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ARCHAEOLOGICAL HORIZONS IN CENTRAL  
CALIFORNIA

By ROBERT F. HEIZER and FRANKLIN FENENGA

INTRODUCTION

THE present paper is an attempt to define the archaeological situation in the lower Sacramento Valley. The aim of this discussion is to summarize a threefold culture sequence called here Early, Middle and Late, and to place it within the general scheme of California prehistory as we understand it at the present time. Until quite recently California culture has been widely cited as endowed with an unique uniformity and unchangeableness, persisting in its simple, specific form for thousands of years. We now know this to be incorrect. Wherever intensive, planned archaeological work has been prosecuted in California, cultural differences have obtruded themselves.<sup>1</sup>

Our type section and largest sampling is from the Mokelumne-Cosumnes river region, with additional data from the upper Sacramento valley (site 1) and the Sacramento-San Joaquin river Delta region (sites 138, 139). The Cosumnes river sites are 107, 6, 120, 126, 127; the Mokelumne river sites 68, 66, 142. Site 60 on the Sacramento river is geographically intermediate as is site 99 on the lower American river. Map 1 shows the location of these sites.<sup>2</sup>

Schenck and Dawson published, in 1929, a volume on the archaeology of the northern San Joaquin valley.<sup>3</sup> They concluded that in this region (called Stockton-Lodi), certain sites could be differentiated by characteristic cultural forms, and that these cultural divergences reflected temporal differences. But Schenck was very hesitant in offering this interpretation, and when in 1933 the Sacramento Junior College instituted an archaeological program under the direction of President J. B. Lillard, it was with the main idea of gaining a general insight into the archaeology of their area, and not of a specific search for cultural sequence. Two Cosumnes river sites (126, 127) yielding the same culture were successively investigated. The third, site 107,<sup>4</sup> soon showed itself to be stratified, the topmost level agreeing with the culture disclosed in sites 126 and 127, the bottom level something entirely different. Intermediate in this site between these two divergent cultures was a manifestation apparently of a transitional phase.

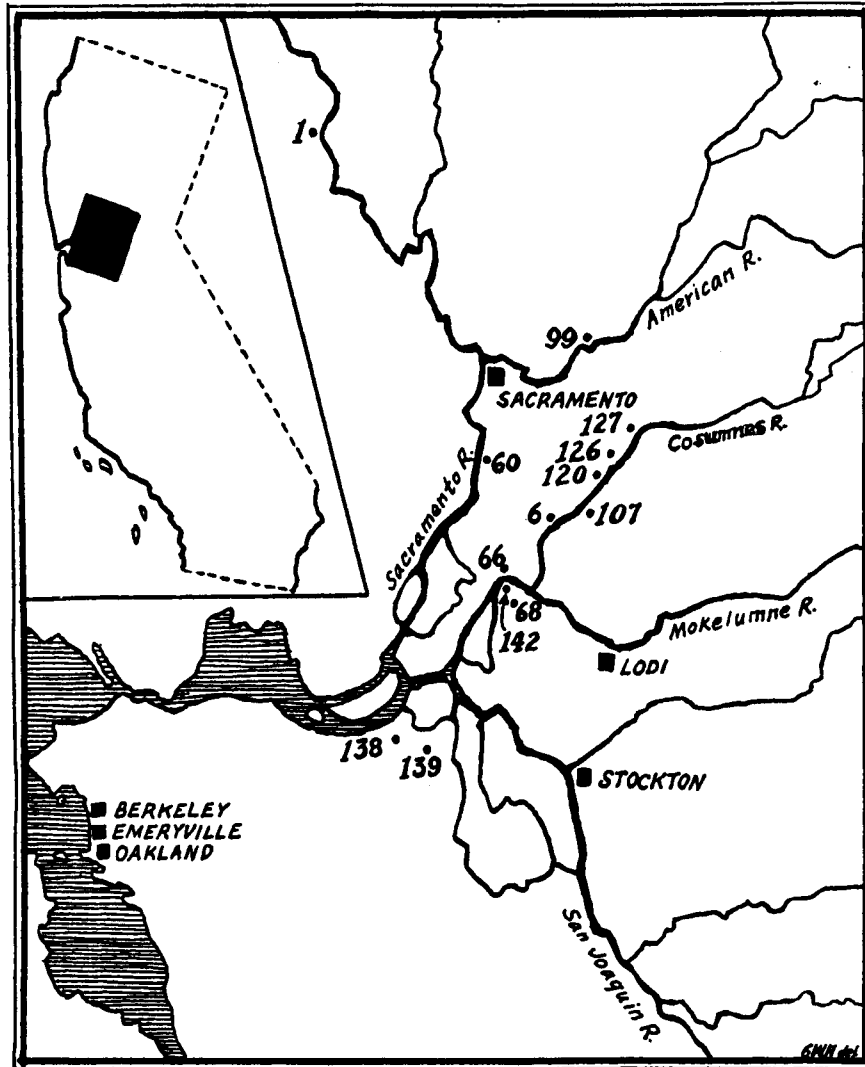
In 1936 Lillard and Purves published a bulletin on the basis of this trio

<sup>1</sup> See Rogers, M. 1929; Olson, 1930; Rogers, D.B. 1929.

<sup>2</sup> See Schenck and Dawson (1929; 293-305) for a good geographical description of the area.

<sup>3</sup> Schenck and Dawson, 1929.

<sup>4</sup> Lillard's sites 1, 2, and 3 are respectively our 127, 126, 107.



MAP 1. Location of sites in the lower Sacramento Valley region, California.

of Cosumnes river sites which had been under investigation for three years.<sup>6</sup> Their conclusion was that an Early and Late culture period were distinguishable, the Post-contact or historic period forming the final phase

<sup>6</sup> Lillard and Purves, 1936.

of the Late. In the summer of 1937 the Department of Anthropology of the University of California reinvestigated, at the invitation of Lillard, his key stratified site (107) and worked site 142 located somewhat further south on the Mokelumne river. More recently, the Sacramento institution has excavated site 99 located about 6 miles east of Sacramento on the American river, site 60, and site 66 on the lower Mokelumne river, in all of which appeared a clear transitional manifestation between Early and Late. Other investigations include the excavation of sites 68, 1, 138 and 139 by the University of California. The data from these sites have been utilized in this paper which is merely a summary. The final report, dealing with each site as a unit, is in progress.

Artifacts occur so overwhelmingly in association with burials that, in large part, cultural manifestations are judged on burial complexes. Roughly there is about a 30 per cent incidence of burials without material culture

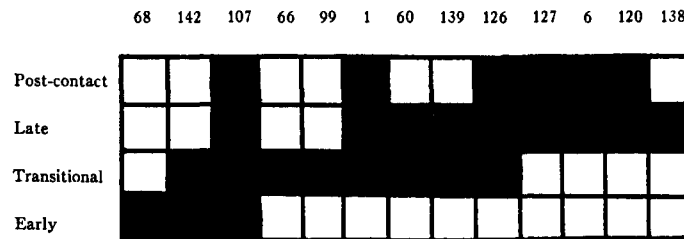


CHART 1. Representation of sites by cultural horizon.

association. Articles such as bone basketry-sewing awls, objects of baked clay, and implements for grinding (in short, articles of "camp use") which occur not at all, or only very exceptionally, in association with burials, are exceptions.

