BOUNDING CHACO

Great House Architectural Variability Across Time and Space

Ruth M. Van Dyke

ABSTRACT

The broad similarities that allow for the definition and recognition of great house architecture at sites throughout the greater San Juan Basin strongly suggest the form is not the product of independent invention. How and why were great houses built in outlier communities? What does the appearance of great house architecture suggest for relationships between outliers and Chaco Canyon, and for the social structure of the outlier communities themselves? As part of my dissertation research (Van Dyke 1998, 1999) I conducted a comparative architectural study designed to address these questions. In this paper, I revisit the original study, using 188 cases from an expanded database developed by participants in the Chaco World meeting. Variables compared among the outlier cases include geographic location, distance from Chaco Canyon, size, room count, kiva/room ratio, and presence/absence of great kivas, roads, earthworks, core-and-veneer masonry, and elevated kivas. Not surprisingly, Bonito style architectural attributes are found to co-occur in the Chacoan core area during the Late Pueblo II period. Landscape modifications and multiple great kivas represent the Chacoan package later in time and further afield. Most interestingly, core-and-veneer masonry and kiva/room ratios are found to exhibit significant, patterned distributions in both time and space. An absence of core-and-veneer masonry, together with a high kiva/room ratio, emerge here as a useful way to set boundaries on the geographic scope of Chacoan influence.

RESUMEN

Las semejanzas amplias que nos permiten la definición y el reconocimiento de la arquitectura de los "Great Houses" en todo el Cuenco de San Juan sugieren convincemente que esta arquitectura no fuera una invención independiente. ¿Cómo y por qué se construían los "Great Houses" en las comunidades vecinas? ¿Por qué el aspecto de la arquitectura de los "Great Houses" presupone la relación entre el Cañón Chaco y las comunidades

KIVA: The Journal of Southwestern Archaeology and History, Vol. 69, No. 2, (Winter 2003), pp. 117–139.

vecinas y también explica la estructura social de estas cominidades? En parte de mi tesis doctoral (Van Dyke 1998, 1999) llevé a cabo el estudio arquitectónico comparativo que abordó estas preguntas. En esta investigación vuelvo a analizar las mismas preguntas al usar 188 casos sacados de la base de datos ampliada que ha sido desarrollada por los participantes en la reunion mundial Chaco. Los factores que se compararon en los casos de las comunidades vecinos son: posición geográfica, distancia del Cañón Chaco, tamaño, número de cuartos, proporción de kiva/cuarto y presencia/ausencia de kivas grandes, caminos, trabajos de preparación del terreno, construcción con enchapado y madera, kivas elevadas. No fue una sorpresa ver que los atributos arquitectónicos del estilo Bonito coinciden temporalmente en el área principal de los Chacos durantre el período Ultimo Pueblo II. Las modificaciones al paisaje y las kivas grandes multiples representan el estilo de los Chacos más tarde y más extendido espacialmente. De mayor interés fue el hecho que la construcción con enchapado y madera y la proporción de kiva/cuarto ponen de manifiesto las distrubuciones importantes de patrones tanto en el espacio como en el tiempo. La ausencia de la construcción con enchapado y madera y la proporción de kiva/cuarto nos sirven de límite geográfico de la influencia de los Chacos.

Chacoan great houses are planned buildings of core-and-veneer construction characterized by distinct, banded masonry styles. Most contain multiple stories, large rooms with high ceilings, great kivas, and enclosed kivas. Earthworks and cleared or constructed road segments are associated with many great houses. These architectural characteristics are sometimes referred to as *Bonito style architecture,* following the term that originated with Gladwin (1945). Communities containing elements of Bonito style architecture are documented across the San Juan Basin and adjacent areas. These sites are popularly called "outliers," a term that emphasizes their spatial relationship with respect to Chaco Canyon. Each outlier minimally contains a Bonito-style great house. One or more great kivas, road segments, earthworks, and a group of surrounding small sites may also be present. Despite the broad similarities that allow for the definition and recognition of Bonito style architecture across a wide area, all outliers were not created equal. Not only does the composition of Bonito-style elements differ among communities, but outlier great houses themselves exhibit considerable variability with respect to shape, size, and elevation (Figure 1).

Neither the precise nature of the relationship between Chaco Canyon and the outliers nor the function of Bonito style architecture within outlier communities is well understood. A number of models have been developed to explain the rather dramatic spread of Bonito style architecture across an arid, agriculturally marginal landscape between ca. A.D. 890–1140. Early explanations focused on the canyon. More recent work has recognized that relationships between the

