75. THE ARCHAEOLOGY OF THE FERNANDEZ SITE

A SAN FRANCISCO BAY REGION SHELLMOUND

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ABSTRACT

This descriptive report is the result of several field investigations conducted for the most part between the years 1935 and 1959. It is presented now because the site was virtually destroyed in 1958.

In several respects the Fernandez mound is unusual. First of all, it is a typical shellmound accumulation although it is situated approximately four and one-half miles from the nearest existing source of shellfish. Secondly, the site reflects the most intensive occupation of Phase II of the Late Central California Horizon archaeological culture known in the region of San Francisco Bay south of Marin and Napa Counties. Also, the mound presumably presents a nearly continuous aboriginal occupation from the earliest defined archaeological culture known in the region through the early historic period.

Three main archaeological components may be distinguished on the basis of burials and their accompanying artifacts. The components are: A, Phase II, Late Horizon, Fernandez Facies; B, Phase I, Late Horizon, Emeryville Facies; C, Middle Horizon, Ellis Landing Facies.

PREFACE

To acknowledge individually each of those who has contributed a share of time, labor, or information to the project would here be needlessly difficult. Special recognition is extended to Mr. Manuel Fernandez, who granted permission to the University of California to excavate on his property in 1938, and to his son, Mr. C. B. Fernandez of Pinole, who kindly allowed the U.C.A.S. to conduct the 1959 excavations. Appreciation is also extended to Mr. Donald Perryman of Martinez, who supplied us with data on his collection of burials and artifacts from the site. Mr. L. J. Barker of Berkeley generously donated a considerable collection of artifacts which he had recovered from burials and cremations in the mound.

INTRODUCTION

The Fernandez mound is situated at the base of a range of hills which forms the southern slope of Rodeo Valley, on the left bank of a small unnamed creek tributary to Rodeo Creek, at approximately 38° 2" north latitude and 122° 31" west longitude. The property on which the site is located is presently owned by Mr. C. B. Fernandez of Pinole. It had been purched originally by his grandfather, Bernardo Fernandez.

Bernardo Fernandez had been a sailing master who settled in Pinole in August, 1854, and established a grain storage and shipping enterprise (Anon., 1882, pp. 556-57).

According to the present owner, at the time his grandfather bought the land there were no Indians living in the vicinity of Rodeo Valley or Pinole, nor had any other ranchers lived on the land. In this connection, it is interesting to note that at site CCo-2, located about three-quarters of a mile due west of the Fernandez mound, historic materials in the form of crockery sherds were noted on the surface of the site by Mr. C. B. Fernandez. We were unable to obtain samples of this material due to the fields being in permanent pasture. A single test pit was sunk into the deposit at CCo-2, but no artifacts were recovered although two burials were exposed at a depth of 4 feet. Thus it is possible that a continuous occupation from Middle Horizon times to the historic period between 1800 and 1825 is traceable at the Fernandez mound, which yielded a single glass trade bead and a scraper fashioned from bottle glass, and at site CCo-2, from which crockery sherds were collected. However, a detailed study of this possibility must await further investigation at CCo-2.

The Fernandez mound was first recorded by Nelson (1909, Map 1; p. 329), who assigned to it number 259 in his survey. This number was retained by the University of California Archaeological Survey and the abbreviation CCo-, referring to Contra Costa County, was prefixed. Thus the official designation of the Fernandez mound in the files of the UCAS is CCo-259. In 1910 Nelson excavated a single burial from the site, but accompanying data are lacking.

L. J. Barker, an amateur collector, removed ten burials and cremations with associated grave goods from the deposit in 1935. The collection taken at this time, together with the accompanying burial data, was subsequently donated to the Museum of Anthropology of the University of California.

In October, 1938, R. F. Heizer, together with several other graduate and undergraduate students from the University of California, excavated several cremations and burials from the site. Except for minor excavations by local collectors between 1938 and 1958, the site remained relatively undisturbed aside from annual hay crop cultivation. It was the intention of the Archaeological Survey to conduct extensive excavations at the site if it was informed of the imminent destruction of the area.

In the summer of 1958, a garden supply company purchased rights to level the mound for the purpose of obtaining topsoil. The Archaeological Survey learned of the situation only incidentally when the owner was approached for permission for the University of California to conduct a field class in archaeological method at the site during the following spring term. By August, 1958, the mound had been virtually leveled; however, a small remnant of the original surface was preserved at the southern margin of the site (see Map 1), and auger tests revealed a depth of 4-5 feet of deposit remaining below the leveled portion. During the course of the topsoil excavating operations, Donald Perryman, an interested local collector, was able to obtain information on seven cremations accompanied by grave goods. This information he kindly made available to the Archaeological Survey.

Since one Middle Horizon burial had been recovered in the excavations of 1938, it was believed that an undisturbed Middle Horizon burial area might be discovered through further excavation in 1959. Hence, it was decided to proceed with the plan of excavating the site during the spring semester of that year. Permission to dig was granted, and excavation was carried out by the field class for a portion of the term. Two Middle Horizon burials with accompanying artifacts were recovered; however, the area dug proved to be quite barren of other artifacts or features.

