

BLACK MOUNTAIN AND PAQUIME: DATING THE MEDIO PERIOD OF CASAS GRANDES

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Paquimé (also known as Casas Grandes), a 14th-15th century ruin in northern Chihuahua, Mexico, is one of the most important sites in the greater Southwest (Di Peso 1974). Its origins have been a matter of debate and speculation, fueling a large and complex literature well beyond the scope of this short essay. Because the site is clearly important, it is the center of several major controversies.

Charles Di Peso (1974), who excavated about one-third of Paquimé, defined three major periods, each subdivided into several phases. (I omit dates here, because dates are in contention.) The Viejo period consisted of small pit house villages; during the following Medio period, Paquimé rose to power; and the final Tardío period coincides with the colonial era. The Medio period is our focus here. Di Peso proposed three phases within the Medio period: the Buena Fe phase (a period of scattered adobe compounds), followed by the Paquimé phase (massive "urban renewal"), and a final disastrous Diablo phase (more an event than a phase: the sacking and abandonment of the city).

A key issue for Paquimé, as with any site, is its date; and particularly the timing of its origin or rise. Paquimé was largely (but perhaps not entirely) contemporary with the Medio period of the regional Chihuahua chronology. The beginnings of the Medio period may (or may not) define the beginning of the city itself. This essay focuses first on important recent work by Michael Whalen and Paul Minnis at sites in Chihuahua, and then on equally important chronological research in central Chihuahua, on the reverse of the question: the end of the Viejo period, which preceded the Medio period, by Jane Kelley, Joe Stewart and their colleagues. Was there a seamless transition or, as I have suggested elsewhere (Lekson 2002), a gap of a century or more between the end of the pithouse and small pueblo period (Viejo) and the rise of the city of Paquimé (Medio)?

The first two sections of the paper address the original dating of Paquimé by Di Peso (1974), and revised chronologies proposed by Whalen and Minnis (e.g., 2001, 2009). The third and final section discusses the implications of these dates. **APPENDIX; DISCUSSION OF KELLEY ET ALIA & SOUTHERN CHIHUAHUA VIEJO...**

Beyond getting it right, why would the date of the Medio period or of Paquimé be of more than local interest? Because Paquimé itself was of more than local interest. More than any other Southwestern site, Paquimé was deeply engaged with Western Mexico and Mesoamerica; and Paquimé has been promoted as a central actor within the larger Southwestern region. Di Peso (1974) argued that Paquimé was contemporary with and politically connected to Chaco Canyon, 600 km to the north (Chaco flourished AD 1020-1125). To make that argument, Di Peso had to posit a late 11th century beginning date for Paquimé (and the Medio period) far earlier than most archaeologists would

accept. Although there is a range of ideas, the currently accepted dating for the beginning of the Medio period is Dean and Ravesloot's (1993:97) "between A.D. 1200 and 1250" (discussed further below). Recently, Michael Whalen and Paul Minnis (2009) argue for a relatively early beginning date for the Medio period not to implicate Paquimé in distant cultural interventions, but rather to demonstrate *in situ*, local development of Paquimé with historical and cultural continuity from preceding Viejo period pit-house villagers (discussed further below). Their interpretations are supported by the work of Kelley, Stewart and colleagues (discussed further below), who offer an end-date for the Viejo period much later than Di Peso's, which meets or nearly meets Whalen and Minnis's suggested early dates for the Medio period (Stewart and others 2004).

Nature abhors a vacuum only slightly more than archaeology detests a gap in the sequence. We rush to fill the void; but some gaps were real—and, perhaps, really interesting. I believe there was a substantial gap—historical and cultural, and perhaps chronological—between the Viejo period and the Medio period in the Rio Casas Grandes valley and its surroundings—Paquimé's setting.

PHASE SHIFT ONE: DI PESO

Paquime's original chronology, developed by Charles Di Peso (Di Peso, Rinaldo and Fenner 1974), was based almost entirely on tree-ring dating. Di Peso was one of the Southwest's greatest archaeologists, but Casas Grandes' chronology was not his finest hour. He stretched Paquimé's chronology back into the 11th century, because (in my opinion; Lekson REFS) he believed that Paquimé and Chaco were at least in part contemporary (Di Peso 1974:299-301; Di Peso, Rinaldo and Fenner 1974:208-211). To make it so, Di Peso accepted non-cutting dendrochronological dates on from Paquimé as actual construction dates, and arrived at the startling conclusion that Paquimé began around A.D. 1060, with major "urban renewal" (i.e., Paquimé phase) from 1205 to 1340 (Di Peso 1974)—"startling" because ceramic assemblages contradicted those datings.

Di Peso was quite aware of the problems. There were substantive issues. Construction beams at Casas Grandes were carpentered to a uniform diameter: tapered tree trunks were planed or shaved down, removing the key outside rings and quite a bit more, besides. Thus, most the tree-ring specimens from Casas Grandes consisted of heartwood with a variable number of outer (but not outside) rings. Di Peso knew this (Di Peso, Rinaldo, and Fenner 1974:9-10), but argued around the problem. Consequently, Di Peso's Medio period substantially predated pottery types found at the site and Di Peso was forced to negate accepted ceramic cross-dating and posit novel histories for several key types (in particular, Gila Polychrome, generally accepted as post-1280), arguing that these types originated at Paquimé and later diffused northward.

Troubled by Di Peso's chronology, I and others re-considered Paquime's dated ceramic types (e.g. Carlson 1982; Lekson 1984, 2002). Every ceramic assemblage (with more with than a score of sherds) from every context at Paquimé (including sub-floor contexts) contained Gila Polychrome, well-dated to AD 1280 at the earliest and more

likely AD 1300 (Lyons REFS). Thus, based on ceramics, there was no evidence that Paquimé itself greatly pre-dated AD 1300. NOTE 1

Dean and Raveslout (1993) later revisited Paquimé's tree-ring chronology, reinterpreting Di Peso's specimens. They developed a method to estimate the number of missing rings from Di Peso's beams. They started with the "derived date;" that is, the date of the outermost ring of the remaining, carpentered beam, as reported by the original tree-ring analysis. Their statistical projections, based on living trees around Santa Fe, NM, produced "estimated felling dates;" that is, the probable actual date (with a statistical plus/minus). In almost every case, the "estimated date" fell at least 100 years later than the original "derived date" (Dean and Raveslout 1993:Fig. 6.4)—that is, the actual date was a century after the outermost ring date of the specimen. It will be important to remember that Casas Grandes wood shaping practices: at least at Paquimé, carpenters consistently removed about 100 years of tree-rings from structural beams. Or more, as Dean and Raveslout (1993:93) warned: "due to a number of factors, the actual dates of the tree felling are likely to be later than the estimates. Thus, any adjustment of the estimated dates should be upward, which would make Casas Grandes even younger than is proposed." This, if the outermost surviving ring (the "derived date") on a carpentered beam at Paquimé represented the year 1200, the tree was likely actually cut in 1300 (the "estimated date")—or even later.