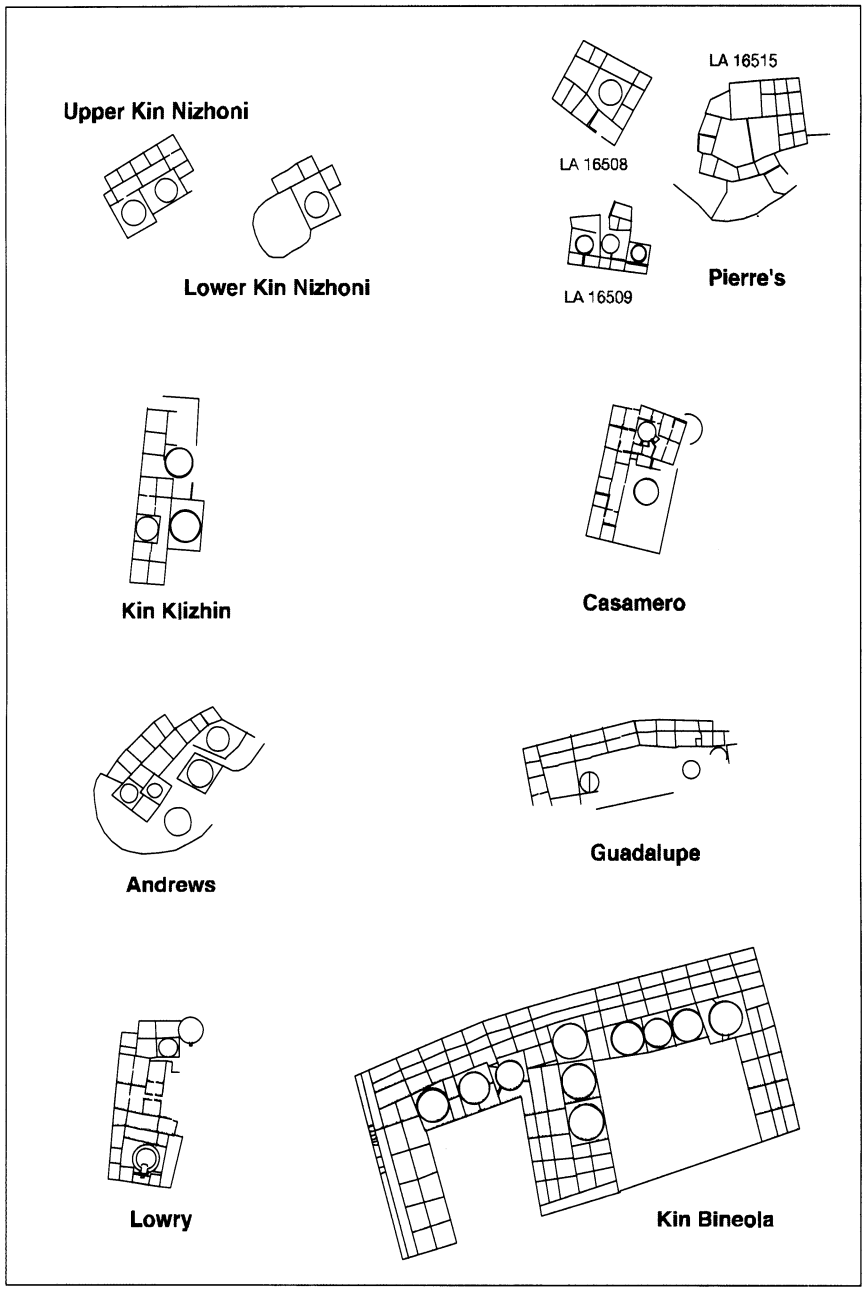

Figure 1: Examples of some Classic Bonito-phase great houses from across the Chaco world. See Figure 1 in this volume's Preface for locations.

Chaco Canyon and the outliers must have been an important part of the *raison d'être* of Bonito style architecture in both areas.

The broad similarities that allow for the definition and recognition of great house architecture at sites throughout the greater San Juan Basin strongly suggest the form is not the product of independent invention. How and why were great houses built in outlier communities? What does the appearance of great house architecture suggest for relationships between outliers and Chaco Canyon, and for the social structure of the outlier communities themselves? As part of my dissertation research (Van Dyke 1998, 1999) I conducted a comparative study designed to address these questions. My analysis was based on the premise that outlier great house similarity should reflect a Chacoan source for Bonito style architecture, and diversity should reflect the converse. Results were ambiguous, indicating that tremendous diversity exists within the confines of what is considered Chacoan, and pointing towards a range of explanatory models rather than one single exegesis. I concluded that construction of Bonito style architecture is likely related to community ritual and power issues, and that a variety of relationships probably existed between outlier communities and Chaco Canyon. Stein and Lekson's (1992) concept of ritual landscape, and Renfrew and Cherry's (1986) peer-polity interaction model best described how Bonito style architecture may have spread across a wide area without necessitating direct supervision from Chaco Canyon.

BOUNDING CHACO

In this paper, I revisit the original study, using an expanded database developed by participants in the Chaco World meeting (Preface, this volume). As I see it currently, there are two interrelated issues that can be addressed by comparing specific architectural variables across time and space. One has to do with the nature of the interaction between outliers and Chaco Canyon; the other has to do with defining the limits of the interaction. In the original study, I bounded my sample universe in time and space—I included only great houses dated to the Classic Bonito phase (ca. A.D. 1040–1100) from the San Juan Basin and immediately adjacent areas. The expanded database offers an opportunity to look at variability in great houses across a wider expanse of time and space. Before one can investigate the nature of interaction with Chaco, it is necessary to discern whether, in fact, there was interaction at all. Where are the boundaries of what we may usefully consider to represent the Chaco world?

Banded, core-and-veneer masonry was one of the initial, easily identifiable features used to characterize large Pueblo II structures across the San Juan basin as "great houses" (Marshall et al. 1979:15; Morris 1919:105; Powers et al. 1983:16; Roberts 1932:29; Roys 1936). The definition of "great house" has since been expanded by some (e.g., Lekson 1991) to include any large structure locat-

ed prominently in the midst of other, smaller structures, regardless of the presence of shared, "internal" aspects of building construction such as core-and-veneer masonry. As a result, the expanded database originally included large structures as far afield from Chaco as Wupatki.

Is it reasonable to think that 11th century people living 450 km apart had meaningful and regular social interaction, or at minimum, were members in a common religious sect? In the analysis presented here, I not only revisit the original study to assess whether my earlier findings hold with a larger sample and to look for new patterns, I also look for differences that likely represent boundaries to the Chacoan experience. The analysis is based on the assumptions that some architectural variables do represent participation in common learning frameworks and social activities, and that shared experiences are one way to characterize the Chaco world.

The Original Study

The first part of the original study involved a comparison of general outlier attributes to assess the nature of gross regional patterning, if any. I sought to determine whether outlier community attributes such as great kivas, roads, and berms exhibit a patterned or regional distribution. Classic Bonito phase canyon great houses cover two-dimensional areas in excess of 2,000 m2. However, outlier great house floor area was known to be extremely variable. Using a database containing 12 canyon and 39 outlier great houses, Powers et al. (1983:313–315, 344–345) defined three great house size classes and used that framework to argue that great houses represent a three-tiered, integrated settlement system. In the original study, I investigated whether great house size is associated with distance from Chaco Canyon, regional outlier location, or the presence of great kivas, road segments, or earthworks. Great house size, great kiva size, and presence/absence of roads and earthworks were compared against each other and against north/south location, region, and distance in km from Pueblo Bonito for 62 cases (Van Dyke 1998). Comparisons of dichotomous categorical variables were made using Fisher's exact test. Comparisons of polytomous categorical variables were made using Pearson's chi-square test. Comparisons of metric variables were made using the Mann-Whitney U-test and Kruskal Wallis one-way analysis of variance. P values of 0.05 or less were considered statistically significant.

In the original analysis, I found few statistically significant associations. Great house size was not significantly associated with any other variable, although most of the small outlier great houses were located in the central San Juan Basin. Roads and earthworks were found more commonly in the south, but this may have been because, within the confines of the sample database, road and earthwork-related research was concentrated in the south (e.g., Fowler et al. 1987). The most important finding was a statistically significant association

between great kiva presence/absence and distance from Pueblo Bonito. Great kivas were more likely to be absent in outliers within 40 or 50 km of Chaco Canyon. This pattern resonated with Breternitz et al.'s (1982; Doyel et al. 1984) idea of a Chaco Halo, where sites located in the immediate environs of Chaco Canyon are considered economically and demographically synonymous with sites in the canyon. I have explored this more thoroughly in a recent *Kiva* article (Van Dyke 2002).

The second part of the original study was designed to distinguish canyon-directed from local great house construction at outliers. The data set included 61 Classic Bonito phase (A.D. 1040–1100) great house components from 55 outlier communities. The study focused on internal, or low visibility aspects of great house construction, because these are most likely to contain enculturative information (Carr 1995). The idea was that local emulation should be distinguishable from directed, Chacoan construction in that although the general form and appearance of Bonito style architecture might be emulated, internal, precepts of the style could not. If outlier great houses were built by people from Chaco Canyon, then five internal variables were expected to co-occur and should be similar in their distribution across space. If outlier great houses were built by local communities to emulate the structures of Chaco Canyon or of their neighbors, then the internal variables were expected to exhibit great disparity, with little co-occurrence. If communal labor practices led to Bonito style architectural information being passed from community to community, then diversity among internal variables was expected to decrease as distance from Chaco Canyon increases. Because most outlier great houses are unexcavated, internal variables were drawn from surface data, although this situation is less than ideal.