The method of excavation has been that of cutting two trenches intersecting centrally in order to recover stratigraphic profiles, systematic test pitting in the quadrants, and the excavation of cemeteries located either by the trenching or testing operations.

Certain aggregations of burials within certain sites at one stratigraphic level form cultural units. Different cultures may be represented in one site (see Chart 1), by differences reflected by later intrusives (site 142), by absolute vertical stratigraphy (sites, 1, 60, 107), or by location of cemeteries in other parts of the site (horizontal stratigraphy) as in sites 139, 107. Pure culture sites (68, 66, 99 and 138) are those occupied during only one culture period.<sup>5a</sup>

<sup>5a</sup> Site 139 should be corrected to read site 141.

## CULTURE CLASSIFICATION

Three cultural horizons, called here Early, Transitional and Late (the Post-contact being the historic phase of the Late) have been defined in our area. The order of succession is demonstrated, as outlined above, either by vertical or horizontal stratigraphy or later intrusives, and is further confirmed by the cultural evidence which demonstrates a cultural continuum, the changes and additions within this continuum forming our three horizons. Where sharp breaks appear, the possibility that we are dealing with an incomplete sampling should not be overlooked. The picture in brief is one of development in culture, different emphases reflecting the particular tenor of each period.

## CULTURAL DEVELOPMENT

*Early period.* This culture, known from sites 68, 107, and 142, is the earliest we have found archaeologically on the valley floor.<sup>6</sup> We have no idea of its immediate provenience, since it appears in a similarly developed form in each of these sites. It is, however, Californian in general tenor. This is demonstrated by the extensive use of *Olivella* and abalone (*Haliotis*) shells, and stone materials (quartz crystals, amphibolite schist) which could have come only from the Sierras to the east, and obsidian which is found to the northeast in the Coast range valleys. It is not a simple culture, but already highly developed and with numerous unique elements. A list of the features peculiar to this period and which are, in most cases, lacking in the two succeeding horizons would include: burials lying face down, fully extended; complete permineralization of bones; regularity of westerly orientation of burials; deposits characterized by a calcareous hardpan cap; perforated (types A., B.1, B.3) charmstones; slender ground slate "pencils;" thick-walled, conically drilled tubular stone pipes; great abundance of whole or fractured clear quartz crystals; ground quartz crystals; predominance of stemmed-type projectile points of chert or slate; unworked fist-size colored quartzite pebbles associated with burials; large rectangular *Olivella* beads; rectangular abalone shell beads with one or two central perforations; circular abalone ornaments with one or two central perforations; short, undecorated mammal bone tubes; large cylindrical bone pins, one end flattened, other end sharp; turtle carapace or plastron ornaments; use of human bones for artifacts (receptacle made of human skull from site 107 shown in pl. 3d, whistle of proximal end of a human radius from

<sup>6</sup> Surface finds of Folsom-type points have been noted. See Harrington, 1938a, 1938b; and Heizer, 1938a. The fact that these occur only as surface finds imposes a limitation so great that no inference, except a highly hazardous one based on typology and technology, can be drawn from them.

site 142); bead applique with asphaltum; sandstone "paint palette" from site 107 (see pl. 3h); antler fishspear points; single piece bone fishhook (fig. 1, 17).

*Transitional period.* Of apparent wider geographical extension is the Transitional horizon in the valley sites. It is known from sites 1, 66, 60, 99, 107, 142, 139. (See map 1). Early period traits which carry over into the Transitional period include; use of the metate; importance of quartz crystals; use of asphaltum for adhesive purposes; charmstones; large chipped points with stemmed or concave-base and diagonal flaking; flat, narrow, long bone, or antler "strigils;" obsidian cores used as "bangles;" chrysolite asbestos splinters; beaver mandibles and unworked bird head, leg and foot bones in burials; bone tubes with cut ends. The unique features would include; cobblestone platforms associated with burials; fishtail type charmstones (type D. 5); thin, steatite disc beads; thin, short steatite tubes; perforated ground slate pendants (pl. 1, g); steatite and baked-clay earplugs; predominant interest in concave-base obsidian points with transversal ribbon-flaking technique; ground hematite chunks; small, flat circular *Olivella* beads; abalone disc beads; large perforation in abalone ornaments; dentate edge (deeply serrated) circular abalone ornaments; almost exclusive use of *Haliotis cracherodii* (green backed abalone); thick mammal bone whistles; blunt, perforated bone bodkins; flat spatula-like antler "strigils" with concave base; small, flat bone dice marked on one surface; incised, perforated bone needles; barbless, blunted antler projectile points (fig. 1, 18); problematical notched antler tips; sturgeon mouthplates with ground edges; elk antler "adze."<sup>7</sup>

*Late period.* We know a very large number of sites producing culture remains of this horizon,<sup>8</sup> but few have been scientifically excavated. The present discussion is based on sites 1, 107, 138, and a composite series from sites 120, 126, 127 and 6. These sites are circular mounds comprised of unstratified black, ashy dirt with accumulation refuse such as animal bones, shell and stone fragments scattered throughout. All are elevated, the deposits generally resting upon a natural subsoil elevation, and all are near existing stream courses. Unique features of this period are: light, friable skeletal material; light, ashy mound deposit; laterally notched small arrow-points; "stockton type" square serration (fig. 2, 1), "stockton curves"

<sup>7</sup> Fenenga, n.d.

<sup>8</sup> Surveys during the past five years have resulted in the full recording and mapping on USGS quadrangle sheets of archaeological sites in the drainage basins of the Sacramento, lower American, Consumnes-Deer Creek, lower Mokelumne-Dry Creek, lower San Joaquin and Delta drainways. About 300 sites are known, approximately 90 percent being classifiable as Late period sites. Many of these, as yet untested, may be stratified.

(fig. 2, o); delicate chipped points measuring less than 45 mm. (actually ca. 30 mm. as an average) in length; biconically drilled stone (most often steatite) pipes with base-rings and bone stem (fig. 1, 28); thick steatite disc beads; steatite hourglass—or spool-shaped beads; magnesite disc beads; biconically drilled magnesite tubes; flat, circular stone “discoidals;” flat-rimmed, flat-bottomed stone mortar and flat-bottomed stone pestle (Delta region); acorn anvil; molded cakes of powdered red ochre; saucer-shaped *Olivella* beads; clam shell disc beads (*Saxidomus nuttalli*); long tubular and flat ovoid beads of *Tivela crassatelooides*, (a southern species most common to the Santa Barbara region); ovoid and “banjo” type abalone ornaments; shallow drilled-pit decoration around the periphery of abalone ornaments; use of whole abalone shells to contain infant burials; perforation of abalone ornaments invariably near edge; exclusive use of *Haliotis rufescens* (red-backed abalone); short, undecorated mammal bone tubes with constricted center; bird bone tubes with incised geometric designs; tubular birdbone whistles in pairs; barbed (unilaterally and bilaterally) antler fishspears; perforated antler shaft straighteners; great variety of objects of baked clay;<sup>9</sup> carbonized remains (seed offerings, basketry, netting, wooden fishhooks,<sup>10</sup> etc) in cremations.

