B. S., Nicholson, H. A., and Gardner, K. M. (1995). Possible Mimbres documentation of Pueblo snake ceremonies in the eleventh century. *North American Archaeologist* **16**: 17–32.
- Shaffer, B. S., and Schick, C. P. (1995). Environment and animal procurement by the Mogollon of the Southwest. *North American Archaeologist* **16**: 117–132.
- Shaw, C. W., Jr. (1993). *Human Responses to Past Climate, Environment, and Population in Two Mogollon Areas of New Mexico*, Ph.D. Dissertation, Department of Anthropology, University of Arizona, Tucson.
- Short, S. A. (1998). *When the Animals Still Danced: Animal Images in Mimbres Pottery and Petroglyphs (New Mexico)*, Ph.D. Dissertation, Department of Anthropology, University of Minnesota, Minneapolis.
- Spielmann, K. A. (2000). Gender and exchange. In Crown, P. L. (ed.), *Women and Men in the Prehispanic Southwest: Labor, Power, & Prestige*, School of American Research Press, Santa Fe, NM, and James Currey, Oxford, England, pp. 345–378.
- Stein, J. R., and Lekson, S. H. (1992). Anasazi ritual landscapes. In Doyel, D. E. (ed.), *Anasazi Regional Organization and the Chaco System*, Anthropological Papers No. 5, Maxwell Museum of Anthropology, Albuquerque, pp. 87–100.
- Stoffel, D. E. (1991). *Classic Mimbres Iconography: An Investigation of Style, Symbol, and Meaning*, M.A. Thesis, Department of Anthropology, SUNY, Buffalo, NY.
- Stokes, R. J. (1995). *Prehistoric Settlement Patterns in the Sapillo Creek Valley, Gila National Forest, New Mexico*, M.A. Thesis, Department of Anthropology, Eastern New Mexico State University, Portales.
- Stokes, R. J. (1999a). The development of Classic period Mimbres communities in peripheral areas, southwestern New Mexico. Poster presented at *The 64th Annual Meeting of the Society for American Archaeology*, Chicago.