The five internal variables used in the original study included core-and-veneer masonry, banded facing, symmetry, elevated kivas, and kiva/room ratio. For specific information about how these variables were defined, and how problems of data comparability among outliers were addressed, the interested reader is referred to Van Dyke (1998, 1999). Analyses proceeded using the same statistical measures as described above. Core-and-veneer masonry was nearly ubiquitous in distribution, indicating that this construction technique was widely shared. Banding and symmetry occurred in approximately half the cases, but they did not co-occur in a patterned relationship, and no discernible patterning was found in the locational distribution of these variables or in their association with other variables. Kiva/room ratio and elevated kivas were not ubiquitous but exhibited some regional patterning. Where regional patterning exists, it suggests that some outlier groups shared information with each other and with Chaco, but other groups did not.

The results of the analysis suggested architectural information followed subregional networks of interaction across the Chaco world, but the specific nature of these networks could not be further defined. Great house architecture

did not spread in a linear or uniform manner. I concluded that the presence of great house architecture does not necessarily entail direct contact with Chaco Canyon, and that large-scale architectural similarities need not be interpreted to indicate participation in one coherent, centralized, Chaco system. Rather, some outlier communities may be local, in situ developments. A similar interpretation was also reached by Marshall et al. (1979:337) and Powers et al. (1983:341).

Investigations Using the Expanded Database

The expanded database offers an opportunity to revisit my original comparative studies to see if the patterns I observed for 62 cases will hold for a database three times that size, and whether any new patterns may be discerned. The expanded database contains 188 cases with enough information to be useful for a similar analysis (see Table 1, Preface, this issue). The original study cannot be replicated exactly, because not all the same variables were collected, and some of them were assessed differently. The expanded database also provides a broader time horizon (A.D. 900–1300), affording the opportunity to move beyond the Classic Bonito phase (A.D. 1040–1100) window of the original study and assess how spatial patterning at outliers changes through time. Temporal, geographic, and architectural variables used in the current analysis are discussed below.

Temporal Variation

Database compilers assigned numeric date ranges to outliers based on available information. In most cases, date ranges were gleaned from surface ceramics; in the rare cases where excavations have been conducted or where there is standing architecture, tree-ring and radiocarbon dates were included. For purposes of this study, it was important to be able to sort outliers by time period, both in order to factor out noncontemporaneous sites from comparisons, and to track changes in outlier patterning through time. To create comparable date categories for the analysis, I used the information in the database to assign each case to one or more of three broad temporal periods: Early Pueblo II (A.D. 900–1040), Late Pueblo II (A.D. 1040–1150), and Pueblo III (A.D. 1150–1300). This resulted in five possible temporal designations (Table 1). Single component sites are best for comparison, but of 188 cases, 77 are multi-component. I did not wish to completely eliminate the 77 multi-component sites, as this group contains many prominent outliers (e.g., Kin Bineola), so I devised a way to incorporate them into the analysis using six subjectively developed date groups (Table 2). Groups A, D, and F are single-component groups. Groups B and E include respectively all Early Pueblo II, or Pueblo III, components, including multi-component background noise. Group C contains the entire spectrum of Late Pueblo II components; earlier and later single-component sites are excluded, but multi-component sites are included.

Table 1. Temporal assignments of sites in the database (n = 188)

Date Code	Periods	Date Ranges	Breakdown by Region	n
1	Early Pueblo II	A.D. 900–1040	San Juan Basin = 9; Arizona = 1; Four Corners = 1	11
2	Early Pueblo II –Late Pueblo II	A.D. 900–1150	San Juan Basin = 15; Southern = 18; Arizona = 8; Four Corners = 2	43
3	Early Pueblo II –Late Pueblo II –Pueblo III	A.D. 900–1300	San Juan Basin = 1; Arizona = 1	2
4	Late Pueblo II	A.D. 1040–1150	San Juan Basin = 22; Southern = 11; Arizona = 16; Four Corners = 6	55
5	Late Pueblo II –Pueblo III	A.D. 1040–1300	San Juan Basin = 6; Southern = 6; Arizona = 3; Four Corners = 17	32
6	Pueblo III	A.D. 1150–1300	San Juan Basin = 7; Southern = 4; Arizona = 22; Four Corners = 12	45

Table 2. Temporal groups used in the analysis.

Date Group	Date Codes Included	Breakdown by Region	Total (n)
A	1: Early Pueblo II components only	San Juan Basin = 9; Arizona = 1; Four Corners = 1	11
B	1 & 2: includes all Early Pueblo II components, even when a Late Pueblo II component is also present	San Juan Basin = 24; Southern = 18; Arizona = 9; Four Corners = 3	54
C	2, 3, 4, & 5: includes all Late Pueblo II components; excludes single-component Early Pueblo II and Pueblo III sites	San Juan Basin = 44; Southern = 35; Arizona = 28; Four Corners = 25	132
D	4: Late Pueblo II components only (smaller sample than Group C, but more temporally pure)	San Juan Basin = 22; Southern = 11; Arizona = 16; Four Corners = 6	55
E	5 & 6: includes all Pueblo III components, even when a Late Pueblo II component is also present	San Juan Basin = 13; Southern = 10; Arizona = 25; Four Corners = 29	77
F	6: Pueblo III components only	San Juan Basin = 7; Southern = 4; Arizona = 22; Four Corners = 12	45

Geographic Variation

The greater San Juan Basin may be divided physiographically into 20 or more subregions (e.g., Marshall et al. 1979:20–22), but this level of compartmentalization yields outlier counts for each area that are too small for meaningful comparison. In my original study, I combined outliers into three general regions by means of two east-west boundaries drawn approximately at the north edge of the Chaco Plateau and the south edge of the South Chaco Slope. In the expanded database, outliers were assigned to one of 14 geographically defined regions (Figure 1, Preface, this volume). Again, this level of subdivision results in outlier counts for some areas that were too small for meaningful comparison. To mitigate this problem, I collapsed the expanded database into four broad geographic categories—the San Juan Basin, Southern, Arizona, and Four Corners *regions* (Table 3). Two additional geographic variables were also used. Cases were characterized as *north* or *south* based on their position relative to an imaginary east-west line running through Chaco Canyon and extending in either direction. *Distance* is a metric variable referring to km between each outlier great house and Pueblo Bonito.

Architectural Variables

The expanded database contains presence/absence information for great kivas, roads, and earthworks for each outlier case. It also contains counts for great kivas and roads, where present. This information was used to create two additional categories viable for statistical comparisons—multiple great kivas, and multiple roads—in which each case contained 0, 1, or more than 1 instance of the feature. Thus, it was possible to look for associations not only between the presence/absence of roads, great kivas, and other variables, but also between the presence of multiple roads, multiple great kivas, and other variables.

