

CHIMNEY ROCK AND CHACO CANYON: ACROSS THE WIDE SAN JUAN

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DRAFT August 25 2010 [June 30, 2011]

In this essay, I make a few large arguments from small numbers of dates, because some of the key sites and events in the early 10th century Chacoan region are represented (I think) by only a few dates. I anticipate uneasiness from archaeologists accustomed to great numbers of tree ring dates (especially those who work with Chaco and Mesa Verde). They do dendro early and often, and tend to spurn the odd or individual date. Before dismissing chronological interpretations of small numbers of tree-ring dates, please consider the following preemptive parable. In a later section I discuss Pinnacle Ruin, a 200-room pueblo with many beams and posts, good solid pieces of wood – wood that you could hang your hat, or yourself on. Unfortunately, all that fine wood was juniper and therefore undatable. So Pinnacle's chronology is built from a handful of AMS 14C determinations, with all 14C's attendant ambiguity, uncertainty, and expense. If I had just a small number – for example, seven – tree ring dates from Pinnacle, I would be thrilled. I would dance in the streets and treat friends and strangers to beverages of their choice. For this parable, let's say that good things sometimes happen to bad people and I get my tree-ring dates: 982vv, 1125vv, 1136vv, 1202vv, 1213vv, 1250v and 1256c. From these few dates I would cheerfully (and, I believe, quite properly) interpret Pinnacle Ruin as dating somewhere around 1256 (that's consistent with ceramics, architecture, etc). I would NOT say: gosh...I really need several hundred more tree-ring dates before I can say anything useful about Pinnacle Ruin's chronology. I'd welcome more dates, but I'll take what the site (hypothetically) gives me, and be content. This parable will re-appear in concrete application in the context of Chacoan sites, notorious for profligate wood-use and vast marching armies of tree-ring dates.

Here are two interesting facts about Chaco:

Fact #1: Although three Chaco Canyon Great Houses began in the late 9th or very early 10th century, Chaco's glory days ("Golden Century" REFS) are conventionally understood as 1020 to 1120, give or take a decade (REFS). Thus, the span from 920 to 1020 has always been a bit of a mystery.

Fact #2: Major Chacoan expansion to the north (that is, northern San Juan great houses) are conventionally dated after 1075 (Lipe 2006; Cameron 2006, REFS).

A few dates from a few sites undermine these facts. I will consider several unusually or "anomalously" early tree-ring dates at several Chaco sites (Pueblo Alto, Chetro Ketl, Chimney Rock, Far View House), which have been or may be lost amidst far more numerous later dates. Before discussing those few dates, I must digress briefly to address our conventions for thinking about anomalous, low-frequency dates amid arrays of more numerous later dates. Much, of course, depends on the context of individual dates; but much also depends on our assumptions about ancient construction strategies.

Sites with scores, even hundreds of tree-ring dates are happy rarities. "Happy," because our interpretations are bolstered by large numbers of dates. "Rarities," in that such sites are truly exceptional. And indeed, large numbers of dates can deceive: one burned roof might produce one hundred cutting dates at, for example, 1045; a nearby unburned roof might produce only one date at, for example, 1005v. One hundred cutting dates of 1045 versus one near-cutting date at 1005v; yet 1045 and 1005 are exactly equal in dating *events*: the cutting of trees to build roofs. More dates are better than fewer dates, in that more dates add confidence to our interpretations; but interpretations still can be and must be made of few or even single dates.

The rarity of sites and structures with hundreds of dates must be considered in our evaluation of chronological interpretations. We may (and shall, in this paper) see interpretations of one or a few dates; indeed, many sites and most contexts have only a few dates, at most. The same validity we extend to chronologies built on a few dates in dendrochronologically "thin" regions should be extended to contexts with few dates in dendrochronologically rich sites and districts—that is, Chaco sites.

The Southwest, we are told, was a harsh and marginal place and existence was a struggle. Thus, we assume expediency: people used whatever was lying around and readily available. Anomalous early dates are often dismissed as reused wood and "old wood," particularly amid arrays of later dates. Surely expediency was the rule, in many times and place. But perhaps not for Chacoan architecture, monumentally over-built, symbolically charged, and conspicuously non-expedient. I suspect that Chaco construction used precisely the type of wood wanted for the purpose.

