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SMALL WHITE DISC BEADS OF THE NORTHERN RIO GRANDE REGION, NEW MEXICO

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Submitted by
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ABSTRACT

The temporal distribution and the material of small white disc beads from the Northern Rio Grande region have not been previously examined. This research concludes that small white disc beads made of travertine can be common on Northern Rio Grande Coalition period sites and are scarce on Classic Period sites. The travertine beads were apparently not made at the sites where they were abundant, but appear to have come from one area near San Ysidro.

TABLE OF CONTENTS

Figures

Tables

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INTRODUCTION

The small white disc beads found occasionally on archaeological sites in the Northern Rio Grande region have generally received only cursory attention in archaeological reports. This study and systematic laboratory analysis examines the occurrence of beads on sites in the Northern Rio Grande area (Fig. 1; Tables 1, 3). Research indicates the beads are more numerous than previously suspected, and are found primarily on sites dating to the Rio Grande Coalition period. Most beads are travertine, a locally available material in the Rio Puerco area.

While examining surface material on Northern Rio Grande sites, I noticed that small white disc beads were plentiful on anthills on some Coalition period sites but appeared scarce on Classic period sites. Using criteria devised by Mathien (1984a) to differentiate travertine and shell (a material that might be confused with travertine), I found that most beads appeared to be travertine, whereas very few were shell. (See Table 1 for the results of this preliminary survey, including three bead-making sites visited later.)

A review of the literature indicates that white stone beads were common in the San Juan Basin (Hewett 1936:89-92; Mathien 1987:389-391, 393-394, table 6.2, 1988:249-251, 253-258; McNeil 1986:143-145; Windes 1990 ornament tables). This study also shows these beads to be common in the Rio Grande area. White disc beads were mentioned in reports from 14 Northern Rio Grande locations, but there was no agreement about the identification of the bead material, and the discussions did not note the apparent Coalition period association of most beads (Table 2). (Three of the reported sites--Paako, Te'ewi, and the San Ysidro area Cañada de las Milpas sites--are described in Table 1 showing travertine bead occurrences). At the Laboratory of Anthropology, collections were examined from the Northern Rio Grande sites of Paako, Pindi, and Pueblo Alamo to confirm the material identifications. All of these beads turned out to be stone (travertine), and it is likely that other beads reported in Table 2 are stone also. (A further review of museum collections might be valuable to identify the material of beads incorrectly identified.)

Six sites were chosen (Table 3) for a detailed study and comparison with beads found in museum collections and those reported in the literature. I found bead-making debris only on the two small Cañada de las Milpas sites in the drainages southwest of San Ysidro, suggesting that this area may be the source of the beads. Bice and Sundt (1976), Sundt (1978), and Sundt et al. (1983) provide information about these and neighboring bead sites.

The temporal classification of Coalition and Classic period sites was primarily based on ceramic associations, and relevant ceramic types are reviewed here. Table 4 presents the chronology and classification system and Table 5 the ceramic dating. The Coalition period sites are recognized by the presence of carbon-painted Santa Fe Black-on-white, which replaced the

Table 1. Preliminary Site Survey: Small White Disc Bead Occurrences

Site and Reference	Location	Size	Anthills	Visits	Small White Disc Beads[1]	Bead-Making Debris
LA 835 (Developmental) Stubbs 1954:43-45 Wiseman and Olinger 1991:209-217	Cuyamungue River	12-15 small mounds, great kiva	20+, 3 mounds	2	2 trav.	None
LA 10 group (Developmental/Coalition) NMCRIS	Lamy vicinity	~4 mounds, small pueblo	Less than 50	3	None	None
LA 27 group (Developmental/Coalition) NMCRIS	Lamy vicinity	~7 mounds, small pueblo	~50	7	9 trav.	None
LA 3333 (Coalition) NMCRIS; Ware 1989	Galisteo Basin	12 mounds, small pueblo	100-200	15	169 trav., 2 shell	None
Tsiping LA 301 (Late Coalition) Dougherty 1980 Beal 1987:37-40	Chama River drainage	400+ ground floor rooms	~25	1	None	None
Palisade LA 3505 (Late Coalition) Peckham 1981:113-147 Beal 1987:42-44	Chama River	48 rooms	~20	1	None	None
Colina Verde or Piedra Lumbre LA 309 (Coalition and early Classic) Lang 1977:389-392	Galisteo Basin	~5 mounds, pueblo of ~150 gr. floor rooms	~25	7	8 trav. from mounds	None
Largo LA 183 (Late Coalition/Classic) Nelson 1914:68-73 Dutton 1953:339-351	Galisteo Basin	489 ground floor rooms	~25	6	1 trav. off site	None
Ponsipa LA 297 (Coalition/Classic) Buge 1978, 1979 Beal 1987:84, 86-88	Ojo Caliente River	900+ ground floor rooms	200+	12	64 trav.	None
Tsama LA 908-909 (Coalition/Classic) Beal 1987:56-59 Greenlee n.d.; NMCRIS	Chama River	~1000 ground floor rooms	~300	15	129 trav., 1 possible shell	None
She LA 239 (Late Coalition/Classic) Nelson 1914:80-84	Galisteo Basin	1543 ground floor rooms	~200+	120+	8 trav.	None
Paako LA 162 (Late Coalition/Classic) Lambert 1954	San Pedro Creek	Large pueblo	~100	4	8 trav.	None

Site and Reference	Location	Size	Anthills	Visits	Small White Disc Beads[1]	Bead-Making Debris
Te'ewi LA 252 (Coalition/Classic transition/Classic) Hewett 1906:34 Wendorf 1953 Beal 1987:63-66, 106	Chama River drainage	500+ ground floor rooms	~50	11	1 trav. off site	None
San Marcos LA 98 (Classic) Reed 1954:323-343 Creamer and Haas 1988:26-27	Galisteo Basin	2000 ground floor rooms	~50	5	None	None
Sapawe LA 306 (Classic) Hewett 1906:40-41 Beal 1987:89, 92-95 Creamer and Haas 1988:28	El Rito Creek	1000 ground floor rooms (Beal); 1800 (Creamer and Haas)	200+	11	2 trav.	None
Cerro Colorado or Pony Pauken LA 307 (Classic) Beal 1987:89-91	El Rito Creek	350 ground floor rooms	<50	2	2 trav. (assoc. with Wiyo B/w)	None
Howiri LA 71 (Classic) Beal 1987:76-79 Fallon and Wening 1987	Ojo Caliente River	~1739 rooms	<50 part of site	4	None	None
Poshu LA 274 (Classic) Hewett 1906:34-36 Jeancon 1923 Beal 1987:52, 54-56	Chama River	700+ ground floor rooms	~150	20	11 trav., 1 shell	None
Blanco LA 40 (Classic) Nelson 1914:85-94	Galisteo Basin	1450 ground floor rooms	100-200	9	1 trav.	None
Ku LA 253 (Classic) Hewett 1906:33-34 Beal 1987:64, 67-69	Chama River drainage	300+ ground floor rooms	<25	8	2 trav.	None
Colorado LA 62 (Coalition/Classic transition/Classic) Nelson 1914:74-79	Arroyo La Jara	881 rooms	100+	2	2 trav.	None
Pose LA 632 (Classic) Hewett 1906:38-39 Beal 1987:73-76	Ojo Caliente River	600-700 ground floor rooms	<200	4	None	None
San Cristobal LA 80 (Classic) Nelson 1914:41-67 Lang 1977	Galisteo Basin	1645 rooms	200+	40	~22 trav., several shell (1980-1985)	None
LA 21427-21431 cluster (Coalition) Preucel 1987:13, 24, 26 Janet Orcutt, pers. comm. 1990	Pajarito Plateau, Garcia Mesa[2]	Small mounds	~20	1	None	None

Site and Reference	Location	Size	Anthills	Visits	Small White Disc Beads[1]	Bead-Making Debris
LA 12700s cluster (Coalition) Pruecel 1987:13, 24, 26 Janet Orcutt, pers. comm. 1991	Pajarito Plateau Guaje Mesa[3]	~6 pueblos small, medium	5	1	None	None
LA 1309 (Coalition) NMCRIS	Lamy vicinity	5 mounds	~20	2	2 trav.	None
Site near Masanares LA 10607 (Coalition) Steen 1980:129-189	Lamy vicinity	Small mound	3	1	2 trav.	None
Burnt Corn LA 359 (Late Coalition) NMCRIS	Galisteo Basin	Medium pueblo	25	1	2 trav.	None
LA 13197 (Coalition) NMCRIS; Bice and Sundt 1976 Sundt et al. 1983:5	Cañada de las Milpas/San Ysidro area	45-50 rooms	15	1	6 trav.	Plentiful on all anthills, raw material
LA 44006 (Coalition) NMCRIS	Cañada de las Milpas/San Ysidro	2-3 rooms	2	1	5 trav.	Plentiful on anthills, raw material
Guadalupe LA 2757 (Chaco outlier A.D. 1000-1250, 6 assoc. mounds) Pippin 1987	Rio Puerco		~5 Guad., 50+ mounds	1	5 trav. Guad. 6 trav. mounds	Present on Guad.; plentiful on anthill mounds, raw material mounds

[1] My identification
[2] New Mexico Cultural Resources Information System
[3] I found no reported white disc beads from the Pajarito Plateau (see Table 3). Snow (1974:68) suggested distinct differences between the Plateau and the Rio Grande Valley in the Coalition period. Stuart and Gauthier noted "isolation in trade patterns" perhaps "characteristic of the early Santa Fe B/w sites in the Pajarito Plateau" (Stuart and Gauthier 1981:419), and they suggested that "Santa Fe B/w sites of the upper Pajarito Plateau . . . were abandoned no later than A.D. 1275 to 1290" (Stuart and Gauthier 1981:54).

Table 2. White Disc Bead Information from Northern Rio Grande Sites

REFERENCE	SITE	WHITE BEAD IDENTIFICATION
Allen 1973:10	Pueblo Alamo LA 8 Coalition	Necklace[1] (burial)
Barnett 1969:98-99, 1973:11, 28	Tonque LA 240 Classic, LA 12261 Early Classic	3 beads shale or slate,[2] 2 beads shale[2]
Bice and Sundt 1972:95-97	Prieta Vista LA 9608 Coalition	16 beads, blanks & unfinished beads calcareous stone[2]
Jernigan 1978:155-156	Northern Rio Grande Anasazi sites	Stone or alabaster[2]
Kidder 1958:26-27, 1932:184, 185, fig. 159	Forked Lightning LA 672 Coalition Pecos LA 625 Classic	Over 5300 beads shell[2] (burials), 2 short strands shell[2] (burials)
Lambert 1954:133, plate 36, 160	Paako LA 162 Late Coalition/Classic	A few beads possibly limestone; 19 beads shell illus.; necklace in collections labeled shell, relabeled stone[1]
Lang 1989:115, 117	Agua Fria LA 2 Coalition	8 beads travertine
Lange 1941:57	Evans LA 12378 Gallina area A.D. 1200s	7 beads shell[2]
Seaman 1976:99	LA 11843 Gallina area A.D. 1200s	1 bead fragment rhyolite tuff[4]
Stubbs and Stallings 1953:138-139, plate 36	Pindi LA 1 Coalition	20 beads illus., 27 beads text, shell[1]
Sundt et al. 1983:104-105	Cañada de las Milpas LA 44002-44027 Transitional Dev./Coalition/Coalition	33 beads from 7 of the sites, stone[2]
Venn 1984:232-233	Arroyo Hondo LA 12 Late Coalition	6 beads shell
Wendorf 1953:87, plate 33	Teewi LA 252 Late Coalition/Classic	1 bead shell[2]
Wilmeth 1956:166-167	Cuyamungue LA 38, 168 Classic	Several beads, 1 strand shell
Wiseman and Darling 1986:122, fig. 12	Bronze Trail sites LA 53452-53457	1 bead calcite

[1] A check of Museum collections showed these beads to be travertine.
[2] Not available for subsequent identification
[3] $CaCO_3$
[4] White stone (Richard Bice, pers. comm. 1989)

Table 3. The Six Detailed Study Sites

Site and Reference	Location	Size	Site Disturbance
LA 3333 Coalition[1] NMCRIS; Ware 1989	Galisteo Basin	12 small to medium mounds, pueblo of about 50 rooms[2]	Parts of 3 mounds destroyed by ranch road
La Cienega LA 3 Coalition Nelson 1915 Dickson 1979:53-54, 87, 100	Santa Fe River	about 140 rooms	Large trash area bulldozed and dirt partly removed; a few small pot hunter's pits present
Ponsipa LA 297 Coalition/Classic Buge 1978;1979 Beal 1987:84, 86-88	Ojo Caliente River	about 900 ground floor rooms	Excavation pits; pot hunter's pits, some large, in rooms & trash areas in much of Classic part
Tsama LA 908-909 Coalition/Classic Greenlee n.d.; NMCRIS Beal 1987:56-59	Chama River & El Rito Creek	about 1000 ground floor rooms	Excavation pits; pot hunter's pits in possibly 50% of Classic East Plaza (LA 908)
Pose LA 632 Classic Hewett 1906:38-39 Beal 1987:73-76	Ojo Caliente River	600-700 ground floor rooms	Excavation and pot hunter's pits in rooms & trash areas
Poshu LA 274 Classic Jeancon 1923 Beal 1987:52, 54-56	Chama River	700+ ground floor rooms	Excavation and pot hunter's pits in rooms

[1] Near the site are two Developmental period pithouses associated with Red Mesa Black-on-white style mineral-painted sherds, and some of these sherds are also on Mound A (Fig. 2).
[2] My estimate.