Dean and Raveslout worked within Di Peso's chronological framework of periods and phases for Paquimé. Recall that Di Peso posited three sequential phases for the Medio Period: Buena Fe, Paquimé and Diablo. Dean and Raveslout accepted those phases, and attempted to date the Buena Fe phase—and thus the beginning of the Medio period—noting three "estimates of A.D. 1215, 1173, and 1198...[but] all these dates come from rooms that yielded other samples with much later estimated dates of A.D. 1328-1382, 1359-1413, and 1390-1444" with two standard deviation ranges (Dean and Raveslout 1993:96). They dismissed two putatively Buena Fe ¹⁴C dates and two uncorrectable "derived dates" as "useless for the [temporal] placement of anything" and concluded "the earliest estimated felling date from a Buena Fe room falls at A.D. 1218-1271. Taken together, these dates suggested that the phase began between A.D. 1200 and 1250" (Dean and Raveslout 1993:97). Dean and Raveslout's lower estimate for Buena Fe at A.D. 1200—offered, I think, to safely encompass rather than define the Medio period—has become widely accepted as the actual beginning date of Paquimé (e.g. Phillips REFS).

Turning to Di Peso's Paquimé phase, Dean and Raveslout conclude "the distribution of latest estimated tree-felling dates from the individual rooms leaves little room for doubt that the Paquimé phase was a fourteenth-century phenomenon whose inception can be placed very near A.D. 1300" (Dean and Raveslout 1993:97). This is consistent with the site's ceramic assemblage, and (as noted above); it is now seems clear that Paquimé itself was largely or entirely a post-AD 1300 phenomenon. NOTE 2

PHASE SHIFT TWO: WHALEN AND MINNIS

In more recent work, Whalen and Minnis rejected Di Peso's Buena Fe phase (a Medio period preliminary to the city), and compress Di Peso's several phases into one period: "Di Peso's three phases of the Medio Period [Buena Fe, Paquimé, and the final Diablo phase] have been criticized extensively and no longer should be used" (Whalen and Minnis 2009:44). They "flatten" Di Peso's phases—rightly, I think—concluding that Di Peso's internal chronological divisions at Paquimé are difficult or impossible to recognize and operationalize (although, as we shall see, they propose an "early Medio" and ceramic divisions within the "late Medio," discussed below).

Absent new excavations at Paquimé itself—unlikely in our lifetimes—we must look elsewhere for chronological clarity. The Casas Grandes world was much larger than its central city. Whalen and Minnis (2009) excavated four Medio period sites in the Casas Grandes region, looked carefully at chronometry and chronology, and concluded that "the Medio period clearly is underway by A.D. 1200, although there are hints in the Casas Grandes area and elsewhere that it may have begun a little before this date" (Whalen and Minnis 2009:68). But I fear Whalen and Minnis's chronometry suffers from flaws almost as serious as Di Peso's tree-rings.

Tree-ring dating was unsuccessful at their sites, so Whalen and Minnis (2009) rely on 14C dating (and two archaeomagnetic dates, discussed below). They obtained 84 14C dates, "nearly all of which are from Medio period contexts" (Whalen and Minnis 2009:45; the dates are presented in commendable detail in Chapter 2 of that report). Fifty-five of the dates were processed with extended count techniques, which should "reduce the standard deviation of each date" (Whalen and Minnis 2009:45).

Unfortunately, all but six of those dates were obtained from wood, from both fuel and construction contexts (the other six were obtained from maize, discussed below). The chronological problems of 14C dating of wood are well known, particularly for tight problems like the Medio phase—arguments about decades, not centuries. Wood almost always produces dates which are too old: that is, wood dates substantially pre-date targeted events, particularly construction elements, which tend to be larger than wood fuel. Only the outermost rings on trees actively fix atmospheric carbon; inner tree rings in effect store older, "fossil" carbon, set in place during the years when inner rings were outer, active rings. Thus a 14C date on wood will almost invariably produce a date older than the actual felling of the tree (REFS). NOTE 3, 3.3

We cannot evaluate the degree to which these factors did or did not affect calibrations; however, we can assume bias (if any) in the determinations will push calibrations too early rather than too late.

Within particular contexts, Whalen and Minnis employed a series of statistical procedures to eliminate statistical "outlier" dates and then combined or pooled 14C dates using Kintigh's (2002) programs (Whalen and Minnis 2009:45-47). This process produced weighted means for which they re-calculated probability distributions for

individual contexts (that is, a particular room, sector, or area of a site). The statistical combination of several 14C determinations should (or could) increase precision of dating *an event*: that is, of increasing the precision of 14C year determinations around a central tendency. Eliminating "outlier" dates, of course, might also increase precision of dating *an event*. Pooled means and eliminated outliers do not (of themselves) define *spans*; they increase precision for *events*. Whalen and Minnis then take the statistically processed data to standard calibration programs (apparently OXCAL), from which they derive calibrated, two-standard-deviation probability spans for each context (Figure 2, upper). That's fine, as far as it goes: the target date should fall somewhere within those spans, with increased probabilities toward the center (e.g, median) of the distribution, if unimodal (Figure 2, lower). But Whalen and Minnis then turn the two-standard-deviation calibrated date ranges into *spans*, specifically *occupation spans* (not individual events) for each contexts or sites. A two-standard-deviation calibrated range (for hypothetical example) of 1210 to 1350, is offered directly as the actual occupation span of the site: thus, the site was occupied from 1210 to 1350 (Whalen and Minnis 2009:47ff).