For example, consider "radial-beam pilasters," typical of Chaco "kivas," which usually have six or eight such pilasters at even spacings around the "bench." The "pilaster" consists of a short section of log—often anomalously old—lying lying flat on the bench, shallowly seated into the wall above the bench. The wooden core of the pilaster was encased in a masonry "box," a carefully constructed veneer of small stone elements (lacking compressive strength), leaving the uppermost and inward most aspects of the beam exposed and visible. The wood element often had a small, round repository carefully carved into its exposed upper surface, sometimes fitted with a lid. Several repositories contained turquoise fragments and other deposits consistent with offerings. The "radial beam pilaster" looks, to me, much like a wood shrine.

Yet the wood used in the "radial beam pilasters" was sometimes old wood, with a motley variety of species and dates mixed in a single "kiva." The sundry species, varied and anomalous datings, and sometimes rough condition of these elements might be dismissed as the use of old, readily available, expedient wood – whatever was lying around. I think, however, that the use of particular pieces of wood was a deliberate and meaningful architectural statement. Chacoan builders could muster considerable labor to harvest, prepare, transport, and install hundreds of thousands of very specific wood elements. The sizes and species used in the roofing of deep, dark interior storage rooms were often highly standardized. Chacoan builders could obtain and use whatever woods they wanted

(within reason...mostly). If they used "old wood" in pilasters or elsewhere, it was probably for an explicit architectural, symbolic, or cosmological purpose: old wood was used for radial beam pilasters, because *they wanted* those particular pieces of wood in that key architectural context. The old wood *meant something*.

The functions of both "radial beam pilasters" and Chacoan "kivas" are matters of debate. I believe "kivas" were actually residences (Lekson REFS), and "radial beam pilasters" were not structural members (i.e., they had little to do with ceilings or roofs; Lekson REFS). Others believe these structures are analogous with modern Pueblo "kivas" (Crown and Wills REFS) and the "pilasters" were load-bearing members, supporting heavy cribbed roofs (REFS). In either reading, both "kivas" and "pilasters" were almost certainly tremendously important (far more significant than, for example, a storage room). The attention given to the "kiva" is obvious: for example, they often exhibit the finest, most detailed masonry, and they were frequently modified and rebuilt. It seems likely that the "radial-beam pilasters" were, indeed, shrines, with the encased wood commemorating distant forests, old buildings or settlements, or other historic or cosmologic referents. Wood, itself, was important and symbolically charged.

Chacoan architectural canons were profligate but purposeful in wood use. Use of old wood might not be simply expedient, but rather highly meaningful: wood from older buildings might be re-incorporated in new construction as memorials (for example, the wood enshrined in "radial beam pilasters"). In other cases, the mixture of older and younger wood elements might also indicate less symbolically-charged interpretations—not the assumption of randomized expediency, but less esoteric than kiva pilasters. For example: re-roofing. Indeed, Chacoan building may have been a continuous process (Lekson REFS; Crown and Wills REFS). The very act of building (and re-building) probably had political and ideological significance (Lekson REFS; Stein REFS; Van Dyke REFS). For roofs/ceilings, the installation and re-installation of roofing elements was facilitated by walls which "stepped back," creating a ledge to seat secondary beams at each story (Lekson REFS). While replacement of major primary beams was indeed difficult, it would have been (relatively) easy to remove and replace the far more numerous secondary beams. Primary beams are often significantly older than the secondaries they support; this situation is typically interpreted as re-use of old primary beams, but it may also represent re-installation of secondaries and roofing/flooring. Thomas Windes (REFS) has noted that lintels and other wood elements firmly embedded in the masonry fabric sometimes date significantly earlier than far more abundant secondary roof beams, suggesting actual construction at an earlier date, and roofing or re-roofing at a later date. Numerically, a half-dozen early door lintels might "disappear" amid the hundreds of later beams of a collapsed roof; yet, those few early dates could be key to understanding construction chronology. And roofing and re-roofing might well have had a cyclic periodicity, or at least repetition, which had nothing to do with actual structural or maintenance concerns. That is, the act of building and re-building may well have had the sort of ritual and even political implications that cycling re-building had in Mesoamerica – a suggestion made, for different arguments, by Van Dyke (REFS) and Crown & Wills (REFS) and others (REFS).