Great house size is assessed differently in the expanded database than in my original work. In the original study, I assigned the metric variable *area* to each

Table 3. Four collapsed regions used in the analysis.

Region (this analysis)	Region (expanded database)	n
San Juan Basin	Central San Juan Basin, Chuska Valley, Lobo Mesa/San Juan Basin	60
Southern	Acoma, Lobo Mesa/Red Mesa Valley, Cibola/Zuni	39
Arizona	Black Mesa, Defiance Plateau, Little Colorado, Rio Puerco, Upper Chinle	51
Four Corners	Middle San Juan, San Juan Foothills, Totah/Upper San Juan Basin	38

great house on the basis of two-dimensional roofed area in square meters, exclusive of plaza space (cf. Powers et al. 1983:313, Table 41). However, we tabulated room count rather than great house area for the expanded database because of disparities in the methods used by the researchers to collect areal information. So, *room count* is used here as a proxy measure, albeit imperfect, for great house size. As an additional way to look at this variable, I used a stem and leaf plot to organize the room count data into four broad categories. Small (1–11 rooms), medium (12–20 rooms), large (22–49 rooms), and very large (50 or more rooms) great houses are identified by the categorical variable *size group*.

Two internal variables used in the original study—banding and symmetry—are not employed here, because they do not appear in the expanded database. The remaining three—core and veneer, kiva/room ratio, and elevated kivas, are included. It should be noted that most of the great houses in the expanded database are unexcavated, which means that there is undoubtedly some degree of error in the tallies of these variables. Evidence derived from surface survey is not only incomplete, but is not always comparable, due to differences among investigators in terms of both research agendas and field experience. I have not ground-verified every case in the expanded database, but I have attempted to minimize this problem by omitting cases where the evidence for these variables seemed sketchy or ambiguous. In the case of multicomponent great houses, every effort was made to separate architectural building episodes. To the extent possible given database limitations, core-and-veneer masonry, kiva/room ratio, and elevated kivas were tabulated separately for each temporal component, and these constituted discrete cases used in the analysis. As in the original study, *elevated kivas* is taken here to include both second-story enclosed kivas, and tower kivas, which consists of a series of up to four enclosed kivas vertically stacked on top of one another (see Marshall et al. 1979:18 for a comparison). This categorization ensures a large enough sample of elevated kivas for comparison, and it circumvents the confusion surrounding the term *tower kiva*, which is sometimes used to describe second-story kivas (e.g., Irwin-Williams and Shelley 1980; Lekson 1984:52).

Methods

As in the original study, comparisons of dichotomous categorical variables were made using Fisher's exact test. Comparisons of polytomous categorical variables were made using Pearson's chi-square test. Comparisons of metric variables were made using the Mann-Whitney U-test and Kruskal Wallis one-way analysis of variance. Correlations with distance were explored using regression analysis. P values of 0.05 or less are considered statistically significant.

Results and Interpretations

Results of the comparisons are presented in Tables 4–8 and are discussed in detail below. In the interest of clarity, only significant results are listed. Table 4 presents results for the entire database; these comparisons, including sites from all temporal groups, enabled the identification of changes through time. Additional comparisons among variables were conducted for each of the six date groups to factor out the "noise" contributed by multiple temporal components. No significant associations were found within Group A (n = 11), possibly because it is so small. Results for Groups B, C, D, and E are presented in Tables 5, 6, 7, and 8, respectively. Significant results for Group F were too few to warrant a separate table, but they are discussed in the text.

General Patterns

Changes Through Time

Although the database is relatively crude with respect to regional and temporal definition, a cross-tabulation of temporal and locational variables supports basic, well-known shifts in regional patterning in the Chaco area between A.D. 900–1300. Between A.D. 900–1150, during the growth and peak of the Chaco phenomenon, most sites are located in the San Juan Basin and the Southern regions, with relatively few sites in other areas. There is a tendency for Early Pueblo II sites to appear in the Red Mesa Valley (see also Van Dyke 2000). During the Late Pueblo II/Pueblo III period, there is a shift in focus to the Four Corners region, and between A.D. 1150–1300, most sites are located in Arizona. These patterns are supported by significant associations between the categorical variable *date* and *north/south, region,* and *distance* (Table 4).

Date is significantly associated with *rooms* (Table 4), reflecting the unsurprising pattern that sites in the database in the Four Corners and Arizona regions dating from the Pueblo III period tend to be larger than sites in the San Juan Basin core dating from the Pueblo II period. Finally, *date* is significantly associated with *multiple great kivas* (Table 4), reflecting the fact that there are no sites with multiple great kivas in Group A (refined Early Pueblo II), over half (52%) of all outliers with multiple great kivas fall within Group B (Early Pueblo II), and the largest group of sites that lack great kivas (34%) falls within Group D (refined Late Pueblo II). Multiple great kivas are clearly an Early Pueblo II phenomenon.

Great House Size

Great house size for the sites in the database, as measured by room counts, varies between 1 and 437 rooms. The categorical variable *size group* consists of 35 small, 41 medium, 38 large, and 41 very large sites. *Size group* is significantly associated with *region* and *distance* for the entire database (Table 4). Both associations

Table 4. Significant results of comparisons for all variables and all cases (n = 188).

	Date* (n=186)	Distance**	Region	Size Group	Rooms	Great Kiva P/A	Mult. Great Kiva P/A	Road P/A	Mult. Road Segment P/A	Berm P/A	Core/ Veneer P/A	Elevated Kiva P/A
N/S	0.000	N/A	N/A	—	—	—	—	—	—	—	—	—
Region	0.000	N/A										
Size Group	—	0.036	0.000									
Rooms	0.003	—	—	N/A								
Great Kiva P/A	—	—	—	—	0.004							
Mult. Great Kiva P/A	0.041	—	0.014	—	0.011	N/A						
Road P/A	—	—	—	—	—	—	—					
Mult. Road Segment P/A	—	0.004	0.007	—	—	—	—	N/A				
Berm P/A	—	—	—	—	—	—	—	—	—			
Core/Veneer P/A	—	0.000	0.008	—	—	—	—	—	—	—		
Elevated Kiva P/A	—	—	—	0.008	0.000	0.007	0.005	0.033	0.025	—	—	
Kiva/Room Ratio	—	—	—	N/A	N/A	0.008	0.024	—	—	—	—	—

* the two cases comprising Date Group 3 were omitted here, since these multicomponent sites were occupied in all time periods

** km to Pueblo Bonito

hold for the Group C Late Pueblo II subset (Table 6), and there is a significant association between *region* and *rooms* for this group as well. The association between *region* and *rooms* holds for the Group D refined Late Pueblo II subset (Table 7), which factors out some very large Pueblo III sites. In sum, most sites in the San Juan Basin and Southern region are of the small, medium, and large varieties (1–49 rooms), whereas the very large sites (50 or more rooms), such as Aztec East, tend to be located in the Four Corners.