Table 4. Northern Rio Grande Chronological Classification

Period	Dates (Wendorf and Reed 1955:138-154)	Revised Dates (Peckham 1984:276)
Developmental	A.D.600 to 1200	A.D. 400-600 to 1150-1200
Coalition	A.D. 1200 to 1325	A.D. 1150-1200 to 1325
Classic	A.D. 1325 to 1600	A.D. 1325 to 1600

Table 5. Ceramic Dating

Type	Dates A.D.	References
COALITION PERIOD CERAMICS		
Santa Fe Black-on-white[1]	1175-1300	Warren 1977a:99; Traylor 1982:455; Traylor and Scaife 1982:242-245; Sundt 1987:140
St. Johns Polychrome	1175-1300	Carlson 1970:31-41
Chupadero Black-on-white[2]	1150-1400	Shelley 1991
Wiyo Black-on-white	1250-1400	Traylor and Scaife 1982:242, 245
Galisteo Black-on-white[3]	1250-1400	Traylor and Scaife 1982:242, 245-246
CLASSIC PERIOD CERAMICS		
Biscuit Wares: Biscuit A (Abiquiu Black-on-Gray) Biscuit B (Bandelier Black-on-Gray	 1350-1450 1425-1550	Warren 1977a:99; Traylor and Scaife 1982:242
Glaze Wares: Glaze A/Red (Agua Fria Glaze-on-red) Glaze A/Yellow (Cieneguilla Glaze-on-yellow) Later Glaze Wares	 1315-1425 1325-1425 1425-1600	Warren 1977a:99; 1979:189-193; Traylor and Scaife 1982:242, 246-247

[1] Traylor and Scaife (1982:443) and Peckham (1984:279) suggested Santa Fe Black-on-white was present as early as A.D. 1150.
[2] Dickson (1979:119-120) suggested trade dates to the Coalition period Pueblo Alamo (LA 8) A.D. 1250-1300. The upper date for this type may be mid to late fifteenth century A.D. (Regge Wiseman, pers. comm. 1993). The sites used by Shelley are LA 37452, LA 69102, and LA 84319.
[3] Warren (1977a:99) suggested an A.D. 1350 date for the upper range for this ceramic type.

mineral-painted black-on-white types of the Developmental period sites (Wendorf and Reed 1955:143; Peckham 1984:279). This dominant Coalition type was present throughout the Northern Rio Grande region (Mera 1935, map 2; Traylor 1982:445) where it frequently occurred with the trade wares St. Johns Polychrome and Chupadero Black-on-white on sites in the Santa Fe area and southward. (Chupadero Black-on-white was not present on any Classic sites that I examined during this study, and it appears to have been traded to the southern part of the Northern Rio Grande region only during the Coalition period.)

In later Coalition sites (A.D. 1250-1300), Santa Fe Black-on-white was associated with carbon-painted Wiyo Black-on-white and Galisteo Black-on-white. Both of these types continued to be produced into the Classic period, as well as some Santa Fe Black-on-white that dated to the middle 1300s (Traylor 1982:458), or until A.D. 1425 (Lang 1977:388).

The Classic period is identified by carbon-painted biscuit wares on sites in the north, and by glaze-painted wares on sites in the south (Mera 1934:3). These two Classic period wares were commonly traded back and forth (Warren 1979:190). For pottery descriptions and discussion see Table 5; Mera (1935:11-18); Sudar-Murphy et al. (1977:19-25); Warren (1977b:364-368); and Warren and Snow (1978:C1-C34).

METHODS FOR DETAILED INVESTIGATIONS

Site Selection

The preliminary observations provided a strong but inconclusive case for the abundance of white travertine disc beads on Coalition rather than Classic period sites. Also, preliminary observations, which suggested that Classic period sites with accompanying Coalition components had a larger number of beads on the surface than single component Classic sites, needed further investigation. Two of the six sites chosen for detailed study are on private land and four are on federal land. Permission was obtained to make a total bead collection from anthills. The sites include two Coalition-Classic period sites, Tsama (LA 908-909) and Ponsipa Akeri (LA 297); two pure Coalition period sites, La Cienega (LA 3) and LA 3333; and two pure Classic period sites, Poshu-ouinge (LA 274) and Pose-ouinge (LA 632) (Table 3). The sites were chosen for accessibility and for high sherd and anthill density.

Field Techniques

Beads are not commonly retrieved by excavation except from burials or caches. Many early excavators did not screen deposits, and screening information is not included in many texts. The ¼-inch screen commonly employed today allows small disc beads to pass through the mesh, perhaps accounting for the small number of beads recovered from some Northern Rio Grande site excavations. Windes (1987:605) noted that many beads probably passed through ¼-inch screen mesh, and that:

> . . . black and white stone beads (unlike those of turquoise) were probably poorly represented in almost all collections simply because their size and color make them difficult to see. They are also smaller than the ¼ in. screen mesh. (Windes 1987:567)

When beads are present on a site, ant activity can be relied on to expose large numbers of beads if they are present and to reveal a lack of beads if they are scarce. Kidder (1932:185) indicated that small shell disc beads were probably common on Pecos Pueblo ruin as many single beads were collected from anthills as well as from trash areas after rains. Morris noted the paucity of beads and ornaments from excavations on La Plata sites:

> While the dearth of such objects in graves and buildings is not conclusive proof of the original scarcity of [ornaments] . . . evidence provided by ant heaps may be considered final. Whether or not it was the practice to bury beads with the dead, a good many unavoidably were lost from broken strands and, with sweepings from dwellings or yard,

> found their way into the rubbish heaps. . . . From [them] ants select great numbers of objects . . . to augment the mounds of small gravel with which they surround the apertures to their habitations; hence they are veritable bead collectors. (Morris 1939:141)

Windes studied ant habits and how they affect the cultural record on sites in the Chaco area. He observed:

> There is little question that turquoise and other cultural material has [sic] been mined and collected by ants because similar cultural material has been found scattered throughout and deep within the prehistoric sites. *P. rugosus* (dark or black ants) build irregular or flat mounds that are often densely covered by small gravels. . . . It is *P. rugosus* that generally retrieves so much cultural material from across and within the sites . . . probably a mixture of both subsurface and surface materials. . . . In conclusion, ant nests can be informative of certain cultural material found within sites without recourse to excavation. (Windes 1990, appendix B)

Windes noted that 200 anthills could contain 180,000 foragers (1990, appendix B). The foraging distances vary as ants move halfway to the nearest hill (Thomas Windes, pers. comm. 1989). Although galleries can reach a depth of 3 m, at one site in Chaco Canyon, Windes found that ant galleries in one room went down into the hard floor 93 cm below the surface. However far they might go down, the galleries do not spread outside the area protected by the ant's gravel shield. On study sites in the Northern Rio Grande region, ants augmented the shield with gravels (and beads) brought from underground, not from foraging activities as observed by Windes and Morris.

Based on information about ant behavior (Windes 1990), the sample units for the detailed bead study were hills of the harvester ant, *Pogonomyrmex rugosos*. Each site had from 150 to 300 hills scattered over all features. Included in the hill count are deserted and silted hills, which also are possible bead sources. The hills were usually 6 to 15 m apart, with diameters of 20 cm to 1 m, except for a very new hills that were only a few centimeters wide.

I collected beads from anthills for most of one season during warm months between April and November. At LA 3333, I made collections in March, August, September, and October in several different years. Because many people who frequent archaeological sites know beads can be found in anthills, the threat of bead looting influenced how I collected beads. La Cienega, LA 3333, Ponsipa, and Tsama were known as sites with beads to local collectors, and visitors to the most frequented sites, Ponsipa and Tsama, left behind many disturbed or destroyed anthills. Less disturbance was noted on little-known La Cienega, and none on LA 3333. The two pure Classic sites, Pose and Poshu, where I rarely found beads, had negligible anthill disturbance.

I made weekly visits to the two study sites with scarce beads, Pose and Poshu. The three study sites with beads, La Cienega, Ponsipa, and Tsama, I saw biweekly, and the fourth site with beads, LA 3333, on consecutive days to collect beads otherwise available to bead hunters and to casual visitors. I could see almost the same number of hills once a week on the sites with few beads as I could see twice a week on sites with large bead occurrences, where I spent additional time recording each collected bead. Because I could not see every hill during the usual three to four-hour visit, I monitored hills in rotation, always checking the known bead hills, usually located on trash areas and room-block edges.

Although ants deposited beads on hill surfaces, I found most beads buried in the hill gravels. Newly exposed beads were often covered by silt, displaced by rain. They were often pushed into the gravel shield by livestock on Tsama and occasionally on La Cienega. On all six sites I moved anthill gravels with a straight edge to turn up hidden beads, and also to verify a lack of beads. Because the smooth beads slide easily out of sight, constant hill checking is necessary to find them. Only a small number of beads I recovered from the site surfaces were away from anthills.

Field notes, bead tags, descriptive anthill cards, and bead logs all identified each bead; these records listed site and anthill numbers, feature designations, dates of collection, and each bead's unique number. Locations of beads found in areas other than anthills were recorded in the same manner as anthills. Site feature designations were copied from existing site plans. (See Table 3 references and Mera's site plans in Beal 1987). The plan for LA 3333 was made from an aerial photograph taken by the New Mexico State Highway and Transportation Department and a field map. The locations of all anthills with and without beads were plotted onto the site maps; the number of beads from each anthill was noted (Figs. 2-7).

Dating was based on ceramic association. Beads from the four single component sites (LA 3333, La Cienega, Pose, and Poshu) were clearly either Coalition or Classic period beads. Beads from the Coalition-Classic period sites, Tsama and Ponsipa, found on anthills in association with Santa Fe Black-on-white, Wiyo Black-on-white, Santa Fe-Wiyo transition, and intrusive St. Johns Polychrome, I assigned to the Coalition period. Beads occurring where these types were absent I tentatively assigned to the Classic period. Although Classic period biscuit sherds were everywhere on these sites, I identified the Coalition components by the presence of numerous sherds of Santa Fe Black-on-white and the accompanying Coalition types. These occurred only in discrete areas, often surfacing from slope and room-block erosion, and from site disturbances such as pot hunter's excavations and rodent activity in trash areas. The Classic components were identified by the absence or near absence of these sherds. Figures 4 and 5 indicate the Coalition pottery occurrences.

Laboratory Analysis

The beads from the six study sites and the beads and bead-making debris from the two San Ysidro sites were examined microscopically. Each bead's diameter, thickness, and perforation to the nearest ¼ mm was recorded, and the condition and material of each bead was noted using Mathien's criteria (1984a) to differentiate stone from shell beads. Tables 6 and 7 present the size range of the beads.