The Archaeological Survey continued excavating the site through part of the summer of 1959; this resulted in the discovery of a Middle Horizon burial area from which eight burials with accompanying artifacts were removed.*

ENVIRONMENT

Rodeo Valley, in which site CCo-259 is located, is one of a number of similar shallow valleys trending northwesterly in the northern end of the Mt. Hamilton Range of the Coast Ranges. This is the lowest section of the Coast Ranges of mountains and forms the southern part of the low gap through which the Sacramento-San Joaquin river systems flow into the complex of bays, Suisun, San Pablo and San Francisco, and thence through the Golden Gate into the Pacific Ocean.

* The present paper is based upon these several collections.

The climate is typical of that of the east side of San Francisco Bay, which is characterized by very dry, moderately warm summers and cool, moderately wet winters.

Rodeo Creek and its tributaries normally carry water through much of the year, but frequently are dry in the early fall. However, the surrounding land is not completely dry, since several nearby springs in the hillsides appear at present to be running throughout the year.

Numerous land mammalian species were available to, and utilized by, the aboriginal inhabitants, as judged by their osteological remains in the site. Apparently the single most important mammal, both for food and furnishing raw material for making implements, was the black-tailed deer (Odocoileus hemionus columbianus).

Sea mammals and fish appear not to have been generally available to the inhabitants, except perhaps through trade or an occasional fishing venture to San Pablo Bay or Carquinez Straits. Gill plates of the large sturgeon (Acipenser, sp?) are present but no other bones of this species were found. Rostlund (1952, p. 12) says this is to be expected, since their bones are "primarily cartilaginous and would not be long preserved."

Molluscan species gathered included an abundance of salt water mussel (Mytilus edulis), a small bay oyster (Ostrea lurida), and in the upper levels of the midden the soft-shelled clam (Macoma nasuta) is abundant. Shells of a small marsh gastropod (Cerithidea californica) and a fresh water clam (Margeritifera margaritifera) are also present in some quantity and were probably used as a supplementary food resource.

Of the several dominant floral species in the vicinity of the site, the following were probably most important economically, either as food or for artifact materials: oak (Quercus lobata, Q. agrifolia, Q. wislizenii), buckeye (Aesculus californica), blue elderberry (Sambucus glauca), wild grape (Vitus californica), and willow (Salix sp.).

Geographically the region is quite favorable for aboriginal occupation. Water was in plentiful supply and near at hand, and food was abundant; with the exception of shellfish, the gathering of which necessitated a walk of about nine or ten miles round trip, all animal or plant species were immediately available. In any case, the trip to the shores of San Pablo Bay would not necessarily have been made every day.

Because of the presumed long occupation of the site, we may assume that the region remained a favorable one ecologically for unspecialized hunters and gatherers during the entire period of such occupation.

DESCRIPTION OF ARCHAEOLOGICAL REMAINS

A. Mound Constituents and Structure

The site, as noted by Nelson (1909, p. 329), is unusual because it has a very high shell content of species of salt water molluscs and yet is situated about four and one-half air miles from the shore of San Pablo Bay.

The lower depths of the midden are characterized by a clayey soil, presumably stained black by carbon and organic matter, and are shot through with finely crushed shell, predominantly of a salt water bay mussel (Mytilus edulis) and the oyster (Ostrea lurida). In addition to burials and artifacts, there are quantities of small, waterworn pebbles, larger fist-size cobbles, animal bone, ash, and charcoal.

The upper levels of the site are characterized by larger amounts of nearly whole shell, predominantly that of the soft-shelled clam (Macoma nasuta), although oyster and mussel shells are also conspicuous.

Several previous investigators have observed these same features, i.e., a general change from mussel and oyster shell in the lower levels to clam shell in the upper levels (Nelson, op. cit., p. 338; Gifford, 1916, p. 9, tables 13-22; Greengo, 1951, p. 5, fig. 1B; Davis and Treganza, 1959, p. 8), and finely crushed shell and more compact deposit in the lower portion (Nelson, op. cit., p. 336; Davis and Treganza, op. cit., p. 8).

The occurrence of numerous water-worn pebbles has also been noted (Nelson, op. cit., p. 335; 1910, p. 379; Greengo, op. cit., pp. 4, 8). Each of these investigators finds the circumstance puzzling (ibid.), but it seems possible that these small pebbles were brought in inadvertently as a concomitant of gathering mussel and oyster, which attach themselves to both large and small rocks as well as to one another. It seems likely that the molluscs were plucked away from the larger rocks before being carried home because of the added weight, while the numerous small pebbles were left attached to the shellfish, not seeming to add a great burden to the daily collection. Numerous trips by many individuals over a long time span thus would contribute a large quantity of pebbles to the total accumulation of refuse. This same phenomenon was noted during excavations by the University of California Archaeological Survey of a site likewise situated several miles from the shores of the bay, near El Sobrante (site CCo-151).

