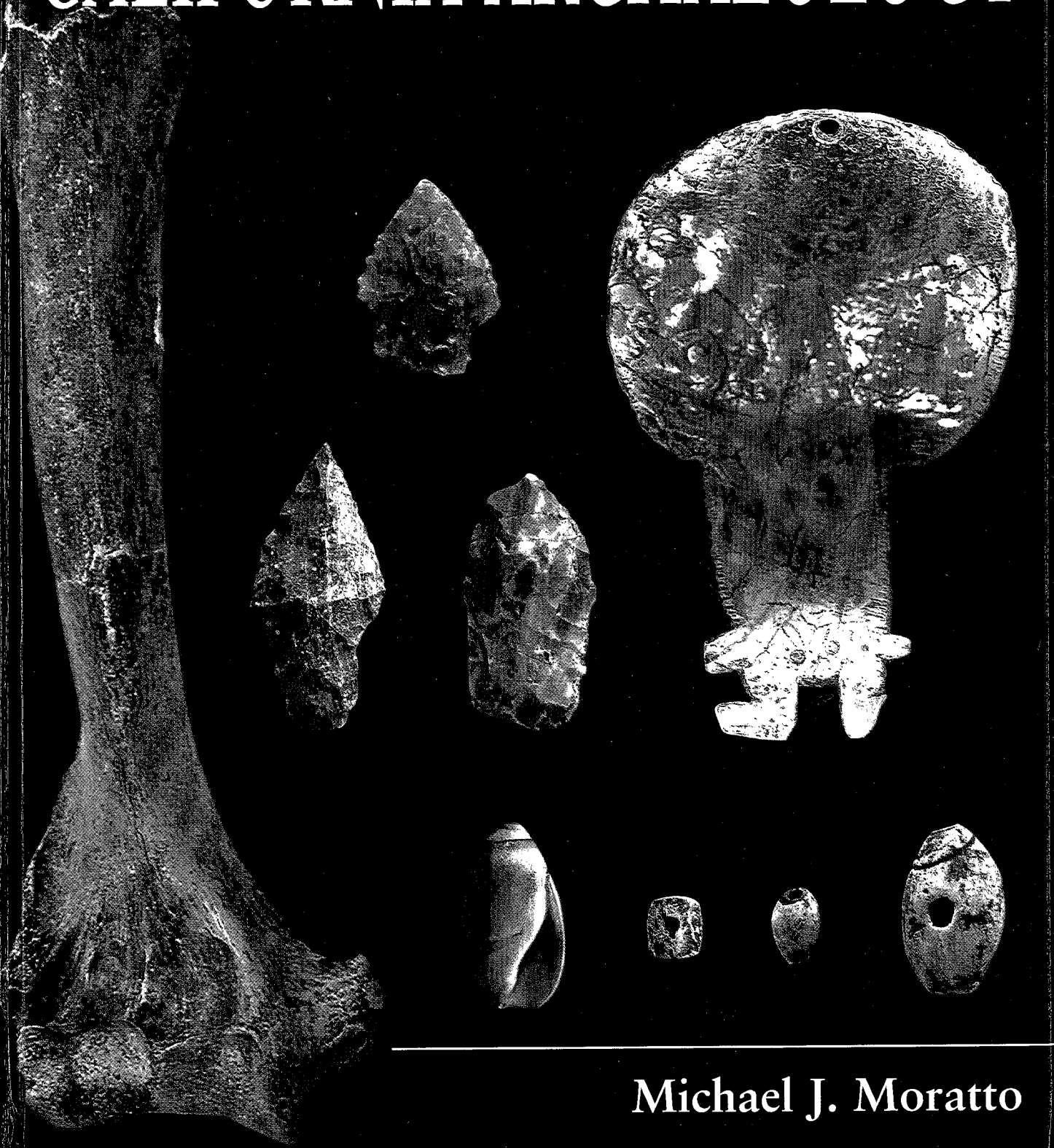
CALIFORNIA ARCHAEOLOGY



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CALIFORNIA ARCHAEOLOGY

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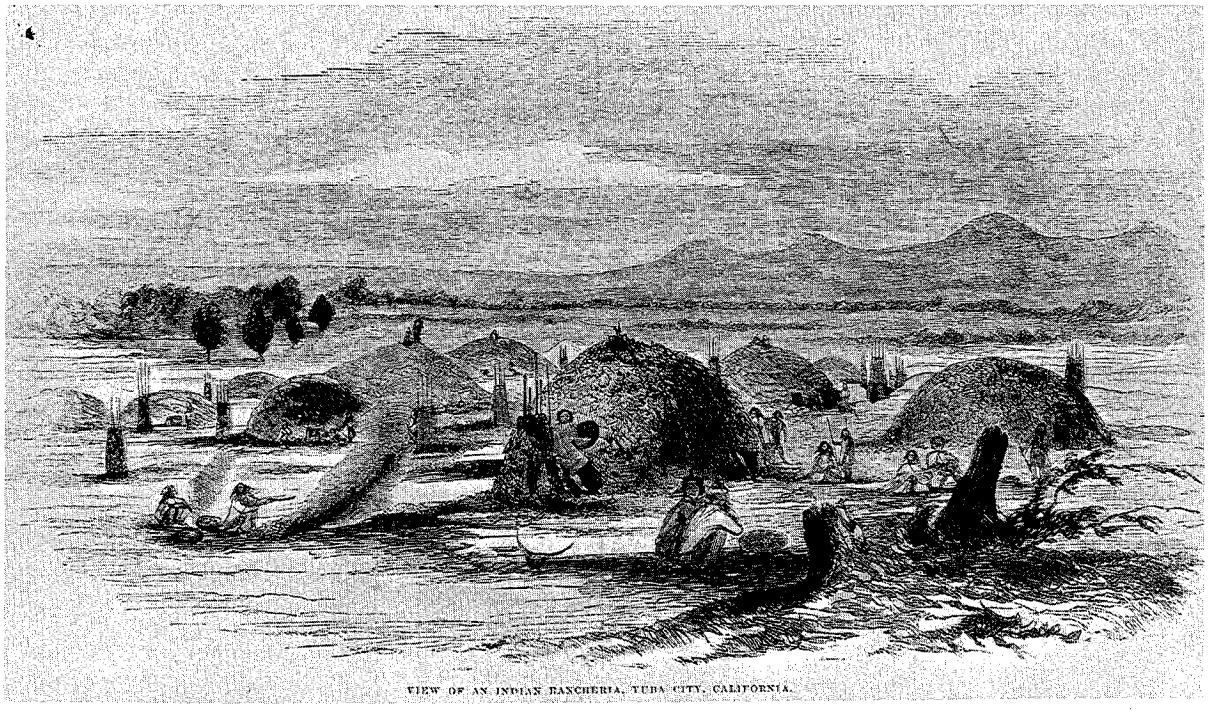
5. The Central Valley Region

> The banks of the Sacramento and San Joaquin, and the numerous tributaries of these rivers, and the Tule Lake (i.e., Tulare Lake), were at this time studded with Indian villages of from one to twelve hundred inhabitants each. The population of this extensive valley was so great that it caused surprise, and required a close investigation into the nature of a country that without cultivation, could afford the means of subsistence to so great a community, and who were such indifferent hunters.
>
> *(Trapper 1832, in Cook 1955b:319)*



VIEW OF AN INDIAN RANCHERIA, TUBA CITY, CALIFORNIA.

(Courtesy of the R. H. Lowie Museum of Anthropology, University of California, Berkeley.)

most parts of central California. The assemblage from the Maltby site (CCo-250) at the western end of Suisun Bay (Figure 6.4) was taken as evidence that the Carquinez Strait–San Francisco Bay region did not receive cultural stimuli directly from the Valley, and that when influences did reach the Bay "they were few in number and met a conservative, established culture which was developing along its own individual lines" (Lillard *et al.* 1939:61). The Delta sequence and its place in central California archaeology are discussed more fully later in this chapter.

The Central California Taxonomic System

In his landmark study, *Temporal and Areal Relationships in Central California Archaeology*, Richard Beardsley (1954) refined the Delta sequence and extended it to include the prehistory of the San Francisco Bay region. The result was the Central California Taxonomic System (CCTS), which inherently assumed that a basically uniform cultural succession had developed in central California from the coast to the interior. Beardsley's monograph introduced into the California literature several concepts that University of California archaeologists had adapted prior to 1946 from the Midwestern Taxonomic Method (McKern 1939). The term *component* was used to designate an archaeological record of occupation at a single site during a brief interval of time. A group of closely related components made up a *facies*, and related facies comprised a *province*. The province thus entailed both geographic and cultural significance. *Horizons* were seen as broad cultural units that could be arranged in a temporal sequence. Lastly, *zones* were set apart as geographic entities that separated coastal and Central Valley areas (Figure 5.6) (Beardsley 1954).

Central California Horizons

Beginning in 1936, a series of papers defined with increasing precision the Delta sequence of cultural horizons (Lillard and Purves 1936; Heizer and Fenenga 1939; Lillard *et al.* 1939). Detailed studies of the Early Horizon appeared subsequently (Heizer 1949, 1974b; Ragir 1972), but comparable treatments of the Middle and Late Horizons never materialized. The cited works identified the central California horizons as follows:

1. *Early Horizon:* (1) known sites predominantly in the Delta locality; (2) ventral or occasional dorsal extension of burials (Figure 5.13) with westerly orientation (Figure 5.14), and very rare cremations; (3) high frequency (≈85%) of graves with artifacts, often (≈26%) with quartz crys-

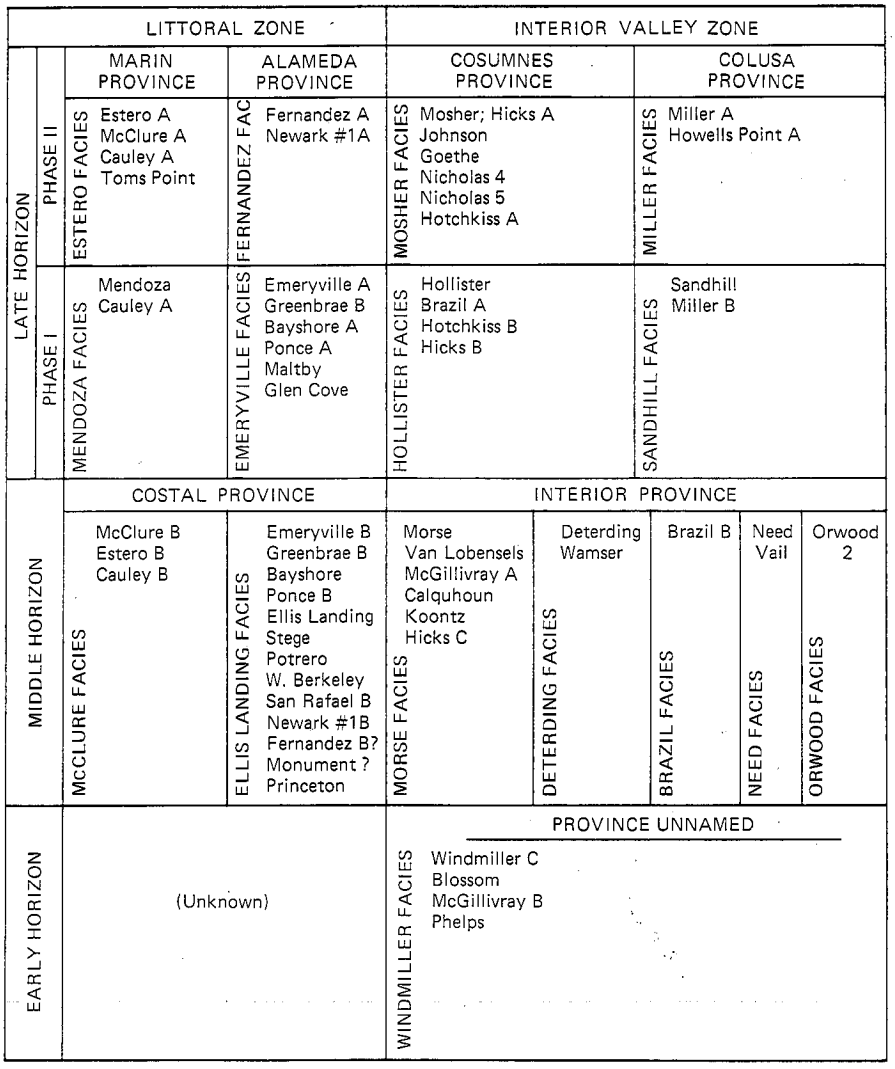


Figure 5.6 Cultural sequences in central California archaeology. (After Beardsley 1954.)

tals and sometimes (≈11%) with red ochre; (4) *Olivella* beads of Types A1a and L; (5) rectangular *Haliotis* beads; (6) perforate, often edge-incised *Haliotis* ornaments in geometric shapes, some with asphaltum and bead appliqué; (7) perforate biotite, canid teeth, and turtle-carapace ornaments, and slate pendants; (8) well-made charmstones, typically perforate, of amphibolite schist, granite, and translucent alabaster in spindle, biconical, phallic, and other forms; (9) thick, conical smoking pipes of stone; (10) heavy stemmed and foliate projectile points, usually (≈60%) of non-obsidian materials, and inferred use of the atlatl; (11) a paucity of bone

artifacts, though cannon bone "daggers," flattened matting needles, spatulae, and beveled-base pins may be distinctive; (12) hand-molded baked-clay objects, especially net weights; (13) infrequent mortars, pestles, millingstones, and manos; and (14) inferred hunting and fishing, but apparently little dependence on acorns or hard seeds (Figure 5.12).

2. *Middle Horizon:* (1) sites found throughout the mid-Central Valley; (2) tightly flexed burials of variable orientation are normal, but ≈5% of the dead are cremated; (3) nearly all cremations, but only ≈40% of the primary inhumations have funerary artifacts, while red ochre stains and stone cairns are common in graves; (4) *Olivella* beads of Types C1, F, and G; (5) circular and subrectangular *Haliotis* beads; (6) abundant *Haliotis* ornaments of varied geometric shapes, frequently made of *H. cracherodii* rather than *H. rufescens* shell; (7) perforate canid teeth and bear claws; (8) distinctive "fishtail" and asymmetrical spindle-shaped imperforate charmstones, sometimes with asphaltum and cord impressions at the neck; (9) cobble mortars and evidence of wooden mortars in the form of chisel-ended pestles; (10) an extensive bone industry of flakers, bipoints, basketry awls, spatulae, fish spear tips, saws, etc.; (11) large, heavy projectile points, often of nonobsidian lithics, with foliate and lanceolate concave-base types predominating, and inferred use of the atlatl; (12) much evidence of violent death, such as disarticulated skeletons and weapon points imbedded in >5% of the skeletons; (13) baked-clay objects; and (14) a diversified subsistence with inferred hunting, fowling, fishing, and seed processing (Figure 5.16).