*Post-contact period.* The post-European remains in the Valley are rather scarce owing to the sudden Caucasian impact and the retreat of the valley Indians to the foothills. However, most of our Late sites yield a few burials of this period, and it is from this small sampling from sites 1, 120, 126, 127, 107 and 6 that the information in this paper is based. Flexed burials lying in the near-surface levels of the loose, ashy deposit of Late sites are identified by the association of Hudson’s Bay Company glass trade beads and metal objects. In addition, objects of Late material culture such as incised birdbone tubes; small, serrated obsidian arrowpoints; double birdbone-whistles and clamshell disc beads serve to link the post-European phase<sup>11</sup>

<sup>9</sup> See Heizer, 1936. In this paper I attempted to show, in the light of the then available data, that this near-pottery complex was restricted to the Late culture period and was due to introduction by the Late people. Since this article appeared, new data indicate that objects of baked clay are to be found in the Transitional and Early culture levels, though very sparingly, and of predominantly non-utilitarian shape (e.g. “spindle whorls,” pipes, earplugs, small polished cut-groove “balls”). In this light, the case for a local origination of non-utilitarian forms, later developing into objects of utilitarian importance, such as substitutes for rocks in stone-boiling in this alluvial region, appears more likely than my original thesis which would link this as a peripheral manifestation of the Southwestern pottery focus. There is no real evidence yet of a local origin, however, and the question must remain open until conclusive evidence is forthcoming.

<sup>10</sup> Heizer, 1937.

<sup>11</sup> An excellent description of the ethnographic material culture may be found in Barrett and Gifford, 1933.

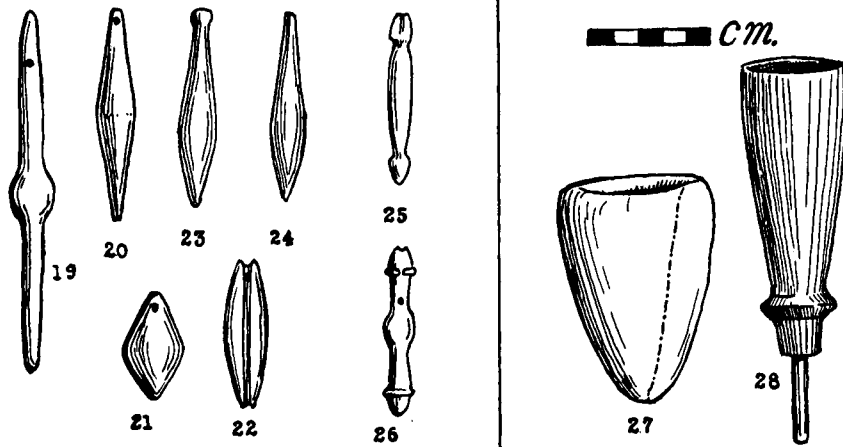
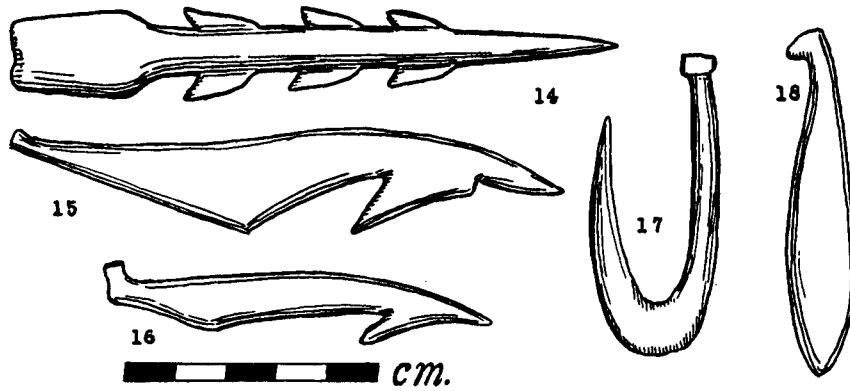
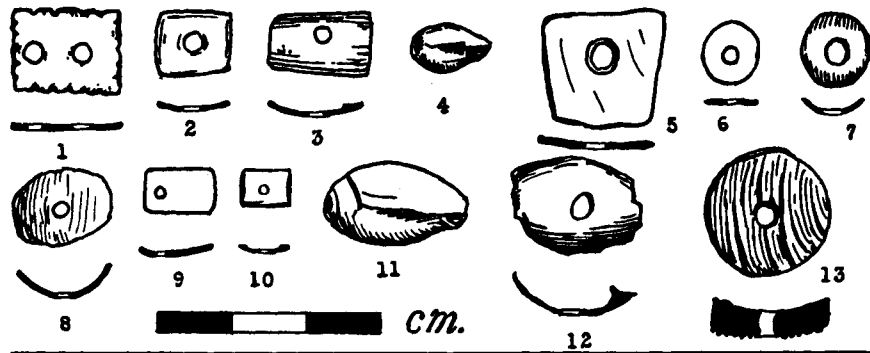


FIG. 1. (See opposite page for description)



with the prehistoric Late culture. Schenck,<sup>12</sup> using early historical accounts, has made the start on this important problem of tracing culture back in time from positively dated terminal (i.e. historic) finds by reconstructing the aboriginal population, location of villages and areas inhabited by the historic aboriginal groups of the region.<sup>13</sup>

#### CULTURAL ITEMS

*Burial techniques.* Burials, fully extended on the ventral side and invariably oriented west, characterize the Early period (pl. 3a). Cremation seems to have been unknown to these people. It is first found with the appearance of flexed burials in the Transitional period (pl. 3b). Both cremation and flexed burial were practiced by the Late people (pl. 3c); cremation becoming more common until some historic groups are known to have used this method of disposal of the dead to the exclusion of any other. The concentration of burials in certain parts of the village seems to be characteristic of the two later horizons. The Early people apparently buried away from the village on elevated knolls. Burial accompaniments include, in some cases, not only an individual's personal belongings (utilitarian and non-utilitarian), but also gifts, presumably from relatives and friends. For example, one could cite large stone pestles, charmstones, mortars, stone pipes and projectile points which occur with infants. Pestles are not uncommon with male burials, and female burials often have implements which could have been used only by males. The presence of cremation in the Late period accounts for the preservation of carbonized remains. Presumably if cremation were an Early trait, such perishable objects would also be present. "Killing" of objects (shell beads and abalone ornaments perhaps alone excepted) occurs in all three horizons.<sup>14</sup>

*Charmstones.* Much has been written on the subject of these problematical, non-utilitarian objects. Schenck<sup>15</sup> and Kroeber<sup>16</sup> have both considered

<sup>12</sup> Schenck, 1926a.