Table 5. Significant results for Group B (n = 54).

	Distance	Region	Size Group	Rooms	Kiva/Room Ratio
Great Kiva P/A	—	—	—	—	0.002
Mult. Great Kiva P/A	—	0.026	—	—	0.004
Core/Veneer P/A	0.010	—	—	—	—
Elevated Kiva P/A	—	—	0.007	0.000	—

Table 6. Significant results for Group C (n = 132).

	Distance	Region	Size Group	Rooms	Mult. Great Kiva P/A	Kiva/Room Ratio
Size Group	0.014	0.002				N/A
Rooms	—	0.000	N/A			N/A
Great Kiva P/A	—	—	—	0.004	N/A	0.011
Mult. Great Kiva P/A	0.004	0.024	—	—	—	—
Core/Veneer P/A	0.000	0.017	—	—	—	—
Elevated Kiva P/A	—	—	0.009	0.000	0.049	—

Table 7. Significant results for Group D (n = 55).

	Region	Great Kiva P/A	Elevated Kiva P/A
Size Group	0.003	—	—
Rooms	0.021	0.023	0.042
Road Segment P/A	0.003	—	—
Multi. Road Segment P/A	0.006	—	—
Core/Veneer P/A	0.049	—	—
Kiva/Room Ratio	—	0.032	—

Table 8. Significant results for Group E (n = 77).

	Region	Rooms	Great Kiva P/A	Core/Veneer P/A
Elevated Kiva	—	0.029	0.019	—
Kiva/Room Ratio	0.014	N/A	—	0.011

Great Kivas

Great kivas are found at 108 outliers in the expanded database. Of these, 25 cases contain more than one great kiva. Great kivas are reported as absent from the remaining 80 outliers. The categorical variable *great kiva presence/absence* is significantly associated with *rooms,* and with *elevated kivas,* for the entire database (Table 4; n = 188; p = 0.004). The association with rooms is maintained for Late Pueblo II Groups C–E (Tables 6–8). During the Late Pueblo II period, great kivas are much more likely to be present at sites with high room counts. The association with *elevated kivas* in the overall database probably reflects the fact that elevated kivas also are more common at pueblos with high room counts, as discussed further on.

The categorical variable *multiple great kivas* is significantly associated with *region* for the entire database (Table 4). Cases with 0 great kivas are more likely in the San Juan Basin—great kivas are lacking for 52% of the outliers in this region across all time periods. Cases with a single great kiva are distributed fairly evenly across the four regions. Nearly half (48%) of all cases with more than one great kiva are found in the Southern region. This significant association is maintained for the subset of Early Pueblo II period sites (n = 54, p = 0.026) and for the Group C subset of Late Pueblo II period sites (Table 6; n = 132, p = 0.048). As I found in the original study (Van Dyke 1998, 2002), great kivas are less likely to be present at outliers in the central San Juan Basin. Furthermore, most sites with multiple great kivas are found in the Southern region.

Multiple great kivas also are significantly associated with *rooms* and *elevated kivas* for the entire database (Table 4) and for the Group D refined Late Pueblo II subset (Table 6). This again reflects the fact that great kivas are more common at larger sites, and this pattern is particularly strong during the Classic Bonito phase, or Late Pueblo II period.

Roads

Road segments are recorded as present in 91 cases and absent in 38 cases; there is no information available for the remaining 59 cases. Where roads are present, multiple segments are recorded for 36 cases. In the original study, roads were significantly more likely to be present in the south (Van Dyke 1998:218). Although no significant associations were found between roads and *north/south* in the expanded database, there are significant associations with *distance* and

region. *Presence/absence of roads* is significantly associated with *region* for the Group D refined Late Pueblo II subset, reflecting the fact that, during the Chaco heyday, an outlier *without* a road segment could be located most anywhere, but an outlier *with* a road segment was most likely located in the San Juan Basin (Table 6). *Multiple road segments* are significantly associated with *region* and *distance* for the entire database (Table 4). These results hold for the Group C Late Pueblo II subset (Table 6), and the association with region holds for the Group D refined Late Pueblo II subset (Table 7). In the Four Corners and in Arizona, far from Chaco Canyon, outliers most likely have either no roads or multiple roads, whereas in the San Juan Basin and the Southern region, nearer to Chaco Canyon, outliers most likely have either no roads or one road segment.

Earthworks

Earthworks, or berms, are recorded as present in 34 cases and absent in 3 cases in the expanded database; there is no information available for the remaining 151 cases. No significant associations were found between the presence/absence of earthworks and any other variable for any time period. The lack of associations undoubtedly reflects, in part, the uneven distribution of information about this variable. Of the 34 cases where earthworks are present, 27 are located in the southern half of the Chaco world. I noted a similar pattern in the original study (Van Dyke 1998:218–219), where 9 out of 10 outliers recorded as having earthworks were located in the south. As with roads, this pattern may be a function of the fact that much of the research that has recognized berms and earthworks (Fowler et al. 1987; Marshall and Sofaer 1988) has been concentrated in the southern part of the San Juan Basin. The case of Bluff, in southeast Utah, is an interesting exception (Jalbert and Cameron 2000).

The functions of berms and earthworks in Chaco Canyon and at outliers are poorly understood (Wills 2001). The Bluff berm is one of the few outlier earthworks to have been tested; in a recent report, Cameron (2002) provides details and synthesizes information about outlier berms. Stein and Lekson (1992) have suggested that earthworks are part of a ritual landscape, symbolically defining space in front of the great house. Following an observation made by John Roney (personal communication 2000), I have suggested that these features, which contain a confusing array of trash, sterile earth, and construction debris, may represent fake middens built to bolster legitimacy through constructed appeals to the past (Van Dyke 2003).

Internal Variables

Three of the five internal variables used in the original study—core-and-veneer masonry, elevated kivas, and kiva/room ratio—were revisited here. In the expanded database, all three exhibit interesting patterning.

Core and Veneer Masonry

Because core-and-veneer masonry is an internal variable not immediately visible to outside observers, it is a good indicator of participation in common learning frameworks (*sensu* Lechtman 1977; Lemonnier 1986; Dobres 2000). In my original study, core-and-veneer masonry was significantly associated with the dependent variable *distance,* suggesting that in the relatively rare (4 out of 64) cases when core-and-veneer masonry was lacking at a Late Pueblo II great house, it was far away from Chaco Canyon. This relationship holds for the current study, and the expanded geographic and temporal information allows us to make even more sense of it.