3. *Late Horizon:* (1) sites distributed throughout central California with influence extending into adjacent areas; (2) various types of primary burial, often in flexed positions, and cremations; also pre-interment burning of basketry and other artifacts; funerary red ochre less common than before and found in lumps rather than as powder in graves; (3) abundance of baked-clay artifacts; (4) *Olivella* beads of Types E and M; (5) elaboration and proliferation of *Haliotis* ornaments with "banjo" (dancer effigy?), trapezoidal, and triangular shapes; (6) magnesite disk beads and drilled cylinders; (7) clamshell disk beads; (8) flanged, tubular smoking pipes of schist and steatite; (9) small, side-notched obsidian points, locally with deep angular serrations; (10) bow and arrow inferred from small points and arrow-shaft smoothers and straighteners; (11) shaped, flat-bottomed mortars and cylindrical pestles; (12) bird bone tubes with incised geometric designs; (13) items of non-Indian origin late in the sequence; and (14) subsistence focus on gathering acorns and other plant foods, as well as hunting, fowling, and fishing (Figure 5.17).

Chronology

Efforts to date the central California sequence have been fraught with problems. Ten years before radiocarbon dating was available, Heizer and

seems clear that central California prehistory was far too complex and dynamic to have been represented by a monolithic scheme such as the CCTS.

Central California Patterns

Recent years have seen the emergence of archaeological sequences for many localities in central California. For example, J. Bennyhoff has divided this area into a number of geographic *districts* (Diablo, Colusa, Cosumnes, etc.) and defined for each a succession of cultural phases (Bennyhoff 1972, cited in Elsasser 1978b:38–44). However, the current emphasis on local developments does not mean that regional or areal models have been abandoned. One such model, formulated by D. Fredrickson in collaboration with J. Bennyhoff, advances the concept of *pattern* as an integrative cultural unit without temporal implications:

> A pattern is an adaptive mode extending across one or more regions, characterized by particular technological skills and devices, particular economic modes, including participation in trade networks and practices surrounding wealth, and by particular mortuary and ceremonial practices. (Fredrickson 1973:7–8)

As a general way of life shared by peoples within a defined geographic space, the pattern is the unit most readily perceived in the archaeological record. The smaller units of *aspect* and *phase* are detectable only through detailed analysis of the pattern. Thus, "a pattern is defined in terms of generalized forms and types, whereas aspects and phases are defined in terms of certain distinctive features which characterize these general forms and types" (Fredrickson 1973:124). Fredrickson has defined several patterns, of which Windmiller, Berkeley, and Augustine are especially relevant to Central Valley prehistory.

Windmiller Pattern

To infer from the fairly common mortar fragments in at least some Windmiller sites, the grinding of acorns and/or other seeds was relatively important. Enormous numbers of baked-clay balls may have substituted for rocks in basket cooking of acorn mush and other foods by "stone" boiling. Large quantities of projectile points along with faunal remains indicate that deer, elk, pronghorn, rabbits, and waterfowl were hunted in quantity. Fishing is attested not only by the remains of sturgeon, salmon, and smaller fishes, but also by a unique trident fish spear, two types of angling hooks, and pecan-shaped objects of baked clay thought to have been fishline sinkers (Heizer 1949; Ragir 1972).

As for Windmiller technical skills, flaked- and ground-stone industries are well represented. Especially notable are ground and polished charmstones of alabaster, marble, diorite, and other rocks (Figure 5.12). In the extensive inventory of baked-clay artifacts are vessels, disks, sinkers, and cooking "stones." Twined basketry is known from impressions on baked clay. Work in shell, including *Haliotis* ornaments, *Olivella* beads, and shell bead appliqué, is well developed. The minimal bone industry consists mainly of awls, needles, and flakers (Fredrickson 1973; Ragir 1972).

Trade seems to have been focused upon acquiring utility goods as well as ornamental and ceremonial objects, many of which apparently were obtained as finished items rather than as raw material. Windmiller groups in the Delta acquired (1) obsidian or finished obsidian artifacts from no fewer than two Coast Range quarries and three trans-Sierran sources; (2) *Haliotis* and *Olivella* shells and ornaments from the coast; (3) asphaltum from an undetermined source; (4) quartz crystals and alabaster from the Sierra foothills; and (5) many other exotic materials (Heizer 1949, 1974b; Ragir 1972). This implies that California was already settled extensively by 4000 years ago, and that the Windmiller Pattern was effectively integrated into the economic matrix of that time.

In the Delta locality, Windmiller burial of the dead occurred both in village grave plots and in cemeteries separate from the habitation sites. The ceremonial aspects of the mortuary complex are reflected by red ochre in graves and by funerary artifacts with ≈85% of all burials. Skeletons are most often extended ventrally and oriented toward the west, although westerly oriented dorsal extensions are also common. Flexed burials, nonwesterly orientation, and cremations occur infrequently (Fredrickson 1973; Ragir 1972).

It is significant that nearly all Windmiller burials were oriented toward the west (Figure 5.13). P. D. Schulz (1970) determined that in four Windmiller sites the predominance of orientations fell between 223° and 282° (magnetic), which are, respectively, the positions of the sun at the winter and summer solstices. Assuming that the burial orientation was toward the setting sun, the body positions would indicate that ≈80% of the deaths occurred in the winter. The highest frequency of burials at all sites is oriented toward 240°, which corresponds either to mid-February or to October–November (Figure 5.14).

Further assuming that the Windmiller economy was focused on hunting rather than gathering storable seeds (and particularly acorns), Schulz (1970) proposed that, in lean years, episodes of near-starvation may have combined with disease to decimate Valley populations. Supporting this hypothesis are human remains that seem to show evidence of recurrent starvation among Windmiller children (McHenry 1968). Skeletal analysis revealed that Harris lines—thought to result from disease or trauma—

and referred to by Gaumer (1968) as the Emery Tradition (Fredrickson 1973:125a). Initially a San Francisco Bay region development, the Berkeley Pattern later spread to surrounding coastal and interior areas of central California. The shift to the Berkeley Pattern in many places was not an abrupt or total cultural replacement, but rather a gradual yet significant change in economic emphasis and particular material traits. Although the inception of the Berkeley Pattern does not seem to be the result of a separate migration into California, its appearance in some places may signal local population movements (see Chapter 11).

Because the Berkeley Pattern is discussed at length in Chapter 6, only a brief synopsis is given here. Berkeley Pattern subsistence activities focused upon acorns as a dietary staple. Technologically, the Berkeley Pattern is set apart from Windmiller by relatively more mortars and pes-

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Figure 5.16 Berkeley Pattern ("Middle Horizon"), Cosumnes District: Significant artifact types and temporal changes, from Lobensels ("Early–Middle Horizon transition facies") to Need (Late–Middle Horizon) facies. Drawings not to scale. Position of specimens shown within facies has no chronological significance. Bead typology from Lillard *et al.* (1939). B, basalt; C, *Haliotis cracherodii*; Ch, chert; E, trait persists from "Early Horizon"; F, "fishtail" charmstone; L, trait persists into "Late Horizon"; R, *Haliotis rufescens*; U, *Haliotis*, sp. unidentified. 1–14, *Olivella* beads: 1, modified "saddle," Type 3b2; 2, split-drilled, Type 3b1; 3, small "saucer," Type 3c; 4, small modified "saddle," Type 3b2; 5, full "saddle," Type 3b; 6, round "saddle," Type 3b; 7, ring, Type 3c2; 8, large "saucer," Type 3c; 9, small "saucer," Type 3c; 10, "beveled" bead (arrow points to bevel), Type 3b1; 11, oval "saddle," Type 3b; 12, diagonal spire-lopped, Type 1c; 13, thick-shelved rectangle, Type 2b; 14, spire-lopped, Types 1a, 1b. 15, *Macoma* disk bead. 16–21, *Haliotis* beads: 16, large, amorphous, Type H4; 17, small amorphous, Type H4; 18, nacreous disk, Type H3; 19, large disk, Type H3; 20, small disk, Type H3; 21, square, Type H1a. 22, Steatite "claw" pendant. 23, Steatite ring. 24, Steatite lenticular disk bead. 25. Steatite "hourglass" earspool. 26, Steatite flat disk bead. 27,28, Flat slate pendants. 29, Cylindrical slate pendants. 30, Flat slate pendant. 31, Biotite ornament. 32–36, *Haliotis* pendants. 37–39, Bone pendants. 40, Canid tooth pendants. 41–45, Deer tibia and antler spatulae. 46, Cremation. 47, Flexed burial, all orientations. 48, Burial, ventral, semiextended, all orientations. 49, Burial, ventral, extended, all orientations. 50, Burial, tight flexure (most distinctive of "Middle Horizon," though other positions, including rare extension, also occur), all orientations. 51, Cremation (rare, none for Brazil Facies). 52, Mammal tibia "wand." 53, Split rib strigil (Type 1). 54, Whole rib strigil (Type 2). 55, Flat bone strigil (Type 3). 56, Bone dice. 57, Bird-bone whistle, central stop. 58, Bird-bone whistle, end stop. 59, Mammal-bone whistle, central stop. 60, Steatite perforated cup ("cloud blower"?). 61, Flat stone bars. 62–65, Charmstones. 66–76, Chipped-stone artifacts: 66–69, probably spear points (note careful diagonal flaking, on 68, 69, to left); 70, knife designed for hafting; 71, bipointed knife (occurs in all facies but most common in Lobensels); 72, leaf-shaped knife; 73–76, dart points. 77, Antler-tine flaker. 78–81, Atlatl spurs (?) of bone. 82, Barbed-bone fish spear. 83–85, Unbarbed-bone fish spears (?). 86, Bone gorge hook. 87, Bone mesh gauge. 88, Cannon-bone awl, pointed distally. 89, Ground-bone awl. 90, Bone splinter awl. 91, Bone needle. 92, Socketed antler handle. 93, Antler wedge (rare). 94, *Margaritifera* spoon, perforated. 95,96, Flat slab pestle for use with wooden mortar. 97, Cylindrical bipointed pestle for use with wooden mortars. 98, Pitted bipointed pestle. 99, Wooden mortar. (After Elsasser 1978b: Figure 4; chart by J. A. Bennyhoff, 1972; courtesy of A. B. Elsasser, J. A. Bennyhoff, and the Smithsonian Institution.)

tles, a well-developed bone industry, distinctive diagonal flaking of large concave-base points, and certain forms of *Olivella* and *Haliotis* (especially *H. cracherodii*) beads and ornaments (Figure 5.16). Berkeley peoples normally interred their dead in flexed positions with variable orientations and fewer grave goods than are found with Windmiller burials. A small proportion of cremations with funerary artifacts may identify high-status individuals.

Berkeley Pattern assemblages appear in the lower Sacramento Valley soon after circa 500 B.C. It is proposed that the Berkeley components at such sites as Sac-6, Sac-142, Sac-34, and Sac-145 (Figure 6.4) may represent the arrival and spread of the ancestral Plains Miwok in the Cosumnes District (i.e., the area of the lower Cosumnes, Mokelumne, and Sacramento rivers) from a Proto-Miwok homeland in the Bay region. Radiocarbon dates bracket this spread between circa 500 and 0 B.C. (Figures 5.11 and 6.16). The ancient Plains or Bay Miwok probably also held the area north of Suisun Bay during this interval, later relinquishing this territory to the Patwin (Bennyhoff 1977b).

In the Stockton District farther south, the Berkeley Pattern is less evident. Instead, the Windmiller Pattern evidently continued much longer than in the Cosumnes District. One relatively late Windmiller settlement was at French Camp Slough (SJo-91) near Stockton, where J. Johnson in 1970 and 1971 rescued materials jeopardized by a construction project. Radiocarbon dates place the initial occupation of SJo-91 at circa 1000 B.C. The subsistence economy at this site was based upon the use of slough resources: Sacramento perch and squaw fish, freshwater clams, tules, and ducks and geese, along with deer, elk, and acorns from higher ground (J. Johnson 1971b:6).

At SJo-91 Johnson found two cemeteries in a dark midden deposit. One cemetery, with a ^{14}C date of circa A.D. 630 ± 100, contained about 60 burials but only three artifacts. The other, dated between 984 ± 60 B.C. and A.D. 105 ± 190, yielded 115 extended burials in ventral positions with red ochre and abundant artifacts (large stemmed and concave-base points, bone pins and spatulae, *Haliotis* ornaments, pestles and other groundstone items) in the graves. Some skeletons were found to have been wrapped and buried in tule mats; others had remains of headdresses; and at the feet of one burial were bits of twined fabric, presumably remnants of sandals. Relative wealth or poverty of graves may indicate status differentiation. The survival of perishable items at SJo-91 was remarkable, "and in some cases the actual mold of the bodies was preserved. Had this been recognized early in the investigation some of them could have been filled with plaster, such as many of the body molds at Pompeii had been, and the actual physical appearance of the individuals might have been recovered" (J. Johnson 1971b:5).

