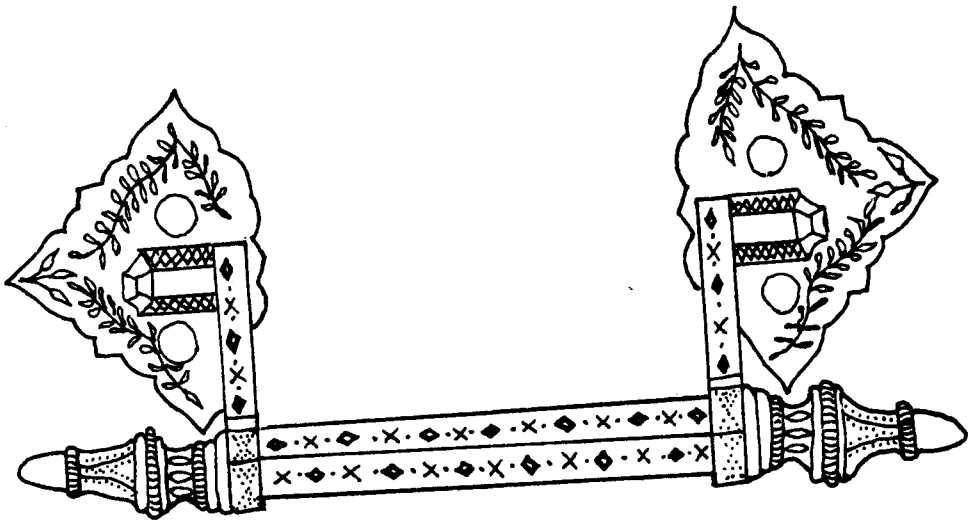
KERN COUNTY

ARCHAEOLOGICAL SOCIETY

JOURNAL



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The Kern County Archaeological Society Journal is published on an occasional basis. The Journal publishes articles and reports on the archaeology and ethnography of Kern County and surrounding areas.

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Cover illustration: Casket handle from CA-KER-480H
(see article by Blackwell beginning on page 52)

KERN COUNTY ARCHAEOLOGICAL SOCIETY JOURNAL

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MESSAGE FROM THE EDITORS

This is the sixth volume of the *Kern County Archaeological Society Journal* that has been published to date. We have recently reprinted a limited number of copies of Vol. 1 (1977); so in addition to the current volume, as well as Vol. 1, we now have available Vol. 2 (1984), Vol. 3 (1992), Vol. 4 (1993), and Vol. 5 (1994). It is the goal of the Kern County Archaeological Society (KCAS) to publish a *Journal* annually, and with enough submissions we will be able to accomplish this goal.

We are interested in papers on the archaeology or ethnography of the San Joaquin Valley and surrounding areas written by members of the KCAS or others in the community, whether they be professionals, students, or avocationalists. We always strive to include as many articles as possible and encourage authors to submit their papers for consideration. By publishing such material, it is our hope that we may benefit our members by making available the important archaeological and ethnographic work being done in the San Joaquin Valley and environs, as well as educating the public about the significance of such work.

Finally, we express our gratitude to Mark Q. Sutton, whose patience, advice, and editorial assistance guided us through some turbulent waters and kept us afloat.

Jill Gardner
Robin Tidmore
Co-Editors, *Kern County Archaeological Society Journal*, Vol. 6 (1995)

ARCHAEOLOGICAL INVESTIGATIONS AT THE GREENLEE SITE (CA-TUL-1695), SOUTHERN SIERRA NEVADA

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INTRODUCTION

The Greenlee site, CA-TUL-1695, is located in north-central Tulare County on the Homer Ranch in the foothills of the southern Sierra Nevada (Fig. 1). The site was discovered by Jeff Greenlee, a California State University, Bakersfield (CSUB), student who leased the land for ranching. A series of depressions (possible housepits), milling features, midden, and artifacts were noted in a relatively undisturbed setting. It was therefore decided to map and test excavate several of the depressions at the site using the field classes from CSUB.

Very little archaeological work in this region has been reported. However, three nearby sites along the Kaweah River four to five miles south of the Greenlee site have been tested and reported. The first is the Slick Rock site (CA-TUL-10), a small late village (Fenenga 1952). This site contained 13 "housepits" ranging from three to five meters (10 to 16 feet) in diameter (Fenenga 1952:341), numerous milling features, burials and cremations, and a variety of artifacts.

Second, excavations at the Cobble Lodge site (CA-TUL-145) were reported by von Werlhof (1961). This is a late village site with associated milling localities and a cemetery. It was reported (von Werlhof 1961:3) that a smallpox epidemic in the 1860s killed many people from that village, who were buried at the site in a mass grave (discovered during the excavations there, von Werlhof 1961). Evidence of houses (burned clay) and many artifacts were found at the site.

Lastly, the Greasy Creek site (CA-TUL-1, possibly an ethnohistoric Yokuts site) was excavated in 1958 (Pendergast and Meighan 1959). Pendergast and Meighan (1959) reported the recovery of a variety of artifacts, including brownware ceramics from the upper 12 in., 23 steatite disk beads, and a number of slate artifacts. Only one shell bead was found at Greasy Creek, perhaps due to the use of 1/4-in. mesh screens.

SITE DESCRIPTION

The CA-TUL-1695 site is located in a saddle on the top of a large hill about 1.5 mi. east of Dry Creek and 3 mi. north of the Kaweah River, at an elevation of approximately 670 m. (2,200 ft.). It is composed of at least four distinct loci and measures approximately 160 m. north/south by 100 m. east/west (Fig. 2). Features include bedrock mortars, cupules, and at least 13 circular depressions. A variety of artifacts is present on the surface and midden is evident in several locations.

The soil on the site is a silty loam underlain by decomposing granite. The vegetation community is Oak Woodland. An active spring and an unnamed drainage (containing a little water) is present along the eastern edge of the site. An earthen dam was recently constructed in this drainage, creating a pond (Fig. 2). Cattle grazing has impacted the integrity of the site and an excavated pit is present, indicating that some vandalism may have occurred (although it may be a cattle wallow).

Locus 1 (Fig. 3) contains two bedrock mortar features, A and B (Fig. 4), and an area of disturbance. Locus 2 (Fig. 5) consists of five circular depressions (Features C through G, averaging 9.3 $m.^2$ in size; Table 1), midden, and a variety of artifacts on the surface. Locus 3 consists of three features, including one cupule feature

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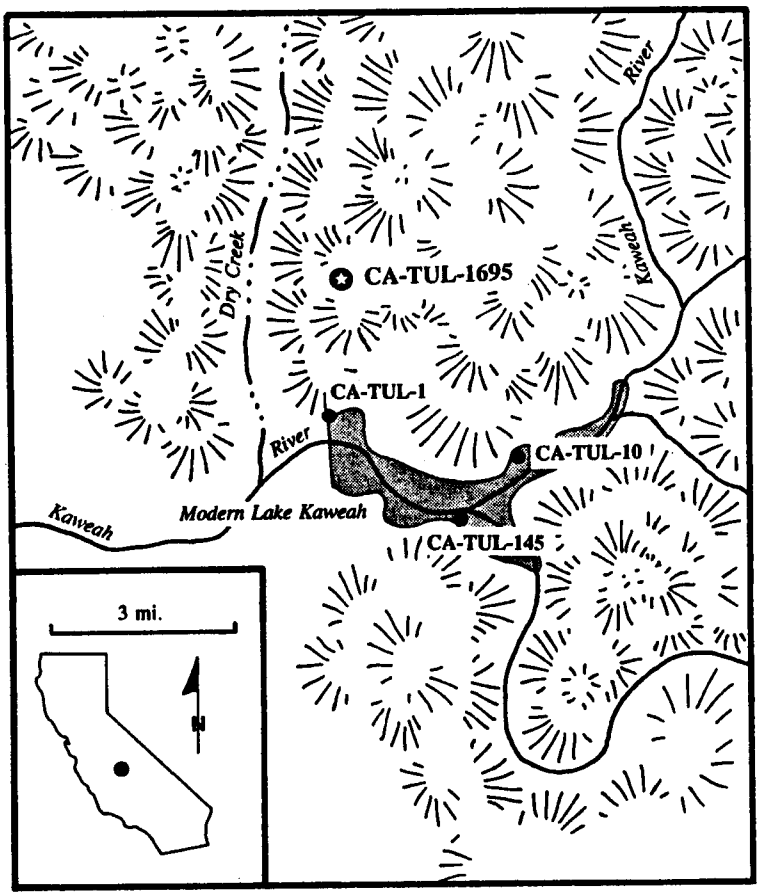

Fig. 1. General location of the CA-TUL-1695 site.

Table 1
SIZE OF CIRCULAR DEPRESSION FEATURES, CA-TUL-1695

Feature	Dimensions (N/S x E/W, in m.)	Area ($m.^2$)	Avg. Area ($m.^2$)
Locus 2			
C	4.0 x 3.8	11.9	
D	3.0 x 2.6	6.2	
E	2.8 x 2.7	6.1	9.3
F	2.8 x 2.6	5.7	
G	4.6 x 4.6	16.6	
Locus 4			
H	2.8 x 2.8	6.2	
I	2.3 x 2.0	3.8	
J	2.1 x 1.8	3.1	
K	1.9 x 1.8	2.7	3.6
L	2.0 x 2.1	3.1	
M	2.2 x 2.3	3.8	
N	2.3 x 1.5	3.1	
O	1.8 x 1.9	2.7	

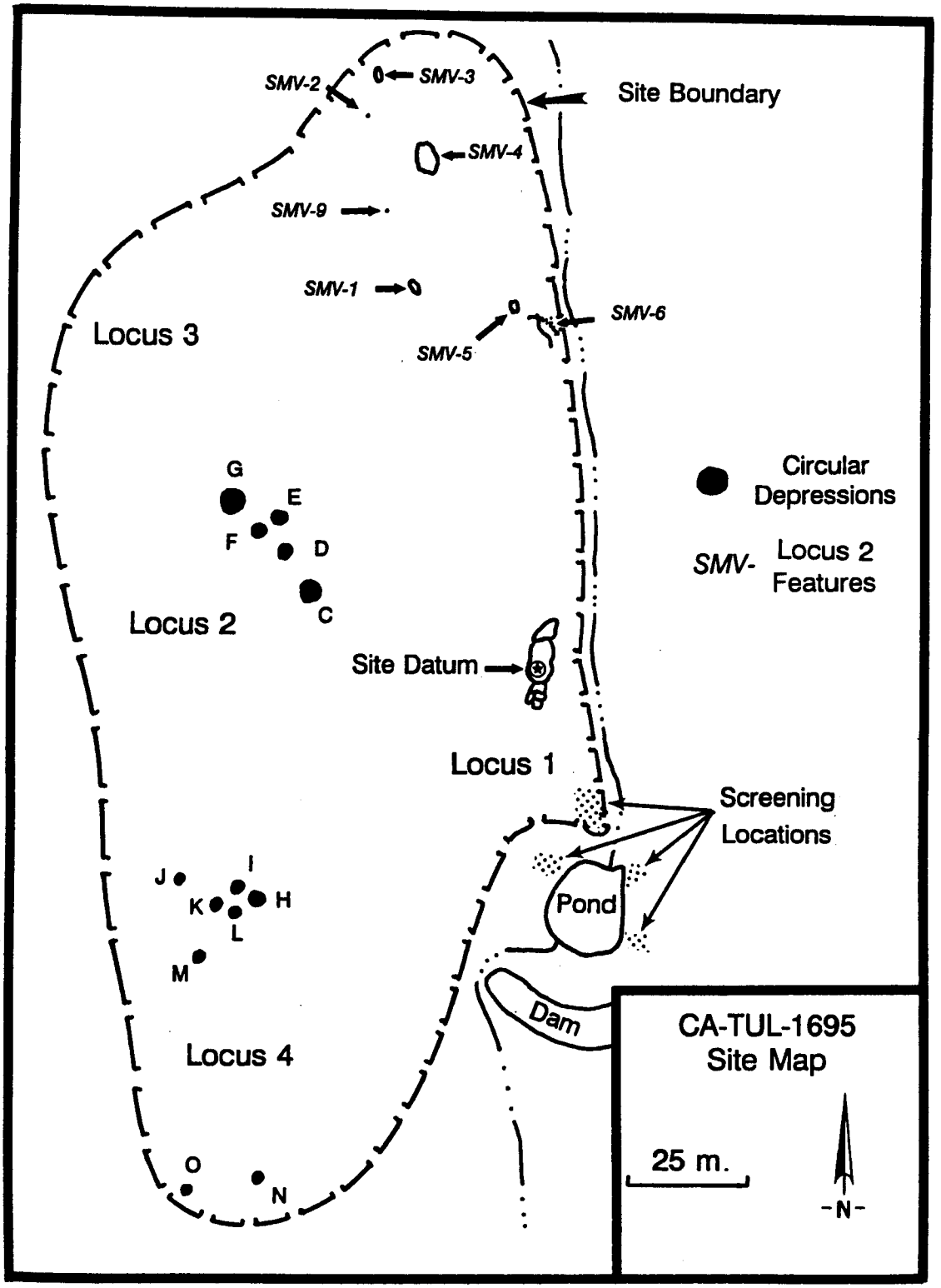

Fig. 2. Map of the CA-TUL-1695 site.

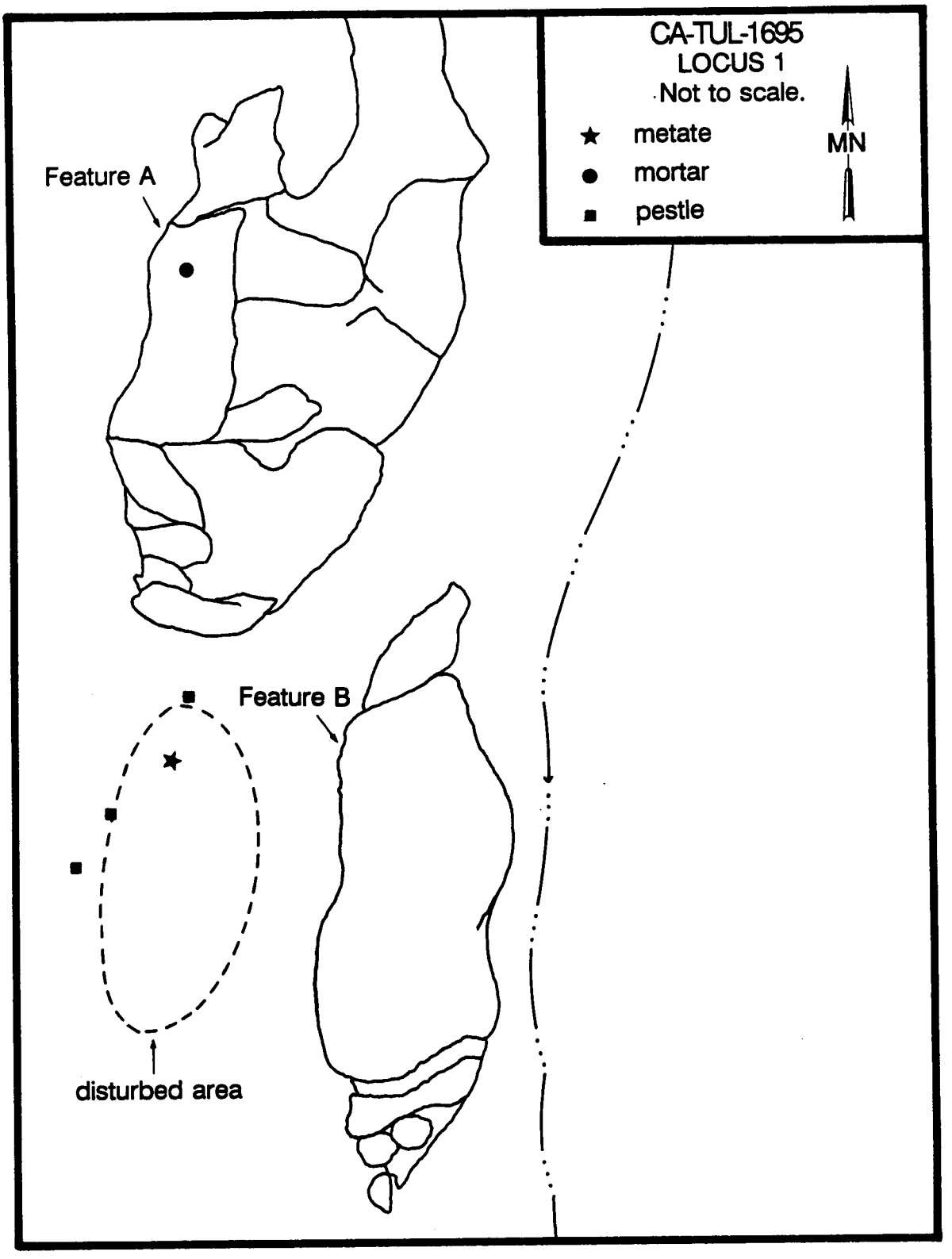

Fig. 3. Map of Locus 1, CA-TUL-1695.

(there are incomplete data for this locus). Locus 4 (Fig. 6) consists of eight circular depressions (Features H through O, averaging 3.6 m.^{2} in size; Table 1), midden, and several artifacts on the surface.

PROJECT GOALS

The work at the site was not a general testing program but was conducted with two basic goals in mind. The first goal was to simply record the site, providing field experience to the students.

The second goal was to explore the architecture, content, and age of the circular depressions. The site is located in ethnographic Wukchumni (or Wikchamni; Spier 1978:471) Foothill Yokuts territory (Gayton 1948:55). The Foothill Yokuts groups were largely independent political units, and while most Yokuts groups were organized in totemic moieties, the Wukchumni were not (Gayton 1948:97; Spier 1978:481). However, the presence of two major clusters of "circular depressions" suggested the possibility of the presence of some sort of dual social organization (e.g., moieties). It was hoped that exploration of the circular features could shed some light on this problem.

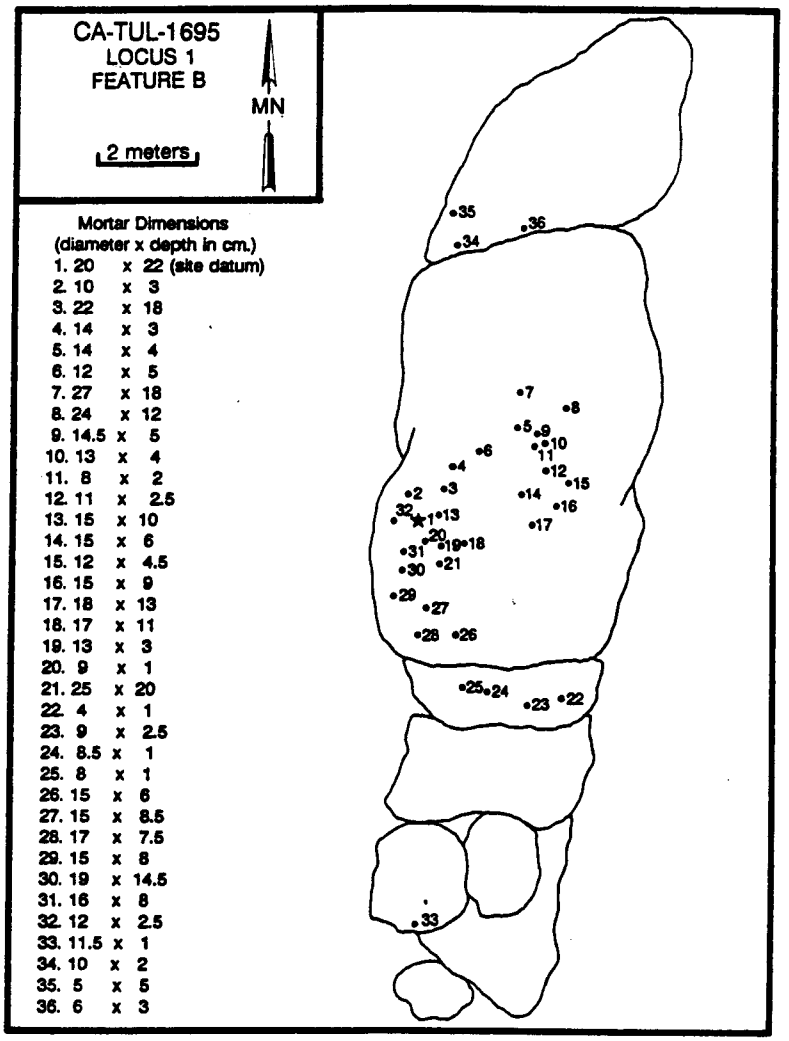

Fig. 4. Map of Feature B, Locus 1, CA-TUL-1695.

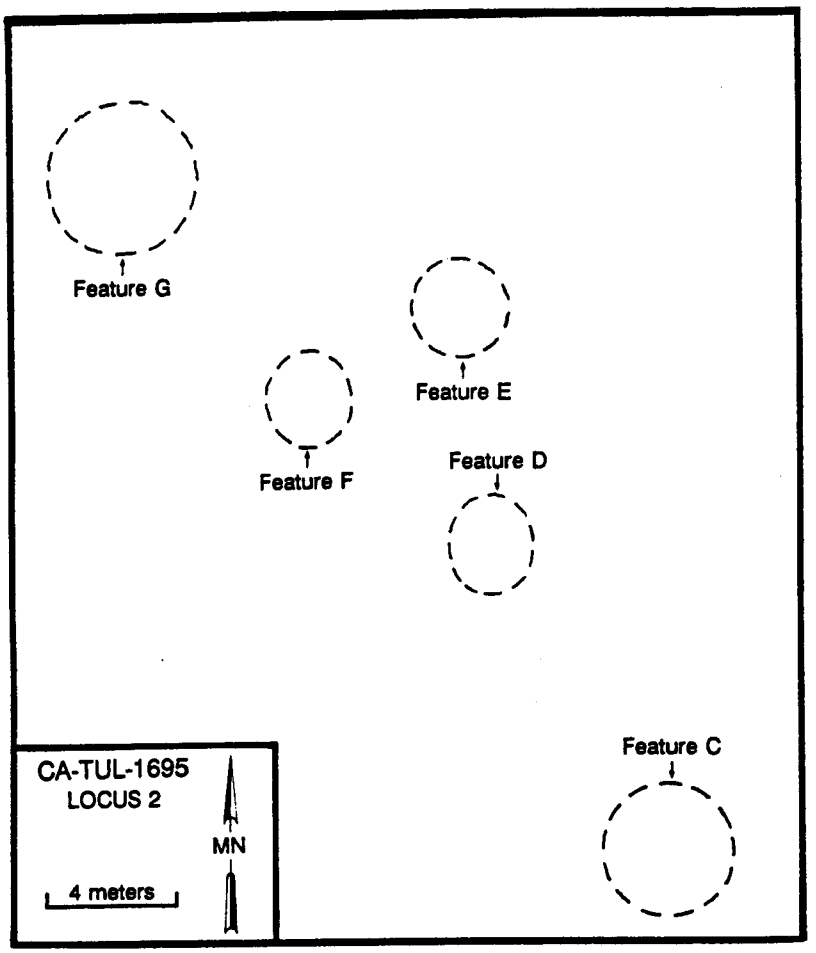

Fig. 5. Map of Locus 2, CA-TUL-1695.

METHODS

A map of the site was made and the various features were plotted on this map. No systematic surface collection was made, but a few diagnostic artifacts were mapped and collected. Two circular depressions were judgmentally selected for testing, one from each of the main clusters of depressions (Feature C at Locus 2 and Feature H at Locus 4). At Feature C, two quadrants, NW and SE, were excavated; at Feature H, only the SE quadrant was dug. Each excavation unit was 2 x 2 m. in size, the corner of the unit being located in the center of the depression. Thus, the excavation units encompassed portions of the center, rim, and exterior of the depression.

Each level was excavated in 5-cm. contour levels with trowel and shovel, and all removed soils were passed through 1/8-in. mesh screen. None of the excavations exceeded 10 cm., as prepared clay floors were encountered and no excavation was undertaken below the floor. Occasionally, some soil was screened through 1/16-in. mesh screen to check for small beads. Within each of the levels, materials from the "interior" of the depressions were kept separate from the "exterior" materials. All cultural materials, including questionable items, were collected from the screen and bagged by unit, level, and area (interior or exterior of the depression). A disturbed area near the bulldozed pond was also screened in different areas in order to determine the extent of the site and assess damage done.

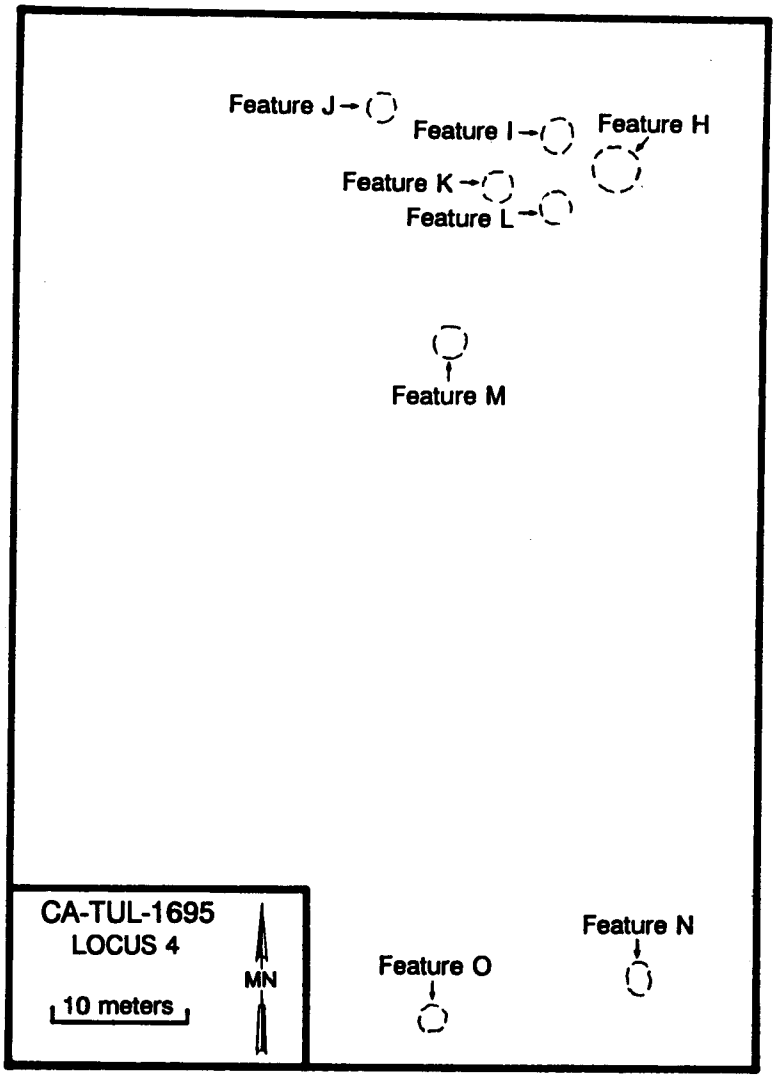

Fig. 6. Map of Locus 4, CA-TUL-1695.

All of the materials recovered from the site were catalogued with the aid of a computer program (LabAssistant). Each artifact received a separate number; debitage of the same material, faunal remains, and floral remains from each level were grouped and received one number. Metric attributes (length, width, thickness, and weight) were obtained on each artifact.

RESULTS

Description of Excavated Features

Locus 2, Feature C. Locus 2 contained five circular depressions, one of which (Feature C) was judgmentally selected for excavation. Feature C was sightly oblong, measuring some 5.0 m. in length, 3.4 m. in width, and about 28 cm. deep prior to excavation (Fig. 7). A burned area, possibly a hearth, was found in the approximate center of the feature (see Fig. 7).

The soil on the surface of the feature was a grayish-brown, silty loam with considerable pea gravel mixed in. In the interior of the depression, a very hard and compact layer was encountered (Fig. 8). A root layer was present at the contact between the soft and hard soil, and this hard layer was interpreted as the prepared floor of the structure. A series of "postholes" was found along the rim of the depression (see Fig. 7), appearing to form a double line along the edge.

Locus 4, Feature H. Locus 4 contained eight circular depressions, one of which (Feature H) was judgmentally selected for excavation. Feature H was about 2.8 m. in diameter and about 15 cm. deep prior to excavation (Fig. 9). The soil in the depression was a light grey-brown, silty loam. A packed clay floor was discovered at a depth of between 5 and 10 cm. (Fig. 10). Postholes were not obvious along the edge, but four possible postholes, perhaps representing ramada supports, were mapped along the southeastern side of the depression (Fig. 9).

Material Culture

A total of 314 artifacts was collected from the site, including ground stone, flaked stone, shell, bone, and glass beads, and ceramics. Each category is described below.

Milling Equipment. In addition to the numerous bedrock milling features recorded on the site, one metate, one mano, and three pestles were mapped but not collected. Two mano fragments, both made of granite, were recovered from the excavations (see Table 2); one in each of the excavated depressions.

Ornamental Ground Stone. Five steatite ornaments were recovered: a disk and four beads. The steatite disk (FH-019; Fig. 11) likely was made from a bowl fragment as one surface is slightly concave. It is interpreted as an earring.

Four steatite beads (see Table 2) were found in Feature H, two complete round specimens and two fragmentary square ones. The steatite beads (also found at Slick Rock Village [Fenenga 1952:345] and at Greasy Creek [Pendergast and Meighan 1959]) may be Late Period markers (e.g., Fenenga 1952:345) and all were found in Feature H (as were all of the shell and glass beads). A small number of apparently unmodified fragments of steatite was found in the excavations.

Flaked Stone. The flaked stone subassemblage consists of two projectile points, a basalt uniface, an unidentified basalt artifact, and debitage. The provenience and attributes of the formed, flaked stone tools are presented in Table 3. One complete clear quartz Rose Spring series projectile point (Fig. 12a) was discovered on the surface. This point series dates to Phase 1 of the Late Period. The second point is a fragmentary obsidian Desert Side-notched specimen (Fig. 12b). It is from an unknown geological source (see below). Its surface is too weathered to obtain a hydration rind measurement. A basalt, unifacially flaked, streamworn cobble was found in Feature C, as was an unidentified basalt artifact. These artifacts are similar to the "river cobble core scrapers" recovered from the Greasy Creek site (Pendergast and Meighan 1959:Table 1).

A total of 230 pieces of debitage was recovered (Table 4). Of that number, 125 (54.3%) are basalt, 92 (40.0%) are obsidian, seven (3.1%) are quartz, four (1.7%) are chalcedony, and two (0.9%) are jasper. Although no formal lithic analysis was undertaken, the following observations were noted. Most of the obsidian flakes are small (average of 0.18 g.) and interior (tertiary), although one did have some cortex remaining. The basalt flakes are much larger (average of 1.61 g.) and many more cortical flakes are present. No cores were identified from the site (although the excavations were very limited).

Table 2
PROVENIENCE AND ATTRIBUTES[a] OF GROUND STONE ARTIFACTS, CA-TUL-1695

Cat. No.	Provenience	Form	Length	Width	Thick-ness	Weight	Comments	Fig.
MANOS								
FH-051	SE 1/4, Feature H, 5-10 cm.	fragment	64.0	56.0	52.0	197.1		
FC-001	NW 1/4, Feature C, 0-5 cm.	fragment	121.0	79.0	67.5	869.2	also used as hammerstone	
–	surface, near creek	complete	–	–	–	–	bifacial, shaped, not collected	
STEATITE DISK								
FC-019	NW 1/4, Feature C, 5-10 cm.	complete	46.0	44.0	11.0	35.4	made from bowl frag.	11
STEATITE BEADS								
FH-018	SE 1/4, Feature H, 5-10 cm.	complete	9.0	8.9	2.0	0.5	round, perf. dia. is 3.2	
FH-019	SE 1/4, Feature H, 5-10 cm.	complete	5.0	5.0	1.9	0.3	round, perf. dia. is 2.5	
FH-080	SE 1/4, Feature H, 5-10 cm.	fragment	7.5	3.0	3.3	0.2	square	
FH-081	SE 1/4, Feature H, 5-10 cm.	fragment	8.5	6.0	3.0	0.2	square	

[a] metrics are in millimeters and grams.

Table 3
PROVENIENCE AND ATTRIBUTES[a] OF FLAKED STONE ARTIFACTS, CA-TUL-1695

Cat. No.	Provenience	Artifact	Material	Length	Width	Thick-ness	Weight	Fig.
S-001	Locus 2, surface	Rose Spring point	quartz	20.3	9.0	3.5	0.85	12a
FC-010	NW 1/4, Feature C, 5-10 cm.	Desert Side-notched point	obsidian	15.3	8.5	2.0	0.34	12b
FC-020	NW 1/4, Feature C, 5-10 cm.	unifacial tool	basalt	99.5	65.5	33.0	266.8	
FC-030	SE 1/4, Feature C, 0-5 cm.	unidentified	basalt	44.0	24.0	11.0	12.5	

[a] metrics are in millimeters and grams.

Table 4
SUMMARY OF DEBITAGE RECOVERED FROM CA-TUL-1695

Material/Unit and Level	No Location	SE 1/4, Feat. H, 0-5 cm.	SE 1/4, Feat. H, 5-10 cm.	NW 1/4, Feat. C, 0-5 cm.	NW 1/4, Feat. C, 5-10 cm.	SE 1/4, Feat. C, 0-5 cm.	SE 1/4, Feat. C, 5-10 cm.	Totals
basalt	2	5	18	27	44	5	24	125
chalcedony	–	–	1	3	–	–	–	4
jasper	–	–	–	–	–	–	2	2
obsidian	10	6	22	15	16	17	6	92
quartz	–	–	–	3	2	–	2	7
Totals	12	11	41	48	62	22	34	230

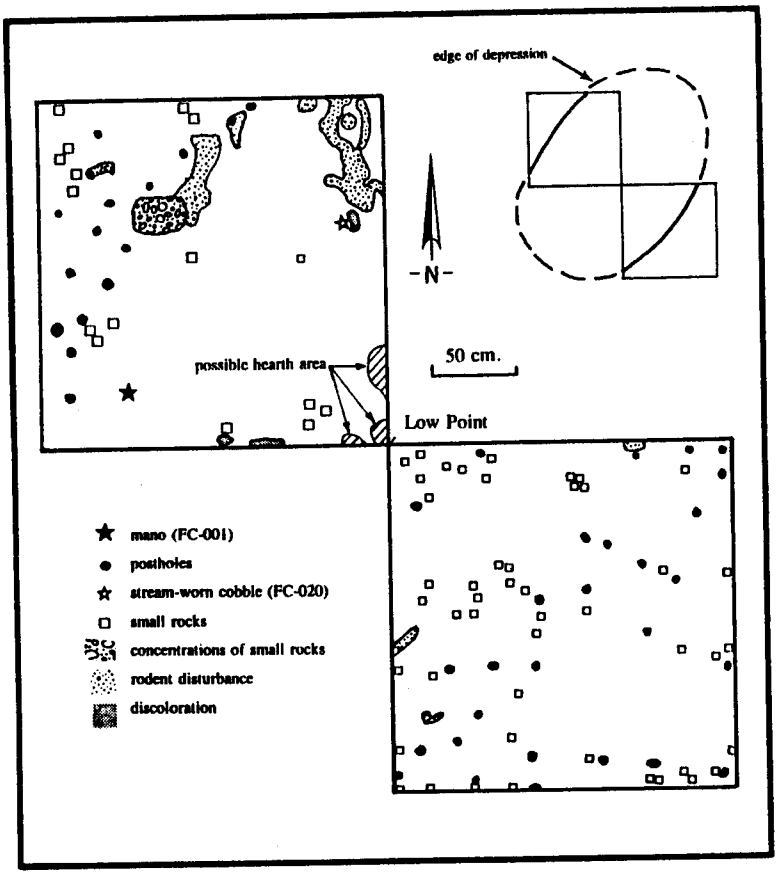

Fig. 7. Detail map of the excavation of Feature C, Locus 2, CA-TUL-1695.

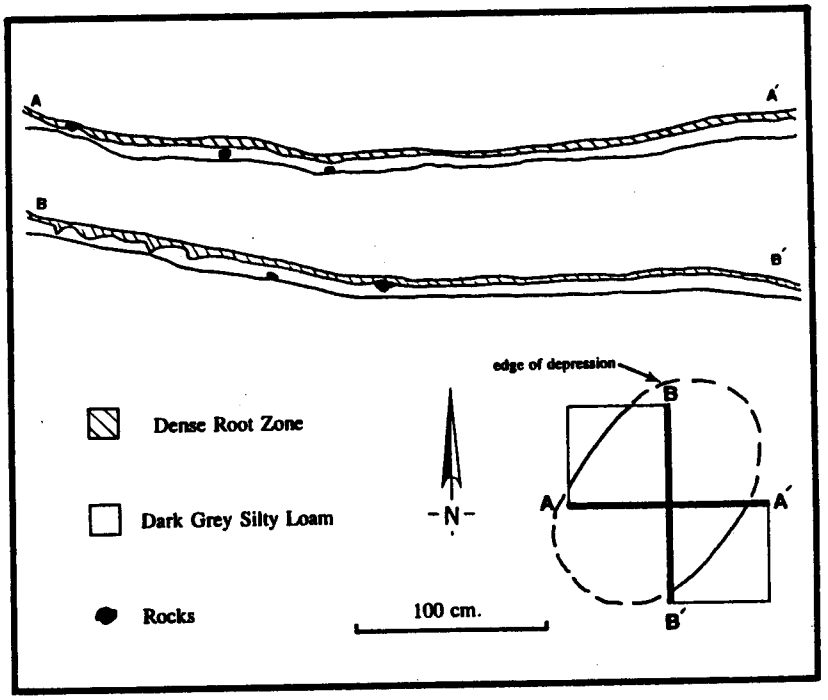

Fig. 8. Soil profiles of the excavation units, Feature C, Locus 2, CA-TUL-1695.

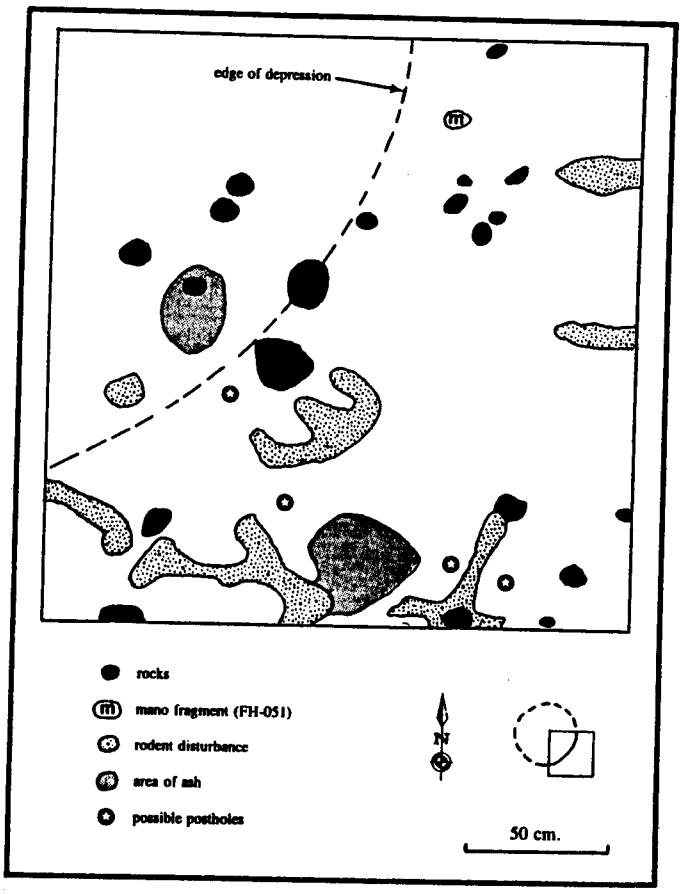

Fig. 9. Detail map of the excavation of Feature H, Locus 4, CA-TUL-1695.