Although shell and travertine are both calcium carbonate ($CaCO_3$), shell growth lines are distinctly different from the bedding lines of travertine when seen microscopically (Mathien 1984a:106-111). The shell beads appear generally whiter, shinier, and of a finer grain than the travertine beads, and shell beads have fewer pits often associated with travertine. Shell growth lines, however, are not always present and "are only found when growth lines were crossed at the proper angles" (Mathien 1984a:111) during bead manufacture. Lacking these lines, shell can be identified by its very polished and shiny appearance. All travertine beads are made from layered stone. Barker describes travertine as "a banded limestone deposited at or near the surface by ground water. . . . Bedded limestone is the primary source rock for the carbonate-charged

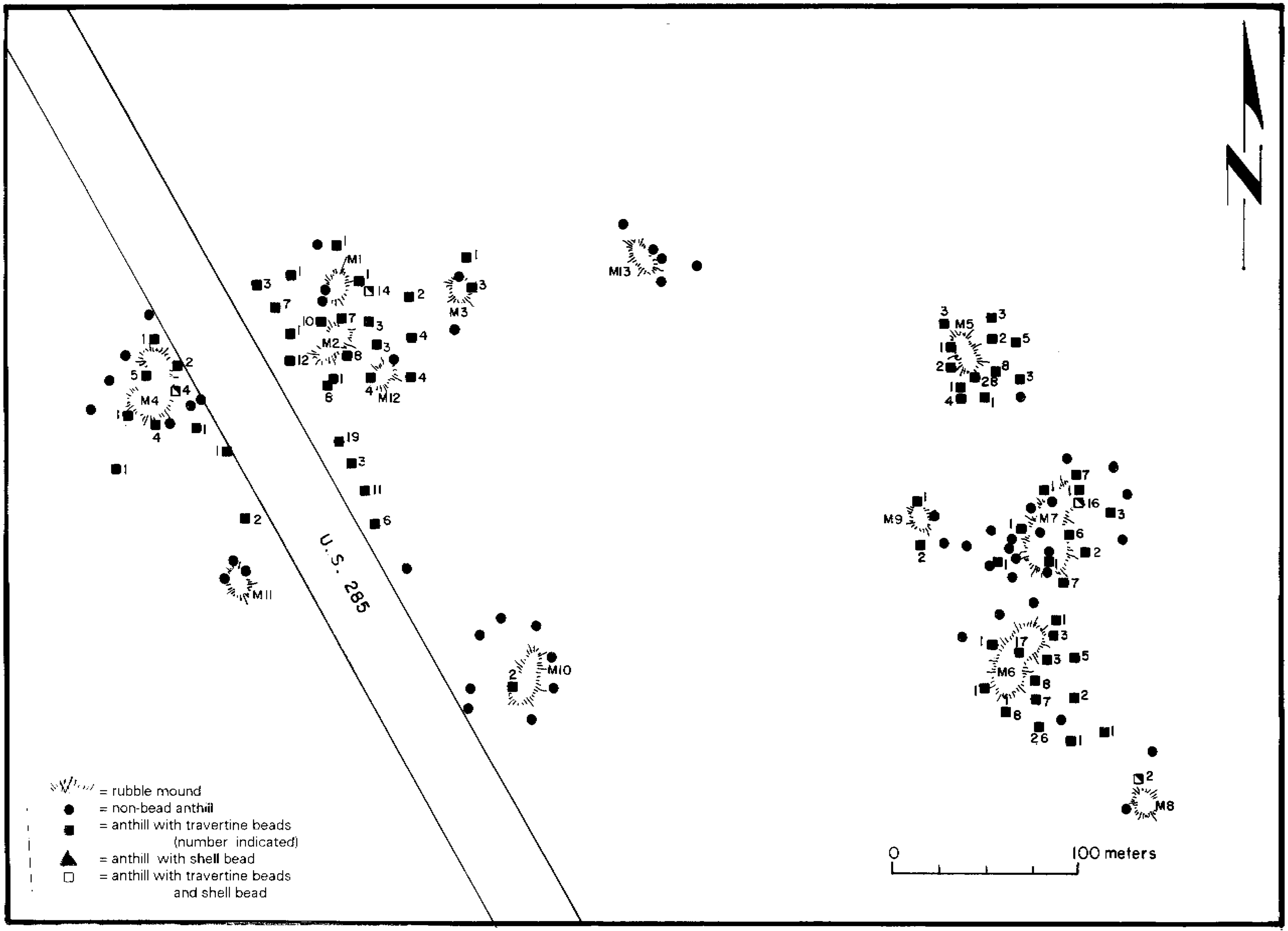

Figure 2. Site map, LA 3333, and bead locations.

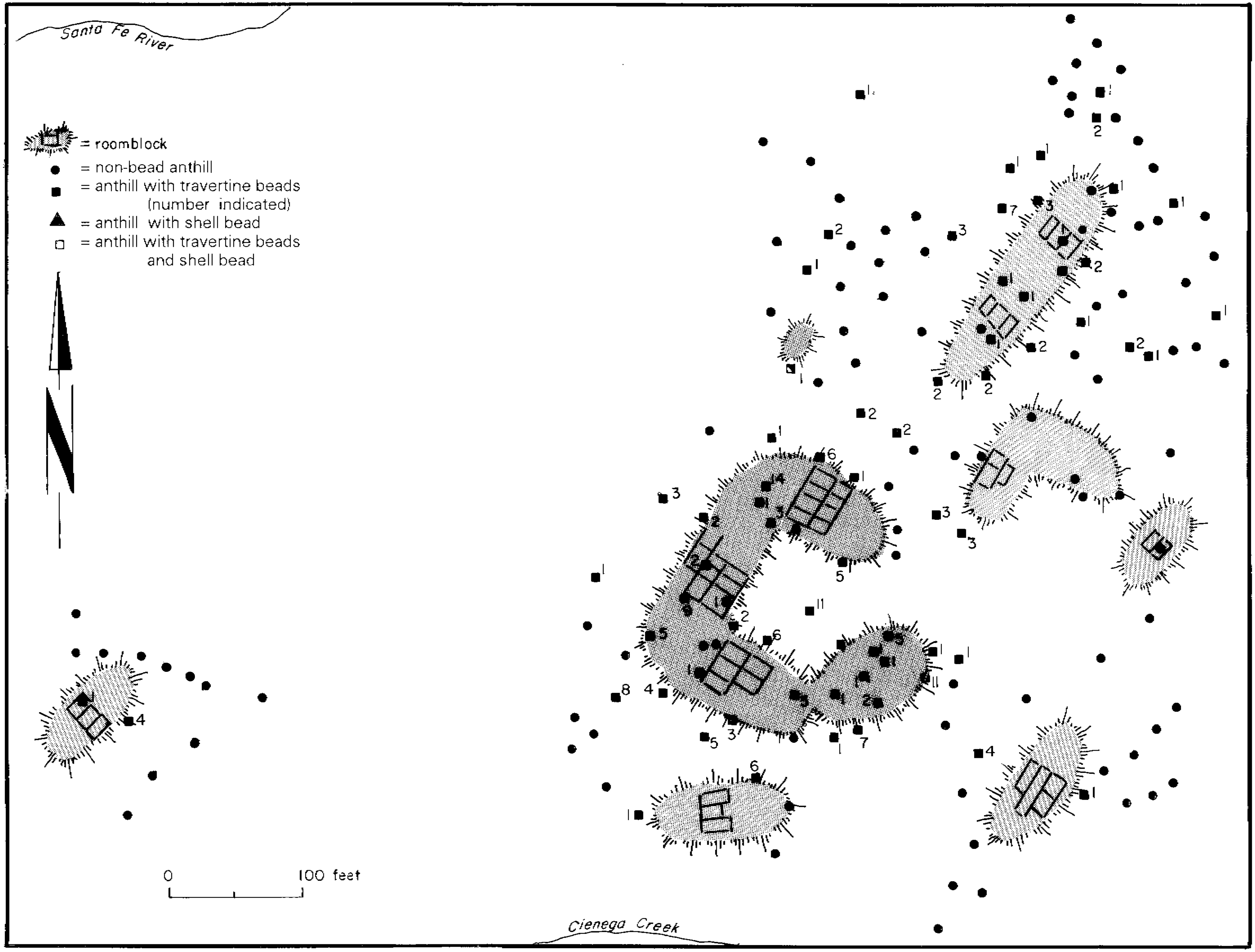

Figure 3. Site map, La Cienega LA 3, and bead locations.

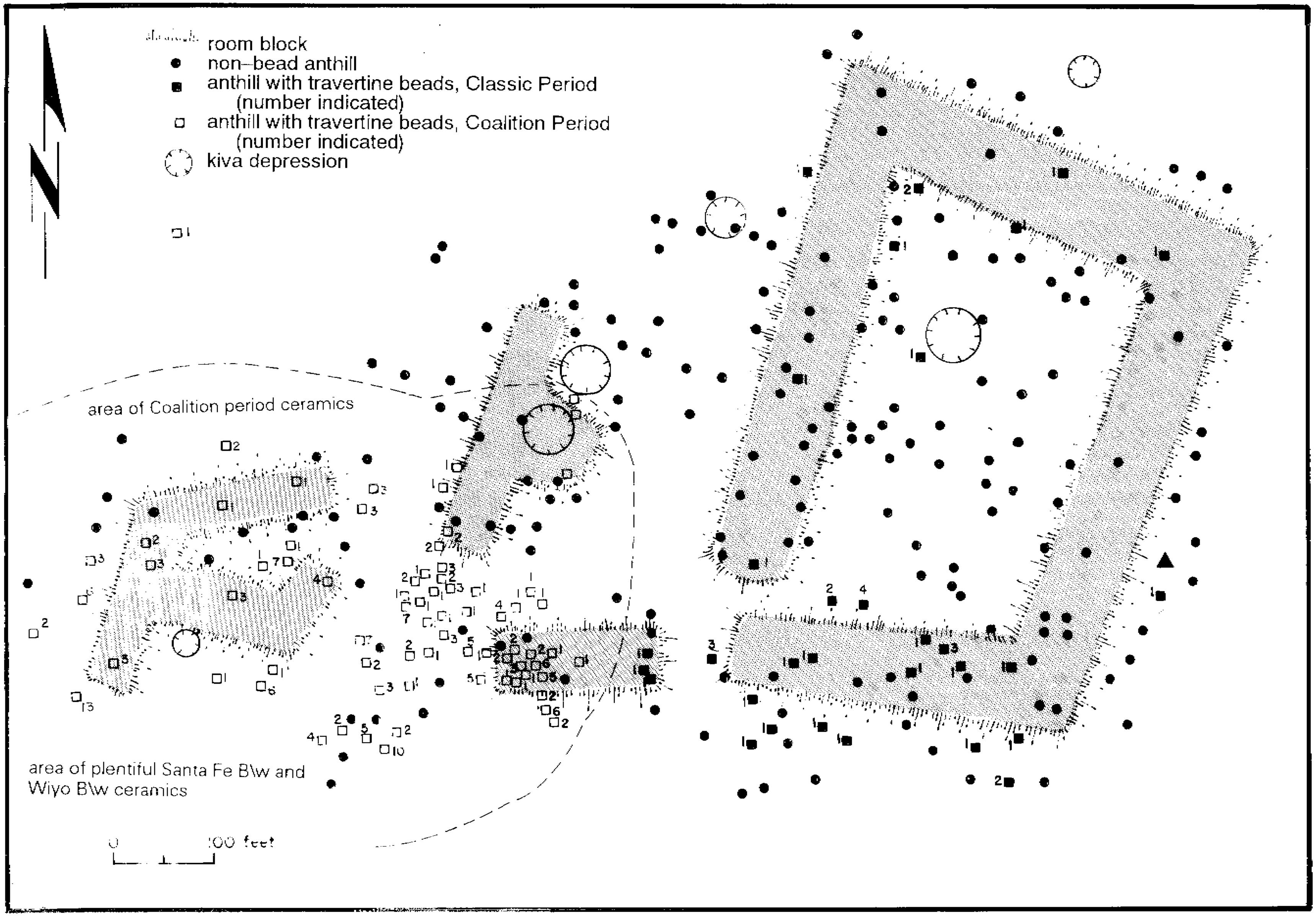

Figure 4. Site map, Tsama LA 908-909, and bead locations.

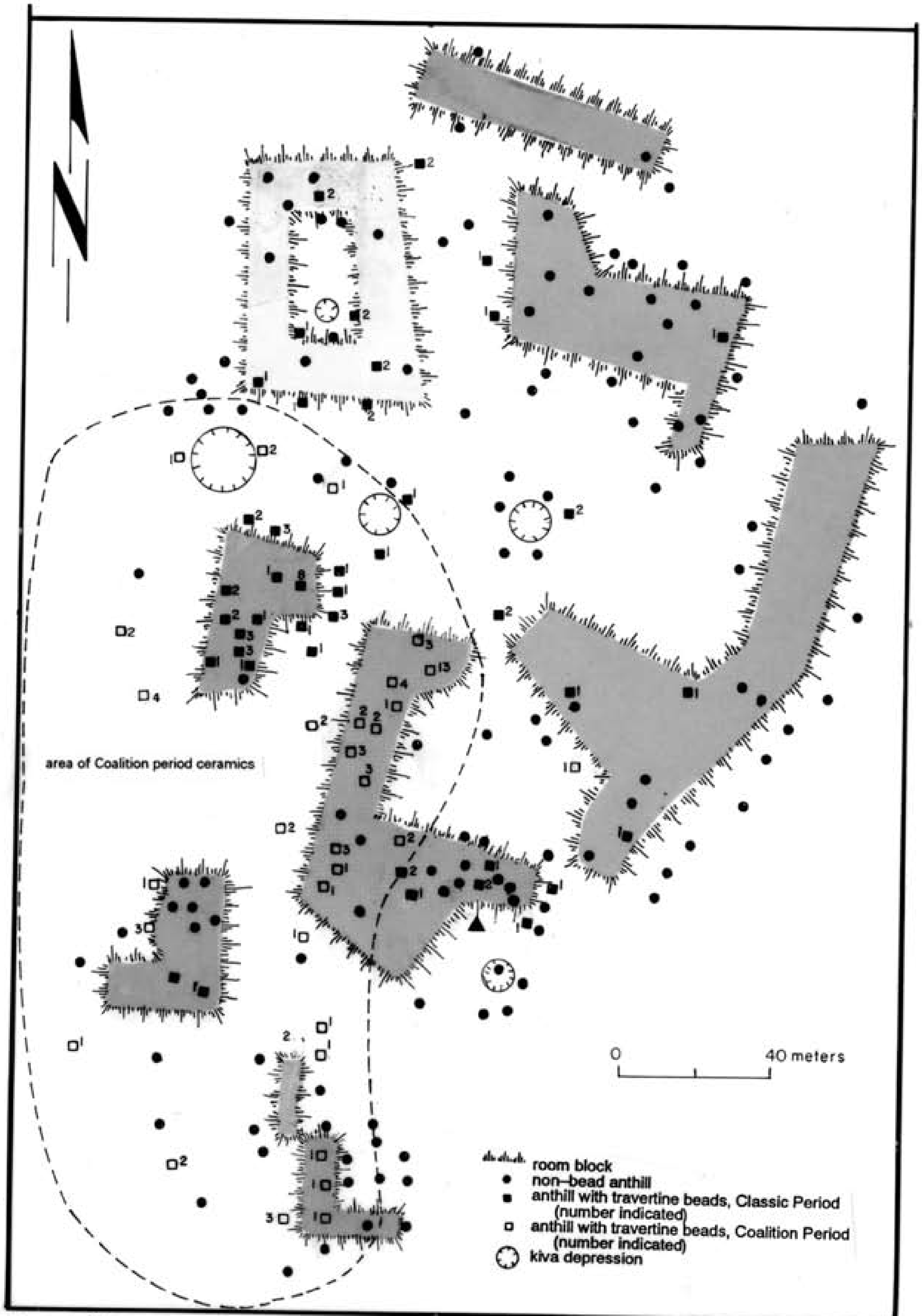

Figure 5. Site map, Ponsipa Akeri (Ponsipa) LA 297, and bead locations.

