Journal of California and Great Basin Anthropology
Vol. 14, No. 1, pp. 55-71 (1992).

"Women's Money": Types and Distributions of Pine Nut Beads in Northern California, Southern Oregon, and Northwestern Nevada

GLENN J. FARRIS, California Dept. of Parks and Recreation, P.O. Box 942896, Sacramento, CA 94296-0001.

BEADS of various kinds have become important temporal indices to California prehistory. In fact, the extensive use of beads continued among the native peoples well into the historic period. Beads were used both as items of wealth and as ornaments. Apart from the insight they provide us concerning the aesthetic interests of the native inhabitants of California, they are often used as temporal markers (cf. Bennyhoff and Heizer 1958; Bennyhoff and Hughes 1987; King 1978, 1981). Most beads are made of shell or stone and so are well-suited to long-term preservation in archaeological contexts. However, beads were made of other materials including bone and the coatings of seeds (e.g., *Viburnum ellipticum*, *Juniperus* sp).

One species of pine (*Pinus sabiniana*) has a particularly hard-shelled seed ideal for beads.[1] Ornaments made from them have been found in northern California, southern and coastal Oregon, and northern Nevada in the late prehistoric and historic periods. They are commonly known as pine nut beads.

PINE NUT BEAD TYPES

At least four types of pine nut beads have been identified (Fig. 1), although two forms or types predominated (Heizer 1942:126). Type I beads have both ends ground off and are often described as barrel-shaped. Type II have the fat end ground off and a hole drilled in the side. There seem to be two varieties of this second type. Type IIa has the end hole cut at right angles to the length of the nut. Type IIb has the end cut made on an angle diagonal to the length of the nut. After some personal experience in replicating these beads, it appears that these two Type II variants are probably more accidental than planned and so their apparent difference should not be over-emphasized. Although specific information on the types used is usually lacking in the ethnographic record (Table 1), it is clear from the archaeological record that both types I and II are widely distributed (Table 2).

Another type that has not previously appeared in the literature is found in the Lowie Museum (now the Phoebe A. Hearst Museum) collections obtained from Humboldt Cave (26Ch 35) in Nevada (see Figs. 1 and 2). This type is a composite of types I and II insofar as it has both ends ground off as well as having a perforation through its side. This will be called Type III. Humboldt Cave was excavated in 1936 and reported by Heizer and Krieger (1956). Heizer was also responsible for presenting the earliest analysis of pine nut beads (Heizer 1942:126). It is odd that he did not take note of this variant form in his overview analysis. One other form was mentioned by Cressman (1933a:121-122) and described as "not rubbed off at the end but . . . perforated laterally with two holes." These beads were found at the Gold Hill site along the Rogue River in Oregon (Cressman 1933b:19) and also at CA-Teh-10 (Johnson et al. 1989:285-286). It will be called Type IV (Fig. 1).

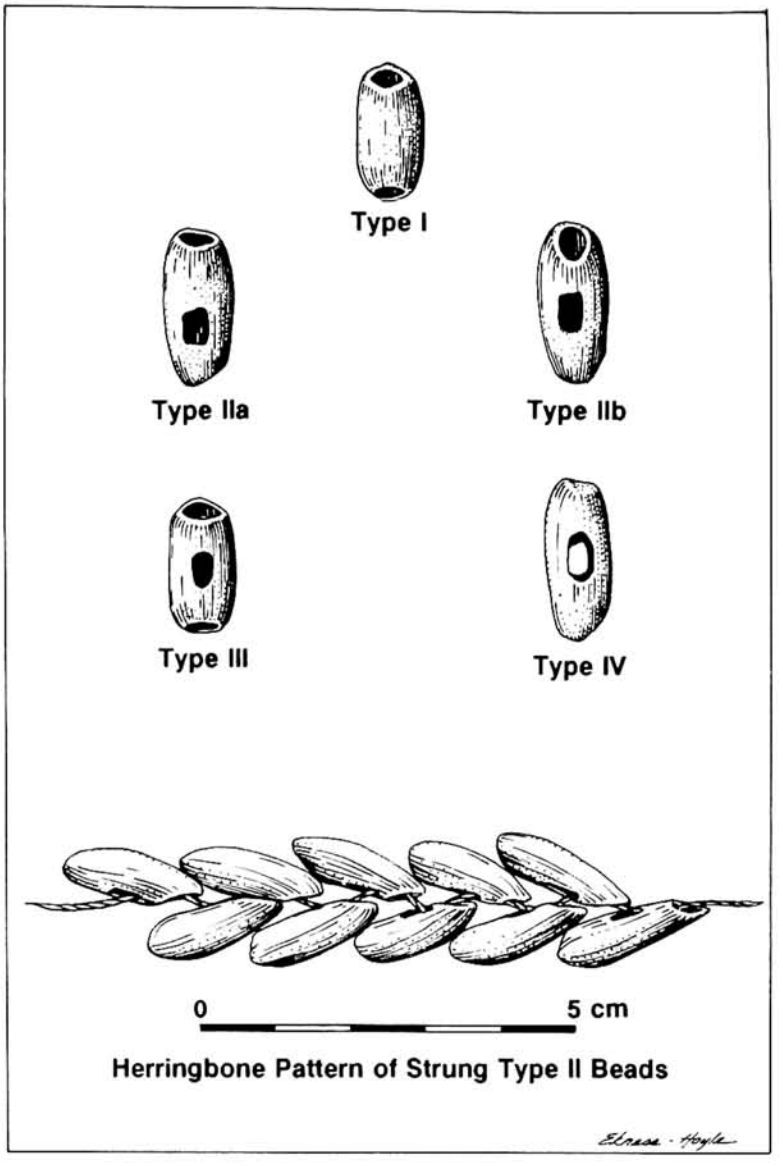

Fig. 1. Pine nut bead types.

Types I and II are mentioned in various ethnographic accounts (Table 1), especially for the Karok, Shasta, Wintu, and Yana. Regarding this latter tribe, the names of these two main bead types are provided. Type I beads were called *mi'yauna*, while Type II were called *'u'miyau* (Sapir 1910:142; cf. Sapir and Spier 1943:253-254). A description of how the beads were made by the Yana was also given.

> The nuts were soaked, cut off at each end, bored through and cleaned inside, and parched until blackened by the fire, then strung through for tassels [Type I]. In another style the pine nuts were perforated not at the ends but from one side in the middle of the nut [Type II?] [Sapir and Spier 1943:253-254].