The original surface contour of the mound cannot be ascertained with positive accuracy because the drafting of a contour map of the site had not been accomplished prior to its virtual destruction in 1958. It was felt

that since a remnant of the original slope at the southern edge of the site was left undisturbed, it might be possible to extrapolate the original contours with the aid of field descriptions and early photographs. Even with these obvious limitations, it is believed that a reasonably accurate reconstruction of the original surface contours of the mound has been achieved (Map 1).

Verbal descriptions of the appearance of the mound before it had been disturbed indicate that it sloped gently from the west to an elevation of about 7 feet above the surrounding terrain. The highest part of the mound occurred near its southern and eastern portions, and the margins facing the creek to the south and east descended quite rapidly. A fairly extensive area on the top of the site has been described as being quite flat. An examination of the extrapolated contours depicted on Map 1 reveals each of the aforementioned characteristics.

Measurements of the distances presented in Diagram 1, which represents the north-south transection of Trench A (Map 1), were obtained through direct measurement and the aid of a level-transit and stadia rod. The line above the top of the transection represents the original surface of the mound, based upon the extrapolated contours above Trench A. With the aid of this diagram, it is possible to convert the depth measurements obtained during the course of the excavations in 1959 into depths from the proposed original surface of the mound. The fact that such extrapolated depths are not absolutely accurate is realized, but it is felt that they are in error by probably not more than 12 inches, and that even such a large possible error is better than no reasonable approximation. Measurements of the depths of artifacts, burials, and features unearthed in 1959 were taken from the southwest corner of each excavation unit. Thus in the transectional diagram the depths which have been added to those recorded in the field are shown above the lines corresponding to the southern end of each pit.

Because the Fernandez site evidently spans such a long period of probably continuous occupation, a short summary of the Central California culture chronology is offered here. The three temporal subdivisions involved, A, B, and C, correspond respectively to dated Central California archaeological horizons, as follows.

Component	Horizon	Approximate Date
A	Late (Phase II)	1600-1850 A.D.
B	Late (Phase I)	300-1600 A.D.
C	Middle	3000 B.C.-300 A.D.

Details and documentation of this chronology are given in the final section of this paper, titled "Culture Chronology."

B. Burial Complex

Since 1910 several persons or groups have excavated and recorded burial data at the site. Throughout the text of this paper (and summarized in Table 1) references to the burials are made by using numbers and letter prefixes. The key to the letter prefixes is here shown, arranged alphabetically, as follows:

Prefix	Person or group which recovered data, with date	Predominant type of interment
B	L. J. Barker (1935)	Cremations
C	UC Field Party (1938)	Cremations
D	UCAS Field Party (1959)	Flexed burials
F	UC Field Class (1959)	Flexed burials
H	UC Field Party (1938)	Flexed burials
N	N. C. Nelson (1910)	Flexed burials
P	D. Perryman (1958)	Cremations

Table 1 shows that two predominant methods of disposing of corpses were practiced during the history of the mound. The earliest practice was that of primary inhumation in a tight, ventrally flexed position. All Middle Horizon (Component C) burials accompanied by mortuary goods were so disposed. Eight burials from C Component not possessing preserved artifacts were flexed in various postures; three on their right side, two on their left, and three ventrally. There seems to have been no preferred direction toward which the bodies were oriented.

Though there apparently was no specific cemetery, burials do tend to be grouped in the same general area, in what were probably different periods of occupation. This grouping of burials has been noted by other investigators (Lillard and Purves, 1936, p. 9; Heizer and Fenenga, 1939, p. 385; Davis and Treganza, op. cit., pp. 9-10).

Cremation replaces primary inhumation as the predominant means of disposal of the dead in both Phases of the Late Horizon (Components A and B), although the earlier method (primary interment) continues to be practiced.

Two methods of cremation may be distinguished from the remains. One of the methods involved placing the corpse on a fire in a pit and shortly there-

after extinguishing the fire, which resulted in only partial cremation; sometimes the bones of individuals so treated are merely scorched on the underside. The other method involved placing the corpse on a very hot fire and maintaining the temperature for some time. The result is a nearly complete cremation of the corpse with only a handful of charred or calcined bone remaining in the ashes.

Each method of cremation was apparently practiced in both A and B Components. Lillard, Heizer and Fenenga (1939, p. 79) found partial cremations to be most prevalent in the Delta Province during Phase I of the Late Horizon. Beardsley (1954, pp. 60, 84) lists the generic trait of cremation as a feature of the Late Horizon generally and of the Phase I Emeryville Facies specifically. Cremations, though evidently not widely prevalent, are nevertheless known from the Early Horizon in the Central California archaeological sequence, and one lot of calcined human bone, from a cremation at site SJo-68 has been carbon-14 dated (Heizer, 1958, p. 3). Heizer and Fenenga (op. cit., p. 385) found rare cremations in the Middle Horizon in the Interior Valley Zone and state that the trait becomes much more frequent in the Late Horizon.

Cremation was apparently absent in Alameda Province during the Middle Horizon except as noted by Davis and Treganza (op. cit., p. 9) in Component C of Ala-328.