Core-and-veneer masonry is recorded as present at 93 cases and absent at 45 cases in the expanded database. The variable is significantly associated with *region* and *distance* for the entire database (Table 4). Both relationships hold for the Late Pueblo II Group C (Table 6), and the association with *region* holds for the refined Late Pueblo II Group D (Table 7). These findings indicate a patterned distribution of core-and-veneer sites that holds through the Late Pueblo II period, but disappears from the data sets with Pueblo III components. Not surprisingly, core-and-veneer masonry is more common in the Chaco core area. Most (76–82%) great houses in the San Juan Basin and the Southern region contain core-and-veneer masonry through the Late Pueblo II period. However, in Arizona and the Four Corners region, only about half (45–55%) of the Late Pueblo II great houses contain core-and-veneer masonry. When broken down into the Chaco World database's smaller regions (Figure 1, Preface, this volume), this pattern holds. Approximately half the great houses in the middle San Juan, San Juan foothills, Totah/Upper San Juan, Rio Puerco, Defiance Plateau, and Upper Chinle areas contain core-and-veneer masonry. The masonry is entirely lacking in the Black Mesa and Little Colorado areas. The fact that the masonry is present about half the time in subregions distant from Chaco suggests that its use is not merely a function of the presence of tabular and blocky Cliff House sandstone, or some other suitable building material.

Core-and-veneer masonry is significantly associated with *multiple road segments* ($p = 0.030$, $n = 32$) and with *kiva/room ratio* ($p = 0.018$, $n = 44$) for Group F, suggesting that all three variables were a recognizable part of a package of architectural attributes that continued through the end of Pueblo III period, in the post-Chaco world. In my conclusions below, I argue that the presence/absence of core-and-veneer masonry can and should be employed to set spatial, as well as temporal, boundaries around the Classic Bonito-phase Chaco world.

Elevated Kivas

In the original sample, elevated kivas were heavily concentrated in the south and were significantly associated with road segments as well as great house size.

These findings are borne out here. Elevated kivas are recorded as present at 42 and absent at 76 outliers in the expanded database. For the database as a whole, the *presence/absence of elevated kivas* is significantly associated with six variables: *great kivas, multiple great kivas, road segments, multiple road segments, size group,* and *rooms* (Table 4). The association with rooms holds for Groups B, C, D, and E (Tables 5–8), and the association with *size group* holds for Groups B and D (Tables 5 and 7). Elevated kivas, when present, occur more often at larger sites; none are present in the group of "small" great houses (less than 11 rooms). This may reflect the fact that larger sites are more likely to incorporate several construction episodes across time, in which later, "higher" kivas were built on top of earlier architecture and deposits.

In the database as a whole, most sites that lack elevated kivas also lack road segments. The presence/absence of elevated kivas also is significantly associated with great kivas (Table 8) and multiple great kivas (Table 6). Most sites that lack elevated kivas also lack great kivas. These associations indicate that these three variables—roads, great kivas, and elevated kivas—occur more often at the same sites, and less often in isolation. The patterns may also reflect a tendency for all three variables to appear at larger sites, although neither great kivas nor road segments are, independently, significantly associated with *size group.*

Kiva/Room Ratio

In the original study, kiva/room ratios were significantly different in the north and south; great houses in the south (n = 46) had a median kiva/room ratio of 1:9, whereas great houses in the north (n = 11) had a median kiva/room ratio of 1:20. The 1:20 kiva/room ratio figure for northern great houses is similar to a figure obtained by Lipe (1989:56, Table 1), who estimated a kiva/room ratio of 1:15.2 for nine Chacoan great houses in the Mesa Verde area, although contemporaneous, "local" pueblos exhibited kiva/room ratios of 1:6.5. Steward (1937), noting a kiva/room ratio of 1:5–1:6 as characteristic of Pueblo II habitation sites, interpreted this to mean that each family group constructed its own kiva for its own ceremonies, and a later shift to kiva/room ratios of 1:15–1:25 reflected a change in the organization of ritual. Lipe and Hegmon (1989) further contended that kivas at this point acquired a new function as settings for integrative social activities. Whatever the specific functions of kivas in great houses—whether ceremonial, domestic, or both—the differences in kiva/room ratio patterns observed in the original study suggested that northern Chacoan great house kivas were used differently than kivas in other areas, or in non-Chacoan northern sites.

In the current study, for n = 122 cases, kiva/room ratios range from extremes of 1:3 to 1:175, with a median of 1:10. Significant associations are present with *kiva/room ratio* through all date groups, but interestingly, there is a shift in results between date groups with only Pueblo II components (B–D), and date

groups that include Pueblo III components (E and F). *Kiva/room ratio* is significantly associated with the *presence/absence of great kivas* and *multiple great kivas* for the entire database, and these relationships hold for the Pueblo II date groups (Tables 4–8). Great house size is undoubtedly a factor here—one or more great kivas are more often present at larger sites, and kiva/room ratios are not independent of room count. P values below 0.05 can be obtained between kiva/room ratio, room count, and *size group* for every sample set, but I do not consider these results to be meaningful, because the variables are not independent—both *kiva/room ratio* and *size group* were derived, in part, from room count. It would be useful to explore this pattern further with an independent measure of site size, such as area.

Some of the most interesting kiva/room ratio results have to do with differences between the Pueblo II (Groups A–D) and Pueblo III (Groups E and F) sites. The median kiva/room ratios for both groups are similar (1:10 and 1:12.5, respectively), but the smallest kiva/room ratio for sites with only Pueblo II components is 1:60, whereas the smallest for sites with Pueblo III components is 1:175. This pattern confirms and underscores the findings from the original study—the special role of kivas in late Chacoan great houses seems to be intensified, as there are fewer of them, and more rooms.

For Group E, *kiva/room ratio* is significantly associated with *region* (Table 8). This reflects the presence of 9 large, late sites with few kivas in the Southern region, particularly the Acoma and the Cibola/Zuni areas (Figure 1, Preface, this volume). However, many of these sites, such as Bosson Wash, Cerro Prieto, and Gonzales Well, are listed in the expanded database as containing 50 or more rooms on the basis of rather tenuous information summarized in Fowler et al. (1987).

For both Groups E and F, *kiva/room* ratio is significantly associated with *core-and-veneer masonry* (see Table 8 for Group E; for Group F, $p = 0.018$, $n = 44$). Late Pueblo III sites that lack core-and-veneer masonry have a median kiva/room ratio of 1:8 (Group E) or 1:7 (Group F), whereas Late Pueblo II sites that exhibit core-and-veneer masonry have a median kiva/room ratio of 1:14 (Group E) or 1:13.5 (Group F). This final pattern, I argue below, has important implications for our ability to distinguish truly Chacoan great houses from very large pueblos.

Discussion and Conclusions

The picture that emerged from the original study of $n = 62$ great houses was of set of outliers characterized by diversity rather than homogeneity, requiring a range of interpretations. The results of the expanded outlier database analysis clarify those findings. Many of the patterns observed in the original study are strengthened and upheld, and new progress has been made towards separating the Chacoan from the merely Chacoesque (*sensu* Hurst 2000).