The use of a statistical probability distribution as an actual occupation span is problematic. A two-standard deviation range (with normal distributions) represents a 95% probability that the actual date—the target event—falls within that range, more likely near its center than toward either of its two truncated tails. Indeed, the probability of the event falling at either end of a two-sigma range is actually very small (about 5% or less). Consider the hypothetical two-sigma span of 1210 to 1350: the chances of the actual date (*event*) being either 1209 or 1351 is in fact less than 2.5% (as an *event*, the probability becomes one-tailed; the event can't be both 1209 AND 1351). If two-sigma ranges could in fact be used to define occupation spans, the probabilities of beginning and ending dates at 1210 and 1350 are, in fact, small—very small. Indeed, the actual value of the pooled value would much more likely be near the center of the distribution (if the distribution was normal or near-normal), or within the probability space below "peaks" (if the distribution was multi-modal)—anywhere but out on the edges! The use of a statistical range as an occupation span turns the logic of probability on its head. The novel technique seems inappropriate for the use to which it is put. Consider: a one-sigma range (equally arbitrary) would, of course, produce a different, shorter (but more likely) occupation span. The assignment of calendrical values to an arbitrary segment of a statistical range is probably incorrect. A two-sigmas arbitrarily defines a statistical range but not an occupation span. NOTE 3.5 NOTE 4.5

Whalen and Minnis (2009:69-70) summarize their four Medio period sites using their two-standard-deviation convention:

Site 204, 41 dates: "a much larger and more complex community [than the other three.] ...[discounting a small, earlier Viejo Period component] it is clear that the site's peak occupation came between the late 1200s and the early to mid-1300s...vestiges persisted into the early to mid-1400s"

Site 231, 10 dates: "A.D. 1220-1450"

Site 242, 9 dates: "A.D. 1270-1410"

Site 317, 7 dates: "A.D. 1280-1530" (plus an archaeomagnetic date in "the early 1300s" (Whalen and Minnis 2009:43)

Note that the dates do not total 84 because some 14C determinations were eliminated by Whalen and Minnis as statistical "outliers," and I have used the same data in the same arrays. NOTE 4

Figure 1 shows Whalen and Minnis's (2009:69-70 and Figure 2.14) "estimated occupation spans" Medio sites (discussed above). Whalen and Minnis (2009:XXX) combined several provenience determinations from Site 204 to date the occupation span of the entire site.

Whalen and Minnis's original 14C data were carefully (and quite reasonably) statistically "pruned" and selected by them: see discussions in Whalen and Minnis 2009: 45-67. Figure 3 -- following exactly Whalen and Minnis's analysis -- shows these data as they have been clustered and pooled, as cumulative probabilities for each context in their analysis, calibrated by CALIB (the use of a different program should have only minor effects on calibration). That is, this is the same data presented in Whalen and Minnis (2009:Tables 2.3-2.14 and Figs. 2.2-2.11) recalibrated.

Estimates in Figure 1 tend to be slightly more expansive than the two sigma ranges of the CALIB cumulative distributions (Figure 3), for example site 231. But of interest here is not a comparison of estimated occupation spans and statistical ranges (which is inappropriate) but rather the estimated spans and the cumulative probabilities. CALIB more accurately displays the cumulative probabilities than those offered in Whalen and Minnis (2009:Figures 2.1-2.11), and the actual form of the distributions are of interest. The uni-modal distributions from about 1200 to 1300 followed by multi-modal distributions after 1300 reflects the calibration curve which is steep between 1200 and 1300, levels off after 1300 and steepens again around 1400 (Jeff Dean, p.c. 2010). As probability distributions around a central tendency, the chances of the actual value falling under the mode or modes is significantly higher than the actual values falling at either end of the distribution. With the exceptions of 204 lower midden and 204 Viejo, for every site and every context the likeliest datings of *events* fall comfortably after 1250; that is, the entire cumulative distribution or the clear modes (in the case of site 204 area 1) post-date 1250. Discounting the "small Viejo component" unrelated to later Medio period architecture (Whalen and Minnis 2009:69), the only context which clearly suggests a pre-1250 date is the lower midden of Mound A, site 204. As discussed below, their "early Medio period" is a significant and important discovery, however, while Whalen and Minnis suggest (based on the equation of two-sigma ranges and occupation spans) that this Early Medio context began around 1160, the probability distribution for the lower midden of Mound A, site 204 indicates that the actual date of the pooled 14C determinations far more likely falls a half-century later, around 1220—the mode of the cumulative probabilities.

Whalen and Minnis conclude that Ramos Polychrome largely post-dates 1300, but push the type back, slightly: "Ramos Polychrome does not appear before about A.D.

1280" (2009:117)—the early end of the two-sigma range for three relevant dates on wood (2009:115-118, Table 4.1). The calibration of the cumulative probability for these three dates), as they note, is strongly bimodal, with marked modes at ca. 1295 and 1375 and 2 sd ranges of 1282-1311 and 1359-1387. "There is no way to decide which of these calendar-year intervals most probably contains the true date" (Whalen and Minnis 2009:116); however, a beginning date of 1280 is statistically rather unlikely, for reasons discussed above. It is far more likely that these three samples—if they represent an event—date about 1295 (or 1375). Of course, we are dealing with only 15 years here...

Ceramic stratigraphy from a midden at site 204 which strongly suggest an "early Medio period" typified by the absence of Ramos Polychrome (Whalen and Minnis 2009:115-120, 147-149) . The designation "early" comes from both stratigraphic and ceramic data: the "early Medio" is not defined by "diagnostic" types (Babícora Polychrome is the main decorated type Babícora Polychrome continues through the Medio period). "Early Medio" deposits in middens at site 204, lacked these Ramos Polychrome (and other later types) and were consistently overlain by layers containing Ramos Polychrome (Whalen and Minnis 2009:116-118, figs.4.3, 4.9). Figure 2 shows six dates from lower levels of 204 Mound A Midden (Whalen and Minnis 2009:Table 2.11). Whalen and Minnis (2009:60) interpret the pooled probabilities of these six dates as follows: "averaged to produce a single date of 832 +/- 25 B.P, which is cal A.D. 1160-1280 (2 sigma)," and use the lower limit of that range for beginning of the occupation span of site 204. However, the pooled dates (if assumed to represent an event) have a very high likelihood (over 0.80 of area under the curve) of falling after 1200 (with a marked mode at about 1215).