<sup>13</sup> This method of approach to archaeology is now in general use. Strong's (1935) and Wedel's (1936) works are model examples.

<sup>14</sup> It is of some interest to note that there is a definite pattern of killing objects. Killed Early objects, for example, are generally broken into three or four pieces. Transitional pestles are generally broken into two or three pieces. The evidence indicates a planned, not indiscriminate, procedure in killing. <sup>15</sup> Schenck, 1926: 255-264. <sup>16</sup> Kroeber, 1936: 108-115.

FIG. 1. 1-4, shell beads of the Early period; 5-9, Transitional period; 10-13, Late period. For description see text section on *Shell beads*. 14-15, Late period fishspears; 17, Early period single-piece fishhook; 18, Transitional period fishspear (?). 19-22, Early period charmstones; 23-24, Transitional period charmstones; 25-26, phallic charmstones of the Early horizon. 27, Early period thick-walled, conically drilled "pipe"; 28, Late period biconically drilled smoking pipe with bone mouthpiece.

them. Kroeber's suggestion (pp. 114-115) that the (perforated) harcmstone is perhaps earliest throughout California finds support in our findings where all Early (types A. and B.) charmstones are drilled (fig. 1, 19-22). We reserve discussion of charmstones for the fuller final report. Charmstones of phallus form are quite common and characteristic of the Early period, and are a notable feature of this horizon (fig. 1, 25-26).

Olson<sup>17</sup> says, "A number of considerations point to a purely ceremonial use (of perforated stones), perhaps replacing the earlier 'charmstones.' It is of some interest to note that in the Sacramento area, as in the Santa Barbara region, charmstones characterize the Early and Transitional horizons, and drop out in Late times, being replaced in occurrence (not necessarily in function) by perforated stones ('discoidals')."<sup>18</sup> There is no archaeological evidence in our area of the use of these rather fragile and finely worked pieces. Kroeber<sup>19</sup> notes their use ethnographically as true spindle-whorls among the Valley Nisenan. Several mounted specimens were recovered from a dry cave in the Santa Barbara region.<sup>20</sup>

*Flaked implements.* The Early period points are predominantly of green chert and slate, obsidian being present to a lesser degree. They are consistently either of leaf-shaped (NAb1), concave-base (NAb3) or stemmed and shouldered (SAa, SAb, SAc) forms.<sup>21</sup> For the most part, rough primary flaking with little secondary chipping is found. The materials used may, to some extent, dictate this, since fine rechipping is not easy with refractory chert or slate. See fig. 2 a-g.

Transitional period points maintain the same forms as those just described for the Early. Obsidian and slate are the dominant materials; chert is found but rarely. The characteristic form is NAb3, and the flaking technique that of fine diagonal flaking. See fig. 2 h.

Late period points are predominantly small, laterally notched, square-serrated ("Stockton type") arrowpoints. Larger chipped points which are probably spearpoints or knife blades (type NAa) carry over from the two earlier periods. Obsidian is used for the most part, though small chert arrowpoints are found occasionally. See fig. 2 i-m.

One unusual feature of some Early period (and to a very slight extent of the Transitional) chipped points is the practice of grinding the basal edges or flaked surfaces. Schenck illustrates two specimens from site 68.<sup>22</sup>

<sup>17</sup> Olson, 1930: 18. See also Wheeler, 1879: 135-189.

<sup>18</sup> Examples shown by Schenck and Dawson, 1929: pl. 98e, f.

<sup>19</sup> Kroeber, 1929: 262-263. <sup>20</sup> Henshaw, 1887: 28-31.

<sup>21</sup> Typology from Strong, 1935: 88-89.

<sup>22</sup> Schenck and Dawson, 1929: pl. 91b; pl. 98h.

*Weapons.* The presence in the Early horizon of only large, heavy, stemmed, leaf-shaped, contracting-stemmed or concave-base type chipped projectile points is noteworthy (fig. 2 a-g). Smaller points, in similar technique and form, appear in Transitional deposits, with the large types maintaining themselves. Small, delicate notched arrowpoints predominate in the Late period where the bow is ethnographically known to be the type weapon (fig. 2 i-m). This suggests the absence of the bow in the Early period its gradual appearance along with other new elements in the Transitional period and its complete ascendancy over the previous type weapon of the earlier culture. We suggest that the Early type weapon was possibly the atlatl or spear-thrower; certainly the heavy points from this period are eminently suitable for the heavy atlatl dart and not to the light arrow shot with the bow. Until objective proof of the presence of the atlatl appears, we must regard its possible occurrence as inferential and tentative. Olson<sup>23</sup> notes something similar in one of his early Santa Barbara sites where small arrowpoints were absent.

*Incised-line decoration.* This decoration is almost lacking in the Early period. Aside from some short, incised lines around the periphery of a few circular abalone ornaments and one stone pipe with radial lines on the flat rim there is nothing. In the Transitional period these edge-incised abalone ornaments are elaborated into dentate-edged pieces. Appearing first in Transitional sites (60, 66, 99) is geometric incising on bone. Rudimentary geometric designs on long perforated bone needles or awls seem to foreshadow the elaborately incised birdbone tubes of the Late period. Schenck has a good discussion and illustration of these interesting objects.<sup>24</sup> Birdbone whistles decorated in this style are known also from site 138 (Late period, delta region). They are on record for the Late period in the Santa Barbara region.

*"Bird cult."* The presence, in all horizons, of bird beaks, mandibles, leg and foot bones points to the possible ancient existence of the bird cult as described by Gifford.<sup>25</sup> These remnant bones are presumably the vestiges of hawk, eagle and condor skins worn by the cult dancers. The bones have been identified as belonging to these species.<sup>26</sup>

General ceremonial observances toward animals are demonstrated by the presence in burials, of unworked beaver (*Castor canadensis*) mandibles

<sup>23</sup> Olson, 1930: fn. 10. See also Heizer, 1938b, Woodward, 1937.

<sup>24</sup> Schenck and Dawson, 1929: 353-356; fig. 5, 6; pl. 78.

<sup>25</sup> Gifford, 1926. See also Gifford and Schenck (1926b: 111-112) for evidence of this type from the southern San Joaquin valley.

<sup>26</sup> Letter from Dr Hildegarde Howard of the Los Angeles Museum dated February 2, 1938.