With respect to patterning of general variables such as size, great kivas, and landscape features, I reconfirmed a number of earlier observations. Sites of any size are located in the San Juan Basin, but very large sites tend to be late, and they tend to be located further away from Chaco. The Southern region not only has a concentration of Early Pueblo II great houses but also a concentration of very large, Late Pueblo II great houses with multiple great kivas. Most sites that lack great kivas are located close to Chaco Canyon, and these generally date from the Late Pueblo II period (see also Van Dyke 2002). Most sites with one road segment are in the San Juan Basin. There are strong associations among great kivas, elevated kivas, and high room counts, especially during the Late Pueblo II period. In sum, the suite of Bonito style characteristics hangs together, particularly during the Classic Bonito phase or late Pueblo II period.

Moving out from the Chaco core area, great houses either lack roads, or they are associated with multiple road segments. Earthworks and multiple road segments are commonly found at Late Pueblo II and Pueblo III sites in the Four Corners and in Arizona. The further removed from Chaco Canyon in both space and time, the more important landscape modifications such as roads and earthworks appear to become. Formal landscape modifications may be more important in the post-Chaco world (Fowler and Stein 1992). Alternatively, the patterns may merely reflect the fact that road and earthwork research is not geographically consistent across the sample.

Internal variables are expected to help distinguish Chacoan great houses from very large sites. Three internal variables used in the original study were compared for the expanded database. Elevated kivas do not appear to be particularly sensitive indicators with respect to this issue. Elevated kivas occur more often at larger, Late Pueblo II great houses—they appear to be part of the package described above, that includes road segments and great kivas. All three features occur more commonly together than they do in isolation, and all occur more commonly at large sites.

Core-and-veneer masonry and kiva/room ratios, however, both appear to be useful indicators of Chacoan-ness. In the expanded database, core-and-veneer masonry exhibits significant, patterned distributions in both time and space. It is concentrated in the San Juan Basin and the Southern region during the Late Pueblo II period. However, it is present in only about half the contemporaneous great houses in Arizona and the Four Corners. A closer look at geography reveals that the masonry is absent in the Black Mesa and Little Colorado areas. I do not believe this is merely a function of the availability of suitable building materials; this assertion could be confirmed with geologic studies.

Just as we use the absence of core-and-veneer masonry to set an initial temporal boundary on the Classic Bonito phase (Hawley 1934, 1938), we can use the absence of core-and-veneer masonry for setting spatial boundaries on the Chaco world. Obviously these boundaries are not rigid, but because the mason-

ry technique should be passed through common learning frameworks and shared labor pools, I would argue one is more likely to see non-Chacoan sites *with* core-and-veneer, than Chacoan sites that *lack* the masonry style. The importance of core-and-veneer as a Chacoan marker increases during the post-Chaco, Pueblo III period, when it is significantly associated with multiple road segments and very low kiva/room ratios.

Adding kiva/room ratio to the mix clarifies the picture still further. The typical Late Pueblo II Chacoan great house has a kiva/room ratio of about 1:15. Moving into the 1100s and later, some great house kiva/room ratios become quite extreme; for example, Salmon only has one kiva for 175 rooms. These low ratios reflect the functions of both kivas and rooms in Chacoan great houses—whatever was going on at these structures (see Durand, this volume), one apparently needed few kivas and lots of rooms. This pattern is in stark contrast to those sites with kiva/room ratios of 1:8, or even higher. Remember, Lipe's (1989:56, Table 1) non-Chacoan, domestic Mesa Verdean sites had kiva/room ratios of 1:6.5. Clearly, kivas in these domestic sites have different, perhaps less integrative functions. Following Lipe, I would argue that sites with very high kiva/room ratios, perhaps less than 1:10, are less likely to be Chacoan.

Things get really interesting when the pattern of sites with high kiva/room ratios is juxtaposed with the pattern of sites that lack core-and-veneer masonry. I would argue that these are the sites least likely to be Chacoan. Given the statistically significant associations between these two variables discovered here, the argument should hold particularly well for Pueblo III sites. Of 100 sites in the database where both variables are tabulated, 12 sites lack core-and-veneer masonry and have kiva/room ratios higher than 1:10. As one might expect, these are mainly late sites in the Four Corners or in Arizona. Whatever was going on in the Black Mesa and Little Colorado areas, I would argue, it is not something directly related to Chaco. Not every big site is best described or understood as a "Chaco outlier."

CONCLUSION

This study, then, is an encouraging step towards putting some spatial boundaries around the Chaco world. These boundaries are permeable, not rigid, of course, and they change over time. Bonito style architectural attributes occur together in the Chacoan core area during the Late Pueblo II period. Landscape modifications and multiple great kivas represent the Chacoan package later in time and further afield. The absence of core-and-veneer masonry together with high kiva/room ratios seem a useful way to define the geographic scope of Chacoan influence. By the Pueblo III period, the large sites tabulated here are either huge, core-and-veneer pueblos containing multiple road segments, a great kiva or two, and one or two (probably elevated) kivas...or they are huge pueblos with lots of little

kivas, lacking core-and-veneer masonry. The first group of sites, I argue, can be considered directly connected in some way back to Classic Bonito phase Chaco. The second are something different.

I think what we are seeing across time and space is the spread of an iconic style, affiliation with the Chacoan package—and not everybody was a member. Massive, visually impressive architectural features obviously contained symbolic meanings for prehistoric builders and viewers—some outlier communities shared common meanings with Chaco and each other, and some did not. Are the less Chacoan-looking sites emulators, or are they outside the network altogether? We do not presently have enough of a handle on internal variables to determine the nature of the relationship these "outsiders" had with Chaco. However, with better data on internal variables such as banding and kiva floor features, and with better temporal resolution, we should be able to improve our understanding of interactions inside the Chaco world.

ACKNOWLEDGMENTS

This study emerged from the stimulating and thought-provoking Chaco World summit organized by John Kantner, Nancy Mahoney, and Keith Kintigh in September 1999 at ASU. My thanks to them, and to Tim Pauketat and Dennis Gilpin for encouraging me to revisit my dissertation project using the expanded database. Gwinn Vivian, Barbara Mills, and Chuck Adams provided invaluable guidance and support for the original project. John Kantner, Keith Kintigh, Peter McKenna, Ron Towner, and Tom Windes kindly offered critical commentary at various stages of manuscript completion, and the article is, I hope, stronger as a result. Any errors are, of course, my own responsibility.

REFERENCES

Breternitz, Cory D., David E. Doyel, and Michael P. Marshall
1982 *Bis sa'ani: A Late Bonito Phase Community on Escavada Wash, Northwest New Mexico.* Navajo Nation Papers in Anthropology 14. Navajo Nation Cultural Resource Management Program, Window Rock.

Cameron, Catherine M.
2002 Sacred Earthen Architecture in the Northern Southwest: The Bluff Great House Berm. *American Antiquity* 67(4):677–695.

Carr, Christopher
1995 A Unified Middle-Range Theory of Artifact Design. In *Style, Society, and Person: Archaeological and Ethnological Perspectives,* edited by C. Carr and J. Neitzel, pp. 171–258. Plenum Press, New York.