Pine nut beads were used in making necklaces and for tassels or fringes on women's skirts and aprons. The Type II beads were espe-

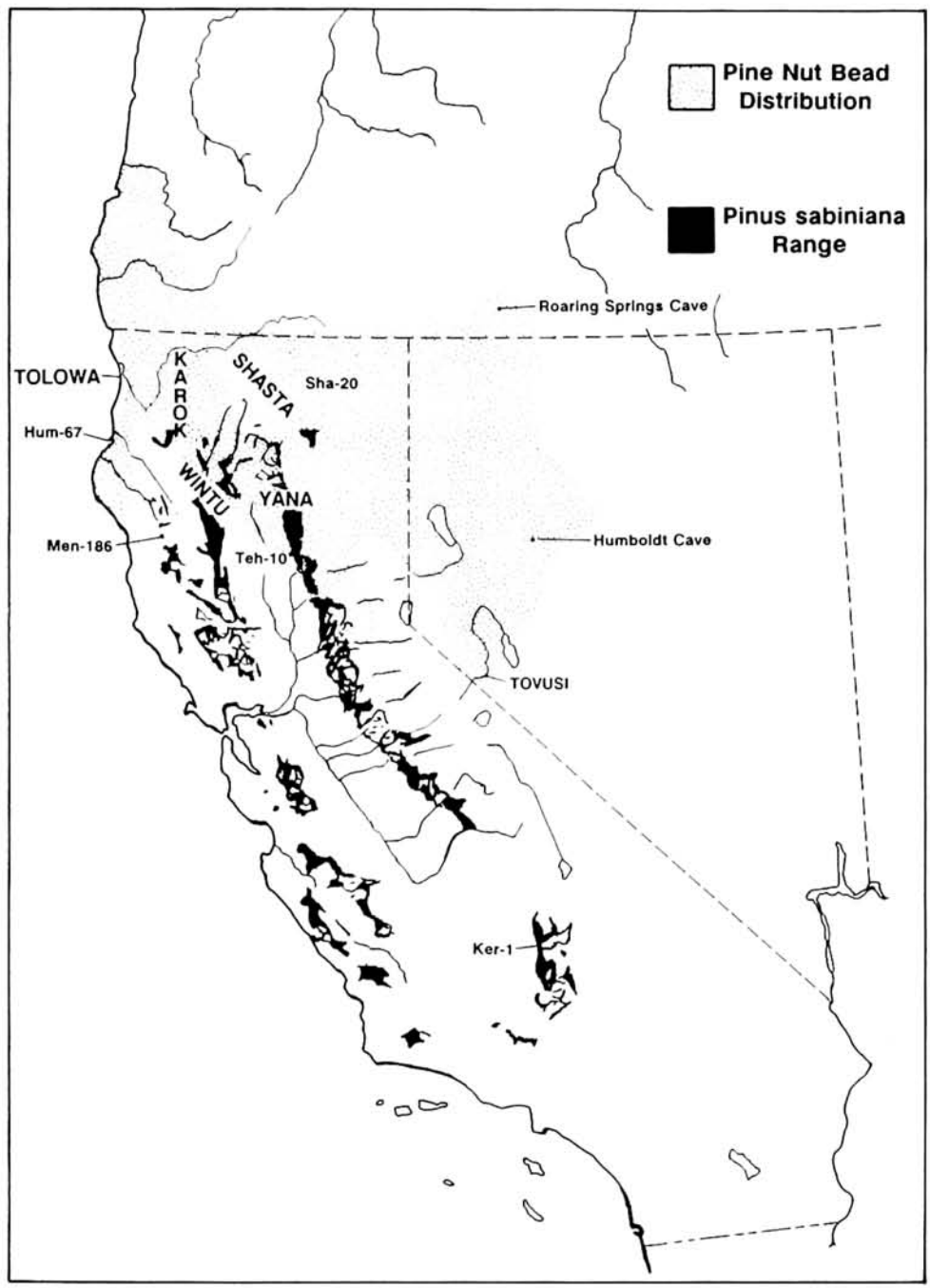

Fig. 2. Archaeological/ethnographic area of pine nut beads superimposed on map showing range of *Pinus sabiniana* (after Griffen and Critchfield 1976:89, Map 56).

Table 1
ETHNOGRAPHIC REFERENCES TO PINE NUT BEAD[a] USE

TRIBE	USE	SOURCE
CALIFORNIA		
Tolowa	--	Barnett 1939:174; Drucker 1937:243
Yurok	skirt	Loud 1918:386
Hupa	apron, necklace	Baumhoff 1958:214; Goddard 1903:20
Wiyot	skirt	Loud 1918:233; Kroeber 1911:411
Bear River	necklace	Nomland 1938:105
Mattole	--	Davis 1961:23
Lassik	skirt	Foster 1944:172
Yuki	skirt	Foster 1944:172
Karok	dress	Schenck and Gifford 1952:378
Shasta	necklace, apron	Dixon 1907:413; Holt 1946:304-305
Wintu	skirt	DuBois 1935:120; Merriam 1957:40; Powers 1877:233
Yana	skirt	Sapir and Spier 1943:253-254
Achomawi	skirt, apron	Davis 1961:15; Dixon 1908:210
Atsugewi	necklace, apron	Garth 1953:147; Dixon 1908:210
Modoc	skirt	Davis 1961:15
Concow	--	Riddell 1978:374
Nisenan	necklace	Wilson and Towne 1978:391
Yokuts	skirt	Latta 1977:331
NEVADA		
Tövusi (Paiute)	necklace	Stewart 1941:391
OREGON		
Tillamook	--	Barnett 1939:174
Siuslaw	--	Barnett 1939:174
Coos (Kus)	--	Barnett 1939:174
Six Rivers	--	Barnett 1939:174
Tututni	--	Barnett 1939:174
Chetco	--	Barnett 1939:174
Galice Creek	--	Barnett 1939:174

[a] The bead type was normally unspecified in the ethnographic sources with the exception of the Karok (Types I and II), the Yana (Types I and II), and the Wintu (Type I).