Indeed, similar assemblages exist to the south, in central Chihuahua (Burd, Kelley and Hendrickson 2004; see [Appendix A](#))—perhaps another source of people to build Paquimé and its sister cities. NOTE 8 The base population of Paquimé's region may have encompassed a diverse, even polyglot conglomeration of post-Mimbres, central Chihuahuan and local Rio Casas Grandes populations –and others from even farther afield (Lekson 1999, Mathiowitz REFS). It takes more than a village to build a city. NOTE 9, NOTE 9.3

Based on the estimated felling dates and ceramic cross-dating (discussed above), it seems likely that Paquimé itself dates largely after AD 1300 (a point accepted by Whalen and Minnis 2009:259-265). AD 1300 seems like a reasonable, working date for how early Paquimé could be. Of course, the city could have appeared later. NOTE 7.5

To summarize, the 14C data as presented by Whalen and Minnis (2009) strongly indicate a relatively limited "early Medio period" in the early 1200s, followed by a much more expansive Medio period development after 1250. As discussed below, Paquimé itself probably began at or after 1300.

EVENT HORIZON: WHY THIS MATTERS

Arguments about the dates of the Medio period and the rise of Paquimé focus almost exclusively on "earliest" possibilities. That is, first Di Peso and now Whalen and Minnis asked: how early *could* it be? They weighted their chronometric interpretations toward that early end. Critics (Dean and Ravesloot, Lekson, and others) asked: how early *should* it be? And they took corrective measures to what appear to be chronometric transgressions. We might usefully turn the whole question on its head: how *late* could/should the Medio period and Paquimé be? Rather than pushing Paquimé back, how might we push it forward? An agenda-driven question, on my part, but useful none-the-less for this and EVERY chronological analysis.

There could well have been short run-up in the "early Medio period," and maybe it was not short. I could live with that: Paquimé was not built in a day. But I worry that hints of "early Medio"—like the problematic two-sigma range—will be welcomed as filling gaps in the sequence, and thus (by extension) supporting models of continuous, evolutionary, fundamentally *local* development from the earlier, apparently sparse Viejo period agrarian settlements of Paquimé, the most cosmopolitan city of the ancient Southwest.

Gradualism, continuity, local development: that seems to be a Holy Grail for Chihuahua archaeology, a goal greatly to be desired. Why? In part in reaction to Di Peso's perceived excesses, perhaps. But sending *pochteca* packing does not mean Paquimé had a simple provenance. Few southwestern societies did. Consider contemporary archaeology north of the border: movement and discontinuity and extra-local dynamics frame much of current archaeological thinking. In the Mimbres region—a scant 100 km from Paquimé—archaeological interpretations enjoy the all the rights and privileges of the 21st century: Salado and Mesa Verde migrations into southern New Mexico (Lekson 2002; Lekson and others 2002); population shifts in and out of the Mimbres area (Nelson 1999); "fallow valleys" (Nelson and Anyon 1996), where major river valleys were periodically emptied and allowed to regenerate. A period of particular interest to the events in this chapter came immediately after the Mimbres phase (that is, after AD 1130)—as noted above, a time period characterized by archaeological contention and confusion (Hegmon and others 1999; Lekson 2006) directly reflecting, I think, the hfluid and unsettled events of that period. NOTE 10 Population movements and fallow valleys were controversial two or three decades ago, but today have become commonplace. Those historical potentialities do not available to Casas Grandes and Paquimé.

Perhaps Paquimé was fundamentally local. It's possible. But is it likely? Consider Paquimé's "I"-shaped ball courts, colonnades, abundant West- and Meso-American objects, stunning quantities of exotic shells and minerals from all quarters. And prominent, nearly ubiquitous "Anasazi" T-shaped doors. And remarkable quantities of Gila Polychrome and local "copies" of that key "Salado" pottery. No other site in the Southwest approaches Paquimé's cosmopolitan engagement with a much, *much* larger world. Would not the lively dynamics we now almost routinely ascribe to

(comparatively) simple pueblo-like sites north of the border be even more likely—indeed, greatly exceeded by—the historical *sturm und drang* of Paquimé, the Southwest's last and greatest city?

New dates and data from Casas Grandes and central Chihuahua are welcome and important—major accomplishments! My queries and objections are not meant to impugn or belittle excellent archaeologists or admirable research programs. It is *interpretations* which I question; hopefully, interpretations and ideas are open to review and even revision. The dating of the Medio and Viejo periods underwrite contrasting interpretations. Pushing the Medio period back and pushing the Viejo period forward supports continuity and local evolutionary development. Keeping the Medio period and Paquimé late, to some degree disjunct from Viejo, invites more historical interpretations: events, movements, dynamics. In my opinion, the published interpretations of new 14C dates from Chihuahua do not support the former and do not preclude the latter.

THE BLACK MOUNTAIN PHASE

There are hints and allegations that the fall of Mimbres, which ends about 1125, has something to do with the rise of Casas Grandes, sometime after 1250. Physical anthropology (REFS, REFS) and possibly artistic traditions (Brody REFS; Moulard REFS) link Mimbres and Paquimé, but there is an evident problem: a missing century from 1125 to 1250. Attempts to grapple with the immediate post-Mimbres (Hegmon et alia 1999, Nelson and Anyon REFS), with little agreement between and among the several research projects on terminology, dating, or even continuity.

I have argued elsewhere (Lekson 1999, 2009) that the missing century may well be represented by the Black Mountain phase, a poorly understood period thought to fall somewhere in that span – but Black Mountain could also be later, and contemporary with Paquimé (LeBlanc REFS).

Opinions vary widely on the Black Mountain phase. Many archaeologists see continuities between Mimbres and post-Mimbres populations (e.g., Creel 1999). Others see the Black Mountain period as non-Mimbres intrusions (e.g, Shafer 1999), perhaps of El Paso phase peoples from the east. Others suggest that Black Mountain may represent an aspect of the famed "Salado" intrusion, from the northwest (generally dated 1250-1450 or later) (e.g., Lekson 2002; Nelson and LeBlanc 1986; also the focus of on-going research by the Center for Desert Archaeology). Alternatively, Black Mountain could represent a northern extension of Casas Grandes from the south, or at least a shift towards the Casas Grandes sphere (Anyon and LeBlanc 1984).