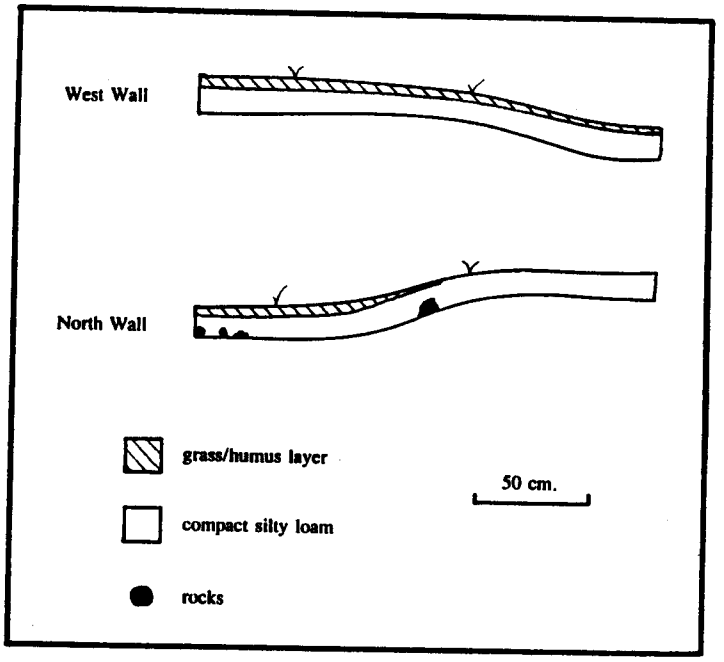

Fig. 10. Soil profiles of the excavation unit, Feature H, Locus 4, CA-TUL-1695.

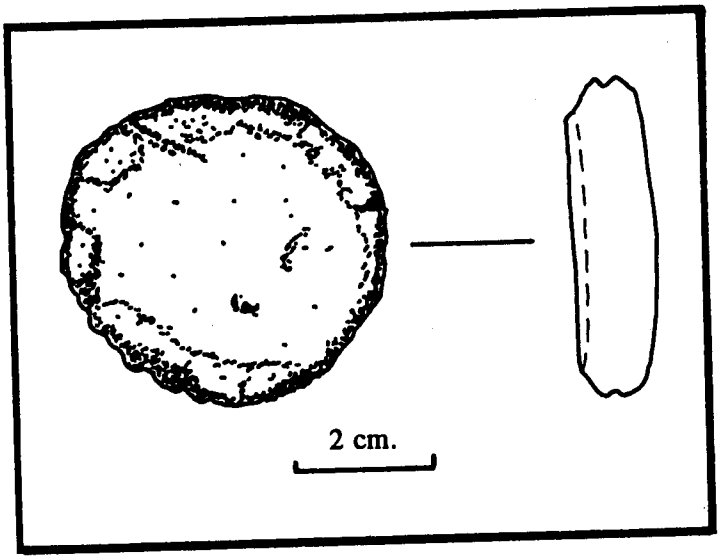

Fig. 11. Steatite "earring" (FC-019) from CA-TUL-1695.

***Olivella* Shell Beads.** Seven *Olivella* beads were recovered (Table 5), all from Feature H. Five are tiny saucers (G1; Bennyhoff and Hughes 1987:132), which are not temporally sensitive. The other two are classified as wall disks (J; Bennyhoff and Hughes 1987:136), dating to the Late Period. Both of the Class J beads are ground on the dorsal surface (reminiscent of ground disks [H1a; Bennyhoff and Hughes 1987:135]). None of the beads were burned.

Table 5
PROVENIENCE AND ATTRIBUTES[a] OF *OLIVELLA* BEADS, CA-TUL-1695

Cat. No.	Provenience	Type[b]	Diameter	Thickness	Perforation Diameter	Weight
FH-008	SE 1/4, Feature H, 0-5 cm.	G1, tiny saucer	4.5	1.2	2.0	0.1
FH-009	SE 1/4, Feature H, 0-5 cm.	G1, tiny saucer	4.6	1.1	2.0	0.1
FH-020	SE 1/4, Feature H, 5-10 cm.	J, wall disk	7.5	2.0	1.3	0.3
FH-021	SE 1/4, Feature H, 5-10 cm.	J, wall disk	5.1	1.4	1.6	0.7
FH-022	SE 1/4, Feature H, 5-10 cm.	G1, tiny saucer	4.4	1.5	1.0	0.2
FH-023	SE 1/4, Feature H, 5-10 cm.	G1, tiny saucer	4.3	1.0	1.0	0.1
FH-024	SE 1/4, Feature H, 5-10 cm.	G1, tiny saucer	4.1	1.7	1.8	0.2

[a] metrics are in millimeters and grams.
[b] following Bennyhoff and Hughes (1987).

Bone Bead. Two small fragments of a burned tubular bone bead (FC-038) were found in the 5 to 10-cm. level of the SW 1/4 of Feature C. The bead measures 4.5 mm. in diameter, 3.1 mm. in length, has a perforation diameter of 2.1 mm., and weighs 0.4 g. It was made from the bone of an unidentified bird.

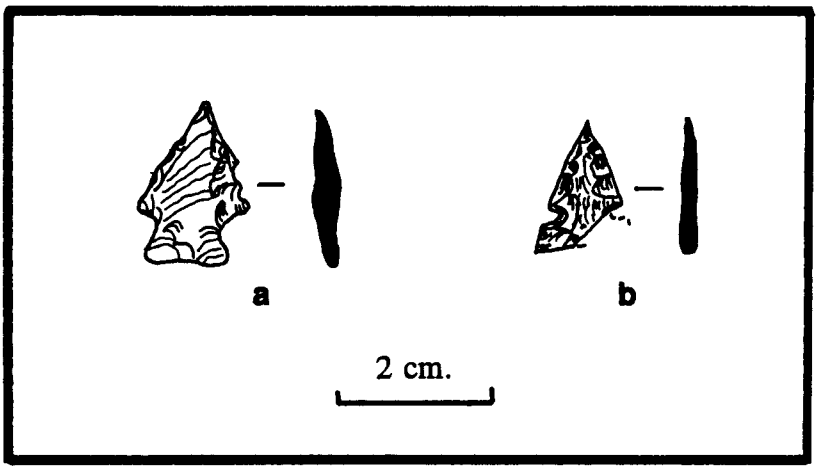

Fig. 12. Projectile points from CA-TUL-1695: (a) quartz Rose Spring point (S-001); (b) obsidian Desert Side-notched point (FC-010).

Glass Beads. Twenty-nine glass beads were recovered, all from Feature H (Table 6). Of that number, five are round and are red with white centers (Cornaline d'Allepo), four are round and are purple with white centers, five are round and aqua-colored, four are round and white-colored, 10 are cobalt blue faceted (hexagon) (one of these being dark blue), and one is round and blue (a fragment). Glass beads date to Protohistoric or Historic times, after A.D. 1700, and the faceted blue beads and the Cornaline d'Allepo beads date to the American Period, in the mid-nineteenth century.

Ceramics. A total of 32 pieces of ceramics (a brownware, perhaps what Fenenga [1952:343] called Tulare Plain Ware) was recovered (Table 7). With the exception of one fairly large piece (32 g.), the remainder are quite small, averaging 1.23 g. Five (FH-046, FH-053, FH-056, FH-076, and FC-018) are rim fragments representing three rim styles; rounded (Fig. 13a), rounded and recurved (Fig. 13b), and squared-off and slightly recurved (Fig. 13c). The shapes of these rims are suggestive of bowls and are similar to those recovered from the Greasy Creek site (Pendergast and Meighan 1959:Fig. 1). The large piece noted above (FH-017) appears to be a fragment of a flat-bottomed vessel, what Fenenga (1952:344) called "flower pot" vessels, typical of Tulare Plain Ware (this shape was copied from European forms in order to sit on tables). Most (91%, n = 29) of the ceramics were found in Feature H, indicating that Feature H was occupied late in time (ceramics appear in the region after about A.D. 1300 [Pendergast and Meighan 1959:4; Jackson 1990:164]).

Other. A number of other materials also was recovered. These include small amounts of charcoal scattered throughout the soil, three small fragments of unmodified steatite, and one small piece of poor quality red ocher.

Faunal Remains

A total of 252 faunal elements was recovered from the site, six from nonfeature locations, 218 from Feature C, and 28 from Feature H (Table 8). A description of the taxa and elements recovered is presented below.

Invertebrates. Invertebrate remains are represented by three specimens, two fragments of freshwater mussel and one unidentified burned insect fragment. Both the freshwater mussel fragments were found in Feature C. They have been tentatively identified as *Anodonta* sp., although other mussels (*Margaritifera margaritifera* and *Gonidea angulata*) occur in local streams and rivers (e.g., the nearby Kaweah River). This material may represent the remains of food obtained in the San Joaquin Valley.

Table 6
PROVENIENCE AND ATTRIBUTES[a] OF GLASS BEADS, CA-TUL-1695

Cat. No.	Provenience	Type	Diameter	Length	Hole Diameter
FH-001	SE 1/4, Feature H, 0-5 cm.	round, red w/white center	4.0	3.0	1.5
FH-002	SE 1/4, Feature H, 0-5 cm.	round, white	4.0	3.5	2.0
FH-003	SE 1/4, Feature H, 0-5 cm.	round, aqua	3.0	2.5	2.0
FH-004	SE 1/4, Feature H, 0-5 cm.	blue hexagon	4.3	5.0	2.5
FH-005	SE 1/4, Feature H, 0-5 cm.	blue hexagon	5.0	5.1	2.2
FH-006	SE 1/4, Feature H, 0-5 cm.	blue hexagon	4.5	5.4	2.3
FH-007	SE 1/4, Feature H, 0-5 cm.	blue hexagon	5.5	4.6	3.7
FH-010	SE 1/4, Feature H, 0-5 cm.	round, blue (frag.)	6.6	2.5	4.0
FH-025	SE 1/4, Feature H, 5-10 cm.	blue hexagon	5.9	5.8	3.1
FH-026	SE 1/4, Feature H, 5-10 cm.	blue hexagon	5.9	5.3	3.9
FH-027	SE 1/4, Feature H, 5-10 cm.	blue hexagon	5.2	4.9	3.0
FH-028	SE 1/4, Feature H, 5-10 cm.	blue hexagon	5.1	5.1	2.5/3.8 (oblong)
FH-029	SE 1/4, Feature H, 5-10 cm.	blue hexagon	5.1	5.0	2.2
FH-030	SE 1/4, Feature H, 5-10 cm.	dark blue hexagon	4.9	4.0	3.3
FH-031	SE 1/4, Feature H, 5-10 cm.	round, white	3.9	3.6	2.1
FH-032	SE 1/4, Feature H, 5-10 cm.	round, white	4.0	2.9	2.0
FH-033	SE 1/4, Feature H, 5-10 cm.	round, white	3.5	2.3	2.0
FH-034	SE 1/4, Feature H, 5-10 cm.	round, aqua	2.8	2.6	1.0
FH-035	SE 1/4, Feature H, 5-10 cm.	round, aqua	3.0	2.2	1.6
FH-036	SE 1/4, Feature H, 5-10 cm.	round, aqua	3.0	2.0	1.2
FH-037	SE 1/4, Feature H, 5-10 cm.	round, aqua	3.1	2.1	1.4
FH-038	SE 1/4, Feature H, 5-10 cm.	round, purple w/white center	4.1	2.9	1.7
FH-039	SE 1/4, Feature H, 5-10 cm.	round, purple w/white center	4.0	3.0	1.8
FH-040	SE 1/4, Feature H, 5-10 cm.	round, purple w/white center	3.5	2.9	1.3
FH-041	SE 1/4, Feature H, 5-10 cm.	round, purple w/white center	3.1	2.3	1.9
FH-042	SE 1/4, Feature H, 5-10 cm.	round, red w/white center	4.2	2.9	2.0
FH-043	SE 1/4, Feature H, 5-10 cm.	round, red w/white center	4.9	3.0	2.0
FH-044	SE 1/4, Feature H, 5-10 cm.	round, red w/white center	3.7	2.7	2.8
FH-045	SE 1/4, Feature H, 5-10 cm.	round, red w/white center	3.5	2.2	1.6

[a] metrics are in millimeters and grams.

Table 7
SUMMARY OF CERAMICS FROM CA-TUL-1695

Unit/Level	SE 1/4, Feat. H	NW 1/4, Feat. C	SE 1/4, Feat. C	Totals
0-5 cm.	2	--	1	3
5-10 cm.	27[a]	1[b]	1[b]	29
Totals	29	1	2	32

[a] includes three rim fragments.
[b] rim fragment.

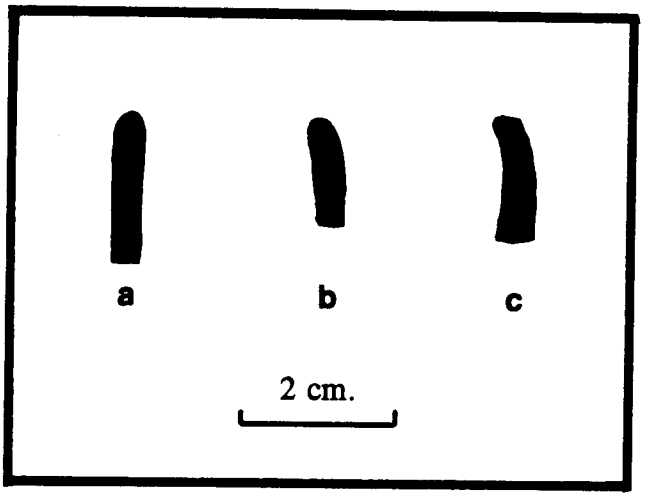

Fig. 13. Ceramic rim styles: (a) rounded (FC-046); (b) rounded and recurved (FC-018); (c) squared-off and slightly recurved (FH-056).

Vertebrates. Vertebrate remains include those of fish, birds, reptiles, and mammals. A description of the elements recovered is provided below.

Fish. Two fish vertebrae from the Sacramento sucker (*Catostomus occidentalis*) were found, both in the same unit (SE 1/4, Feature H, 5 to 10 cm.). The Sacramento sucker inhabits the river and lake systems of the central valley and may be found in the valley bottom or in the rivers and streams of the foothills (McGinnis 1984:162). The Kaweah River is located about three miles south of the site and it is quite possible that the fish were obtained there.

Bird. One phalange from an unidentified small bird was found.

Reptiles. Two reptile vertebrae were found, one from a small, unidentified lizard, and the other from an unidentified snake.

Mammals. Most of the faunal remains recovered from the site are from mammals. A small number of lagomorph remains was found, including one scapula from a black-tailed hare (*Lepus californicus*), an axis from a cottontail rabbit (*Sylvilagus audobonii*), and various elements (one vertebra, one humerus, one femur, one metatarsal, and one metapodial) from unidentified lagomorph(s). One humerus from a pocket gopher (*Thomomys* sp.) also was found.

In addition to the materials described above, nine elements of unidentified large mammal, 139 unidentified medium mammal, and 88 unidentified small mammal bones were recovered. Many of the medium elements may also represent lagomorphs, which may have contributed considerably to the diet. Of interest is the fact that the majority of the faunal remains (58.8%, n = 147) came from the NW 1/4 of Feature C, and most of those were unidentified small or medium mammals.

Floral Remains

In addition to the small fragments of charcoal recovered from the screens, 24 unburned seeds were found. Twenty-three of the specimens (FC-025) came from the upper 5 cm. of Feature C and the other (FH-050) was from the 5 to 10-cm. level in Feature H. None of the seeds are considered cultural and so were not identified to taxon.

Table 8
SUMMARY[a] OF FAUNAL REMAINS RECOVERED FROM CA-TUL-1695

Taxon/Unit and Level	No Location	Feat. H, SE 1/4, 0-5 cm.	Feat. H, SE 1/4, 5-10 cm.	Feat. C, NW 1/4, 0-5 cm.	Feat. C, NW 1/4, 5-10 cm.	Feat. C, SE 1/4, 0-5 cm.	Feat. C, SE 1/4, 5-10 cm.	Totals
freshwater mussel (cf. *Anodonta* sp.)	--	--	--	2	--	--	--	2
Sacramento sucker (*Catostomus occidentalis*)	--	--	2	--	--	--	--	2
unident. lizard	--	--	--	--	1	--	--	1
unident. snake	--	--	--	1	--	--	1	2
unident. bird	--	--	--	--	--	1	--	1
cottontail rabbit (*Sylvilagus audobonii*)	--	--	--	--	--	--	1	1
black-tailed hare (*Lepus californicus*)	--	--	--	1	--	--	--	1
pocket gopher (*Thomomys* sp.)	1	--	--	--	--	--	--	1
unident. lagomorph	--	--	2	--	2	1	--	5
unident. small mammal	--	13	--	--	37	2	36	88
unident. medium mammal	2	11	--	18	87	5	16	139
unident. large mammal	3	--	--	--	--	6	--	9
Totals	6	24	4	22	127	15	54	252

[a] number of identified specimens.

Human Remains

A single fragment (possibly parietal) of an adult human cranium was found on the surface, within Feature E (Locus 2). The discovery was reported to the Tulare County Coroner's Office (following Section 7050.5 of the Health and Safety Code), but no response was received. No other information could be obtained from the fragment, and it was not collected.

Obsidian Studies

Eight pieces of obsidian (seven flakes and one projectile point) were submitted for sourcing and hydration analysis (Table 9). Six of the flakes came from the Coso Volcanic Field, the other from the Casa Diablo source, and the point came from an unidentified source. The hydration rind of the point and three of the flakes could not be measured due to visually vague rinds. The rind of the other four flakes ranged between 4.3 and 6.0μ, with an average of 5.0μ. Such rim sizes would seem to date to Phase 1 of the Late Period.

Dating

The site is dated using two basic methods: artifact styles and obsidian hydration results. The artifacts from the site suggest the presence of two components. A Late Period Phase 1 (roughly equivalent to the latter part of the Greasy Creek Phase, ca. A.D. 300 to 1300, Moratto 1984:299) occupation is suggested by the presence of the

Rose Spring series point. A Late Period Phase 2 (Slick Rock Phase, ca A.D. 1300 to 1800, Moratto 1984:299) component is definitely present, as evidenced by the presence of glass beads, late shell bead types, the steatite earring, steatite beads, "flower pot" ceramics, and the Desert Side-notched point. Based on the glass beads, it is possible that the late component was limited to the Protohistoric Period, ca. after A.D. 1700.

The obsidian hydration data generally conform to a Phase 1 occupation (average micron value of 5.0). Perhaps the later inhabitants used less obsidian than the earlier ones.

Table 9
RESULTS OF OBSIDIAN STUDIES, CA-TUL-1695

Cat. No.	Lab. No.[a]	Artifact	Hydration Rind	Comments	Source
FC-010	1	Desert Side-notched projectile point	–	vague rind	unknown[b]
FC-008a	2	flake	6.0 ± 0.0	–	Coso
FC-008b	3	flake	–	vague rind	Coso
FC-024	4	flake	5.1 ± 0.1	–	Coso
FH-014a	5	flake	4.6 ± 0.1	–	Coso
FH-014b	6	flake	–	vague rind	Casa Diablo
H-004a	7	flake	4.3 ± 0.1	–	Coso
H-004b	8	flake	–	vague rind	Coso?

[a] BioSystems Lab. No. BO-94-12-.
[b] The following are the trace element data from the unknown source: Zn = 4.34 ± 7.3; Pb = 26.8 ± 3.9; Rb = 155.9 ± 3.5; Sr = 28.8 ± 6.2; Y = 26.3 ± 1.9; Zr = 127.1 ± 5.4; Nb = 31.8 ± 2.1; Fe/Mn ratio = 18.9.

CONCLUSIONS

The research goals of the project were accomplished: the site was recorded and we were able to explore the nature of the "circular depressions." The excavations revealed that the depressions (at least the two examined) are structures, as evidenced by the presence of postholes and prepared floors in each and of a hearth in one (Feature C).

The average size of the structures (n = 5) at Locus 2 (believed to reflect a Phase 1 occupation) is 9.3 $m.^2$ (see Table 1), while the average is 3.6 $m.^2$ at Locus 4 (believed to reflect a Phase 2 occupation). Each locus possessed one structure substantially larger than the others (Feature G at Locus 2 and Feature H at Locus 4), perhaps representing the residence of the "chief" of the site (a similar pattern exists at Hidden Reservoir, G. Fenenga, personal communication 1995). As Foothill Yokuts structure size is related, at least in part, to family size (Gayton 1948:63), it may be that family size was smaller during the later occupation.

The two distinct groups of structures may reflect two separate temporal components and not two distinct social units (e.g., moieties) as originally suggested (see above). A Phase 1 occupation is weakly hinted at Locus 2 due to the presence of a Rose Spring series point on the surface and the absence of late artifact markers in Feature C. A Phase 2 occupation is indicated at Locus 4 due to the presence of a large number of late bead types (shell and glass) found in Feature H. This may suggest that the initial occupation of the site occurred during Phase 1 of

the Late Period (although it is certainly possible that the site was occupied earlier, as the bottom of the deposit was not tested) and that occupation continued until after Euroamerican contact.

It is possible that the population of the site was impacted by the smallpox epidemic reported for the area in the 1860s (von Werlhof 1961:3); either by the deaths of site occupants or the influx of "refugees" from other sites (or both).

Further work at the CA-TUL-1695 site would be very enlightening and beneficial. Continued excavations of Features C and H would provide a broader picture of the prehistory of the sites, as would the excavation of additional features.

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A SURFACE ARTIFACT COLLECTION FROM THE DRUNKEN NAVIGATOR SITE (CA-KIN-39) AND IMPLICATIONS FOR LATE HOLOCENE HUMAN ADAPTATIONS IN THE TULARE LAKE BASIN, CALIFORNIA

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INTRODUCTION

This paper provides data on recent research conducted by the author at one locality on the western shoreline of ancient Tulare Lake (Fig. 1). A small surface collection of artifacts was made at the Drunken Navigator Site (CA-KIN-39), a shell midden located on a wave-cut terrace at an elevation of 210 to 215 ft. (64.6 to 66.2 m.).

The artifacts collected from the Drunken Navigator Site reflect an occupation at the Late Middle Period and/or Middle/Late Period transition (ca. 1,500 to 1,000 B.P.). Evidence from the Buena Vista Lake Basin to the south, and other locations in the western United States, suggests that major climatic shifts may have occurred around 1,000 B.P., with concurrent shifts in human adaptation. This paper will attempt to explore the possibility that the Drunken Navigator Site was occupied during a period in which the level of Tulare Lake was relatively stable and biotically productive.

SITE DESCRIPTION

The Drunken Navigator Site is located on the currently dry southwestern shore of Tulare Lake. The site location, in contrast with much of the Tulare Lake Basin, has likely never been subjected to plowing, land leveling, or other major alterations. Therefore, many morphological features associated with the lake (e.g., strandlines) are still intact, as are several midden deposits. In those areas of the San Joaquin Valley where farming has occurred, deposits appear to be heavily smeared, and midden indicators (e.g., shellfish) often are highly fragmented.

The Drunken Navigator Site is situated along what was once the contact zone between Tulare Lake and the western shoreline during much of the Historic Period. Although there is debate over the maximum elevation of the lake (cf. Arguelles 1983:13-14), it was probably somewhere between 217 and 220 ft. (66.7 to 67.6 m.). Between the years 1850 and 1870, Tulare Lake was at or above the 200 ft. (61.5 m.) elevation, and at three times the lake reached its maximum level (Grunsky 1930; Atwater et al. 1986). Tulare Lake formed an extremely rich biotic community which was readily exploited by native inhabitants (see Kroeber 1925; Latta 1929, 1976, 1977; Gayton 1948; Preston 1981).

HISTORICAL CONTEXT

During the latter half of the nineteenth century, Tulare Lake formed a large embayment in the vicinity of the Drunken Navigator Site. This embayment was home to large numbers of western pond turtles (*Clemmys marmorata*), and was thus given the label "Terrapin Bay" by the local commercial turtle fisherman. According to early pioneers, turtles within Terrapin Bay were so thick that they were taken with a seine. Pioneers stated that turtles, "could be seen on the banks of Tulare Lake and on drift logs so thick that the ground was completely covered. When disturbed they popped into the water in a solid mass making a roar like the surf on a beach" (Latta 1929:3). Interestingly, the area had been known as "Turtle Bay" to archaeologists (even before the "official" name was learned) due to the quantity of turtle bone on the surface of aboriginal sites.

Floral and faunal communities would vary depending on the level of Tulare Lake (see Preston [1981] for lists of native flora and fauna). Tules and other emergent plants were common on the margins of the lake.

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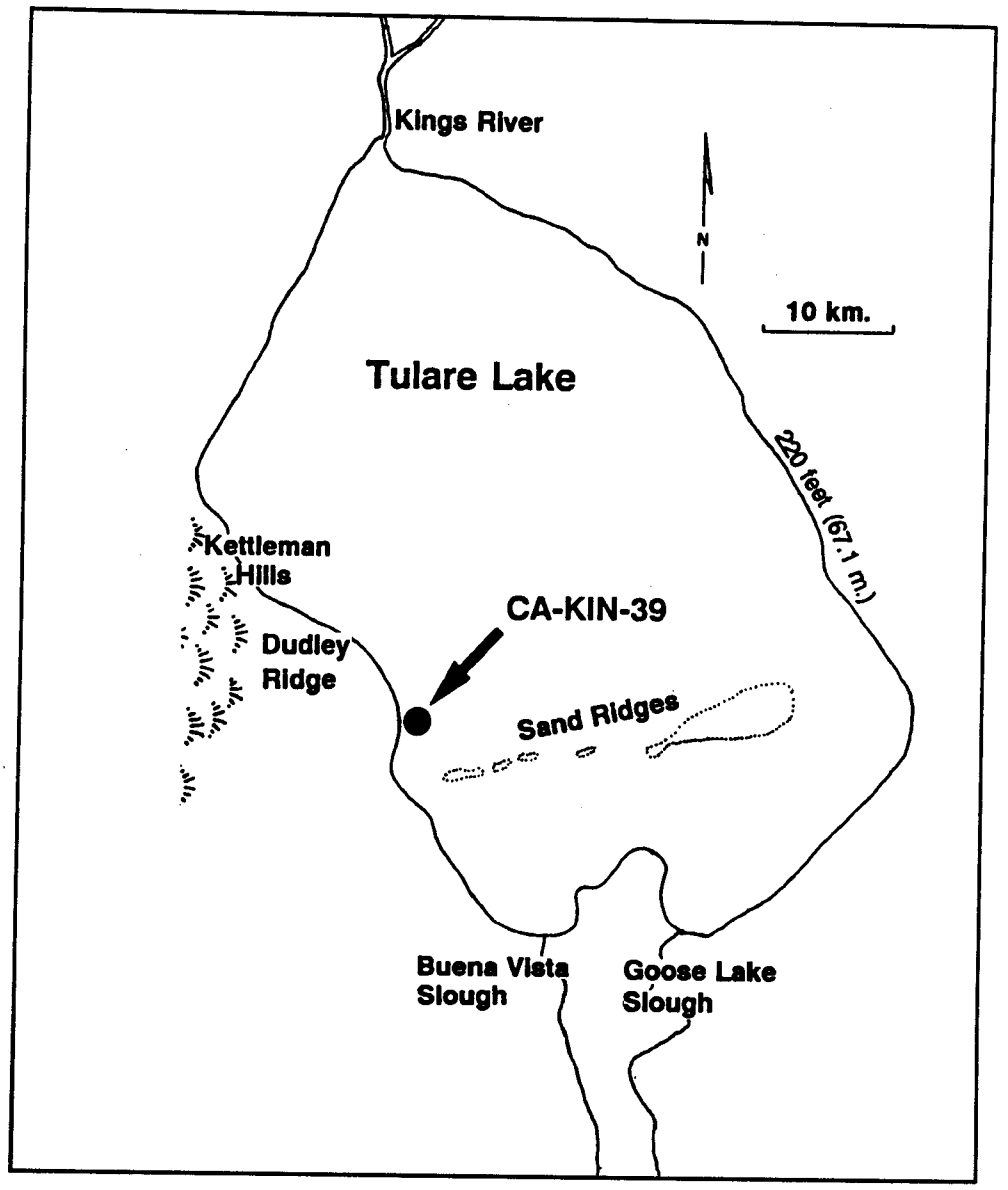

Fig. 1. Location map of the Drunken Navigator Site (adapted from Arguelles 1983).

Elevations above the 215 ft. (66.2 m.) level probably maintained a mesic vegetation community (e.g., Preston 1981:20, Fig. 12). Gen. George Derby, for instance, was in the immediate vicinity of the Drunken Navigator Site in 1850, and reported that the area, "was a perfect desert, and I found here no forage for the animals but wire grass, the water standing in the tule brackish, and no wood at all" (Farquar 1932:34).

The ethnographic inhabitants in the vicinity of the Drunken Navigator Site are poorly known. Von Werlhof and Vierhus (1956) claimed that the area was held by the Tache tribelet, and Latta (1936:11-12, 1949:242-245, 1977:306, 333; see also Woodward and Rivers [1993]) identified two historic Tache campsites, Alamo Solo (CA-KER-152) and Alamo Mocho (CA-KIN-57), approximately 20 km. and 13 km. west of the Drunken Navigator Site, respectively. Consultation of the unpublished fieldnotes of John P. Harrington, Samuel A. Barrett, and others may shed more light on this situation.

The author's original interest in the area was driven by a search for the location of the village "Bubal," the principal rancheria of the Wowol Yokuts. Historically, the Wowol held the southeastern periphery of Tulare Lake (Kroeber 1925; Gayton 1948; Latta 1977). As estimated from Spanish accounts (Cook 1955:43), the population of Bubal may have been as high as 1,300 individuals. Accounts of Spanish explorers document the movement of the location of Bubal between 1804 (the year Bubal was first "officially" visited) and about 1830 (e.g., Cook 1955:43-44; Siefkin 1993). Although the records are somewhat ambiguous, Bubal apparently was originally located on the western shoreline of Tulare Lake, but was gradually moved eastward as Spanish depredations increased. The Estudillo exploration of 1819 (Gayton 1936) provided an excellent description of just such a village shift. Estudillo and his troops pursued the inhabitants of Bubal through thick tule swamp for several hours. By consulting the map made by the Estudillo expedition (see Preston 1981:51, Fig. 19b), one can view the path of eastward movement taken by the inhabitants of Bubal.[1]

Most of the archaeology conducted previously on the western shore of Tulare Lake has occurred at the Witt Paleoindian Site (CA-KIN-32) located about 8 km. north of the study area (e.g., Riddell and Olsen 1969; Fenenga 1993, 1994). Most of these studies have concentrated on Paleoindian materials and early Holocene adaptations. Several unrecorded archaeological sites are known in the vicinity of the Drunken Navigator Site. Most are not substantial, and appear to date from the Middle to Late Holocene. One unrecorded, badly disturbed site on the western edge of Sand Ridge has produced numerous artifacts for avocational collectors, many dating to the Late Prehistoric Period.

Very few scientific investigations have been undertaken in the Tulare Lake Basin (Gifford and Schenck 1926 and Hewes 1941 are notable large-scale exceptions; also see Wallace [1993a] for other examples). California State University, Bakersfield (CSUB), has been conducting excavation and survey along the southwestern shoreline of Tulare Lake for the last several years (e.g., Fenenga 1994). Limited research was undertaken at Goose Lake (Sutton 1992), and near the town of Buttonwillow (Baxter et al. 1994). By contrast, sites near Buena Vista Lake have received more attention. In the 1930s and 1960s, the Wedel sites (Wedel 1941) and CA-KER-116 (Fredrickson and Grossman 1977), along the southwestern shoreline of Buena Vista Lake, were extensively investigated and excavated; more recently, Hartzell (1992) re-analyzed the collections derived from these investigations, and performed limited excavations at these and other sites. In the 1940s, Walker (1947) undertook a large-scale excavation on the northwest shore of the lake. Data from Buena Vista Lake will be used to help integrate the results from the Drunken Navigator Site into a regional perspective of lacustrine adaptation.

ARCHAEOLOGICAL INVESTIGATIONS AT THE DRUNKEN NAVIGATOR SITE

During the summer of 1993, several attempts were made by the author and others from CSUB to locate CA-KIN-39, an archaeological site that was first recorded by E. B. Allen (1972) and later updated (apparently using aerial photographs) by Ceniceros and Ceniceros (1978). The site was described as a small midden deposit that contained artifacts (flakes, manos, projectile points, steatite, and beads) and burials along the old shoreline of Tulare Lake. The site had been pothunted to a depth of three feet. The intent of the 1993 visit was to determine if the site was related to Bubal.

Site Description

Though misplotted on the site records, CA-KIN-39 was eventually found (Fig. 2). The CSUB investigations at CA-KIN-39 revealed a much larger archaeological deposit than the site records had indicated. It was determined that the site records described only the southern tip of CA-KIN-39. However, the beach line described in the CA-KIN-39 site records extends much further to the north. Midden is fairly continuous on the landward side of the beach line, and rarely exceeds more than 50 m. in width. The deposit was subsequently dubbed the "Drunken Navigator Site," and an updated archaeological site record for CA-KIN-39 was prepared.

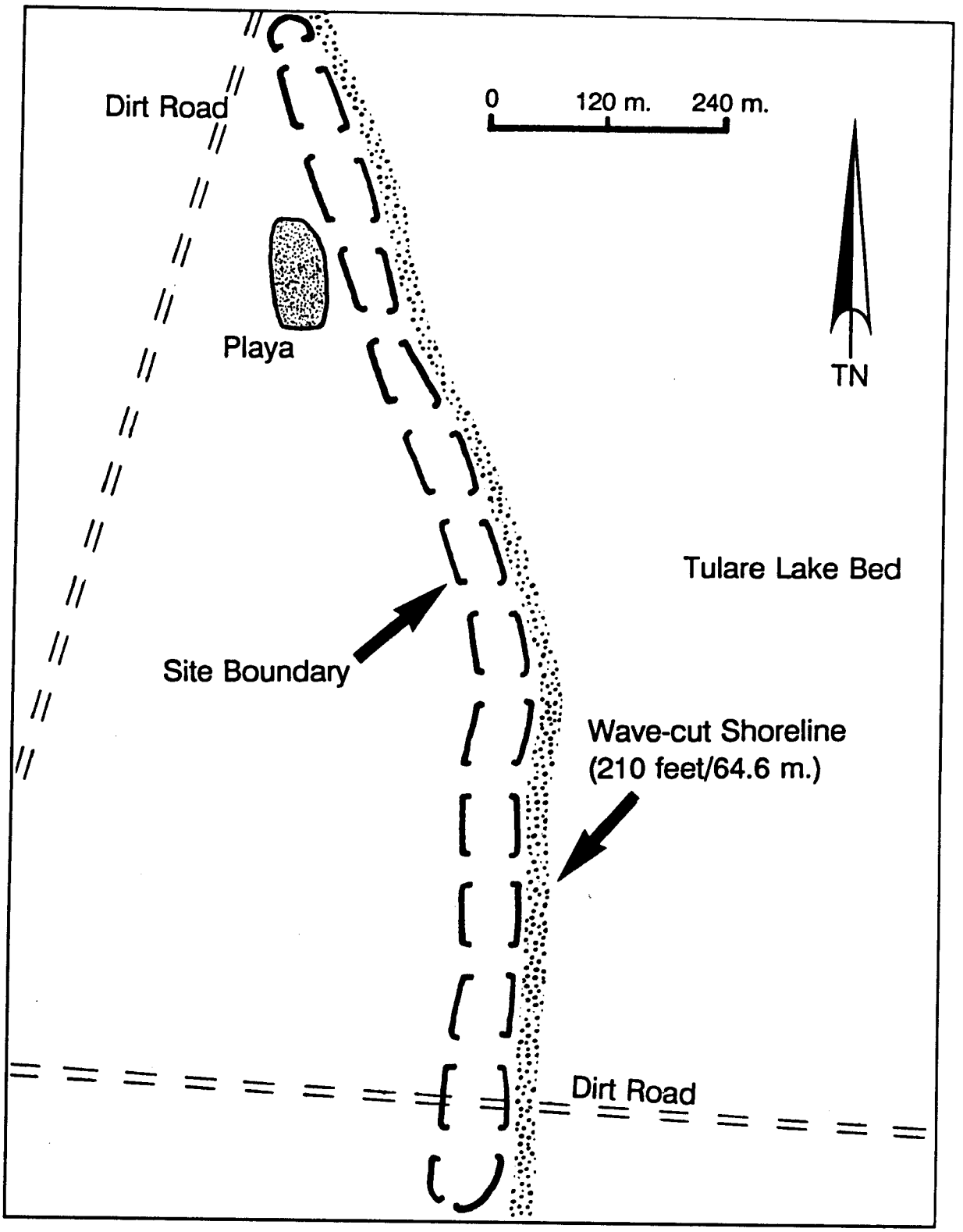

Fig. 2. Site map of the Drunken Navigator Site.

Most conspicuous about the site is the quantity of freshwater shellfish (*Anodonta* sp.) that composes the midden. In contrast to most other sites that CSUB has investigated in the area, the Drunken Navigator Site deposit is composed of heaps of culturally deposited shell (i.e., a shell midden). The Drunken Navigator Site also contains quantities of bone, flaked stone debitage and artifacts, ornaments, groundstone, and manuports. Extensive rodent tailings are present over much of the site, but no evidence of subsurface pothunting was noted. On the surface, the midden varies in density along the beachline, consisting of patches of dense deposits interspersed with less dense areas. It is possible that the denser areas relate to household disposal areas. The author spoke with a local collector familiar with the Drunken Navigator Site, who claimed that during the drought of the late 1980s, a row of shallow house depressions was clearly visible. One of these, located at one end of the row, was much larger than the others. If they do indeed exist, these features were not encountered during the author's visits to the site.

Field Methods

A surface collection was the only archaeological technique utilized at the Drunken Navigator Site. The site surface was not systematically investigated, and emphasis was given to the denser midden areas. Artifacts collected consisted exclusively of diagnostic items. Exact provenience was not noted for any of the artifacts.

Laboratory Methods

In the laboratory, all materials were catalogued using the LabAssistant computer program, and were given consecutive numbers. All artifacts were weighed, and metric measurements (length, width, thickness) were taken. Shell beads were identified based on the classification of Bennyhoff and Hughes (1987).

MATERIAL CULTURE

Several artifacts were collected during several visits to the site, including projectile points, a biface, one piece of obsidian debitage, shell and stone beads, and an ear spool. Descriptions and illustrations of the artifacts are provided below. Unfortunately, the high density of fragmented shell created difficulties in locating other cultural remains.

Flaked Stone

Three bifaces (two of which are classified as projectile points) and one piece of obsidian debitage were collected from the Drunken Navigator Site. Metric attributes for each are found in Table 1, and each specimen is illustrated in Figure 3.

Table 1
BIFACES FROM THE DRUNKEN NAVIGATOR SITE

Cat. No.	Material	Length (mm.)	Width (mm.)	Thickness (mm.)	Weight (g.)	Fig.
DNS-001	obsidian	31.55	17.29	5.35	2.83	3a
DNS-002	chert	41.51[a]	15.21	7.68	4.49	3b
DNS-003	obsidian	22.32[a]	21.60[a]	6.94	3.82	3c

[a] incomplete measurement.