SJo-91 might have been an early Yokuts settlement, or perhaps the

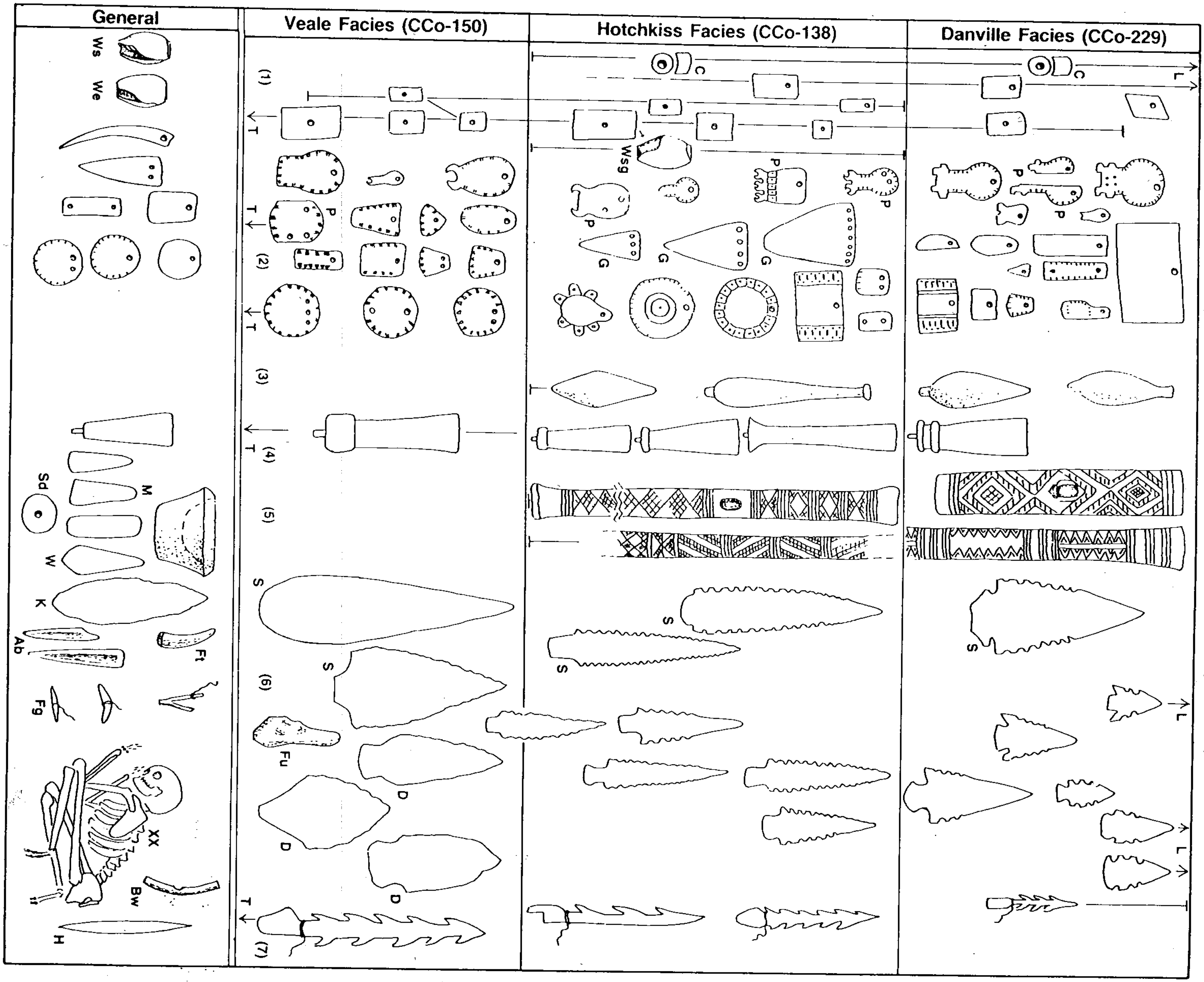
residents of this community spoke a Utian language derived from the speech of earlier Windmiller populations. In any event, similarities between the French Camp Slough assemblage and components of the Chowchilla Phase (see Chapter 7) to the southeast argue for cultural unity from the Stockton District to the south-central Sierran foothills during some interval between circa 1000 B.C. and A.D. 500. James Bennyhoff, who first called attention to the *in situ* continuity of archaeological developments in the Cosumnes, Diablo, and Stockton districts over a span of 2000 years or more, relates these district sequences to the emergence of the Plains Miwok, Bay Miwok, and Northern Valley Yokuts, respectively (Bennyhoff and Fredrickson 1969, cited in Fredrickson 1973:66–68).

The cultural distinctiveness of the Stockton District (as well as that of the Colusa District and others) shows that the Berkeley Pattern did not spread uniformly throughout central California. Rather, the Berkeley Pattern seems best explicated as the archaeological record of Utian (Miwok–Costanoan) cultural developments in the San Francisco Bay Region after circa 1500 B.C. (see Chapter 6) and the subsequent spread of Miwok groups from the Bay northward to Clear Lake and eastward, across the mid–Central Valley, to the Sierra Nevada. Berkeley traits ultimately came to be distributed over a wide geographic area, but the pattern seems most closely linked to the "Utian radiation" (see Chapters 6 and 11).

Augustine Pattern

As defined by Fredrickson (1973), this widespread central California pattern includes cultures previously assigned to the "Late Horizon" (or "Hotchkiss Culture"; see Ragir 1972). The Augustine Pattern is distinguished by intensive fishing, hunting, and gathering (especially of acorns); large, dense populations; highly developed exchange systems; social stratification, as indicated by considerable variability in grave furnishings; elaborate ceremonialism; and the mortuary practices of cremation (often reserved for high-status persons) and preinterment grave-pit burning of artifacts, coupled with flexed burial. Technologically, the Augustine Pattern exhibits shaped mortars and pestles, bone awls for making coiled baskets, and the bow and arrow (Fredrickson 1973:127–129). Pottery is also found in some parts of the Central Valley (Figure 5.17). The Augustine Pattern represents both local innovation and the blending of new traits with those of the older Berkeley Pattern.

An important stimulus to the Augustine Pattern was the southward expansion of Wintuan peoples in the Sacramento Valley, identified archaeologically by preinterment burning, harpoons, flanged tubular pipes, and arrows tipped with Gunther Barbed points. The later elaboration of


General
Veale Facies (CCo-150)
Hotchkiss Facies (CCo-138)
Danville Facies (CCo-229)
Ws
We
Sd
M
W
K
Ab
Ft
Fg
XX
Bw
H
(1)
(2)
(3)
(4)
(5)
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T
P
S
D
Fu
C
L
Wsg
G

the Augustine Pattern—beginning circa A.D. 1400 and witnessed by a proliferation of settlements, intensification of trade, general use of clamshell disk beads as money, and new levels of social and political complexity—is seen not as the result of additional immigration, but as a product of growth and increased contacts among resident populations, fostered by improved environmental conditions.

An important Augustine Pattern settlement in the Cosumnes District was located at the Blodgett site (Sac-267) near Sloughhouse (Figure 6.4). Excavations by J. Johnson revealed two prehistoric components, ^{14}C-dated at A.D. 580 ± 90 and A.D. 1605 ± 145. The earlier of these exhibits flexed burials with few accompaniments, rectangular *Olivella* beads, and Gunther Barbed arrow points (see Figures 10.5B and 10.7E). The later (Plains Miwok?) component is recognized by various triangular arrow points, clamshell and steatite disk beads, magnesite cylinders, *Olivella* disk beads, and pottery.

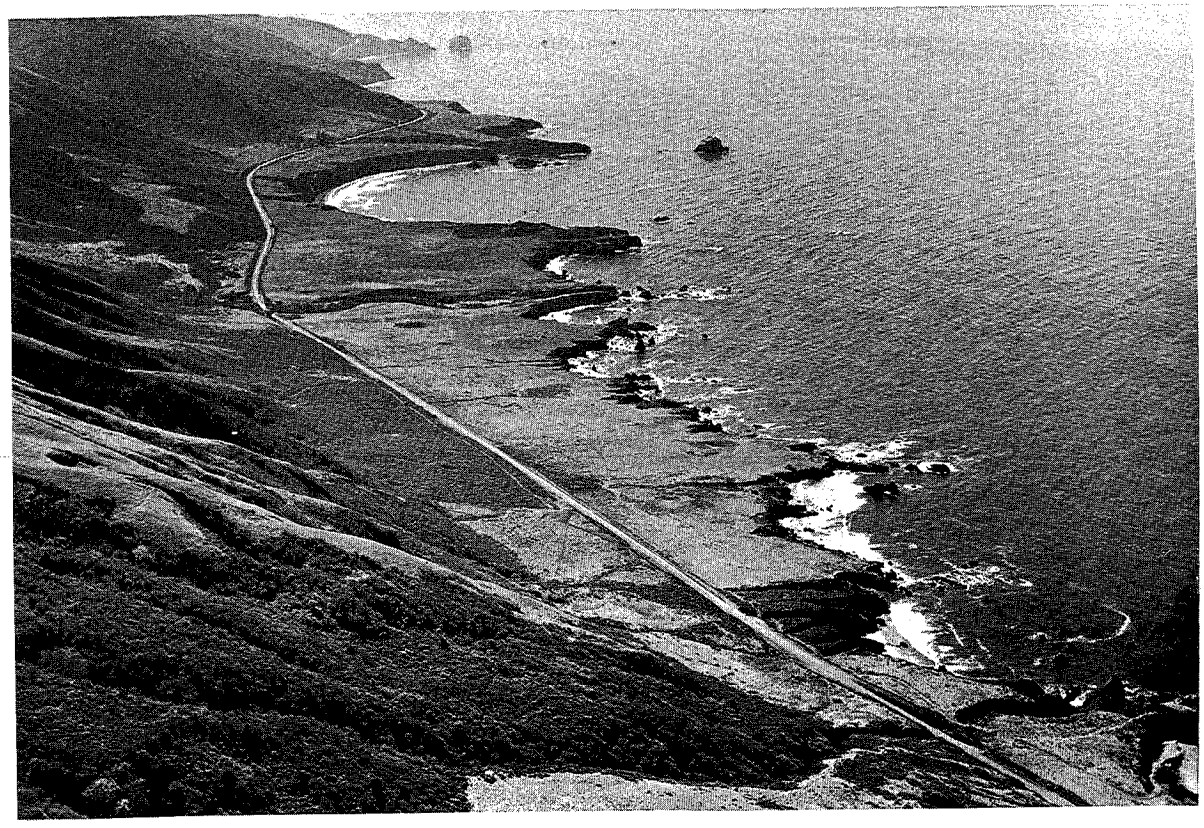
A surprising discovery at Sac-267 was a well-defined pottery-making technology. Large quantities of rolled, coiled, and pinched clay, along with finished rim and body sherds, allowed Johnson (ed. 1976) to define a Cosumnes Brown Ware. Similar pottery now has been identified at Sac-56, -67, -113, and -265, all within 25 km of Sac-267. The Brown Ware pottery is thought to be related to the extensive baked-clay industry (net sinkers, pipes, discoids, cooking "stones," etc.) already well known in the lower Sacramento Valley. Johnson concluded that "the Plains Miwok were making a Brown Ware type of pottery throughout the lower Cosumnes area and that previous investigators may have missed the coiled clay fragments and sherds because they often did not use screens and they did not wetscreen the material before sorting" (1976:371).

Finally, Johnson (ed. 1976:336) sees the Gunther Barbed points at

Figure 5.17 Augustine Pattern ("Late Horizon"), Diablo District: Significant artifact types and temporal changes. Drawings not to scale. Except for projectile points, position of specimens within subphases has no significance. Approximate order of artifacts represented, from left to right: 1, *Olivella* beads; 2, *Haliotis* ornaments (note that first appearance of heavy incision on many ornaments is in "Middle–Late Horizon Transition"); 3, charmstones; 4, stone pipes; 5, decorated-bone ear tubes and whistles; 6, stone projectile points; 7, bone harpoons. Legend: Ab, bone awls; Bw, bone whistles; C, "cupped" *Olivella* beads; D, dart point (undesignated points are presumed arrow points); Fg, fishhook or gorges of wood (top), shell, and bone (bottom); Ft, antler tine flaker; Fu, bone (ulna) flaker; G, ornaments worn as girdle; H, bone hairpin; K, stone knife; L, trait carries over to "Phase 2, Late Horizon;" M, stone mortar and pestles; P, ornaments usually found paired in mirror image; S, spear point; Sd, stone discoidal, perforated; T, trait appears for first time in "Transition Phase," between "Middle" and "Late Horizons;" W, stone pestle for use in wooden mortars; We, whole end-ground *Olivella* bead; Ws, whole spire-ground *Olivella* bead; Wsg, whole side-ground *Olivella* bead; XX, flexed burial position (27% grave pit burning; 32% have northwest orientation). (After Elsasser 1978b:Figure 6; chart by J. A. Bennyhoff, 1972; courtesy of A. B. Elsasser, J. A. Bennyhoff, and the Smithsonian Institution.)

6. San Francisco Bay and Central Coast Regions

This is certainly a fine harbour: It presents on sight a beautiful fitness, and it has no lack of good drinking water and plenty of firewood and ballast. Its climate, though cold, is altogether healthful and it is free from such troublesome daily fogs as there are at Monterey, since these scarcely come to its mouth and inside there are very clear days. To these many good things is added the best of all: The heathens all around this harbour are always so friendly and so docile that I had Indians aboard several times with great pleasure, and the crew as often visited them on land.
Ayala (1775)



(Photograph by John S. Shelton.)

1970, midden sites dated to circa 1000–2000 B.C. comprised the oldest recognized evidence of occupation in the Bay region, and almost nothing was known of early prehistory on the Central Coast. Now it is known that these parts of west-central California were inhabited in early Holocene times. Even older archaeological traces may exist on the submerged continental shelf or below the waters and sediments of San Francisco Bay (Figure 6.2).

Radiocarbon-dated components at SCl-178 near San José and SCr-177 in Scotts Valley attest to cultural activity at circa 8000 B.C. in the area between San Francisco and Monterey bays (Table 6.3 and Figure 6.13). The lower, subdune deposit at SCr-7 may be of comparable antiquity. At present, little else can be said about these early components: SCr-177, although partly destroyed, is still being investigated; the materials from SCl-178 have not yet been published; and SCr-7 has never been excavated by archaeologists.

Bay and Coast prehistory between circa 5000 and 2000 B.C. is better documented. A dozen or more ^{14}C-dated archaeological discoveries confirm occupation during this period in areas of the north Bay (lower Mrn-17), east Bay (CCo-308C), Santa Clara Valley (SCl-64, -106), west Bay (BART, Stanford, and Sunnyvale sites), Santa Cruz coast (SCr-7 dune), and Monterey Bay (Mnt-228, -254, -414, -834, and -838). Data from these sites indicate that widespread but relatively sparse populations of hunter–gatherers lived in the Bay and Coast regions before 2000 B.C. The locations of their settlements, in hill country as well as on bay and ocean shores, are marked by earth or sand deposits with significantly less shell than is found in later middens. Shellfish were collected, but this was not a major subsistence activity. Large projectile points and millingstones show that both hunting and vegetal food processing were important. Semisedentism, a foraging subsistence strategy, and technologic traits assign these early peoples to the Archaic Stage (Fredrickson 1974a; Willey and Phillips 1958). On the Central Coast, the origins of the Sur Pattern (Breschini and Haversat 1980) are seen in these early Archaic manifestations. This pattern apparently extended as well into the San Francisco Bay region. In both regions, the Sur Pattern probably was associated with speakers of Hokan languages.