Table 2
ARCHAEOLOGICAL SITES WITH PINE NUT BEADS

Site Designation/Ethnic Territory	Bead Type 1	Bead Type 2	Unspecified	Source(s)[a]
CALIFORNIA (CA-)				
Eld-255 (Boychuck)/Nisenan	X	--	--	1
Hum-67 (Gunther Island)/Wiyot	--	X	--	2, 3
Hum-112	X	--	--	4
Hum-169 (Tsurai)/Yurok	X	X	--	5
Hum-182	--	X	--	6
Ker-1/Tubatulabal	--	X	--	7
Las-1 (Tommy Tucker Cave)/Paiute	X	X	--	8, 9
Men-186/Yuki	X	X	--	10
Men-428b/Coast Yuki ?	X	--	--	41
Mod-2 (Petroglyph Point Cave No. 2)	--	X	--	11
Pla-142 (Evelyn)/Nisenan	X	--	--	12
Plu-33 (Lake Almanor)/Concow	X	--	--	13
Plu-716/Maidu	--	--	X	14
Sha-20/Wintu	X	X	--	15
Sha-22/Wintu	X	X	--	15
Sha-46	--	--	X	16
Sha-52 (Callison Ranch)/Achomawi	X	X	--	17
Sha-169 (Wintu Pumping Plant)/Wintu	--	--	X	18
Sha-207 (Wintu Fishing Station)/Wintu	X	X	--	19
Sha-237/Wintu	X	X	--	20
Sha-340/Achomawi	--	X	--	21
Sha-400/Achomawi	--	--	X	21
Sha-678 (Anders Boat Ramp)/Wintu	X	--	--	21a
Sha-1169	--	X	--	22
Sha-1175	--	X	--	22
Sis-13/Shasta	--	X	--	23
Sis-168/Shasta	X	--	--	24
Sis-262/Shasta	X	X	--	25
Sis-273 (Nightfire Island)	--	--	X	26
Teh-1 (Kingsley Cave)/Yana	--	--	X	27
Teh-10/Nomlaki	X	X	(Type IV)	28
Teh-58/Wintu	--	X	--	29
Teh-193 (Payne Cave)/Yana	--	X	--	30
Teh-210	X	X	--	31

[a] see continuation of Table 2 for sources

Table 2 (Continued)
ARCHAEOLOGICAL SITES WITH PINE NUT BEADS

Site Designation/Ethnic Territory	Bead Type 1	Bead Type 2	Unspecified	Sources[a]
OREGON (35-)				
CS-3 (Bullard Site)	--	--	X	32
CU-20 (Euchre Site)	X	--	--	33
Gold Hill (no trinomial)	X	--	(Type IV)	34
CU-37 (Lone Creek Ranch)/Chetco	--	X	--	33
CU-30 (Pistol River)	--	X	--	35
HA-433 (Roaring Springs Cave)	--	--	X	11
NEVADA (26-)				
Ch18 (Lovelock Cave)/Paiute	--	--	X	36
Ch35 (Humboldt Cave)/Paiute	--	X	(Type III)	37
Wa274 (Paradigm Lost Cave)/Paiute	X	X	--	38
Wa1502 (Hanging Rock Shelter)/Paiute	X	--	--	39
Massacre Lake Cave/Paiute	--	X	--	40

[a] (1) Jim Woodward, personal communication 1981; (2) Loud 1918:386; (3) Heizer and Elsasser 1964; (4) Bennyhoff and Elsasser MS; (5) Elsasser and Heizer 1966:64; (6) Bennyhoff et al. MSa; (7) Fredrickson and Mohr MS; (8) Fenenga and Riddell 1949; (9) Riddell 1956; (10) Treganza et al. 1950:116, 118; (11) Heizer 1942; (12) William Olsen, personal communication 1982); (13) Kowta 1980:124; (14) Kowta 1989:9; (15) Smith and Weymouth 1952; (16) Boyd MS; (17) Bennyhoff et al. MSb; (18) Treganza and Heicksen 1960:15; (19) Dotta 1962:54; (20) Dotta and Hullinger 1964; (21) Jerry Johnson, personal communication 1982; (21a) Brott 1981 (22) Basgall and Hildebrandt 1989:293, 365; (23) Wallace and Taylor 1952; (24) Motz et al. 1986:117; (25) Bennyhoff and Elsasser MS; (26) Sampson 1985:412; (27) Baumhoff 1955:62; (28) Jerry Johnson, personal communication 1988; (29) Treganza 1954; (30) Baumhoff 1957; (31) Elsasser and Bennyhoff MS; (32) Leatherman and Krieger 1940:23; (33) Berreman 1944; (34) Cressman 1933a:121-122; Cressman 1933b:19; (35) Heflin 1966:170; (36) Bennyhoff and Hughes 1987; (37) Heizer and Krieger 1956:84; (38) Don Tuohy, personal communication 1990; Tuohy 1980:52; (39) Layton 1970; (40) Heizer 1942:126; (41) Greg White, personal communication 1991.

pecially well-suited to this latter use since they form a pleasing herring-bone pattern when strung (Fig. 1). Type I beads could also be used for tassels and were often tied to the bottom end of the skirt fringes. In addition, Type I beads were good for making necklaces, whereas Type II beads did not lend themselves to this purpose.

A number of northern tribes are mentioned in the ethnographic accounts as using pine nut beads (Table 1). These accounts complement the archaeological record quite well (Table 2) with most of the same tribes being represented. In some ways, the ethnographies are superior since they make specific mention of the ways in which beads were used; however, they rarely mention the types of pine nut beads. That pine nut beads were well-known to people living in the recent past is supported by the large number of instances of such beads being found along

with European trade goods or late-prehistoric artifacts, such as clam shell disc beads, in the archaeological record. The fact that native people in northern California and southern Oregon were spared intensive contact by Europeans until the 1830s to 1840s meant that the prehistoric period (or, more properly, the protohistoric) for these people continued to a comparatively late time.

PINE NUT BEAD DISTRIBUTION

Although pine nut beads were most probably made in north-central California, they were traded well beyond their natural source of supply as noted by Heizer (1942; Heizer and Krieger 1956). The plotted distribution (Fig. 2) shows the remarkably small overlap that exists between the natural range of *P. sabiniana* and the area in which pine nut beads were known to have been used. In fact, the largest quantities of these beads are found in portions of coastal California (apart from the huge number found at CA-Sha-20).

Other large finds were made in Nevada and southern Oregon, both areas outside the range of *P. sabiniana*. Judging from the quantities of pine nut beads of this species found in archaeological sites in Wintu, Shasta, and Karok territory, it would appear that these areas were the center of the industry. The term "industry" must be used judiciously, however, because pine nut beads did not assume the economic status, much less the value, of such other types of beads as *Dentalia* and clam shell discs. In addition, there is no suggestion that there were pine nut bead-making specialists such as were noted among the Pomo, with their clam shell disc beads (Hudson 1975). Nevertheless, pine nut beads spread widely, generally, though not always, through trade (Davis 1961:13).

Some interesting patterns of pine nut bead distribution are apparent in the ethnographic and archaeological record. In the Coast Ranges there seems to be a southern limit coincidental with the borders of the Athabaskan groups. Ironically, it was the discovery of pine nut beads at CA-Men-186 in Round Valley that led Meighan (1955:Fig. 9) to include them in the northerly oriented, late (post A.D. 1600) period "Shasta Complex" (Meighan 1955:32). That pine nut beads do not figure either in Pomo ethnographies nor in archaeological sites is especially remarkable given the extensive shell and stone-bead making activities of these people.