Pueblo Alto

Pueblo Alto, high atop the North Mesa at Chaco Canyon, produced 136 tree-ring dates, including a very conspicuous cluster at 1044-1045, with over 30 cutting or near-cutting dates (Windes 1987a:Table 8.2) (Figure 4). This date has been suggested as indicative of "major, perhaps the initial, period of construction ... The earliest date of A.D. 1021 [discussed below] does not rule out earlier construction... the two dates are closely related in time and present the strongest case for the A.D. 1045 period of initial construction unless a major hiatus occurred between construction of walls and roofs" (Windes 1987a:213).

Dozens of 1045 specimens were recovered from the Trash Mound; the single 1021 specimen came from the walls of the building itself, and a 1004v date from roof fall. Let's look further at beams and tree-ring dates from the building. Windes notes "only seven tree-ring dates, three from wall-clearing, were obtained from room excavations at Pueblo Alto" (Windes 1987:210). Of these seven, five are non-cutting dates, ranging from 911vv to 1016vv. One "single v" near-cutting date was obtained from roof fall of Room 142: 1004v; and the 1021r cutting date came from an intramural beam in the north wall of Room 110 (Windes 1987a:Table 8.2). Thus, there are two cutting or near-cutting dates of 1004v and 1021r, and five non-cutting dates, none of which exceed 1016 (that is, there are no 1030vv or 1040vv, 1050vv etc. to demonstrate later dating).

The 1004v date came from the "floor fill" (Layer 6) directly above the floor of Room 142. (Full disclosure: I excavated Room 142, but I don't recall the details.) Thanks to Windes careful and complete report on Pueblo Alto, we learn that Layer 6 included "large chunks of adobe roofing ... The density of artifacts was greater in this layer than in any other above Floor 1, and probably represent debris left scattered over the roof at abandonment" (Windes 1987b:72). Windes discounts this date: "its association with room construction is dubious, however, because of its context and because it was superseded by a more recently dated specimen (A.D. 1016vv) used as a roof support in the same room" (Windes 1987a:210). But I think the 1004v date is worth consideration; probably a roof element, possibly a lintel from a collapsed door in the south wall of the room, but almost certainly a meaningful date. Room 142 was part of the first major construction phase at Pueblo Alto ("Stage IA"), a line of very large rooms backed by paired storage rooms, and Windes dates Stage IA to 1020-1040, but clearly favors the later limit of that span (Windes 1987a:151-152). The ceramic assemblage associated with construction of these rooms was well represented in excellent, sealed contexts: a purely Red Mesa Black-on-white assemblage (Windes 1987b:Figs. 2.11, 2.16), which agrees well with the 1004v date.

The other date from construction contexts, 1021r, came from an intramural beam in Room 110 in the west wing of the site ("Stage II") which Windes dates to 1020-1050. Trash Mound. The 1021r date is consistent with the Red Mesa ceramic assemblage associated with initial room construction, Floor 3 and the layer immediately above it (Windes 1987b:261); however, Windes states: "We did not recover other supportive tree-ring evidence for construction this early, whereas ceramic cross-dating and other absolute

dates suggest construction may have taken place a decade or two later" again, leaning towards construction in the 1040s. Ceramic cross-dating (the Red Mesa assemblage) supports a 1021 date for initial construction; the "other absolute dates" from Floor 3 consisted of a 14C date which Windes interpreted as 1024+/- and an archaeomagnetic date of 1170+/-22 (Windes 1987a:Table 8.8). Needless to say, both of these dates are problematic--although Windes' interpretation of the 14C fills me with (muted) joy. We can trust the strong association of a solid Red Mesa ceramic assemblage, which supports initial construction at 1021 or shortly thereafter.