Soon after 2000 B.C., bayshore- and marsh-adapted people representing a new and distinctive pattern settled at Ala-307 (West Berkeley). During the following millennium, similar bayshore settlements appeared at Bodega Bay (Son-299), De Silva Island (Mrn-17), and Pacheco Valle (Mrn-152) in the north Bay area, at Ellis Landing (CCo-295) and Newark (Ala-328) on the east bayshore, and at University Village (SMa-77) on the Bay's southwestern edge (Figure 6.4). By A.D. 1, numerous villages had been established throughout the San Francisco Bay region and along the Central Coast as far south as the Monterey Peninsula. Fredrickson (1973,

1974a) includes these developments in his Berkeley Pattern, the more southerly expressions of which apparently correspond to the Monterey Pattern (Breschini and Haversat 1980), discussed earlier. The Berkeley Pattern, including those components previously assigned to the "Middle Horizon," is characterized as follows:

> a. Technological skills and devices. The minimally-shaped cobble mortar and cobble pestle are employed as the virtually exclusive milling implements. Manos and metates [millingstones] . . . are rare. The dart and atlatl are present. . . . Chipped stone projectile points are less frequent than in the Windmiller Pattern, and nonstemmed forms predominate. There is a growing emphasis (through time) upon the bone industry. . . . The polished stone industry does not appear to be as highly developed as it is with the Windmiller Pattern.
>
> b. Economic modes. As indicated by a high proportion of grinding implements in relation to projectile points and by the regional accumulation of large shell heaps, the Berkeley Pattern has a collecting emphasis. The acorn is probably the dominant staple. The larger number of sites and great depths of deposit suggest a larger population than that supported by the Windmiller Pattern. . . . The use of local material predominates. Trade goods, when they appear, are finished specimens, rather than raw material.
>
> c. Burial and ceremonial practices. The mortuary complex is rarely elaborated. Flexed burials with variable orientation occur in village sites. Burial goods are restricted to a few utilitarian items or ornamental objects. . . . Ceremonialism is indicated predominantly by shamanism, that is, by the presence of single graves with objects compatible with known ethnographic "shaman's kits," e.g., quartz crystals, charmstones, bone whistles. Graves are sometimes accompanied by bird and animal bones, occasionally by articulated portions of skeletons. Birds and animals sometime[s] are found as ceremonial burials. (Fredrickson 1973:125a–126)

Fredrickson adds that the Berkeley Pattern is marked by considerable inter- and intraregional variation, but that its essential characteristics serve to distinguish it from more or less coeval manifestations, such as the Windmiller Pattern to the east and the late Borax Lake Pattern (see Chapter 10) to the north (1973:116–133). As evidenced by the lower Stone Valley (CCo-308) and West Berkeley (Ala-307) components, the Berkeley Pattern was emerging in the east Bay area by circa 2000 B.C. Stone Valley may have been near the boundary between the Berkeley and Windmiller patterns; similarly, University Village (SMa-77) possibly reflects a boundary zone between the Berkeley and Sur patterns.

Gerow (1968) included SMa-77, along with lower West Berkeley (Ala-307B), in his Early Bay Culture. However, several other bayshore components (e.g., at Ellis Landing, De Silva Island, Pacheco Valle, Newark, and Castro) evidently are as old as, or older than, the Early Bay type site. Excepting SMa-77, these are true shell middens reflecting intensive use of bayshore resources. Moreover, the distinctive foliate and lozenge-shaped projectile points of Monterey chert and large crescentic stones found at SMa-77 do not typify the other assemblages. As judged by its artifacts as well as human skeletal traits, the University Village material

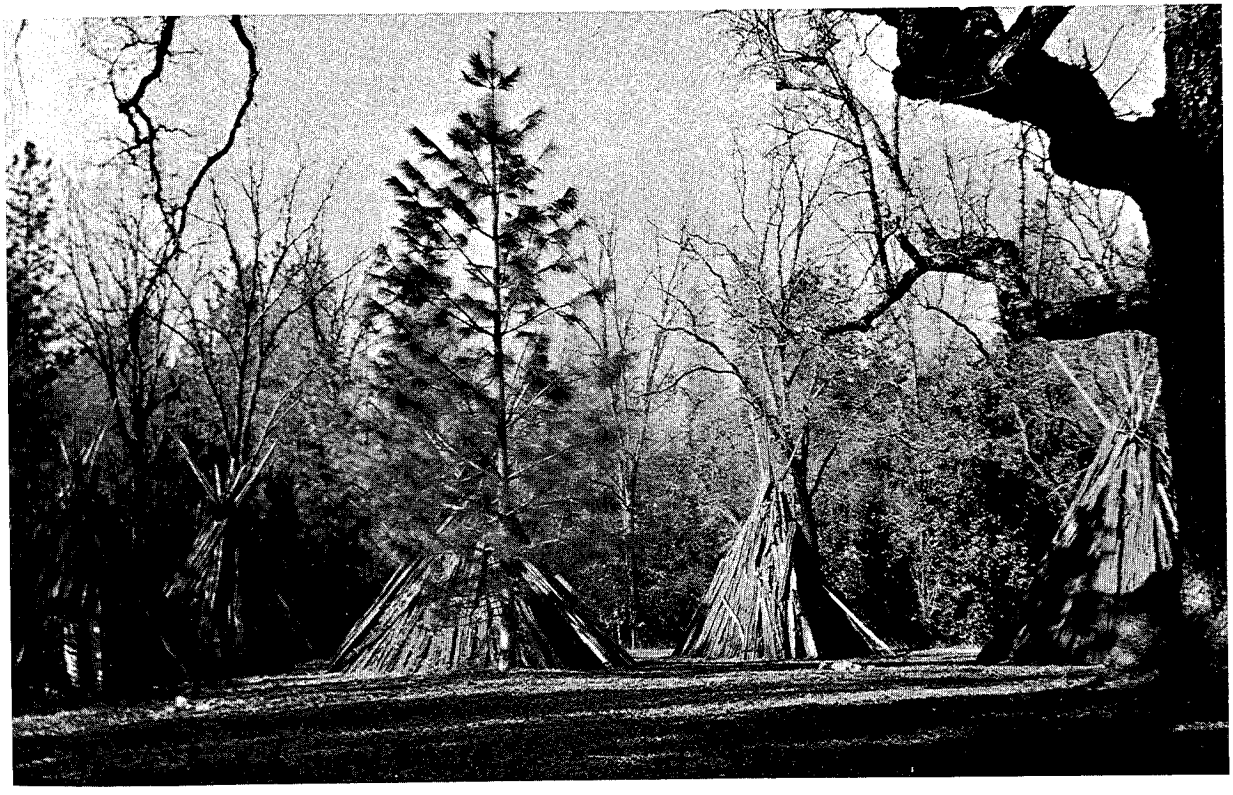
oped into the Augustine Pattern (see Chapter 5). As defined by Fredrickson (1973:127–129), the Augustine Pattern incorporates those phases previously assigned to the "Late Horizon," namely, the Mendoza and Estero facies in western Marin County, the Emeryville and Fernandez facies in the east Bay area, and other facies (phases) elsewhere in central California (see Chapters 5 and 10). Unlike the Berkeley Pattern, Augustine does not mark general population replacement in the San Francisco Bay region; rather, it is identified by new traits such as the bow and arrow, harpoon, tubular tobacco pipe, and preinterment grave burning, that accompanied the southward movement of Wintuan (ancestral Patwin) peoples into the lower Sacramento Valley. Patwin expansion and concomitant displacement of Bay Miwok surely affected populations in the northeast Bay area; otherwise, Augustine traits seem to have diffused into the Bay region without social replacement.

Through time, the Augustine Pattern came to embody much more than a veneer of northern influences on a core of Berkeley cultural features. As compared with Berkeley, the Augustine Pattern manifested larger populations; a greater number of settlements and more evidence of status differentiation among them; a greater emphasis on gathering vegetal foods, especially acorns; more intensive trade and highly developed exchange systems; the spread of secret societies and cults together with their associated architectural features and ceremonial traits; and, in late prehistory, the appearance of clamshell disk beads as a currency for exchange. This was the emerging cultural pattern encountered and destroyed by the Spanish mission system and later historic developments.

7. The Sierra Nevada

When we reflect that the mountain valleys were thickly populated as far east as Yosemite (in summer, still further up), and consider the great extent and fertility of the San Joaquin plains. . . ; then add to this the long and fish-full streams, the Mokelumne, the Stanislaus, the Tuolumne, the Merced, the Chowchilla, and the San Joaquin encircling all, along whose banks the Indians anciently dwelt in multitudes, we shall see what a capacity there was to support a dense population.

Powers (1877:346)



(Photograph by the author.)

the popularity of obsidian in later prehistory is evidence of expanding trade relationships between the northern Sierra and adjacent regions (Jackson 1974a; Jackson and Schulz 1975). Quantities of marine shell artifacts in late components further show the range of trade contacts and the degree of Sierran integration into the central California economic system.

The Central Sierra

Mortuary Caves

Central Sierran archaeological caves have held great interest since the time of the Gold Rush. These include both rockshelters (exogene caves) and endogene caverns (which extend deeper into the earth than the entrance width). Endogene caverns occur at elevations of 250–650 m in limestone formations of the foothill cave belt (Figure 7.2). Rockshelters are distributed more widely, from the edge of the Central Valley to altitudes above 3500 m. Whereas rockshelters functioned as dwelling, milling, storage, and rock-art sites, endogene caves served mainly as burial chambers. Human bones, often in great numbers, have been found in limestone solution chambers such as Moaning Cave, Mercers Caverns, Winslow Cave, and Pinnacle Point Cave in Calaveras and Tuolumne counties (Heizer 1952b; Moratto 1976c; Payen and Johnson 1965). A few endogene caves also were used as quarries for calcite, which, after circa 2000 B.C., was fashioned into charmstones, ornaments, and pipes (Heizer and Treganza 1944; Payen 1964).

One of the best-known mortuary caverns is Moaning Cave (Cal-13), formerly called Solomon's Hole or Cave of the Sepulchre. This is a complex vertical solution cavity deeper than 140 m in a band of permeable limestone west of the Stanislaus River (Figure 7.2) near Vallecito in Calaveras County (Orr 1952a; Short 1970). The cave was first explored in 1851 by J. B. Trask, who noted human bones. Two years later, on October 31, 1853, the *Daily Alta California* carried an incredible account of explorers who, "at the depth of about 300 feet, . . . came upon a collection of over 300 human bodies perfectly petrified; that the hall contained an immense number of stalactytes [sic], some of which were incorporated with the bodies."

Nearly a century later, R. F. Heizer and A. E. Treganza of UCB investigated Moaning Cave and found a jumble of dissociated human bones in red clay below the mouth of the cave (Figure 7.8). Long bones and cranial parts of nine adults and two children were found along with hundreds of

complete and fragmentary bones scattered about by earlier visitors. With the skeletons were *Haliotis* ornaments, *Olivella* beads, a cup-shaped pipe bowl, and an obsidian point (Wallace 1951a) of types that would date the ossuary deposits between circa 1000 B.C. and A.D. 500 (Figure 7.7).

Fossil deposits, including both human bones and those of the extinct Sierran ground sloth, occur at Mercers Caverns (Cal-11) in weathered limestone about 1.8 km north of Murphys (Figure 7.2). Mercers Caverns were visited by W. H. Holmes before 1900 and by J. C. Merriam and F. W. Putnam in 1901, and were excavated in 1902 by W. J. Sinclair. The position of the human bones indicated that bodies had been thrown into the upper chamber of the cave through the small entrance; no artifacts were reported.

Cave of Skulls and O'Neal Cave also have been investigated. Long ago, Whitney (1867) removed a number of crania from the Cave of Skulls (Cal-29), west of the Stanislaus River near Abbotts Ferry. Like the bones from Mercers and Moaning caves, these calcium carbonate-encrusted skulls reposed on the cave floor and had not been buried deliberately. Nearby, the limestone grotto of O'Neal Cave (Cal-6)—a vertical shaft more than 15 m deep—is described as "choked" with human and animal bones along with some unspecified artifacts and pieces of charcoal (Wallace 1951a).

One of the most important mortuary chambers is Winslow Cave (Cal-99), located about 2 km northwest of Murphys (Figure 7.2). A small pit dug by University of California archaeologists into sticky black clay 15 m below the cave entrance produced 1735 dissociated and mineralized human bones and fragments representing 12 adults, 3 children, and an infant. It is estimated that no fewer than 100 individuals had been dropped into Winslow Cave. Charcoal found on the deposit surface may be attributed to torches tossed from above by Indians, early gold seekers, or curious passersby. Testing yielded more than 4300 *Olivella* shell beads and 75 other artifacts, among them *Haliotis* shell ornaments, quartz crystals, a bone atlatl spur, a human-femur implement (atlatl?), fish-vertebra beads, and large projectile points (Gonsalves 1955). These items attest to the use of Winslow Cave chiefly during the millennium before circa A.D. 300.