Even less easily explained are apparent boundaries in the use of pine nut beads between tribes speaking related languages, such as the Wintu and Nomlaki Wintun. This division is especially notable since the Wintu seemingly made extensive use of pine nut beads (e.g., the 4,765 beads found at CA-Sha-20, a McCloud Wintu site), but the Nomlaki apparently did not. This is particularly curious because these tribes were known to have been actively involved in trade and the Nomlaki were the conduit for the trade items coming from the south including clam shell disc beads. In addition to the Wintu, at least two other neighbors of the Nomlaki used pine nut beads: the Yana and the Concow Maidu.

The recent case of burials found at the Nomlaki site of CA-Teh-10 is particularly interesting in this regard. Two cemeteries were excavated (Johnson et al. 1989; Johnson 1990). In the earlier one (dated to A.D. 1500-1750) there were a total of 306 pine nut beads found associated with at least 11 burials (seven others had one bead each but were so jumbled as to make the association uncertain) including men, women, and children. It is interesting to note that nearby Cemetery 2, dated to A.D. 1700-1850, produced only 25 pine nut beads. This is particularly meaningful considering the fact that it is usually the later, protohistoric, burials that produce pine nut beads. Important differences in the artifact types of the two cemeteries makes it clear that Cemetery 1 was ancestral to Ceme-

tery 2 and represents the fully prehistoric Nomlaki. The overwhelming majority of the beads in Cemetery 1 were Type II (4 Type I, 209 Type II, 2 Type IV, and 91 too fragmentary to identify). Although two of the burials were men, the association of Type II with women's herringbone pattern skirts leads to the possibility that the men were "berdaches" (men who dressed and acted like women, but who sometimes gained great respect as shamans). Of the sexed burials, three others were women and three children undetermined as to sex (Johnson et al. 1989:285), though one of the males (Burial 87, a 40 year-old man with 170 beads) and one child (Burial 2 with 40 specimens) had 68.6% of the pine nut artifacts. Is it possible that pine nut beads had been more prevalent at an earlier period among the Nomlaki, but were on the decline among them in the later contact period? This would indicate a contraction of the area influenced by this trait and needs to be further considered if and when new site information becomes available.

On the east side of the Central Valley is the anomalous situation of pine nut beads being associated with the various Maidu peoples, but seeming to stop with the Nisenan, and not being found among the Sierra Miwok. Further south, the Yokuts were said to use skirts fringed with pine nut beads (Latta 1977:331). A single pine nut bead was reported found at an archaeological site (CA-Ker-1) in Tubatulabal territory (Fredrickson and Mohr MS). Unfortunately, it has since been lost. Why the Sierra Miwok would not have adopted this trait is unexplained. Of course, one must consider the sparse data base involved. There are currently known only five examples of pine nut beads being found throughout Maidu and Tubatulabal territory (CA-Eld-255, CA-Pla-142, CA-Plu-33, CA-Plu-716, and CA-Ker-1). There is ethnographic corroboration of the use of pine nut beads by the Concow Maidu, the Nisenan, and the Yokuts (Table 1), whereas this is lacking for the Sierra Miwok. Voegelin (1938) made no mention of pine nut beads being used by the Tubatulabal.

Further to the east, the trade in pine nut beads moves across the Sierra Nevada into the Great Basin. The most probable line for this movement would have followed the Pit River of northern California into the Great Basin and then into the Northern Paiute trade (cf. Hughes and Bennyhoff 1986:239; also Table 2, Fig. 2).

The absence of pine nut beads in Miwok, Pomo, Wappo, and Patwin territory does not seem to be a case of differential preservation in the archaeological sites because the shells of gray pine[2] nuts, apparently used only for food, have shown up in a number of archaeological sites there (Robinson 1964; Johnson 1967; Spaulding 1984:1002-1011; Hartzell 1991).

ASSOCIATION WITH WOMEN AND TRADE

Trade suggests exchange, and exchange usually means that the item in question has some monetary value. The interesting thing is that there is no indication of value for pine nut beads in the ethnographies, with one exception. This was a reference to money equivalence recorded for the Tolowa, a coastal tribe on the Oregon-California border outside the gray pine zone. "Women's money . . . included: . . . pine seeds (*muLhwe':n*∈) traded from inland, $1.50 per 5 fathoms" (Drucker 1937:243).

Calculating approximately 20 pine nuts to the foot when strung, a five fathom (30 feet) strand would amount to 600 beads. Therefore, it would appear that even when given a monetary value, they were worth little. Despite their small value, there is abundant evidence that pine nut beads were made in large quantities. Examples collected from the Modoc around 1900 included strings of pine nut beads as long as 87 feet, with a number of other strings in the 20 to 30 foot range (e.g., Phoebe A. Hearst Museum specimens 1-27245, 1-27248, 1-27238, 1-

27239). Amazingly large quantities have been found in archaeological sites as well (e.g., the 4,765 beads found at CA-Sha-20, a McCloud Wintu site).

The notion of "women's money" mentioned by Drucker seemed to carry over to a common association with women (Powers 1877:233; Stewart 1941:391; Merriam 1957:41; Wilson and Towne 1978:391). Female shamans of the Bear River people, who lived between the Wiyot and the Mattole, were not allowed to wear necklaces of seal and sea-lion's teeth as were the male shamans. Instead, they used strings of *Olivella* shells, abalone shell, and shells of carved (?) pine nuts. These pine nut beads were traded from the Hupa (Nomland 1938:105, 107).

Various archaeologists have suggested that graves which include pine nut beads are likewise those of women, and often children (Leatherman and Krieger 1940:23; Smith and Weymouth 1952:28; Dotta and Hullinger 1964: 35). Indeed, in the vast majority of cases where the sex of a burial associated with pine nut beads could be determined, it was female. However, it must be noted that pine nut beads are most often recovered from cremation sites because the charring that took place in the funeral fire protected them from the normal deterioration of organic items (similar preservation is also found in firepit ash). In one site where there were pine nut beads associated with 52 burials, only one could be sexed (female; Heizer and Elsasser 1964:36-68). A burial recovered from near Lake Shasta (CA-Sha-678), in ethnographic Wintu territory, appeared to have been a female with 20 Type I beads associated, probably fringe tassels for a skirt (Brott 1981).

As noted previously, recent excavations at an important cemetery site in Nomlaki territory, CA-Teh-10, provided information on additional burials with deposits of pine nut beads. At least two of the burials (Nos. 8 and 87) were males while three others were females (Johnson et al. 1989:285).