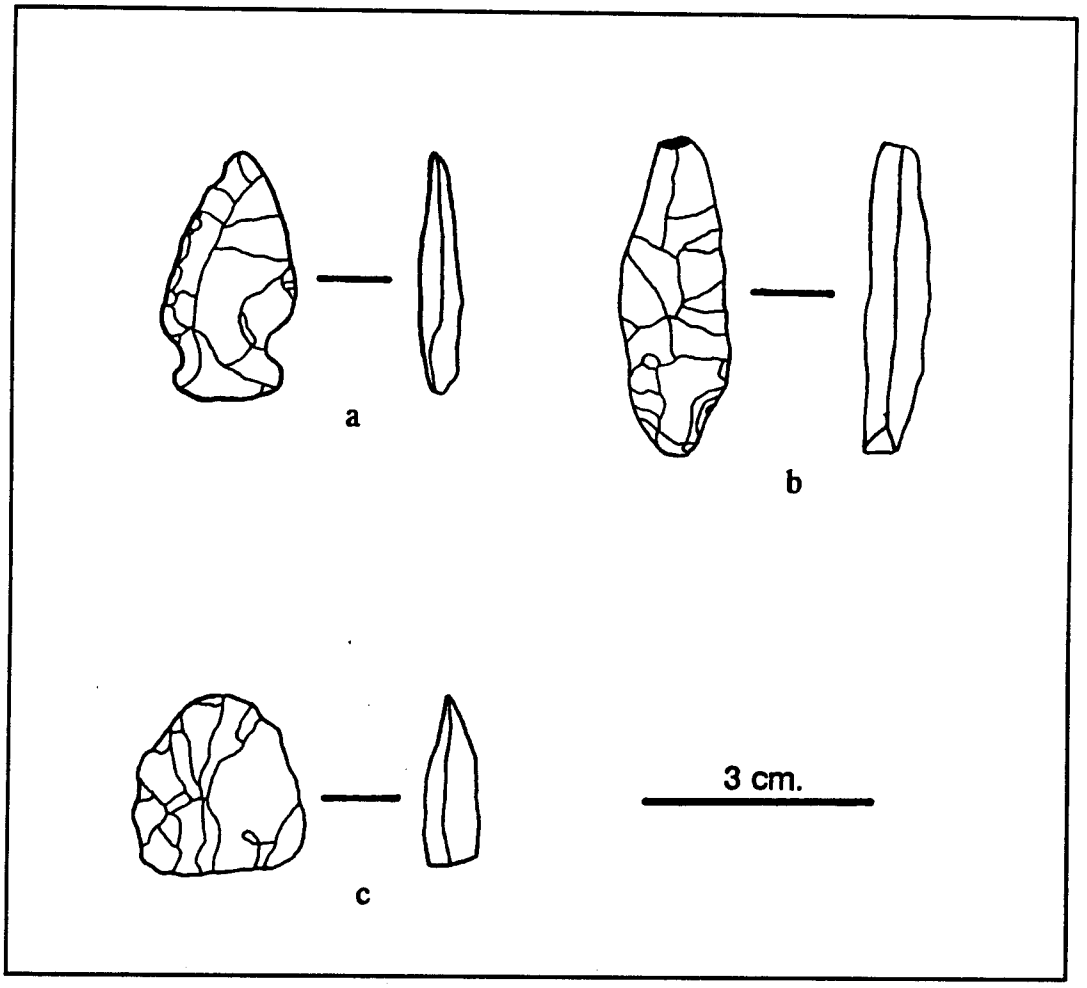

Fig. 3. Bifaces from the Drunken Navigator Site: (a) DNS-001; (b) DNS-002; (c) DNS-003.

Projectile Points. One specimen, Cat. No. DNS-001, (Table 1, Fig. 3a) is a side-notched point that appears to have been fashioned from a large obsidian flake. The base of the point is expanding and straight. Both faces of DNS-001 have flake removal scars only along the periphery of the point. The interior of one face is covered with cortex or is heavily weathered. It is distinctively asymmetrical in shape, suggesting that this artifact was resharpened. Judging by its size, DNS-001 may represent either a very small dart point or very large arrow point, or perhaps a transitional type.

Points similar to DNS-001 have been recovered throughout the western United States. Thomas (1981:19) subsumed points of this variety (e.g., Elko Side-notched [Heizer and Clewlow 1968], Rose Spring Side-notched [Lanning 1963]) into a residual Large Side-notched class. The criteria for inclusion into this category include a weight of greater than 1.5 grams and a proximal shoulder angle greater than 150° (as distinguished from the smaller Desert Side-notched points). Thomas (1981:18-19) noted that the temporal affiliation of Large Side-notched points is uncertain, but likely predate Desert Series points (i.e., pre-700 B.P.).

Points attributable to Thomas's Large Side-notched class have been recovered throughout the southern San Joaquin Valley and Sierra Nevada. A smaller but somewhat similarly formed point (W-2-2275) was found at CA-KER-116 on the southwestern shore of Buena Vista Lake (Hartzell 1992:239, 245). Twenty-two specimens were recovered throughout deposits of the Grayson Site (CA-MER-S94) in western Merced County (Olsen and Payen

1969:18, Fig. 17:a-k). However, the Grayson Site points are characterized by convex, rather than straight, bases. Moratto (1972:253-254, Plate 2, Plate 3) reported 25 specimens from Buchanan Reservoir on the Chowchilla River. Twelve of these were classified as Rose Spring Side-notched, and 13 as Elko Side-notched.

It is interesting to note that DNS-001 fits between the metric dimensions for the Elko Side-notched and Rose Spring Side-notched specimens at Buchanan (Moratto 1972:253-254). Assuming that the Elko Side-notched points (i.e., dart points) predate Rose Spring Side-notched points (i.e., arrow points), this would provide further evidence that DNS-001 may represent a transitional type.

The other specimen, Cat. No. DNS-002, is a small leaf-shaped point (Table 1, Fig. 3b) that is complete except for the very tip and a small portion of the base. The artifact is made of chert, and its whitened and crenulated appearance suggests that it has been heat-altered. In cross section, DNS-002 is distinctly plano-convex in shape.

Small, leaf-shaped points are fairly common in late Holocene assemblages from the southern San Joaquin Valley (e.g., Gifford and Schenck 1926:82, 84; Wedel 1941:63, 98; Hartzell 1992:231). DNS-002 is quite similar in form and size to a point (W-2-2768) recovered from CA-KER-116 (Hartzell 1992:239).

Biface. This fragmentary biface, Cat. No. DNS-003 (Table 1, Fig. 3c), is made of obsidian. This fragment may represent a broken preform rather than a finished artifact, as peripheral flake scars extend to the center of the artifact, rather than terminating close to the edge. The break is a hinge fracture perpendicular to the biface's long axis.

Debitage. One piece of obsidian flaked stone debitage (DNS-010), lacking clear dorsal or ventral surfaces, was collected from the site surface. DNS-010 was collected with the intent of eventually conducting sourcing and hydration analysis. The specimen measures 17.04 x 12.68 x 7.97 mm. and weighs 1.57 g.

The rather large size and angular shape of this piece is different than most obsidian observed by the author at the Drunken Navigator Site. Typically, obsidian occurs as complete bifaces or small biface thinning flakes (probably associated with biface maintenance).

Shell Beads

Four shell beads, all *Olivella*, were collected from the site. Metric attributes for each are presented in Table 2, and each specimen is illustrated in Figure 4. Although all of the shell beads were obtained from a scattered surface context, some comments about temporal significance can be made. Although temporal placement of shell beads in the southern San Joaquin Valley is uncertain, the limited evidence available suggests parallels with southern and central California chronologies (G. L. Fenenga, personal communication 1994; Hartzell 1992).

Type A1c, Large Spire-lopped. A single specimen (Cat. No. DNS-004) of this type was recovered (Table 2, Fig. 4a). The spire was removed perpendicular to the long axis of the shell, although it is uncertain if the removal was due to cultural or natural processes. Beads of this type lack temporal significance in central and southern California (Bennyhoff and Hughes 1987:118); however, they are more common in Middle and Protohistoric period assemblages.

Type D1a, Shelved Punched. One bead (Cat. No. DNS-005) of this type was recovered (Table 2, Fig. 4b). Shelved punched beads (i.e., split-punched beads) are extremely common in the Tulare Lake region (e.g., Gifford and Schenck 1926:59; Wallace 1993b:44-45). This specimen is comprised of half of an *Olivella* shell. The edges appear to have been chipped and were not ground. The central perforation was punched, and is irregular in shape. Bennyhoff and Hughes (1987:125) placed this bead type at the Middle/Late Period transition, with perhaps

Table 2
OLIVELLA SHELL BEADS FROM THE DRUNKEN NAVIGATOR SITE

Cat. No.	Type[a]	Diameter (mm.)	Thickness (mm.)	Perforation Diameter (mm.)	Fig.
DNS-004	A1c	10.6	–[b]	–	4a
DNS-005	D1a	18.3	6.7	4.09	4b
DNS-006	G2/J	7.8	2.4	1.43	4c
DNS-007	untyped	11.4	3.7	2.28	4d

[a] following Bennyhoff and Hughes (1987).
[b] length of specimen is 15.8 mm.

some continuation into the early phases of the Late Period. Their occurrence in both central and southern California was contemporaneous.

Type G2 or J, Saucer or Wall Disk. One saucer or wall disk (Cat. No. DNS-006) was found at the site (Table 2, Fig. 4c). Bennyhoff and Hughes (1987:136) maintained that grave lots are needed to distinguish between *Olivella* saucers and disks. In terms of metrics, DNS-006 fits quite well with other disk beads recovered from the southern San Joaquin Valley, and is slightly larger than those recovered from the southern California coast (Bennyhoff and Hughes 1987:136). Wall disks are extremely abundant in sites on the southwestern shoreline of Buena Vista Lake (Wedel 1941:52, 95), with much smaller quantities being recovered from the northern San Joaquin Valley (e.g., Olsen and Payen 1968, 1969; Pritchard 1970).

This bead was constructed from an *Olivella* shell wall. The central perforation was conically drilled from the exterior surface. The edges are ground, and the diameter of the bead is uniform. Disk beads of this type are marker types for the Protohistoric Period in the southern San Joaquin Valley, where they are believed to be of local manufacture (Bennyhoff and Hughes 1987:136). However, Type J disks are abundant at the Buena Vista Lake sites in components dating ca. 1,500 B.P. and later (Wedel 1941:52, 95; Fredrickson and Grossman 1977:179; cf. Hartzell 1992). In southern California, Type J disks were first manufactured in Phase 1 of the Late Period on the southern California Coast (Bennyhoff and Hughes 1987:136).

Untyped Wall Bead. A single, untyped *Olivella* wall bead (Cat. No. DNS-007) was recovered (Table 2, Fig. 4d). This specimen is oval in outline, strongly curved in cross section, and has a centrally punched perforation. The edge shelf is present on the interior surface of the bead. DNS-007 appears to have suffered damage from erosion, and may not represent its original form.

Stone Bead

Calcite Bead. A single calcite bead (Cat. No. DNS-008) was recovered from the site (Fig. 4e). The raw material was identified as calcite because the stone reacts vigorously to the application of a drop of hydrochloric acid.

The bead itself is highly polished, and the surface texture is smooth. It has a diameter of 20.0 mm., a perforation diameter of 7.44 mm., and weighs 3.51 g. Biconical drilling appears to have been employed to create the central perforation. The large diameter of the perforation (relative to the overall bead diameter) may indicate that the bead was strung with fairly substantial cordage.

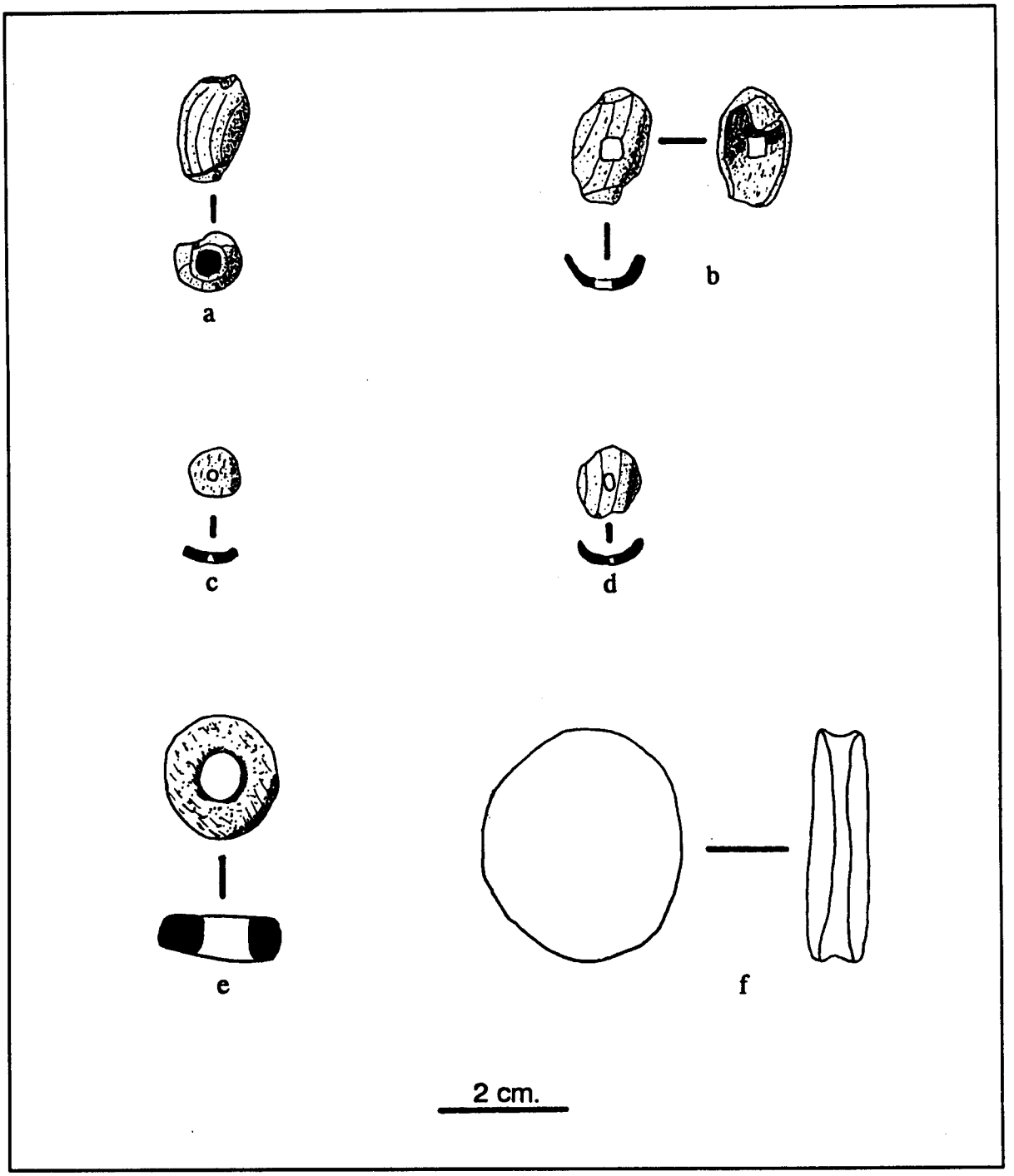

Fig. 4. Beads and ear spool from the Drunken Navigator Site: (a) DNS-004; (b) DNS-005; (c) DNS-006; (d) DNS-007; (e) DNS-008; (f) DNS-009.

Beads of similar type and material have been recorded from various contexts in the vicinity of Tulare Lake. For instance, a single, smaller specimen made from a material tentatively identified as calcite was recovered from the Grayson Site in western Merced County (Olsen and Payen 1969:7, Fig. 8bb). The temporal placement of this bead type is uncertain.

Ear Spool

A single steatite ear spool (DNS-009) was found at the site (Fig. 4f). It is roughly round in shape, has a maximum diameter of 36.75 mm., and a thickness of 7.56 mm. The edge of the artifact is grooved 1 to 2 mm. deep around its entire perimeter, thus allowing it to be "buttoned" into the earlobe of the wearer.

The shape and metric dimensions of this ornament are comparable to others recovered from different sites in the San Joaquin Valley (e.g., Gifford and Schenck 1926:72; Wedel 1941:56-57). Ear and nose piercing was very common among the ethnographic Yokuts (e.g., Kroeber 1925:519; Gayton 1948:66-67; Latta 1977:332-333), although the use of steatite ear ornaments was not mentioned in these sources.

DATING

Although the sample size is small, several of the artifacts recovered from the Drunken Navigator Site are temporally sensitive. Perhaps the best chronological evidence is provided by the *Olivella* shell beads, particularly the saucer/wall disk bead and the split-punched bead. These bead types have been recovered in large quantities at sites along the southwest shore of Buena Vista Lake in deposits dating from ca. 1,500 B.P. to historic times. Assuming that the *Olivella* wall bead is a disk rather than a saucer (as inferred from assemblages at Buena Vista Lake), these two beads could be contemporaneous.

The steatite ear spool is a very coarse chronological marker. Arguelles (1983:100, cf. Moratto 1972) suggested that steatite use in the San Joaquin Valley may have originated as early as 1,800 B.P., with a major increase at 1,400 B.P. Very few articles of steatite were recovered from lower components at sites on the southwestern shore of Buena Vista Lake (e.g., Wedel 1941:136), while the upper components contained large quantities. Based on cross dating of various artifacts, Hartzell (1992) believed that these lower components ranged from 4,000 to 2,000 B.P.

Projectile points from the Drunken Navigator Site are somewhat useful for dating. As mentioned, the two finished points are similar to points recovered at CA-KER-116 and the Sierra Nevada foothills; however, the similarities are not clear-cut. As stated earlier, DNS-001 might represent a "transitional" arrow/dart point; thus a date of ca. 1,500 B.P. or later is suggested. DNS-002 is similar to points recovered from Late Holocene deposits at Buena Vista Lake, and could easily be contemporaneous.

Perhaps more significant is that the point types *absent* from the Drunken Navigator Site assemblage are as revealing as those that are present. First, the site appears to lack the larger, more varied (e.g., Pinto, Elko) forms that are very common on the western shoreline of Tulare Lake. This suggests the lack of an earlier component. The possibility exists that earlier materials are buried within the deposit. However, rodent burrowing at the site is extensive, and it should be expected that these artifacts would be exposed on the surface.

The lack of small Desert series (e.g., Desert Side-notched, Cottonwood Triangular) arrow points is also intriguing. These points are typically assumed to date to post-700 B.P. (e.g., Thomas 1981:27). At Buena Vista Lake, Tulamniu Cottonwood Triangular points were found in stratified deposits dating to 1,200 $\pm$ 160 B.P. (at Wedel's [1941] Site 1), as well as 1,320 $\pm$ 170 B.P. and 1,430 $\pm$ 120 B.P. at CA-KER-116 (Hartzell 1992:173, 216). In the southern Sierra Nevada, the use of Desert series points is preceded by Rose Spring points (between ca. 1,700 and 700 B.P. [Moratto 1984:Table 7.2]). Rose Spring points have been recovered from the Tulare Lake area (e.g., Arguelles 1983:76, 102; Breschini et al. 1985:63; Wallace 1993b). The lack of Rose Spring points at sites on the southwestern shore of Buena Vista Lake is an issue worth further investigation. In any event, the absence of Cottonwood Triangular and Desert Side-notched points at the Drunken Navigator Site suggests the lack of a very late occupation. Several of the collected flaked stone artifacts are made of obsidian. If funding becomes available, obsidian hydration will be conducted on these artifacts.

In summary, the small material sample from the Drunken Navigator Site is suggestive of an occupation during the Late Middle Period, and/or Middle/Late Period transition. Time-sensitive *Olivella* beads and projectile points suggest parallels with major occupations at Buena Vista Lake and the southern Sierra Nevada (i.e., ca. 1,500 to 1,000 B.P.).

DISCUSSION

It is clear that the Drunken Navigator Site is potentially very significant for understanding prehistoric developments in the Tulare Lake Basin. As noted above, the limited artifactual assemblage from the surface of the site is suggestive of an occupation between 1,500 and 1,000 B.P. Based on available data, the Drunken Navigator Site can be tentatively placed in a larger regional perspective and compared with sites in the Buena Vista Lake Basin.

Occupation along the southwestern shore of Buena Vista Lake ranged from 8,000 B.P. to historic times. Based on artifact cross dating, obsidian hydration, and limited radiocarbon assays, Hartzell (1992) recognized strata within CA-KER-116 (Fredrickson and Grossman 1977), and Wedel's (1941) Sites 1 and 2 that dated to ca. 1,500 to 1,000 B.P.

Several characteristics of the components within these strata were noted. First, numerous house structures, stone-lined hearths, and clay-lined pits were encountered (at the Wedel sites, in particular). Furthermore, many features were superimposed over others, suggesting multiple episodes of feature construction. Second, the diversity of terrestrial and lacustrial faunal remains was greater than during preceding or subsequent periods. The remains of diving ducks, which do best in deeper waters, were most abundant in these strata (at CA-KER-116, diving duck remains were found exclusively in this component). Also in these components, Sacramento blackfish exceeded (both in NISP and MNI) the remains of Sacramento perch, a species tolerant of very alkaline water conditions. Additionally, Hartzell (1992:308, 325) noted the presence of reel-shaped steatite artifacts and tule-wrapped baked clay objects (possibly net weights and/or cooking stones), and bipointed bone tools (possibly compound fishhook parts) to reflect specialized technologies for the exploitation of lacustrine resources.

These lines of evidence suggested that between 1,500 and 1,000 B.P., favorable climatic conditions led to a highly productive lake margin with fresh and relatively deep water conditions (Hartzell 1992). Moratto et al. (1978:149) recognized a cool, wet period from 1,750 to 1,000 B.P. The post-1,000 B.P. period was considerably warmer and drier. More recent paleoclimatic data have further documented the onset of a warmer and drier climate ca. 1,200 to 1,000 B.P. (e.g., Scuderi 1993; Stine 1994).

Furthermore, Atwater et al. (1986:Fig. 6B, Table 3) identified a marl deposit within Wisconsin-age deposits in the bed of Tulare Lake. This deposit, which unfortunately is not dated, contained abundant fish remains and was deposited during a period when Tulare Lake was shallow, but stable. Davis (1990:4) provided a pollen diagram for deposits from Tulare Lake. The diagram reveals a small rise in the frequency of pine, and a decline in cattail pollen ca. 1,500 to 1,000 B.P. Perhaps this relates to a cooler climate and more stable water level for Tulare Lake at that time. However, given the small amount of change noted in pollen frequencies, and a lack of absolute dates from this time interval, this interpretation must be viewed with caution.

The conclusions of Hartzell (1992) on this matter can certainly be challenged. For instance, the shift from Sacramento perch to Sacramento blackfish may be more reflective of changes in fishing techniques, or even sampling error. Alternatively, Hartzell's interpretations could easily be valid, and at the very least, provide testable hypotheses.

Strong lacustrine and marsh orientations have been recognized during this period in other areas of the western United States. For instance, Sutton and Hansen (1986) and Sutton (1990) argued that Koehn Lake (now

dry), located in Fremont Valley in the western Mojave Desert, contained a substantial amount of water between ca. 1,500 and 1,000 B.P. During this time period, a very intensive settlement (CA-KER-875) occurred along the southern shoreline. From CA-KER-875, Sutton (1990) recovered large quantities of artifacts and ecofacts, as well as the remains of a substantial semi-subterranean "pithouse." The faunal remains from CA-KER-875 have yet to be fully analyzed, but the placement of the site on a fossil shoreline, at an elevation of 586 m. (Sutton and Hansen 1986), is suggestive of a lakeside habitation. The post-1,000 B.P. adaptations in the Fremont Valley are poorly known, but appear to have been associated with streams and springs.

Among the other localities in the western United States that reflect intensive use of lake and marsh habitats from ca. 2,000 to 1,000 B.P. (and slightly later) include Malheur Lake (Oetting 1992) and Stillwater Marsh in the Carson Desert (Raven and Elston 1988; Raven 1990; Raymond and Parks 1990). Another line of evidence is found in the Santa Barbara Channel region, where major social and economic changes occurred among the Chumash at ca. 850 B.P. (e.g., Arnold 1992). The intimate economic ties between the Chumash and inhabitants of the southern San Joaquin Valley have been well-documented. In all probability, Chumash adaptations were affected by these environmental changes.

While a few European articles were recovered from CA-KER-116 and the Wedel sites (Wedel 1941:48-49; Bass and Andrews 1977:17; Fredrickson and Grossman 1977:178), the most intensive settlement of the Late Prehistoric and Historic periods (CA-KER-450 and CA-KER-44) appears to have occurred on the northwestern shoreline of Buena Vista Lake at the base of Elk Hills (Walker 1947; Bass and Andrews 1977:16; Dieckman 1977). Thus, after 1,000 B.P., populations apparently shifted residence from the southwestern to northwestern shorelines. An important question is what prompted this shift.

The level and quality of water in the Buena Vista Lake Basin, much like that of the Tulare Lake Basin, was determined by a combination of runoff, direct precipitation, and evaporation (cf. Harding 1949; Atwater et al. 1986). Cooler and wetter conditions would have led to higher runoff and precipitation, and less evaporation. The ultimate result may have been a stable lake level near full capacity. Both Tulare and Buena Vista lakes existed in extremely shallow basins. The result was that very small vertical fluctuations would lead to very large horizontal movements. To contend with the fluctuating lake levels in Tulare Lake, the Yokuts would either follow the shifting shorelines (e.g., Latta 1976:85) or would reside on slough or river banks close to the lake (e.g., Beals and Hester 1958), with the effect that steeper banks would alleviate fluctuations.

Conditions at Buena Vista Lake were different because of the presence of Buena Vista and Elk hills. These landforms contacted the lakeshore directly and provided excellent locations for permanent settlements.[2] However, Elk and Buena Vista hills may have afforded different advantages depending on the nature of Buena Vista Lake at a given time period. If the level of Buena Vista Lake was both high and stable from ca. 1,500 to 1,000 B.P., as speculated above, the necessity to relocate on steeper shorelines might have been lessened. However, historic records for Tulare Lake (1850 to 1870) reveal that the lake level varied as much as 16 vertical feet from year to year (Grunsky 1930:290). Thus, less stability of lake level is also implied for Buena Vista Lake.

If steepened shorelines were more important post-1,000 B.P. than between 1,500 and 1,000 B.P., this might be reflected in differences in the hillslopes along the Buena Vista and Elk hills. Unfortunately, the ground slope is steeper on the southwestern shore than the north. However, the distribution of materials seems to differ on the northwestern and southwestern shorelines. The distribution of the CA-KER-450 and CA-KER-44 deposits range in elevation from 340 ft. to less than 290 ft. (104.6 to 89.2 m.) (Walker 1947; Payen 1963; Dieckman 1970). By contrast, the Wedel sites and CA-KER-116 are primarily restricted to elevations of 290 to 300 ft. (89.2 to 92.3 m.) (Hartzell 1992:142, Fig. 6.1). As Dieckman (1977:51) contended, Spanish accounts seemed to place the location of Tulamniu (cf. CA-KER-450) on a hill overlooking Buena Vista Lake rather than on the shoreline. It is possible that the steeper hillslope to the south of CA-KER-116 and the Wedel sites may have made occupation above the 300 ft. (92.3 m.) elevation difficult, while the gentler slope on the northwestern shore provided more options for settlement. If so, the Wedel sites and CA-KER-116 were well-suited for occupation along a stable Buena Vista Lake.

Other differences are suggested for the shift between the southwest and northwest shores. For instance, the northwest shore is located very close to the historic outlet of Buena Vista Lake. This locality may have received greater quantities of fresh water than the southwestern shore. Most village locations of the Tache Yokuts, who held the northern shore of Tulare Lake, were placed along Fresno Slough (Tulare Lake's outlet) or the mouth of the Kings River (e.g., Beals and Hester 1958).

If the productivity of the lacustrine resources decreased during the last 1,000 years, villages might have been placed in order to better exploit terrestrial resources. Unfortunately, very little scientific excavation has been conducted at sites on the northwest shore of Buena Vista Lake (see Walker 1947; Dieckman 1977). Hartzell's (1992:333, Note 1) impression of sites on the northwest shore is that they contain much less fish bone and shell than the Wedel sites or CA-KER-116, and the faunal remains are dominated by lagomorphs. A scientific investigation of these sites is very much needed.

The occupation of the Drunken Navigator Site is intriguing as it fits into this regional framework. First, the site appears to be positioned on a fossil strandline. This strandline would have formed during a period of relatively high (i.e., ca. 210 ft. [64.6 m.]) and stable lake level (cf. Currey 1994a, 1994b). The formation of this strandline probably either predates or is contemporaneous with the occupation of the Drunken Navigator Site. This is based on the observation that midden deposits are found almost exclusively on top of the strandline, rather than scattered below it, as might be expected if erosion of the midden had occurred.

The formation of the strandline itself is an interesting issue. It faces to the east and northeast, directions from which modern winds in the Tulare Basin rarely blow (Preston 1981:6, Fig. 3). Perhaps prevailing wind directions varied during this time period. Another possible explanation is that Dudley Ridge (also known as Gordon's Point and located 6 km. north of the site) may have caused southward moving waves to refract to the west and break on the lake's western shoreline. With populations settled along the lakeshore, constant foot traffic would have kept emergent vegetation (e.g., tules and bulrushes) from growing, and left the shoreline exposed to breaking waves.

The small surface collection from the Drunken Navigator Site contains ornaments as well as utilitarian objects. In addition, the CA-KIN-39 site record (likely the southern portion of the Drunken Navigator Site) indicates the presence of a fairly deep deposit, diverse artifact assemblage, and burials. This suggests that, like the contemporaneous upper deposits at the Wedel sites and CA-KER-116, the Drunken Navigator Site served as a place of intensive and/or long-term occupation (i.e., a village). If housepits are present at the Drunken Navigator Site, this interpretation would be further strengthened.

The apparent lack of a very late component at the Drunken Navigator Site is also consistent with the Wedel sites and CA-KER-116. The assessment of Late Prehistoric adaptations at Tulare Lake has been hampered by a lack of studies. Very large populations were clustered along the eastern, northern, and southern shorelines during the Historic Period (e.g., Cook 1960, 1962), and the largest known Late Holocene archaeological sites are located in these settings. These localities may have had a greater diversity of terrestrial resources (e.g., acorns, grass seeds) available than the areas adjacent to the western shore of Tulare Lake. This may have been important if lacustrine productivity was diminished after ca. 1,000 B.P.

CONCLUSIONS

Ultimately, excavation data are needed to provide a clearer picture of cultural developments at the Drunken Navigator Site. If the author's hypothesis of a stable lacustrine environment at Tulare Lake between ca. 1,500 and 1,000 B.P. is correct, there are several other implications. For instance, other sites dating to this period should be found in similar settings and at similar elevations. Quality survey data are needed to conduct such a task, and one such effort is currently underway (Siefkin n.d.). The results from the Drunken Navigator Site also highlight

the importance of obtaining more and better environmental data. Only when these data are collected will the complexities of the archaeological record in the Tulare Basin be readily approachable.

NOTES

1. The original location of Bubal may be the site of Sin Tache, a village encountered by Derby in 1850 (Farquar 1932:35), located ca. 10 km. southeast of the Drunken Navigator Site on the western bank of Buena Vista Slough. The Sin Tache site was investigated by amateur Donald Witt (1964; see also Pilling 1948). Although Witt exhumed a large number of burials and artifacts from this site, he reported his finds incompletely and recorded no intrasite provenience. Witt contended that only a single burial (of 120 he personally exhumed) from the Sin Tache site was accompanied by glass beads (Pilling 1948:10; Witt 1964:2). This seems odd given the large number of glass beads that Witt obtained from the site (1964:2, Fig. 1). A total of 550 burials was reported to have been recovered from the site (Witt 1964:2). A detailed study of the Witt and other collections from the site may shed more light on this situation.

2. The Kettleman Hills on the western shore of Tulare Lake also provided such an opportunity. Indeed, the Tache Yokuts village of Walna was located in the vicinity of present-day Kettleman City (Kroeber 1925:484; Gayton 1948:9; Latta 1977:141). The author has questioned numerous collectors in the area, and none know of midden deposits in the Kettleman Hills that are comparable to those found at Buena Vista Lake.

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AN ISOLATED CREMATION FROM SAND CANYON, TEHACHAPI, CALIFORNIA

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INTRODUCTION

Between 1954 and 1956, the Archaeological Survey Association of Southern California (ASA) conducted survey, surface collections, and excavations at a number of sites in the vicinity of Nettle Springs in the Sand Canyon area near Tehachapi (Fig. 1). The ASA referred to this site complex as "Phillips Ranch," and encoded the various individual sites by a letter appended to their project code KN 39-S- (Kern County, Project 39). One of the sites ASA encountered was an isolated, secondary, human cremation (labeled "KN 39-S-I"), which was excavated by Stuart Peck of the ASA in 1954. The precise location of this site was not recorded by ASA and so was not formally recorded until 1995 (by using an old ASA photograph of the site). It is now recorded as CA-KER-4168/H.

None of the ASA material from the Sand Canyon area was ever formally analyzed or reported, and the collections were transferred to California State University, Bakersfield (CSUB), in 1989. A recent inventory of the collection revealed the presence of the human remains from the site. The material was contained within a shoe box labeled "KN 39-S-I." Within the box were some loose materials, as well as a bag marked "KN 39-S-I" that contained other faunal, human, and artifactual remains. This paper is a report of the cremation and its associated materials.

SITE DESCRIPTION

The CA-KER-4168/H site was located along a north-facing rock ridge, just to the south of the main Nettle Springs site (CA-KER-230). It consisted of a rock cairn within a crevice in the rocks of the ridge. The cairn was dismantled by Peck, and the bones and artifacts were collected. Price (1954:10) gave this description of the site:

> 200 yards from the [Nettle] spring and village site Stuart Peck discovered a rock cairn in a cleft in an outcropping rock ledge. This contained a human reburial. All of the bones were not there but there were many personal possessions that had been buried with the body. Among the beads were Olivella shell beads, trade beads and a quite large stone bead an inch in diameter. There was also a cylindrical bead 3/4" in diameter and 3½" long made of clam shell. This was drilled the length of the long axis. A piece of cloth was also found with the bones. Mr. [Mark] Harrington identified the cloth as "White Man's" wool blanket which dates the reburial as a "Post Contact" one; probably within the last 200 years.

The photograph of the site (Fig. 2) shows a small overhang, smoke staining of some of the rock faces, and portions of a packrat nest. The location of the cairn within this rock cleft is unknown (it is not known if the photograph was taken before or after the excavation). No rock art was noted in the immediate area.

HUMAN REMAINS

A total of 12 human bones was present in the collection. The material is described below with metrics for the identified human limb bones provided in Table 1. The following is an inventory of the human remains found in the ASA collection from the site.

Kern County Archaeological Society Journal 6:41-51 (1995).

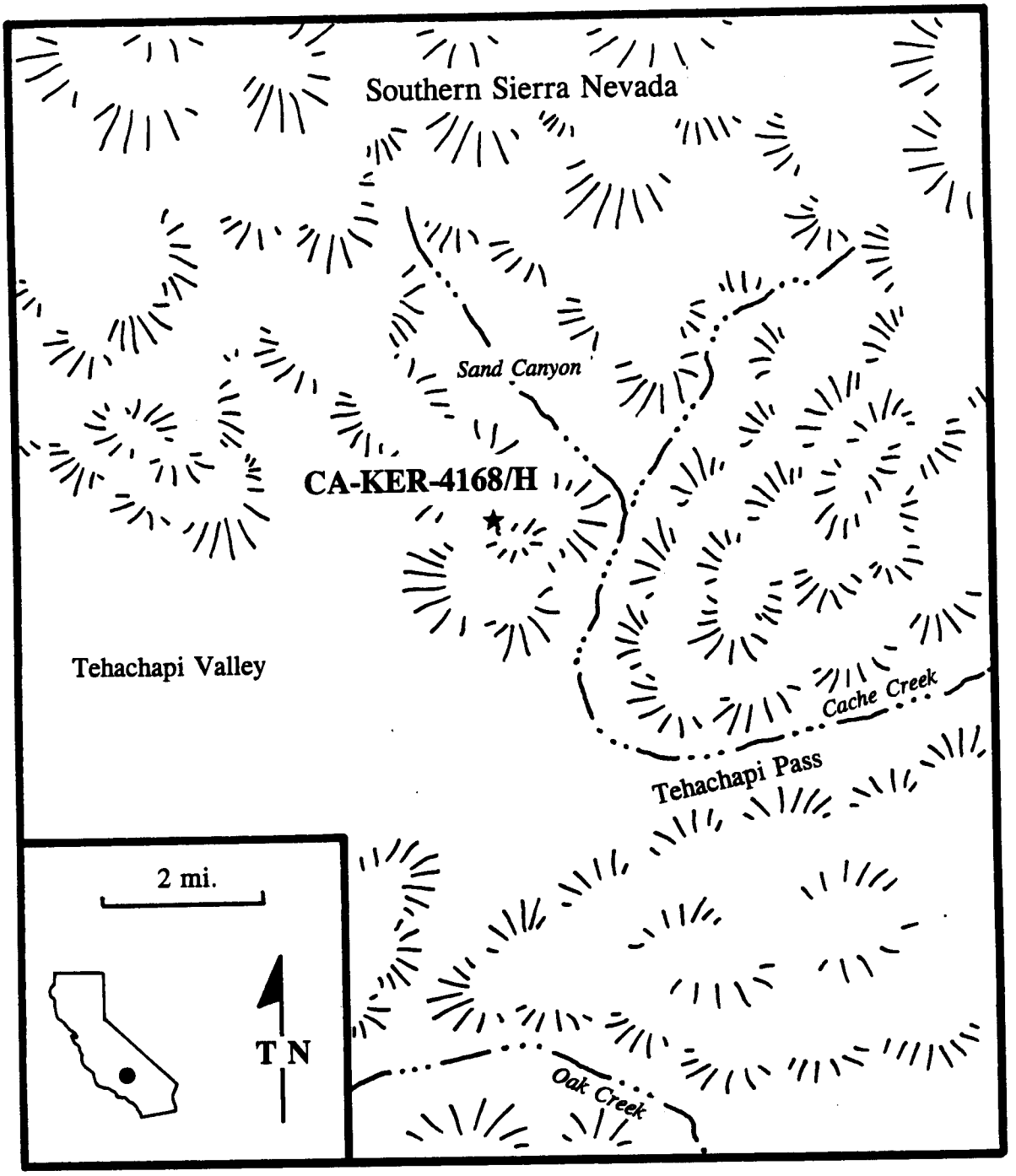

Fig. 1. General location of the CA-KER-4168/H site.

Cranial Fragments

The cranial remains in the box included a partial frontal bone, a portion of the basicranium, a small fragment of the left maxilla, and one canine. The frontal included part of the right orbit and approximately one-third of the vault of the frontal bone. The browridges (at cranial point glabella) were robust, indicating that the individual may have been male (Krogman 1986). Since these remains represent an isolated individual, the

Fig. 2. Photograph of the CA-KER-4168/H site, taken about 1954 (photographer unknown).

variation in sexually dimorphic features in this population is unknown, and the determination of sex as male is not reliable (Buikstra and Ubelaker 1994:16). The bone was burned but well preserved. No cracking of the bone had occurred, suggesting that this bone was buried at the time of discovery.