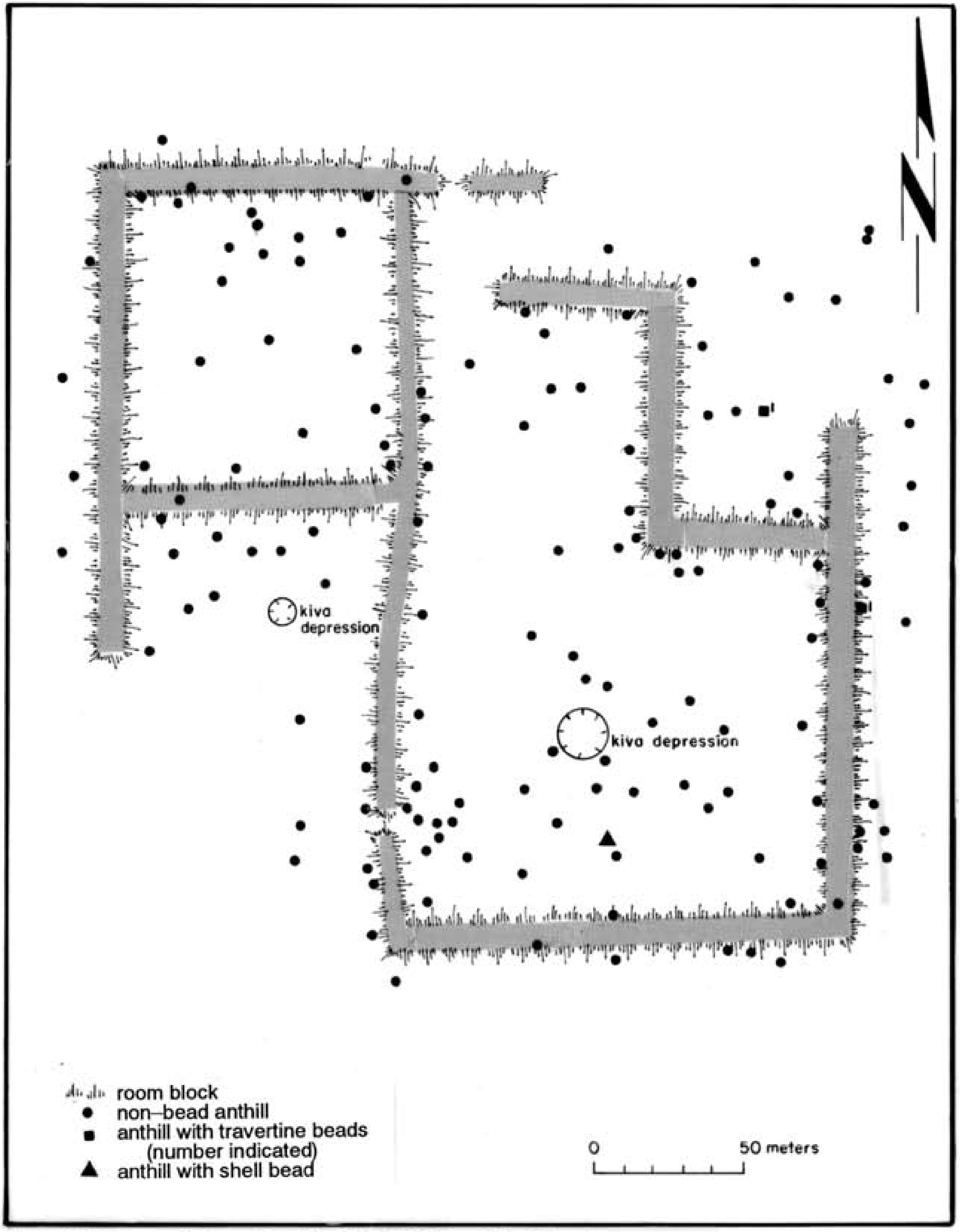

Figure 6. Site map, Poshu-ouinge (Poshu) LA 274, and bead locations.

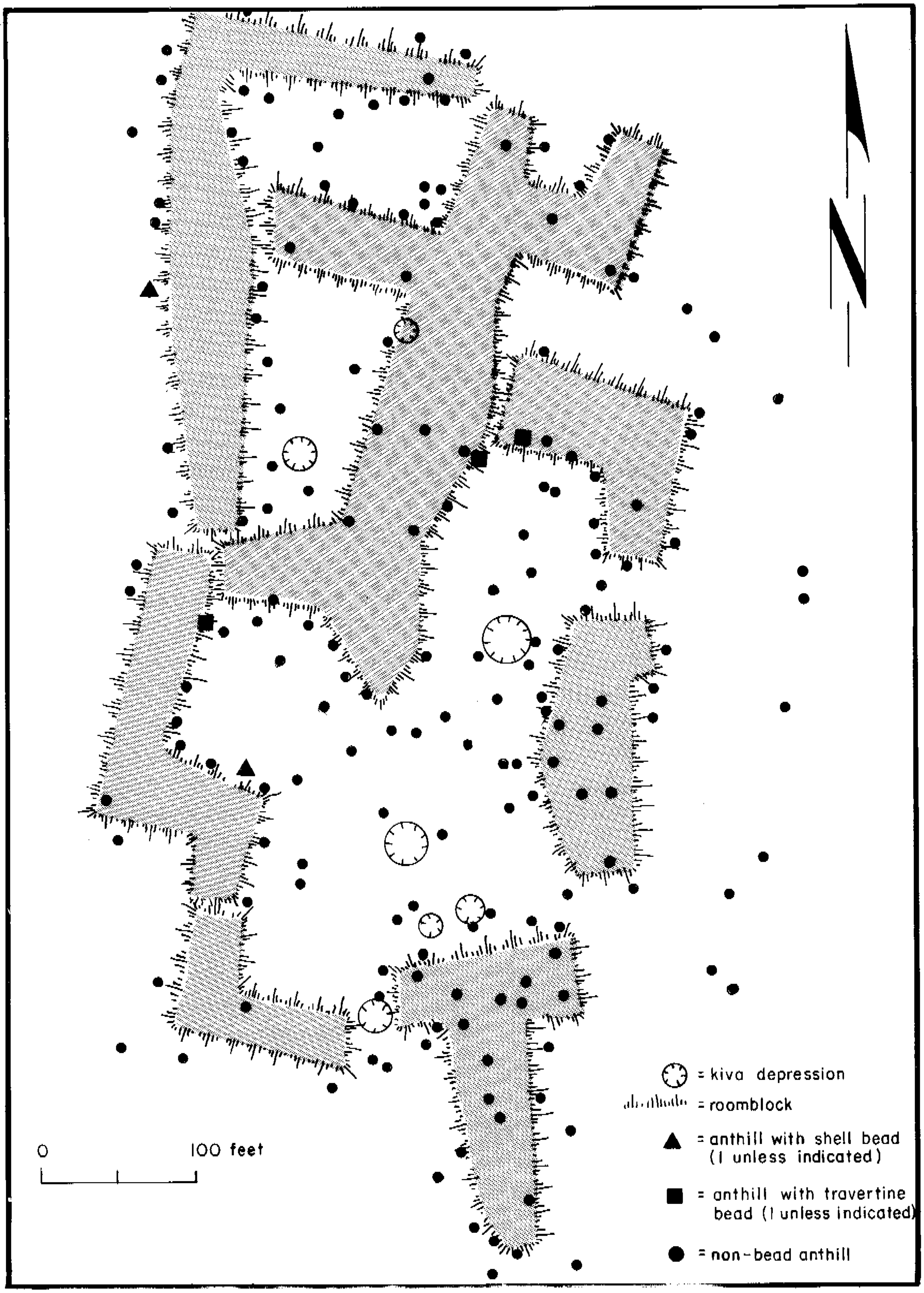

Figure 7. Site map, Pose-ouinge (Pose) LA 632, and bead locations.

Table 6. Travertine and Shell Bead Measurements from the Six Study Sites

	Trav. perfor.		Trav. thickness		Trav. Diameter		Shell Perf.	Shell Thickness	Shell Diameter
mm	# Beads	%	# Beads	%	# Beads	%	# Beads	# Beads	# Beads
0.75	0		2	<1	0		0	1	0
1.00	99	11	12	<1	0		0	**5**	0
1.25	**562**	**64**	30	3	0		2	1	0
1.50	**186**	**21**	56	6	0		1	1	0
1.75	21	2	**172**	**18**	0		**5**	1	0
2.00	4	<1	**396**	**42**	2	<1	2	2	0
2.25	1	<1	**121**	**13**	0		1	0	1
2.50	2	<1	90	10	0		0	0	0
2.75	0		49	5	9	1	0	1	0
3.00	0		18	2	80	9	0	0	0
3.25	0		1	<1	89	10	0	0	1
3.50	1	<1	0		**139**	**16**	0	0	1
3.75	0		0		**175**	**20**	0	0	0
4.00	0		1	<1	**227**	**26**	0	0	**6**
4.25	0		0		41	5	0	0	0
4.50	0		0		38	4	0	0	0
4.75	0		0		31	4	0	0	0
5.00	0		0		34	4	1	0	2
5.25	0		0		5	1	0	0	0
5.50	0		0		8	1	0	0	0
5.75	0		0		2	<1	0	0	0
6.00	0		0		4	<1	0	0	1
No measurements between 6.00 mm and 8.00 mm									
8.00	0		0		1	<1	0	0	0
Total	876		948		885		12	12	12
Range	1.00-3.50 mm (2.50 mm)		0.75-4.00 mm (3.25 mm)		2.00-8.00 mm (6.00 mm)		1.25-5.00 mm (3.75 mm)	0.75-2.75 mm (2.00 mm)	2.25-6.00 mm (3.75 mm)
Range 1% +	1.00-1.75 mm (0.75 mm)		1.00-3.00 mm (2.00 mm)		2.75-5.00 mm (2.25 mm)		-	-	-
Mean	1.2968 mm		2.0266 mm		3.8249 mm		2.0000 mm	1.4167 mm	4.0833 mm
SD	0.1930 mm		0.3807 mm		0.5807 mm		0.9886 mm	0.5967 mm	0.9435 mm

Note: bold face numbers indicate peaks

Table 7. Travertine Bead Measurements from Bead-Making Sites LA 13197 and LA 44006

	Perforation	Thickness	Diameter
mm	# Beads	# Beads	# Beads
1.00	4	2	0
1.25	6	0	0
1.50	1	0	0
1.75	0	0	0
2.00	1	4	0
2.25	0	3	0
2.50	0	2	0
2.75	0	1	0
3.00	0	0	0
3.25	0	1	0
3.50	0	0	2
3.75	0	0	1
4.00	0	0	6
4.25	0	0	1
4.50	0	0	2
Total	12	13	12
Range	1.00-2.00 mm (1.00 mm)	1.00-3.25 mm (2.25 mm)	3.50-4.50 mm (1.00 mm)
Mean	1.2500 mm	2.1346 mm	4.0000 mm
SD	0.2820 mm	0.6176 mm	0.3198 mm

Beads included are two finished beads from LA 44006, four from LA 13197, and seven finished fragmented beads from sampling the anthills of LA 13197.

waters that form most travertine deposits" (Barker 1988:68). Prinz et al. indicated that travertine has "no stratification but thin bands differentiated by concentrations of impurities or by grain size" (Prinz et al. 1978:332). Not all travertine beads exhibit visible bedding lines when bedding is irregular or curved, but these beads can be identified as travertine since they are similar to the material between the bedding lines of the visibly banded beads (Mathien 1984a:111, fig. 9).