There are certainly data to suggest discontinuity: (1) almost complete depopulation of the upper and middle Mimbres (and Gila) valleys, and greatly reduced population in the lower Mimbres Valley (at least according to Blake et alia REFS); (2) a complete shift in ceramics from Mimbres Black on white and corrugated brownware jars to Chupadero Black on white (in relatively tiny amounts), Playas red, and El Paso brownwares; (3) a shift from compact stone masonry pueblo (in Mimbres) to straggling

adobe room blocks (in Black Mountain); and (4) apparent shifts in burial practices from intra-mural corner inhumations to urn cremations.

Conversely, an argument can be made for demographic continuity (albeit with significant reduction in total population) across these changes in material culture and social practices. Darrell Creel (REFS) notes small (and some not so small) Black Mountain components at many Mimbres phase villages in the lower valley; the Black Mountain components are simply displaced spatially, usually to the south. Indeed that may be the case for population in general, as we shall see: a Mimbres exodus into the desert, to the south.

Black Mountain sites are generally rather small (less than 50 rooms) (Creel REFS, Raveslout REFS) – and there are not many of them. The 800-pound gorilla of the Post-Mimbres is the Black Mountain site itself, about 10 km northwest of Deming NM. It is a game-changer. The Black Mountain may have been geographically, temporally, and demographically intermediate between the fall of Mimbres and the rise of the Chihuahuan regional center at Casas Grandes..

The Black Mountain site (LA 49), on the lower Mimbres River, near Deming NM, is conventionally thought to date from AD 1150-1250 (reviewed in Hegmon and others 1999). It is by far the largest known immediately post-Mimbres site. Black Mountain was visited and recorded by the Mimbres Foundation in the 1970s, but never excavated. Their field map indicates eight large adobe (not stone masonry) room-blocks grouped around three plazas, with a total of 300 rooms. Shortly thereafter, the rancher leasing the lands filled and contoured the site's numerous potholes with a road grader, obscuring but presumably not destroying the pueblo (Minnis and LeBlanc 1979).

Because of Black Mountain site's extraordinary size, its dating is critical to regional demography. Mimbres ends with a demographic crash, relocation, or diaspora (or all of the above): sometime after AD 1125, several thousand people left their ancestral villages the upper Gila, middle and upper Mimbres, and other smaller rivers and streams in the region. Clearly, Mimbres populations went in several different directions: north and east into the mountains (Nelson 1999; Shafer 1999, 2003); south into the deserts (Creel 1999); and, perhaps, eventually further south into Chihuahua (Lekson 1999). The post-Mimbres period in southwestern New Mexico is clearly a matter of some consequence, but it has been overshadowed by the astonishing pottery of the preceding Mimbres period; we are only beginning to understand the post-Mimbres (Hegmon and others 1999; Lekson 2006; Skibo and others 2002).

Field research by Kathryn Putsavage of the University of Colorado in 2010 and 2011 has added considerably to our knowledge of the Black Mountain site (Figure 4). Putsavage (2011) established that the site covered an area of about 0.5 by 0.25 km, with evident "horizontal stratigraphy" (Figure 4). From west to east: (1) a small Late Pithouse component is evident at the west end of the site; (2) a 260-plus room Black Mountain component (adobe room blocks with Chupadero B/W, Playas, St Johns Polychrome, El Paso Polychrome and no later types) occupies most of the central site area, (and probably

continues to the east, under the third component); and (3) the easternmost component, a 170-room adobe plaza-pueblo with Gila Polychrome and Ramos Polychrome (both post-1300 types). Probable Black Mountain phase structures were found below the later, Gila/Ramos pueblo; the Black Mountain component could even double the estimated 260 rooms.

We have datable materials (maize cobs and cupules) but as yet no dates for the Black Mountain site. For the present, I present archaeomagnetic dates from the Walsh Site, excavated by the Mimbres Foundation (Ravesloot REFS); my thanks to Dr. Steven LeBlanc for his permission to use these dates. LeBlanc's original data were recalibrated by the Archaeomagnetic Lab at the Museum of New Mexico (Figure 5). There are currently three different archaeomagnetic curves for the later Southwest; most researchers use the SWCV2000 curve. Figure 6 shows the date spans of the Walsh archaeomagnetic dates and the recalibrated 14C dates from Whalen and Minnis's Medio period sites. These chronometric data support the ceramic dating of the Black Mountain phase as pre-1300, and mostly pre-1250. That is, the Black Mountain phase (on these data) spanned the period between the end of Mimbres at 1125/1130 and the rise of Casas Grandes at 1250 – the missing century. The 260 (perhaps 500?) Black Mountain phase rooms at the Black Mountain site go a long way, I think, to explaining the depopulation of the Mimbres Valley and the explosion of population evident in the Medio period of the Casas Grandes Valley.

NEW DATES EXPECTED SHORTLY FROM BLACK MOUNTAIN! STAY TUNED!

NOTE 1 In 1984, I addressed the *end* of the Medio phase, arguing that the abundance of Gila Polychrome at Paquimé suggested end-dates far after 1300 (contra LeBlanc 1980; another early critic of Di Peso's dating). In 2002, I looked at the beginnings of Paquimé, and realized that the abundance of Gila Polychrome favored a late interpretation of the revised dendrochronology (Dean and Ravesloot 1993), with Paquimé *beginning* at, near or shortly after 1300. Whalen and Minnis (2009:127) recognize that almost every ceramic context of over 100 sherds at Paquimé (including substantial sub-floor deposits) contain Gila Polychrome and Ramos Polychrome, both now well-dated as post-dating 1300.

NOTE 2 In conference papers and a few publications, I nodded to the convention that chronologies should allow "transition times," and suggested that the city might have begun as early as 1250 or 1275. Perhaps it did, but there are no compelling data to support those earlier dates. I regret that slip; conventions are merely conventions.

NOTE 3 A common tactic is to sample only the outermost rings (this has operational problems as well, but should avoid a false, early date). We are not told, but it would seem that Whalen and Minnis did not sample outer rings, but instead dated chunks or fragments of wood.