Pinnacle Point Cave (Tuo-272) is a multichambered solution cavity at the base of a limestone pinnacle high above the Stanislaus River in Tuolumne County (Figure 7.2). Inside and below the cave opening was an archaeological deposit nearly 10 m deep consisting of angular limestone fragments, dark earth, human bones, and artifacts (McEachern 1968:56). Excavations in 1965 by archaeologists from California State University, Sacramento (CSUS), brought to light the skeletal remains of some 30 adults, adolescents, and children, along with more than 400 *Haliotis* shell ornaments and 10,500 *Olivella* shell beads; such bone artifacts as fish-

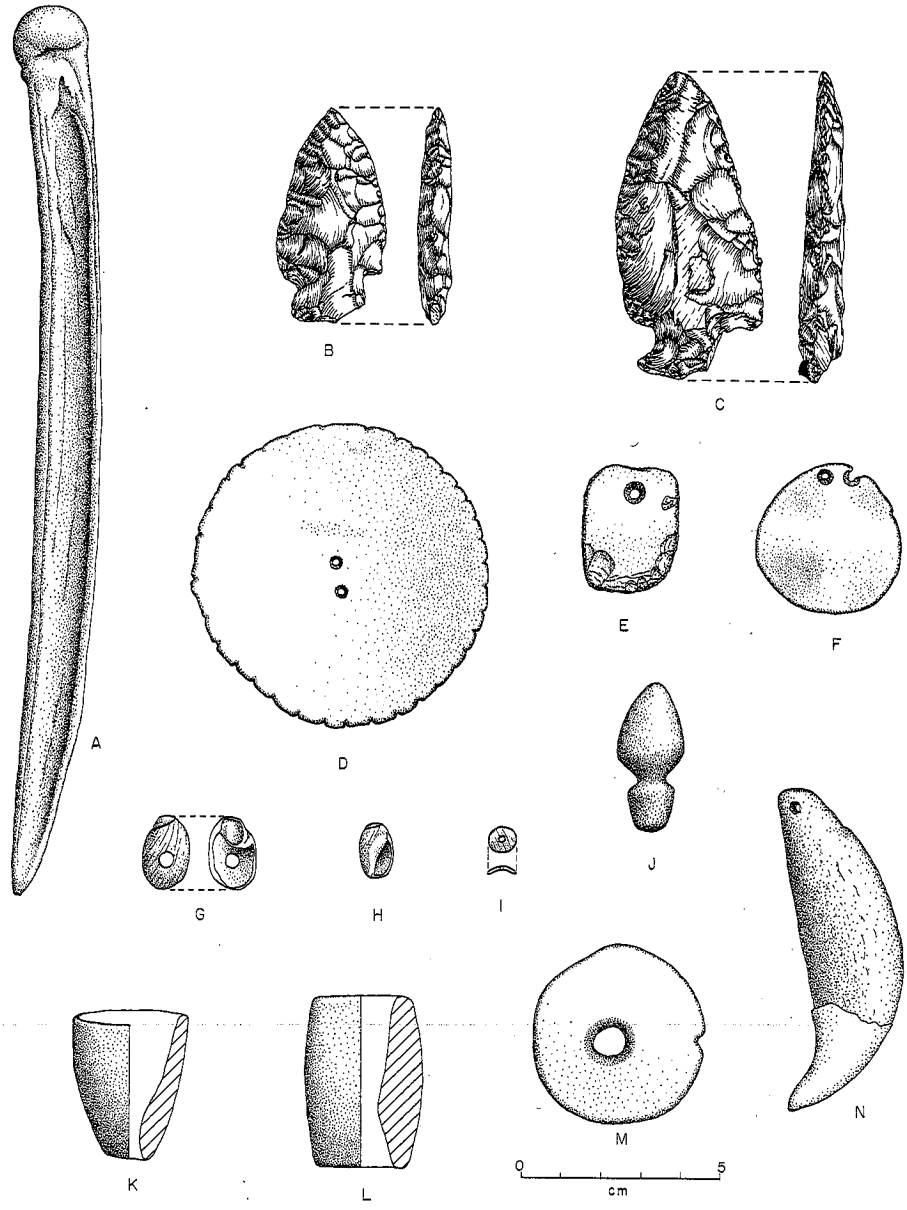


Figure 7.7 Artifacts from mortuary caves in the central Sierra Nevada. A, bone dagger; B, C, projectile points of black chert; D–F, *Haliotis* shell ornaments; G, *Olivella* split-drilled bead; H, *Olivella* spire-ground bead; I, *Olivella* saucer bead; J, atlatl spur of bone; K, L, travertine pipes; M, steatite discoidal; N, perforated bear canine. Items A, D, and J–M are from Pinnacle Point Cave; B, C, and E–I are from Moaning Cave; N is from Winslow Cave. (After Gonsalves 1955; Payen 1964; Payen and Johnson 1965; and Columbia State Historic Park collections; drawn by Thad Van Bueren.)

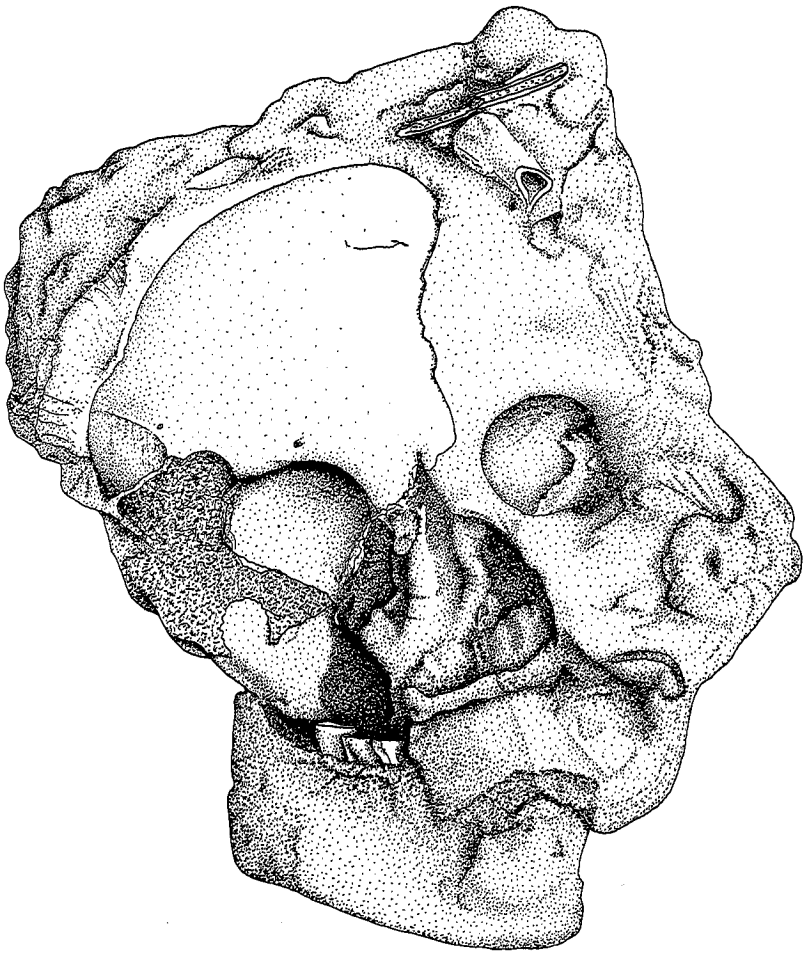


Figure 7.8 Human bones embedded in speleothem (dripstone), from Moaning Cave, Calaveras County. Such fossils, evidently 1500–3000 years old, represent the use of central Sierran caves as mortuary chambers. (Drawn by Thad Van Bueren.)

vertebra beads, an atlatl spur, an incised rectangle, a bird-bone whistle, and perforated limb bones of the Pacific freshwater turtle; large projectile points of chert and obsidian; and limestone pipes, steatite beads, stone disks, and quartz crystals (Beck 1970b; Payen 1965; Payen and Johnson 1965) (Figure 7.7). Some perishable items also were recovered from the cave, including 80 fragments of cordage, 3 basketry pieces, and a problematical wooden object (McEachern and Grady 1977:25).

One of the more interesting questions about these ossuary caves re-

lates to mortuary customs: Were bodies placed or thrown into the caves, or were loose bones deposited in the chambers? Although bodies may have been carried rather than thrown into the Cave of Skulls and Cave of Catacombs (Danehy 1951), clues elsewhere point to less delicate means of disposal. At Mercers and Moaning caverns, for example, broken bones were cemented in dripstone breccia; and Winslow Cave's black clay was crammed with dissociated skeletal parts. This suggests that bones and perhaps some bodies, along with artifacts, were cast into the void.

The case for secondary burial, at least in certain caves, is supported by Payen and Johnson's (1965) discovery of cremated bone, as well as unburned but fragmented bone, throughout the matrix at Pinnacle Point Cave; only two instances of articulation were observed. Human remains apparently had been dropped into the cave and then covered by rocks thrown into the shaft. Payen (1965) opined that the fragmentary and scattered skeletal material may have resulted from secondary bundle burials being dropped into the cave. In any event, the dissociated and burned bone, charcoal, burned artifacts, and clast piles would seem to refute the notion that accidental death by falling was how the ossuaries came to be (cf. Orr 1952a:16).

The cavern burials evidently are of late Holocene age, despite a visitors' leaflet proclaiming that "more than 13,000 years ago, the bodies of prehistoric men fell or were thrown into the blackness of this huge cavern" (Anonymous 1981b:3). Other age estimates range from more than 12,000 years, based upon assumed dripstone accumulation rates (Orr 1952a), to historic times (Sinclair 1908a,b). C. H. Merriam (1909, 1910) noted that the Miwok Indians of the Sierran limestone belt normally cremated their dead and believed that a cannibal rock giant named *Che'-ha-lum'che* lived in the caves and caught people to eat. Merriam saw this belief as confirmation that the caves had been used in pre-Miwok times, several thousand years ago.

Although the mortuary cave specimens have not been dated directly, artifacts from Moaning, Winslow, and Pinnacle Point caves duplicate specimens from radiocarbon-dated Central Valley sites. Analysis and cross-dating of beads, pipes, and projectile points (Figure 7.7) from the caves suggest that the natural tombs were used mainly between circa 1000 B.C. and A.D. 500, with occasional burials in certain caves more recently (McEachern and Grady 1977; Payen 1964; Payen and Johnson 1965; Pritchard n.d.). The data suggest further that at least some of the cave disposals were left by people of Windmiller cultural affiliation (see Chapter 5). The practice of cave burial largely ceased about 1700–1300 years ago, possibly because Windmiller access to the caves and foothill resources was disrupted by environmental changes and settlement of the mountains by other populations (see Chapter 11).

Yosemite National Park

Numerous surveys and testing projects, as well as some major excavations, have been completed in the south-central Sierra Nevada. Some of the more important studies have been done in Yosemite National Park (Figure 7.2), where there was early recognition of a cultural sequence that has become a milepost in Sierran archaeology. Since 1930 many archaeological surveys of variable scope and intensity have been conducted in Yosemite. Following several avocational surveys, UCB archaeologists documented 401 sites in the course of "intuitive" surveys in Yosemite during the summers of 1952, 1953, and 1954 (Bennyhoff 1953b, 1956; Grosscup 1954). The recorded sites ranged in altitude from 485 to 3250 m, with 83% of the village-size habitation sites (identified by large middens and numerous bedrock mortars) being in the Transition zone below about 2000 m (Bennyhoff 1953a, 1956).

During the 1970s, systematic inventory work by teams from California State College, Stanislaus (CSCS) brought to more than 560 the total of recorded sites in Yosemite (Napton 1974a,b; Napton *et al.* 1974b,c; Napton and Greathouse 1976). To date, an estimated 5% of the Park—mostly in areas of heavy use—has been surveyed by professional archaeologists (Napton 1978). This work has led to the recording of many types of sites, among them middens, lithic scatters, rockshelters, bedrock milling stations, cemeteries, pictographs, and stone alignments; nearly all of these types are correlated in their distribution with particular sets of environmental variables (Moratto 1981a).

Scientific excavations in Yosemite have consisted of minimal testing at 13 sites, "salvage" excavations at 4 sites, and the removal of several isolated interments. Based upon flaked- and ground-stone artifacts recovered from test excavations at four sites and from widespread surface collecting, Bennyhoff (1956) defined a local cultural sequence of three complexes: Crane Flat, Tamarack, and Mariposa, from oldest to youngest. The Crane Flat Complex is marked by heavy projectile points, inferred use of the atlatl and dart, and the mano–millingstone for grinding seeds, whereas the Mariposa Complex is distinguished by lightweight projectile points, inferred use of the bow and arrow, bedrock mortars (Figure 7.9) and cobble pestles (presumably used chiefly to process acorns), steatite vessels, and clamshell disk beads. Characterizing the intermediate Tamarack Complex are projectile points weighing between 1 and 3 g, inferred use of the bow and arrow, and use of the bedrock mortar and cobble pestle (Bennyhoff 1956).

Representing the protohistoric Sierra Miwok, the Mariposa Complex is dated between circa A.D. 1200 and 1800 on the basis of resemblances between Mariposa projectile-point types and those from dated contexts in

Figure 7.9 Bedrock mortars on large outcrop of limestone at *Tco'se* (Ama-14), Indian Grinding Rocks State Park, Amador County. Scattered on this outcrop are 1185 bedrock mortars and 363 petroglyph designs. (Photograph by the author.)

the Central Valley and Great Basin (Bennyhoff 1956:53–54). The Tamarack Complex (A.D. 500–1200?) is defined only tentatively and not linked clearly to the predecessors of any historic group. The Crane Flat Complex (? B.C.–A.D. 500?) shares manos, slab millingstones, and several types of large projectile points with the Martis Phase farther north, but the emphasis on obsidian in Yosemite (most likely a function of proximity to obsidian sources) contrasts with the relatively greater use of basalt and other nonsilicate lithics in the northern Sierra. In sum, although the status of the Tamarack Complex was unclear in 1956, Bennyhoff showed that Yosemite had been occupied for 2000 years or more; that significant cultural changes, and perhaps population replacement, had occurred during this interval; and that Yosemite's prehistoric cultures had been influenced by those of the Great Basin, Central Valley, and other parts of the Sierra Nevada (Bennyhoff 1956).

Excavations in Yosemite at El Portal (Mrp-181), Crane Flat (Mrp-105), and Hodgdon Ranch (Tuo-236) (Figure 7.2) during the early 1960s led R. J. Fitzwater to replace Bennyhoff's sequence with a two-phase chronology, lacking Tamarack. Fitzwater (1962) subsumed Tamarack under the Mar-

iposa Phase because to him they seemed virtually identical except for the weight of projectile points. The Crane Flat Phase, little changed in content from Bennyhoff's complex of the same name, was first evidenced in the Yosemite locality about A.D. 1. It was supplanted circa A.D. 1000 by the Mariposa Phase, which in turn persisted until the mid-nineteenth century. The earlier part of Fitzwater's chronology is supported by three ^{14}C dates from Crane Flat: A.D. 1000 ± 70 (UCLA-276), A.D. 370 ± 80 (UCLA-277), and 90 ± 100 B.C. (UCLA-278) (Fitzwater 1962, 1968a,b).