Examples of variations of the physical properties of travertine beads, blanks, and raw materials were examined and travertine identification was confirmed by William Overstreet, a geologist from Santa Fe.

RESULTS

Of the 1,012 beads collected from the six study sites, 948 are travertine beads (Table 8), including fragmentary travertine beads (22 percent of the travertine bead collection) that were collected and counted with the whole beads. Only 12 shell beads were collected. The remaining 52 beads were neither travertine nor shell but were made from red, tan or gray stone, and these beads will not be considered further except to comment that their measurements are similar to those of the white beads (Tables 6 and 7) so all could easily blend together in a strand. Table 8 presents the bead occurrences on the study sites.

Both travertine and shell beads show polish on the edges and faces, and the edges are slightly rounded, not sharp. (The San Ysidro area travertine beads found in association with the travertine bead-making debris, however, were not polished, had sharp edges and rough striated sides, and are generally whiter than the beads from the study sites.) Most of the beads from the study sites had a uniform thickness, but 25 percent are wedge-shaped. The beads were double perforated, and show a biconical profile, except for some very thin beads that were possibly drilled or perforated from one side only. Haury (1985:119-120) and Ward (1976:96-98), among others, describe and illustrate Southwestern prehistoric bead-making. The blanks and unfinished beads from the San Ysidro area are similar to those in the illustrations, suggesting the beads were made in the manner described.

Bead Attributes

Certain inferences can be drawn from the laboratory analysis and from the fieldwork concerning bead attributes and bead deposition. The narrow size range of the bulk of the beads shown in Table 6 makes them one population, but eight travertine beads with large diameters that also have perforations over 2 mm in diameter stand out. There is no gradual increase in diameter from the smaller to the larger beads. Five of these beads with large diameters and large perforations are broken, suggesting that their thin, narrow faces surrounding wide perforations are structurally weak. Although a desire for stronger beads could explain the preference for the smaller beads, 22 percent of the travertine and shell beads are also broken. The softness of calcium carbonate, which measures 3 on the Mohs scale of hardness, may be the reason for the large number of broken beads, regardless of size. Half of the sample of travertine bead-making debris collected from anthills on the San Ysidro area sites is broken, unfinished beads, indicating that breakage was common at the presumed bead source. (Measurements of worked and broken pieces and blanks found on trash areas and on the ground as well as in ant hills at the bead-making sites are consistent with those of the collected beads.)

The soft material does not, however, explain the 158 (20 percent) off-round and irregular whole travertine beads. Haury and Gifford (1959:6, fig. 5) described soft and easily worked steatite beads as having a high degree of uniformity, especially when compared with beads of harder material (turquoise) that have more irregularities. (Steatite has a hardness of 1 on the Mohs scale, and turquoise, 5 to 6.) Expediency in production may account for the irregular beads rather than carelessness (Cordell and Plog 1979:409).

The similar diameters of the travertine beads and the few shell beads (Table 6) is perhaps coincidental and the result of unknown causes, but conceivably the travertine bead-makers emulated shell beads that were desirable because of the exotic appeal of their marine origin and their fine, shiny appearance. For instance, Kidder said that the inclusion of shell disc beads (among other shell beads) "in caches obviously ceremonial in nature leaves little doubt that shell was held in high reverence" (1932:194). Lambert (1954:158) and Dittert (1959:589) mentioned the desirability of shell beads; McNeil (1986:35-36, 143) suggested that the most favored material for beads in the Southwest was shell, and that calcite beads were common, not exotic; and Judd (1954:101) considered calcite undesirable for ornaments because it lacked prized luster. Pueblo Indians today consider shell spiritually important because of its source, its beauty, and the difficulty in obtaining it, so perhaps prehistoric Indians also regarded it as ceremonially valuable.

Tapered beads were widespread on the study sites, a shape not difficult to achieve using a material as soft as calcium carbonate. Less than 1 percent of the shell beads, and 21 percent of the rounded travertine beads are wedge-shaped. (An additional number of irregular travertine beads and those with broken or gouged faces also had a wedged shape.) Almost half of the beads, the smoothed blanks and scraps, and a partially smoothed larger piece of travertine collected from the San Ysidro sites were also tapered. Thus tapering may have been unintentional, and perhaps another result of expedient behavior, or deliberate. Today Indians from Santo Domingo Pueblo fashion tapered beads to make a strand pleasing at the curve, without gaps (Joe and Terry Reano, pers. comm. 1986). Lancaster, describing a prehistoric necklace, said "beads are tapered to make the necklace lie in a gentle, even curve" (Lancaster and Pinckley 1954:67, plate 43). The polish and signs of wear on the travertine bead faces, edges, and perforations, and the possible deliberate tapering imply that the beads were intended as ornaments and were worn. Most of the San Ysidro area beads, in contrast, appear new because of their sharp edges and general whiteness.

Bead Deposition

Small artifacts like beads can enter the archaeological record by intentional deposition in offerings, caches, and burials. Kidder (1932:194, 1958:16) mentioned white disc bead (shell) caches from Forked Lightning and Pecos ruins, but small white disc beads are not commonly reported from caches nor from offerings in the Northern Rio Grande region. Only a few burials with these beads have been noted for the Coalition and Classic periods (Table 2). Edmund Ladd (pers. comm. 1993) believes beads are exotic goods that are given ritually in offerings or grave goods, but never carelessly handled and never lost.

Many beads recovered from ruins, especially trash deposits, however, have been called lost for want of known deposition. Morris (1939:141) said that many beads were lost and put into trash areas from sweepings; Judd (1954:99) commented that in Pueblo Bonito many beads were lost about the village, and also in kivas and houses where they were removed to trash areas from sweepings; and Schiffer, discussing artifact size, said "small items are more likely to be lost [and] loss is usually the process responsible for the deposition of small, still usable items . . . in activity and refuse areas" where trampling pushes small items downward into loose soil where they are not recoverable (Schiffer 1983:679). Whether lost or intentionally disposed of, Kidder (1932:185) found white beads (shell) on the refuse piles after rains at Pecos Ruin; McNeil (1986:73, 105-107) found the majority of calcite and other beads at Salmon Ruin in trash; and Mathien (1987:393) and Windes (1987:605) reported calcite beads from Pueblo Alto in trash. Burials are also known to occur in trash, where beads as grave goods would be deposited.

On the study sites, most of the anthills with beads were in trash areas, recognized by scattered sherds and patches of bare soil, often grayed or slightly grayed where exposed by disturbance. A pattern comonly observed on the sites with beads was scattered trash on one side of a room block where many beads were recovered from anthills, and sterile soil on the opposite where anthills had few or no beads. Figure 2, for instance, shows 9 bead hills with 44 white beads on the west side of Room Block 7 on LA 3333, on tan or grayed soil, where sherd scatters were common, and two bead hills with only two white beads on the east side, associated with few sherds and plentiful grass. Trash heaps, however, were not often identified on most of the sites, where apparent sheet trash with scattered sherds and lithics was common.

The original disposition of beads brought up by ants is difficult to assess. Beads from offerings, caches, or graves are indistinguishable; and beads deposited in dissimilar ways brought up from different strata (jumbled or uniform) would become mixed in the anthills. One or a few beads to a hill could be called lost as documented in Southwestern sites, or could just as well have been intentionally offered. Larger numbers of beads per hill were possibly deposited together, perhaps in a strand. The range of beads per hill under consideration in this study is 1 to 27 beads (the latter number represented by one hill only) (Figs. 2-7).

Anthills with few beads are the most common, and are found scattered randomly over the sites. Two hundred and sixty-one (79 percent) of the total 330 anthills with travertine beads yielded 1, 2, or 3 beads each, 402 beads in all (nearly half of the beads) that could be called lost or part of small offerings. The remaining 70 hills (16.5 percent) contained 546 beads (over half of the travertine beads) would not be called lost, but either offered ritually or of unknown deposition. Of these hills, however, 18 hills had high frequencies of travertine beads, from 9 to 27 beads per hill, totaling 252 beads. (Of the 252 beads, 162 [64 percent] from 10 anthills came from LA 3333.)

How many of these beads came from burials cannot be known. At LA 3333, John Ware (pers. comm. 1990) suggested that beads from hills with numerous beads could have come from burials, although no beads were recovered from the fine-screened dirt around the burials he excavated in a pithouse area in 1990 and in 1991. Five anthills with 51 beads are closely associated with Ware's pithouses and not with the room blocks that were the source of the remaining beads I collected, presenting an enigma of bead deposition. Figure 2 shows the five bead hills along the east fence of LA 3333 as well as the bead hills related to the room blocks.

A total of 205 partial travertine beads were recovered. Beads broken during site occupation probably would have been discarded. Because the partial beads were usually collected in small numbers from the anthills, I included them with whole beads in the bead frequency count regardless of when they might have been broken. More than half of the recovered partial travertine beads, however, were collected from LA 3333, 121 in all, and of these beads, 31 (more than one-third) came from only two anthills, a rare occurrence and an unusually high number of partial beads from single hills (7 from one hill and 23 from the other) (Fig. 2). The 7 half-beads were from a silted scatter of a few gravels long abandoned by ants, so perhaps more broken beads were present but not seen. For whatever reason, such a concentration of half beads appears purposefully discarded.

DISCUSSION

Shell Disc Beads

Although the collected shell and travertine disc beads may seem interchangeable as ornaments because of their similar size, color, and chemical composition, they were not acquired by the inhabitants of the northern Rio Grande region in the same manner. The travertine beads may be a northern New Mexico product traded from the San Ysidro area, and the shell disc beads are of uncertain origin and represent a different trade and distribution system.

Brand (1938:7-8), Tower (1945:44-46), and more recently, Venn (1984:243), traced the Southwestern shell trade routes from coastal sources, showing routes through New Mexico to the Pecos area, an important destination for shells from the Pacific, Gulf of California, and Atlantic coasts. Although trade routes have been worked out, unfortunately the chronology of the trade to the northern Rio Grande region area, especially to Coalition period sites, has not.

Brand (1938:6) and Tower (1945:27-29) indicate that disc beads were ground from bivalves thus obliterating identifying signs of species; and Kidder reported that "in no case is it possible to identify the sort of shell from which [disc beads] were manufactured" (1932:184). The point of origin is known if the shells can be identified (Tower 1945:2). Because no evidence of shell disc bead manufacture is known in the Northern Rio Grande region, shell beads are assumed to have come there already finished. The anthills on all of the sites examined contained no debris from shell bead-making; Kidder (1932:194) found no shell disc bead blanks or beads in process of manufacture at Classic period Pecos, a designated destination for shell beads; and Venn said "no evidence was found at Arroyo Hondo [LA 12, a late Coalition and early Classic period site] for the local manufacture of shell ornaments, and there is little indication of such activity on the sites in the area" (1984:246). Brand (1938:9) and Tower (1945:44-45) believed the Hohokam were the final finishers of western rough shell and the style setters of shell beads. Haury (1937:136,153), however, thought the Hohokam influence did not include the Rio Grande area because of style differences and the presence of shells from the Atlantic, but as disc beads lack style variation and are not made from identifiable shell, the collected beads could possibly be of Hohokam origin.

More shell disc beads were collected from Coalition period sites than from Classic period sites (Table 8). Of the 12 collected shell beads, 7 came from the two pure Coalition sites, La Cienega and LA 3333. These beads are assigned to the Coalition period. Because few beads have come from Developmental period sites, none of these beads are considered to be from this time (Tables 1 and 2). Only 5 beads came from the Classic period sites, 2 from Classic Pose, 1 from Poshu (Table 8), and 1 each from the Classic period components of Tsama and Ponsipa. On the Classic components, earlier beads cannot be separated from later beads because of site mixing activities, and possible re-use and curation of beads. (See the section on travertine disc beads for a discussion of these points.)

Shell beads might have been more plentiful. Lambert (1954:158) and Dittert (1959:463), among others, suggested that shell ornaments (always scarce) were deserving of curation and were removed from the sites upon abandonment. The few shell beads collected may suggest that some were curated, because only 4 (33.3 percent) of the 12 shell beads were whole, compared with 80 percent of the whole travertine beads. Munday and Lincoln state that "artifact curation rates may have contributed to the lack of strong agreement between expected and observed results" and "caution is advisable when the relative frequencies of artifact categories from different assemblages are compared, because differences may be partially the result of curation differences" (1979:346-347).