NOTE 3.3 Compounding the problem—perhaps!—was Casas Grandes wood-shaping practices. We know at Paquimé beams were carpentered and shaved down, removing outer rings and substantial numbers of inner rings. The shaping was not minor: recall that Dean and Ravesloot estimated that a century or more of wood growth was lost by carpentering Paquimé's beams! We do not know if Paquimé practices were followed elsewhere in the Casas Grandes region; but we do *not* know that those practices were *not* followed. At the four sites, "all [dendrochronological] samples lacked sapwood rings" (Whalen and Minnis 2009:45), consistent with carpentering on architectural elements. Missing outer rings is a common complaint at many Southwestern sites, and may not signify Paquimé-style carpentering at all Medio sites, but we would be remiss if we did not consider the possibility that wood samples from Whalen and Minnis's Medio sites—in addition to the original sin of *being wood*—might also represent interior sections of carpentered beams. This is not a trivial question: our best information is that Medio period carpenters modified wood in ways to skew 14C determinations a century or more toward false early dates.

NOTE 3.5 Statistical methods for analyzing a number of separately 14C-dated events to determine a probable occupation span are currently being developed (Keith Kintigh, personal communication, 2010); but that's a very different question: the dates are treated as separate events, and not pooled into a cumulative probability distribution, which assumes a central tendency (i.e., that actual date).

NOTE 4 These dates include seven maize dates, presented as two-standard-deviation ranges (Whalen and Minnis 2009:Tables 2.4, 2.12, 2.14):

204 area 2, plaza midden: 1290-1420
231, Room 2, lower fill: 1260-1530
317, Room 3, floor, feature 32: 1300-1370, 1380-1530, 1560-1640 (multiple intercepts)
317, Room 3, floor, feature 17: 1160-1560
317, Room 4, floor, feature 31: 1270-1450
317, Subfloor oven, feature 14: 1010-1430

Figure 3 shows that these dates are consistent with a late 13th century or even early 14th century placement of Medio phase beginnings. Four almost certainly post-date 1300, and more likely date to the late-13th or early 14th century; two others, dipping back to the 12th and even 11th centuries, have large two-standard deviation ranges that reach up to the 15th and 16th centuries.

NOTE 4.5 Site 231 (with its two-sigma span of A.D. 1220-1450) seems the strongest candidate for the early 13th century. Again ignoring problems of wood dating and statistical methods, the A.D. 1220 "lower limit" is questionable on its own merits. Recall that the two-sigma spans are derived from pooled means and probabilities from multiple individual 14C determinations (minus "outlier" values). Pooled data of course, will reflect vagaries of the constituent determinations. Site 231 had four dates with standard-

error ranges extending back into the first half of the twelfth century and one more extending back to A.D. 1150 (a date from a sub-floor oven, with a two-standard-deviation range of A.D. 1150-1300). Notably, three of those five dates (including the earliest) "...were not processed with extended counting ...[and] generally have lower precision ...as reflected by the relative sizes of their standard deviations" (Whalen and Minnis 2009:61); that is, three of five early date ranges may result simply from larger standard errors in the determination of 14C ages. The lower limits of these larger standard deviations undoubtedly skew the standard deviations of the weighted mean used to obtain the calibrated range of the site's occupation span. Thus, Site 231 does not seem a strong case for an early 13th century Medio period. Indeed, Whalen and Minnis note that the other dates from Site 231 seem "consistent with the archaeomagnetic placement of the site's dated contexts from the late 1300s to the early 1400s" (Whalen and Minnis 2009:62; see also page 43).

NOTE 5 The Convento site was found accidentally during the excavation of a colonial (Tardío period) site. Clearly there was a Medio Period occupation somewhere on the site, as well: stray sherds of Tularosa B/W, Galisteo B/W, and other "Pueblo IV" types—as well as Chihuahua polychromes—were found in upper levels of the site (Rinadlo and Fenner 1974:29-30).

NOTE 6 Stewart and others (2005:187) cite Oppelt (2002) for an end date of Mimbres Black-on-white of 1250—which comes, I assume, from Breterniz 1966—both sources seriously out of date. Stewart and others (2005:187) cite Hegmon and others (1999) for continued production of Mimbres Black-on-white into the early 1200s outside the Mimbres core area and even into "post-1200s contexts"—datings I and many others cannot accept (Lekson 2006).

NOTE 7 Their research area is large and complex, encompassing a northern, Casas Grandes zone and a southern non-Casas Grandes tradition, with sites from Viejo and later periods. In the end, 30 dates were applicable to the Viejo period (24 reported in Stewart and others 2004:236ff, Table 11.3; a total of 30 in Stewart and others 2005:Fig. 3).

NOTE 7.5 How late *could* Paquimé be? Gila Polychrome lasts at least until AD 1450; but it would be wrong to assign that latest date (AD 1450) to all Medio contexts with the distinctive type. Dean and Ravesloot (1993) projected "estimated felling dates" by a statistical procedure which produced an estimated date with a standard error or deviation. The latest "estimated felling dates" from individual rooms at Casas Grandes range from 1224 to 1419 (Dean and Ravesloot 1993:Table 6.2). Inspired by the methods I criticize above, we could consider the two-standard deviation span of the estimated dates (data available in Dean and Ravesloot 1993:Table 6.2). At the two-sigma limit, "latest" dates range from 1277 to 1473, with four rooms dating to the late 1200s, thirteen rooms dating to the 1300s, and eight rooms to the mid- to late-1400s. That's how late Paquimé *could* be—that is, there's a slim statistical chance that its rooms were built that late. Maybe not so slim: remember that Dean and Ravesloot's estimated felling dates were biased to low values; that is, their estimated dates were too old. The method is wrong, but the results are congruent with ceramics found at Paquimé. The city *could* be that late, ceramically.

NOTE 8 An intriguing alternative: perhaps the Viejo did indeed last longer, and the Medio period start earlier in central Chihuahua than in the Rio Casas Grandes valley. Stewart and others (2004:234) reject "a short-lived perception [of Brand, Kidder and other early archaeologists] that southern Medio period sites, centered in the Babicora Basin, are marginally earlier than Paquimé and other pueblo sites in the north." They argue that their two-sigma ranges disprove that perception. But given Whalen and Minnis's discovery (discussed in the text, above) of limited "early Medio" deposits with Babicora polychrome but no later types, perhaps that early perception is worth re-consideration.