Further work in Yosemite has included salvage excavations in 1966 at Ahwahnee (Mrp-56) to make way for a new visitors' center (Rasson 1966); surface collecting and testing in 1980 at five sites in the Wawona Valley (Whittaker 1981); and minimal testing in 1981 of several sites in areas of proposed development at El Portal (Baumler and Carpenter 1982). The Ahwahnee and Wawona sites were chiefly Mariposa Phase settlements, but they also yielded large projectile points and other traces of Crane Flat occupation. The El Portal sample was too small to permit reliable inferences about prehistory.

The development of an archaeological chronology for Yosemite in the 1950s and early 1960s was tenuous and based upon limited data. Nonetheless, in light of strong parallels between the Yosemite sequence and that of the nearby Chowchilla River area, where intensive excavations and 35 radiocarbon dates have been reported (T. King 1976; Moratto 1972b), Bennyhoff's original sequence would appear to be valid.

North-Central Sierra Nevada

Dam and reservoir projects in the central Sierra have destroyed hundreds of cultural properties, but they have also led to archaeological investigations along every river in the area. For example, during 1970–1971 archaeologists from San Francisco State University (SFSU) and Merced Junior College (MJC) conducted a field survey and salvage excavations in the New Don Pedro Reservoir basin (elevation, 85–270 m) along the Tuolumne River (Figure 7.2). Remnants of 41 aboriginal sites were recorded, and 7 of these were sampled (Moratto, 1971f).

Excavations at the stratified Roger Creek site (Tuo-300) revealed two components. The lower levels yielded millingstones and manos, cobble mortars, atlatl weights, quartz crystals, and large quantities of percussion-flaked bifaces, preforms, and debitage. Tuo-300 appears to have been both a habitation site and a workshop for processing metachert, which outcrops nearby. Other remains in the lower midden included bone awls and a fish spear tip, *Haliotis* and *Olivella* beads, and large projectile points. A saucer-shaped earthen floor (≈9 m in diameter) represents a house constructed circa A.D. 915. Twelve fragmentary skeletons at and

below the floor level indicate a mortuary pattern of flexed burial, without surviving artifacts, under stone cairns. On typologic grounds, this component is dated between circa A.D. 300 and 1500. Radiocarbon age determinations include A.D. 1200 ± 95 (I-5372), A.D. 915 ± 90 (I-5602), and A.D. 905 ± 90 (I-5601) (Moratto 1971d).

The late prehistoric culture (ca. A.D. 1500–1800) at New Don Pedro Reservoir is manifested in the upper levels of Tuo-300 and at Tuo-279 by steatite disk beads and cooking vessels, bedrock mortars with cobble pestles, small flake tools and arrow points of chert and obsidian, and circular dwellings averaging about 4 m in diameter. At Tuo-279 this component is ^{14}C-dated at A.D. 1655 ± 90 (I-5603) (Henn 1971; Moratto 1971f).

Two cultural phases thus are well documented at New Don Pedro Reservoir: an expression of the Mariposa Phase, thought to represent Miwok prehistory, and an earlier phase comparable to Crane Flat. Evidence of yet other phases has been reported from two sites: a few points and beads of early (pre-Crane Flat) types were found in 1970 at the Moccasin site (Tuo-314) after it had been bulldozed and vandalized (Slaymaker 1971); and at Tuo-910, excavated during the 1970s by C. Ostrander of MJC, projectile points reflect several phases of occupation over a span of perhaps 3 to 4 millennia (M. Arguelles, personal communication, 1981). Tuo-910 yielded Pinto, Elko, and Windmiller stemmed points, probably 2500 to 5000 years old, as well as points datable to various intervals between circa 500 B.C. and A.D. 1800.

About 20 km north of New Don Pedro Reservoir, archaeologists from CSUS, in 1977 surveyed a proposed route of Highway 108 near Sonora. Among the sites recorded (and later tested) was the Sanguinetti quarry (Tuo-767)—a metachert quarry, lithic workshop, and habitation site covering nearly 45,000 m^2 (Rondeau 1978). Three other chert quarry–workshop sites have been reported in the general vicinity of Sonora (Moratto 1981b; Moratto *et al.*, 1983; Motz 1978). The predominance of nonobsidian lithics at these sites and at Tuo-300 (just discussed) reflects both the local availability of chert and the relatively high cost of obsidian from distant sources.

Northwest of Sonora, the foothill country along the Stanislaus River has been the focus of extensive archaeological work in connection with the New Melones Dam and Reservoir project (Figure 7.2). Between 1968 and 1981 the federal government funded 10 phases of survey and excavation work at New Melones. Within the project area of ≈12,000 hectares (≈30,000 acres), nearly 700 archaeological sites have been documented (Gage 1969; Greenwood 1976, 1977; Moratto 1976b,c; Oman 1982; Orlins 1977; Payen *et al.* 1969). Approximately 90 of these sites have been sampled, a few intensively (Fitting *et al.* n.d.; Gage 1970; P. Johnson 1973; Moratto 1976a–d; Moratto *et al.* 1983; Peak 1973).

During the 1981 field season at New Melones, Holocene environmental and cultural changes were investigated at two deeply stratified sites: Redbud, Cal-S-347 (O'Brien 1983), and Texas Charley Gulch, Cal-S-286 (Moratto and Arguelles 1983). Multiple components were identified at Cal-S-286, the lower two being within a compacted yellow clay deposit of variable depth. The upper levels of this clay (Stratum D) yielded a ^{14}C date of 5120 ± 170 B.P. (UCR-1439A). The lower levels (Stratum E)—as yet not dated directly but thought to be of early to middle Holocene age—contained cores, distinctive scrapers, and large percussion-flaked bifaces exhibiting remarkable craftsmanship (Singleton 1983). Above the clay strata at Cal-S-286 were midden deposits, the base of which has provided ^{14}C dates of >3550 ± 160 B.P. (UCR-1488A–D) just below a structural floor with an associated large mortar (Goldberg 1983). Several prehistoric and protohistoric components have been defined in the midden deposits, among them one ascribable to the late prehistoric Miwok and another representing late nineteenth-century Indian mourning practices and habitation.

At the Redbud site, Cal-S-347, several prehistoric components were recognized in cultural deposits as much as 270 cm deep. One stratum, 110 cm deep, containing Elko series projectile points, has been ^{14}C dated at 3200 ± 110 B.P. (UCR-1450A). A large, stemmed projectile point (Figure 3.2B) from Cal-S-347 is typologically like Hell Gap points on the Great Plains (see Frison 1974: Figure 1.37C) and Parman points in the western Great Basin; the latter have been ^{14}C-dated at circa 8500 B.P. in northwestern Nevada (Layton 1979) and circa 8130 B.P. near Lake Tahoe (Elston *et al.* 1977).

Although some of the New Melones data remain to be analyzed and reported, a few preliminary observations can be made:

1. The archaeological sequence along this part of the Stanislaus River spans an estimated 8000 to 9000 years and included multiple prehistoric cultural phases (Table 7.2).
2. Stratified and seriated components reflect both cultural and environmental changes through time.
3. Some cultural changes (e.g., advent of the bow and arrow at ca. A.D. 500) may represent trait diffusion; others are linked to *in situ* adaptive shifts or to population replacement.
4. Nearly all the tested Indian sites include components less than 500 years old, and most of these are single-component sites. This recent proliferation of settlements probably reflects Miwok expansion after circa A.D. 1400.
5. After the Gold Rush, Indian use of traditional foods, milling equipment, houses, mortuary practices, and ceremonial structures persisted until the 1880s and later (Van Bueren 1982). Indeed, there is evidence that

parts of the New Melones project area may have been a refugium for displaced Indians from the surrounding country.

In the mountains east of the New Melones Reservoir a great deal of archaeological survey work and some testing have been sponsored by the U.S. Forest Service in its effort to inventory and assess cultural properties (ACRS 1975, 1977; Chartkoff and Chartkoff 1981; Goldberg 1983; Moratto 1981b; Napton 1974b–g; Napton and Greathouse 1982). For example, by 1981 nearly half the area of the Stanislaus National Forest had been examined in the course of 165 survey projects, and approximately 1100 sites had been recorded within ≈180,000 hectares (≈440,000 acres) of land (W. Woolfenden, personal communication, 1981). This work has documented two modes of late prehistoric settlement: High Sierran seasonal camps marked by lithic scatters but few bedrock mortars, and Transition zone settlements recognized by middens, numerous bedrock mortars, and structural remains (Moratto 1981b). Archaeological sites in the central Sierran forest belt occur near annual streams, on ridgelines, and in certain midslope (non–stream/ridge) settings. In this regard, T. Jackson (1979b:2) discovered "a near perfect correlation between mid-slope site locations and the contact between two major lithologic units of the area—the Mesozoic granitic basement complex of the Sierra Nevada batholith and overlying Pliocene pyroclastic rocks." These midslope site locations attracted Indian settlement because the lithologic contact zone featured relatively level terraces, springs, granite outcrops suitable for mortars, both intrusive and volcanic rocks, and biotic ecotones with diverse flora and abundant game.

Other notable research in the north-central Sierra has focused upon rock art and bedrock mortars. At *Tco'se* (Ama-14), northeast of Jackson (Figure 7.2), Payen and Boloyan (1963) documented 1185 mortars and 363 petroglyphs in a single limestone outcrop (Figure 7.9). *Tco'se* is of special interest not only as the largest known aggregation of bedrock mortars at any California site, but also because of the unusual association of mortars and petroglyphs, including the incorporation of mortars into rock-art motifs.

Central Sierran rock art has been described and variously interpreted by Steward (1929), Fenenga (1949), and Payen (1959, 1966, 1968). It occurs chiefly as angular and curvilinear motifs, some of which are representational, on rock panels at scattered sites—mostly in the foothills (Figure 7.10). Heizer and Clewlow (1973:25–29) designated this as the Central Sierra Petroglyph Style and, based upon its similarity to dated styles in the western Great Basin, estimated its age at 3000–500 years B.P. As the central Sierran petroglyphs seem not to have been made by the Miwok, they may represent pre-Miwok peoples of Great Basin origin or affiliation, or visits by Great Basin groups, or both.

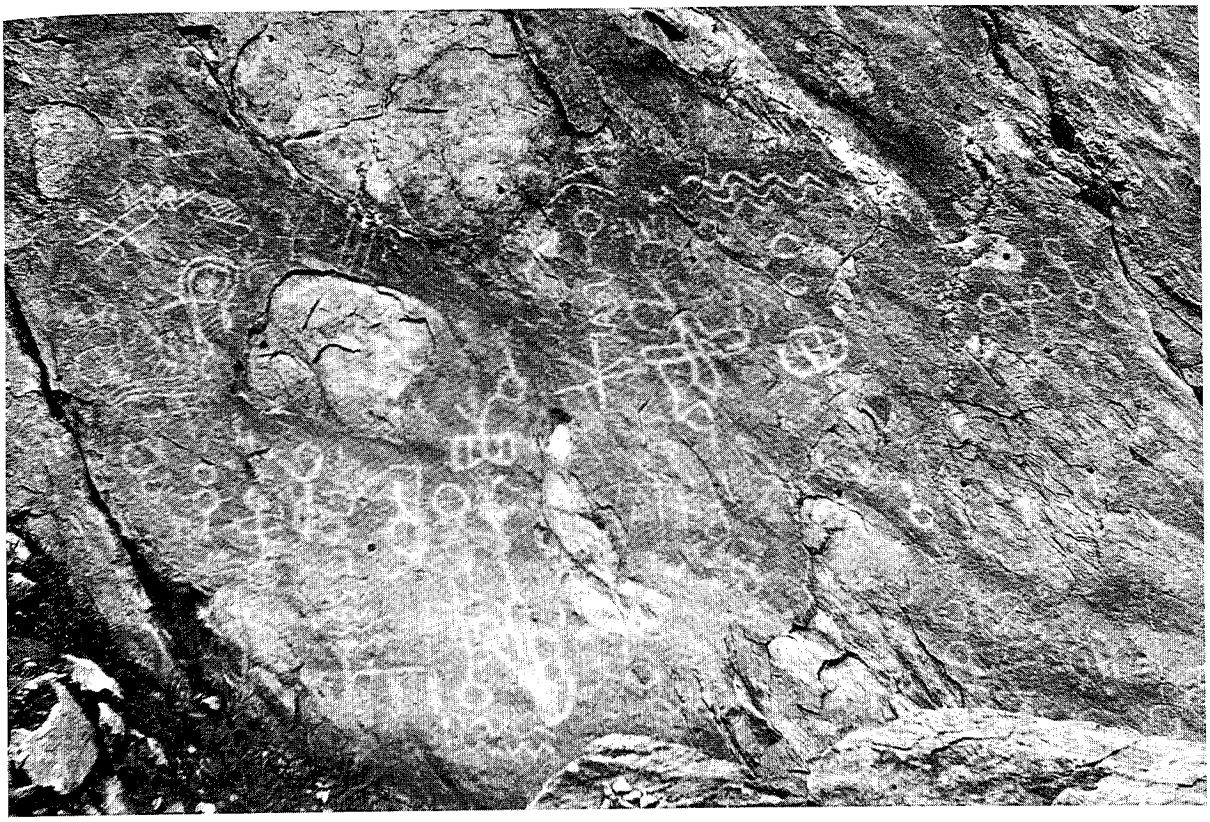


Figure 7.10 Petroglyphs on exfoliating red granite at site Cal-5 near Horseshoe Bend on the Stanislaus River, Calaveras County. Although found within the ethnographic territory of the Central Sierra Miwok, these petroglyphs stylistically resemble those of the western Great Basin. It is believed that the rock art at Cal-5 was left by pre-Miwok people of Great Basin cultural affiliation. (Photograph by the author.)

South-Central Foothills

Buchanan Reservoir

One of the more intensively studied areas in the Sierran province is the Buchanan Reservoir (Eastman Lake) vicinity in the Madera County foothills (elevation, 120–275 m), along the Chowchilla River, about 45 km east of Merced (Figure 7.2). Even before excations had begun, the discovery of 66 small to very large habitation sites and more than 3375 bedrock mortars within an area of only 9.75 km^2 seemed to indicate long and/or intensive occupation by a sizable population (Moratto 1968; Rackerby 1964).