Windes interpretations are consistent with the array of tree-ring dates from Pueblo Alto, if we weigh the importance of dates by frequency: over 30 dates at 1044-1045 versus single dates at 1004v and 1021. But if we consider context, there may have been three construction *events*: 1004v, 1021 and 1045.

It is instructive to compare Pueblo Alto to Chetro Ketl (and Hungo Pavi). Stage IA at Pueblo Alto was in many ways comparable to initial construction at Chetro Ketl. Both Alto and Chetro Ketl "straightened out" the earlier arced Pueblo I ground plans of late 9th and early 10th century Pueblo Bonito, Penasco Blanco and Una Vida (Lekson 1984, REFS). Chetro Ketl produced 591 tree-ring dates, almost all from architectural contexts. Only a small handful of cutting dates fell between 1000 and 1025, compared to several scores of cutting dates from 1030-1125 (Dean and Warren 1983:Figure V:3). The earliest individual cutting dates at Chetro Ketl were 989r (Room 58/59), 1000 (Room 47) and 1004c (Room 44), but of course in each case they were recovered in association with many later dates (it should also be noted that an even earlier near-cutting date of 850v was recovered from Room 27) (Dean and Warren 1983). The earliest clusters of dates (again, spread over a number of later rooms) was 1008-1010. While no collapsed roofs (or other wood constructions) were discovered which clearly dated to the earliest 11th century, Dean and Warren concluded that "clusters at 1008-1010, 1020-1021, 1026 and 1028-1030 represent wood cut for North Block A [the earliest part of the building] that was redistributed throughout [the building] after the earlier unit was razed" (Dean and Warren 1983:199). The early dates from Stages IA and II at Pueblo Alto, 1004v and 1021r, are consistent with the dating of initial construction at Chetro Ketl.

Thus, individual or small clusters of early dates, in *or out* of their original contexts, might indeed be meaningful for understanding the construction history of Chetro Ketl and, I suggest, Pueblo Alto and other sites considered here. For Pueblo Alto, I believe that the earliest construction at Pueblo Alto (Stage IA) could well be represented by the 1004v date from Room 142, and/or the 1021 date of the intramural beam of Room 110. Those early 11th century dates may better represent initial construction than does the demolished 1045 roof found in the Trash Mound.

My points here are threefold. First, anomalous early dates at Chaco buildings may well represent either important, very conscious re-use of earlier wood or they may represent actual initial construction with extensive later reroofing. Second (and consequently), individual or scarce early dates from contexts with much larger numbers of later dates should not be discounted a priori, but rather considered as evidence of significant earlier

activity. Chaco builders did not use whatever wood they found at hand, whatever was lying around; Chaco builders carefully planned, harvested, prepared, transported and installed very specific wood elements in very particular places. And, finally, Pueblo Alto, in its remarkable location high above the valley floor, was probably initially constructed during a presumably short span represented by only two (out of 136) tree-ring dates: 1004v and 1021r.

Pueblo Alto's and Chetro Ketl's early dates are consistent with (and even slightly later than) early but poorly known construction at Hungo Pavi, with cutting or near cutting dates from 942 to 1009, with a second cluster of cutting dates from 1054 to 1077. Rather than a hiatus or "dark age," it appears that big things were happening between 950 and 1020, particularly between 1000 to 1020.

Far View House

Few Chacoan structures have the remarkable numbers of dates of Chetro Ketl or Pueblo Alto: only the very largest Great Houses at Chaco Canyon and Aztec Ruins. Most of the few excavated "outlier" Great Houses have only a handful of tree-ring dates. In this section, I will consider two of those structures with sizable tree-ring collections which include "anomalously" early dates within much larger numbers of later dates: Far View House and Chimney Rock.