Fewkes (1909:27-28), Haury (1985:131-132), and Dittert (1959:589) attributed shell bead scarcity in the Mesa Verde, Forestdale Valley, and Acoma areas to cultural seclusion and lack of trade. Shell disc beads were scarce on the study sites, but the Coalition period sites were not particularly isolated. St. Johns Polychrome and Chupadero Black-on-white (the latter on the two southern study sites) came from the southwest and south, the directions of shell routes to the Pecos area; and the Zuni area (focus for St. Johns Polychrome) was on the southwestern route (Venn 1984:243-245). Although the Classic Period sites received little or no intrusive pottery from outside the glaze and biscuit ware areas, they were contemporary with Pecos, the receiver of abundant shell ornaments. In spite of the suggested curation of shell disc beads, the small number of shell beads (0.1 percent of the total number of beads) implies minor shell trading to the study sites.

Travertine Disc Beads

Nine hundred and forty-eight beads are travertine. Because they are the majority of the white beads, and the shell beads occur in negligible numbers and were associated with the shell trade, travertine beads alone are considered in the bead distribution discussion. Data from the detailed study support the anticipated large numbers of travertine beads on Coalition sites and components, and the fewer bead occurrences on Classic sites (Figs. 2-7, Table 8). (Information on Table 1 shows low bead numbers from nine additional Classic period sites.) A review of the anthill samples indicates that there were many more anthills with beads on the Coalition sites and components than hills without beads, in contrast to a preponderance of nonbead hills on the Classic sites (Figs. 2-7, Table 8). The four study sites with beads (the two pure Coalition sites of La Cienega and LA 3333, and the two Coalition period components of Tsama and Ponsipa) had abundant travertine beads, totalling 902. The two pure Classic sites, Pose and Poshu, had only 5 travertine beads between them, but the Classic components of Tsama and Ponsipa had many more beads, 42 from Tsama and 33 from Ponsipa (Figs. 4-5, Table 8).

The 5 beads were recovered from the pure Classic period sites, Pose and Poshu, may seem surprisingly low in contrast with the 75 beads from the Classic period components of the Coalition-Classic period sites of Tsama and Ponsipa. One reason for many beads on Classic components is suggested by their proximity to the Coalition components, where the most numerous beads were available (Figs. 4-5). Because site mixing can account for movement of artifacts (beads) from the Coalition to the Classic components, numerous beads would be expected

Table 8. White Disc Bead and Anthill Occurrences on the Detailed Study Sites.

Site	Travertine Beads	Shell Beads	Other Stone Beads	All Beads	Travertine Bead Hills[1]	No Bead Hills	Total Anthill Sample[2]
COALITION PERIOD							
LA 3333	359[3]	4	34[3]	397	75	52	131
LA 3 La Cienega	210	3	5	218	70	98	168
COALITION-CLASSIC PERIOD							
LA 908-909 Tsama							
Coalition component	193	0	6	199	73	34	107
Classic component	42	1	0	43	32	156	189
Both components	235	1	6	242	105	190	296
LA 297 Ponsipa							
Coalition component	106	0	5	111	50	24	76
Classic component	33	1	0	34	25	101	128
Both components	139	1	5	145	75	125	204
CLASSIC PERIOD							
LA 632 Pose	3	2	0	5	3	177	182
LA 274 Poshu	2	1[4]	2[5]	5	2	143	148
Totals all sites	948	12	52	1012	330	785	1129

[1] Included in anthill count are 15 locations of surface beads not associated with an anthill: LA 3333 is 1; LA 3 are 5; LA 908-909 are 6; LA 297 are 2; and LA 632 is 1.
[2] Anthills with only shell of nontravertine stone beads are included in the total anthill sample and do not have a separate column.
[3] LA 3333 had more than half of the total number of partial travertine beads (121 of the total 205) and also more than half of the nontravertine stone beads, 23 of which are red.
[4] This bead has no visible shell growth lines and may not be shell (Mathien 1984b:111).
[5] One bead is white, but may not be travertine.

to occur on the Classic components of Tsama and Ponsipa. Conversely, if only a few beads were found on the Classic parts of the two Coalition-Classic period sites, this would indeed be unexpected. Kidder discussed the importance of briefly occupied, single-component sites with "pure representations" of pottery types in order to "avoid the inevitable mixing which takes place in the refuse of longer-lived communities" (Kidder and Shepard 1936:599). Pippin, citing nine supporting references, said "the prehistoric mixing of cultural materials in archaeological sites has been noted repeatedly" (1987:55).

Beads could have been picked up and re-used by the Classic inhabitants of Tsama and Ponsipa, an activity considered in some detail by McNeil (1986:38, 189) on Salmon Ruin. McNeil specified calcite beads as well as others regardless of their considered worth. Also, some Classic beads could be heirlooms, but their abundance on Coalition sites and the following scarcity on the pure Classic sites of Pose and Poshu do not suggest that many were curated.

A pattern of bead occurrences can be seen at Tsama, where there is bead clustering in the "gate" area and on the south room block of the Classic East Plaza, including the slope south towards the mesa edge overlooking the Chama River, suggesting a previous Coalition use of this area (Fig. 4). Thirty-two of the 42 beads designated Classic are from 23 anthills and surface locations there. Seventeen hills had 1 bead each and the remaining 6 hills had from 2 to 4 beads each, showing a light scattering of beads, which strongly suggests a Coalition period activity area rather than an occupation component, especially since no Santa Fe Black-on-white sherds were eroding from the slopes to the mesa edge (Fig. 4). The Coalition component itself was also on the southern part of the site. Most of the Coalition period beads were on the southern part of this component, extending towards the mesa edge (Fig. 4; Beal 1987, fig. 16).

A less distinct pattern of bead clustering is seen at Ponsipa on the southern part of Room Block I of the Classic component adjacent to Coalition areas, where 17 of the 33 Classic beads are from 10 anthills (Fig. 5). A fairly light scattering of beads occurred here, although included are a 3-bead and a 5-bead hill. (The latter hill may be associated with the earlier ceramics because of its proximity to the Coalition area.) In the context of site superimposition, it must be remembered that ants bring up beads from underground strata to the top where they become mixed. Some beads that may be considered Coalition from site superimposition could have been present by other means.

INTERPRETATION

These data suggest that the travertine beads are from the Coalition period and not the Classic period, regardless of where they were found. Additional information from two San Ysidro area sites, LA 13197 and LA 44006, lends credence to a Coalition period origin of the travertine beads. These 2 sites are among 36 Coalition period sites in the San Ysidro area (specifically located in the Cañada de las Milpas) with Santa Fe Black-on-white as the dominant ceramic type, and with occurrences of the trade ware St. Johns Polychrome, among other types (Bice and Sundt 1976:5; Sundt et al. 1983:10-11, site descriptions). LA 13197, with 45-50 rooms, was the largest site in the group (Sundt et al. 1983:5, site descriptions; NMCRIS LA 13197, LA 44002-44027), and had a bead-maker's room (Richard Bice, pers. comm. 1989). LA 44006, unexcavated, had only three rooms (NMCRIS, LA 44006). The sites are dated to the transition between the Developmental and early Coalition periods to ca. A.D. 1300 (Bice and Sundt 1976:7; Sundt et al. 1983:5-6, 13; NMCRIS, LA 13197, LA 44002-44027).

Bead-Making Sites

Based on field observations, LA 13197 and LA 44006 were bead-making sites (Table 1). A bead-making site in the Forestdale Valley of Arizona is described by Haury:

> Ant hills about [the ruin] produced many fragments of steatite, mostly the wastage of bead manufacture, as well as finished beads. The prevalence of the material suggests that the surrounding ground must be well saturated with it and that bead-manufacture was a local activity, dependent on a readily available supply of the stone. (Haury 1985:119)

During one visit to LA 44006, with only 2 anthills, and to LA 13197, which had 15 anthills, I collected samples of unfinished travertine beads and of travertine bead-making scraps from hills that were so heavily laden with small worked travertine pieces that a total collection was not feasible. (The scraps were present also on trash areas and occasionally on the ground.) Seven partially finished beads were recovered from LA 13197. From both sites I made a total collection of 6 unbroken beads, a small number considering the dense debitage. Hand-sized and smaller unworked travertine slabs were widely scattered on the sites, strongly suggesting a nearby source of travertine. Richard Bice (pers. comm. 1989) noted additional small bead-making sites in the area; and although no bead-making was described by either Bice or Sundt (Bice and Sundt 1976; Sundt 1978; Sundt et al. 1983) in their preliminary reports, they noted 33 stone beads from seven sites in the group (Sundt et al. 1983:104-105, site descriptions).

Travertine is exposed in the Rio Puerco area in narrow fissures, suitable for bead-making, as opposed to massive travertine formations in the Belen area (Robert Weber, pers. comm. 1990).

Bice and Sundt describe "white . . . calcareous limestone-like rock [which I call travertine] that usually occurs as thin occlusions" in the area around Prieta Vista (1972:93); Joan Mathien (pers. comm. 1989) and James Moore (pers. comm. 1990) found small travertine slabs in formations in the Cabezon Peak and the Guadalupe Ruin area, sources near the Rio Puerco that are not far from the San Ysidro sites. Richard Bice (pers. comm. 1990) found slab travertine in a small outcrop near the San Ysidro bead-making sites. A series of hot springs existed along the Nacimiento Fault, which runs on a line between Los Alamos and Cuba and continues southward through the Cañada de las Milpas area to Los Lunas. These hot springs may be the source for the travertine in the San Ysidro-Milpas area (Richard Bice, pers. comm. 1992).

Two additional travertine bead-making sites in the Rio Puerco area are Coalition Prieta Vista, and Guadalupe Ruin, a Chaco outlier with a second occupation in the A.D. 1200s, but there is no reported information on this activity. From Prieta Vista (Bice and Sundt 1972:95-97, fig.56, Fig. 1; Table 2), Bice and Sundt reported white calcareous stone beads made from a local source, and illustrated unfinished beads (1972:93, 95-97, fig. 56). On Guadalupe Ruin, Pippin (1987:77, fig. 33) found 49 white stone beads that he called tufa (see Prinz et al. 1978:332), but he did not mention finding bead-making scrap. During one visit to Guadalupe I observed a few travertine beads and bead-making waste on anthills and elsewhere (Fig. 1, Table 1). On the smaller sites below Guadalupe mesa, I found a larger number of unfinished beads and discarded bead-making pieces occurring in almost every anthill (Table 1). Widely scattered on the surface of the small sites were unworked small travertine slabs; fewer were found on Guadalupe Mesa. The bead-making scrap I found on the small sites was associated with early black-on-white ceramics, Red Mesa, Gallup, and Chaco Black-on-white (Pippin 1987:251-254), predating Santa Fe Black-on-white and St. Johns Polychrome. This suggests early bead-making there--before A.D. 1200, although later occupation occurred there as well as at Guadalupe proper (James Moore, pers. comm. 1992). Thomas Windes (pers. comm. 1991) suggested that bead-making started there by the A.D. 900s; and he suggested that beads were not made there during the second occupation--after the A.D. 1200s (Thomas Windes, pers. comm. 1993).

As emphasized, bead-making sites are recognized by the presence of raw material, and plentiful debitage from bead manufacture. Except for the anthills seen on the two San Ysidro area sites and on Guadalupe Mesa, the hills examined on the six study sites and on sites contained no bead-making debitage, and no raw travertine pieces were found on these sites. No reports with white disc bead information (Table 2) mention bead-making activity, and Paako and Te'ewi had none.

Although similar Coalition period artifacts are associated with the later occupation of Guadalupe, San Ysidro, Prieta Vista, and the Rio Grande study sites (Coalition ceramics and travertine disc beads; though in the Guadalupe area the beads may have come from earlier cultural material--Sundt and Bice 1972:93, 95-97, 139-141; Pippin 1987:46-48, figs. 22, 77, 114), evidence of bead-making present at the Rio Puerco sites is not shared with the study sites. Guadalupe and the San Ysidro sites were contemporary during the transition period from Developmental to early Coalition periods and during the A.D. 1200s (Bice and Sundt 1976:7; Sundt et al. 1983:5-6; Pippin 1987:114), but the beads made on these sites appear to have gone to different areas, the San Ysidro beads probably to the Rio Grande region during the Coalition period, and the Guadalupe beads almost certainly not, since travertine beads apparently were not abundant in the Rio Grande region before the Coalition period, and the bead-making debris on Guadalupe seems associated with the earlier pottery of the Chaco occupation and not later San

Juan-Mesa Verde pottery (Pippin 1987:174, 194; Thomas Windes, pers. comm. 1993).

Guadalupe may be a possible source of travertine beads reported in Chaco Canyon, where the beads occur but no travertine bead-making debris has been noted by Mathien (1984b:174-184), nor by Thomas Windes (pers. comm. 1989). Acknowledgement of local travertine in some San Juan areas (Mathien 1987:384) does not imply bead-making, which is always accompanied by signs of travertine wastage and unfinished beads.