C. Ceremonial Complex

Charmstones. Thirty-four charmstones, comprising eighteen separate types, were recovered, mostly from the screen of the topsoil excavators. The specimens are now in the possession of private collectors.

The typology employed in this report is identical to, and a continuation of, that utilized by Davis and Treganza (op. cit., p. 15). The prime consideration in this typology is whether or not a perforation is present. Other criteria which may be applied to either of the basic categories, I (single biconical perforation near one end) and II (not perforated), are as follows: (A) ends not piled, (B) ends piled, (C) with longitudinal grooves completely around specimen. Additional criteria, here included under category (M) (miscellaneous), have no relationship to the primary criteria (perforated or unperforated).

It will be observed in the paradigm below, employed to show the specific ramifications of charmstone types, that traits such as shape apply to each of the larger categories (i.e., those represented by the capitals A, B, C) separately. An example of the use of this classification is as follows: a

type IA2b charmstone is one with a single biconical perforation near one end, with an asymmetric spindle shape, with the end of greatest diameter curved, and with tip blunt or rounded. (Ends not piled.)

A. End(s) not piled (i.e., one or both ends not modified by secondary curvature).
   1. Egg-shaped.
   2. Asymmetric spindle-shaped.
      a. End of greatest diameter shouldered, tip more or less pointed.
      b. End of greatest diameter curved, tip blunt or rounded.
      c. End of greatest diameter curved, tip blunt or rounded; grooved at perforated end.
   3. Symmetric spindle-shaped.
      a. Perforated end squared off and grooved longitudinally; opposite end curved with blunt tip.

   5. Pendular.
      a. Smaller end with encircling groove.

B. End(s) piled (i.e., one or both ends modified by secondary curvature).
   1. Plummet-shaped.
      a. Piled at both ends.
      b. One end piled, opposite end not piled.
      c. One end piled, opposite end knobbed.
   2. Symmetric spindle-shaped.
      a. Piled end grooved.
   3. Asymmetric spindle-shaped.
      a. Piled end knobbed.

C. Longitudinally grooved completely around.
   1. Symmetric spindle-shaped.
   2. Sides parallel, ends slightly curved.

M. Miscellaneous.
   1. End grooved, incised geometric design (fragment) (fig. 6d).
   2. Longitudinally grooved around one end and two sides (fragment).

Outline drawings of charmstone types may be seen in Figure 1.

All but one of the nonperforated charmstones for which there are depth data occur at depths above 60 inches; the only perforated charmstone for which there is find information occurred at a depth of 89 inches.

Lithic materials utilized in the manufacture of the nonperforated forms include sandstone, microcrystalline metasedimentary rock, and basalt (perhaps derived from the Napa area along with obsidian). The single type IIC1 is reddish scoria. Four of the five perforated specimens are steatite; type IB1b is granitic.

The general difference between lithic material employed in making perforated charmstones and nonperforated forms was observed at another site (Ala-328) on the east side of San Francisco Bay (Davis and Treganza, op. cit., pp. 15-16, table 5). It was also observed at Ala-328 that the perforated forms were considerably lower in depth than the nonperforated ones (ibid., table 5). Until further data are available, present evidence supports the generalization for Alameda Province that perforated charmstones (usually of steatite) are associated with the Middle Horizon, while the Late Horizon is characterized by an abundance of nonperforated forms.

Other investigators have tended to regard perforated charmstones as being more ancient than those lacking such modification in Central California (Heizer and Fenenga, op. cit., p. 385; Kroeber, 1936, pp. 112, 114; Schenck, 1926, pp. 259-60).

A reverse sequence, i.e., a preponderance of nonperforated charmstones being followed in time predominantly by perforated forms, was noted by Meighan (1955, cf. figs. 4-8) for the region north of San Francisco Bay. The following observation (ibid., p. 31) is pertinent in this regard.

"The major difficulty in setting up the Clear Lake Complex is the possibility that older archaeological objects may have been picked up by the Indians; this problem is likely to lead to erroneous interpretation for such objects as projectile points and charmstones."

As to the possible range of functions of these stones in California, the reader is referred to a paper reporting a charmstone site north of San Francisco Bay (Elsasser, 1955).

Most of the charmstones from CCo-259 show traces of asphaltum around the small end and generally exhibit battering scars at the large end. It appears that nearly all of them were designed to be suspended in some fashion and experienced a fairly rough usage or handling.

Types IIC1 and IIC2 do not present these characteristics, and it is possible that they were not charmstones at all. Each of these specimens is quite similar in size and shape to grooved stones illustrated by Barrett (1952, pl. 61, fig. 6; pl. 62, fig. 4) and described by him as "string-stretchers" utilized during the twining process to stretch the string for added strength (ibid., pp. 176, 277).

Quartz crystal. Associated with burial C-4 was a small, transparent crystal of quartz exhibiting scars from battering on the pointed end.

Quartz crystals occur throughout the archaeological record in Central California (Heizer and Fenenga, op. cit., p. 381; Lillard, Heizer and Fenenga, op. cit., p. 75; Beardsley, 1954, p. 83; Heizer, 1949, p. 19).