Far View House at Mesa Verde is a classic "outlier" great house constructed during Chaco's PEAK, ca. 1000 to 1125 (REFS) – although contrary interpretations persist (e.g. REFS). An undated (but obviously fairly recent) trail guide published by the Mesa Verde Museum Association includes the following curious quote "Far View House was built and occupied between A.D. 1100 and 1300—during the Classic Pueblo Period of Mesa Verde Ancestral Puebloan occupation." (MVMA nd)

Far View House tree ring dates come from a variety of field operations, all long after its original excavation. Most are provenienced only to rooms, at best. We do not know the original functions of almost all the beams (only one or two are attributed to lintels, for example), but I assume that most were from collapsed roofs. In any event, of 76 (CHECK) tree ring dates, 21 pre-date 1000; 41 fall between 1000 and 1120 (Chaco's height); and 14 post-date 1120 (Figure 5). No dates, cutting or non-cutting, post-date 1243. Of course, those totals include many "vv" dates; limiting the dates only to cutting or near-cutting (single "v") dates, there are only 14:

890 (Kiva C*)
932v (Miscellaneous)
1018, 1018 (Room 33)
1049 (Room 33)
1059, 1059, 1059, 1059, 1059 (Room 33)
1069v (Room 32)
1243, 1243, 1243 (Kiva C*)

The earliest date of 890 comes from Kiva C, which also produced the latest dates of 1243. Kiva C appears to be a Mesa Verde phase unit intruded into the earlier Chacoan structure—a very common phenomenon in the northern San Juan (REFS)—which incorporated much earlier wood. Another early date, 932v from an unknown provenience, suggests that either an early great house or wood from an important PI building was incorporated in the later Great House. Almost all the remaining cutting and near-cutting dates come from a single unit Room 33, with multiple cutting dates at 1018 and 1059. "However, these could represent reused timbers from one of the many sites in the vicinity" (Bannister and Harrill 1974:63), an interpretation favored by those who see Mesa Verde as something of an isolated island during the Chaco era, such as the author of the Mesa Verde Museum Association trail guide cited above. (There are, indeed many sites in the Far View cluster; dates from those sites include a number of cutting dates from the span 898-899, and many later vv dates--but we search in vain for cutting or near cutting dates at or around 1018 and 1056, for reuse in Far View; Bannister and Harrill 1974:60-62).

A conventional interpretation might have Room 33 built in 1059, expediently reusing earlier wood cut in 1018. That may indeed be the case, but as I have argued above, the anomalous early dates at 1018 might (1) represent deliberate incorporation of wood from earlier significant construction, or (2) indicate that Room 33 was built actually in 1018 and re-roofed in 1059.

The final near-cutting date of 1069v from Room 32 supports the interpretations that most of Far View House (minus obvious later modifications, such as Kiva C) was built during the Chaco era, and that—far less certainly—that roofing and re-roofing may have spanned decades.

My interpretations may seem a heavy burden for only 14 dates, but I submit that seemingly "anomalous" dates in small date arrays, such as Far View's, are perhaps even more significant than "anomalous" early dates in very large arrays, such as Chetro Ketl's. That is, we expect to see uncommon things in large samples, like Chetro Ketl's. Thus, uncommon things in small samples should command our attention. Finding uncommon things in small samples can of course be a quirk of probability—uncommon things must eventually turn up somewhere, sometimes. If "anomalously" early dates were present only in one sample (for example, Far View) then they could perhaps be dismissed. However, the repeated occurrence of anomalous dates *in independent samples* both large and small adds credence to the significance of those early dates, and decreases the likelihood that those dates are anomalous and therefore insignificant. Early (that is, 1000 to 1020) dates were represented at both Pueblo Alto and Chetro Ketl. With Chetro Ketl's remarkably large sample, these dates were accepted as evidence of early construction; at Pueblo Alto, with far fewer dates, they were discounted, I think incorrectly.

Chimney Rock

A new, but small set of tree-ring dates from Chimney Rock speaks to this problem (Todd and Lekson 2010). All dates from Chimney Rock Great House are shown in Figure 2; dates from 1970s excavations in the surrounding community are shown in Figure 3.