Bead Trade

Because the inhabitants of the San Ysidro area sites demonstrably made travertine beads, and the Coalition period study sites apparently did not make them but had abundant beads, it is reasonable to propose that beads were traded to the study sites from these bead-making sites. No other Coalition period sites in the Northern Rio Grande region are known to have been travertine bead-making sites, and no other Coalition period sites are known to have had abundant travertine beads. Moreover, no sites except those near the Rio Puerco and San Ysidro had suitable slab travertine at hand for bead-making. (Coalition period Prieta Vista did indeed have some bead-making activity, but Bice and Sundt [1972:95-97, fig.56] did not emphasize this nor suggest the debris was profuse, and only illustrated unfinished beads.) Because the travertine beads from the study sites and those from sites in the San Ysidro area exhibit a narrow size range (Tables 6 and 7), they are more likely to have come from one area, and not from scattered areas. Furthermore, the bead-making sites (including Prieta Vista) were abandoned before the Classic period (Bice and Sundt 1972:176, 1976:7; Sundt et al. 1983:5-6, 13; Sundt 1988:31), providing a possible explanation for the scarcity of beads on the pure Classic period sites.

The profuse bead-making debitage of LA 13197 and LA 44006 suggests a scale of production large enough to imply specialization, and its necessary adjunct, trade and exchange (Cordell and Plog 1979:420-421).

Windes (1990) said of turquoise beads on the Spadefoot Toad site:

> craft specialization . . . was evident from the thousands of bits and pieces of turquoise found at the site. It is clear from the many bead fragments broken during the drilling process (for holes) that bead manufacture was a primary craft activity at the site. Also notable was the near lack of finished turquoise beads at the site.

Whalen states that his "experience with Mexican sites suggests that identifiable debris are always left behind by any large-scale production activity involving durable raw material" (1987:176). These descriptions may be applied to the travertine bead-manufacturing activities at the San Ysidro sites.

Intersite trade networks in the Northern Rio Grande region during the Coalition period are suggested by both Cordell and Lang. Cordell refers to the extensive occurrence of Santa Fe Black-on-white as supporting "alliance networks . . . critical to the subsistence of each village" (1979:3). Lang cites Coalition period localized pottery manufacturing as a basis for "regular, organized and extensive trade" (1989:192). I find nothing suggested except pottery in return for beads. When discussing cached beads in southern New Mexico, Whalen threw some light on a possible function for beads in exchange systems, saying that since utilitarian and nonutilitarian items are traded together, beads move as a "symbolic regulator maintaining channels through which also flow essential utilitarian goods" (1987:176-177).

Bead Site Dating

The Coalition period travertine beads have a wide temporal distribution covering over a century, and their association with Santa Fe Black-on-white also spans this time. The three travertine beads from Developmental period sites, LA 835, and the Bronze Trail sites (Tables 1 and 2) are associated with earlier mineral-painted wares, and could possibly be from the early bead-making complex of the Guadalupe area, at least starting in the A.D. 900s as suggested by Thomas Windes. A comparison of the dates of the San Ysidro bead-making sites, of the study sites where beads were abundant, and also of Pueblo Alamo, a Coalition site where a travertine necklace was found (Allen 1973:8, 10; Fig. 1, Tables 2 and 4), suggests the time span when bead manufacture and trade flourished.

All of the Coalition period sites mentioned above except La Cienega, and the Coalition components of Tsama and Ponsipa are dated generally from A.D. 1200 to A.D. 1300. Although LA 3333 was dated by Robinson et al. (1973:7, 56) from the late A.D. 1100s to mid-A.D. 1200s from pithouse excavations, the site was probably occupied until the end of the Coalition period based on the frequent presence of Galisteo Black-on-white on Mound 7 and the large size of this room block (personal observation; John Ware, pers. comm. 1991; Fig. 2).

Dickson (1979:10, 87, 100) estimated that La Cienega was settled by A.D. 1200 and abandoned by A.D. 1250, indicating occupation may not have spanned the century. Tsama and Ponsipa, the northernmost study sites with beads, were probably not occupied before A.D. 1250, as the earliest Coalition settlement in the Chama drainage apparently did not precede this date (Beal 1987:96-97). The West Plaza of Tsama (Fig. 4) was probably established ca. A.D. 1250, the date suggested on the *National Register of Historic Places* nomination form (NMCRIS LA 908-909) for LA 909 (the Coalition component) because of associated Santa Fe Black-on-white and Wiyo Black-on-white ceramics (Tables 4 and 5). Beal (1987:88) also used ceramic dates to suggest an initial occupation of Ponsipa ca. A.D. 1250-1275. Buge (1978), in his preliminary site work, suggested the Coalition part of the site was first occupied in the late 1200s.

Considering a possible abandonment of La Cienega in the middle A.D. 1200s and the founding of Tsama and Ponsipa around the same time, the popularity of the travertine beads very likely occurred in mid-century, but the trade cannot be restricted to this time only because these and the remaining sites may not have engaged in the trade for beads at the same time.

SUMMARY AND CONCLUSIONS

From the study of the small white disc beads, the following information is known: 99 percent of the white disc beads recovered from the study sites are made of travertine, not of shell. The travertine beads were apparently not manufactured on the sites where they were found, but Coalition period bead-making sites were in the San Ysidro and Rio Puerco area where travertine is found in thin slabs. Abundant travertine beads can occur on Coalition period sites; Classic period sites with Coalition components have more beads on them than Classic period sites without Coalition components, and these pure Classic period sites have very few beads. Shell beads are scarce but occur on Coalition and Classic period sites, and apparently were not made on these sites.

To account for the known travertine bead abundance and subsequent scarcity on the study sites, interpretation of the evidence from the field, the laboratory, and the reports cited, leads to the conclusion that the travertine disc beads probably came from the San Ysidro area, and that most or all are Coalition period beads. Travertine beads were made and traded earlier than Coalition times, but they do not appear to be made later than the Coalition period. The few Developmental period beads may also be from the general Rio Puerco-San Ysidro source, but apparently were not traded in any significant numbers to the Northern Rio Grande region. The beads once seemed of consequence as part of a Coalition subsistence exchange system when they were evidently sought in large numbers for ornaments. The beads quickly went out of favor for adornment when the bead-making sites were abandoned by A.D. 1300 and no group continued bead-making in the area.

Too little is known about the shell disc beads to pinpoint their source and their temporal affiliation. Shell beads, always described as scarce in the literature, were very scarce on the study sites, and might have been carefully curated because of the small ratio of recovered whole beads to broken beads. On the other hand, the travertine beads are more clearly identified. I believe that all of the travertine beads are from the same source, the San Ysidro area; that all are more or less contemporary, before ca. A.D. 1300, and probably flourished in the middle of the thirteenth century; and that sites of the Classic period did not participate in the trade from San Ysidro since the bead-making sites were abandoned by the end of the thirteenth century.

REFERENCES CITED

Allen, J. W.
1973 *The Pueblo Alamo Project: Archaeological Salvage at the Junction of U.S. 85 and U.S. 285 South of Santa Fe, New Mexico.* Laboratory of Anthropology Notes No. 86. Museum of New Mexico, Santa Fe.

Barker, James M.
1988 Travertine Quarries and Deposits in New Mexico. *New Mexico Geology* 10(3):68.

Barnett, Franklin
1969 *Tonque Pueblo: A Report of Partial Excavation of an Ancient Pueblo IV Indian Ruin in New Mexico.* Albuquerque Archaeological Society.

1973 *San Ysidro Pueblos: Two Prehistoric Pueblo IV Indian Ruins in New Mexico.* Albuquerque Archaeological Society.

Beal, John D.
1987 *Foundations of the Rio Grande Classic: The Lower Chama River A.D. 1300-1500.* Southwest Project No. 137. Southwest Archaeological Consultants, Inc., Santa Fe.

Bice, Richard A., and William M. Sundt
1972 *Prieta Vista: A Small Pueblo III Ruin in North-Central New Mexico.* Albuquerque Archaeological Society.

1976 *AS-8 Archaeological Salvage Report: Progress Report Number One.* Albuquerque Archaeological Society.

Brand, Donald D.
1938 Aboriginal Trade Routes for Sea Shells in the Southwest. *Yearbook of the Association of Pacific Coast Geographers* 4:3-10.

Buge, David E.
1978 Preliminary Report: 1978 Excavations at NM-01-3495, Ojo Caliente, New Mexico. Ms. on file, Archeological Records Management Section, New Mexico Historic Preservation Division, Santa Fe.

1979 Preliminary Report: 1979 Excavations at Ponsipa-Akeri, Ojo Caliente, New Mexico. Ms. on file, Archeological Records Management Section, New Mexico Historic Preservation

Division, Santa Fe.

Carlson, Roy L.
1970 *White Mountain Redware: A Pottery Tradition of East-Central Arizona and Western New Mexico.* Anthropological Papers No. 19. University of Arizona, Tucson.

Collins, Susan
1975 *Prehistoric Rio Grande Settlement Patterns and the Inference of Demographic Change.* Ph.D. dissertation, University of Colorado, Boulder.

Cordell, Linda S.
1979 The Prehistory of Santa Fe Country. In *Archaeology and History of Santa Fe Country,* edited by Raymond V. Ingersoll, pp. 1-5. New Mexico Geological Society Special Publication No. 8.

Cordell, Linda S., and Fred Plog
1979 Escaping the Confines of Normative Thought: A Reevaluation of Puebloan Prehistory. *American Antiquity* 44(3):405-429.

Creamer, Winifred, and Jonathan Haas
1988 Warfare, Disease and Colonial Contact in the Pueblos of Northern New Mexico. Ms. on file, Laboratory of Anthropology. Museum of New Mexico, Santa Fe.

Dickson, D. Bruce, Jr.
1979 *Prehistoric Settlement Patterns: The Arroyo Hondo, New Mexico, Site Survey.* Arroyo Hondo Archaeological Series 2. School of American Research, Santa Fe.

Dittert, Alfred E., Jr.
1959 *Culture Change in the Cebolleta Mesa Region, Central Western New Mexico.* Ph.D. dissertation, Department of Anthropology, University of Arizona, Tucson.

Dougherty, Julia D.
1980 *An Archaeological Evaluation of Tsiping Ruin (AR 03-10-01-01).* Cultural Resources Report No. 1. USDA Forest Service, Southwestern Region, Albuquerque.

Dutton, Bertha
1953 Galisteo Basin Again Scene of Archaeological Research. *El Palacio* 60(10):339-351.

Fallon, Denise, and Karen Wening
1987 *Howiri: Excavation at a Northern Rio Grande Biscuit Ware Site.* Laboratory of Anthropology Notes No. 261b. Museum of New Mexico, Santa Fe.

Fewkes, Jesse Walter
1909 *Antiquities of the Mesa Verde National Park. Spruce Tree House.* Bureau of American Ethnology Bulletin 41, Washington, D. C.

Greenlee, Robert
n.d. Archaeological Sites in the Chama Valley, and Report on Excavations at Tsama 1929-1933. Ms. on file Laboratory of Anthropology. Museum of New Mexico, Santa Fe.

Haury, Emil W.
1937 Shell. In *Excavations at Snaketown: Material Culture.* Medallion Papers 25.

1985 *Mogollon Culture in the Forestdale Valley, East-Central Arizona.* University of Arizona Press, Tucson.

Haury, Emil W., and Carol Gifford
1959 A Thirteenth Century "Strongbox." *The Kiva* 24(4):1-11.

Hewett, Edgar L.
1906 *Antiquities of the Jemez Plateau, New Mexico.* Bureau of American Ethnology Bulletin 32. Washington, D.C.

1936 *The Chaco Canyon and its Monuments.* University of New Mexico Press, Albuquerque.

Jeancon, Jean Allard
1923 *Excavations in the Chama Valley, New Mexico.* Bureau of American Ethnology Bulletin 81, Washington D.C.

Jernigan, E. Wesley
1978 *Jewelry of the Prehistoric Southwest.* School of American Research. University of New Mexico Press, Albuquerque.

Judd, Neil M.
1954 *The Material Culture of Pueblo Bonito.* Smithsonian Miscellaneous Collections 124. Washington, D.C.

Kidder, Alfred V.
1932 *The Artifacts of Pecos.* Yale University Press, New Haven.

1958 *Pecos, New Mexico: Archaeological Notes.* Papers of the Robert S. Peabody Foundation for Archaeology, vol. 5. Phillips Academy, Andover.

Kidder, Alfred V., and Anna O. Shepard
1936 *The Pottery of Pecos,* vol. 2. Yale University Press, New Haven.

Lambert, Marjorie F.
1954 *Paa-ko, Archaeological Chronicle of an Indian Village in North Central New Mexico.* The School of American Research Monograph 19, Santa Fe.