In four seasons of fieldwork at Buchanan between 1967 and 1970, T. F. King and M. Moratto excavated several sites—notably Schwabacher (Mad-117), Dancing Cow (Mad-106), Jones (Mad-159), and Moby Rattlesnake (Mad-107)—and tested 23 others (King 1968, 1969; Moratto 1968, 1969b, 1970b,d). In all, some 20,000 artifacts, 140 burials, and 92 structural features were documented. Temporal control was provided by stratigraphy, cross-dating, seriation of grave and house lots, and 13 radiocarbon dates. By 1972 Moratto (1972b) was able to synthesize these data and define three phases of Chowchilla River prehistory (Table 7.2).

The Chowchilla Phase (ca. 300 B.C.–A.D. 300) marks an interval of prosperity. Three Chowchilla Phase settlements were found at Buchanan Reservoir in prime settings on the banks of the river. Fish spears, large projectile points, millingstones, and cobble mortars attest to the importance of fishing, hunting, and gathering vegetal foods, perhaps including acorns. Also characteristic are the atlatl and dart, and profusion of small obsidian flake tools, varied bone artifacts, and abundant ornaments and beads of *Haliotis* and *Olivella* shell (Table 7.2 and Figure 7.11). This inventory is generally comparable to that of the Crane Flat Phase in the Yosemite locality, 80 km to the northeast. Artifact types and materials reflect extensive trade with Indians east and west of the Sierra. Chowchilla people customarily buried their dead in extended or semiextended positions, furnishing their graves with red ochre and "killed" (ritually broken) artifacts (Table 7.2 and Figure 7.11). The nonrandom distribution of mortuary goods and quantity of artifacts with some buried children imply both nonegalitarian social status and status ascription (T. King 1976; Moratto 1972b).

TABLE 7.2

Cultural Phase Markers at Buchanan Reservoir, South-Central Sierra Nevada[a]

	Chowchilla Phase (300 B.C.–A.D. 300)	*Raymond Phase (A.D. 300–1500)*	*Madera Phase (A.D. 1500–1850)*
Settlements	Few, large villages next to Chowchilla River; relatively large populations	Sporadic occupation of old sites near river; relatively small populations	Village community pattern; large, main villages near river; smaller settlements proliferate in the hinterlands; large populations
Architecture	No data	No data	Oval to circular plan, semi-subterranean ceremonial structures of wattle and daub, 8–17

TABLE 7.2 (*Continued*)

	Chowchilla Phase (300 B.C.–A.D. 300)	*Raymond Phase (A.D. 300–1500)*	*Madera Phase (A.D. 1500–1850)*
			m in diameter; smaller, circular plan houses
Subsistence	Hunting, fishing, gathering hard seeds; possibly some use of acorns	Acorns and hard seeds emphasized; hunting continues; no evidence of fishing	Acorns exploited intensively, along with other seeds; bulbs, greens, and berries gathered; hunting of elk, deer, and small game
Technology	Atlatl/dart; large projectile points of Types CLB, ECB, EE, ESN, SCB, SCS, PSS, SSN, TCS[b]; cobble mortar, cylindrical pestle; millingstones; bone fish spear tips	Bow and arrow replace atlatl/dart; medium projectile points of Types EES, ESS, RSCN, RSSN[b]; bedrock mortar and cobble pestle introduced; millingstones	Bow and arrow; small arrow points of Types DSN, CT, and a few EES, RSCN[b]; bedrock mortar, cobble pestle; millingstones
Ornaments	Abundant *Olivella* shell beads, Types A1a, B5b, C1b, C7, C8, F2, F3a, G1, G2a, G2b, G3b; *Haliotis* beads, H3a1, H3a2, H3b, H4[c]; *Acmaea* rings; numerous *Haliotis* ornaments	Few *Olivella* shell beads, Types B1, B2, B3a, C3, D1, M1a[c]	Abundant steatite disk beads; rare *Saxidomus* disks; some *Olivella* beads, Types B5, E1, E2, H1[c]; bird bone tubular beads; steatite pendants and ear/nose ornaments
Mortuary	Extended and semi-extended primary burials with copious grave goods; ochre in graves	Mostly tightly or loosely flexed primary interments; few mortuary artifacts; stone, daub, or millingstone cairns over burials	Flexed primary interments common; some cremations in houses; cremations are furnished with abundant artifacts
Miscellaneous	Evidence of trade with Great Basin and southwestern California groups; developed bone industry; artifacts reflect Windmiller affiliation	Little evidence of trade with coastal groups; violent death common; andalusite cylinders, spindles, earplugs	Brown Ware pottery (acquired in trade); elaborate steatite industry; ancestral Miwok

[a] After Moratto (1972b).
[b] Projectile point type codes after Moratto (1972b).
[c] Shell artifact type codes after Bennyhoff and Fredrickson (1967).

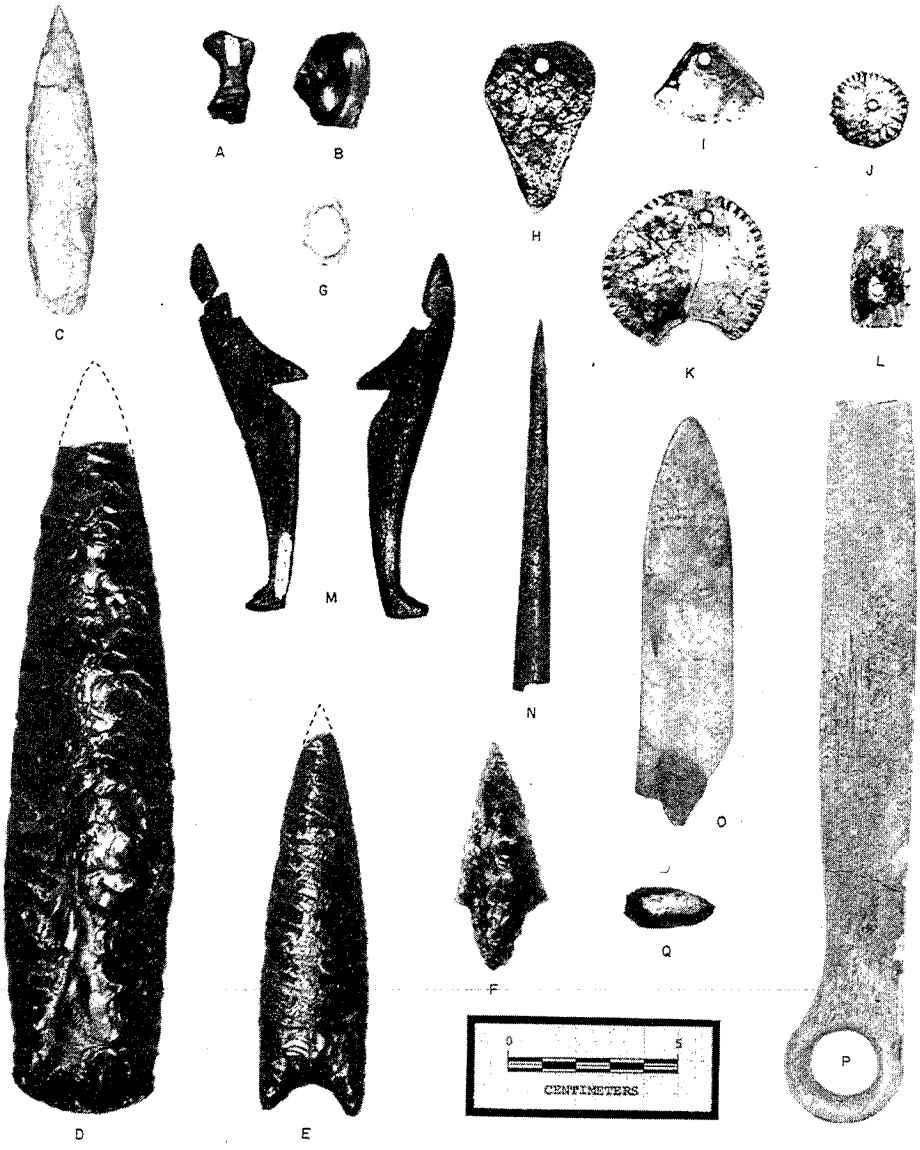


Figure 7.11 Chowchilla Phase artifacts from sites Mad-117 and Mad-159, Buchanan Reservoir, Madera County. A, B, retouched obsidian flake tools ("scrapers"); C, phyllite foliate projectile point; D, obsidian large biface; E, obsidian Sierra Concave Base projectile point; F, obsidian Triangular Contracting Stem projectile point; G, *Acmaea* shell ornament; H–L, *Haliotis* shell ornaments; M, antler fish-spear guides; N, bone awl-tip; O, bone spatulate object (fragment) with punctate decorations; P, bone ringed-wand or dagger; Q, antler atlatl spur. (After Moratto 1972b.)

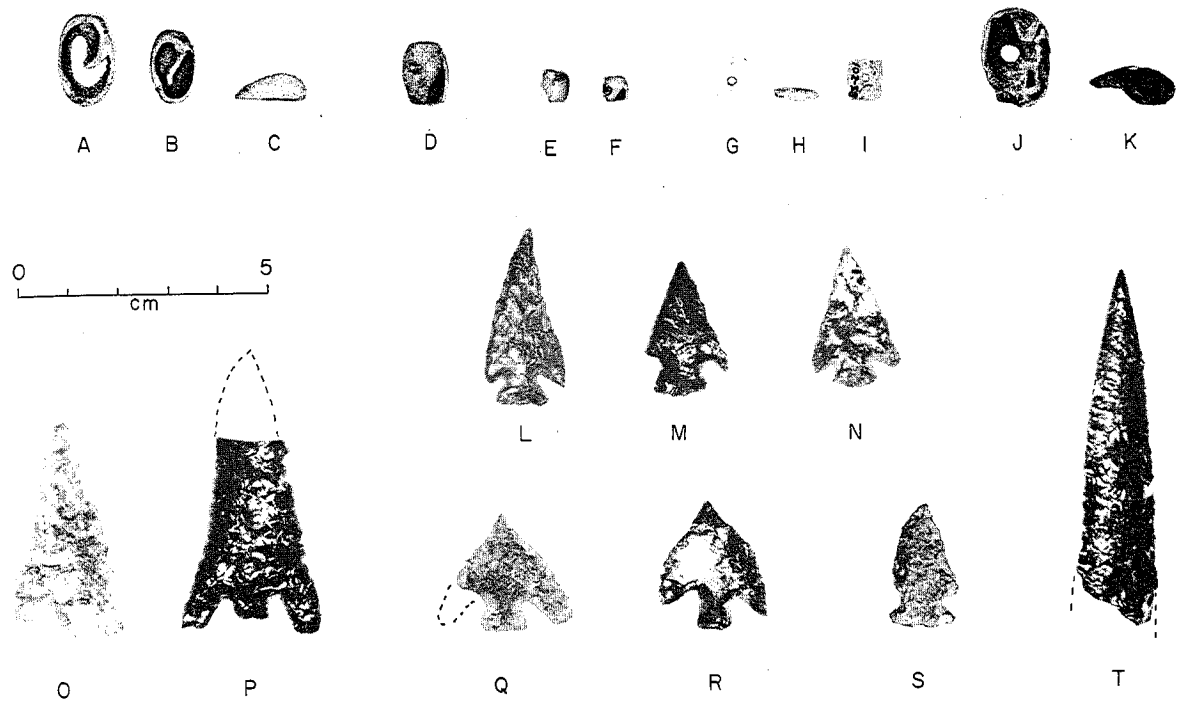


Figure 7.12 Raymond Phase artifacts from Buchanan Reservoir, Madera County. A, B, Type B1 Side-Ground/End-Ground *Olivella* beads; C, Type B1 *Olivella* bead, lateral view; D, Type B2b End-Ground *Olivella* bead; E, F, Type B3a Small Barrell *Olivella* beads; G–I, Type M1a Thin Rectangular *Olivella* beads; J, K, Type D1 Split-Punched *Olivella* beads, ventral and lateral views; L–S, chert and obsidian projectile points of the Rose Spring or Eastgate ("Rosegate") series; T, well-made obsidian projectile point tip of uncertain type. (After Moratto 1972b.)

The Raymond Phase (ca. A.D. 300–1500) seems to reflect an episode of cultural instability and change. Although millingstones, core tools, and small retouched flakes continued to be important, *Olivella* beads were scarce and *Haliotis*-ornaments were virtually unknown—presumably because the Chowchilla River people no longer had access to sources of marine shell or ornaments. Typical of the Raymond Phase are small-to-medium projectile (arrow?) points (Figure 7.12) and general use of the bedrock mortar and unshaped pestle (Figures 7.9 and 7.13). Populations were small and dispersed; old villages appear to have experienced chronic cycles of occupation and abandonment after circa A.D. 500. Violence was common. Primary interment of the dead in flexed positions was the normal mortuary practice, although some extended burials were interred

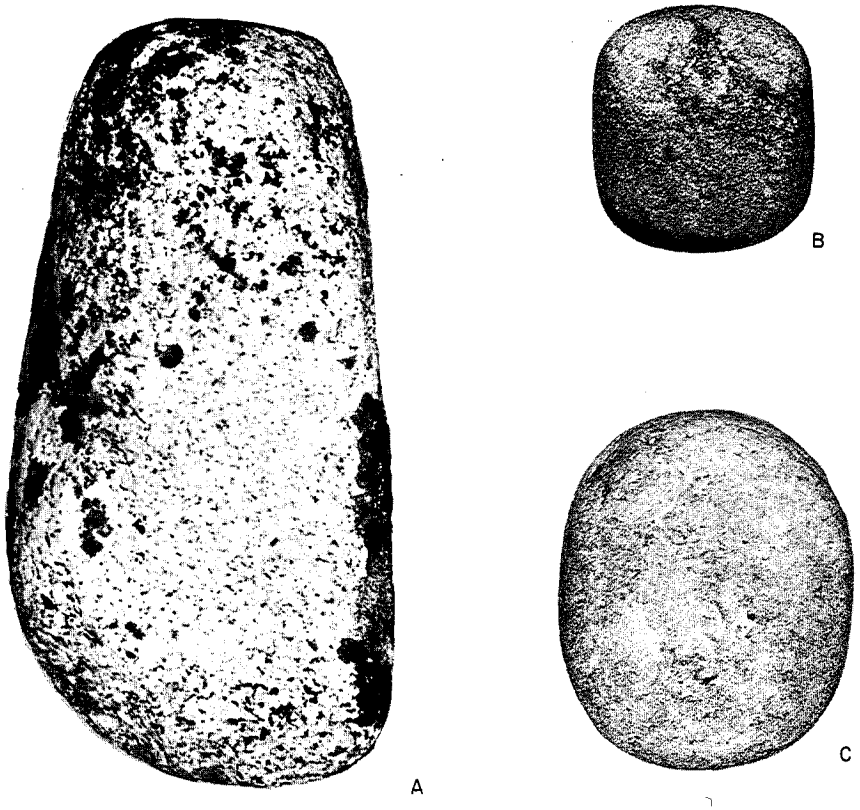


Figure 7.13 Ground-stone artifacts from Buchanan Reservoir, Madera County. A, unshaped cobble pestle of a type used extensively in bedrock mortars during late prehistoric times, length 245 mm; B, rectanguloid mano, length 73 mm; C, ovoid mano, length 118 mm. Manos and millingstones appear to have been in use throughout the known prehistory of the Chowchilla River vicinity. (After Moratto 1972b.)

during the early part of the phase. By contrast to Chowchilla Phase displays of funerary wealth, however, Raymond burials seldom were furnished with anything but cairns of boulders and millingstones (Moratto 1972b).