Fired clay figurines. Of particular interest among the cultural remains at this site are a number of fragments of fired clay, some of which are believed to be portions of human figurines. Unfortunately, none of the eight specimens was recovered through systematic excavation.

A brief description of each specimen will be given in order to allow reasonable comparison with similar articles from other regions.

UCMA 1-223136. This specimen is a small, buff-colored, cigar-shaped roll of fired clay containing a finely crushed shell and grit temper. One end is rounded and slightly flattened, the other end terminates in a pinched concave projection. The possibility that it is the leg of a figurine is suggested even though no previously known examples of legged figurines are known from Central California. However, it may also be a complete bird effigy similar to those described by Heizer (1937) for Central California. (See Davis, 1959, for a discussion of the known California occurrences of anthropomorphic figurines.) The measurements of this specimen are: length, 60 mm.; average diameter, 7.5 mm. (illustrated pl. 2o).

UCMA 1-137082. This object is similar to UCMA 1-223136, described above, and it is suggested that it too may be the leg of a human figurine or a bird effigy. The roll of clay tapers from a broken end measuring 12 by 18 mm. in opposing transverse sections to a diameter of 9 mm. at the "foot" end. From the end of lesser diameter a pinched projection extends which possibly represents a foot. It is of a gray-black color, with finely crushed shell and grit temper, and is 50 mm. long (illustrated pl. 2n).

UCMA 1-223135. A small, undecorated, cigar-shaped roll having both ends broken. It is buff colored and contains a grit and finely crushed

shell temper. Measurements of the object are: length, 48 mm., and 12 by 13 mm. in opposing transverse sections.

UCMA 1-137158. Same as UCMA 1-223135 described above. Measurements are: length, 30 mm. and 12 by 16 mm. in opposing transverse sections.

UCMA 1-137083. Same as UCMA 1-137158 except that it is sharply curved and may have asphaltum mixed with clay. Measurements are: length, 30 mm., and an average of 16 mm. in diameter.

UCMA 1-137084. Same as UCMA 1-137083 described above, except asphaltum is not included. Five mm. from one of the broken ends is a small, conical, pinched protuberance which may represent a female breast.

UCMA 1-223133. Small, pencil-sized roll which is brown in color. Measurements are: length, 28 mm.; diameter, 9 mm.

UCMA 1-223134. This specimen is a grayish-buff color and contains grit temper. It is a cigar-shaped roll, 40 mm. long and 11 by 13 mm. in opposing transverse sections. From one broken end it tapers to a rounded base. Three rows of punctate dots extend from the break to a distance of 8 mm. toward the base. Immediately below the rows of dots are two shallow horizontal incisions 3 mm. in length, which are 2 mm. apart (fig. 6e).

UCMA 1-137157. A small, bulbous, buff-colored piece of fired clay containing grit temper is present in the collections but lacks specific data as to its provenience in the site. It is somewhat flattened on one side and measures 34 mm. in length by 7 mm. in diameter at the small end, with a diameter of 10 mm. at the bulb end. It is apparently complete and the possibility that it represents the figurine of an infant is suggested.

Beardsley (1948, p. 13; 1954, p. 59) assigned the trait of fired clay human figurines to the Middle Horizon McClure Facies in the Marin Province of Central California; however, it is certain that the example from site Sac-6 illustrated in Davis' paper (op. cit., fig. 1g) is from a pure Late Horizon site in the Delta Province. Specimens from the Fernandez mound, with one exception (this piece lacks provenience data), were recovered from the screen of the topsoil excavators in 1958 and probably are from a Late Horizon occupational zone.

Stone pipes. Associated with burial B-A, at a depth of 24 inches, was a thick-walled, biconically-drilled, tubular pipe of sandstone, having a flanged, grooved proximal end. (See pl. 2m for illustration.) It had been subjected to considerable heat, apparently as the result of cremation of the corpse.

Measurements of the specimen are: length, 104 mm.; diameter at stem end, 32 mm.; diameter at bowl end, 45 mm.; inside bowl diameter, 20 mm.; inside stem diameter, 17 mm.; inside diameter where the two perforations meet, 5 mm.

In the grave pit of burial B-D, at a depth of 30 inches, was a fragment of a polished, black tubular pipe of steatite.

Burial C-7, at a depth of 54 inches, included one polished black steatite tubular pipe, having a single flange at the stem end. It is in two fragments, one the stem end, the other the bowl end. Red ochre is present on both fragments, but it does not appear to have been intentionally painted, rather the stains appear to be the remains of powder sprinkled on the corpse at the time of cremation (pl. 2q).

Measurements of this specimen are: length, greater than 60 mm.; diameter at stem end, 26 mm.; diameter at bowl end, 31 mm.; inside bowl diameter, 21 mm.; inside stem diameter, 13 mm.

Another polished, black tubular pipe of steatite, having a flanged end, was recovered during the mound-leveling operations. Its measurements are: length, 44 mm.; diameter at bowl end, 28 mm.; diameter at stem end, 25 mm.

A single example of a conical steatite pipe was associated with burial C-4 at a depth of 51 inches (see pl. 2p). Measurements of this pipe are: length, 25 mm.; diameter at bowl, 18 mm.; inside stem diameter, 8 mm.