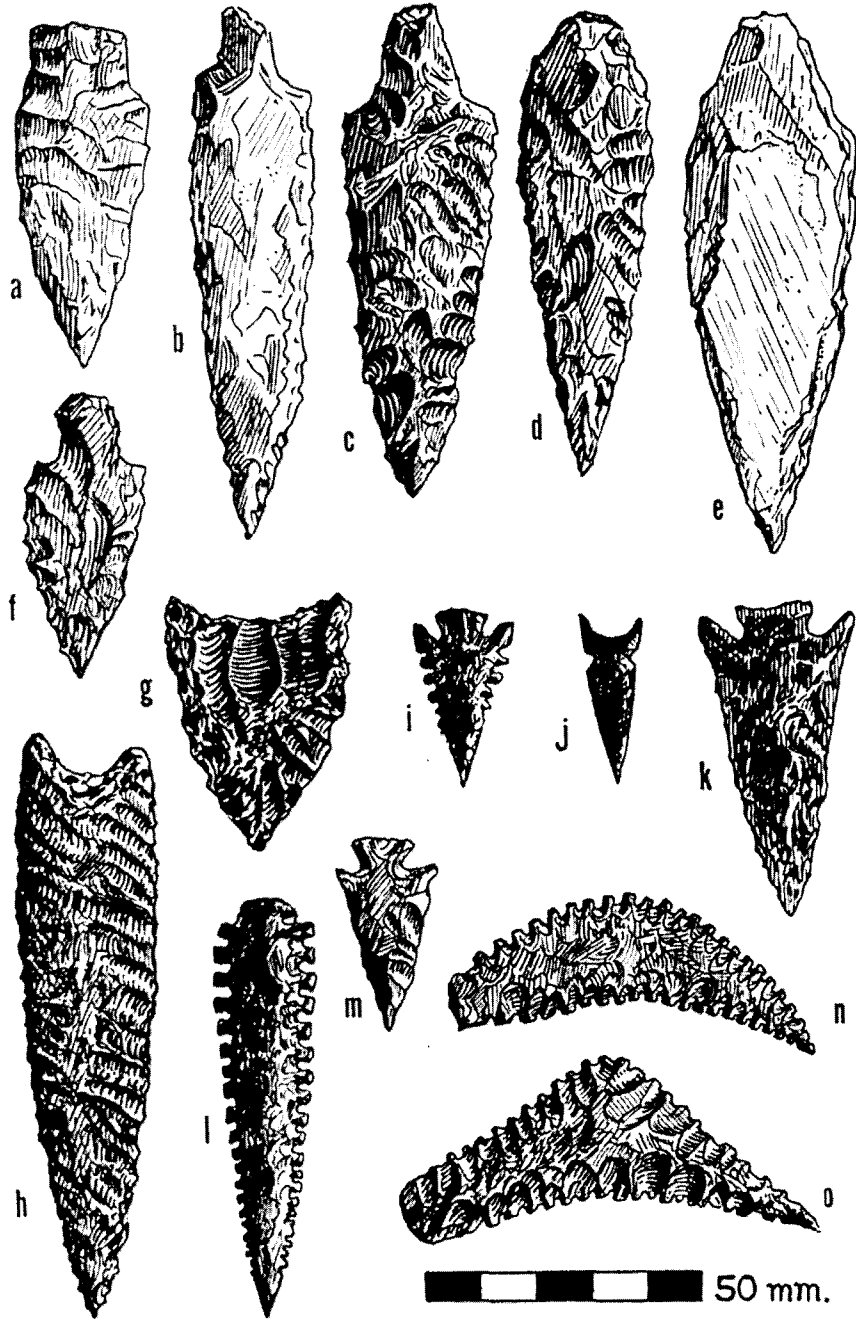


FIG. 2. (See opposite page for description)

which show no signs of use, of coyote (*Canis latrans*) burials associated with bone implements, quartz crystals, red ochre and abalone ornaments from sites 66 and 99. Site 138 yielded a perfectly articulated skeleton of a black bear (*Ursus americanus californiensis*) with abalone shells over the head and rectangular *Olivella* shell bead strings around his body. A complete and articulated deer skeleton associated with four charmstones is reported from the area. Site 60 has produced from the cemetery area several badger (*Taxidea taxus neglecta*) interments. This complex of animal ceremonialism is being treated in a separate article.

*House remains.* Thus far no Early house remains have been found in the sites so far worked. The presence of scattered pieces of burned clay with pole and grass impressions in these sites leads us to believe that these may be evidence of a clay-plastered smokehole, yet we have not found the house to go with the postulated smokehole. One site 66 (Transitional) house was so disturbed by intrusive burials that it was impossible to determine size, shape or posthole alignment. Late houses from sites 1, 107, and 127 agree with ethnographic descriptions.<sup>27</sup>

Particularly noteworthy is the fact that burials are always associated with archaeological remains of the large semi-underground "dance houses" of the Late period. There seems to have been a custom of burying individuals not only around the outside of the ceremonial house, but also inside the house under the floor. At site 1 were found a large number of infant burials which had been interred while the house was in use; adult burials lay for the most part outside, but near the house. When a house was abandoned the pit was used for two purposes; to dump refuse into, and for graves.

*Grinding implements.* The type implement for the Early period is the metate (pl. 1, i); the mortar is known, but very slightly. Specimens have come not from burials, but have been found without specific association in the Early levels and deposits. The Transitional people abruptly begin to bury pestles with their dead, but we find few mortars of stone. The chisel-pointed pestle type (pl. 1, f) is presumably associated with the wooden mortar since the type of wear it demonstrates would be impossible to achieve in a stone bowl. The metate lingers a while in this period, then drops out. The Late people of the valley used the mortar and pestle to the exclusion of the metate which they apparently rejected completely.

<sup>27</sup> See McKern, 1924; Barrett and Gifford, 1933: 200-205.

FIG. 2. a-g, Early period flaked points; h, typical Transitional period projectile point; i-m, Late period chipped points; n-o, obsidian "Stockton curves." Note characteristic small size of Late period points as contrasted with those of the Early period. The square serrations in i, l, n, o are distinctively Late.

Environment plays no small part in this discussion of implements. Stone was entirely lacking in the overflow area of the valley. This accounts for the practical absence of stone mortars on sites 68, 142, 107, and their presence on site 138, in which location on the edge of the valley stone was readily available from the nearby hills. Small fragments, however, attest the presence of the stone mortar on site 68 and 107 in the Early period. Several slab metates (pl. 1, i) are known from the latter site, Early period.

*Stone pipes.* Early period pipes are distinctive. They are short, thick-walled and conically drilled (fig. 1, 27). Whether they were actually used for smoking is doubtful, since there is no evidence of an inserted stem or of a "cake." None has been found with charred residue inside the bowl. No pipes have been found in the Transitional culture deposits. Late pipes were definitely used for smoking, as attested by the presence of bone pipestems and ash residue in the bowl cavity. They are long (ranging from 3 to 14 inches) biconically drilled and have enlarged base rings. Often there is a birdbone stem.