Initial excavations at Chimney Rock occurred before the development of tree-ring dating. Eddy's excavations produced many tree-ring dates (Eddy REFS) and our work in 2009 produced numbers proportionate to the smaller scale of our excavations. Our samples repeat and confirm Eddy's dates, particularly the clear evidence of roofing (or re-roofing) in 1093. But a couple of dates are, indeed, anomalous (Figure 2): cutting dates at 1011 and 1018. Both of these dates were almost certainly architectural elements. They had "a characteristic surface patina and smoothness, which develops on the exterior surface of beams...." stripped of bark, which was originally defined as characteristic of Chaco beams but which now extends to some beams from other building traditions, but still occurs disproportionately on Chaco specimens (Jeffrey Dean, p.c. 2010). The beams which produced 1011 and 1018 dates were not pieces of wood which were just lying around. Nor was there any evidence of occupation of Chimney Rock Mesa (or the surrounding area) in the early 11th century (Jason Chuipka, p.c. 2010). I believe that these dates indicate either (1) construction of Chimney Rock in the early 11th century, followed by re-roofing in 1093; or (2) construction of an earlier structure on or near the location of present Chimney Rock Pueblo, with purposeful re-use of its timbers in a later Great House.

Chimney Rock's masonry, as seen in our excavations and in pre-stabilization photography from the 1920s, is Style II, which dates from at least 1020, if not earlier, to about 1050: Style II was NOT used by Chacoan builders at or around 1093, either in Chaco Canyon or in major Great Houses like Salmon Ruins. At or around 1093, Styles III and IV (and the mis-named "McElmo" style) were in fashion. Thus, the masonry of the building is compatible with an early dating of the Great House. If the Great House was built in 1093, then the Style II masonry might suggest "emulation;" that is, construction by locals who didn't really "get it" (Cameron REFS). However, the East Kiva is a perfect example of a Chaco kiva; and that, for me, is highly significant (Lekson REFS). I believe that Chimney Rock may very well have been constructed, at least in part, in the early 11th century, and re-roofed a final time in 1093.

Pueblo Alto, Far View House, and Chimney Rock

Pueblo Alto, Far View House, and Chimney Rock form an interesting triangle. Far View and Chimney Rock are both about 150 km from Pueblo Alto, and about 100 km from each other. All three are conspicuously up high: Pueblo Alto atop North Mesa at Chaco, Far View near the uppermost edge of Mesa Verde, and Chimney Rock on a spectacular ridge setting. All three command sweeping views.

Why was Pueblo Alto built where it was? In part, almost certainly, because the spot marked the north end of a highly significant north-south alignment defining Chaco's basic

urban structure (Fritz REFS; Lekson 1999; Van Dyke REFS). That spot had been marked, a short time before construction of the Great House, by a small but substantial structure, Rooms 50 and 51 directly under the very center of the later building. It is possible that the 1004v date, which came from a room subsequently built almost atop the older 50-51 building, was purposefully reused from the earlier structure; but the 1004v date is also consistent with the Red Mesa ceramic assemblage associated with the huge building we today call Pueblo Alto (Windes REFS). In addition to defining the north end of the central meridian of Chaco Canyon, Alto's position atop North Mesa gave it a stunning field of view, especially to the north, where Huerfano Butte dominates the northern skyline. (Long distance vistas reach the Sandia Mountains to the southeast, a broad arc to the north, and the crest of the Chuska Mountains to the west EXPAND.) Alto's view to the south was blocked by the south rim of South Mesa. It is reasonable to conclude that Alto's location was selected in part for its viewshed to the east, north and west—but not to the south.

Conversely, why were Far View and Chimney Rock built where they were? Far View House was the largest (perhaps not the only) Chacoan Great House on what is today Mesa Verde National Park. Its location is puzzling, on the narrow neck of a mesa, with very limited watershed and arable areas. Indeed, most settlements of 975-1075 (Mancos Phase—the early Chaco era) were down in valleys, near reliable water and good farmlands (specifically in Morefield and Prater Canyons), not high atop mesas—although mesa-top settlements were by no means unknown (Smith 1987:Fig. 32). Far View was aptly named [and early: who gave it its name???]. No analysis has been done of its full viewshed, but it surely covered most of the San Juan Basin, from the Chuska Mountains on the west to the HD Mountains on the east (NOT SURE ABOUT THIS). From Far View, both Huerfano Butte [for sure] and Pueblo Alto [almost certainly] were visible. [One GIS says "yes", one says "no but almost"]

As described above, Chimney Rock is in the most spectacular of setting of the three sites—indeed, in one of the most spectacular settings of any site in the Four Corners. High atop a knife-edge ridge, Chimney Rock's field of view was in fact rather circumscribed: surrounded by taller mountains, its most notable long-distance vista was straight down the Piedra River Valley, where presumably deliberate placement of the Chimney Rock Great House allowed a limited but precise view of Huerfano Butte (REFS).