- Stokes, R. J. (1999b). Mimbres pottery microseriation: Determining subsurface room locations from surface ceramic collections. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference, Silver City, New Mexico, 1996*, SRI Press, Tucson, AZ, pp. 135–143.
- Stokes, R. J. (2000). Dating fill deposits and pithouses in the Mimbres area through two ceramic seriation techniques: An example from the Lake Roberts Vista site. *Kiva* **65**: 235–251.
- Stokes, R. J., and Roth, B. J. (1999). Mobility, sedentism, and settlement patterns in transition: The Late Pithouse period in the Sapillo Valley, New Mexico. *Journal of Field Archaeology* **26**: 423–434.
- Stuart, D. E., and Gauthier, R. P. (1984). *Prehistoric New Mexico: Background for Survey*, 2nd edn., New Mexico Archaeological Council, Albuquerque.
- Swanson, S. (2002). *Mogollon Settlement Organization in the Pithouse Periods: Constructing Occupational History With Floor Assemblages and Abandonment Patterns* (Manuscript on file), Department of Anthropology, Arizona State University, Tempe.
- Thompson, M. (1994). The evolution and dissemination of Mimbres iconography. In Schaafsma, P. (ed.), *Kachinas in the Pueblo World*, University of New Mexico Press, Albuquerque, pp. 93–105.
- Thompson, M. (1999a). Knife-wing: A prominent Mesoamerican, Mimbres, and Pueblo icon. In Whittlesey, S. M. (ed.), *Sixty Years of Mogollon Archaeology: Papers From the Ninth Mogollon Conference, Silver City, New Mexico, 1996*, SRI Press, Tucson, AZ, pp. 145–150.
- Thompson, M. (1999b). *Mimbres Iconology: Analysis and Interpretation of Figurative Motifs*, Ph.D. Dissertation, Department of Archaeology, University of Calgary, Calgary, Canada.
- Turnbow, C. (2001). Saving the Mimbres. *Archaeology Southwest* **15**(3): 2–4.
- Turnbow, C. A., Van Hoose, J. E., Reed, L. S., Huckell, L. W., Railey, J. A., Reycraft, R. M., Duncan, G. A., Holmes, R. D., Acklen, J. C., Baugh, T. G., Smith, G. D., Heyne, C., Bozarth, S., Shackley, M. S., Russell Nelson, A., Carpenter, A., Grant, J., and Neff, H. (2000). A highway through time: Archaeological investigations along NM 90 in Grant and Hidalgo Counties, New Mexico. New Mexico State Highway and Transportation Department Technical Report 2000–2003, Albuquerque.
- Turner, C. G., II (1993). Southwest Indian Teeth. *National Geographic Research and Exploration* **9**(1): 32–53.
- Turner, C. G., II (1999). The dentition of Casas Grandes with suggestions on epigenetic relationships among Mexican and Southwestern U.S. populations. In Schaafsma, C. F., and Riley, C. L. (eds.), *The Casas Grandes World*, University of Utah Press, Salt Lake City, pp. 229–233.
- Upham, S. (1984). Adaptive diversity and Southwestern abandonment. *Journal of Anthropological Research* **40**: 235–256.
- Vargas, V. D. (1996). *Copper Bell Trade Patterns in the Prehispanic U.S. Southwest and Northwest Mexico*, Arizona State Museum Archaeological Series, University of Arizona Press, Tucson.
- Varién, M. D. (1999). *Sedentism and Mobility in a Social Landscape: Mesa Verde and Beyond*, University of Arizona Press, Tucson.
- Varién, M. D., and Mills, B. J. (1997). Accumulations research: Problems and prospects for estimating site occupation span. *Journal of Archaeological Method and Theory* **4**: 141–191.
- Varién, M. D., and Potter, J. M. (1997). Unpacking the discard equation: Simulating the accumulation of artifacts in the archaeological record. *American Antiquity* **62**: 194–213.
- Washburn, D. K. (1992). The structure of black-on-white ceramic design from the Mimbres Valley. In Duran, M. S., and Kirkpatrick, D. T. (eds.), *Archaeology, Art, and Anthropology: Papers in Honor of J. J. Brody*, Papers of the Archaeological Society of New Mexico, 18, Albuquerque, pp. 213–224.
- Wheat, J. B. (1955). *Mogollon Culture Prior to AD 1000*, Memoirs of the Society for American Archaeology 10, Washington, DC.
- Wilcox, D. R., McTuire, T. R., and Sternberg, C. (1981). *Snaketown Revisited*, Arizona State Museum Archaeological Series 155, University of Arizona, Tucson.
- Wills, W. H. (1988a). *Early Agriculture in the American Southwest*, School of American Research Press, Santa Fe, NM.
- Wills, W. H. (1988b). Early agriculture and sedentism in the American Southwest: Evidence and interpretations. *Journal of World Prehistory* **2**: 445–488.
- Wills, W. H. (1989). Patterns of prehistoric food production in west-central New Mexico. *Journal of Anthropological Research* **45**: 139–157.

- Woosley, A. I., and McIntyre, A. J. (1996). *Mimbres Mogollon Archaeology: Charles C. DiPeso's Excavations at Wind Mountain*, Amerind Foundation, Dragoon, AZ, and University of New Mexico Press, Albuquerque.
- World Archaeology (1998). The past in the past. *World Archaeology* 30(1).