Apparently there were two separate introductions of tubular stone pipes in the area. We do not know whether our Early specimens were actually used for smoking. They may have been used as sucking tubes by shamans or have served some function comparable to the "cloudblowers" of the Anasazi Basketmaker cultures. The Transitional period demonstrates a hiatus in the use of pipes in the valley, unless of course, we postulate the presence of wooden smoking pipes which have disappeared in time. The Late pipes, distinctive in form, demonstrate by themselves that they were used for smoking.

*Stone beads.* By definition, such objects are lacking in the Early period. Transitional stone beads are comparatively rare. A small, exceedingly thin disc bead of steatite is quite characteristic. In Late times there is a marked development of stone beads. Small disc and large tubular beads of magnesite are quite common. The steatite disc bead has become several times thicker and less carefully made. A distinctive steatite bead of spool-or hourglass-shape appears in the Late horizon.

*Fishspears and fishhooks.*<sup>28</sup> Early period fishhooks are few. A unique single-piece curved hook (fig. 1, 17) is the only occurrence of this type noted thus far in the Central valley. The ubiquitous gorge hook occurs here, as in the two succeeding periods. A fishspear made of three slightly curved antler tips with notched ends attached to the end of a shaft is distinctly Early.

Transitional period fishspears are of distinctive form (fig. 1, 18) shows

<sup>28</sup> Gifford, n.d. This paper contains full information on this subject.

one of a pair. They are blunted, flat and were arranged laterally on the end of a shaft.

Late culture fishspears are of several types. A simple, two-piece barbed type (fig. 1, 15, 16) in variant forms, and a single point with unilateral or bilateral barbs are most distinctive (fig. 1, 14). A distinctive wooden fishhook has been noted from sites 60, 6 and 138 (Late period).<sup>29</sup>

*Use of human bones for artifacts.* This is a distinctively Early period trait, and is so unusual that we think it worthy of special mention. From a site 107 burial came a "skull cup," a container inside of which were four charmstones. The edges are cut and smoothed down—its use as a receptacle is undoubted (pl. 1d). Site 69 yielded a whistle made of the proximal end of a human radius. In addition, various cut human bones have been found.

Throughout the three periods it is not uncommon to find burials with the skulls missing. The authors believe this to be evidence for the ancient occurrence of taking trophy heads. Kroeber<sup>30</sup> lists this war custom for a large number of Californian groups. Further evidence for this practice is seen in the occurrence of isolated skulls buried with individuals; these are presumably trophy heads.

*Shell beads.* Olivella. The Early period beads are of two types, each of a different species. Small whole shells (*Olivella baetica*) with the spires ground off are common (fig. 1, 4). Large, thick, rectangular centrally drilled beads of *Olivella biplicata* are the second type (fig. 1, 3). Their size is quite distinctive.

Transitional period *Olivella* beads are of four types: (1) circular, flat with large central perforation (fig. 1, 7); (2), "saddle-shaped" (fig. 1, 8); (3), rectangular, but definitely thinner and smaller than its Early period forerunner (fig. 1, 9); (4), small whole shells with the spire ground off.

Late period beads carry on the whole shell with ground spire, and introduce the cupped "saucer" type (fig. 1, 12), which is comparatively crude and on the under side bears part of the lip of the shell. Persisting from the Transitional type is the small, rectangular bead (fig. 1, 10). Minute circular disc beads appear in this horizon.

Haliotis. Early period rectangular beads of the *Olivella* pattern are very characteristic and found only in this horizon. They may have one central hole and undecorated edges, or a two hole variety with lightly serrated edges may occur (fig. 1, 1-2). A few small, circular disc beads are found.

In Transitional times the rectangular bead is forgotten, the emphasis now being on the circular disc type (fig. 1, 6). Large, thick beads of irregular outline are typical.

<sup>29</sup> Heizer, 1936.

<sup>30</sup> Kroeber, 1925, *passim*.

There are no beads of abalone shell in the Late period.

Clamshell (*Saxidomus nuttalli*). This material was not used in the Early or Transitional periods for beads. Late culture deposits yield great quantities of disc beads of this shell (fig. 1, 13). In proto- or early-historic times, long beads of *Tivela crassatelloides* were traded into the valley from some Santa Barbara region source.

*Abalone ornaments*. These, together with shell beads, are our most consistent indicators in characterizing culture periods. Shapes are limited—circular, rectangular, ovoid, etc. Differences are found in such techniques as size, position and number of perforations, decoration, size and species used.

Early period abalone ornaments tend to exhibit two central perforations. The shape is predominantly circular, though rectangular forms do occur.

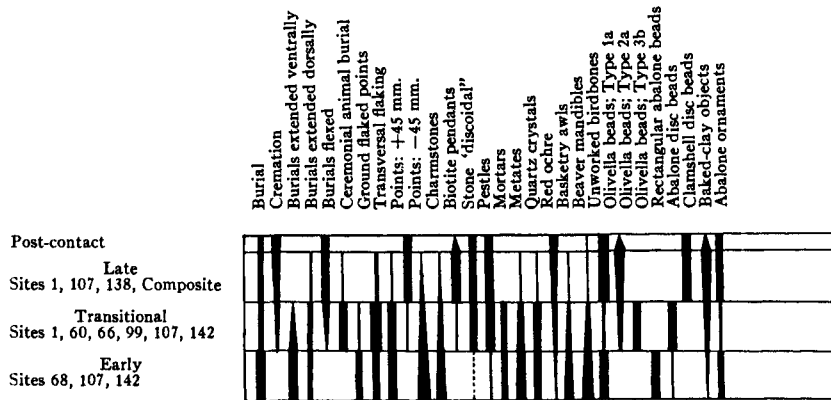


CHART 2. Diagrammatic representation of lower Sacramento Valley cultures

Edges of ornaments of this period may be lightly serrated, though it is most usual for them to be undecorated. *Haliotis rufescens* and *H. cracherodii* are both used.

Transitional period abalone ornaments are predominantly circular. Perforations are generally enlarged, and in extreme cases the ornament appears as a thin ring. Two perforations, one central and one edge, or both central tend to predominate. This type of double perforation seems to be a pattern, since it also occurs on various types of bone implements. Edges may be deeply serrated, an elaboration of the lightly incised edge decoration of the Early period.

In Late times there is an efflorescence of the art of making abalone orna-



ments. Perforations are small, often multiple, and invariably at the edge or periphery of the ornaments. Ovoid, circular and rectangular forms predominate. In addition, there are numerous types of bizarre forms with projecting hooks, lugs, etc. Decoration is accomplished by incising concentric circles on the surface, by drilling small conical pits around the edge of the specimen, or by light edge incising.

#### AGE INDICATIONS

Attention is called to the progressive stages of mineralization of skeletal material and induration of deposits as one goes back in time from Late through Transitional to Early. Early skeletal material is completely permineralized; Transitional bones are slightly but definitely mineralized, while Late skeletal material is fresh-looking, light, clean and friable. Late deposits are soft, ashy midden accumulations; Transitional midden strata are compacted and shot through with small lime accretions, while Early deposits are, except for charcoal flecks, unrecognizable as midden deposit, and have become metamorphosed into areas of calcareous hardpan in which the burials are impeded. This whole question is reserved for future treatment by specialists. It is sufficient to note here that both the varying degrees of compactness of the various cultural deposits and of mineralization of the bones, confirm the general succession of the cultures.