Biconically drilled tubular stone pipes are affiliated with the Late Horizon in Central California (Heizer and Fenenga, op. cit., p. 383; Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 18; 1954, p. 61), although what is presumed to be a small conical pipe bowl occurs in Middle Horizon times (Beardsley, 1954, p. 83).

Conical baked clay pipe. From the surface of the site was recovered a fragment of what is assumed to be a fired clay pipe. It is an ashy-gray color both on the exterior and interior, and contains a fine grit temper.

The outside diameter at the stem end is 10 mm., and at the broken bowl end it is 35 mm. Length of the fragment is 46 mm. A perforation having a constant diameter of 4 mm. extends 41 mm. from the stem end of the base of the bowl. A specimen from the Interior Valley Zone, having a nearly identical shape, is illustrated by Heizer (1937, p. 37, fig. 3[6]B).

Another similar pipe of the same color and shape was found in the screen of the topsoil excavator. Its measurements are: length from stem to broken bowl end, 53 mm.; diameter at broken bowl end, 28 mm.; diameter at stem end, 12 mm.

Similar pipes are known from several areas in Central California (e.g., in the San Francisco Bay region) and are attributable to the Late archaeological Horizon (Heizer, 1937, passim; Schenck and Dawson, 1929, p. 366; Davis and Treganza, op. cit., p. 20).

Bird bone whistles. Seventy-three whistles of bird bone have been recovered. Fifty-two of these were associated with five burials (see table 1 for these associations).

Lengths range from 52 mm. to 210 mm., with an average of 107 mm., and diameters range from 4 to 14 mm., with an average of 8 mm.

The stop hole is cut always on the concave curvature of the bones at about the midpoint of the length, with the exception of seven specimens associated with burial N-1 which have the stop cut at about one-third of the length. Both ends are trimmed and smoothed on practically all of the specimens. Asphaltum stop plugs are preserved near the holes and at one end on many examples. Two of the whistles associated with burial D-8 retain impressions of shell beads in asphaltum near the stop holes, but it is impossible to determine exactly which bead type was present.

Davis and Treganza (op. cit., p. 21) suggest that a temporal difference existed between two types of bird bone whistles occurring at Ala-328. Subsequent investigation, e.g., by Hammel (1956), has not demonstrated clear typological distinctions through time, and the sample of whistles from CCo-259 also cannot be utilized to reinforce the suggestion.

Incised bird bone tube. In the grave of burial C-12, at a depth of 54 inches, were several fragments representing one or possibly two incised bird bone tubes. The geometric design is rather difficult to describe in a brief and lucid manner; therefore the reader is referred to Figure 6a for illustration of these fragments.

A sharp flake of obsidian could have been employed in making the shallow incisions which were then apparently rubbed with dark pigment (charcoal?) to highlight the design.

Another fragment of a bird bone tube incised with a geometric design was

found unassociated in the midden. Again, it is suggested that charcoal had been rubbed into the incisions to highlight the design elements. This specimen is illustrated in Figure 6b.

Incised bird bone tubes evidently occur first in the Delta Province in Phase I of the Late Horizon and carry over into Phase II in all archaeological provinces (Heizer and Fenenga, op. cit., p. 383; Lillard, Heizer and Fenenga, op. cit., pp. 79-80; Beardsley, 1948, p. 18; 1954, p. 60).

Undecorated bird bone tubes. Only two complete bird bone tubes have been recovered. One of these was associated with burial B-A at a depth of 24 inches. It is 47 mm. long and 5 mm. in diameter. The other complete specimen lacks association and depth data. It is 56 mm. long and 20 mm. in diameter.

Eight long fragments of worked bird bone were recovered from various depths in the mound, frequently with burials which also contained bird bone whistles. It may be that several or all of the fragments described here are actually whistle fragments, but since they lack necessary features for classification as whistles, they are listed merely as tubes.

No temporal significance is attached to the occurrence of these objects.

Red ochre. Powdered red ochre, besides being sprinkled on numerous corpses, was also apparently employed as a pigment for red paint, as demonstrated by markings on clay figurine fragments and one charmstone.

In the grave of cremation 12 was a large quantity (about five pounds) of roughly shaped lumps of the mineral, which had been mixed with a small amount of clay to hold it together.

Quite possibly the substance was employed as a body paint also, although there is no archaeological evidence to support such an assumption.

Heizer and Fenenga (op. cit., p. 383) list shaped lumps of red ochre as a trait of the Late Horizon.

Sprinkling powdered ochre in the grave is much more common in the Middle Horizon, but also occurs in both phases of the Late Horizon (Heizer and Fenenga, op. cit., p. 383; Lillard, Heizer and Fenenga, op. cit., p. 78; Beardsley, 1954, p. 85).