NOTE 9 There are, of course, other data linking Mimbres and Casas Grandes: ceramic and osteological analyses (REFS, REFS). Presentation and discussion of those data is far beyond the scope of this paper.

NOTE 9.3 Gila Polychrome is a key type for cross-dating both Medio period and Paquimé. The dates generally accepted for the earliest Gila Polychrome are AD 1280 and, more widely, 1300 (Lyons REFS). Those "beginning" dates, of course, refer to Gila Polychrome's area of origin and densest distribution, far to the northwest of Paquimé. If Gila Polychrome began between AD 1280 and 1300 in that core area did it take a decent interval of time to appear thereafter in impressive quantities at Paquimé? Perhaps, but Paquimé's aggressive mercantilism might move mountains of particularly important products – and Gila Polychrome was apparently important. However, the Gila Polychrome at Paquimé is generally in styles considered late (Lyons REFS)—and inspired even later-looking local imitations (Escondido Polychrome: Di Peso, Rinaldo, and Fenner 1974). A key issue is this: apparently there was no Gila Polychrome at Whalen and Minnis's sites. Chavez Pass redux: does the absence reflect chronology – Whalen and Minnis's sites are earlier? – or differential distributions among contemporary sites – Whalen and Minnis's sites don't have the range of oddities seen at Paquimé. Or both?

NOTE 10 And that's only considering prehistory immediately north of the border! Range farther afield and further in time, and consider the remarkable demographics of the Four Corners, "abandoned" and re-peopled at least twice before the final "abandonment" in the AD 13th century (REFS). People came and went and returned again, in large numbers. Sites were built, occupied and abandoned in a generation or two; and then re-occupied a few generations later. Even the Hohokam, famously "tethered" to canal systems, saw an apparently deliberate shift in settlement location from pre-Classic to Classic (REFS), perhaps a repudiation of what came before. Towns moved, people moved, goods and services and ideologies moved, with profound consequences for local and regional histories. Indeed, archaeology in the last two or three decades seems to suggest that there was seldom a "local sequence" in the ancient Southwest (REFS).

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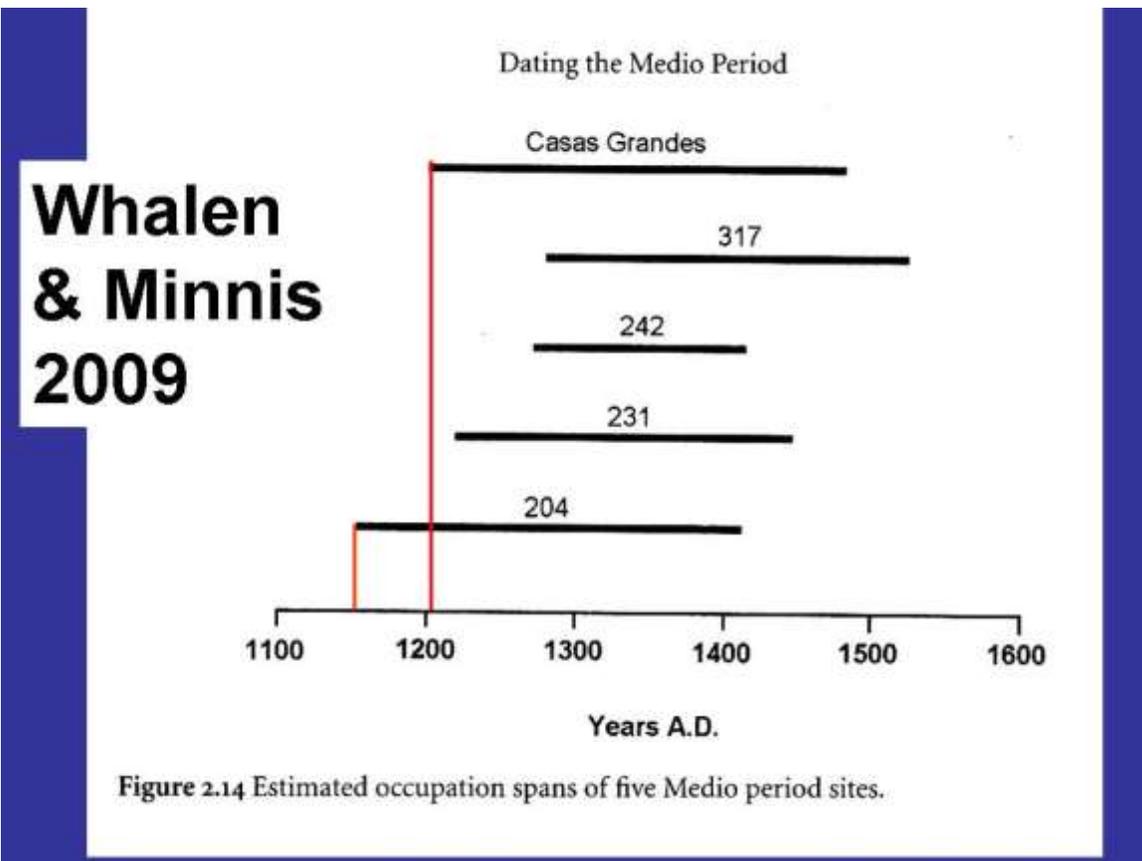


Figure 1. Estimated occupation spans of five Medio period sites (Whalen and Minnis 2009:Fig. 2.14)

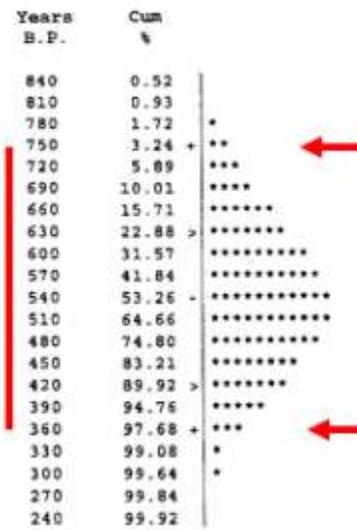


Figure 2.12 Cumulative probability distribution for seven floor-level radiocarbon dates from site 317.