Unfortunately, another major project in the Shasta country that produced burial-associated pine nut beads failed to provide information on either the types of beads encountered or the sex of the burials. Since the material was immediately re-interred, further access to this information is not available (Basgall and Hildebrandt 1989:E-1).

Even so, I do have at least two strong misgivings on the notion of a strict association of women and pine nut beads. One was the previously discussed CA-Teh-10 example, the second was from the Gunther Island site (CA-Hum-67) excavated by Loud (1918) in ethnographic Wiyot territory. Eight of the 22 burials were found to have pine nut beads among the grave goods. Loud pointed out that the type (only Type II) found with the burials is similar to those found on the clothing of women; however, he went on to say:

> it is not necessary to consider all the interments with pine nut beads as being the remains of females . . . seventy-three per-cent of all artifacts were with the bodies which also had pine nut beads [Loud 1918:386].

It would seem that Loud was making two assumptions here. First, that pine-nut beads would only be associated with women's burials, and, second, that the presence of numerous artifacts with a burial would indicate that it was a man. Neither of these suppositions seems supportable by themselves.

Using data obtained by Loud (1918) and Heizer and Elsasser (1964), Hughes worked on Wiyot trade and presented (1978) an analysis of the obsidian sources of the ceremonial blades, projectile points, drills, and bifaces found with six of the CA-Hum-67 burials. Hughes concluded (1978:61) that these were wealth items, in part for their having been traded in for such a long distance from the source of supply. Of the six burials represented by the grave-goods

analyzed by Hughes, five had pine nut beads also associated (Loud 1918; Hughes 1978). In addition, 26 of the 41 obsidian artifacts examined by Hughes were projectile points. This would seem to indicate that either: (1) the women and children were being buried with valuable goods (normally associated with males), (2) men were also using Type II pine nut beads (normally associated with women's skirts), (3) the pine nut beads were being cast upon the cremation pyres by their grieving women owners, or (4) that some of these wealthy burials represent women shamans or berdaches who would have dressed as women but may have reached positions of wealth in the society (cf. photo of a Tolowa transvestite shaman, Gould 1978:131).

TIME DEPTH OF PINE NUT BEADS

Turning to the question of time-depth for pine nut beads, I begin with Heizer's (1946: 126) view that:

> . . . since [Type II beads] appear archaeologically late and among ethnographic aboriginal groups, we state with fair certainty that wherever these pine nut beads are, archaeologically we are dealing with relatively recent remains.

Heizer (1942:126) went on to say that the Type I beads had not been found in any archaeological context (only as ethnographic specimens). Since then, Type I beads have appeared in at least 22 archaeological sites (Table 2).

Pine nut beads found in a Yukian site (CA-Men-186) could well be explained by the trade of pine-nut fringed skirts coming from the Lassik people to the north (Foster 1944:172). The Shasta Complex, to which this site is attributed, is considered late (post-A.D. 1600) and indicates links to the north (Meighan 1955:32). However, the whole notion of the Shasta Complex has been called into question (e.g., King, 1990). Greg White (personal communication 1982), who has studied the collection from CA-Men-186, believed it is purely Yuki and not from the historic period when Round Valley was occupied by Indians from the many tribes brought to the reservation there.

In the majority of cases, pine nut beads are found in association with relatively late artifacts, whether they be European items or such Late Horizon time markers as clam shell disc beads. One striking exception occurred in a coastal Mendocino County site (CA-Men-428b). This site is remarkable as a single component site with tight radiocarbon dates clustering around A.D. 270 to 450 (White 1991:17-18). One-half of a Type I bead was recovered from this context. The associated artifacts indicate strong ties with the Humboldt Bay area and are typified as coming from the "Gunther Aspect" of the site. This is considerably earlier than the next earliest site with pine nut beads (CA-Hum-67) found along the north coast of California in which the interments are believed to have been placed beginning about A.D. 1350 (Hughes 1978:56). Further study of the site at MacKerricher State Beach (CA-Men-428b) will determine whether this exceptionally early date for a pine nut bead will be supported.

A final case of an apparent early association of pine nut beads is found at Humboldt Cave (26Ch35) in Nevada (Fig. 2). The shell beads found in the same deposit with a Type II pine nut bead (Hughes and Bennyhoff 1986:245) led these authors to determine that the pine nut bead trait dates back to the Early Middle Archaic (2,000-200 B.C.). This appears to be an aberration, for the authors tehn state that the beads disappear from the archaeological record until ca. A.D. 1300 (Hughes and Bennyhoff 1986:249), a lapse of at least 1,500 years. In a subsequent publication these same authors presented a lengthy discussion of the Humboldt Cave pine nut beads that, they suggested, are attributable to 10 discrete occurrences of trade. Regarding temporal placement, they stated (Bennyhoff and Hughes 1987:168-169) that

> All 175 pine nut beads (10 occurrences) have been assigned to terminal Late Lovelock, contemporaneous with late Phase 1 of the Late period [A.D. 1100-1300]. One could easily assign eight beads (3 surface, 5 in level 1) to Historic because type II beads were still in use in Historic times. We should, perhaps, extend the distribution of pine nut beads back to middle Phase 1 of the Late period [A.D. 700-1100], but better stratigraphic associations are needed.

The limited distribution of pine nut beads relative to the extensive areas where they are potentially available is puzzling. They seem to be most popular only at the northern edge of the range of *P. sabiniana* (Fig. 2). This strengthens the argument for a late development of the use of pine nut beads that had not had time to spread more widely. Alternatively, in the case of the failure of the Pomo to take up the trait, their own bead-making tradition may have been guarded well enough to be closed to competition. This latter hypothesis is weakened by the qualitative difference between the money aspect of the clam shell beads versus its apparent lack for pine nut beads. It would not seem that they would be in competition. Ultimately, it may have simply been a matter of cultural preference which limited their distribution.

EXPERIMENTS IN PINE NUT BEAD REPLICATION

In order to understand better the process of making pine nut beads, several experiments were performed. The first was an attempt using the abrading method noted for the Wintu (Dubois 1935:120) who ground pine "nuts . . . off at both ends, meat extracted, shells strung on thong, end of thong braided with other pieces of leather to form tassel" and for the Karok where:

> The [gray pine] nuts are used as beads to decorate dance dresses. Some beads are perforated at both ends, others at one end and one side. The nut shells are very hard, and the Karok made holes for stringing the beads by abrading the nuts on a rock [Schenck and Gifford 1952:378].

Rubbing pine nuts on a rough stone surface proved to be a very tiring and time-consuming procedure. It would take a good 10 to 15 minutes to finish a single bead. By contrast, the method noted for the Yana by Sapir and Spier (1943:253-254) wherein the nuts were "soaked, cut off at each end, bored through and cleaned inside, and parched until blackened by the fire" was found to be much more effective and rapid.