Painted stone "tablet." A single thin, flat piece of gray sandstone, exhibiting rows of parallel black lines, was associated with cremation 4 at a depth of 51 inches. It is fractured on all sides. Its measurements are: length, 52 mm.; width, 45 mm.; thickness, 6 mm. One flat side is rough, the other smooth. On the smooth face, 14 mm. apart, are two sets of three straight parallel lines, about 1-1.5 mm. apart. Intersecting one of the sets of lines at an angle are two straight parallel lines, about 1.5 mm. apart. (See Fig. 6c for illustration.)

Similar but more elaborately executed painted stone tablets are well known in the Napa region (Heizer, 1953, pp. 257, 283) where they are presumed to be chronologically late on the basis of depth of occurrence at site Nap-1 (ibid., p. 257).

Unmodified stones in grave. Recovered near the skull of burial D-6 at a depth of 104 inches, were three large subspherical cobbles of metasedimentary rock. Each exhibits a slight but perceptible amount of apparently random pecking but no battering. Their circumferences are 280 by 350 mm., 280 by 320 mm., and 310 by 340 mm. What utility they might have had is unknown.

In the grave of burial H-1, at a depth of 66 inches, were seventeen round, smooth, water-worn pebbles of various kinds of stone, whose sizes range from that of a large marble to that of a small hen's egg. Similar mortuary accompaniments are known from other sites in Central California, most commonly in the Early and Middle Horizons (Heizer and Fenenga, op. cit., p. 381; Heizer, 1949, p. 24; Beardsley, 1954, p. 83; Davis and Treganza, op. cit., p. 18.

Incipient "Stockton curve." A long, curved obsidian flake with fine pressure flaking along parts of two edges appears to be an unfinished "Stockton curve." It is 95 mm. long, 27 mm. wide, and 9 mm. thick. Data on its depth of occurrence in the site is lacking, but it may be assumed to be late in the sequence of culture at the site, as it is in the nearby Stockton region (Jones, 1922, p. 115; Heizer and Fenenga, op. cit., p. 382; Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 19).

D. Dress and Ornamentation

Shell beads. As noted by numerous authors (Heizer and Fenenga, op. cit., p. 391; Lillard, Heizer and Fenenga, op. cit., passim; Beardsley, 1948, p. 3; 1954, passim), shell bead types, or rather the co-occurrence of certain types

coupled with the absence of other types, is the single most important diagnostic criterion in establishing the horizon affinity of any given burial complex in a site component in Central California. Evidence existing in the present instance adds additional weight to this concept.

Numerous shell bead typologies have been utilized by several authors; however, the one enjoying the most general use is a slightly modified version of that employed by Lillard, Heizer and Fenenga (op. cit., p. 12). Following is a modification of that typology as used in this report:

Clam shell bead types:

1. Circular disc bead, biconically perforated (Saxidomus nuttali).

Pismo clam bead types:

2. Cylindrical bead with longitudinal perforation (Tivela stultorum). (Beardsley, 1954, p. 97, notes the occurrence of a single Tivela cylindrical bead; however, it was not located in the existing collection from the site.)

Olivella shell bead types (shell morphology nomenclature adopted from Keen and Frizzell, 1953; Keen and Pearson, 1958):

1a. Whole shell with posterior spire ground off square.
1c. Whole shell with posterior spire and anterior end ground off square.
2a. Small, flat, rectangular bead with central perforation.
3a1. Approximately half-shell, deeply cupped, oval outline, central perforation with remnant of either parietal callus and/or outer lip along one or both edges of bead.
3a2. Approximate half-shell with inner whorl remnant at one end or slightly to one side of end, circular central perforation.
3b. Saddle-shaped bead, ovoid with rounded ends, longitudinal curvature, central perforation.
3e. Circular, small, cupped, thick, with central perforation cut from very near tip of posterior spire.

The familiar clam disc bead complex, that is, Olivella bead types 3a1, 3a2, 3e, cylindrical magnesite and/or steatite beads along with clam disc beads, is well represented in the upper 6 feet of the Fernandez mound (see table 1) and represents a Phase II Late Horizon assemblage (Heizer and

Fenenga, op. cit., pp. 383, 390, 391; Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 19; 1954, pp. 60, 86).

Olivella type 2a is diagnostic of the Phase I, Late Horizon in Alameda Province (Beardsley, 1948, p. 18; 1954, p. 85) as well as in the Delta Province (Lillard, Heizer and Fenenga, op. cit., p. 80).

Olivella type 3b is diagnostic of the Middle Horizon in all provinces of Central California (Heizer and Fenenga, op. cit., p. 382; Lillard, Heizer and Fenenga, op. cit., p. 78; Beardsley, 1948, p. 12; 1954, p. 83).

The significance of the types and their distribution at site CCo-259 is discussed under "Culture chronology."

Haliotis ornaments. The following typological designations have been established and are illustrated in Figure 2.

R: Rectangular
- a. Single perforation at one end, not decorated.
- b. Two perforations at one end, not decorated.
- c. Two perforations at one end, other end with serrated edge.
- d. Two perforations, one at end, one at side edge.