Lancaster, James A., and Jean M. Pinkley
1954 Excavation at Site 16 of Three Pueblo II Mesa-Top Ruins. In *Archaeological Excavations in Mesa Verde National Park, Colorado, 1950,* pp. 23-81. Archaeological Research

Series Number 2. National Park Service, Washington, D.C.

Lang, Richard W.
1977 *Archaeological Survey of the Upper San Cristobal Arroyo Drainage, Galisteo Basin, Santa Fe County, New Mexico.* School of American Research 37. On file Archeological Records Management Section, New Mexico Historic Preservation Divison, Santa Fe.

1989 Conclusions. In *Limited Excavations at LA 2, the Agua Fria Schoolhouse Site, Agua Fria Village, Santa Fe County, New Mexico,* by Richard W. Lang and Cherie L. Scheick, pp. 189-198. Southwest Report No. 216. Southwest Archaeological Consultants, Inc. On file Archeological Records Management Section, New Mexico Historic Preservation Division, Santa Fe.

Lange, Charles H., Jr.
1941 *The Evans Site: A Contribution to the Archaeology of the Gallina Region, Northern New Mexico.* Master's thesis, Department of Anthropology, University of New Mexico, Albuquerque.

Mathien, Frances Joan
1984a Travertine Versus Shell. A Problem in Identification of Materials Found in Archaeological Sites. In *Collected Papers in Honor of Harry L. Hadlock,* edited by Nancy Fox, pp. 93-112. Papers of the Archaeological Society of New Mexico 9, Albuquerque.

1984b Social and Economic Implications of Jewelry Items of the Chaco Anasazi. In *Recent Research on Chaco Prehistory,* edited by W. James Judge and John D. Schelberg, pp. 173-186. Reports of the Chaco Center No. 8. National Park Service, Albuquerque.

1987 Ornaments and Minerals From Pueblo Alto. In *Investigations at the Pueblo Alto Complex. Chaco Canyon, New Mexico, 1975-1979. Artifactual and Biological Analyses,* vol. 3, part 1, edited by Frances Joan Mathien and Thomas C. Windes, pp.381-428. Publications in Archaeology 18F, Chaco Canyon Studies. National Park Service, Santa Fe.

1988 Appendix G. Analysis of Ornaments, Minerals and Cached Items. In *Historic Structure Report: Kin Nahasbas Ruin, Chaco Culture National Historic Park, New Mexico,* by Frances Joan Mathien and Thomas C. Windes, pp. 249-273. National Park Service, Santa Fe.

McNeil, Jimmy D.
1986 *Ornaments of Salmon Ruin, San Juan County, New Mexico.* Master's thesis Eastern New Mexico University, Portales.

Mera, H. P.
1934 *A Survey of the Biscuit Ware Area in Northern New Mexico.* Laboratory of Anthropology Technical Series Bulletin No. 6. Museum of New Mexico, Santa Fe.

1935 *Ceramic Clues to the Prehistory of North Central New Mexico.* Laboratory of Anthropology Technical Series Bulletin No. 8. Museum of New Mexico, Santa Fe.

Morris, Earl H.
1939 *Archaeological Studies in the La Plata District.* Carnegie Institution Publication No. 519, Washington, D.C.

Munday, Frederick C., and Thomas R. Lincoln
1979 A Comment on Bettinger: Problems in Archaeological Interpretation. *American Antiquity* 44(2):345-351.

Nelson, Nels C.
1914 *Pueblo Ruins of the Galisteo Basin, New Mexico.* American Museum of Natural History, Anthropological Papers 15(1).

1915 Pueblo Cienega, also Called La Mesita. Ms on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Peckham, Stewart
1981 The Palisade Ruin (LA 3505): A Coalition Period Pueblo near Abiquiu Dam, New Mexico. In *Collected Papers in Honor of Eric Kellerman Reed,* edited by A. H. Shroeder, pp. 113-147. Papers of the Archaeological Society of New Mexico 6, Albuquerque.

1984 The Anasazi Culture of the Northern Rio Grande Rift. In *New Mexico Geological Society Guidebook: Rio Grande Rift, Northern New Mexico* (35th Field Conference), pp. 275-281.

Pippin, Lonnie C.
1987 *Prehistory and Paleoecology of Guadalupe Ruin, New Mexico.* University of Utah Anthropological Papers 112.

Preucel, Robert W.
1987 Settlement Succession on the Pajarito Plateau, New Mexico. *The Kiva* 53(1):3-33.

Prinz, Martin, George Harlow, and Joseph Peters
1978 *Simon and Schuster's Guide to Rocks and Minerals.* Simon and Schuster, New York.

Reed, Erik K.
1954 Test Excavation at San Marcos Pueblo. *El Palacio* 61(10):323-343.

Robinson, William J., Bruce G. Harrill, and Richard L. Warren
1973 *Tree Ring Dates from New Mexico J-K, P, V, Santa Fe-Pecos-Lincoln Area.* Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Schiffer, Michael B.
1983 Toward the Indentification of Formation Processes. *American Antiquity* 48(4):675-706.

Seaman, Timothy J.
1976 *Archaeological Investigation on the San Juan-to-Ojo 345 KV Transmission Line for the Public Service Company of New Mexico: Excavation of LA 11843, an Early Stockaded Settlement of the Gallina Phase.* Laboratory of Anthropology Notes No.111g. Museum of New Mexico, Santa Fe.

Shelley, Phillip H.
1991 Progress Report on the Rio Bonito/Fort Stanton Archaeological Research Project, Summer 1988. Ms. on file Archeological Records Management Section, New Mexico Historic Preservation Division, Santa Fe.

Snow, David H.
1974 *The Excavation of Saltbush Pueblo, Bandelier National Monument, New Mexico, 1971.* Laboratory of Anthropology Notes No. 97. Museum of New Mexico, Santa Fe.

Steen, Charlie R.
1980 LA 10607: The Manzanares Site. In *Collected Papers in Honor of Helen Greene Blumenschein,* edited by Albert H. Schoeder, pp. 129-139. Papers of the Archaeological Society of New Mexico 5, Albuquerque.

Stuart, David E., and Rory P. Gauthier
1981 *Prehistoric New Mexico: Background for Survey.* New Mexico State Historic Preservation Bureau, Santa Fe.

Stubbs, Stanley A.
1954 Summary Report on an Early Pueblo Site in the Tesuque Valley, New Mexico. *El Palacio* 61(2):43-45.

Stubbs, Stanley A., and W. S. Stallings, Jr.
1953 *The Excavation of Pindi Pueblo, New Mexico.* Monographs of the School of American Research 18, Santa Fe.

Sudar-Murphy, Toni, and Karl W. Lumbach, with Dabney A. Ford
1977 Analyses of Ceramic, Lithic, Bone and Flotation Materials. In *Archaeological Investigations in Cochiti Reservoir, New Mexico,* vol. 2, *Excavation and Analysis 1975 Season,* edited by Richard C. Chapman and Jan V. Biella, pp. 19-28. Office of Contract Archeology, University of New Mexico, Albuquerque.

Sundt, William M.
1978 *AS-8 Archaeological Salvage Project: Progress Report Number Two.* Albuquerque Archaeological Society. On file Archeological Records Management Section, New Mexico Historical Preservation Division, Santa Fe.

1987 Pottery of Central New Mexico and its Role as Key to Both Time and Space. In *Secrets of a City: Papers on Albuquerque Area Archaeology in Honor of Richard A. Bice,* edited by Anne V. Poore and John Montgomery, pp. 116-147. Archaeological Society of New Mexico 13, Albuquerque.

1988 Typological Analysis of Potsherds in Collections from 12th and 13th Century Sites in the Rio Jemez Watershed and from Around Mesa Prieta. Ms. on file Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Sundt, William M., Bettie Terry, Beryl McWilliams, and Richard A. Bice
1983 *Report of Archaeological Survey of State of New Mexico Lands Along the Canada de las Milpas.* Albuquerque Archaeological Society. On file Archeological Records Management Section, New Mexico Historic Preservation Division, Santa Fe.

Tower, Donald B.
1945 The Use of Marine Mollusca and Their Value in Reconstructing Prehistoric Trade Routes in the American Southwest. *Papers of the Excavator's Club* 2(3).

Traylor, Diane E.
1982 Summary. In *Bandelier: Excavations in the Flood Pool of Cochiti Lake, New Mexico,* edited by Lyndi Hubbell and Diane Traylor, pp. 443-461. National Park Service, Southwestern Cultural Resource Center, Santa Fe.

Traylor, Diane E., and Robert P. Scaife
1982 Ceramics. In *Bandelier: Excavations in the Flood Pool of Cochiti Lake, New Mexico,* edited by Lyndi Hubbell and Diane Traylor, pp. 239-294. National Park Service, Southwestern Cultural Resource Center, Santa Fe,

Venn, Tasmin
1984 Shell Artifacts from Arroyo Hondo Pueblo. In *The Faunal Remains from Arroyo Hondo Pueblo, New Mexico,* edited by Richard W. Lang and Arthur H. Harris, pp. 227-253. Arroyo Hondo Archaeological Series 5, School of American Research Press, Santa Fe.

Ward, Albert E.
1976 Black Mesa to the Colorado River: An Archaeological Traverse. In *Papers on the Archaeology of Black Mesa, Arizona,* edited by George J. Gumerman and Robert C. Euler, pp. 3-105. Southern Illinois University Press, Carbondale.

Ware, John
1989 *Data Recovery Plan for LA 3333, an Early Coalition Pithouse Village in the Eastern Galisteo Basin Along U.S. 285, Santa Fe County, New Mexico.* Laboratory of Anthropology Notes No. 482. Museum of New Mexico, Santa Fe.

Warren, A. Helene
1977a Prehistoric and Historic Ceramic Analysis. In *Archaeological Investigations in Cochiti Reservoir, New Mexico,* vol. 2, *Excavation and Analysis 1975 Season,* edited by Richard C. Chapman and Jan V. Biella, pp. 97-100. Office of Contract Archeology, University of New Mexico, Albuquerque.

1977b Appendix I. New Dimensions in the Study of Prehistoric Pottery. In *Archaeological Investigations in Cochiti Reservior, New Mexico,* vol. 2, *Excavation and Analysis 1975 Season,* edited by Richard C. Chapman and Jan V. Biella, pp. 363-374. Office of

Contract Archeology, University of New Mexico, Albuquerque.

1979 The Glaze Paint Wares of the Upper Middle Rio Grande. In *Archaeological Investigations in Cochiti Reservoir New Mexico,* vol. 4, *Adaptive Change in the Northern Rio Grande Valley,* edited by Jan V. Biella and Richard C. Chapman, pp. 187-216. Office of Contract Archeology, University of New Mexico, Albuquerque.

Warren, A. H., and David H. Snow
1978 Formal Descriptions of Rio Grande Glazes from LA 70. In *Archaeological Investigations at Pueblo del Encierro, LA 70, Cochiti Dam Salvage Project, Cochiti, New Mexico, Final Report: 1964-1965 Field Seasons,* assembled and edited by David H. Snow, pp. C1-C34. Laboratory of Anthropology Notes No. 78. Museum of New Mexico, Santa Fe.

Wendorf, Fred (assembler)
1953 Salvage Archaeology in the Chama Valley, New Mexico. Monographs of the School of American Research 17, Santa Fe.

Wendorf, Fred, and Erik K. Reed
1955 An Alternative Reconstruction of Northern Rio Grande Prehistory. *El Palacio* 62(5-6):131-173.

Whalen, Michael E.
1987 The Bruton Bead Site and Pueblo Period Exchange in Southern New Mexico. *American Archaeology* 6(3):173-178.

Wilmeth, Roscoe
1956 *Cuyamungue Pueblo.* Master's thesis University of New Mexico, Albuquerque.

Windes, Thomas C.
1987 *Investigations at the Pueblo Alto Complex. Chaco Canyon, New Mexico 1975-1979,* vol. 2, part 2, *Architecture and Stratigraphy.* Publications in Archaeology 18F, Chaco Canyon Studies. National Park Service, Santa Fe.

1990 *The Spadefoot Toad Site.* Reports of the Chaco Center Number 12. National Park Service, Santa Fe.

Wiseman, Regge N., and J. Andrew Darling
1986 The Bronze Trail Site Group: More Evidence for a Cerrillos-Chaco Turquoise Connection. In *By Hands Unknown: Papers on Rock Art and Archaeology in Honor of James G. Bain,* edited by Anne V. Poore, pp. 115-138. Papers of the Archaeological Society of New Mexico 12. Albuquerque.

Wiseman, Regge N., and Bart Olinger
1991 Initial Production of Painted Pottery in the Rio Grande: The Perspective from LA 835, the Pojoaque Grant Site. In *Puebloan Past and Present: Papers in Honor of Stewart Peckham,* edited by Meliha S. Duran and David T. Kirkpatrick, pp. 209-217. Papers of the Archaeological Society of New Mexico 17. Albuquerque.