The soaking was an important part of the operation. Cutting the pine nuts without having soaked them first was not only more difficult but also resulted in greater tool wear. When the nuts had soaked for a few days the shells had absorbed just enough water to diminish the friction considerably. However, they had to be cut soon after removing them from the water because they rapidly dried out and became hard as before.

After cutting off either one or both ends of the pine nut, it was helpful to re-moisten the cut end before rubbing it briskly on a rough surface to remove the cut marks. This made for a smooth edge that took on a very attractive polish after a few weeks of wear. It may well have been either observations or descriptions of this part of the bead-making procedure that led the ethnographers to suggest abrasion as the means of making the holes.

Cutting off both ends creates the barrel-shaped appearance known as Type I. To form a Type II bead, only the fat end is cut off. A hole is then drilled in the side. This could be done with a sharp stone flake, preferably one with a point. The pine nut would be held in one hand and the pointed flake would be placed against the side of the nut using the fingers of the other hand. The nut and flake would then be rotated against one another until the point broke through the seed wall. Once the hole was made it could be opened wider by inserting a broader section of the flake. Of course, a Type III bead would be made by combining the procedures for making a Type I and a Type II.

Several ethnographers mentioned the further procedure of blackening the beads in a fire. Using coals from a fire placed in a shallow pan, some newly made pine nut beads were added and then the pan was rotated in the manner of a parching basket. It took a while for the beads to heat up enough to blacken and if they were left too long in contact with the coals, they would catch fire and burn. However, despite the loss of some beads using this method, the ones which did char slightly then took a particularly nice polish, especially when worn on the body. Contact with the body seemed to enhance the polish on all pine nut beads whether charred or not.

Many of the archaeological specimens of pine nut beads that came from California sites had obviously been subjected to charring, but in most cases this was from their association with cremations. By contrast, a number of the specimens that came from dry caves in Nevada clearly had not been charred but had taken a fine polish all the same. Some others found in these sites had indeed been charred and this procedure is indicated in an ethnographic note that the Tövusi (Paiute) used "charred pine seeds for necklaces" (Stewart 1941:391, 435). Although Stewart did not specify that these charred pine seeds were of the species *P. sabiniana*, the presence of the archaeological specimens of charred seeds of this species from other Nevada sites would point to that species as being the most likely candidate.

Although the soaking and cutting method is much faster than using straight abrasion to make the beads, the process is still rather time-consuming, especially when one considers the large number of beads needed to make an item such as a skirt. At least some people in the society must have had sufficient time available to have undertaken such tasks. The fact that such spare time was evidently available further belies the image of people in constant struggle for bare subsistence. The aesthetic realm was very important to Indian peoples, and they were evidently willing to invest considerable time in its creation.

CONCLUSIONS

The aesthetic trait represented by pine nut beads appears to be centered among the Wintu, Shasta, and Karok. From there it spreads widely across tribal boundaries down the trade routes of the Klamath, Trinity, and Salmon rivers to the Pacific coast, as well as in an eastward direction along the Pit River and on out into the northern Great Basin. Trade, rather than mass population movement, was undoubtedly the means of transmission of pine nut beads in prehistoric times. Since pine nut beads were so often associated with women and their apparel, the movement of women from tribe to tribe may have contributed to its appearance outside the core areas. An expanded trade in goods and the exchange of women through marriage that followed the introduction of the horse in northern California circa A.D. 1800 (Layton 1981) probably influenced some of the spread. Why pine nut trade to the south was inhibited is not as yet understood. It does not seem likely to have been due to competition with clam shell disc beads. Such beads were real money items and thus represented wealth as well as decoration. The best explanation for the limited spread seems to be related to time. The trait had not been around long enough to be accepted by many of the more southerly tribes.

NOTES

1. Jan Timbrook, Assistant Curator of Anthropology at the Santa Barbara Museum of Natural History, brought to my attention a string of beads made from the seeds of *P. lambertiana*. These beads were apparently collected by Lorenzo Yates in northern California in the late 19th century. The beads were created using two perforations on one side of the seed and stringing through them. Duncan (1964:29) stated that the Nisenan (Maidu) made beads of sugar pine seeds. This is the only ethnographic association for this trait of which I am aware.

2. *P. sabiniana* is most commonly known by the name "digger pine." Many people object to this name because of its pejorative connotation derived from the offensive form "digger Indian" (e.g., Hinton 1992:14-15). An alternative term "gray pine" has received increasingly general acceptance. Hinton (1992:15) suggested the use of names derived from the California Indian languages such as "Towani Pine" or "Nayo Pine;" however, these would show preference for the words of specific groups (Maidu and Wappo, in these cases) which would mean slighting numerous other names for these seeds found among other groups (cf. Farris 1982:67-68; Hinton 1992:14).

ACKNOWLEDGEMENTS

This paper derives from a chapter in my dissertation (Farris 1982:97-119) which has been updated and rewritten in light of more recent discoveries. A large number of helpful people have contributed over the years. Particular appreciation is extended to the late Marty Baumhoff, Jim Bennyhoff, the late Jim Dotta, Le Gilson, Leslie Hartzell, Richard Hughes, Jerry Johnson, Jim Johnston, Mark Kowta, Don Manuel, Elena Nilsson, Bill Olsen, Fritz Riddell, Eric Ritter, Pete Schulz, Charlie Slaymaker, Suzanne Sundholm, Jan Timbrook, Don Tuohy, Trudy Vaughan, Greg White, and Norm Wilson. Tammara Ekness-Hoyle did an excellent job on the figures. I particularly thank Richard Hughes, Jerry Johnson, India Fleming, and two anonymous reviewers for reading and commenting on various drafts of this paper. They really helped smooth the sometimes cumbersome logic and redundancies of the earlier manuscript. However, I certainly take responsibility for any errors still to be found.

REFERENCES

Barnett, H. G.
1939 Culture Element Distributions: VII Oregon Coast. University of California Anthropological Records 1(3).

Basgall, Mark E., and William R. Hildebrandt
1989 Prehistory of the Sacramento River Canyon, Shasta County, California., 2 vols. Davis: Center for Archaeological Research at Davis Publication 9.

Baumhoff, Martin A.
1955 Excavations of Site Teh-1 (Kingsley Cave). Berkeley: University of California Archaeological Survey Reports No. 33:40-72.

1957 An Introduction to Yana Archaeology. Berkeley: University of California Archaeological Survey Reports No. 40.

1958 California Athabaskan Groups. University of California Anthropological Records 16(5).

Bennyhoff, James A., and Albert B. Elsasser
MS Field Notes on Sis-262. MS No. 255, on file at the University of California Archaeological Research Facility, Berkeley.