The location of sites is of some significance. As stated before, all Late periods sites are upon existent watercourses, or on lakes known to have existed in historic times prior to agricultural reclamation work. Transitional sites are still on present day streams or marsh basins with one exception (site 142) which will be discussed presently. A distinct physiographic change is indicated by the placement of the Early culture sites. On site 107, the Early period remains are found in clay-filled pits dug into the clay substratum. The ashy mound deposit capping the substratum is unrelated (i.e. nonconformable) to the lower subsoil. On site 142 burials lie in similar subsoil pits—the Late deposit is absent. A gray silty-clay calcareous hardpan dome caps the whole red subsoil elevation. This whole site is now nearly submerged by the alluvial silts which in the course of time have filled in the valley floor. Since the time the Indians used the red subsoil elevation as a burial place, there has been laid down or developed in some manner not only a 6 to 12 inch cap-deposit of silty gray clay, but the level of the valley floor has been raised not less than 30 or 40 inches, until now the site projects only 6 inches above the surrounding alluvial plain. Site 68 is capped by a cemented lime hardpan layer, and the top of the site is 18 inches above the valley plain. When excavation of this site was carried out, we found that there was a maximum depth of deposit of 5.5 feet. The valley had silted

in around the deposits to a depth of at least 48 inches since the first occupation on the red subsoil base. This evidence of alluvial filling, together with the observation that sites 68 and 142 are on now extinct river channels points to a long period of elapsed time since these cultures were operative in the area. Site 107 is a high natural red subsoil elevation rising out of the alluvial floodplain of the Cosumnes river. It has apparently maintained its favorable, above-floodwater, location, throughout the time these cultures have developed. Apparently the choice of site 142 by the Transitional people in which to place intrusive burials took place at a time when the deposits had not become as hardened as they now are, and when the site was still elevated. There is no evidence of Transitional occupation (i.e. refuse strata) on site 142.

#### PHYSICAL ANTHROPOLOGY

The following table comprises what little we know already about the people who are accountable for the various cultural periods.<sup>21</sup> Without much doubt at least two major physical types are represented (pl. 3 j-l, m-o). The skeletal remains will be studied by T. D. McCown.

TABLE 1. CEPHALIC INDICES

<i>Period</i>	<i>Site</i>	<i>Crania</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>
Early	142*	7	74.7	66.8	78.6
	107	16	75.2	70.1	79.7
Trans.	66	53	75.2	70.1	83.7
	99	38	75.6	69.0	80.2
Late	107†	63	80.7	73.0	85.5

\* Typical specimen on plate 3, figs. j, k, l.

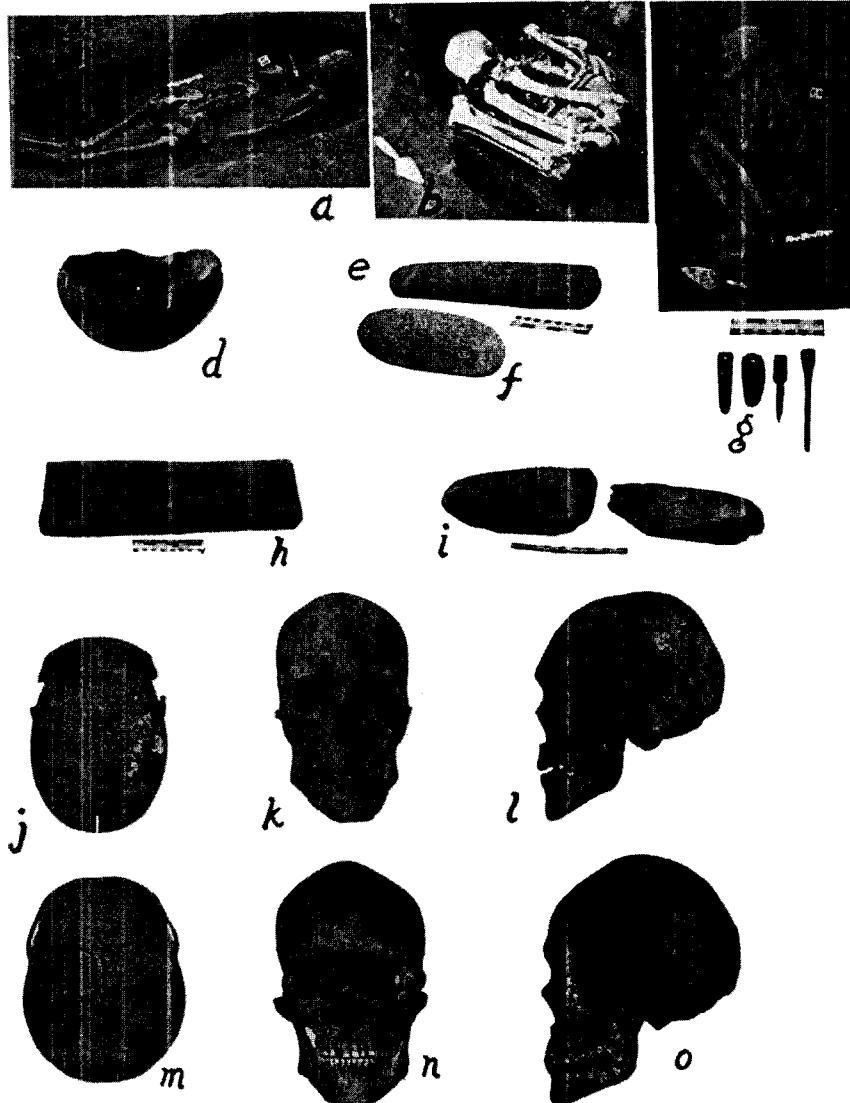
† Typical specimen on plate 3, figs. m, n, o.

#### POSITION OF THE CULTURES

As stated before, we find no developmental stages of the Early Sacramento culture. It first appears, so far as we know, in a fairly developed form with a rich inventory of material traits and with well established trade connections with the Sierras to the east and the Pacific coast to the west. Presumably it has an outside provenience, or at least, an earlier, simpler phase where elements such as abalone ornaments, shell beads, charmstones, etc. were unknown. If these are deleted, a simpler basic cultural substratum remains.