Table 1
METRICS OF IDENTIFIED HUMAN LIMB BONES FROM CA-KER-4168/H

Measurement[a]/Element	Left Humerus (complete)	Right Femur (shaft)	Left Femur (shaft)	Right Tibia (shaft)
maximum length	310.00	–	–	–
midshaft diameter (anteroposterior)	20.75	30.12	30.34	30.85
midshaft diameter (mediolateral)	19.35	25.95	24.70	20.65
deltoid diameter (anteroposterior)	22.78	–	–	–
deltoid diameter (mediolateral)	21.75	–	–	–
proximal diameter (anteroposterior)	45.60	–	–	–
proximal diameter (mediolateral)	48.35	–	–	–
minimum midshaft circumference	–	85.84	88.52	–

[a] all measurements in millimeters.

The segment of the basicranium included a portion of the occipital (including the left half of the foramen magnum and left occipital condyle) and a section of the left wing of the sphenoid. As with the frontal, the bone was burned but well preserved.

The left maxilla consisted of a small fragment of the alveolus with two empty tooth sockets. There is no evidence of resorption in the alveolus, indicating that the teeth were lost postmortem. The only tooth among these remains, the partial canine, did not fit in either of the sockets. Only half of the crown and a portion of the root of the canine were present. The tooth had a postmortem break along the midline from the labial side to the lingual side, and the exterior surface was discolored as if it had been burned. Oblique wear was present on the occlusal surface; most of the enamel was still intact, but the dentine was exposed in the center of the tooth. Dental calculus was found on the labial surface of the tooth, near the cemento-enamel junction.

Scapulae Fragments

Two scapulae, a left and a right, were found among the remains. They were likely from the same individual, as the size of both bones was quite similar. Both scapulae were fragmentary, including only the superior portion of the lateral border with the basal portions of the scapular spine and coracoid process. The glenoid fossae were missing. Neither of the scapulae was burned, but both were very eroded and were probably on the surface for some time prior to discovery.

Left Humerus

A 95% complete left humerus, missing only the medial epicondyle and the capitulum, was present. Degenerative joint disease, in the form of slight lipping on the anterior aspect of the distal articular surface, was noted. The proximal end was burned and the distal end was slightly burned, but the midsection appeared unburned. The bone was well preserved and no cracking of the surface had occurred.

Rib Fragment

A rib fragment that included the sternal end and approximately 5 cm. of the body of the rib was among the remains found.

Innominate Fragment

This fragment consisted of the midsection of the left innominate, including a 2-cm. section of the acetabulum, a section of the sciatic notch, and the base of the auricular surface. The sciatic notch appeared to be wide, as in a female, but there was too little of the entire region to allow an accurate sex determination (Ubelaker 1978; Bass 1987). The bone was not burned, but was eroded due to exposure.

Femora

Two femur shafts, a right and a left, were present among the cremated remains. It is possible that both are from a single individual, but certain features of the femora make this conclusion tentative. While both bones were eroded and severely cracked, the left femur was only slightly burned in some places while the right was unburned. The right femur appeared to be slightly longer than the left.

An additional long bone fragment that was slightly burned on one end, and was consistent with the appearance of a femur shaft, was found in the collection. This bone lacked diagnostic features that could have allowed further identification. This bone may be the partner to one of the femur shafts discussed above.

Right Tibia

The shaft of a right tibia was present in the collection. The bone was burned on the superior and lateral aspects of the shaft and was eroded from exposure.

Discussion

The small number and fragmentary nature of the remains in this collection made gathering demographic information difficult. However, it is possible to say that the population represented by these remains was afflicted with degenerative joint disease and the acquisition of dental calculus. It is also apparent that the majority of these remains were burned, indicating that cremation was part of the treatment of the dead in this population. The differential burn patterns may indicate that the fire did not burn hot enough or long enough to completely burn the remains before it was extinguished (Shipman et al. 1985).

The asymmetry of the two identified femoral shafts, and the presence of a possible third femoral shaft, indicate that there may be two individuals represented by these remains. Unfortunately, which remains actually belong together was impossible to determine in the absence of more detailed provenience information.

The primary individual in this collection was an adult. The presence of degenerative joint disease on the distal humerus suggested that the individual was at least 25 years old (Shipman et al. 1985). The sex of this individual could not be determined due to the lack of sexually dimorphic features. Cranially, the large browridges suggested masculinity (Krogman 1986); however, with only one representative of the population, it was not possible to conclude that only males possessed large browridges (Buikstra and Ubelaker 1994). A segment of the sciatic notch, a more reliable sex determinant, was present but was too fragmentary to obtain an accurate measurement of the angle.

ASSOCIATED ARTIFACTS

A number of artifacts was reported to have been found with the cremation (Price 1954:10), including clamshell tubes, shell beads, a sandstone bead, and a cloth fragment. Price (1954:10) also reported the recovery of "trade beads" (presumably glass beads) with the cremation. No glass beads were in the collection that was transferred to CSUB. All of the materials within the collection are described below, and the metric attributes are provided in Table 2.

Table 2
METRIC ATTRIBUTES OF ARTIFACTS ASSOCIATED WITH CREMATION, CA-KER-4168/H

Cat. No.	Artifact/Material	Quantity/ Condition	Metrics[a]	Perforation Diameter	Fig.
004	clam (*Tivela stultorum*) tube	3, fragments	73.6 x 14.2 x 9.4, 18.6 g.	2.33	3a
005	clam (*Tivela stultorum*) tube	1, fragment	26.4 x 12.6 x 10.9, 6.5 g.	1.72	3b
006	modified clam (*Tivela stultorum*)	1, fragment	12.2 x 6.1 x 5.5, 0.6 g.	–	
007	modified clam (*Tivela stultorum*)	1, fragment	14.1 x 8.1 x 4.6, 0.6 g.	–	
008	modified clam (*Tivela stultorum*)	1, fragment	8.5 x 5.9 x 5.4, 0.3 g.	–	
009	*Olivella biplicata* disk bead[b]	1, complete	6.1 dia., 0.1 g.	0.8	
010	*Olivella biplicata* disk bead[b]	1, complete	5.4 dia., 0.1 g.	1.0	
011	*Olivella biplicata* disk bead[b]	1, complete	6.6 dia., 0.1 g.	1.0	
012	*Haliotis rufescens* disk bead	1, fragment	5.8 dia., 1.7 thick, 0.2 g.	0.9	
013	sandstone bead	1, complete	31.2 x 28.4 x 6.0, 7.1 g.	3.4	3c
014	wool (?) cloth	1, fragment	140.5 x 110.0	–	
015	small bar, iron or steel	1, complete	49.0 x 17.9 x 5.4, 29.0 g.	–	3d
017	chalcedony	2, complete	8.3 g.	–	
018	jasper	1, complete	0.2 g.	–	
019	granitic	2, complete	6.9 g.	–	
020	porphyry	1, complete	5.2 g.	–	

[a] measurements in millimeters and grams.
[b] *Olivella biplicata* semi-rough disk bead (H1b), after Bennyhoff and Hughes (1987:135).

Clamshell Tubes

Seven fragments of modified clam (*Tivela stultorum*) shell were found (Table 2), representing at least two separate, drilled clam tubes. The first specimen (Cat. No. 004, Fig. 3a) consisted of three fragments (glued together by ASA many years ago). It was ground such that the unbroken end was rather flat and tapered, almost like a historic pipe stem. The body of the piece was more rounded toward the broken end. The perforation was evident at both ends and presumably traversed the entire length of the specimen. The second tube (Cat. No. 005, Fig. 3b) was represented by one piece, a midsection. It was thicker and more rounded than the first tube and so was believed to represent a second artifact. These tubes may have been parts of a number of possible artifacts, including whistles or markers of rank. Clam tubes generally date to the Late Prehistoric Period (King 1978). Three other small pieces of modified (surface ground) *Tivela* shell were present (Table 2), obviously fragments of larger artifacts (perhaps one of the tubes).

Shell Beads

Four shell beads (Table 2) were present in the collection; three complete *Olivella biplicata* semi-rough disk beads (H1b; Bennyhoff and Hughes 1987:135) and one partial *Haliotis rufescens* disk. All four specimens had very small perforations ($\leq$1.0 mm.), produced using a metal needle, and date to between A.D. 1800 and 1816 (Bennyhoff and Hughes 1987:135). None of the beads were burned.

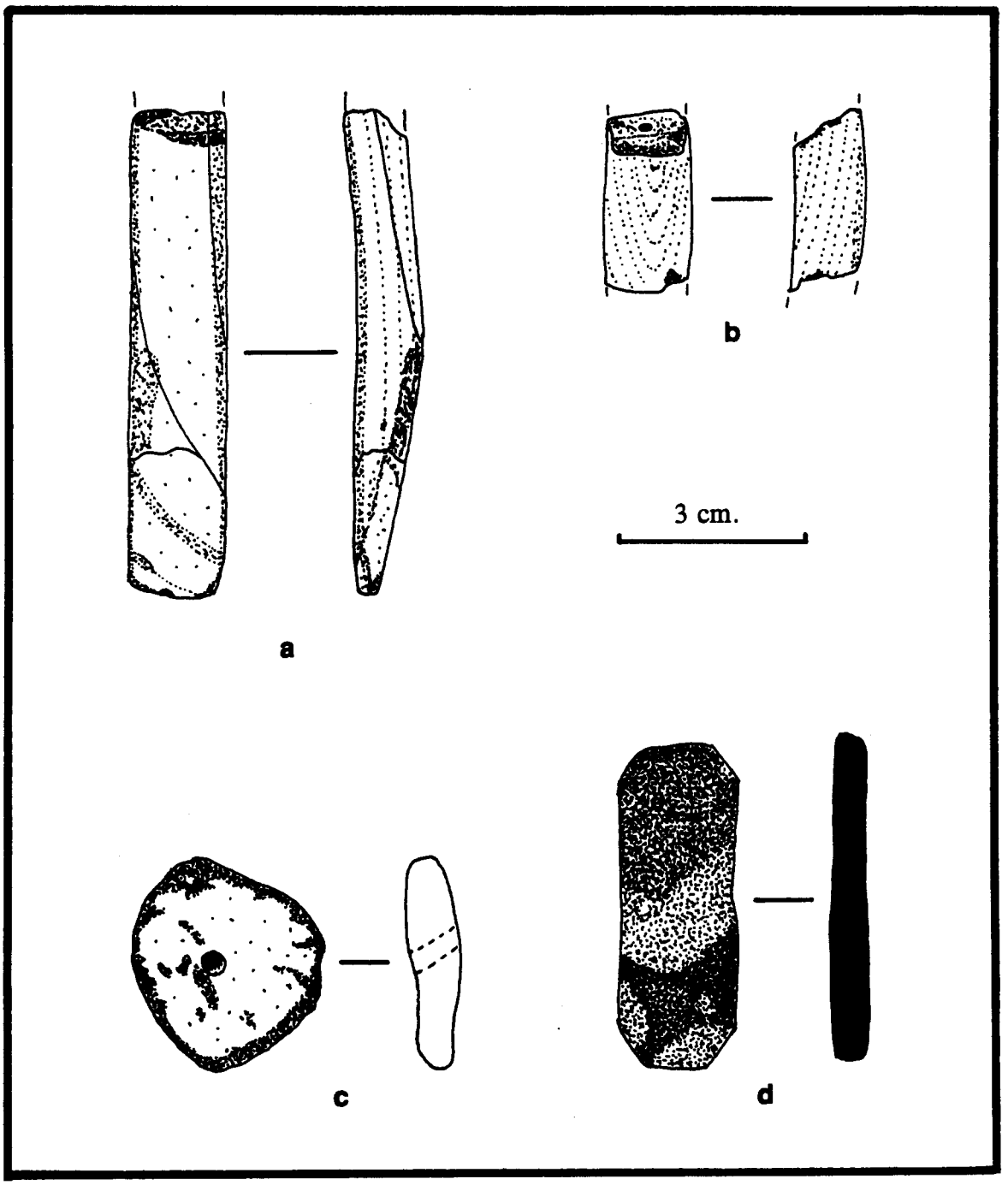

Fig. 3. Some of the artifacts discovered with the cremation: (a) clamshell tube fragment (004); (b) clamshell tube fragment (005); (c) sandstone bead (013); (d) small iron bar (015).

Sandstone Bead

One large stone bead (Cat. No. 013, Fig. 3c, Table 2) was in the collection, made from a type of sandstone ubiquitous in the area. It appeared to have been a casually produced artifact, as if someone found a naturally shaped disk, partially ground its surface and edges, and drilled a hole through it. It was not burned.

Cloth

One piece of historic woven cloth was found with the cremation, and was identified by M. R. Harrington as a fragment of a wool blanket (Price 1954:10). The piece (Cat. No. 014, Table 2) had a small stick and some rodent feces adhering to it (included in the total weight). It was finely stitched, having 13 rows to the inch (warp) and between 10 and 14 stitches to the inch (weft). No burning was evident on the cloth.

Metal Object

A small, flat, iron or steel bar with beveled ends (Cat. No. 015, Table 2, Fig. 3d) was in the collection (but not reported by Price [1954:10]). It was heavily oxidized and it is not clear whether it was burned. The function of the piece is unknown.

OTHER ASSOCIATED MATERIALS

Faunal Remains

A total of 107 pieces (299.6 g.) of nonhuman bone was in the collection (summarized in Table 3), presumably collected from the area of the cairn (this was not specifically reported by Price [1954:10]). Of that number, 52 (49%) were burned. A diversity of taxa is represented and discussed below. No insect (or other invertebrate) or reptile remains were identified.

Birds. Eight elements of birds were found. Although none of the elements were identified to taxon, at least two, and possibly three, sizes are represented: quail, eagle, and possibly owl. None of the bird bone was burned.

Rodents. Two genera of rodent were identified; *Neotoma* sp. (packrat) and *Ammospermophilus* sp. (ground squirrel). Both genera are native to the immediate area.

Lagomorphs. Two lagomorphs were found, black-tailed hare (*Lepus californicus*) and cottontail rabbit (*Sylvilagus audobonii*). More elements of *Sylvilagus* (n = 17) were identified than of *Lepus* (n = 13). Most body elements were represented in the collection; there was no suggestion of differential distribution due to cultural factors.

Medium Mammals. Only one taxon of medium mammal was identified: coyote (*Canis latrans*) (the femur and scapula of two individuals). The remaining material was too fragmented to identify to taxon.

Large Mammals. The large mammals were the most interesting. Five complete (four cervical [two burned] and one thoracic), and two fragmentary vertebrae (both burned), were present and were tentatively identified as mountain sheep (*Ovis* cf. *canadensis*). One of the ribs also appeared to be sheep. The femur of a very large, juvenile mammal was present. It appeared too massive to be an artiodactyl, and perhaps represents a calf (cf. *Bos* sp.).

Discussion. The presence of a packrat nest in the immediate vicinity suggests the possibility that some, if not most, of the faunal material was natural in origin, rather than directly associated with the cremation. Of some interest, however, is the presence of the sheep vertebrae, a species depicted in the rock art at the nearby CA-KER-769 site (Sutton 1981) and associated with Numic oral tradition (particularly sheep cervical vertebrae). It is possible, though unlikely, that the elements were offerings. Most likely, however, their presence is a coincidence.

Table 3
SUMMARY[a] OF FAUNAL REMAINS RECOVERED FROM CA-KER-4168/H

Element[a]/Taxon	Bird	Rodent	Lagomorph	Medium Mammal	Large Mammal	Totals
tarsometatarsus	3	–	–	–	–	3
tibiotarsus	1	–	–	–	–	1
maxilla	–	–	2 (1)	–	–	2 (1)
mandible	–	2	–	–	–	2
vertebra	–	–	–	–	7 (4)	7 (4)
rib	–	–	–	–	2 (1)	2 (1)
scapula	–	2	2 (2)	1	–	5 (2)
humerus	2	2	4 (1)	–	1	9 (1)
radius	–	–	2 (2)	–	–	2 (2)
ulna	–	–	1 (1)	–	–	1 (1)
pelve	–	1 (1)	2 (1)	–	–	3 (2)
sacrum	–	–	1	–	–	1
femur	1	–	5 (2)	1 (1)	1	8 (3)
tibia	–	–	7 (3)	–	–	7 (3)
unident. longbone frags.	1	–	5 (3)	16 (11)	14 (10)	36 (24)
calcaneus	–	–	1	–	–	1
metatarsal	–	–	3	–	–	3
tarsal	–	–	–	1	–	1
phalange	–	–	1	–	–	1
unidentified frags.	–	9 (7)	–	1 (1)	2	12 (8)
Totals	8	16 (8)	36 (16)	20 (13)	27 (15)	107 (52)

[a] number of identified specimens; number of burned specimens is listed in parentheses.

Floral Remains

Three small (a total of 2.0 g.) sticks of an unidentified wood were in the collection. None were modified and all are believed to be associated with the packrat nest.

DATING

Although there are no chronometric dates from the site, all of the associated artifacts (beads, clam tubes, cloth, metal bar) date to ethnohistoric times. There seems little doubt that this cremation dates to within the last 200 years.

DISCUSSION

The human bone and associated artifacts discovered and excavated by Stuart Peck in 1954 appear to be the remains of a secondary cremation. Although dating late in time and associated with a late Kawaiisu village site, the practice of cremation was not customary for the Kawaiisu (Zigmond 1986:404), although it was reported by Driver (1937:99). Other than the cremation, the interment of the body within a rock cleft and in a cairn with

associated grave goods does fit the Kawaiisu pattern. None of the artifacts appeared to have been burned, but were apparently deposited during the interment of the cremated remains in the cairn. The human bone was incompletely burned due to an inefficient fire or lack of experience.

No other human remains have so far been reported from archaeological sites in the vicinity of Nettle Springs (e.g., Sutton 1982; Hinshaw et al. 1993; Osborne 1994). However, an inhumation was described from Cache Creek, just north of Mojave (Robinson 1982). That burial is of interest due to the presence of a large number (n = 1,122) of shell and stone beads, including 28 *Tivela* tube beads. There currently is no direct link between the Cache Creek burial and the Nettle Springs area, but the "common" presence of *Tivela* ornaments is noteworthy for the southern Sierra Nevada/western Mojave Desert region.

ACKNOWLEDGEMENTS

The human remains and associated artifacts were returned to the Kawaiisu (Andy Greene) for reburial. We thank Jill Gardner for her comments on a draft of this paper. The faunal remains were identified with the aid of the comparative collection at CSUB, and we thank Gerrit L. Fenenga for his assistance in the faunal identification.

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SEVENTY-TWO HOURS IN AUGUST: AN ARCHAEOLOGICAL SALVAGE PROJECT AT THE CREST DRIVE-IN SITE (CA-KER-480H), BAKERSFIELD, CALIFORNIA

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INTRODUCTION AND BACKGROUND

On August 17, 1976, the Kern County Archaeological Society (KCAS) began an archaeological salvage excavation at a gravesite located at a southwest Bakersfield home construction site (CA-KER-480H, Fig. 1). The excavation and removal project, which consumed the greater part of three days and nights, was set in motion by the discovery of human remains and artifacts in a location that would soon be a residential front yard. Immediate and complete removal of the contents of the site was deemed essential, given the threat of total destruction by construction operations and by neighborhood residents, who were removing artifacts and scattering human bones about the area. This report on the salvage effort will serve several purposes: first, a brief chronology of the events which preceded the excavation will be presented; second, it will examine statistical data as determined from the analysis of recovered artifacts and skeletal remains; and finally, conclusions will be offered with respect to the origin and historical status of the site and its contents as determined from post-excavation research.

On August 10, 1976, the KCAS was informed by a representative of the Kern County Museum that a discovery of possible archaeological and/or historical significance had been made at the local construction site. Specifically, human bones and artifacts had been unearthed as workers excavated a trench for the emplacement of a water service line. Construction operations were promptly suspended, authorities were summoned, and routine investigative procedures were carried out. From this investigation, which consisted of the removal and examination of a quantity of bones by the Bakersfield Police Department and the Kern County Coroner's Office, it was concluded that the site was an Indian burial ground approximately one hundred years old. This finding was primarily based on the determination by the coroner's pathologist that a skull acquired and examined was that of an elderly Indian male (Anonymous 1976:10). The findings were subsequently reported in the Bakersfield Californian on August 10, 1976, and the incident, so far as local authorities were concerned, was closed. The site was then abandoned to neighborhood vandals and treasure seekers who continued to remove artifacts and skeletal remains.

From the outset, KCAS members felt that the official interpretation of the site was not only prematurely determined, but also was based on vastly insufficient data. This conviction focused principally on the nature of the artifacts which neighborhood residents had removed from the burial site, and which were subsequently examined by KCAS members during a survey of the site and neighboring vicinity following the initial discovery. These artifacts, which were at that time in the hands of neighborhood residents, included a two-in. metal cross inlaid with wood, fragments of a glazed ceramic material, chunks of unworked obsidian, scraps of decomposing wood, and a variety of ornaments and handles presumed to have come from caskets. Although it was not inconceivable that these items could have been acquired by local Native Americans during their contacts with Europeans, they did not appear to be the sort of grave goods normally associated with Indian burial methods. In light of these developments, KCAS members disagreed with the official interpretation, and were convinced that the gravesite was of local historical significance, and therefore merited a more extensive investigation, including excavation.

Excavation at the site was delayed for several days while permission for digging was secured from the property owners, who were out of town at the time. Once contact was established, however, they were extremely cooperative throughout the operation. Construction activities at the site remained on hold as building crews were moved to other locations within the tract. At the same time, several area residents who had developed a sudden

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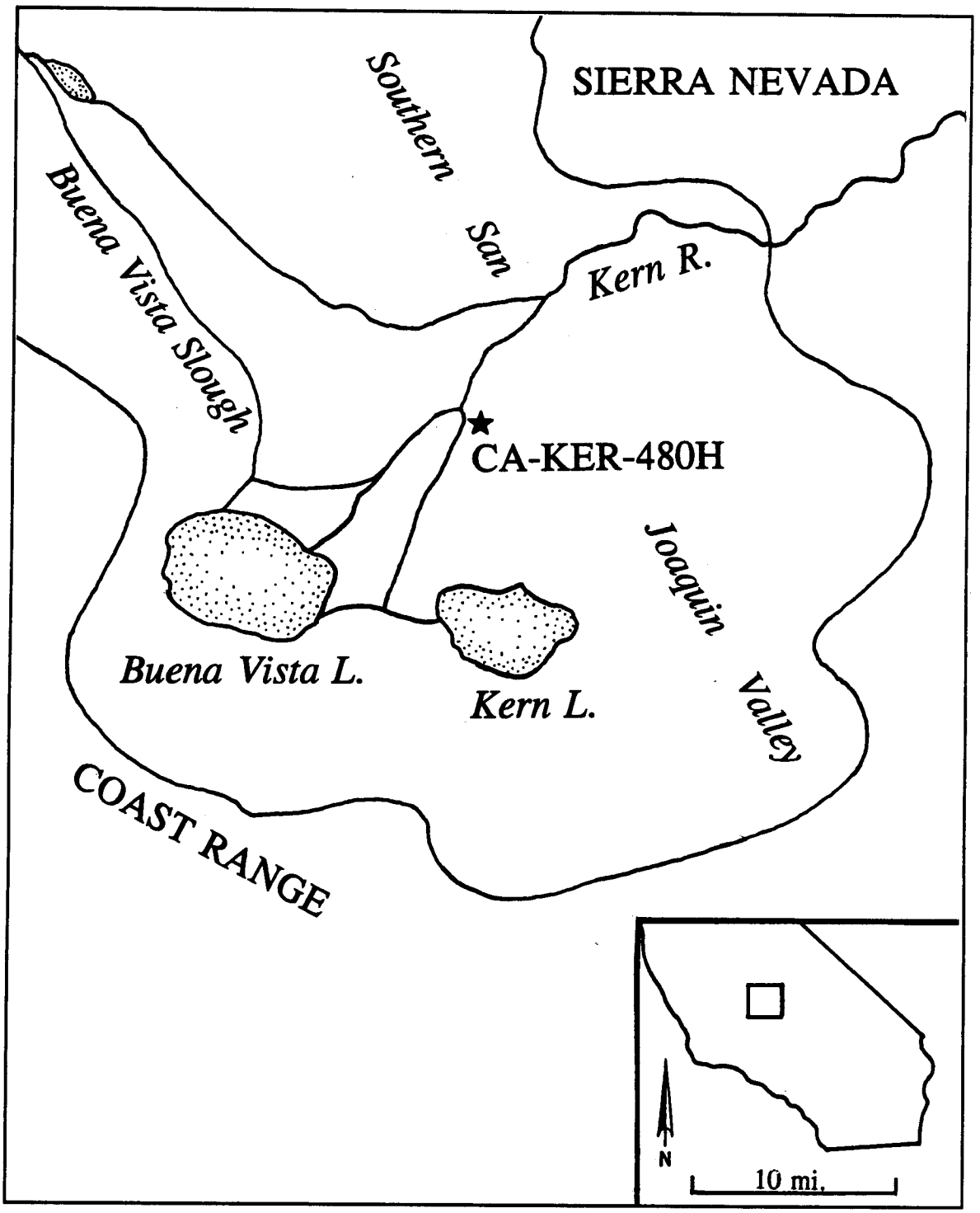

Fig. 1. General location of the CA-KER-480H site.

archaeological passion promised to help protect the site from potential vandalism during the week-long waiting period.

In the meantime, the author contacted the County Coroner's Office in an effort to obtain information about known cemeteries in the discovery area and for possible acquisition of the skeletal remains that officials had removed from the site. While this early search of the coroner's records yielded no information regarding the site area, the office did agree to relinquish the remains that they had to KCAS prior to completion of the excavation, and these remains were analyzed by KCAS members shortly thereafter. Subsequent to the excavation, Robert Schiffman of Bakersfield College, who directed the project, took possession of the remains that were excavated at the site, and the author is unaware of their disposition after that time. Remains of eight individuals eventually ended up at California State University, Bakersfield (CSUB), and these remains were then analyzed by Robert Yohe and Susan Siefkin of CSUB (see following article for analysis of human remains). These bones are presently being maintained at CSUB.

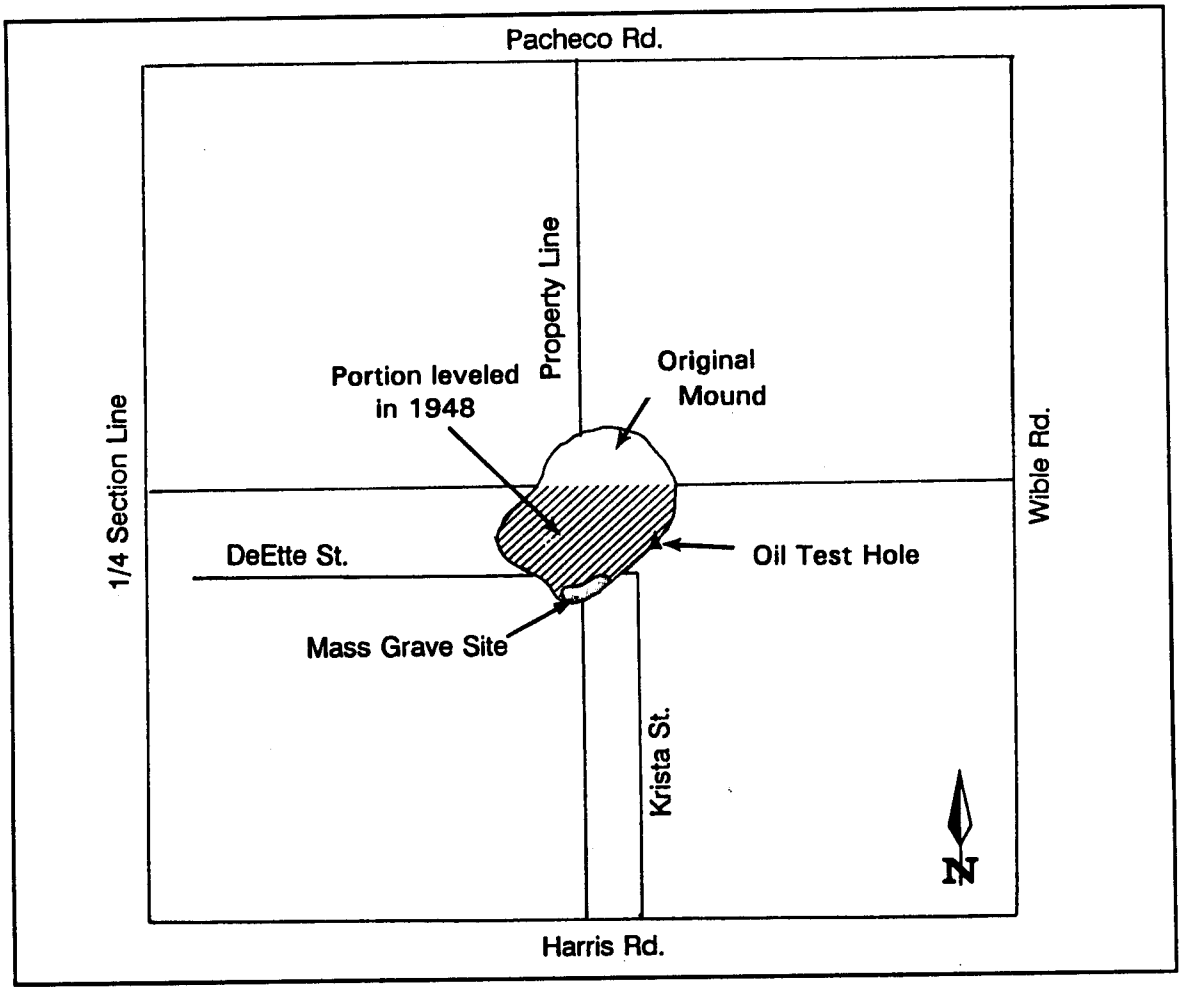

Fig. 2. Map of the CA-KER-480H site.

SITE DESCRIPTION

CA-KER-480H (Fig. 2) consisted of a shallow, mass grave (Figs. 3 and 4) containing the skeletal remains and associated grave goods of approximately one hundred individuals (this determination was made based on the number of femurs). With the exception of eight individuals, the remains have subsequently been reburied. The site was located south of the city of Bakersfield in the northwest quadrant of the Wible Road and Harris Road

Fig. 3. The mass grave at CA-KER 480H and surrounding neighborhood.

intersection, in the vicinity of the Crest Drive-in Theatre. It was situated within an area of a rapidly expanding residential subdivision being developed by Kern Valley Homes Construction Company of Bakersfield.

METHODS

Excavation at the site commenced on August 17, 1976. Screening was performed using nested 1/4-in. and 1/8-in. mesh. Since the disturbance was so great, no grid was established and no levels were kept. As the overlying soil was removed and screened, a massive, disordered gravesite emerged, exposing human skeletal remains piled and packed closely together in an irregularly shaped pit approximately 32 feet long, eight feet wide, and three to four feet deep. As it had been established that approximately two feet of fill dirt had been added to the original ground level in preparation for the current construction project, it was estimated that the original grave pit was about one to two feet below the surface. Removal of the grave's contents required three full days of labor. Throughout this period, KCAS members remained at the site around the clock to protect the open pit from potential disturbance. Neighborhood residents were extremely cooperative during the operation, many even lending some welcomed assistance in screening and soil removal. Their enthusiasm and contributions were greatly appreciated. It should also be noted that most of the artifacts that had initially been removed from the site were later handed over to KCAS members. Upon removal, all of the contents of the graves were placed in brown paper bags.

The shallowness of the gravesite, along with the disordered nature of its contents, led very quickly to speculation that at some point a reburial of massive proportions had occurred at this location. As the excavation proceeded, this suspicion was confirmed as artifacts of recent manufacture began to appear in contexts which ruled out any possibility of post-burial intrusion. A fairly modern glass jar and cover, several fragments of recently

Fig. 4. Close-up of the mass grave at CA-KER-480H.

manufactured glass, and 11 Eastside beer cans dated 1947 (Fig. 5), were dispersed under the bones in such a manner that one could only conclude that they were deposited there at the same time as the human remains.

After the excavation was completed, all of the material culture was removed to Bakersfield College, where it remains today. At the time of this publication, access to the collection could not be obtained due to ongoing construction at Bakersfield College, so the laboratory methods utilized are not known at this time.

MATERIAL CULTURE

A number of historic artifacts was recovered from the site. In addition to the skeletal remains, a significant quantity and variety of artifacts were recovered from the site. An assortment of buttons, beads, round-headed nails,

Fig. 5. Eastside beer cans (no scale) dated 1947, found below the graves (CA-KER-480H).

chunks of glazed brick, a glass jar and glass fragments, remnants of leather shoes, shoe eyelets, a variety of casket handles and ornaments, and various religious paraphernalia were in the collection.

Historic Artifacts

Glass Buttons. Twenty-two white, glass buttons (chinas), many bearing colorful designs and patterns, were scattered among the burials (Fig. 6, Table 1). These buttons were identified according to the type of material they were designed to decorate (S. Andrews, personal communication 1976). For example, those designed to adorn calico were called "Calicos," those with patterns matching gingham were labeled "Ginghams," and so forth. According to Andrews, this pattern-dying process was developed in 1840, with the peak manufacturing period for these styles occurring in the 1860s in Britain and France. The process was also known in Czechoslovakia after 1918.

Shell Buttons. Seventeen shell buttons (11 mussel and six mother-of-pearl), in numerous styles and sizes, were also recovered (Fig. 7, Table 2). Mother-of-pearl buttons were made during the last half of the nineteenth century with a peak manufacturing date of 1885 in the United States (S. Andrews, personal communication 1976). Most were dyed and then painted. Buttons of mussel shell were made during the same period and were classified according to coloring and shade rather than by source of material. According to Andrews (personal communication 1976), Burmingham, Great Britain, was a center for button manufacturing in the last half of the nineteenth century, with numerous types and styles originating there.

Miscellaneous Buttons. In addition to the glass and shell buttons described above, a total of 14 buttons made of wood, metal, brass, metal and glass, and fabric-covered metal were recovered from the site (Table 3).

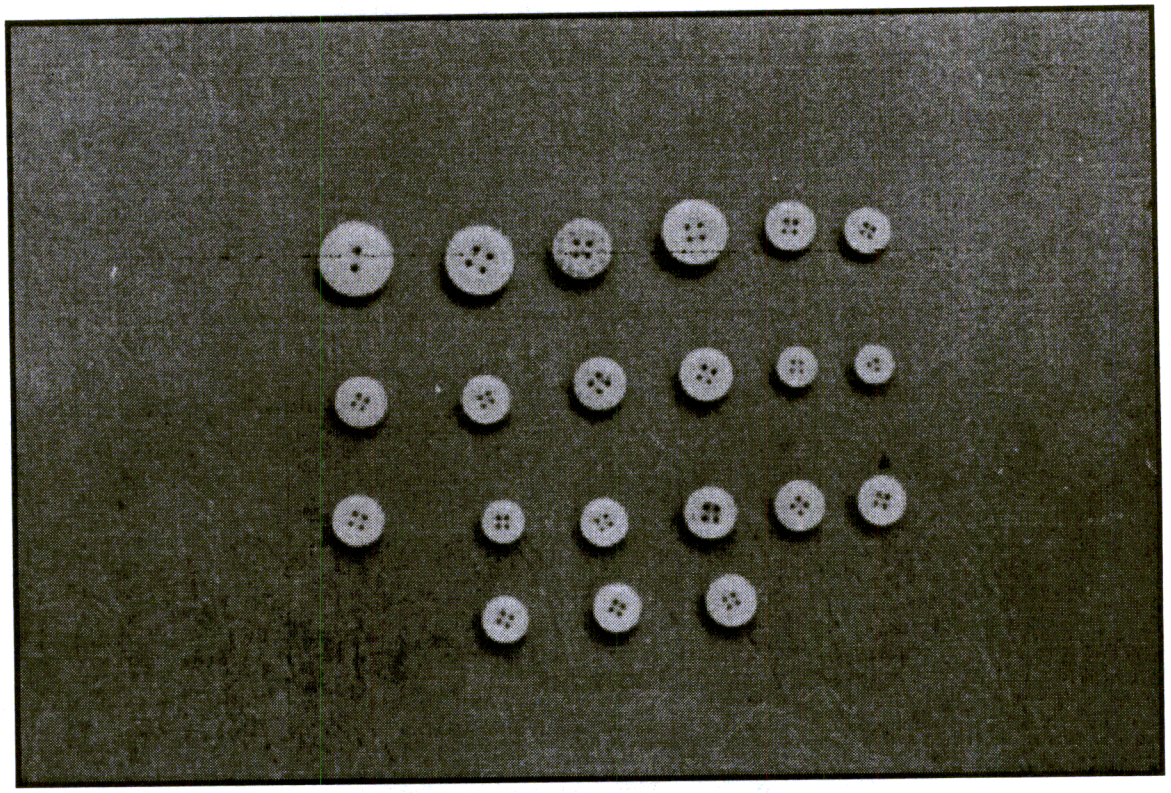

Fig. 6. Glass buttons from CA-KER-480H (no scale).

Table 1
ATTRIBUTES OF GLASS BUTTONS, CA-KER-480H

Number	Number of holes	Size (in.)	Description
1	4	3/8	milk white with black specks
4	4	3/8	milk white
1	4	1/2	black dots on milk white 7 outside, 1 in center
1	3	5/16	milk white
1	4	5/16	clear
1	4	11/32	milk white
1	4	13/32	side 1 - solid light blue side 2 - white with blue ring
1	4	13/32	milk white with red traces on back
1	4	13/32	thin, light milky white
5	4	13/32	milk white
1	4	7/16	milk white
1	4	7/16	tan stars on milk white
1	4	17/32	milk white
1	4	9/16	milk white
1	2	5/8	oval eye-milk white with tan

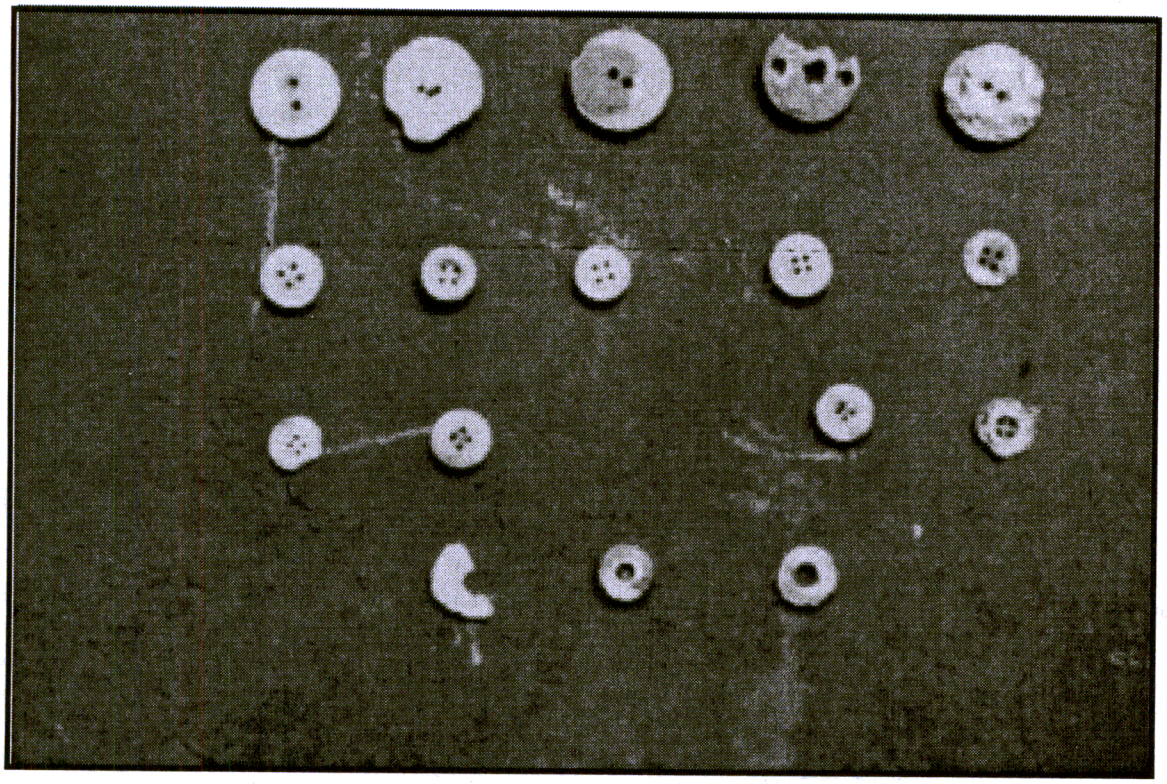

Fig. 7. Shell buttons from CA-KER-480H (no scale).