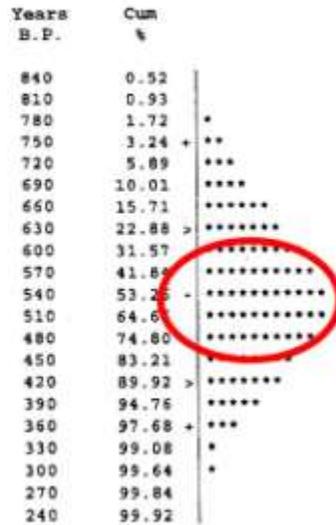


Figure 2.12 Cumulative probability distribution for seven floor-level radiocarbon dates from site 317.

Figure 2. Comparison of Whalen's interpretation of 14C occupational span to likely central tendency of actual date. (Whalen and Minnis 2009:Fig. 2.12)

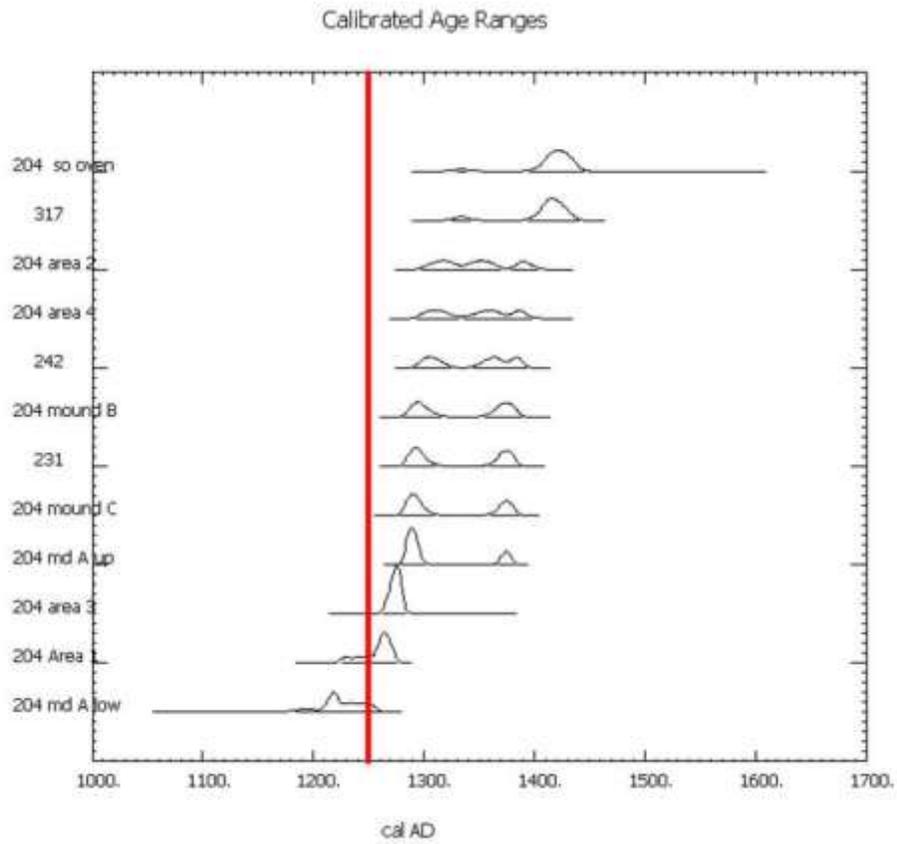


Figure 3. Whalen & Minnis's 14C dates recalibrated, using identical selections (and deletions) and provenience groupings Whalen & Minnis 2009.



Figure 4. Black Mountain site (LA 49). (Putsavage and Lekson 2010)

Walsh Site

	Wolfman	SWCV2000	DuBois
1	1215-1275	1165-1325	1165-1225
2	1240-1350	1005-1320	1095-1220
3	1235-1280	1175-1255	1185-1235
5	1220-1270	1175-1315	1165-1215
6	1210-1275	1160-1255	1155-1210
7	1220-1280	1170-1255	1160-1215
Avg. earliest	1223	1142	1154
Avg. latest	1288	1288	1220

Figure 5. Walsh Site archaeomagnetic dates, recalibrated.

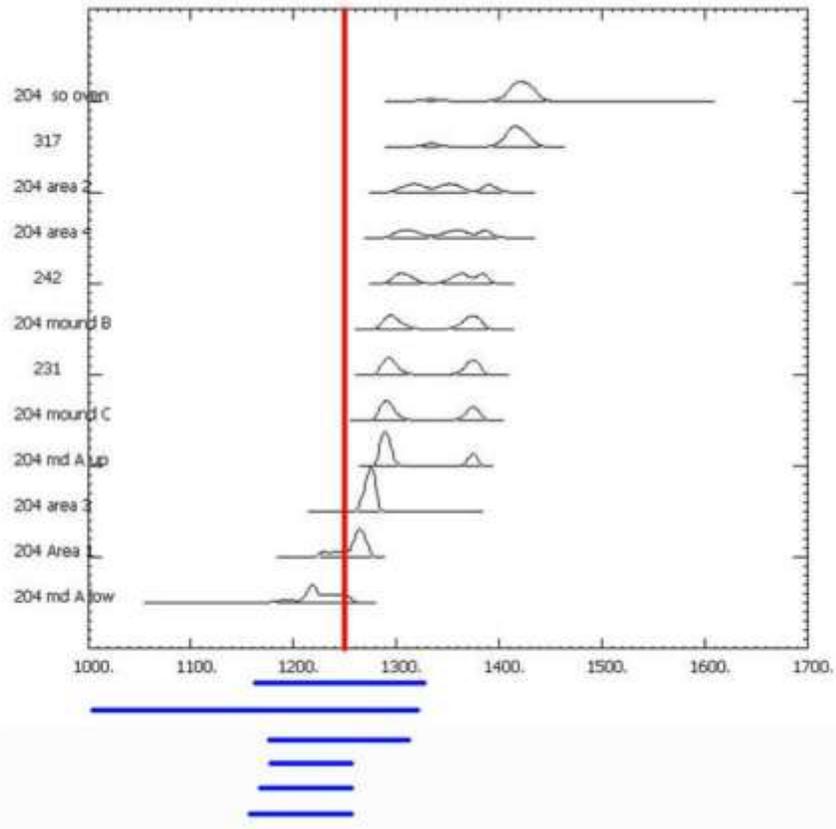


Figure 6. Comparison of recalibrated Whalen & Minnis 14C and Walsh site archaeomagnetic dates (blue lines). Red line = A.D. 1250.