Dobres, Marcia-Anne
2000 *Technology and Social Agency: Outlining a Practice Framework for Archaeology.* Blackwell, Oxford.

Doyel, David E., Cory D. Breternitz, and Michael P. Marshall
1984 Chacoan Community Structure: Bis sa'ani and the Chaco Halo. In *Recent Research on Chaco Prehistory,* edited by W. J. Judge and J. D. Schelberg, pp. 37–54. Reports of the Chaco Center 8. Division of Cultural Research, National Park Service, Albuquerque.

Fowler, Andrew P., and John R. Stein
1992 The Anasazi Great House in Space, Time, and Paradigm. In *Anasazi Regional Organization and the Chaco System,* edited by D. E. Doyel, pp. 101–122. Maxwell Museum of Anthropology Anthropological Papers 5. Albuquerque.
Fowler, Andrew P., John R. Stein, and Roger Anyon
1987 *An Archaeological Reconnaissance of West-Central New Mexico: The Anasazi Monuments Project.* Office of Cultural Affairs, Historic Preservation Division, Albuquerque.
Gladwin, Harold S.
1945 The Chaco Branch: Excavations at White Mound and in the Red Mesa Valley. *Medallion Papers* 33. Gila Pueblo, Globe.
Hawley, Florence M.
1934 The Significance of the Dated Prehistory of Chetro Ketl, Chaco Canyon, New Mexico. *Monographs of the School of American Research* 2, Santa Fe.
1938 The Family Tree of Chaco Canyon Masonry. *American Antiquity* 3(3):247–255.
Hurst, Winston B.
2000 Chaco Outlier or Backwoods Pretender? A Provincial Great House at Edge of the Cedars Ruin, Utah. In *Great House Communities across the Chacoan Landscape,* edited by J. Kantner and N. Mahoney, pp. 63–78. Anthropological Papers of the University of Arizona 65. The University of Arizona Press, Tucson.
Irwin-Williams, Cynthia, and Phillip H. Shelley (editors)
1980 *Investigations at the Salmon Site: The Structure of Chacoan Society in the Northern Southwest.* Eastern New Mexico University Printing Services, Portales.
Jalbert, Joseph Peter, and Catherine M. Cameron
2000 Chacoan and Local Influences in Three Great House Communities in the Northern San Juan Region. In *Great House Communities across the Chacoan Landscape,* edited by J. Kantner and N. Mahoney, pp. 79–90. Anthropological Papers of the University of Arizona 65. The University of Arizona Press, Tucson.
Lechtman, Heather
1977 Style in Technology—Some Early Thoughts. In *Material Culture, Styles, Organization, and Dynamics of Technology,* edited by H. Lechtman and R. Merrill, pp. 3–20. West Publishing, New York.
Lekson, Stephen H.
1984 *Great Pueblo Architecture of Chaco Canyon, New Mexico.* University of New Mexico Press, Albuquerque.
1991 Settlement Patterns and the Chaco Region. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest,* edited by P. L. Crown and W. J. Judge, pp. 31–55. School of American Research Press, Santa Fe.
Lemonnier, Pierre
1986 The Study of Material Culture Today: Toward an Anthropology of Technical Systems. *Journal of Anthropological Archaeology* 5:147–186.
Lipe, William D.
1989 Social Scale of Mesa Verde Anasazi Kivas. In *The Architecture of Social Integration in Prehistoric Pueblos,* edited by W. D. Lipe and M. Hegmon, pp. 53–71. Occasional Papers of the Crow Canyon Archaeological Center 1. Cortez, Colorado.
Lipe, William D., and Michelle Hegmon (editors)
1989 *The Architecture of Social Integration in Prehistoric Pueblos.* Occasional Papers of the Crow Canyon Archaeological Center 1, Cortez, Colorado.
Marshall, Michael P., and Anna. Sofaer
1988 *The Solstice Project: Archaeological Investigations in the Chacoan Province, New Mexico.* Ms. on file, Laboratory of Anthropology, Santa Fe, New Mexico.
Marshall, Michael P., John R. Stein, Richard W. Loose, and Judith E. Novotny
1979 *Anasazi Communities of the San Juan Basin.* Public Service Company of New Mexico, Albuquerque.
Morris, Earl H.
1919 *The Aztec Ruin.* Anthropological Papers of the American Museum of Natural History 26, Part 1, New York.

Powers, Robert P., William B. Gillespie, and Stephen H. Lekson
1983 *The Outlier Survey: A Regional View of Settlement in the San Juan Basin.* Reports of the Chaco Center 3. U.S. Department of the Interior, National Park Service, Albuquerque.
Renfrew, Colin, and John F. Cherry (editors)
1986 *Peer Polity Interaction and Socio-political Change.* Cambridge University Press, Cambridge.
Roberts, Frank H. H., Jr.
1932 The Village of the Great Kivas on the Zuni Reservation, New Mexico. *Bureau of American Ethnology Bulletin* 111. Washington, D.C.
Roys, Lawrence
1936 Masonry of Lowry Ruin and of the Southwest. In *Lowry Ruin in Southwestern Colorado,* by P. S. Martin, pp. 115–142. Field Museum of Natural History Anthropology Series 23 (1). Chicago.
Stein, John R., and Stephen H. Lekson
1992 Anasazi Ritual Landscapes. In *Anasazi Regional Organization and the Chaco System,* edited by D. E. Doyel, pp. 87–100. Maxwell Museum of Anthropology Anthropological Papers 5. University of New Mexico, Albuquerque.
Steward, Julian
1937 Ecological Aspects of Southwestern Society. *Anthropos* 32:87–104.
Van Dyke, Ruth M.
1998 *The Chaco Connection: Bonito Style Architecture in Outlier Communities.* Ph.D. dissertation, The University of Arizona, Tucson. UMI, Ann Arbor.
1999 The Chaco Connection: Evaluating Bonito Style Architecture in Outlier Communities. *Journal of Anthropological Archaeology* 18(4):471–506.
2000 Chacoan Ritual Landscapes: The View from the Red Mesa Valley. In *Great House Communities across the Chacoan Landscape,* edited by J. Kantner and N. Mahoney, pp. 91–100. Anthropological Papers of the University of Arizona 65. The University of Arizona Press, Tucson.
2002 The Chacoan Great Kiva in Outlier Communities: Investigating Integrative Spaces across the San Juan Basin. *Kiva* 67(3):231–248.
2003 Memory and the Construction of Chacoan Society. In *Archaeologies of Memory,* edited by R. M. Van Dyke and S. E. Alcock, pp. 180–200. Blackwell Publishers, Oxford, and Malden, Mass.
Wills, W. H.
2001 Ritual and Mound Formation During the Bonito Phase in Chaco Canyon. *American Antiquity* 66(3):433–451.

Ruth M. Van Dyke
Department of Anthropology
Colorado College
Colorado Springs, CO 80903
(719)389-6362
rvandyke@coloradocollege.edu