Table 2
ATTRIBUTES OF SHELL BUTTONS, CA-KER-480H

Number	Number of holes	Size (in.)	Description
Mussel			
1	4	5/16	hand incised
1	4	5/16	dotted
2	4	5/16	sunk centers, indentation or ring on edge
2	4	5/16	sunk centers
2	4	5/16	flat
1	--	5/16	center missing
1	4	5/16	tapered center
1	4	5/16	flat, rough, irregular, 2 cuts on one side
Pearl			
1	2	1/2	flat, dyed tan
1	2	19/32	oval eye, dyed tan
1	2	19/32	circled and sunken center, dyed tan
1	2	5/8	rough and irregular
1	--	5/8	two indentations on one side, center missing
1	2	11/16	center circled, dyed tan

Table 3
ATTRIBUTES OF MISCELLANEOUS BUTTONS, CA-KER-480H

Number	Number of holes	Size (in.)	Description
3	–	–	brass tacks, or may have had metal loops for uniform
2	4	–	possible black glass set in metal plates
4	–	3/4	fabric set in metal plates, probable shank loops
1	2	3/4	wood or horn
2	–	5/8	fabric set in metal plates, probable shank loops
1	4	5/8	fabric attached to non-metal, possibly leather
1	–	5/8	fabric from front or back of button (no button)

Beads. The excavation produced a large number of beads in a variety of colors and styles. The largest single type consisted of cobalt blue, cane manufactured, faceted, glass beads, of which 47 were recovered from the north end of the grave pit. Commonly called "Russian Blues," these beads were no doubt brought into the area by Russian and Spanish settlers during the nineteenth century. They could well have functioned as items of trade in transactions with local Indians. It is equally possible that these beads served an ornamental or religious function in the construction of a rosary, since other beads and their associated stringing material, which were known to have served this purpose, were discovered among the burials.

Casket Ornaments and Religious Paraphernalia. A total of 51 casket handles, a two-in. cross, two one-in. crosses, and a five-in. cross with a skull and crossbones symbol on its base were among the most impressive objects removed from the gravesite. All were richly embellished with Christian religious symbolism. The pair of nearly identical one-in. crosses had circular bases, and probably served as decorative ornaments at the end of a casket. The five-in. cross was found in association with the rosary remnants. Before the collection was turned over to Bakersfield College, photographs were taken of several of the casket handles, which were then drawn by Stephen Andrews (Figs. 8-14). Additionally, although no drawing was made of the five-in. cross, a photograph was taken and is included as Figure 15.

Detailed examination of the casket handles revealed 16 different styles (S. Andrews, personal communication 1976). Based on relative sizes, 45 handles were judged to be from adult caskets and six from caskets manufactured for children. Of particular significance are patent dates ranging from 1875 to 1877 stamped on the backsides of several handles. These dates, along with those appearing on the previously mentioned beer cans, provided valuable chronological markers and parameters which prompted speculations about past events. They would assume even greater significance in post-excavation research as efforts were made to weave together informants' statements, newspaper articles, and artifact analysis into a coherent and interpretive assessment of the burial site.

Other. As noted above, a modern glass jar and cover, several fragments of recently manufactured glass, and 11 Eastside beer cans, dated 1947, were recovered from the site.

INTERPRETATION OF HISTORICAL CONTEXT

Initial efforts to solve the mystery of the presence of a mass burial at this site were repeatedly frustrated by the apparent nonexistence of official records or knowledge within local agencies which might shed some light on the discovery. Almost certainly, the last event at the site, which was probably a reburial of remains that were accidentally disturbed, must have occurred in or around 1947. This conclusion, based upon the dates of the beer cans, would later be confirmed by an informant (see below). That an event of this nature and magnitude during

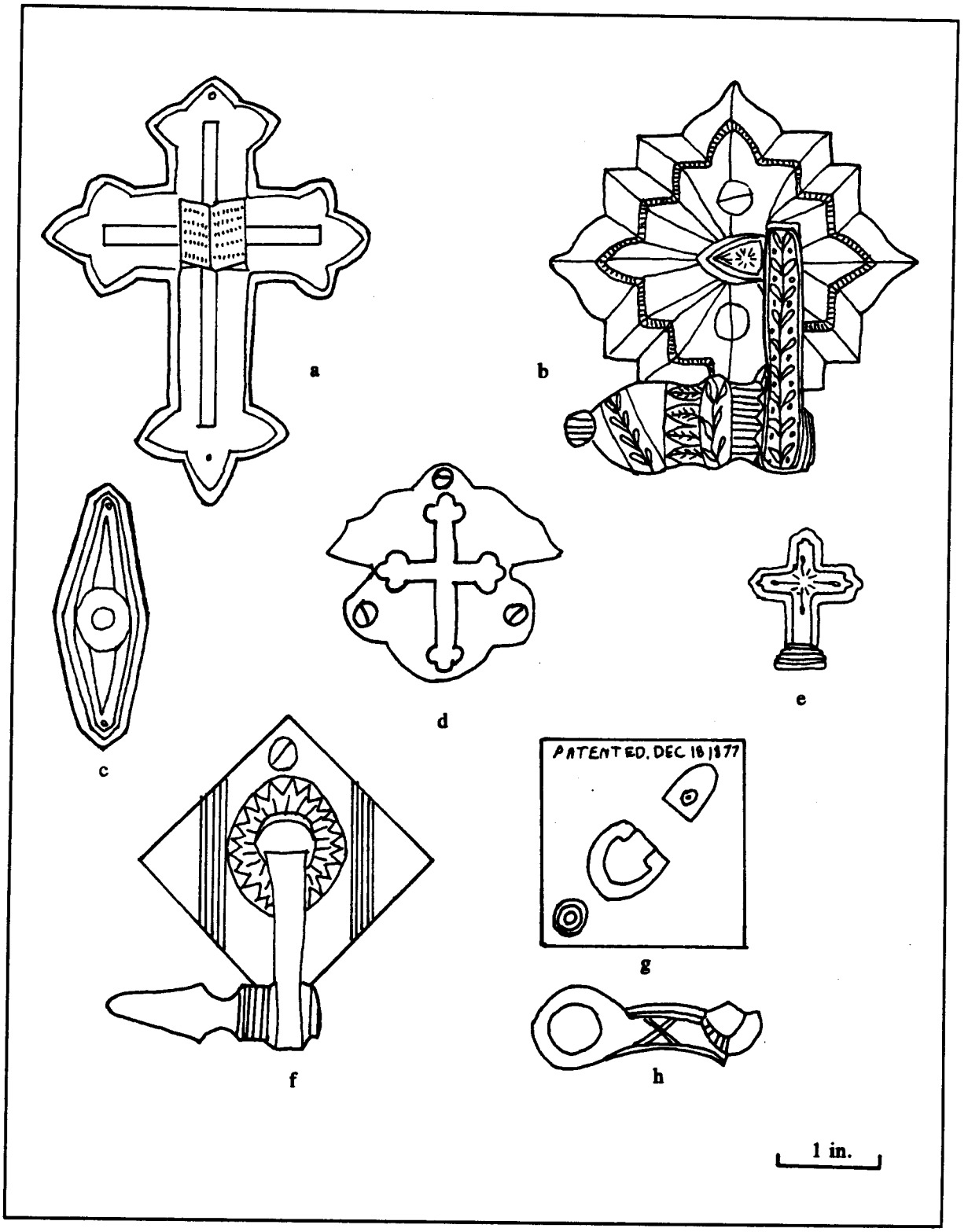

Fig. 8. Casket handles and ornaments from CA-KER-480H (scale approximate): (a) ornament; (b) handle; (c-e) ornaments; (f) handle; (g-h) back view of plate and handle of Figure 8f.

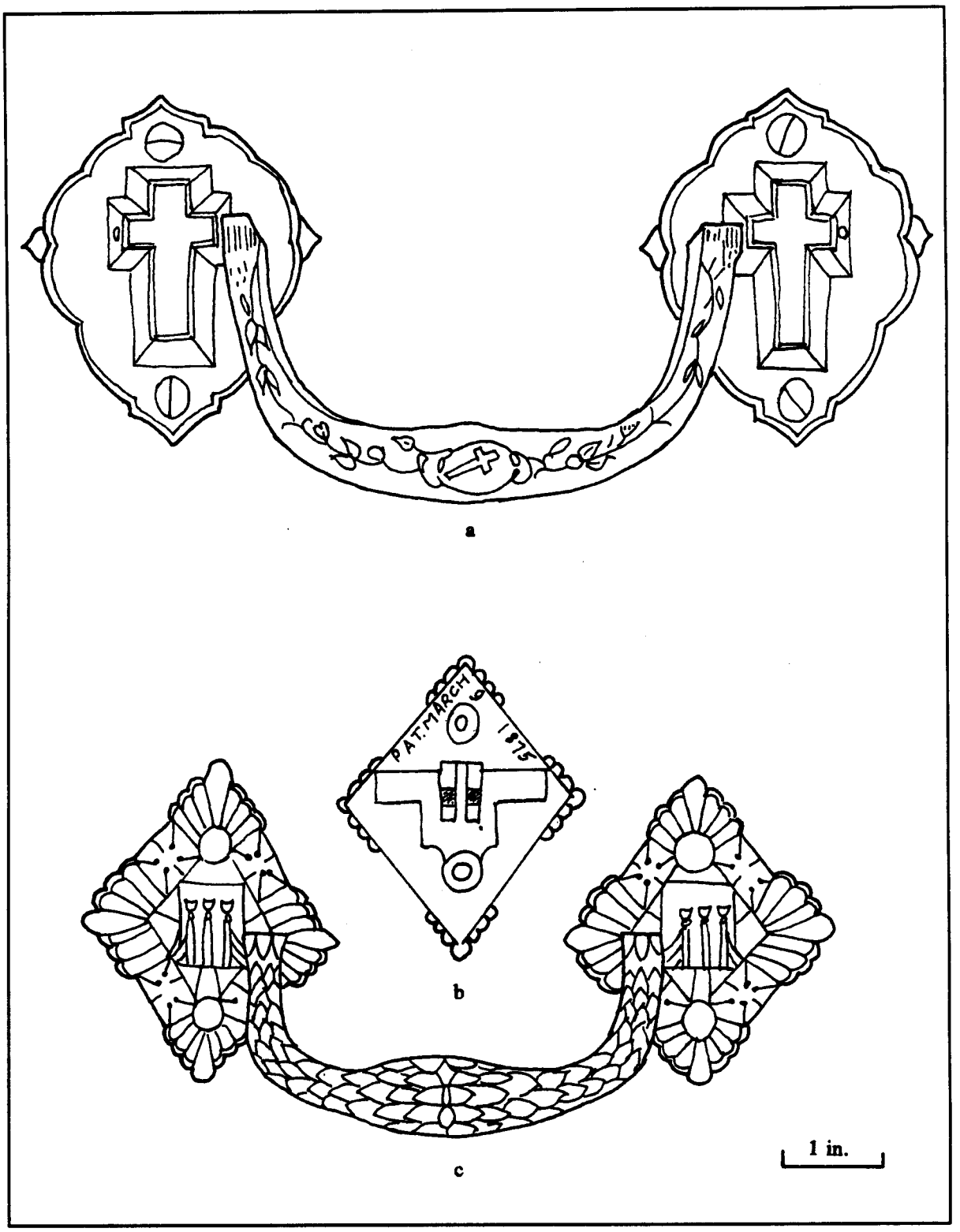

Fig. 9. Casket handles and ornaments from CA-KER-480H (scale approximate): (a) handle; (b) back side of plate of Figure 9c; (c) handle.

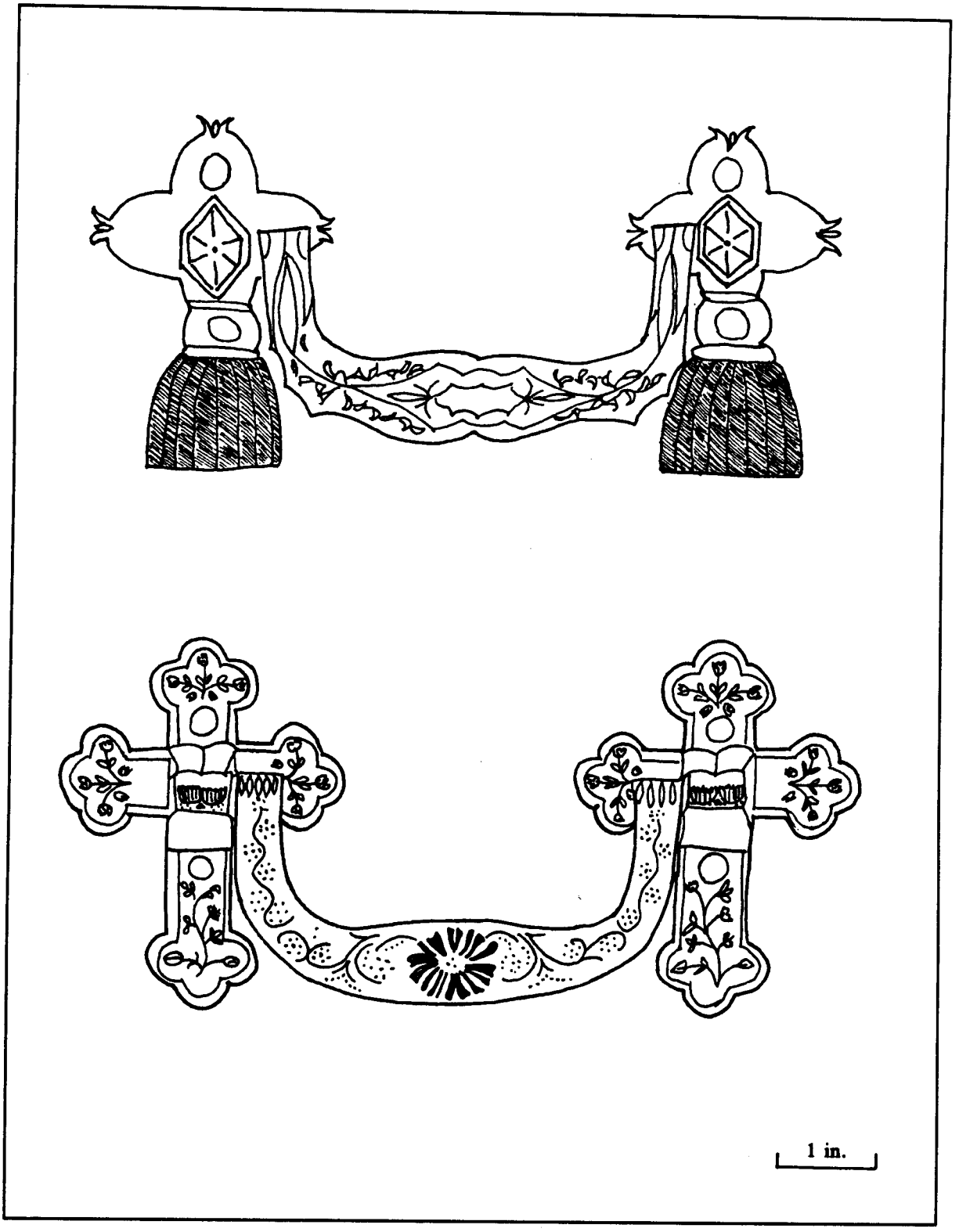

Fig. 10. Casket handles from CA-KER-480H (scale approximate).

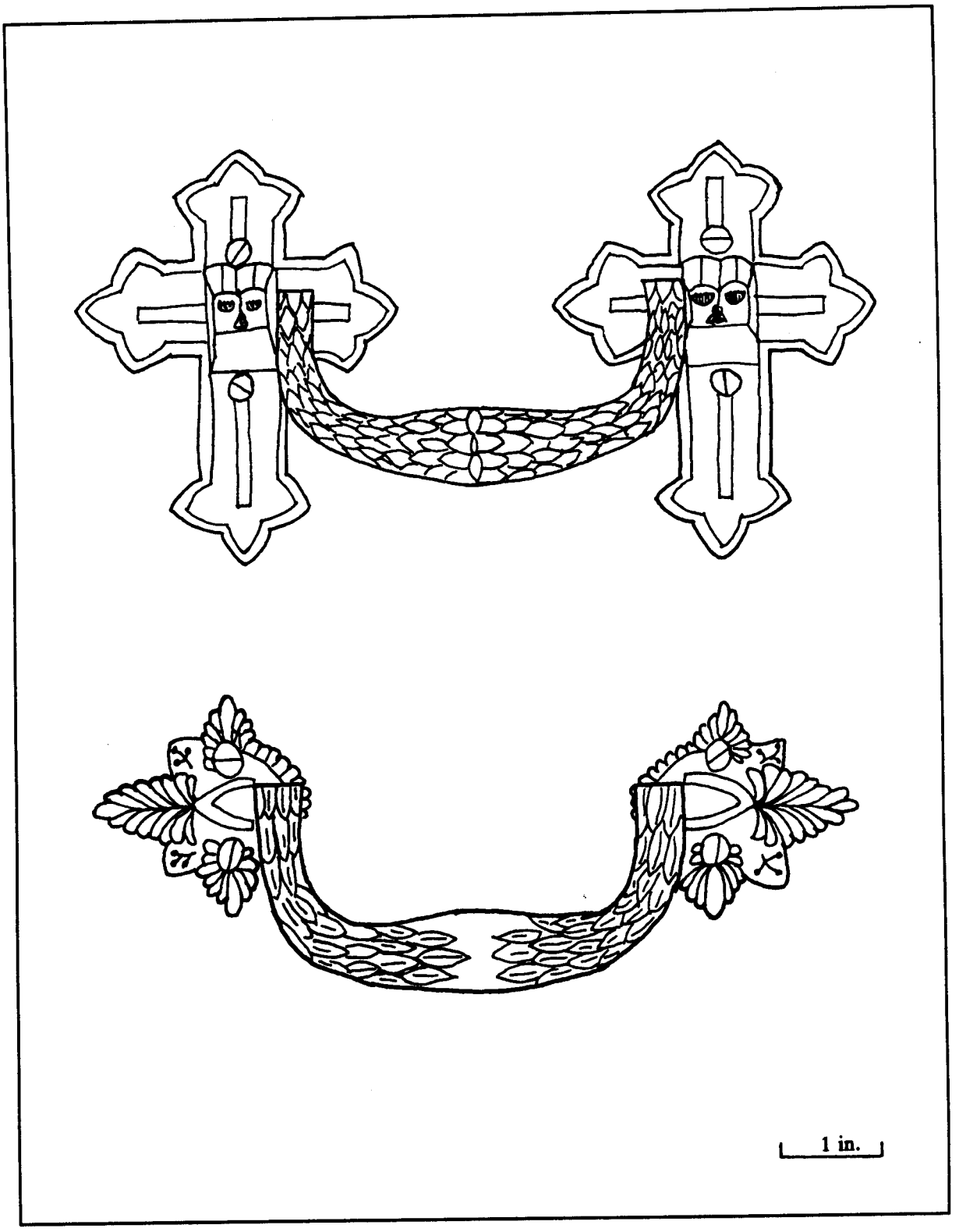

Fig. 11. Casket handles from CA-KER-480H (scale approximate).

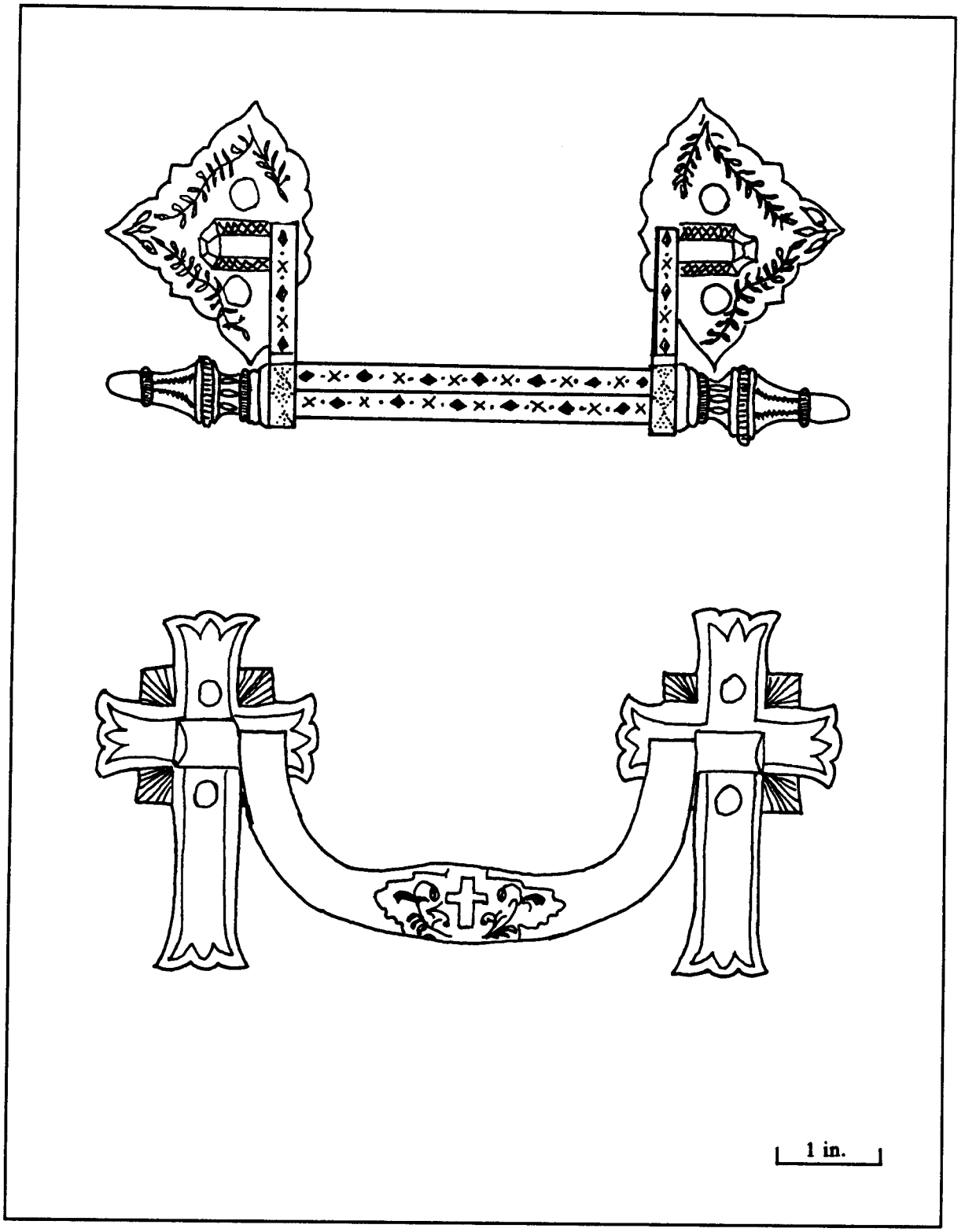

Fig. 12. Casket handles from CA-KER-480H (scale approximate).

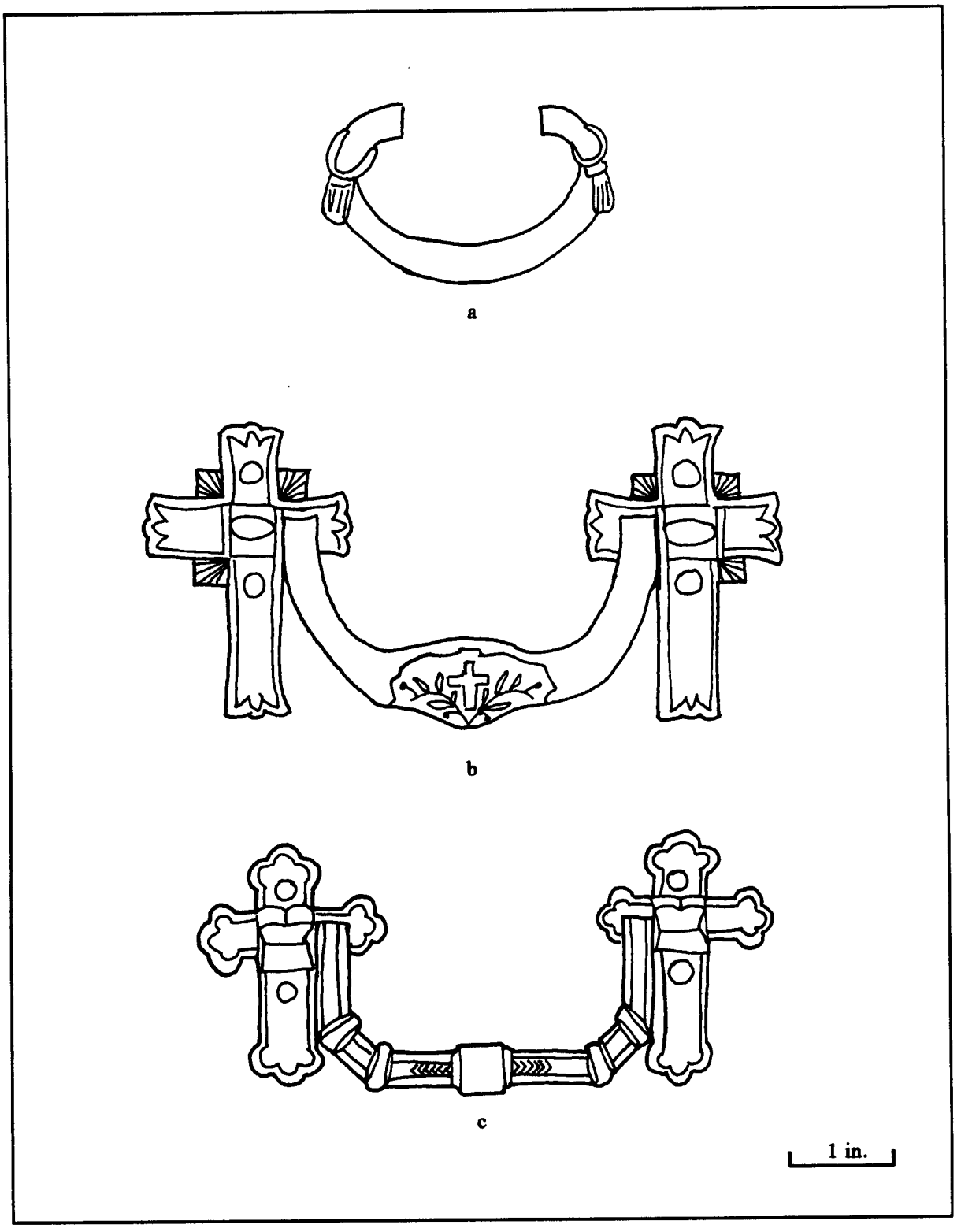

Fig. 13. Casket handles from CA-KER-480H (scale approximate): (a) handle from a child's casket; (b-c) handles possibly from children's caskets.

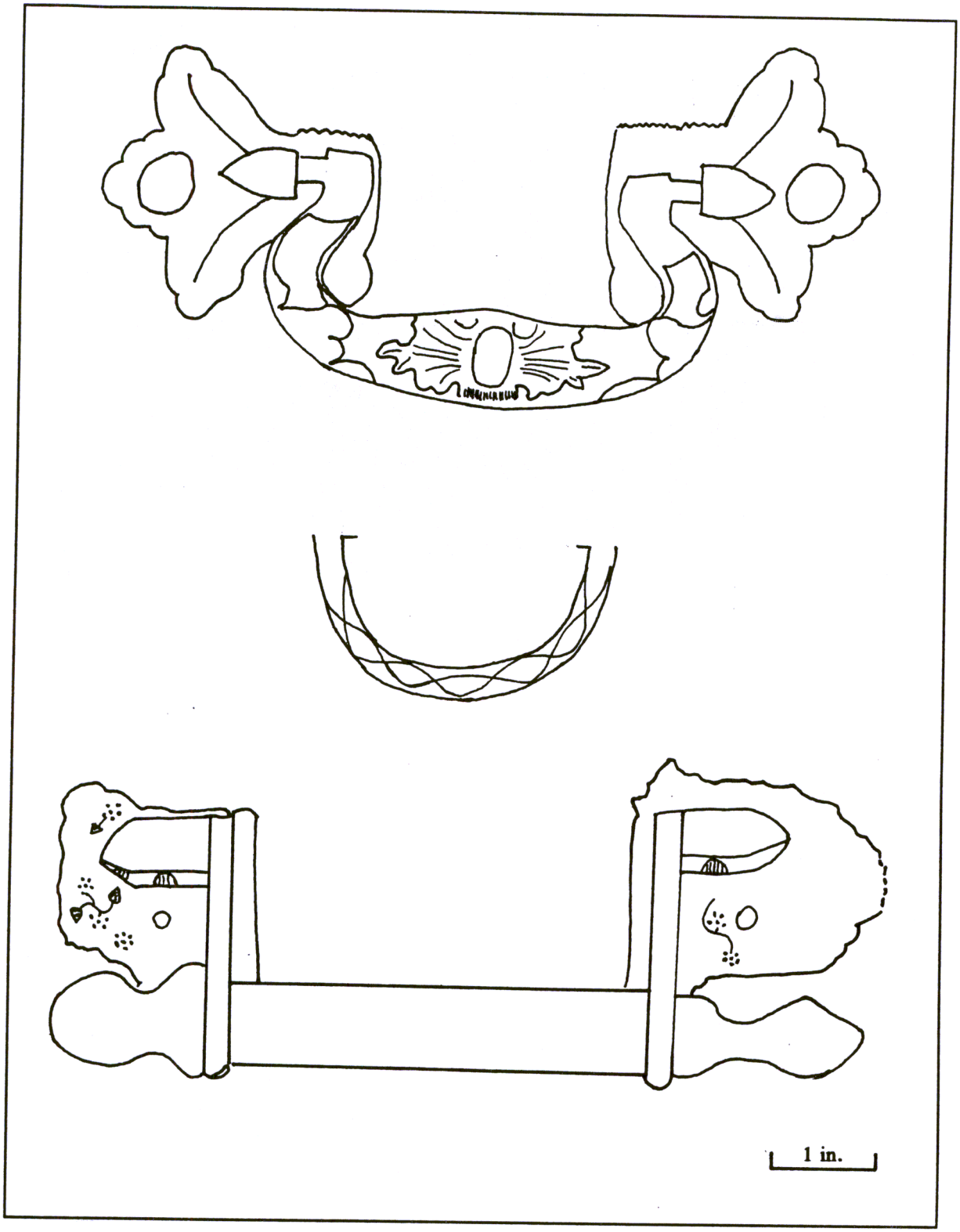

Fig. 14. Casket handles from CA-KER-480H (scale approximate).

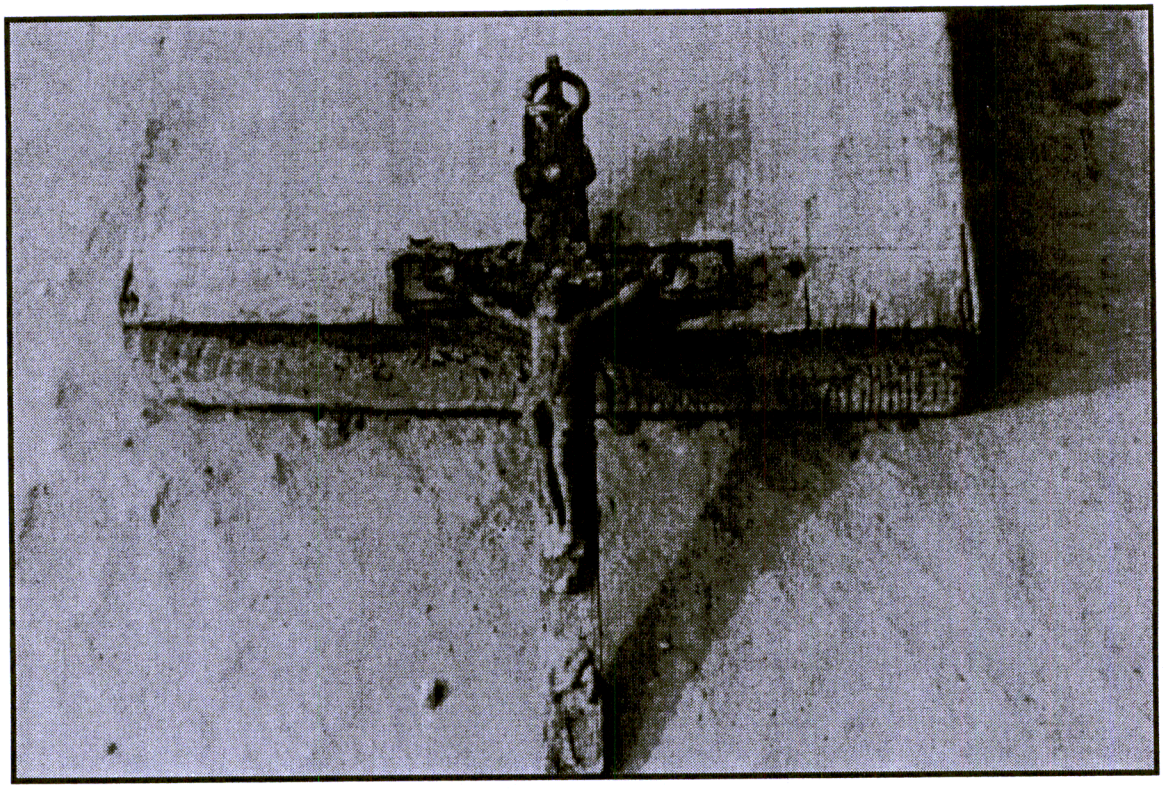

Fig. 15. The five-in. cross from CA-KER-480H (no scale). A skull and crossbones symbol is visible at the base of the cross.

a period as recent as 1947 or thereafter would have been recorded somewhere, or at least remembered by someone in official circles, was a logical assumption. However, no one at the Kern County Museum, the Coroner's Office, the Health Department, or the Hall of Records could provide any useful information in this regard. So far as official records were concerned, no cemetery ever existed in the vicinity of the site nor could any event of record account for the mass gravesite.

At this point, the only information regarding past activities in the area had been provided by former KCAS president John Dieckman, a geologist for Getty Oil Company. While checking past drilling records in the area, Dieckman discovered that an oil well test hole was drilled in close proximity to the site in 1935, leading to speculation that cemetery graves might have been disturbed at that time; however, this could not be verified in the drilling company's records.

In the meantime, Dieckman had acquired additional information from co-worker Frank Delfino at Getty Oil. Prior to 1930, Delfino, who grew up in southwest Bakersfield, recalled traveling with his father to a farm just south of the Southern Pacific Railroad tracks in south Bakersfield to buy wine grapes. On several occasions, the farmer pointed out a low, but prominent, mound in the center of the property, explaining that it was an old Indian cemetery. When shown a 1929 series map of the area containing the burial site, Delfino specifically identified a topographic high point as the mound on which the alleged cemetery was located. As additional information was acquired, a coherent picture began to emerge, and then a significant breakthrough occurred.

Ray and Millie Wheeler, who lived very near the site, were two of the first individuals on the scene when the bones were uncovered, and they continued to be faithful participants throughout the course of the excavation. They would later become long-time members of KCAS, where Millie served two years as KCAS president. It was

Millie's husband, Ray, who directed the author to Claude Stanphill, who would prove to be the key to solving a significant part of the mystery surrounding the burials. Although suspicious and reluctant at first, Stanphill eventually agreed to relate what he knew about past events in his former southwest Bakersfield neighborhood. His statements became the major information source for this report. Stanphill (personal communication 1976) was aware of the historic cemetery and of the 1935 oil test hole, but insisted that the hole was positioned on the edge of the mound, and that, to the best of his knowledge, no graves were disturbed during the drilling. Stanphill recalled the following sequence of events regarding the cemetery.

A resident and farmer in the site area between 1938 and 1944, Stanphill (personal communication 1976) was a close friend of his neighbor and landlord, Paul Riccomini, who had owned and farmed the land since 1919. Stanphill remembers well the prominent mound at the northwest corner of a Riccomini field. The mound also encroached on two, or possibly three, other parcels of land. There was some uncertainty about how much land actually belonged to Riccomini. Although little attention was paid to the mound at the time, rumors were that it was an old cemetery. Mrs. Gillum, an elderly woman who lived nearby, told Stanphill that the mound once served as an Indian burial ground. Another neighbor, Frank Pacheco, who was 70 years old at the time (about 1940), and whose ancestors were pioneers in the area, told Stanphill that he had attended funerals on the hill as a young boy. Pacheco would have been seven years old in 1877, which matches the most recent date observed on the casket handles. According to Stanphill, no headstones, markers, or other evidence of graves were visible on the surface of the mound at the time that he lived in the area. He was certain, however, that no burials had taken place on the hill since about 1900. This appears to be a plausible statement since Bakersfield's first official cemetery, Union Cemetery, was established in 1898. Given these collective historical accounts, there is ample reason to believe that the mound was indeed used as a burial place for early Indians, and that it continued to function as a community cemetery for whites and other European colonists as they moved into the area.

According to Stanphill, in 1947 or 1948, Riccomini needed to level some ground for cultivation of a portion of the mound that lay on his property. Stanphill did not know if Riccomini was aware that graves were located within the sector to be leveled. In any case, the leveling operation disrupted several graves. When authorities were informed and the incident became public, considerable alarm and apprehension arose in and around the area. Certain individuals believed that perhaps they had relatives buried on the hill. To calm the uneasiness of his neighbors, Riccomini was forced to relocate the contents of the disturbed graves to Union Cemetery, at substantial cost to himself. When additional graves were uncovered a short time later, Riccomini, seeking to avoid the inconvenience and expense that resulted from the earlier operation, apparently chose not to inform the authorities. Instead, he allegedly drove a bulldozer to the edge of his property near a fence, scooped out a shallow pit, placed the remains in the hole, and covered the bones with a thin layer of dirt (C. Stanphill, personal communication 1976).

SUMMARY

Although the origin and the circumstances surrounding the excavated burials has apparently been determined, numerous questions regarding other aspects of the discovery remain unanswered. For example, research at this point has yielded few clues as to the identity of the interred individuals. The fact that no grave markers or headstones were present argues for an old age for the cemetery.

If indeed the cemetery site was used by local Native Americans, then who were they, how long ago was it used, and for how many years did they use it? Finally, what happened to the remains of the individuals who were buried on that portion of the mound which was not disturbed in 1948 but which has since been leveled, at a time recent enough that it should have been recorded? Perhaps future research will provide answers to these questions but, unfortunately, time did not permit the exploitation of all possible sources of information prior to this writing. Research has not ceased, however, and as new data are acquired, and additional facts established, these will become available to readers through the Kern County Archaeological Society's official publications.