The Madera Phase (ca. A.D. 1500–1850) represents the spread and cultural florescence of ancestral Southern Sierra Miwok. Among the hallmarks of this phase are steatite disk beads, lightweight arrow points, bedrock mortars and cobble pestles, several types of *Olivella* beads, and occasional pieces of exotic Brown Ware pottery. Also diagnostic is a steatite industry featuring bowls, cooking vessels, pipes, arrow-shaft straighteners, and ornaments (Table 7.2 and Figures 7.13 and 7.14). This assemblage finds close parallels in the Mariposa Phase of Yosemite.

In Madera times the village community settlement pattern emerged, with main villages along the Chowchilla River and subsidiary hamlets on tributary streams. Dramatic population growth after circa A.D. 1550 coincided with the appearance of large (8–17 m in diameter) oval to circular, semisubterranean structures that probably functioned as ceremonial houses. Smaller (3–5 m in diameter) circular houses with slightly excavated floors and central hearths served as dwellings. Cremation, introduced around A.D. 1600, apparently was reserved for high-status individuals; primary interment in flexed positions was the more common disposal mode throughout the Madera Phase (Moratto 1972b).

A fifth season of excavations at Buchanan Reservoir in 1972, including the exhumation of 159 burials in three cemeteries jeopardized by construction, provided data for T. F. King's (1976) study of *Political Differentiation among Hunter–Gatherers* . . . King proposed that Chowchilla River society of 2000 to 1000 years ago was stratified and that social ranking was reflected in burial attributes (1976:89). He argued that mortuary variability at Buchanan Reservoir was better explained as a function of political differentiation than as a result of diachronic change in interment customs: "Flexed interment is a stable practice associated generally with low status *personae,* while disposal of high status dead is accomplished in several ways during the sequence including extended interment during perhaps the earliest period and cremation during the latest" (King 1976:86).

Analyses of the Buchanan data, including 10 additional burials (309 total) and 7 radiocarbon dates (35 total) obtained during some 1975 salvage work by A. S. Peak (1976), permit the following conclusions, some of which modify those of King (1976), about mortuary practices and their implications for Chowchilla River prehistory:

1. Chowchilla Phase social ranking and status ascription are indicated by cemetery patterning, nonrandom allocation of "expensive" grave goods, and burial of wealth items with certain infants and children (King 1976).

2. Both flexed and extended burials co-occur during the Chowchilla and Raymond phases, but extensions decline in frequency after circa A.D. 550 and are not found after circa A.D. 950 (Table 7.3).

3. To the degree that grave lots of valuable items (e.g., *Olivella* and *Haliotis* beads and ornaments) may reflect the status of the deceased, high-status individuals were buried in both flexed (36%) and extended (64%) positions ($n = 53$). Of 74 extended burials in the sample ($n = 309$), 38, or 51%, had no significant funerary associations. Extended burial, therefore, was not reserved exclusively for high-status persons. Rather, through time, flexure gradually came to replace extension as the normal burial position. A greater proportion of extended burials is associated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CENTIMETERS

with wealth because the Chowchilla Phase, wherein extension was the dominant burial mode, was generally prosperous and burials tended to be well furnished. The millennium after circa A.D. 550, however, was evidently a time when luxury goods—particularly those from the coast—were in short supply, and the burial of expensive artifacts virtually ceased.

To summarize, Chowchilla Phase occupation (now dated circa 800 B.C.–A.D. 550) of the Buchanan Reservoir locality was centered at a few main villages along the Chowchilla River. Large, socially complex populations exploited local resources and actively traded with their neighbors. After circa A.D. 550, however, both population size and social complexity diminished; local Raymond Phase settlement was sporadic, violence was common, and trade was disrupted. Then, after circa A.D. 1500, scores of small settlements were established, and these maintained sociopolitical ties with the revitalized older centers. The Madera Phase, with its village community organization and distinctive economic patterns, represents the late prehistory of the Southern Sierra Miwok (T. King 1976; Moratto 1972b–d).

There is limited archaeological evidence of direct historic contacts between Indians and Euro-Americans at Buchanan Reservoir: an isolated glass bead at Mad-159, iron nails associated with native artifacts at Mad-111, and horse bones ^{14}C-dated at 185 B.P. (later than A.D. 1765) in a hearth at Mad-153 (King 1969; Moratto 1972b). The latter discovery may attest to the raiding of mission era corrals by Indians who took refuge along the Chowchilla River (cf. Cook 1960, 1962). In this regard, J. C. Frémont in the 1840s spoke of "Horse-thief tribes" of apostacized Indians who "took to the mountains" with stolen horses, "partly to use as saddle-horses but principally to eat. . . . The streams and springs hereabout were the waters of the Chauchilles and Mariposas River and the Indians of this village belonged to the Chauchilla tribe" (Frémont 1966:n.p.).

It is probable that the Buchanan area was largely depopulated by the malaria epidemic of 1833, which killed thousands of Indians as it swept

Figure 7.14 Madera Phase artifacts from Buchanan Reservoir, Madera County. A–C, clamshell disc beads; D–G, steatite disc beads; H, bird-bone tubular beads; I–K, obsidian Cottonwood Triangular arrow points; L–Q, obsidian Desert Side-notched arrowpoints; R, chert Desert Side-notched arrow point; S, fragmentary, incised bird-bone artifacts; T, discoidal pendant of slate; U, V, fragmentary polished stone rings; W–Y, fragmentary polished stone arcs (nose or ear ornaments?); Z, polished steatite object (earspool?); AA, ground andalusite crystal; BB, pointed, ground, and polished andalusite crystals; CC, DD, bone awls; EE, arrow-shaft straightener on steatite pebble; FF, steatite vessel sherd, modified to function as arrow shaft straightener; GG, steatite pendant; HH, large serrated point of obsidian. (After Moratto 1972b.)

TABLE 7.3

Radiocarbon Ages of Interments at Buchanan Reservoir[a]

Site/Burial	*Position*[b]	*^{14}C date*	*Status*[c]	*Associations*[a]
133/76-03	F (tight)	1495 ± 150 (GX-4291)	L	Cobbles, point fragments, quartz flake, steatite bowl fragments
159/72-05	F	1540 ± 110 (UCLA-1860J)	H	Large lot of *Olivella* G beads, *Haliotis* ornaments, cache of flakes
159/72-06	F	1630 ± 80 (UCLA-1860P)	H	Large lot of *Olivella* G beads, *Haliotis* disks, bone wands, whistles
106/72-24	D	1650 ± 80 (UCLA-1860D)	L	None
159/72-32	E	1690 ± 100 (UCLA-1860A)	H	Steatite bowl, large lot of *Olivella* G beads
106/72-11	F	1740 ± 100 (UCLA-1860E)	L	Atlatl weight
117/69-08	E	1740 ± 110 (I-5361)	H	Millingstone, 3 *Olivella* G beads, 2 cannon bones, 4 cut antler bases, 1 bone awl, 1 mano
117/72-16	F	1745 ± 100 (UCLA-1860G)	L	None (two projectile points in bones)
159/68-03	E	1800 ± 95 (I-5363)	L?	Stone–daub cairn, 12 *Olivella* G beads, 1 *Haliotis* ornament
106/72-01	E	2000 ± 80 (UCLA-1860O)	H	Large lot of *Olivella* G beads and *Haliotis* disks, 2 *Haliotis* ornaments
117/72-44	F	2750 ± 90 (UCLA-1860B)	L?	Dubious association; 4 *Haliotis* disks, 2 *Olivella* G beads
159/76-01	F (loose)	105 ± 120	L	Dubious association; 1 *Haliotis* disk, 2 *Olivella* F beads

(*continued*)

through marshlands and riverine tracts of the Central Valley and lower foothills (Cook 1955b). In the words of a contemporary witness:

> From the extreme northern part of the Sacramento valley to the Tulare lake, . . . the numerous villages which we had left filled with life were converted to Golgothas. The first struck down were buried. But the increasing dead gave not time to the living to thus dispose of their fellows. Huge piles of bodies were consumed with fire, and the ashes deposited in tombs near the village. ("Trapper" n.d., in Cook 1955b:319)

Cook (1955b:322) estimated the mortality rate at 75%. Assuming that the Chowchilla River populations were thus devastated by the epidemic, their numbers probably were small when the Fresno River Reservation was established in 1850 and Indians were removed to it from an area between the Merced and Kaweah rivers (Muñoz 1974, 1975a,b). Thus, the dearth of historic components at Buchanan may be the result of disease and the forced relocation of the Chowchilla River people.

TABLE 7.3 (*Continued*)

Site/Burial	*Position*[b]	*^{14}C date*	*Status*[c]	*Associations*[a]
159/76-03	F (tight)	760 ± 125 (GX-4290)	L	Cobbles, dog burial
133/76-01	F (loose)	830 ± 125 (GX-4285)	L	Two cobbles, 1 *Olivella* M1 bead
133/76-02	F	960 ± 120 (GX-4286)	L	Cobble scatter, 1 *Olivella* M1 bead, 2 manos, 1 "polishing stone"
117/72-21	F	970 ± 80 (UCLA-1860F)	L?	Two EES and ECN points, millingstone cairn
106/72-33	E	1010 ± 80 (UCLA-1860I)	L	None
133/76-05	F (tight)	1055 ± 130 (GX-4287)	L	None
117/72-08	E	1305 ± 80 (UCLA-1860L)	L	Projectile points in bones, small lot of *Olivella* G beads in dubious association
117/72-20	E?	1310 ± 80 (UCLA-1860K)	?	Badly disturbed, small lot of *Olivella* C and G beads, millingstone
159/72-13	E	1400 ± 90 (UCLA-1860H)	H	Bone pin, large bone wand, bone tool, large obsidian biface
117/72-36	F	1425 ± 80 (UCLA-1860N)	L	Core tool
117/72-59	E	1470 ± 100 (UCLA-1860C)	H	Millingstone and mortar cairn, large lot of *Haliotis* disk beads

[a]Data compiled from King 1976, Moratto 1972b, and Peak 1976; artifact type codes after Moratto 1972b.
[b]D, disarticulated; E, extended; F, flexed.
[c]H, evident high status; L, evident low status.

Hidden Reservoir

The foothill environment of the Hidden Reservoir area on the Fresno River is similar to that of Buchanan Reservoir, which lies only 15 km to the north (Figure 7.2). Initial archaeological work by W. Wallace in 1967 and 1968 included testing 9 of 18 documented sites (Wallace 1968, 1969, 1970a). Subsequently, F. Fenenga recorded 13 additional sites and excavated several large middens in the course of five field seasons between 1969 and 1975 (Fenenga 1973, 1975).

Investigations at China Diggings (Mad-173) and other stratified middens revealed cultural developments almost identical to the prehistoric sequence at Buchanan Reservoir as well as historic assemblages not found at Buchanan. The upper components of Mad-171 and -173, as examples, contained bottle-glass scrapers and projectile points, buttons, ceramics, and numerous glass trade beads, along with native artifacts reminiscent of the Madera Phase (Fenenga 1973; Kelly 1974). The glass beads were obtained by the Indians after 1850 from Americans rather than from earlier contacts with the Mexicans or Spanish (Martz 1974).

The Fresno River at Hidden Reservoir formed the ethnographic boundary between Miwok and Yokuts (Figure 11.1). However, relating archaeological material to one or the other of these groups has proved difficult for several reasons: first, the Fresno River vicinity apparently was a refuge for Indian neophytes fleeing from coastal missions during the half century after 1770; next, James Savage's 1851 trading post on the Fresno River attracted Indians from the surrounding country; and finally, the Fresno River Reservation, with its geographic center near Savage's trading post, accommodated no fewer than 16 "tribes" of Mono, Sierra Miwok, Foothill and Valley Yokuts, and "Capoos" (repatriated mission Indians?) between 1851 and 1860 (Heizer 1972b; Muñoz 1974, 1975b).

This intermingling of diverse cultures is reflected in historic components at Hidden Reservoir. Mad-179, where more than 50 saucer-shaped housepits were found on the surface, was littered with horseshoes, Staffordshire ceramics, and glass beads—evidence that this large site was occupied between 1850 and 1860. Mad-179 probably was a principal village of refugees from the southern mines who congregated near Savage's trading post (Fenenga 1973).

Summary

Considerable archaeological work has been done since 1950 in the central Sierra Nevada. In the northern part of this subregion, a 12-year program of field investigations has been completed at New Melones Reservoir. A major study of the New Melones findings, now under way, promises to interpret a long record of archaeological and paleoenvironmental developments. In the Yosemite locality, Bennyhoff's (1956) pioneering chronology has served as a reference for archaeological work in the mid-Sierra. Paralleling the Yosemite sequence, the Buchanan and Hidden cultural phases are well substantiated by radiocarbon dates and large samples of excavated material. Together, the Buchanan, Hidden, and Yosemite researches have led to a fair understanding of the last 2000–3000 years of prehistory in the south-central Sierra. Earlier periods and the more northerly parts of the central Sierra remain poorly known.

The Southern Sierra

Kings and San Joaquin Uplands

The southern Sierra Nevada has witnessed many surveys, but comparatively few excavations. An important study of high Sierran archaeol-