In attempting to place our Early culture, we shall first look to the Santa Barbara region where D. B. Rogers of the Santa Barbara Museum

<sup>21</sup> See Gifford, 1926a, and Kroeber, 1938: 137.



a. burial 15, site 142; b. burial 79, site 99; c. burial 19, site 107; d. skull container, site 107; e. chisel-pointed pestle site 66; f. conical pointed pestle, site 66; g. slate pendants, sites 66, 99, 107; h. sand stone, "paint palette," site 107; i. slab metates, site 107; j. k. l. Early type skull from burial 9, site 142; m. n. o. Late type skull from burial 24, site 1. Specimens shown are in the U. C. and S. J. C. anthropology museums.

of Natural History and R. L. Olson of the University of California have independently established definite culture sequences. Rogers lists his earliest culture as Oak Grove, his latest as Canaliño (Chumash), with an intermediate or transitional phase he calls the period of the Hunting People.<sup>32</sup> Olson has established an Early, Intermediate and Late Mainland sequence, with two correlated Island horizons.<sup>33</sup> Table 2 shows the correlation of the Santa Barbara and Sacramento valley periods.

TABLE 2. PROPOSED CORRELATION OF SANTA BARBARA-SACRAMENTO VALLEY CULTURES

Santa Barbara	Sacramento Valley
Historic [Chumash]	Historic [N. Yokuts, Miwok]
Late Mainland (Olson) Canaliño (Rogers) Late Island (Olson)	Late Sacramento
Intermediate Mainland (Olson) Hunting People (Rogers) Early Island (Olson)	Transitional Sacramento
Early Mainland (Olson) Hunting People (Rogers)	Early Sacramento
Oak Grove People (Rogers) Hypothetical Archaic (Olson)	?????

Up to the present time the simple, unspecialized culture of the Oak Grove people of the Santa Barbara region<sup>34</sup> has not manifested itself in the Sacramento valley plain. The Oak Grove culture would seem to be more directly linked with that, for example, of the San Dieguito Plateau.<sup>35</sup> If this simple, early culture is present in the Sacramento valley, it will prob-

<sup>32</sup> Rogers, D. B., 1929: 342-419. . . <sup>33</sup> Olson, 1930, 1933.

<sup>34</sup> Rogers, D. B., 1929: 342-355, *passim*. The Oak Grove culture complex includes: site locations on old eminences; metamorphosed, highly calcareous, compacted midden deposits; dolichocephalic population; extended burials lying on face or back; heavy, crudely chipped blades; bone bodkins; metate and mano.

<sup>35</sup> Rogers, M., 1929. Sayles (1935: Tables 11, 12) and Gladwin (1937: 33, 114, 137, map 2) have attempted to place these early cultures into a broader pattern of an underlying "pre-agricultural" American cultural substratum. It is not within the scope of this paper to examine the possible validity of this classification of the Oak Grove culture.

ably be discovered only by accident, for the alluvial sediments are deep. It will be recalled that Early sites 68 and 142 are already nearly submerged by alluvium. Earlier sites, if present, are probably completely buried under the floodplain sediments.

Our general conclusion is that the Early Sacramento culture is comparable to Rogers' Hunting People and Olson's Early Mainland horizon to judge from the complexity and general cultural development, presence of charmstones, mortar and pestle, stemmed points, and other diagnostic elements. However, Early Sacramento would seem to contain as cultural carryovers the metate and mano, extended burials lying on the ventral side, and perhaps other traits, from some hypothetical Oak Grove-like antecedent. If this is true, we may look forward to the time when this earlier basic culture may appear in the Sacramento Valley.

The Late Mainland (Olson) and Canaliño (Rogers) and Late Sacramento cultures seem quite similar as indicated by the occurrence of such elements and techniques as flexed burials, predominant use of the mortar and pestle, tubular steatite pipe with bone mouthpiece, paired birdbone whistles, small notched arrowpoints, flat, perforated stone "discoidals," birdbone tubes with incised geometric designs, mortars inverted over burials, shallow hopper mortar, shell applique on mortar rim, and finely worked flat-rimmed, flat-bottomed stone mortars. Other indications are noted in the Late occurrence in both areas of brachycephalic or mesocephalic peoples (dolichocephalic people characterize the Oak Grove and Early Sacramento horizons), loose ashy midden deposits, burning in grave pit, etc. The problem of specific ethnographic similarities between the Chumash and Plains Miwok has not been attacked, but should yield important results when done. It is certain that the Late Sacramento and Late Mainland (Canaliño) cultures are identifiable, in their historic phases, with the Plains Miwok and northernmost Yokuts of the Sacramento valley, and the Chumash of the Santa Barbara region. We thus have positive terminal datings and tribal identifications from which, using our cultural continuum as a basis, we may ultimately be able to set up a time scale.

Although in the past much work has been done in the San Francisco Bay shell-mounds, not much in the way of cultural change has shown up. However, a series of sites sampled in the last few years indicates that not only the bayshore sites, but also mounds in the area between the Bay and the Sacramento-San Joaquin delta region do show significant differences, and that they will fit into the general scheme of culture sequence in the Valley proper when the criteria are applied. Emeryville Shellmound, for example, seems fairly typically Transitional in general content. No Early

period sites are known from San Francisco Bay. Late culture deposits, identical in most respects to those of the valley floor, are known.

Gifford and Schenck<sup>36</sup> failed to find clear evidence of culture change in the Southern San Joaquin valley. Later work, however, conducted under auspices of the FERA by Walker and Strong at Tulamni on Buena Vista Lake, has furnished some evidence of an Early and Late period. At Tulamni, extended burials and mullers were oldest; flexed burials and the mortar were later in time.<sup>37</sup> There is some hope that when the final report appears we may find a succession of burial types, grinding implements, and other traits. This point is not stressed, since we know as yet so little of the results of this excavation.

Thus two facts appear: First, cultural development in certain Californian areas has apparently not been autochthonous, but in at least the three areas outlined above there has been a parallel succession, thus making it a general Californian phenomenon, further evidence of which we may expect when additional areas are investigated carefully. Second, the traditional uniformity and essential stability of California culture of the past is no longer a tenable interpretation; culture change has been definite and pronounced.

The authors forego the temptation of fitting the California sequence into a broader, one might say Western, pattern of underlying dolichocephals using the metate and mano and possibly the spearthrower<sup>38</sup> who were succeeded by a stratum of meso- or brachycephals using the mortar and pestle and bow. More work must be done before such an interpretation can be advanced with sincerity or proof.

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<sup>36</sup> Gifford and Schenk, 1926b.

<sup>37</sup> Stirling, 1935: 399. Personal communication from W. R. Wedel, March 18, 1937. See also the Elk Hills site report (Walker, 1935) for late flexed burials.

<sup>38</sup> The atlatl is well known in the Basketmaker horizon of the Anasazi in the Southwest from Kidder and Guernsey's work, from the Great Basin through Loud and Harrington's investigations at Lovelock Cave. It has recently been reported from dry caves in southeastern Oregon by L. S. Cressman. The question of its presence and significance in the Santa Barbara region has been approached by Woodward (1937) and Heizer (1938b). This distribution, completely surrounding the Central Californian region, would make it seem not improbable that the atlatl was at one time present, although, as stated before, we have no certain evidence of its occurrence. A careful study of the projectile points of the various periods may yield something of a definite nature in indicating weapon types.

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