ACKNOWLEDGEMENTS

I thank John Dieckman, former KCAS president, for providing the topographic maps, as well as Frank Delfino's story. Tony Ferguson and Ed Kristi from the Kern County Coroner's Office were extremely helpful in attempting to track down records. Robert Schiffman of Bakersfield College directed the excavation, and Andy and Sasha Hoenig, Ray and Millie Wheeler, and Lou Anne Uhler participated in the excavation. I also thank Stephen Andrews, former KCAS secretary, for his statistical analysis of the beads, buttons, and casket handles. Additionally, I thank Steve Bass, former KCAS newsletter editor, and Helen Schiffman, former KCAS secretary, for their assistance.

Finally, the author wishes especially to thank Claude Stanphill for his valuable contributions to this endeavor. Without his cooperation, many questions regarding the site, and of the events which occurred there, would remain unanswered.

REFERENCE

Anonymous
1976 Construction Site Yields Skeleton. Bakersfield Californian (newspaper), August 10, p. 10.

REPORT ON THE HUMAN REMAINS FROM THE CREST DRIVE-IN SITE, BAKERSFIELD, CALIFORNIA

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Susan Kerr Siefkin, Dept. of Sociology and Anthropology, CSU Bakersfield

INTRODUCTION

In 1976, members of the Kern County Archaeological Society (KCAS) spent three days excavating burials from a shallow gravesite in Bakersfield (Blackwell, this volume). After cleaning and a brief examination, the human remains were put into storage at California State College (now University), Bakersfield (CSUB). Thirteen years later, the senior author, then at CSUB, performed an inventory of these remains. While Blackwell (this volume, p. 54) indicated that approximately a hundred individuals were excavated at the site, the collection at CSUB included only a fraction of this number. The following report summarizes the osteological data collected from these remains.

ANALYSIS OF THE HUMAN REMAINS

The human skeletal remains excavated from a cemetery at the Crest Drive-in site (CA-KER-480H) includes a minimum of eight individuals, as well as more than 34 skeletal elements and 25 unassociated teeth (Table 1). In addition, associated fish bone, shell ornaments, and shell fragments were retrieved from the collected burial matrix.

Demographic information was gathered using standard osteological techniques (Brothwell 1981; Bass 1987; Buikstra and Ubelaker 1994). Unfortunately, three of the four adult burials lack sufficient pubic remains to determine sex (Phenice 1969; Buikstra and Mielke 1985) and age (Todd 1920; Brooks and Suchey 1990) using the most reliable techniques. Sex determination for these remains is based mainly on sexually dimorphic cranial traits (Buikstra and Ubelaker 1994:19-20), while age is typically based on cranial suture closure (Meindl and Lovejoy 1985), dental eruption (Ubelaker 1989), dental attrition (Brothwell 1981), and the size of subadult remains. As well as a description of each burial, this summary includes metrics for most skeletal elements (Rogers 1984), and a brief summary of nonmetric traits and pathological conditions found during the senior author's study of the collection.

Individual No. 1

According to the pelvic and cranial traits, this individual is an adult male of approximately 25 to 35 years of age. Sex criteria include both pelvic and cranial traits, while the age is based on observation of the pubic symphysis and dental attrition. The burial is nearly complete, missing only the right scapula, all carpals, and most tarsals and phalanges.

The cranium possesses one small lambdoidal ossicle on the left parietal, an incomplete supraorbital foramen (right), and an extrasutural mastoid foramen on the left side. Dental attrition on the mandible (Fig. 1) was scored using Brothwell's (1981) system. The first molar scored "5," the second scored "3+," and the third scored "2." The sacrum has a minor exostosis on the superior surface, although no arthritic lipping was noted (Fig. 2). The first segment of the sacrum is incompletely fused to the rest of the bone. The majority of the vertebral column is in good condition, although there is slight arthritic lipping on the fourth and fifth lumbar vertebrae (Fig. 2) and some exostoses on the facets of the inferior articular processes of the twelfth thoracic vertebra. Cranial and postcranial metrics for this individual are listed in Tables 2 and 3.

Kern County Archaeological Society Journal 6:71-81 (1995).

Table 1
MISCELLANEOUS BONE FROM CA-KER-480H

Number of Elements	Elements	Comments
1	atlas	
3	phalanges	
30+	cranial	fragments
5	incisors, permanent	1 incisor with shoveling and interdental groove
1	premolar	
13	molars	1 molar with a carious lesion
2	unidentified teeth	badly worn
1	incisor, deciduous	unerupted
1	incisor, deciduous	upper incisor, slight shoveling present
2	molars, deciduous	one right, one unidentified
5	unidentified tooth fragments	

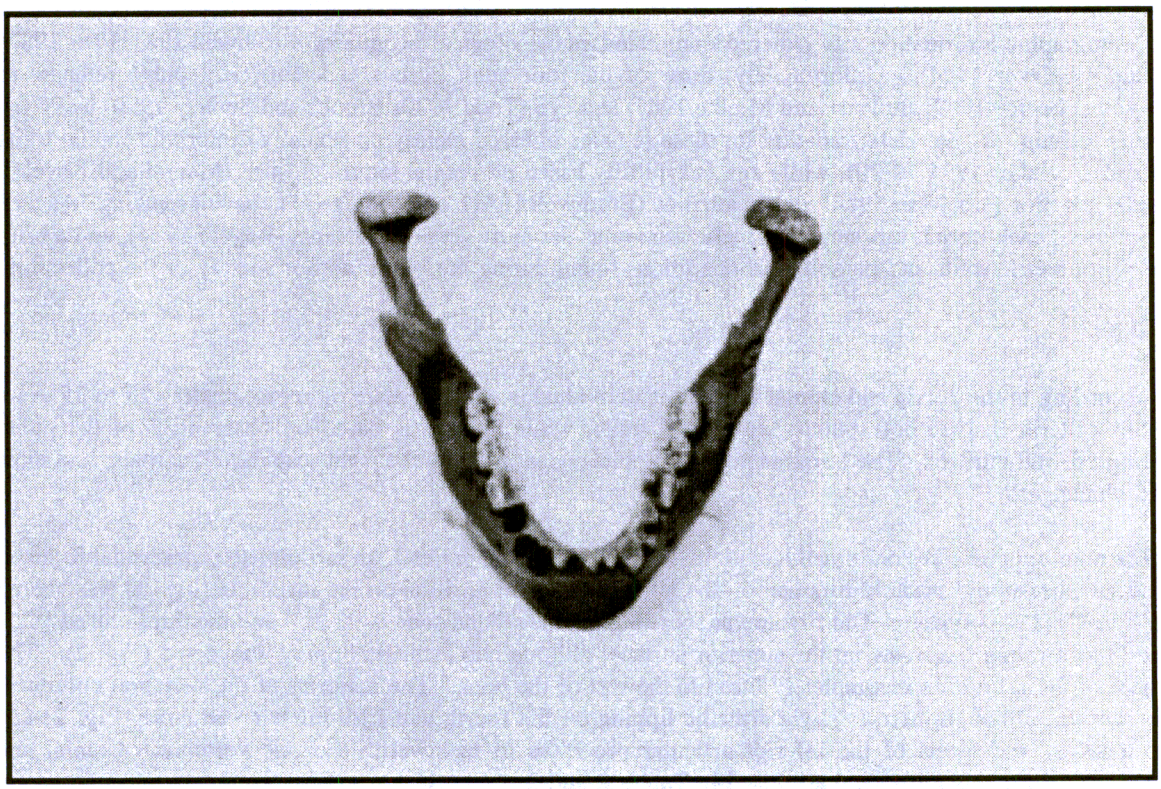

Fig. 1. Occlusal view of mandible showing dental attrition (Individual No. 1).

Table 2
CRANIAL METRICS FOR INDIVIDUAL NO. 1

Cranial Metric	Measurements (mm.)
Maximum cranial length	179
Maximum cranial breadth	138
Basion-bregma height	136
Cranial index	77.5
Porion-bregma height	116
Basion-porion height	13
Auricular height (triangulation method)	
Porion-porion	112
Porion-bregma (left)	113
Porion-bregma (right)	112.3
Minimum frontal breadth	97
Total facial height	112
Upper facial height	68
Facial width (estimated)	132
Nasal height	48
Nasal width (estimated)	24
Orbit height (right)	37
Orbit width (right)	38.6
Palate length	42
Palate breadth	34
Maxillo-alveolar length	51
Maxillo-alveolar width	60
Bicondylar breadth	125
Bigonial breadth	95
Height of ascending ramus	61
Minimum breadth of ramus (right)	42
Minimum breadth of ramus (left)	41
Symphyseal height	32

Objects possibly associated with this individual include shell ornaments, fish bone, shell fragments, and numerous rodent-chewed seeds. It is possible that this individual was interred in a casket; there was a substantial number of rodent feces among the burial matrix, perhaps coming from a rodent nest in a casket.

Individual No. 2

This individual is represented by a cranium only (no mandible). Complete obliteration of the endocranial sagittal suture indicates that this individual is an older adult (Buikstra and Ubelaker 1994:36). In addition, all left premolars, molars, and right first and second molars of the maxilla were lost antemortem. The sex of this individual could not be precisely determined, although the pronounced supraorbital ridge and large mastoid process suggests masculinity (Fig. 3). There is a great deal of variation between populations in these features, so the reliability of this sex is low without other features of the cranium and pelvis to offer support (Buikstra and Ubelaker 1994:19-20). The cranium is flattened at lambda. Cranial metrics for this individual are listed in Table 4.

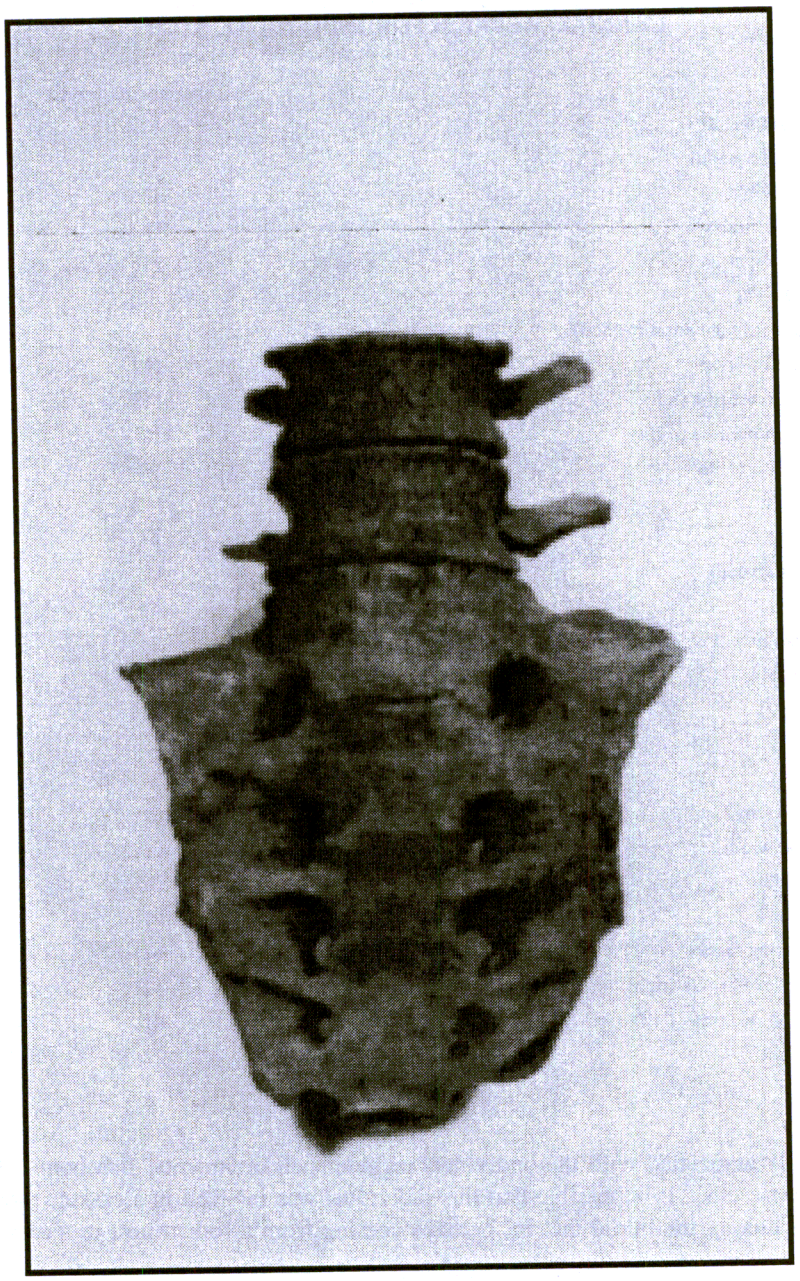

Fig. 2. Anterior view of sacrum and fourth and fifth lumbar vertebrae (Individual No. 1).

Individual No. 3

This individual consists of an adult calvarium (cranium lacking the facial portion). The complete obliteration of the endocranial and nearly invisible ectocranial sagittal suture indicates that this individual is an old adult, perhaps geriatric (Buikstra and Ubelaker 1994:36). A palate found among the remains may be associated with this individual (Fig. 4). Four teeth are present in the palate, including the right canine and third premolar, and the left third and fourth premolars. The right first and second molars were lost antemortem; the sockets for these teeth

Table 3
POSTCRANIAL METRICS FOR INDIVIDUAL NO. 1

Measurement Taken	Measurements (mm.) Left	Right
Humerus Measurements		
Maximum length	318	323
Maximum midshaft diameter	21	22
Minimum midshaft diameter	17	17
Maximum head diameter	45	45
Minimum circumference	62	64
Scapula Measurements (left only)		
Maximum height	165	--
Maximum breadth	102	--
Length of spine	133	--
Length of supra-spinous line	48	--
Length of infra-spinous line	133	--
Clavicle Measurements		
Maximum length	155	--
Midshaft circumference	39	39
Sacrum Measurements[a]		
Maximum length	116	--
Maximum width	124	--
Radius Measurements		
Maximum length	246	250
Ulna Measurements		
Maximum length	271	271
Physiological length	240	238
Minimum circumference	39	38
Innominate Measurements		
Maximum length	220	218
Maximum breadth	165	160 (estimate)
Femur Measurements		
Maximum length	465	462
Bicondylar length	466	459
Anterior-posterior subtrochanteric diameter	23	22
Medial-lateral subtrochanteric diameter	33	33
Anterior-posterior midshaft diameter	26	27
Medial-lateral midshaft diameter	29	28
Maximum head diameter	48	48
Midshaft circumference	88	85
Tibia Measurements		
Maximum length	383	375
Anterior-posterior diameter at nutrient foramen	37	36
Medial-lateral diameter at nutrient foramen	22	21
Fibula Measurements		
Maximum length	367	361

[a] Sacrum measurements are not bilateral.

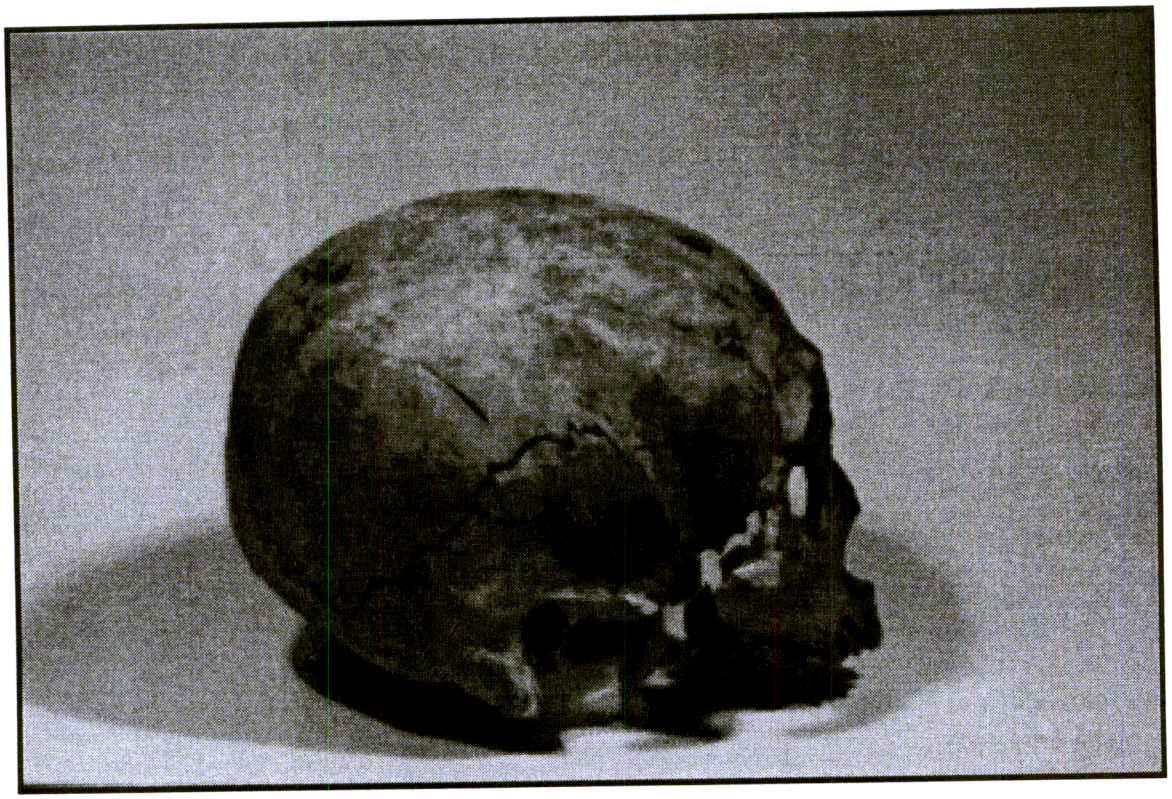

Fig. 3. Lateral view of cranium (Individual No. 2).

Table 4
CRANIAL METRICS FOR INDIVIDUAL NO. 2

Cranial Metric	Measurements (mm.)
Maximum cranial length	179
Maximum cranial breadth	146
Porion-bregma height (left)	127
Porion-bregma height (right)	122
Auricular height (left)	125
Auricular height (right)	130
Minimum frontal breadth	91
Upper facial height	60
Nasal height	39
Nasal width (estimated)	22
Orbit height (right)	24
Orbit breadth (right)	27
Palate length	45
Palate breadth	26
Maxillo-alveolar length	57
Maxillo-alveolar breadth (estimate)	56

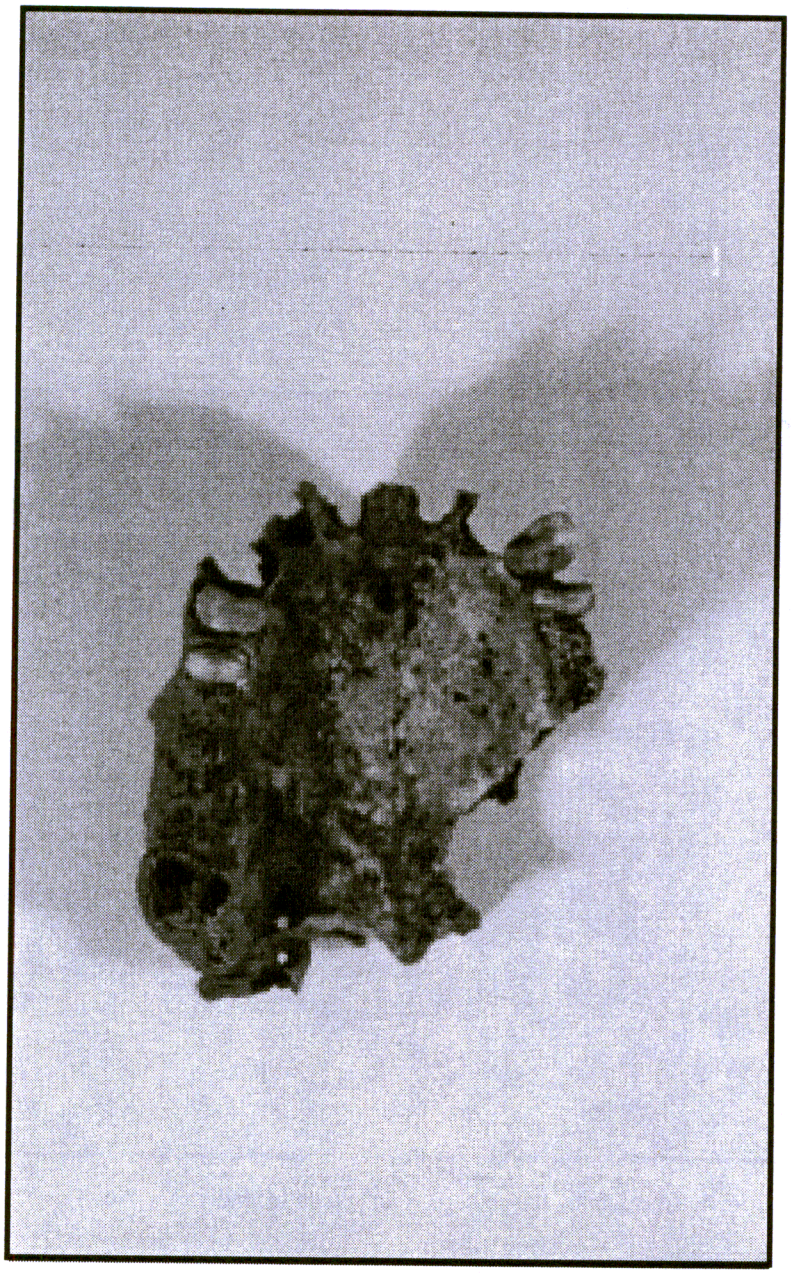

Fig. 4. Palate included with cranium (Individual No. 3).

are completed resorbed. The loss of the molars and severe wear on the canine and premolars indicate that this palate is from an older individual, and supports its inclusion with the cranium of this individual. This individual was afflicted with sinusitis, as evidenced by spicules found in the left maxillary sinus. Cranial metrics for this individual are listed in Table 5.

Table 5
CRANIAL METRICS FOR INDIVIDUAL NO. 3

Cranial Metric	Measurements (mm.)
Maximum cranial length	188
Basion-bregma height	147
Porion-bregma height	137
Basion-porion height	21 (estimate)
Minimum frontal diameter	103

Fig. 5. Cranium of six- to eight-year-old child (Individual No. 4).

Individual No. 4

This individual is represented by a cranium only (Fig. 5). All maxillary first and second deciduous molars are present, and the first permanent molars are fully erupted on both sides of the maxilla. Dental eruption and crown completion indicates that this was a child between six and eight years of age (Ubelaker 1989). A line of ochre is present along the left side of the face, running across the top of the frontal. Traces of ochre were also found on the occipital. Cranial metrics for this individual are listed in Table 6.

Table 6
CRANIAL METRICS FOR INDIVIDUAL NO. 4

Cranial Metric	Measurements (mm.)
Maximum cranial length	180
Maximum cranial breadth	135
Basion-bregma height	140
Porion-bregma height	116
Basion-porion height	131
Auricular height (triangulation method)	
Porion-porion	110 (estimate)
Porion-apex (left)	133
Minimum frontal breadth	94
Upper facial height	58
Nasal height	40
Nasal width	19
Orbit height (right)	32
Orbit width (right)	33
Palate length	41
Palate breadth	13
Maxillo-alveolar length	48
Maxillo-alveolar width	58

Individual No. 5

A mandible not associated with any of the available crania was also found among the remains (Fig. 6). Seven teeth are intact in the mandible, and five additional teeth with similar wear and coloration may be associated with this mandible. The third molar has fully erupted and the second molar is moderately worn, indicating that this person was between 16 and 21 years of age. The overall robusticity of the mandible and the angle of the ascending ramus suggest that this individual is a male; however, due to the variation between populations in these features, the reliability of this sex is low without other features of the cranium and pelvis to offer support (Buikstra and Ubelaker 1994:19-20). Mandibular metrics for this individual are listed in Table 7.

Individual No. 6

This individual consists of the frontal and left parietal of a child of approximately two to five years of age. The parietal exhibits significant lambdoidal flattening. Ochre traces are present on the parietal and the supraorbital ridge of the frontal. The minimum frontal diameter is 86 mm.; this was the only cranial measurement taken.

Individual No. 7

This individual is represented by fragments of the right frontal and left parietal of a child. Postcranial remains include nine vertebral fragments, one left tibia, one left clavicle, one left radius, and four ribs. Long bone measurements (tibia=92.6 mm.; radius=73.9 mm.) provide an age of 0.5 to 1.5 years for this child (Johnston 1961).

Individual No. 8

This individual consists only of a darkly stained infant's left parietal. No further information is available.

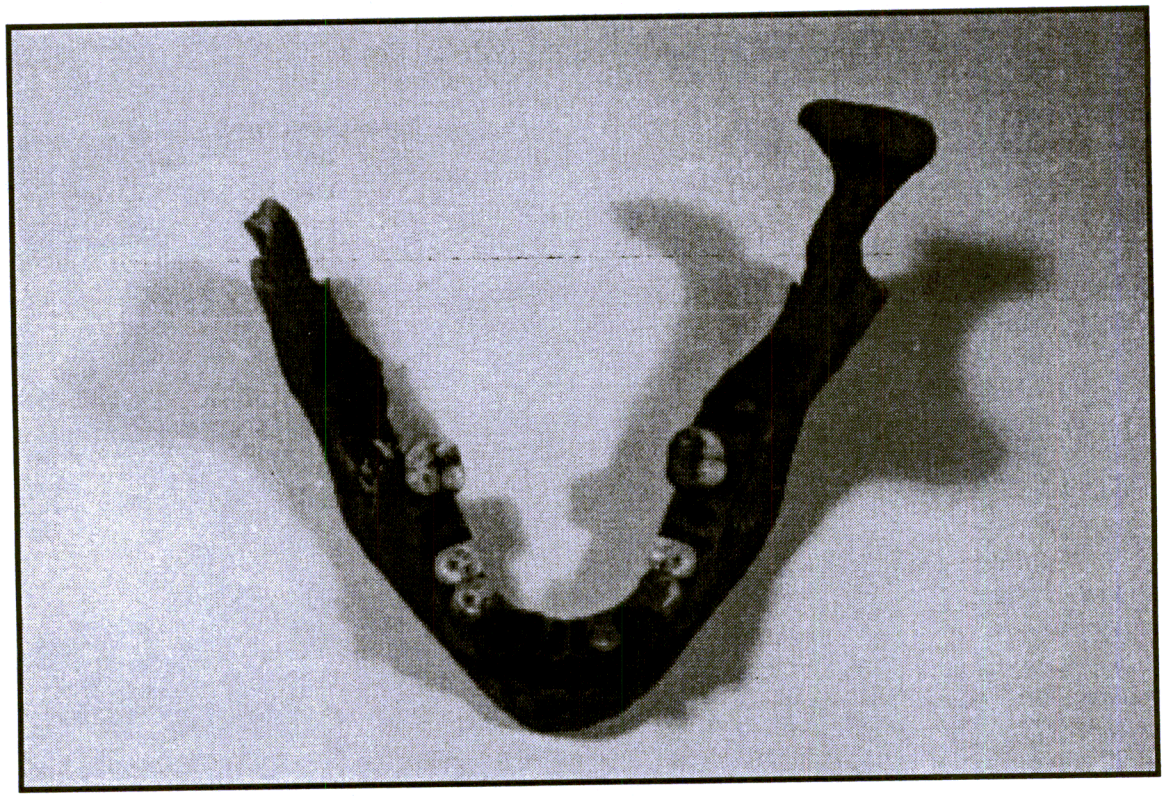

Fig. 6. Occlusal view of mandible (Individual No. 5).

Table 7
CRANIAL METRICS FOR INDIVIDUAL NO. 5

Cranial Metric	Measurements (mm.)
Bigonial breadth	105
Height of ascending ramus	63
Minimum breadth of ramus	38
Symphyseal height (chin height)	33

SUMMARY

The human remains excavated from the Crest Drive-in cemetery site offer a unique view into the history of Bakersfield. Judging from Blackwell's interviews (this volume), it seems that some of the individuals present in this collection are from a prehistoric/protohistoric burial mound. Indeed, there were some significantly worn teeth, some shoveled incisors, and what appear to be midden constituents among the excavated remains. However, despite the collection of pertinent osteometric data, there is still not enough information to accurately predict the ethnic affiliations of the individuals found in the cemetery.

Unfortunately, chronological information relating to specific individuals at this site is lacking. The presence of some historic artifacts suggests late interment for some individuals (one may have been removed from a casket), but other specimens may be considerably older. However, even with the absence of clear time depth relating to the human remains at CA-KER-480H, osteometric data from this region are scant, and the present study, though limited in scope, provides biological information that will hopefully be of use to future scholars.

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AN ETHNOGRAPHIC MILLING SITE AND HISTORIC CHINESE CAMP ON THE TULE RIVER INDIAN RESERVATION, TULARE COUNTY, CALIFORNIA

Kathy Ptomey Moskowitz, U. S. Forest Service

INTRODUCTION

The Tule River Indian Reservation lies in the southern Sierra Nevada foothills, above the city of Porterville, California. Two sites, CA-TUL-430 and CA-TUL-2008H, are located within 100 m. of each other on the reservation (Fig. 1). Both of the sites were occupied around the same time the reservation was established, one by a young Yokuts woman and one by a Chinese work crew. Background investigations were undertaken at both sites, and test excavations were conducted at CA-TUL-2008H. This paper is a summary of the results of those investigations.

SITE DESCRIPTIONS

CA-TUL-2008H

CA-TUL-2008H is a small historic site located on a slight hill above the south fork of the Tule River at an elevation of 960 ft. (Fig. 2). It was discovered after reservation personnel bulldozed the area to build a fire station in cooperation with the U. S. Forest Service. Upon discovery, all activities were halted and the site was recorded by the author on April 18, 1994. It was determined that the site consisted of historic bottles, porcelain, household items, and numerous broken glass and dishes strewn across the entire bulldozed area. The age, function, and integrity of the site could not be determined at that time.

A records search was conducted for the Tule River Indian Reservation, at which time it was determined that CA-TUL-2008H had not been previously recorded either by Varner and Davis (1977) or Gehr (1980). It was noted, however, that two small milling sites, CA-TUL-430 and CA-TUL-431, were located in the vicinity of the bulldozed area. The site map for CA-TUL-430 (the 1977 site record) clearly shows the area of CA-TUL-2008H, although no mention was made about any historic artifacts on the surface.

The CA-TUL-2008H site, which covers an area of approximately 120 sq. m., consists of an area leveled by bulldozing activity and is devoid of vegetation. Two burrows of dirt are piled on the east and southeast portion of the site. Artifact types recorded on the surface included amethyst, cobalt, and milk-colored glass sherds, ceramic sherds, numerous broken bottles, blue-on-white China sherds, a complete China cup, salt-ware sherds, and other historic household items. No features were noted, perhaps due to the damage from the bulldozing activity.

After consultation with the archaeologist from the Bureau of Indian Affairs and the Tule River Indian Reservation, it was decided that the site should be test excavated to determine its age, type, function, and integrity, and to evaluate the damage from the bulldozing activity. The site was subsequently test excavated by Steven Ptomey, J. R. Manuel, and the author on April 25 and 26, 1994.

CA-TUL-430

During the excavation of CA-TUL-2008H, CA-TUL-430 (Fig. 3) was rediscovered approximately 100 m. to the west. It is located on the side of a hill above the south fork of the Tule River at an elevation of 960 ft. It was originally recorded by J. Flaherty and C. Marion in 1977 (Varner and Davis 1977) and is a small milling station consisting of 22 bedrock mortars and one metate slick (a total of 23 milling features). After an interview

Kern County Archaeological Society Journal 6:82-100 (1995).

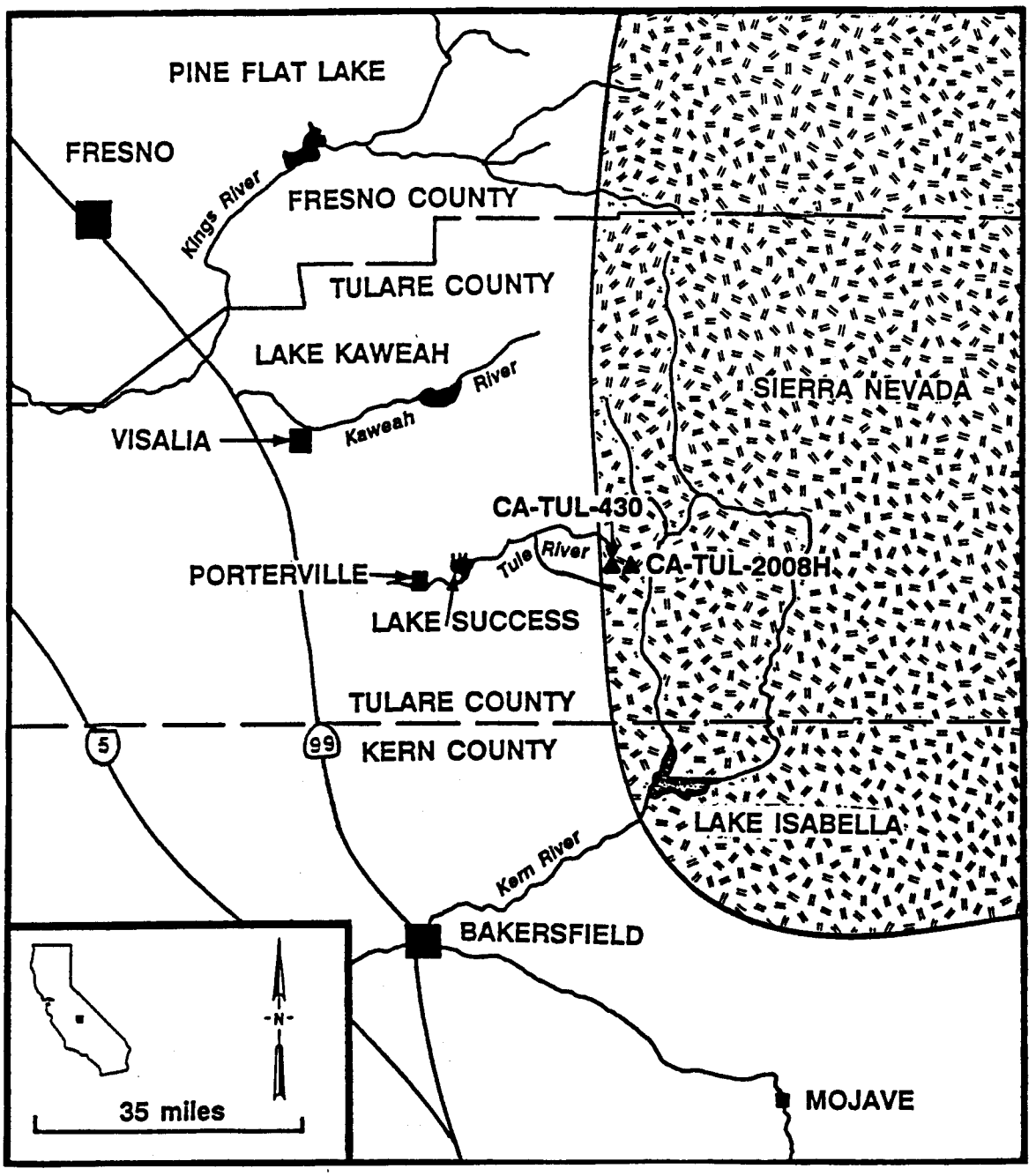

Fig. 1. Location of CA-TUL-430 and CA-TUL-2008H, Tulare County, California.

by the author (in 1994) with the current resident of CA-TUL-430, Marcus Rodilez, it was determined that it was an ethnographic milling site created and used by his grandmother, who was present at CA-TUL-430 while CA-TUL-2008H was being occupied.

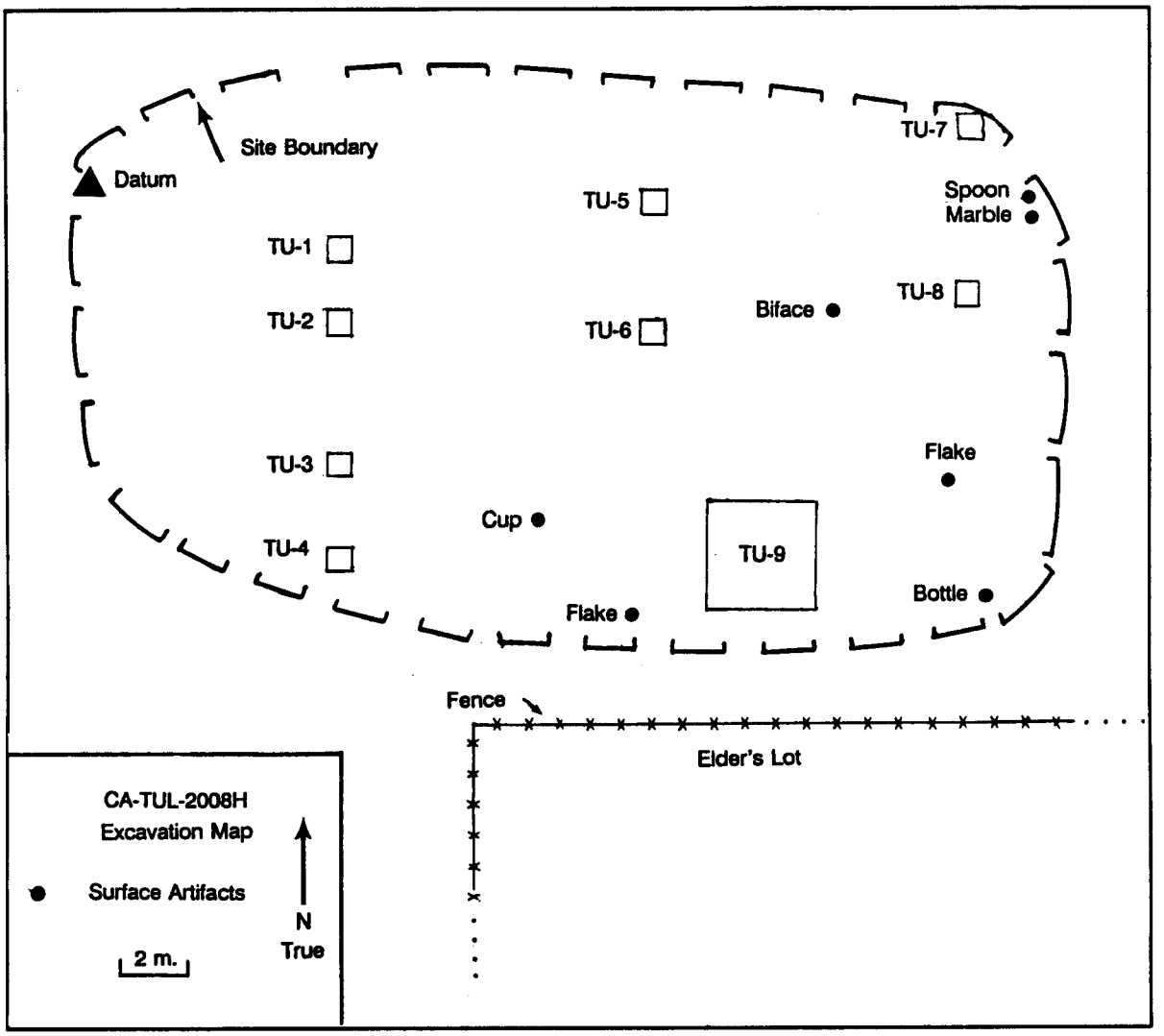

Fig. 2. Map of the CA-TUL-2008H site.