I believe that Far View House was built high up on Mesa Verde [surely near the elevation limits of major settlement???] to see Huerfano and Pueblo Alto. I am reasonably confident that Chimney Rock Great House was built at that specific location in large part to see Huerfano (as well as proximity to the neighboring sandstone pinnacles, Chimney and Companion Rocks, with their astronomical implications). And I believe that Pueblo Alto was built atop North Mesa in large part to be see Huerfano (and less certainly Far View House), the key "repeater" station in the line of site communication system. I believe that these three Great Houses, or earlier versions of these three buildings, were in place by the early 1020s (Figure 6).

While most Great House construction north of the San Juan River dated to 1075 or later (Cameron REFS), it seems possible that construction at Far View and Chimney Rock (and Pueblo Alto) began as early as 1004v or 1011 or 1018—or that structures worth remembering and commemorating were built at those locations at those times. The significance of those specific dates I leave to archaeo-astronomers; my interest is in the possibility that Chaco's regional expansion began in the early 11th century--into an area that was largely depopulated (REFS). The geography of Chaco's region may have had as much to do with cosmology as with population densities and economics—although these, too, were ultimately the chief factors defining the Chacoan region.



Figure 1. Locations of Chimney Rock, Pueblo Alto (above Chaco Canyon), Far View (at Mesa Verde), and Huerfano Butte.

Figure 3. CHIMNEY ROCK COMMUNITY (5AA86, 5AA88, 5AA92)

DATES (N= vv; N = single v; N = cutting)

78 2

87 2
88 3
89 8

98 1 2
99 4
100 3
101
102 1
103 0 3
104 0 2 5
105 1 1 6 7 7 7
106 0 7 8
107 0 2 2 3 3 3 4 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 8 8
108 0 3 4 7

CUTTING AND SINGLE V DATES

1003v
1051v
1070v
1077

Figure 4. PUEBLO ALTO ROOMBLOCK & TRASH MOUND CONSTRUCTION

DATES (N= vv; N = single v; **N** = cutting)

90
91 1
92
93 5
94 9
95
96 6
97
98
99
100 4
101 6
102 **1**
103
104 **3, 4, 5!***

*over 35 1053, 1044 and 1045 cutting dates, represent one or more burned roofs in trash mound

CUTTING AND SINGLE V DATES

1004v
1021
1044, 1045

Figure 5. **FAR VIEW HOUSE** (Robinson and Harrill 1974:59-60)
DATES (N= vv; N = single v; **N** = cutting)

67 1

 77 2

 80 9

 87 3
 88 6 7
 89 **0** 7
 90 5
 91
 92
 93 2 3
 94 3 8
 95 8
 960
 97 4 8
 98 4 8 8
 99 6 9
 100 4 4 7 8
 101 0 3 5 7 **8 8**
 102 1 1 1 2 3
 103 0 8 8
 104 0 0 3 2 4 8 **9**
 105 4 6 **9 9 9 9 9**
 106 4 5 9
 107 8
 108 4
 109
 110 7
 111 7
 112 0 0
 113
 114
 115
 116 3 5
 117
 118 0
 119
 120 6
 121
 122 1 6
 123 9 9 9
 124 2 3 **3 3 3**

CUTTING OR NEAR CUTTING

890 (Kiva C*)

932v (Miscellaneous)

1018, 1018 (Room 33)

1049 (Room 33)

1059, 1059, 1059, 1059, 1059 (Room 33)

1069v (Room 32)

1243, 1243, 1243 (Kiva C*)