Bennyhoff, James A., and Robert F. Heizer
1958 Cross-dating Great Basin Sites by California Shell Beads. Berkeley: University of California Archaeological Survey Reports No. 42:60-92.

Bennyhoff, James A., and Richard E. Hughes
1987 Shell Bead and Ornament Exchange Networks between California and the Western Great Basin. American Museum of Natural History Anthropological Papers 64(2).

Bennyhoff, J. A., A. B. Elsasser, and J. T. Davis
MSa Field Notes on Hum-182. MS No. 303, on file at the University of California Archaeological Research Facility, Berkeley.

Bennyhoff, James A., Pertti J. Pelto, and D. M. Pendergast
MSb Field Notes from Sha-52 (Fall River Mills, Callison Ranch). MS No. 185, on file at the University of California Archaeological Research Facility, Berkeley.

Berreman, Joel V.
1944 Chetco Archaeology: A Report on the Lone Ranch Creek Shell Mound on the Coast of Southern Oregon. Menasha, WI.: General Series in Anthropology No. 11.

Boyd, Donald
MS Report of Excavation at Sha-46, Shasta College, Redding. MS No. 220, on file at the University of California Archaeological Research Facility, Berkeley.

Brott, Clark
1981 Letter report Winfield Henn regarding the excavation of a burial from Sha-678. Report on file at Shasta-Trinity National Forest, Redding, CA.

Cressman, Luther S.
1933a Aboriginal Burials in Southwestern Oregon. American Anthropologist 35(1): 116-130.

1933b Contributions to the Archaeology of Oregon: Final Report on the Gold Hill

Burial Site. University of Oregon Publication, Studies in Anthropology Vol. 1, Bulletin 1.

Davis, James T.
1961 Trade Routes and Economic Exchange among the Indians of California. Berkeley: University of California Archaeological Survey Reports No. 54.

Dixon, Roland B.
1907 The Shasta. Bulletin of the American Museum of Natural History 17(5).

1908 Notes on the Achomawi and Atsugewi Indians of Northern California. American Anthropologist 10(2):208-220.

Dotta, James
1962 The Archaeology of Sha-237. Report on file at the Resource Protection Division, California Department of Parks and Recreation, Sacramento.

Dotta, James, and R. Hullinger
1964 The Salvage Archaeology of a Wintu Fishing Station, Sha-207, Shasta County, California. Report on file at the Resource Protection Division, California Department of Parks and Recreation, Sacramento.

Drucker, Philip
1937 The Tolowa and Their Southwest Oregon Kin. University of California Publications in American Archaeology and Ethnology 36(4).

DuBois, Cora A.
1935 Wintu Ethnography. University of California Publications in American Archaeology and Ethnology 36(1).

Duncan, John Winfield III
1964 Maidu Ethnobotany. Master's thesis, San Francisco State University.

Elsasser, Albert B., and James A. Bennyhoff
MS Notes on Teh-210. MS No. 435, on file at the University of California Archaeological Research Facility, Berkeley.

Elsasser, Albert B., and Robert F. Heizer
1966 Excavation of Two Northwestern California Coastal Sites. Berkeley: University of California Archaeological Survey Reports No. 67.

Farris, Glenn J.
1982 Aboriginal Use of Pine Nuts in California: An Ethnological, Nutritional, and Archaeological Investigation into the Uses of the Seeds of *Pinus lambertiana* Dougl. and *Pinus sabiniana* Dougl. by the Indians of Northern California. Ph.D. dissertation, University of California, Davis.

Fenenga, Franklin, and Francis A. Riddell
1949 Excavations at Tommy Tucker Cave, Lassen County, California. American Antiquity 14(3):203-213.

Foster, George M.
1944 A Summary of Yuki Culture. University of California Anthropological Records 5(3).

Fredrickson, David A., and Albert Mohr
MS Notes on Ker-1. MS No. 5, on file at the University of California Archaeological Research Facility, Berkeley.

Garth, Thomas R.
1953 Atsugewi Ethnography. University of California Anthropological Records 14(2).

Goddard, Pliny Earle
1903 Life and Culture of the Hupa. University of California Publications in American Archaeology and Ethnology 1(1).

Gould, Richard A.
1978 Tolowa. In: Handbook of North American Indians, Vol. 8, California, Robert F. Heizer, ed., pp. 128-136. Washington: Smithsonian Institution.

Griffin, James R., and William B. Critchfield
1976 The Distribution of Forest Trees in California. U.S. Forest Service Research Paper PSW-82/1972, reprinted with supplement. Berkeley: Pacific Southwest Forest and Range Experiment Station.

Hartzell, Leslie L.
1991 Archaeological Evidence for Stages of Manufacture of *Olivella* Shell Beads in California. Journal of California and Great Basin Anthropology 13(1):29-39.

Heflin, Eugene
1966 The Pistol River site of Southwest Oregon. Berkeley: University of California Archaeological Survey Reports No. 67: 151-206.

Heizer, Robert F.
1942 Massacre Lake Cave, Tule Lake Cave, and Shore Sites. In: Archaeological Researches in the Northern Great Basin. L. S. Cressman, ed., pp. 121-134. Carnegie Institute of Washington Publication 538.

Heïzer, Robert F., and Albert B. Elsasser
1964 Archaeology of Hum-67, the Gunther Island Site in Humboldt Bay, California. Berkeley: University of California Archaeological Survey Reports No. 62:4-122.

Heizer, Robert F., and Alex D. Krieger
1956 The Archaeology of Humboldt Cave, Churchill County, Nevada. University of California Publications in American Archaeology and Ethnology 47(1).

Hinton, Leanne
1992 A Pinenut by Any Other Name . . .. News from Native California 6(2):14-15.

Holt, Catharine
1946 Shasta Ethnography. University of California Anthropological Records 3(4).

Hudson, John W.
1975 Pomo Wampum Makers. In: Seven Early Accounts of the Pomo Indians and their Culture, R. F. Heizer, ed., pp. 9-20. Berkeley: University of California Archaeological Research Facility.

Hughes, Richard E.
1978 Aspects of Prehistoric Wiyot Exchange and Social Ranking. The Journal of California Anthropology 5(1):53-66.

Hughes, Richard E., and James A. Bennyhoff
1986 Early Trade. In: Handbook of North American Indians, Vol. 11, Great Basin, Warren L. d'Azevedo, ed., pp. 238-255. Washington: Smithsonian Institution.

Johnson, Jerald J.
1967 The Archeology of the Camanche Reservoir Locality, California. Sacramento Anthropological Society No. Paper 6.