HISTORICAL CONTEXT

Before the entry of Euroamericans into the southern San Joaquin Valley, Foothill and Southern Valley Yokuts occupied the area. These groups were hunters and gatherers, and acorns were a primary resource. It is unknown at this time how long the Yokuts were present in the Porterville area prior to the entry of Euroamericans, but the few extant archaeological data suggest that it had been for several thousand years (Ptomey 1990). Except for a few excursions by Francisco Garcés in 1776, Jedediah Smith in 1827, Joseph Walker in 1834, and Kit Carson in 1843, occupation of the area did not occur until the town of Porterville was settled by Royal Porter Putnam in 1855 (see discussion in Moskowitz 1993).

The history of the Tule River Indian Reservation lies in events that began in 1856 at Battle Mountain. Mitchell (1990:3) reported that during March of that year, a cowkeeper complained to officials in Visalia, the seat of Tulare County, that 500 head of cattle had been stolen in Yokohl Valley. After an investigation, it was discovered that two calves had apparently been taken by Indians from Frasier Valley. Later that month, due to mounting hostility, locals began assembling into posses to put a halt to the cattle stealing. However, the Indians

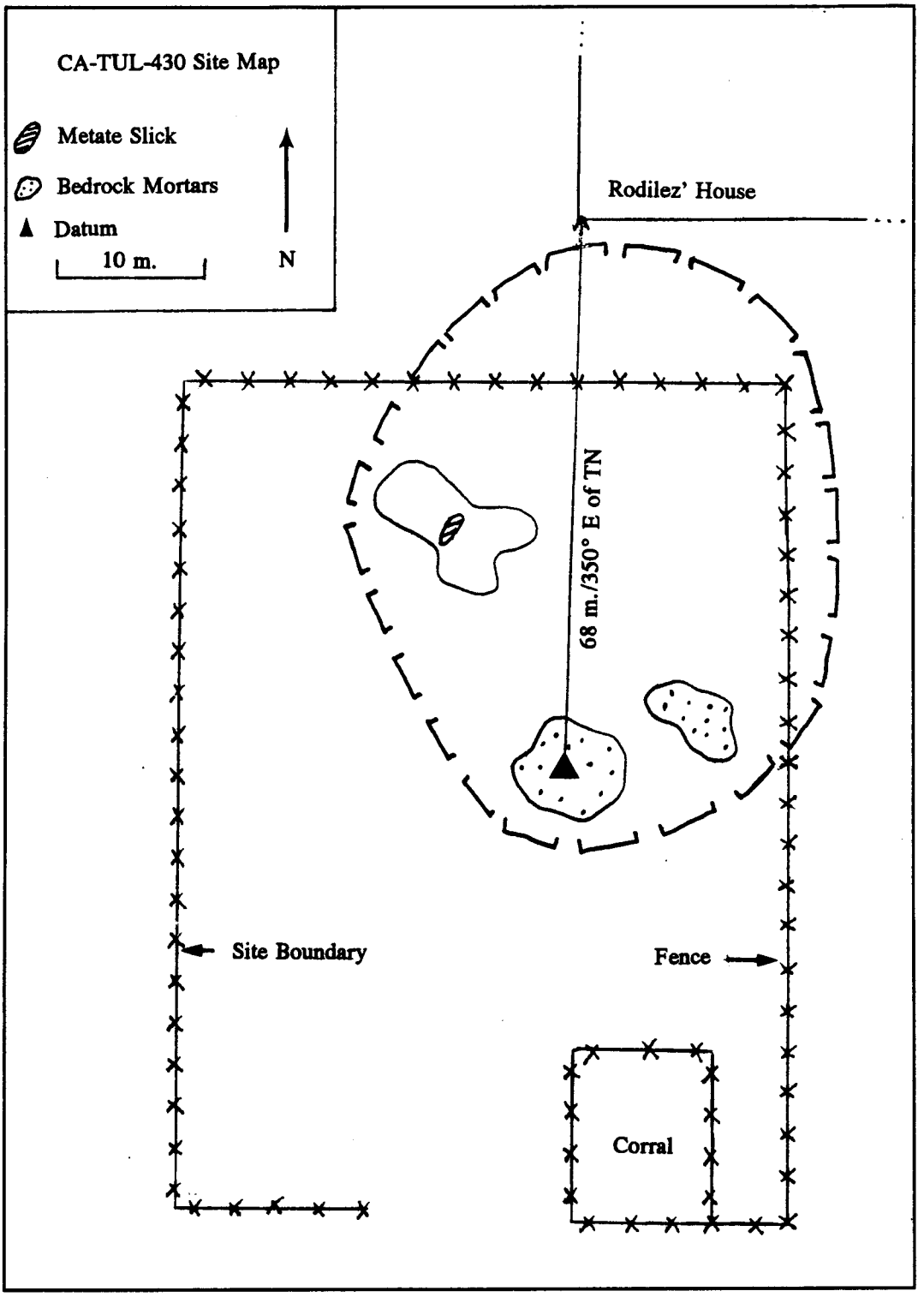

Fig. 3. Map of the CA-TUL-430 site.

from the Tule, Deer, and White rivers, fearing for their lives, had already fled for the mountains (Mitchell 1990:4). Believing that this was an act of war, the men asked for more arms and ammunition and headed out to stop the Indians. The men arrived at Battle Mountain to find the Indians well fortified and ready to fight (Mitchell 1990:4).

After 26 days of fighting, during which time 132 white men had joined the army, a frontal attack by the mounted volunteers forced the Indians into the high mountains, where they had left the women and children (Mitchell 1990:4). The white men did not pursue them for long, because they believed the Indians would soon be rounded up and placed on the proposed reservation. The Indians were indeed forced onto the first Tule River Indian Reservation (called the Alta Vista Reservation) in 1857, located near the current Alta Vista school (Mitchell 1990:4).

The close proximity of the reservation to the settlers of Porterville may have led to yet another incident. Jesse Bossell owned a ranch just southeast of the current Success Lake. On December 4, 1871, several Native Americans from the reservation were working for Bossell picking and packing oranges (Meighan et al. 1984). Bossell offered them a portion of the fruit in payment for their work, but for reasons unknown, the Indians were unhappy about the amount they were given. Three of them spent the night in Porterville drinking, and by the next morning they had apparently decided to avenge the deed on Bossell and his family. Bossell had left early the morning of December 5 to take the oranges to Visalia, leaving his wife and four children behind. The two oldest children went to school as usual, while Mrs. Bossell remained at home with a toddler and an infant (Meighan et al. 1984).

The three Indians arrived at the ranch sometime in the afternoon, just before school let out (Meighan et al. 1984). Finding Bossell gone, they attacked the remaining family members. Not much is known about what happened, except that Mrs. Bossell, in a desperate attempt to save the lives of her children, picked both of them up in her arms and began running down the road of their ranch toward Porterville. She made it approximately a quarter of a mile before she and the children were stopped and killed. Her older children found their bodies, still warm, on their way home from school (Meighan et al. 1984). They then ran to their aunt's house, and the authorities were notified. Apparently, there was little doubt who had committed the deed, and the three Indians were captured shortly thereafter. One was hung on the spot by an angry mob and the other two were shot dead by Bossell when he returned from Visalia and discovered what had happened (Meighan et al. 1984). Bossell's actions were considered justifiable, and the incident was dropped. Mrs. Bossell and the children were buried in Vandalia Cemetery, and a hill by their original ranch is named after the family. This event likely caused the removal of the reservation to its current location in 1873 (Meighan et al. 1984).

CA-TUL-430

Marcus Rodilez, the current resident, was born in 1930 in his mother's house on the Tule River Indian Reservation, and was one of eight children, two boys and six girls. His grandmother, Mary Santiago, lived with the family. Mary was born in 1856 on the Poso River near Bakersfield, California, as a part of the Paleuyami tribe of the Yokuts. She moved to the Alta Vista Reservation with her parents sometime after that. Apparently, Mary's parents died prior to 1873, because Mary went alone to the new reservation at Tule River. It is approximately 20 miles from the Alta Vista Reservation to the new location, mostly uphill. The Indians were forced to make the trek on foot, carrying what they could, while soldiers from Camp Babbitt escorted them on horseback. No road existed at that time, so the walk was made more difficult by the thick underbrush (M. Rodilez, personal communication 1994).

After the group arrived on the new reservation, they were told to pick some land for themselves. Mary picked a parcel above the south fork of the Tule River (M. Rodilez, personal communication 1994). Several men from the tribe helped her build a home, and eventually, she adjusted to her new surroundings. She collected her favorite acorn nuts from white and live oaks, peeled them, and let them dry. She utilized the bedrock in front of her home to pound the acorns into a powder, then walked it down to Tule River to leach it. Normally, Mary would have used the acorns gathered from the year before, but since she had none, she used what she had just processed (M. Rodilez, personal communication 1994).

Rodilez remembered that as a child, both his mother and grandmother pounded acorns in their front yard, and often he and his siblings helped. His grandmother died in 1854 at the age of 98. When his mother died a few years later, the family moved away; however, Rodilez currently lives on the property. When asked why some of the mortars were shallow (less than 2 cm.), while others were well over 30 cm. deep, Rodilez stated (personal communication 1994) that the rock had a certain taste, and those that were shallow obviously did not taste good, and were therefore no longer serviceable.

CA-TUL-2008H

Mary Santiago told stories of Chinese work crews that were brought in from the magnesite mines near Success Lake to build the first road to the reservation in the late 1870s and early 1880s from Porterville to Painted Rocks (M. Rodilez, personal communication 1994). The road was just wide enough for one wagon to pass. Rodilez (personal communication 1994) thought the road crew had camped at CA-TUL-2008H. In addition, he attended school on the site between 1936 and 1942 before the school was moved further up the hill. The school and associated buildings included the schoolhouse, located near the current dirt road; a teacher's house, located within the fenced elders' lot; and a cookhouse and outhouse, located where CA-TUL-2008H is recorded. Willie McDarment, a resident of the reservation (personal communication 1994), reported that the school was leveled and burned after it was abandoned in 1942.

EXCAVATIONS AT CA-TUL-2008H

Methods

At CA-TUL-2008H, eight 50 x 50 cm. units and one 3 x 3 m. unit were judgmentally placed across the length of the site to determine if any portion of the deposit was intact (Fig. 2). In addition, temporally sensitive artifacts were collected from the surface. All bulldozer cuts were examined for intact deposits. The eight 50 x 50 cm. test units were excavated by hand, using shovel and trowel, in arbitrary 50 cm. levels. All units were oriented true north. The soil was dry screened through 1/8-in. mesh, and everything that was left in the screen was placed in bags according to provenience.

As a result of the bulldozing activity, virtually all of the cultural materials had been moved and deposited into dirt piles on the east and southeast portion of the site. Due to this disturbance, and the resulting lack of provenience, it was decided that the best course of action was simply to recover as many diagnostic artifacts as possible from the dirt piles. Based on the distribution of surface artifacts, the 3 x 3 m. unit (TU-9) was placed judgmentally in a portion of the bulldozer pile and was completely excavated, using shovel and trowel in arbitrary 50 cm. levels. Levels were not kept because the site was so disturbed by the bulldozing activity that spacial context of the artifacts had no meaning. In the laboratory, all materials were catalogued by provenience (surface, unit, level, etc.) and given consecutive numbers. Each artifact was measured and weighed.

Material Culture

A total of 429 historic and three prehistoric artifacts was collected from CA-TUL-2008H. No artifacts were recovered from TUs 1, 2, 3, 4, or 7. The recovered artifacts from the surface, as well as those from TUs 5, 6, 8, and 9, are summarized in Table 1, and each category is described and discussed below.

Prehistoric Artifacts. Three prehistoric artifacts were recovered from CA-TUL-2008H. Two obsidian flakes and one obsidian biface were found on the surface. One obsidian flake (Cat. No. 001) weighs 1.3 g. and was found 108° east of true north and 25 m. from the main datum. The second obsidian flake (Cat. No. 006) weighs 0.4 g. and was found 132° east of true north and 20 m. from the main datum. An obsidian biface (Cat. No. 004; Fig. 4) was found 103° east of true north and 20.5 m. from the main datum. It measures 58 x 25 x 10 mm., and weighs 13.8 g.

Table 1
ARTIFACT SUMMARY LIST (BY UNITS), CA-TUL-2008H

Artifact	Surface	Unit 5	Unit 6	Unit 8	Unit 9	Total
obsidian flakes	2	–	–	–	–	2
obsidian biface	1	–	–	–	–	1
glass fragments	4	8	2	2	241	257
whole bottles	1	–	–	–	6	7
bottle necks	1	–	–	–	19	20
bottle bodies	–	–	–	–	20	20
bottle bases	–	–	–	–	28	28
whole jars	–	–	–	–	3	3
jar fragments	–	–	–	–	13	13
household items	7	–	–	–	62	69
Chinese artifacts	3	–	–	–	9	12
Totals	19	8	2	2	401	432

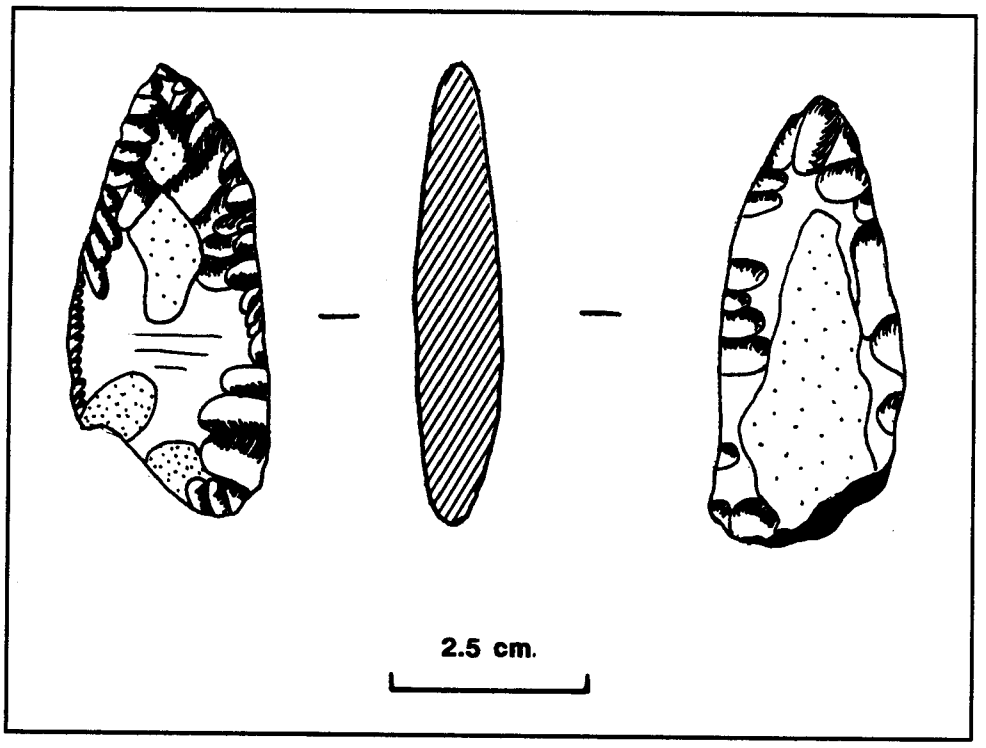

Fig. 4. Obsidian biface (Cat. No. 004) from CA-TUL-2008H.

It is unlikely that the flakes and biface represent a prehistoric component to CA-TUL-2008H. Since CA-TUL-430 is located approximately 10 m. north of the main datum of CA-TUL-2008H, it is possible that the artifacts washed downhill from CA-TUL-430 and were deposited on the surface of CA-TUL-2008H after the bulldozer cut.

Historic Artifacts. The historic component of the collection includes glass items, various other household items, and Chinese artifacts. Each category is discussed and described below.

Glass. The glass category includes glass fragments (Table 2), and whole and fragmentary bottles and jars (Tables 3, 4, and 5). All of the pieces are heavily patinated, and some of the clear glass has turned purple, indicating the presence of manganese, a common element in American bottle manufacturing between 1880 and 1915 (Newman 1970:70). The aqua glass found in TU-9 is indicative of other clarifying agents and was a frequent additive to glass from 1880 to 1920. The type of bottle manufacturing can also be used to date bottles. One common method, semiautomatic machining, was in operation from 1880 to 1913 (Newman 1970:74). The second most common method, automatic machining, was first used in the bottling industry in 1903 and is still is use today (Newman 1970:75). Both of these types are included in the collection.

Table 2
GLASS FRAGMENTS (BY UNIT AND COLOR), CA-TUL-2008H

Color	Surface	Unit 5	Unit 6	Unit 8	Unit 9	Totals
amber	–	–	–	–	76	76
aqua	–	3	–	–	6	9
olive green	–	–	–	1	–	1
clear	3	3	2	1	155	164
cobalt	–	–	–	–	2	2
milk	–	–	–	–	2	2
pink	–	2	–	–	–	2
Totals	4	8	2	2	241	257

Bottles. Seven whole bottles (Fig. 5) and 68 fragments of bottles were recovered from CA-TUL-2008H. These include a variety of colors, shapes, stopper types, and usage types. Table 3 presents provenience and attributes of the bottles, and Table 4 provides a summary of bottle types.

Several of the bottles are worth mentioning individually. A perfume bottle (Cat. No. 003, Fig. 5d) with a U. S. patent number embossed on the bottom is inscribed "US Pat'd 1100547," and dates to after 1915, according to the U. S. list of patent dates. A square prescription bottle (Cat. No. 143, Fig. 5c) also has an embossed inscription which reads "Glover's Imperial Distemper Remedy, H. Clay Glover, New York," and contained a substance used to treat animals. A review of Baldwin (1973) was unsuccessful in locating H. Clay Glover and his distemper remedy, but it likely ranges in age from the 1880s to the early 1900s based on general manufacturing style. Although several medicine or prescription bottles were present in the collection, the only one that could be identified as containing a type of medicine intended for humans was a round morphine bottle (Cat. No. 130), which dates after 1903.

Two Clorox bottles are noteworthy. One bottle (Cat. No. 086) has three lines of embossing on it, reading "Design Pat'd" "14" "Feb 23 18 (unreadable)." This suggests an 1800s date for the bottle, probably in the 1880s to 1890s range. One bottle (Cat. No. 035) still has paper attached to the neck of the bottle. The paper reads "Add to one gallon of (unreadable) contents of (unreadable)" and likely dates from 1931 or 1932.

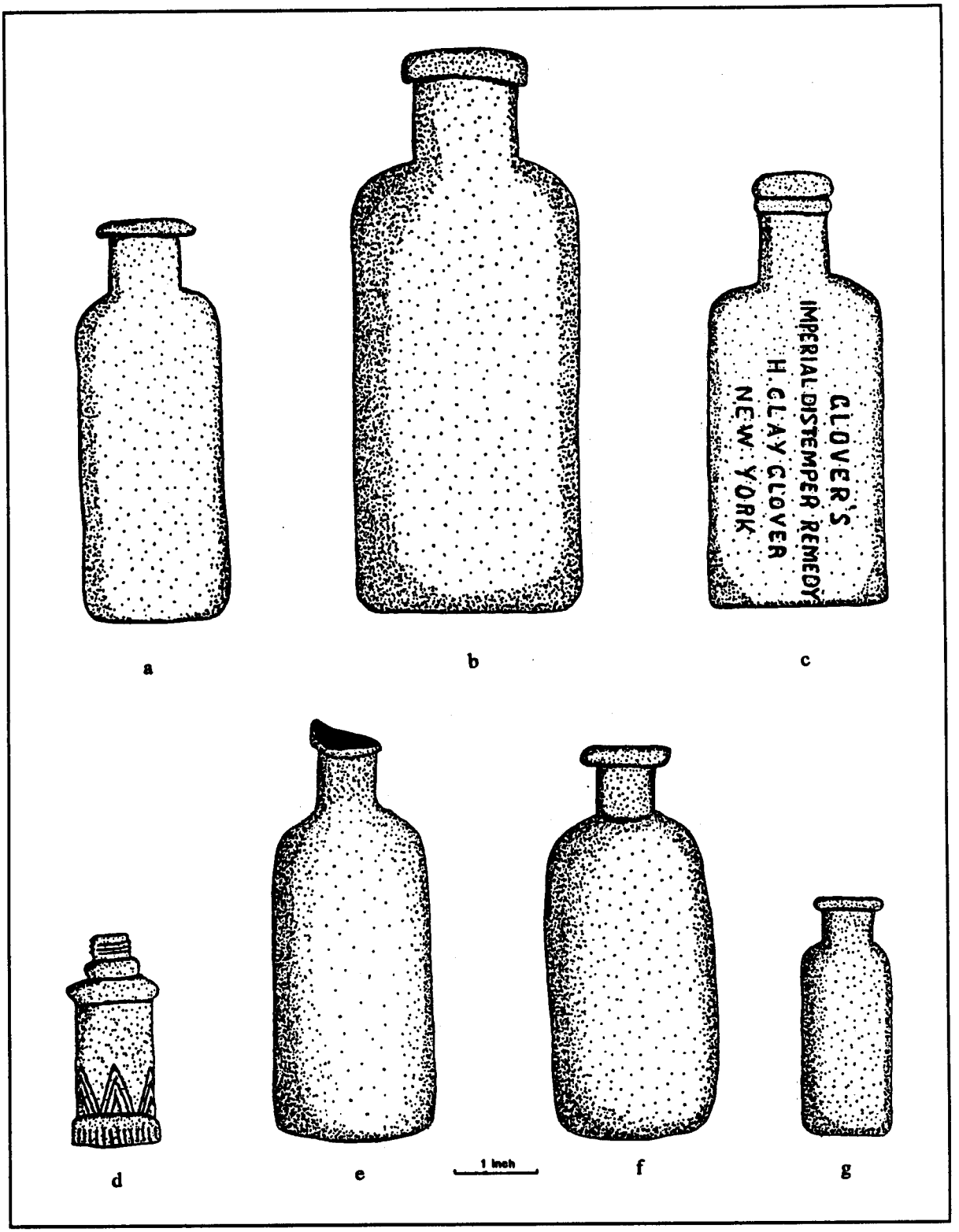

Fig. 5. Bottles from CA-TUL-2008H: (a) 142; (b) 144; (c) 143; (d) 003 (e) 132; (f) 140; (g) 141.

Table 3
PROVENIENCE AND ATTRIBUTES OF GLASS BOTTLES, CA-TUL-2008H

Cat. No.	Provenience	Color	Length	Width	Thickness	Weight	Comments
Whole							
003[a]	122° E of TN; 30 m.	clear	2.5"	1.0"	0.2"	1.1 oz.	perfume bottle, "US Pat'd 1100547" on bottom
132[b]	TU-9	clear	5.0"	1.8"	1.1"	4.4 oz.	round prescription bottle, cork type, automatic
140[c]	TU-9	amber	4.8"	1.8"	0.3"	4.0 oz.	round prescription bottle, cork type, semiautomatic
141[d]	TU-9	amber	2.8"	1.1"	0.3"	1.0 oz.	square prescription bottle, cork type, semiautomatic
142[e]	TU-9	amber	5.0"	1.8"	0.4"	4.5 oz.	square prescription bottle, stopper type, semiautomatic
143[f]	TU-9	amber	5.2"	2.0"	0.4"	7.0 oz.	square prescription bottle, "Glover's Imperial Distemper Remedy, H. Clay Glover, New York," cork type, semiautomatic
144[g]	TU-9	amber	6.5"	2.7"	0.8"	10.5 oz.	oval prescription bottle, stopper type, semiautomatic
Necks							
015	Side Wall Cut Below Datum	amber	2.5"	1.3"	0.1"	1.5 oz.	screw top with cap intact, automatic
035	TU-9	clear	1.5"	0.7"	0.3"	0.6 oz.	Clorox bottle, paper still attached, "Add to one gallon of__ contents of __."
121	TU-9	amber	1.6"	1.4"	1.1"	1.1 oz.	round reusable drugstore bottle, stopper type, automatic
122	TU-9	clear	4.4"	3.0"	1.1"	3.0 oz.	round whiskey bottle with applied lip, cork intact
123	TU-9	clear	3.6"	1.4"	0.2"	2.1 oz.	round Heinz 57 catsup bottle, automatic
124	TU-9	amber	1.0"	1.0"	0.2"	0.5 oz.	square medicine bottle, stopper type, automatic
125	TU-9	clear	3.0"	3.5"	1.1"	3.0 oz.	octagonal peppersauce bottle, cork type, automatic
126	TU-9	clear	3.0"	2.8"	1.1"	1.3 oz.	oval, stopper type, automatic
127	TU-9	clear	1.6"	1.7"	0.1"	1.2 oz.	unknown shape, stopper type, automatic
128	TU-9	clear	2.2"	3.0"	0.1"	2.0 oz.	oval, stopper type, automatic
129	TU-9	clear	1.4"	1.8"	0.1"	0.6 oz.	oval with panel, cork type, automatic
130	TU-9	clear	1.4"	1.2"	0.2"	1.0 oz.	round morphine bottle, stopper, automatic
131	TU-9	amber	1.4"	1.2"	0.1"	1.4 oz.	octagonal peppersauce bottle, cork intact, automatic

[a-g] illustrated in Figure 5.

Table 3 (continued)
PROVENIENCE AND ATTRIBUTES OF GLASS BOTTLES, CA-TUL-2008H

Cat. No.	Provenience	Color	Length	Width	Thickness	Weight	Comments
Necks							
133	TU-9	clear	2.7"	2.0"	0.1"	1.7 oz.	oval, cork type, semiautomatic
134	TU-9	clear	4.0"	2.3"	0.1"	2.2 oz.	square prescription bottle, cork intact, semiautomatic
135	TU-9	amber	2.3"	1.3"	0.1"	0.8 oz.	square prescription bottle, cork intact, semiautomatic
136	TU-9	amber	1.0"	1.4"	0.1"	1.0 oz.	oval, stopper type, semiautomatic
137	TU-9	amber	2.0"	1.7"	0.1"	0.5 oz.	square medicine bottle, cork type, semiautomatic
138	TU-9	clear	2.5"	2.3"	0.1"	2.0 oz.	square, stopper, semiautomatic
139	TU-9	clear	2.0"	2.2"	0.1"	1.5 oz.	round, cork type, semiautomatic
Bodies							
061	TU-9	amber	3.0"	1.0"	0.1"	0.4 oz.	square
062	TU-9	amber	2.0"	1.1"	0.1"	0.2 oz.	square
078	TU-9	clear	1.0"	1.4"	0.1"	0.1 oz.	round, "Bal" on side
079	TU-9	clear	1.4"	1.0"	0.1"	0.1 oz.	unknown shape, "M"
080	TU-9	clear	1.3"	1.7"	0.1"	0.2 oz.	unknown shape, "uality"
081	TU-9	clear	2.0"	1.6"	0.1"	0.2 oz.	square-ring peppersauce bottle
082	TU-9	clear	2.6"	1.3"	0.1"	0.2 oz.	round, "D"
085	TU-9	clear	3.5"	2.7"	0.1"	1.0 oz.	oval
088	TU-9	clear	3.0"	3.5"	0.3"	2.0 oz.	French barrel mustard jar
089	TU-9	clear	2.2"	2.0"	0.1"	0.7 oz.	square
095	TU-9	clear	1.6"	1.6"	0.2"	0.7 oz.	oval
096	TU-9	clear	3.4"	2.4"	0.1"	2.0 oz.	oval
097	TU-9	clear	3.0"	2.0"	0.1"	0.6 oz.	oval, oz. markings on side
098	TU-9	clear	3.0"	2.0"	0.1"	1.1 oz.	oval
101	TU-9	clear	2.7"	1.6"	0.1"	0.5 oz.	oval, "009" and "008" oz. marks on side
102	TU-9	clear	2.4"	1.2"	0.1"	0.3 oz.	oval, "4" oz. marks on side
103	TU-9	clear	2.3"	1.2"	0.1"	0.3 oz.	oval, "23" and "24" oz. marks on side
104	TU-9	clear	3.0"	1.4"	0.1"	0.4 oz.	oval, "10" oz. marks on side
105	TU-9	clear	3.0"	0.4"	0.1"	0.4 oz.	round, "Cleans"
106	TU-9	clear	2.0"	2.0"	0.1"	0.3 oz.	round, "Jhm" "R Wine" on side

Table 3 (continued)
PROVENIENCE AND ATTRIBUTES OF GLASS BOTTLES, CA-TUL-2008H

Cat No.	Provenience	Color	Length	Width	Thickness	Weight	Comments
Bases							
057	TU-9	amber	2.2"	2.0"	0.1"	1.1 oz.	round
058	TU-9	amber	1.8"	1.6"	0.1"	0.3 oz.	square
059	TU-9	amber	1.2"	1.6"	0.1"	0.4 oz.	square
060	TU-9	amber	1.2"	1.6"	0.1"	0.4 oz.	square, "Wy" on bottom
063	TU-9	amber	3.6"	2.1"	0.1"	2.1 oz.	round
064	TU-9	amber	2.8"	1.8"	0.3"	1.3 oz.	round Clorox bottle, diamond on bottom
065	TU-9	amber	2.7"	1.1"	0.3"	1.1 oz.	round
066	TU-9	amber	2.1"	1.7"	0.2"	1.0 oz.	round
086	TU-9	clear	2.5"	2.4"	0.3"	1.4 oz.	round Clorox bottle, diamond symbol, "Design Pat'd" "14" "Feb 23 18__" on bottom
087	TU-9	clear	3.0"	2.5"	0.1"	1.3 oz.	round
090	TU-9	clear	3.0"	2.0"	0.1"	1.0 oz.	square
094	TU-9	clear	3.4"	2.0"	0.1"	1.7 oz.	square
099	TU-9	clear	2.8"	3.4"	0.3"	4.7 oz.	round Clorox bottle, diamond on bottom
100	TU-9	clear	2.8"	2.5"	0.4"	2.0 oz.	round Clorox bottle, diamond on bottom
107	TU-9	clear	3.4"	2.4"	0.1"	1.5 oz.	round, "Louis, MO" on side
108	TU-9	cobalt	3.6"	2.2"	0.1"	1.5 oz.	round, "br" "em" "d ba" on side
109	TU-9	amber	2.0"	1.7"	0.1"	1.1 oz.	square, "Wyetin 42" on bottom
110	TU-9	amber	3.2"	1.6"	0.1"	1.1 oz.	oval, "340" on bottom
111	TU-9	clear	2.4"	2.2"	0.1"	1.8 oz.	oval
112	TU-9	clear	2.6"	2.2"	0.1"	2.0 oz.	oval Clorox bottle with "Lyric," diamond on bottom
113	TU-9	clear	2.6"	1.4"	0.1"	2.2 oz.	square Clorox bottle, diamond on bottom
114	TU-9	clear	2.7"	2.2"	0.1"	3.4 oz.	square, "5" on bottom
115	TU-9	clear	3.8"	2.7"	0.3"	3.6 oz.	oval, "Purity" on lower side
116	TU-9	clear	2.8"	3.7"	0.1"	5.8 oz.	oval Clorox bottle, diamond on bottom
117	TU-9	clear	5.1"	3.3"	0.1"	3.6 oz.	round, "Fine Liquors" and "Sp Cerf" around base side
118	TU-9	clear	2.3"	2.3"	0.1"	10.5 oz.	round, footed
119	TU-9	amber	1.8"	2.2"	0.3"	2.2 oz.	round, "188" and "L" in an octagon on bottom
120	TU-9	aqua	1.5"	3.0"	0.1"	2.8 oz.	oval, "Wit" "Lime & S" on lower side

Table 4
SUMMARY OF BOTTLE TYPES, CA-TUL-2008H

Bottle Type	Glass Color	No. of Specimens	Comments
perfume	clear	1	whole; semiautomatic machine made
round prescription	clear, amber	4	2 whole; 1 semiautomatic, 3 automatic machine made
square prescription	amber	8	3 whole; 5 semiautomatic, 1 automatic machine made
oval prescription	amber	1	whole, semiautomatic machine made
oval medicine	clear	5	–
square-ring peppersauce	clear	1	automatic machine made
French barrel mustard	clear	1	automatic machine made
round Heinz 57	clear	1	automatic machine made
octagon peppersauce	clear	2	automatic machine made; cork intact
Clorox bleach	clear, amber	9	3 semiautomatic, 6 automatic machine made
liquor	clear, amber	6	–
whiskey	clear	1	semiautomatic machine made, applied lip, cork intact
oval	clear, amber, aqua	13	2 semiautomatic, 3 automatic machine made
round	clear, amber, cobalt	9	1 semiautomatic machine made
square	clear, amber	9	1 semiautomatic machine made

Jars. Three whole jars and 13 fragments of jars were found at CA-TUL-2008H. All of the jars were found in TU-9. Attributes of the jars are presented in Table 5.

Household Items. The category of household items includes spoons, buttons, a marble, ashtray and vase fragments, pottery and porcelain dish fragments, a piece of chalk, a bullet, metal cans, and nails. These items are listed in Table 1 under household items, and each category is discussed below.

Spoons. Two silver spoons (Cat. Nos. 002 and 047) were recovered from the site. One (Cat. No. 002) was recovered from 90° east of true north and 25 m. from the main datum (Fig. 2). It measures 7.0 x 2.0 x 0.1 in., and weighs 1.2 oz. The other one (Cat. No. 047) was found in TU-9, measures 5.6 x 1.2 x 0.1 in., and weighs 1.0 oz.

Buttons. Two buttons (Cat. Nos. 022 and 049) were discovered in TU-9. One (Cat. No. 022) is metal with the center broken out. It measures 0.3 x 0.2 x 0.1 in., and weighs 1.1 oz. The other button (Cat. No. 049) is a complete, two-holed, white porcelain button. It measures 0.7 x 1.1 in., weighs 0.2 oz., and dates between 1852 and 1890.

Table 5
ATTRIBUTES OF JARS, CA-TUL-2008H

Cat. No.	Color	Length	Width	Thickness	Weight	Bottom Symbol
Whole						
045	milk	4.3"	4.0"	0.3"	10.5 oz.	"A"
051	clear	4.2"	3.5"	0.3"	10.5 oz.	504
053	amber	4.2"	3.7"	0.3"	10.8 oz.	900 C
Fragments						
046	milk	1.2"	0.5"	0.2"	0.2 oz.	–
046	milk	1.4"	0.7"	0.2"	0.2 oz.	–
046	milk	1.2"	0.5"	0.5"	0.3 oz.	–
046	milk	1.2"	0.7"	0.3"	0.8 oz.	–
046	milk	1.6"	0.7"	0.5"	0.8 oz.	–
046	milk	1.5"	0.5"	0.3"	0.3 oz.	–
054	amber	3.3"	3.4"	0.3"	3.3 oz.	–
056	amber	3.7"	3.7"	0.1"	4.3 oz.	–
073	milk	1.3"	1.0"	0.3"	0.1 oz.	liner from mason jar
076	cobalt	1.1"	0.6"	0.2"	0.1 oz.	–
091	clear	3.6"	2.2"	0.2"	1.8 oz.	–
092	clear	3.5"	2.7"	0.1"	1.1 oz.	–
093	clear	2.5"	1.2"	0.2"	0.5 oz.	–

Marble. A unique artifact recovered from the site is a cobalt blue porcelain marble (Cat. No. 007). It was found 90° east of true north and 25 m. from the main datum (Fig. 2), measures 0.5 in. in diameter, and weighs 1.1 oz.

Ashtray. One ashtray fragment (Cat. No. 083) was found in TU-9. The piece is a clear, badly fragmented portion of a crystal ashtray, measures 1.0 x 0.8 x 0.3 in., and weighs 0.3 oz.

Vase. A diamond design vase fragment (Cat. No. 084) was found in TU-9. It measures 1.8 x 1.3 x 0.1 in., and weighs 0.2 oz. The design is typical of crystal-ware from the depression era; however, the design is still in limited use today.

Pottery. Many pieces of pottery were recovered from CA-TUL-2008H, all in TU-9. A green cup in three pieces (Cat. No. 030) with a mother-of-pearl interior measures 3.0 x 1.7 x 0.2 in., and weighs 1.8 oz. A blue pottery plate fragment (Cat. No. 031) measures 2.5 x 2.0 x 0.5 in., and weighs 1.2 oz. A peach pottery cup fragment (Cat. No. 032) measures 1.2 x 1.0 x 0.1 in., and weighs 0.3 oz. Five pieces of white pottery (Cat. Nos. 033 through 037) collectively weigh 5.1 oz., and 29 pieces of white, burned pottery (Cat. No. 038) weigh 12.0 oz. total. These pottery pieces are common depression-era types, ranging in age from 1920 to 1940.

Two interesting pieces of salt-ware were also found in TU-9. One piece of white salt-ware with a kick-up base (Cat. No. 040) measures 1.3 x 1.3 x 0.4 in. and weighs 0.7 oz. The kick-up base may suggest that it is part of some sort of storage jar. A single piece of burned, white salt-ware (Cat. No. 041) measures 2.3 x 1.6 x 0.2 in., and weighs 0.7 oz. The presence of salt-ware usually suggests the use of food storage vessels. It is unknown how old these items are because no potter marks were found on either of the pieces.

Porcelain. One piece of cobalt blue porcelain (Cat. No. 012) was found 90° east of true north and 25 m. from the main datum (Fig. 2). It weighs 1.1 oz., and has no design. One depression-era plate (Cat. No. 014) with a replica of a Chinese design was found in 10 pieces in the dirt pile by the main datum, and weighs 5.5 oz. total.

Six pieces of porcelain (Cat. No. 042) were found in TU-9. These items collectively weigh 1.1 oz. Two pieces of porcelain (Cat. Nos. 008 and 010) were found 90° east of true north and 25 m. from the main datum. One (Cat. No. 008) is a white plate rim that measures 2.3 x 1.7 x 0.3 in., and weighs 1.1 oz. The other piece (Cat. No. 010) is a dish with a kick-up base measuring 0.7 x 0.6 x 0.3 in., and weighs 1.1 oz. These pieces are of unknown age and may very well be modern.

Two pieces of the same European porcelain cup (Cat. Nos. 009 and 043) were found at separate places on the site. One piece (Cat. No. 009) is a cream-colored cup fragment with pink flowers, and was found 90° east of true north and 25 m. from the main datum (Fig. 2). It measures 2.2 x 2.3 x 0.1 in., and weighs 0.6 oz. The other piece (Cat. No. 043) was found in TU-9, measures 1.7 x 2.0 x 0.1 in., and weighs 0.4 oz.

Chalk. One piece of chalk (Cat. No. 075) was recovered from TU-9. The artifact is burned, measures 0.7 in. long, 0.3 in. in diameter, and weighs 1.1 oz. This artifact is likely associated with the schoolhouse that was located on the site between 1930 and 1940.

Bullet. One Smith and Wesson .38 bullet casing with the end blown out (Cat. No. 048) was discovered in TU-9. It measures 0.9 x 0.3 x 0.1 in., and weighs 1.1 oz. This bullet type was introduced around 1890 and is still being manufactured currently.

Metal Cans. Three metal can fragments (Cat. Nos. 026, 028, and 029) were recovered from the site, all in TU-9. The first piece (Cat. No. 026) is a sardine can measuring 3.1 x 2.2 x 0.7 in., and weighing 1.4 oz. The second (Cat. No. 028) is a metal can top that measures 2.6 in. long, 0.1 in. thick, and weighs 0.7 oz. The can was opened using a church key and can be approximately dated between 1884 and the present. The last piece (Cat. No. 029) is a metal strip from a meat can that measures 6.0 in. long and 0.1 in. thick.

Nails. Five nails were collected from CA-TUL-2008H, all from TU-9. All five are round-headed, measure between 2.0 and 2.5 in. long, and weigh 1.1 oz. each.