## BIBLIOGRAPHY OF RECENT LITERATURE

- Ackerly, N. W. (1997). Mimbresño and Gileño Apache irrigation systems, 1853–1859. *Kiva* 62: 349–364.
- Brewington, R. L. (1992). *Mimbres–Mogollon Stylistic and Assumblage Variation: A Comparison of Surface Pueblo Components, West For and NAN Ruins, Catron and Grant counties, New Mexico*, Intradepartmental M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Bruno, H. L. (1988). *Structural Timber and Wood Procurement at the NAN Ranch Ruin in Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Bureau of Land Management, USDI (1993). *Mimbres Resource Management Plan*, Las Cruces District Office, NM.
- Creel, D. (1989). Anthropomorphic rock art figures in the middle Mimbres Valley, New Mexico. *Kiva* 55: 71–86.
- Dockall, J. E. (1991). *Chipped Stone Technology at the NAN Ruin, Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Ethieson, G. M. (1978). *Archaeological Survey of Selected Areas at Caballo and Elephant Butte Reservoirs, Sierra County, New Mexico*, USDI, Bureau of Reclamation, Southwest Region, Amarillo, TX.
- Guilliford, A. (1991). Museums & the Mimbres people: Interpreting Mogollon culture. In *Mogollon V*, COAS, Las Cruces, NM, pp. 28–33.
- Hill, M. D. (1997). *Sociocultural Implications of Large Mimbres Sites: Architectural and Mortuary Behavior at the Swarts Ruin, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Kelley, K. L. (1994). *Three-dimensional Computer Reconstruction of the South Room Block of the NAN Ruin Archaeological Site*, Interdisciplinary M.S. Thesis, Texas A&M University, College Station.
- Lekson, S. A. (1992). Mimbres art and archaeology. In Duran, M. S., and Kirkpatrick, D. T. (eds.), *Archaeology, Art, and Anthropology: Papers in Honor of J. J. Brody*, Papers of the Archaeological Society of New Mexico, 18, Albuquerque, pp. 111–122.
- McCollum, T. A. (1992). *Sequence Identification of Mogollon–Mimbres Corrugated Wares From the NAN Ruin, Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Nelson, M. C. (1993a). Classic Mimbres land use in the eastern Mimbres region, southwestern New Mexico. *Kiva* 58: 27–47.
- Nelson, M. C. (2001). Case Study: Mimbres Archaeology. In Philips, D. A., Jr., and Sebastian, L. (eds.), *Examining the Course of Southwest Archaeology: The Durango Conference, September 1995*, New Mexico Archaeological Council Special Publication 3, Albuquerque, p. 163.
- Nelson, M. C., and Lippmeier, H. (1993). Grinding-tool design as conditioned by land-use pattern. *American Antiquity* 58: 286–305.
- Parks-Barrett, M. S. (2001). *Prehistoric Jewelry of the NAN Ranch Ruin (LA15049), Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Patrick, S. S. (1988). *Description and Demographic Analysis of a Mimbres Mogollon Population From LA15049 (NAN Ruin)*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Phillips, D. A. (ed.) (1998). *Class III Cultural Resource Survey of Caballo Reservoir and Percha Dam, Sierra County, New Mexico: Phase 2: Archaeological Resources of the West Shore, SWCA*, prepared for USDI Bureau of Reclamation, Albuquerque.
- Phillips, D. A., and Greenwald, D. H. (eds.) (1998). *Class III Cultural Resource Survey of Caballo Reservoir and Percha Dam, Sierra County, New Mexico: Phase 1: Archaeological Resources of the West Shore, SWCA*, Albuquerque, NM. (Prepared for USDI Bureau of Reclamation)

- Shafer, H. J. (1999). The Mimbres Classic and Postclassic: A case for discontinuity. In Schaafsma, C. F., and Riley, C. L. (eds.), *The Casas Grandes World*, University of Utah Press, Salt Lake City, pp. 121–133.
- Shafer, H. J., and Drollinger, H. (1998). Classic Mimbres adobe-lined pits, plazas, and courtyards at the NAN Ruin, Grant County, New Mexico. *Kiva* **63**: 379–399.
- Shafer, H. J., Marek, M., and Reinhard, K. J. (1989). A Mimbres burial with associated colon remains from the NAN Ranch Ruin, New Mexico. *Journal of Field Archaeology* **16**: 17–30.
- Shaffer, B. S. (1990). The modified rabbit pelvis: A newly discovered tool type for the Mimbres. *The Artifact* **28**(2): 7–14.
- Shaffer, B. S. (1991). *The Economic Importance of Vertebrate Faunal Remains From the NAN Ruin (LA 15049), a Classic Mimbres site, Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.
- Shaffer, B. S. (1992). Interpretation of gopher remains from southwestern archaeological assemblages. *American Antiquity* **57**: 683–691.
- Sobolink, K. D., Zimmerman, L. S., and Guilfoyl, B. M. (1997). Indoor versus outdoor firepit usage: A case study from the Mimbres. *Kiva* **62**: 283–300.
- Wigington, P. (1994). *A Synthesis of the Pithouse Architectural Sequence at the NAN Ranch Ruin, Grant County, New Mexico*, M.A. Thesis, Department of Anthropology, Texas A&M University, College Station.