1990 Excavations at Archeological Site CA-TEH-10, Cemetery 2: Black Butte Lake, Glenn and Tehama Counties, California. Report on file at the U.S. Army Corps of Engineers, Sacramento.

Johnson, Jerald J., Steven B. Dondero, and Clinton M. Blount
1989 Excavations at Archaeological Site CA-TEH-10, Cemetery 1: Black Butte Lake, Glenn and Tehama Counties, California. Report on file at the U.S. Army Corps of Engineers, Sacramento.

King, Chester A.
1978 Protohistoric and Historic Archaeology. In: Handbook of North American Indians, Vol. 8, California, Robert F. Heizer, ed., pp. 58-68. Washington: Smithsonian Institution.

1981 The Evolution of Chumash Society: A Comparative Study of Artifacts Used in Social System Maintenance in the Santa Barbara Channel Region Before A.D. 1804. Ph.D. dissertation, University of California, Davis.

King, Ronald F.
1990 Conceptual Units and the "Shasta Complex" of the Interior of Northern California. Paper presented at the annual meeting of the Society for American Archaeology, Las Vegas.

Kowta, Makoto
1980 A Late Prehistoric Mortuary Complex from Lake Almanor, Plumas County, California. Report on file at the Northeast Information Center, California State University, Chico.

1989 Summary Report of the 1987 Test Excavations at CA-Plu-716, Plumas National Forest, Plumas County, California. Report on file at the Northeast Information Center, California State University, Chico.

Kroeber, Alfred L.
1911 The Languages of the Coast of California North of San Francisco. University of California Publications in American Archaeology and Ethnology 9(3).

Latta, Frank F.
1977 Handbook of Yokuts Indians. Santa Cruz, CA: Bear State Books.

Layton, Thomas N.
1970 High Rock Archaeology: An Interpretation of the Prehistory of the Northwestern Great Basin. Ph.D. dissertation, Harvard University.

1981 Traders and Raiders: Aspects of Trans-Basin and California-Plateau Commerce, 1800-1830. Journal of California and Great Basin Anthropology 3(1):127-137.

Leatherman, K. E., and Alex D. Krieger
1940 Contributions to Oregon Coast Prehistory. American Antiquity 6(1):19-28.

Loud, Llewellyn L.
1918 The Ethnogeography and Archaeology of the Wiyot Territory. University of California Publications in American Archaeology and Ethnology 14(3).

Meighan, Clement W.
1955 Archaeology of the North Coast Ranges, California. Berkeley: University of California Archaeological Survey Reports No. 29:1-30.

Merriam, C. Hart
1957 Wintoon Indians. Berkeley: University of California Archaeological Survey Reports No. 38:40-43.

Motz, Lee, Eric W. Ritter, and James Rock
1986 Glass Trade Beads from Two Shasta Sites in Siskiyou County, California. Journal of California and Great Basin Anthropology 8(1):116-128.

Nomland, Gladys A.
1938 Bear River Ethnography. University of California Anthropological Records 2(2).

Powers, Stephen
1877 Tribes of California. Contributions to North American Ethnology 3. Washington: U. S. Geographical and Geological Survey of the Rocky Mountain Region.

Riddell, Francis A.
1956 Final Report on the Archaeology of Tommy Tucker Cave. Berkeley: University of California Archaeological Survey Reports No. 35:1-25.

1978 Maidu and Konkow. In: Handbook of North American Indians, Vol. 8, California, Robert F. Heizer, ed., pp. 370-386. Washington: Smithsonian Institution.

Robinson, Eugene
1964 A House Floor in Napa County, California. Archeological Reports 10 (Part 2):40-63. Sacramento: California State Division of Beaches and Parks.

Sampson, C. Garth
1985 Nightfire Island: Later Holocene Lakemarsh Adaptation on the Western Edge of the Great Basin. University of Oregon Anthropological Papers No. 33.

Sapir, Edward
1910 Yana Texts. University of California Publications in American Archaeology and Ethnology 9(1).

Sapir, Edward, and Leslie Spier
1943 Notes on the Culture of the Yana. University of California Anthropological Records 3(3).

Schenck, Sara M., and Edward W. Gifford
1952 Karok Ethnobotany. University of California Anthropological Records 13(6).

Smith, Clarence E., and W. D. Weymouth
1952 Archaeology of the Shasta Dam Area, California. Berkeley: University of California Archaeological Survey Reports No. 18:1-46.

Spaulding, W. Geoffrey
1984 Archeobotanical and Paleoecological Investigations at Archeological Sites in the New Melones Reservoir Area, Calaveras and Tuolumne Counties, California. In: New Melones Archeological Project, California: Indian Sites 04-CAL-S-286, 04-CAL-S-347, and 04-CAL-S- 461, Vol. 4, Part 3, pp. 973-1047, by Michael J. Mor-atto, Marcus R. Arguelles, Susan K. Goldberg, Steven O'Brien, Lynn Riley, and William L. Singleton. Report on file at the Central California Archaeological Information Center, California State University, Stanislaus.

Stewart, Omer C.
1941 Culture Element Distributions. XIV Northern Paiute. University of California Anthropological Records 4(3).

Treganza, Adan E.
1954 Salvage Archaeology in the Nimbus and Redbank Reservoir Areas, Central California. Berkeley: University of California Archaeological Survey Reports No. 26.

Treganza, Adan E., and Martin H. Heicksen
1960 Salvage Archaeology in the Whiskeytown Reservoir Area and the Wintu Pumping Plant, Shasta County, California. San Francisco State College, Occasional Papers in Anthropology No. 1.

Treganza, Adan E., C. E. Smith, and W. D. Weymouth
1950 An Archaeological Survey of the Yuki Area. University of California Anthropological Records 12(3).

Tuohy, Donald R.
1980 Obsidian Hydration Dates for Western Great Basin Prehistory. In: Anthropological Papers in Memory of Earl H. Swanson, Jr., Lucille B. Harten, Claude N. Warren, and Donald R. Tuohy, eds., pp. 48-66. Pocatello: Idaho Museum of Natural History.

Voegelin, Erminie W.
1938 Tubatulabal Ethnography. University of California Anthropological Records 2(1).

Wallace, William J., and Edith S. Taylor
1952 Excavation of Sis-13, a Rockshelter in Siskiyou County, California. Berkeley: University of California Archaeological Survey Reports No. 15:13-39.

White, Greg
1991 New Finds on the Mendocino County Coast. Society for California Archaeology Newsletter 25(1):1, 16-20.

Wilson, Norman L., and Arlean H. Towne
1978 Nisenan. In: Handbook of North American Indians, Vol. 8, California, Robert F. Heizer, ed., pp. 387-397. Washington: Smithsonian Institution.