Chinese Artifacts. Numerous artifacts of Chinese origin were found at CA-TUL-2008H, three from the surface and nine from TU-9 (Table 6). These include a whole blue-on-white cup (Fig. 6a), porcelain dish fragments of varying colors (Figs. 6b-c, 6e-h), and an opium vial (Fig. 6d). These artifacts date from the 1870s to 1900 and suggest that people of Chinese heritage lived near or on the site at one time. It is very likely that these artifacts were associated with the Chinese that were present during the building of the original road to the reservation during the 1870s and 1880s.

Table 6
PROVENIENCE AND ATTRIBUTES OF CHINESE ARTIFACTS, CA-TUL-2008H

Cat. No.	Provenience	Color	Length	Width	Thickness	Weight	Comments
Complete							
005	137° E of TN; 15 m.	blue-on-white	4.0"	2.5"	0.2"	6.0 oz.	whole cup
050	TU-9	clear	2.7"	0.3"	0.3"	0.8 oz.	opium vial
Fragments							
011	90° E of TN; 25 m.	gold/black-on-white	0.9"	0.8"	0.1"	0.1 oz.	elaborate design; burned
013	90° E of TN; 25 m.	blue-on-white	5.5"	5.2"	0.1"	0.1 oz.	none
021	TU-9	gold/rust-on-white	1.1"	0.8"	0.2"	0.1 oz.	none
044	TU-9	rust-on-white	1.2"	1.0"	0.1"	0.2 oz.	Chinese writing on bottom
067	TU-9	gold/rust-on-white	0.8"	0.5"	0.1"	0.1 oz.	design on inside curve
068	TU-9	gold/rust/blue-on-white	0.8"	0.6"	0.1"	0.1 oz.	design on inside curve
069	TU-9	blue-on-white	1.0"	0.7"	0.1"	0.1 oz.	design on both sides
070	TU-9	blue-on-white	0.7"	0.7"	0.1"	0.1 oz.	design on inside curve
071	TU-9	blue/purple-on-rust	1.1"	0.5"	0.1"	0.1 oz.	design on inside curve
073	TU-9	rust/green/blue	2.5"	2.3"	0.1"	0.6 oz.	bottom of small bowl

DATING

Many temporal indicators are available from CA-TUL-2008H from the presence of bottles, jars, household items, and Chinese artifacts (Table 7), with dates ranging from the 1850s to the present. Because there is no documented occupation of this area by Euroamericans earlier than the 1860s, the 1850 end of the range is not likely. The earliest occupation likely to be represented is probably around the 1870s. This date is associated with the Chinese work crew that was in the area at the time the reservation road was being built. The last time the site was occupied or used is unclear. Recent debris was found at the site, and many of the artifacts date from the early 1920s to the present. The vast majority of the "later" artifacts is most probably associated with the school that once stood on the site, with dates ranging from 1920 to 1940.

SUMMARY AND CONCLUSIONS

Both CA-TUL-430 and CA-TUL-2008H present an interesting view of the use and habitation of the southern Sierra Nevadas. More ethnographic sites may be associated with the establishment of the reservation. The earlier artifacts at CA-TUL-2008H suggest that the site was used during the building of the reservation road, sometime in the 1870s. The presence of Chinese cultural artifacts suggests that Chinese-Americans were present on the road crew. It is not known at this time if the site was inhabited or used as a dump during this time. The later use of the site (1920s to 1940s) is most likely associated with the schoolhouse during those years before it was abandoned.

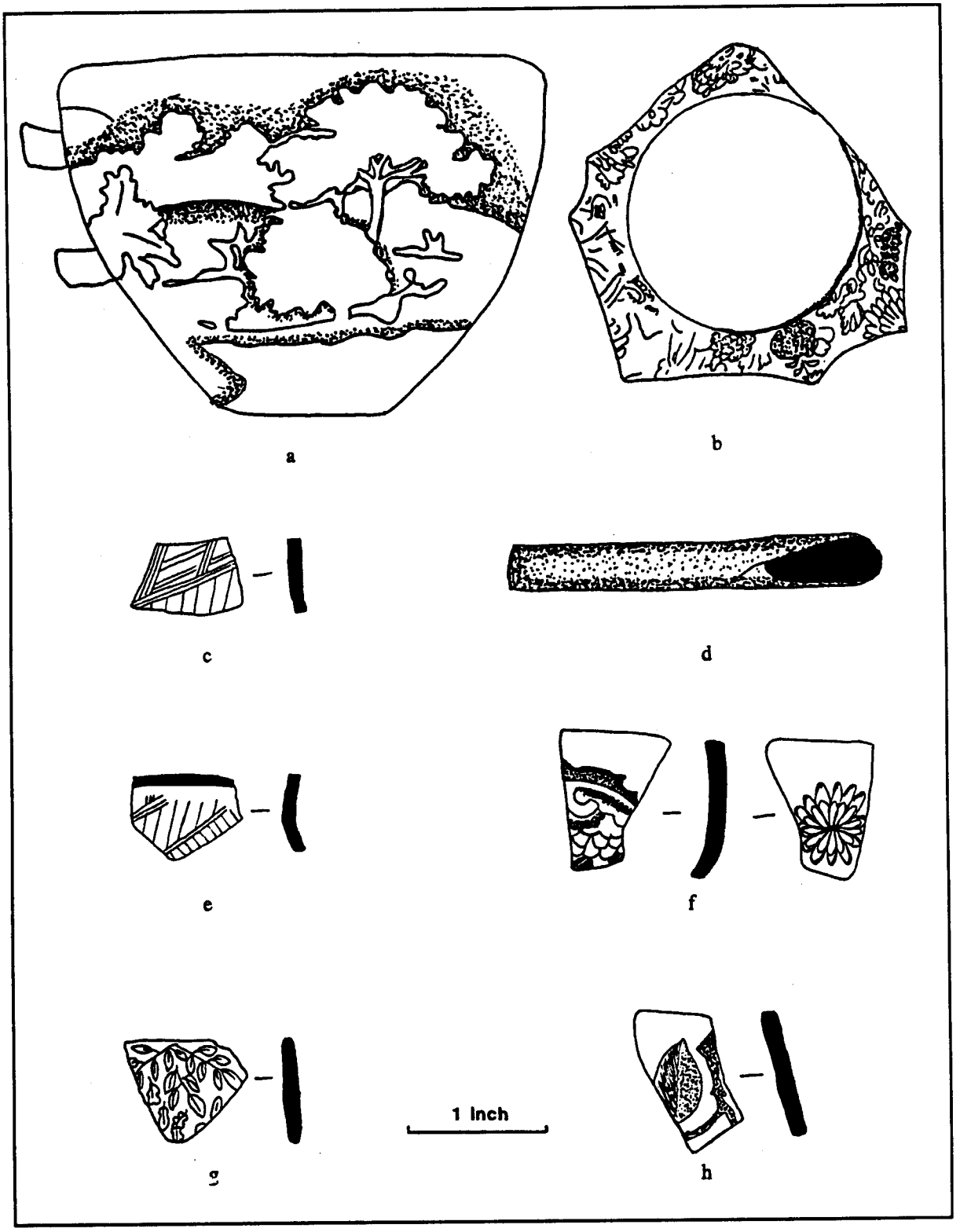

Fig. 6. Chinese artifacts from CA-TUL-2008H: (a) complete blue-on-white cup (005); (b-c, e-h) porcelain dish fragments of varying colors (b=073, c=067, e=068, f=069, g=070, h=071); (d) opium vial (050).

Table 7
SUMMARY RANGE OF DATES, CA-TUL-2008H

Artifact	Date	Based On
porcelain button	1852-1890	type
whole Chinese cup	1870-1900	type
opium vial	1870-1900	type
porcelain fragments	1870-1900	types
round whiskey bottle	1870-1920	applied lip
round Clorox bottle	1880-1899	"Design Pat'd" "14" "Feb 23 18--"
round prescription bottle	1880-1913	semi-automatic machine made
square prescription bottle	1880-1913	semi-automatic machine made
square prescription bottle	1880-1913	semi-automatic machine made
square prescription bottle	1880-1913	semi-automatic machine made
oval prescription bottle	1880-1913	semi-automatic machine made
square prescription bottle	1880-1913	semi-automatic machine made
square medicine bottle	1880-1913	semi-automatic machine made
oval bottle	1880-1913	semi-automatic machine made
square bottle	1880-1913	semi-automatic machine made
round bottle	1880-1913	semi-automatic machine made
round prescription bottle	1903-1930	automatic machine made
octagonal peppersauce bottle	1903-1930	automatic machine made
oval bottle	1903-1930	automatic machine made
square-ring peppersauce bottle	1903-1930	automatic machine made
French barrel mustard jar	1903-1930	automatic machine made
round reusable drugstore bottle	1903-1930	automatic machine made
square medicine bottle	1903-1930	automatic machine made
round morphine bottle	1903-1930	automatic machine made
Clorox bottle	1903-1930	glass, diamond design
perfume bottle	1914	"US Pat'd 1100547"
pottery dishes	1920-1940	depression type
porcelain dishes	1920-1940	depression type
Clorox bottle	1931-1932	paper still attached
round Heinz 57 catsup bottle	1929-1960s	screw top
sardine can	1884-present	type
metal can top	1884-present	opened with church key
.38 bullet casing	1890-present	type
wire cut nails	1900-present	type
European cup	1920-present	type
screw top bottle	1928-present	screw top

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A PRELIMINARY STUDY OF TULARE LAKE PINTO POINT MORPHOLOGY: AN ARCHAEOLOGICAL APPLICATION FOR CLUSTER ANALYSIS

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INTRODUCTION

In general, the Pinto culture is thought of as being a Mojave Desert and Great Basin phenomenon (Irwin-Williams 1979; Warren and Crabtree 1986). Yet, thousands of Pinto, or Pinto-like, projectile points have been found by collectors on the fossil shorelines and beaches of Tulare Lake in the central San Joaquin Valley, Kings County, California. Although these points might be the manifestations of Mojave Desert Pinto groups who incorporated Tulare Lake as a part of their seasonal round, they might also be the product of a regionalized Pinto population of the southern San Joaquin Valley. Needless to say, the interpretation of the prehistory of the region is greatly affected, depending on which scenario one chooses. This leaves the prehistorian searching for additional clues that will help resolve this issue. The central theme of this report is that the morphology of Pinto points may contain essential information for the reconstruction of the cultural history of Tulare Lake.

Since Pinto-like projectile points have a wide spatial distribution, and because of the great time depth associated with the Pinto Complex (Wormington 1959; Fiedel 1984; Jenkins 1987), it is reasonable to assume that regional and temporal variations may exist. Nevertheless, current projectile point keys and typologies do not appear to be sensitive enough to detect these morphological differences. Indeed, when Vaughan and Warren (1987:206) subjected the Awl Site Pinto points to Thomas' (1981) Monitor Valley projectile point key, most of them keyed out as Elko series points.

The pattern of artifact variation may be too complex for static analytic methods. As a result, it is probably unrealistic to think that the variation inherent in these widespread Pinto assemblages can be incorporated into a dart point typology based on five or six different forms. Recognizing this, some archaeologists are beginning to doubt the utility of conventional typologies, recommending the introduction of a more dynamic means of dealing with artifact variation. For example, Judge (1977) believed that typologies should not be based on preconceived notions of what a type ought to be. Instead, he suggested that typologies be established during the process of analyzing an archaeological assemblage (Judge 1977).

Since cluster analysis allows objects to group themselves into similar and dissimilar sets, it may be an effective tool for establishing typologies dynamically. Therefore, the intent of this paper is to provide evidence that cluster analysis can be used to detect morphological variation in Pinto-like projectile points. A small sample of Tulare Lake Pinto points will be clustered with the projectile points from other regions; the resulting clusters will be analyzed. Although these results are preliminary, they are interesting and promising.

CLUSTER ANALYSIS AND APPLICATIONS

Cluster analysis is a generic term for a collection of algorithms that group objects according to some mathematical criteria. In general, when subjected to clustering techniques, if morphological differences exist between two populations of projectile points, they will have a tendency to agglomerate into separate groups. On the other hand, if there are no morphological differences, the points will be dispersed across the resulting clusters according to their relative frequency. In other words, they will intermingle with each other. The results of a clustering session are usually summarized in a tree diagram whose branches graphically display the similarity between the objects being clustered. Although the math needed to perform cluster analysis is relatively simple, the

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total number of numerical computations grows exponentially with the number of objects being clustered (Romesburg 1984:37). Thus, a computer is essential for most applications.

Among its many archaeological applications, cluster analysis has been used to analyze the assemblages of Early Holocene sites from the Columbia River Plateau (Ames 1988), Mississippian mortuary practices (Goldstein 1980), and brooches from an iron age cemetery (Hodson et al. 1966). Furthermore, Gobel et al. (1991) employed cluster analysis to conclude that the Nenana artifact assemblage is more similar to that of the Llano Complex than it is to assemblages of the North American Microblade Tradition.

For the purposes of this study, a set of measurements (Fig. 1) was recorded for each projectile point. These measurements were standardized and used as clustering variables. Ratios such as thickness-to-width were also employed as clustering variables. Recognizing that the overall length of a projectile point may be a function of wear, the decision was made to minimize the impact of length as a clustering attribute. This was somewhat accomplished by not employing the raw measure of length in the clustering algorithm. Since the raw values of other attributes were included in the clustering procedure, this had the effect of giving a zero weight to length. Nevertheless, various ratios incorporating length were retained. For broken projectile points, the shape of the missing section was estimated. These points were included in the analysis because their omission would have affected the sample size significantly. Furthermore, the graphic interpretation of the fractured points did not appear to affect the results of the clustering procedure.

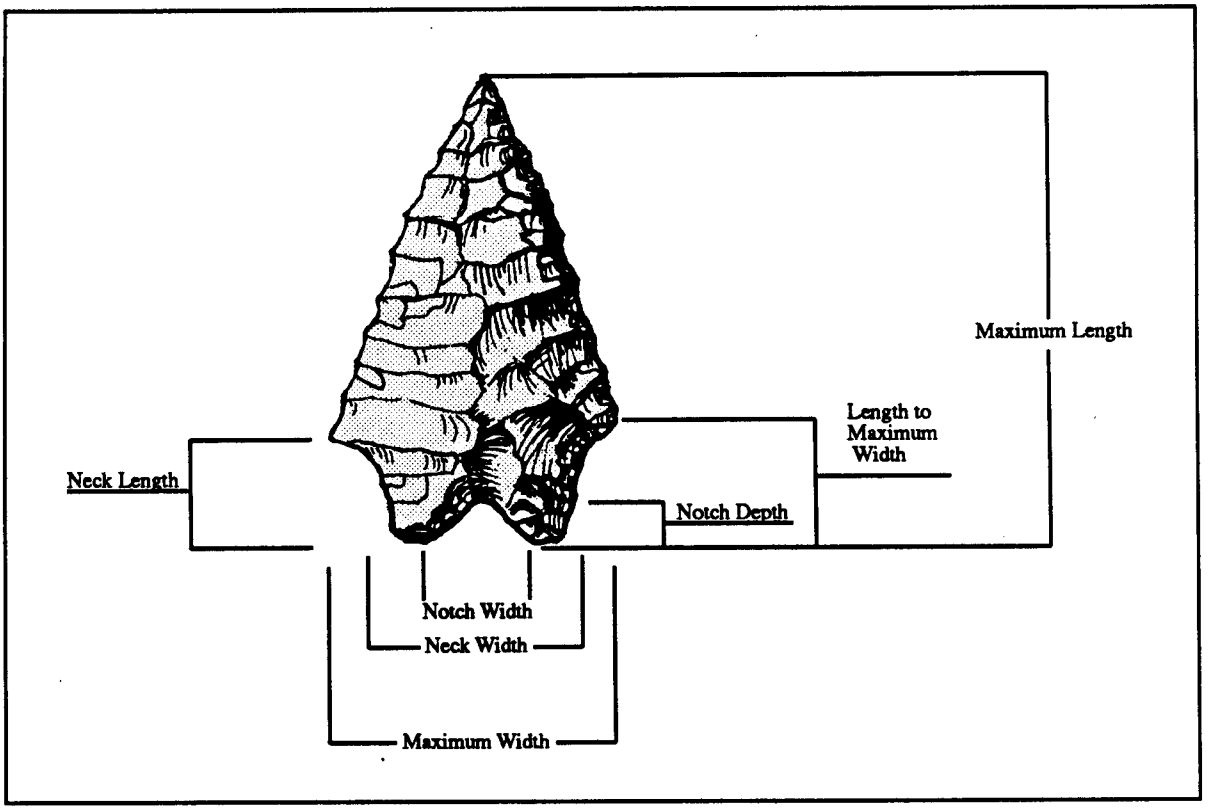

Fig. 1. Some of the key attributes employed in the clustering process.

THE DATA SET

Three sets of projectile points from three distinct regions were chosen for analysis (Fig. 2). One data set is composed of 13 points from the Silent Snake Springs Site in northwestern Nevada. Although these artifacts were originally classified as Pinto points (Layton and Thomas 1979), they were later reclassified as Gatecliff series projectile points (Thomas 1981). Although Gatecliff series points are technically and morphologically different from Pinto points (Thomas 1981; Vaughan and Warren 1987), they resemble the shape of Pinto points enough to provide a sufficient test for any clustering algorithm. Therefore, the Silent Snake Springs material was incorporated into the analysis as a verification and control group. In other words, to satisfy the claim that cluster analysis is an effective tool for analyzing regional Pinto point variants, it must first be able to discern Gatecliff split-stem material from Pinto material with a high degree of accuracy.

The Tulare Lake specimens were acquired from the Seals family collection. Although the Seals collection contained a large number of Pinto points, only 25 specimens were selected for analysis. All of these artifacts were found by members of the Seals family at various Tulare Lake sites. Because the artifacts in the Seals collection were not arranged in a known order, no attempt was made to sample according to a systematic procedure. Instead, these points were selected according to two criteria: first, they exhibited the general characteristics of Pinto projectile points as described by Campbell and Campbell (1935), Rogers (1939), and numerous others, and second, they were not mounted in a display case or a Riker mount.

Due to difficulties, direct access to the Awl Site Pinto material was not possible. Therefore, the information on eight Awl Site Pinto points was obtained from the site report (Jenkins and Warren 1986). All of these artifacts are Group Ib projectile points as defined by Vaughan and Warren (1987). Furthermore, since the information on the Awl Site Pinto points did not include the complete set of attributes that were used to agglomerate the Silent Snake Springs and Tulare Lake material, only those attributes that were published in the Awl Site report were employed in the clustering procedure. As a result, some of the resolution is fuzzy.

METHODS

The data were compared using a hierarchical cluster analysis, using SPSS (Statistical Package for the Social Sciences for the Macintosh, Version 4.0). Membership to a cluster was based on average linkage between the groups, using a squared Euclidean measure.

RESULTS

Silent Snake Springs and Tulare Lake

Clustering the Silent Snake Springs projectile points together with the Tulare Lake projectile points yielded two distinct groups (Fig. 3). One cluster is composed entirely of Silent Snake Springs material while the other is composed of Tulare Lake specimens. Moreover, a closer inspection of the Tulare Lake cluster reveals that three subclusters have emerged. A further examination of the material that comprises these subclusters provided some interesting results.

For example, one Tulare Lake subcluster, Cluster 1d, (Fig. 3) is comprised of six relatively large points (Fig. 4). Four of the six points were manufactured from basalt, and three of the six display deep edge serrations. It is interesting to note that neither serration nor material of manufacture were employed as clustering attributes, especially considering that over 50% of the basalt points occur in this one cluster. The projectile points that comprise this cluster also tend to have a base that contracts slightly. Moreover, they possess a basal notch that is more shallow and more narrow than the basal notches of the other Tulare Lake subclusters, and the shoulder tends to be broader in relationship to the base.

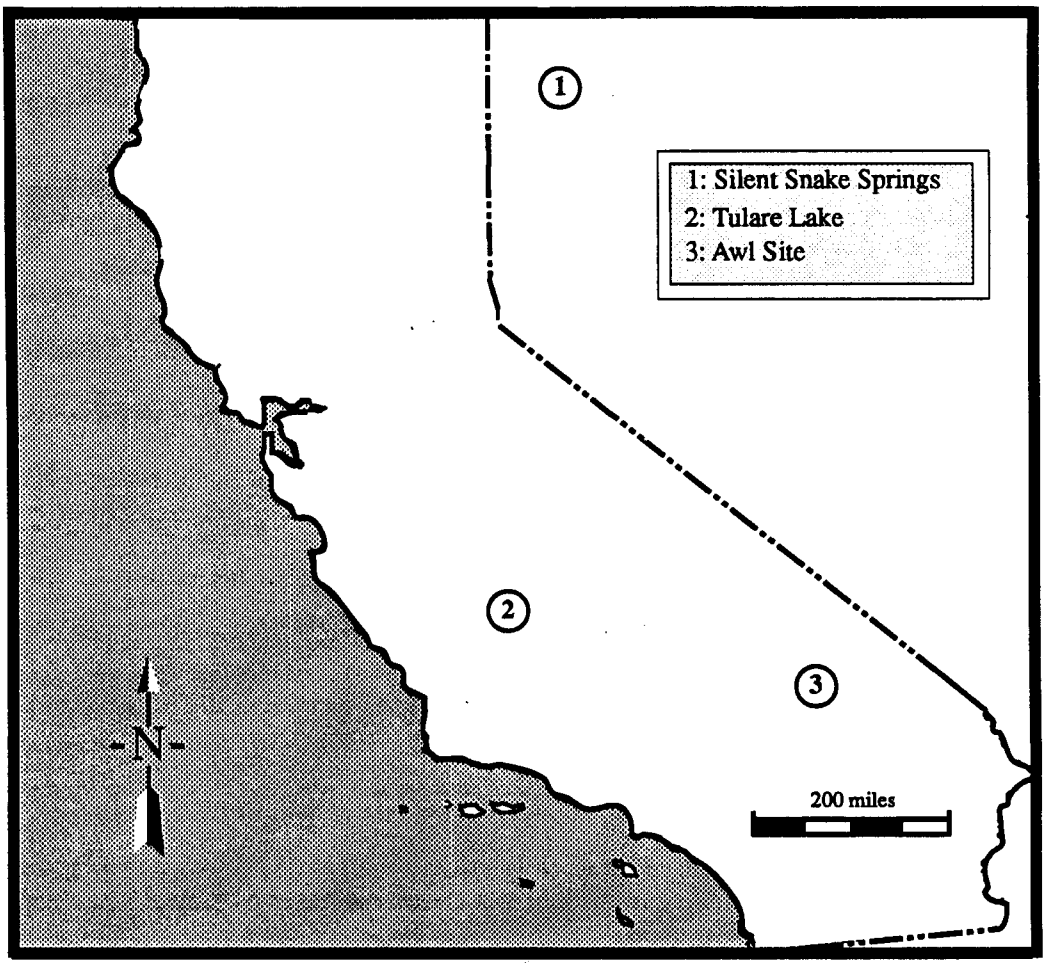

Fig. 2. Location of sites and localities discussed in the text.

The middle subcluster was partitioned by the SPSS program into two smaller mini-clusters, 1b and 1c (Fig. 3). Mini-cluster 1b is made up of four obsidian points (Fig. 4). These projectile points have a tendency to be shorter, thicker, and have a basal notch that is much wider and relatively deeper than the rest of the Tulare Lake material. Another characteristic that these points have in common is a stem that expands slightly. None of the artifacts in this group is serrated.

The remaining mini-cluster, 1c, is comprised entirely of nonobsidian materials (Fig. 4). Three of the four points were manufactured from basalt; the other point was made of chert. The projectile points with the weakest shoulders and the deepest basal notches occur in this group. The stems of these points have a tendency to contract slightly.

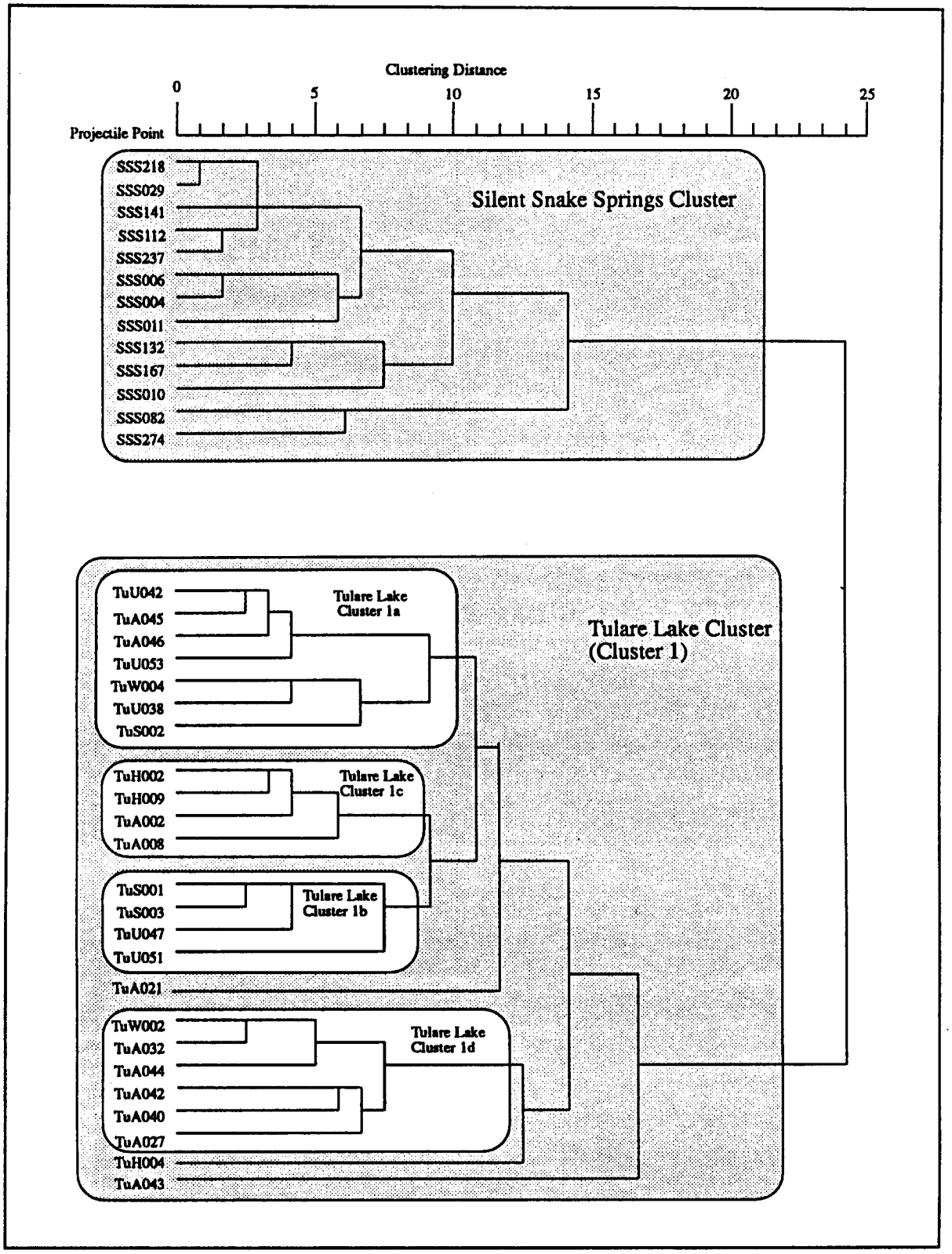

Fig. 3. Tree diagram summarizing the results of clustering Silent Snake Springs and Tulare Lake projectile points.

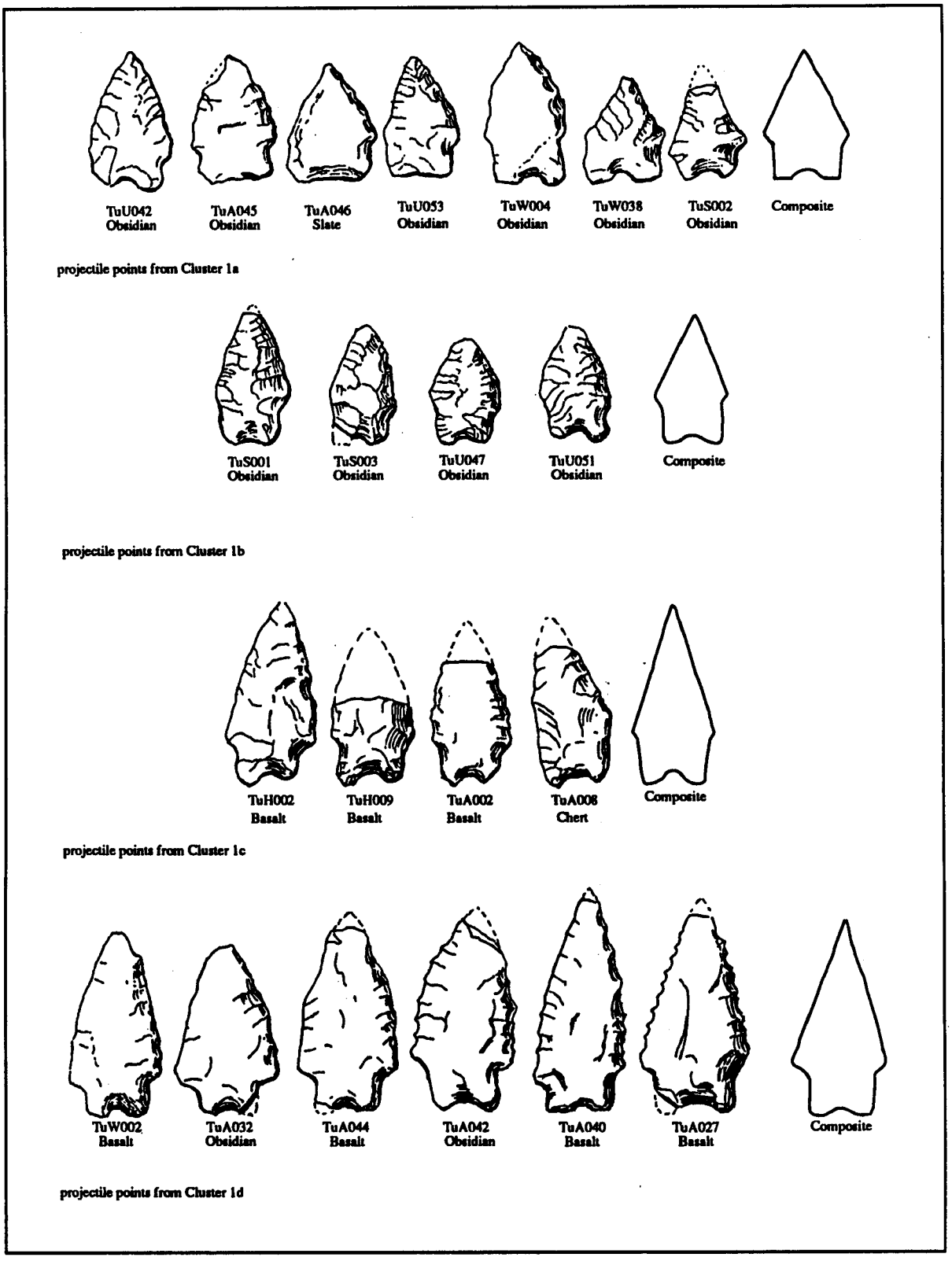

Fig. 4. Projectile points from Tulare Lake, Cluster 1.

Tulare Lake Cluster 1a (Fig. 3) contains seven projectile points (Fig. 4). With the exception of one specimen, all were made from obsidian; the exception was fashioned from a slate-like material. The points in this cluster are thinner than those in the other clusters; two of these points were lightly serrated. Some of the material in this cluster appears to be reworked.

Awl Site and Tulare Lake

When 17 Tulare Lake and eight Awl Site projectile points were lumped together and subjected to cluster analysis, two distinct groups resulted (Fig. 5). One group, Cluster 2, is composed entirely of Tulare Lake points; the other group, Cluster 3, is made up of a mixture of Tulare Lake and Awl Site material. There were also two outliers that were not incorporated into either set; one was from Tulare Lake, the other from the Awl Site.

Cluster 2 is an aggregate of seven Tulare Lake points that appear to be very different from the Awl Site material. The remainder of the Tulare Lake projectile points were grouped into Cluster 3. These points are morphologically similar to the Awl Site forms. Nevertheless, the three apparent subgroups within Cluster 3 suggest that some morphological differences still exist between the projectile points from both regions. For instance, Subcluster 3b is dominated by Tulare Lake material; indeed, only one of the six projectile points in this set is from the Awl Site.

PROBLEM

A number of problems detract from the effectiveness of this study. The most obvious is the small sample size of the data set. The issue of sample size has its greatest impact on hypothesis testing. For example, as stated before, serration was not used as a clustering attribute. Nevertheless, cluster analysis of the Tulare Lake specimens suggests that there may be a relationship between Pinto point morphology and edge serration. Serration did not occur in every Tulare Lake subcluster. In fact, its presence was noted on only five of the 25 Tulare Lake Pinto points. Unfortunately, this hypothesis could not be tested formally because the expected cell frequencies needed to employ chi-square were not large enough. Since this is a function of sample size, the hypothesis should become testable as the n increases.

CONCLUSION AND DISCUSSION

Having the artifacts group themselves according to attribute measurements, cluster analysis allows us to see patterns in the data that might otherwise have been overlooked if more conventional methods were employed. We can then ask questions about these attribute relationships that would have gone unformulated. For example, when considering the Tulare Lake material, the projectile points with the weakest shoulders also have, as a rule, the deepest basal notch. Similarly, the longest Tulare Lake Pinto points collectively have the shallowest and narrowest basal notches of any Tulare Lake cluster. Are these common themes among Pinto assemblages from other regions, or are they found only within the southern San Joaquin Valley?

The clustering of the Awl Site and Tulare Lake material also generated some interesting questions and hypotheses. For instance, many Tulare Lake projectile points were incorporated into Cluster 3 (Fig. 5), which also contained all of the Awl Site specimens. Nevertheless, most of these Tulare Lake points combined to form their own subcluster, Cluster 3b, which they shared with only one Awl Site point (Aw0002). This seems to suggest that, although these Tulare Lake artifacts are morphologically similar to the Awl Site material, there is enough of a difference to be recognized by the clustering algorithm.

There are many possible reasons for this. For example, the minor morphological differences between the Tulare Lake points in Cluster 3b and the Awl Site points contained in Subclusters 3a and 3c might be due to a slight degeneration in the mental template over the relatively great geographic distance—approximately 160 miles—that separates Tulare Lake and the Awl Site. If this is true, then the similarity coefficient generated by the clustering

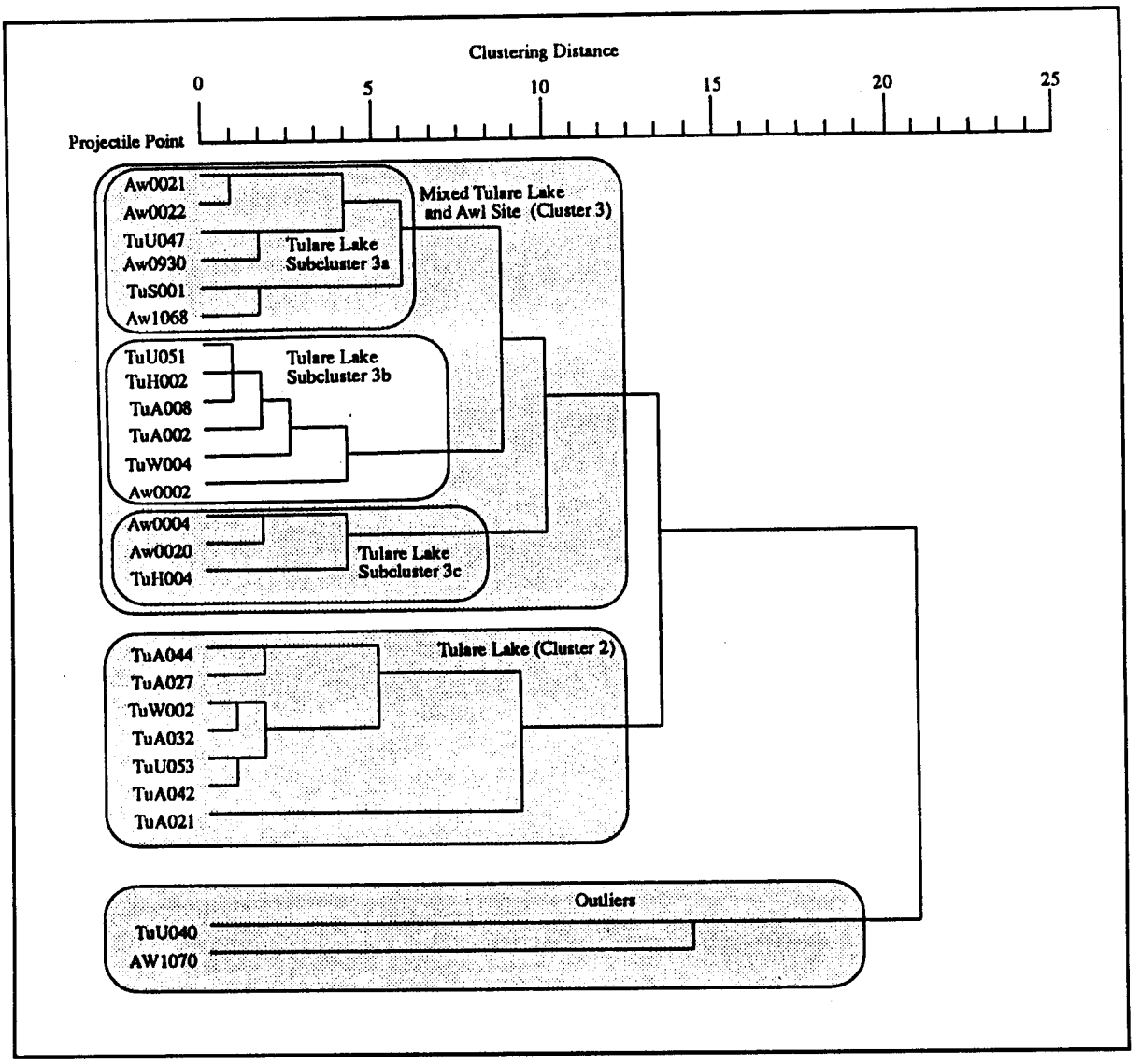

Fig. 5. Results of clustering Tulare Lake Pinto points with the Awl Site Pinto points.

program may also be a measure of social distance. It is also possible to speculate that the differences between the material contained in the two subclusters might be due to a change in the mental template due to a slight chronological shift. In this case, the similarity coefficient may become a measure of social distance over time.

Of course, variations in style between the two clusters of projectile points may be caused by differences in knapping material. If this were the case, however, then we would expect Pinto point clusters to be composed of artifacts manufactured from the same material. In other words, we would expect a basalt cluster, an obsidian cluster, a chert cluster, etc. Unfortunately, the results obtained in this report are ambiguous. On the one hand, the composition of some Tulare Lake clusters indicate that there is a strong correlation between morphology and material of manufacture. On the other hand, the results of the Awl Site/Tulare Lake clustering session suggest the opposite. Once again, this problem will not be solved unless the sample size of the data base is increased considerably.

The goal of this paper was to provide evidence that cluster analysis could be used to detect morphological differences in Pinto-like projectile points. By virtue of the fact that cluster analysis was able to correctly discriminate between the Tulare Lake and Gatecliff series projectile points with 100 percent accuracy, it should be apparent that this objective was obtained. It should also be apparent that cluster analysis accomplishes this task objectively and consistently.

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INTRODUCTION

The following references are an additional supplement to the bibliography originally published in Volume 3 (1992) of the KCAS *Journal*, as well as the updated supplements published in Volumes 4 (1993) and 5 (1994). Readers with additional references are encouraged to contact the editors in order to facilitate the continued updating of the Yokuts bibliography.

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