T: Subtrapezoidal
- a. Single perforation at short side, not decorated.
- b. Two perforations at short side, shallow, solid triangular incisions on opposite side.
- c. Two perforations at short side, single circular notch on one long side; not decorated.
- d. Same as above, type Tc, except side opposite perforations is serrated.
- e. Four perforations on short side, undecorated.
- f. Four perforations on short side; single circular notch on one long side; two short sides have shallow, solid, triangular incisions.
- g. Five perforations on short side.

E. Subelliptical
- a. Single perforation at one end, not decorated.
- b. Two perforations at one end, not decorated.
- c. Two perforations on each of two opposing sides.

C. Circular
- a. Single peripheral perforation; serrated around circumference.

C. Circular
   b. Single peripheral perforation, short incised lines around circumference.
   c. Four closely spaced peripheral perforations; short, incised lines around circumference.
   (1). Circular with large single central perforation, not decorated.

B. "Banjo" type
   a. Single peripheral perforation near large end.

A. Amorphous
   a. Three randomly spaced peripheral perforations, not decorated.
   b. Single peripheral perforation, four circular notches along one edge.

Since ornament type C(1) is a marker trait of the Middle Horizon (Heizer and Fenenga, op. cit., p. 393; Beardsley, 1948, p. 12; 1954, p. 83; Cook and Elsasser, 1956, p. 40 ff.) and has usually been designated as type C(1) (e.g., Cook and Elsasser, loc. cit.; Heizer and Fenenga, op. cit., p. 15), this designation is retained here. Following is a concordance of various typological designations employed by different authors in identifying this type:

Lillard, Heizer and Fenenga (loc. cit.)	C(1)
Gifford (1947, pp. 13, 71)	(J2aI (J2aII (J2aIII
Beardsley (1954, fig. 7b)	RC(1)
Cook and Elsasser (op. cit., p. 40, pl. 1d)	C(1)
Davis and Treganza (1959, p. 32, fig. 2e-f)	IV

Little information of diagnostic temporal value may be proposed on the basis of the Haliotis ornaments from CCo-259 except such as already mentioned.

Edge incising and multiple perforations near the edge of ornaments are apparently more prevalent in the Late Horizon (Heizer and Fenenga, op. cit., pp. 383, 393), although Lillard, Heizer and Fenenga (op. cit., p. 78) ascribe both features to ornaments in the Middle Horizon also.

Type B ornaments first appear in simple form in Phase I of the Late Horizon and become much more elaborate in Phase II times (Heizer and Fenenga, op. cit., p. 383; Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 18; 1954, p. 61).

Haliotis bead. A single circular disc bead of Haliotis (sp. ?), having a central perforation (type 3), was recovered during the mound leveling and lacks association. This bead type is presumed to be a marker trait of the Middle Horizon in Alameda Province (Davis and Treganza, op. cit., p. 29).

Cylindrical magnesite beads. Fifteen cylindrical magnesite beads were recovered from seven cremations in the site (see table 1 for these associations); one bead lacks data on its occurrence.

Each bead is biconically perforated longitudinally. The colors range from ashy through brown to a delicate shell-pink. Lengths range from 5 to 21 mm. with an average of 13 mm., and diameters range from 7 to 12 mm. with an average of 10 mm. The diameter of the perforation ranges from 3 to 4 mm., with an average of 3 mm.

This type of artifact is one of the prominent components of the clam disc bead complex of Phase II of the Late Horizon, although it first appears during Phase I in the Colusa Province (Heizer and Fenenga, op. cit., p. 383; Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 19; 1954, p.60).

Cylindrical beads of steatite. Five cylindrical steatite beads were found unassociated with burials and without exact depth data in the midden deposit. Cremation 6, at a depth of 54 inches, possessed a single specimen.

The average length of these beads is 12 mm., extremes are 12 and 13 mm. Diameters range from 9 to 10 mm., the average being 9 mm. Each is biconically perforated.

Cylindrical steatite beads are also one of the marker traits of Phase II of the Late Horizon (Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 19; 1954, p. 60).

Glass trade bead. A single milk-white glass trade bead was found on the surface of the site. It is Meighan's (ms. notes)* type 179. This type is widely distributed in Northern California. The nearest sites to CCo-259 where it is known to be present are Sac-56, Nap-15, Mrn-201, SJo-82, Col-2, and at an unnumbered site near Niles, California.

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*Collection of glass beads housed in the R. H. Lowie Museum of Anthropology, University of California, Berkeley.

It has not been determined by the author whether this bead type was brought by the early Spanish explorers or missionaries or by later American or British explorers or trappers. At any rate, its presence in the site is the result of Caucasian contact.

Perforated limpet shell. A small limpet shell with the apex ground flat and a small, punched perforation below the abraded area was found unassociated with burials in the deposit. No chronological significance is attached to the occurrence of this artifact.

Tubular bird bone beads. Four types of these beads may be distinguished. The most common type is simply a short section of bone cut from the larger bones of the wing (ulna or humerus).

Following are the various types which may be segregated:

EE1a: Short lengths of bird bone, undecorated; lengths less than 50 mm.; ends may or may not be ground down.

EE1c: Same as type EE1a, except has medial constriction.

EE1e: Same as type EE1a, except a bead of lesser diameter is inserted into a bead of greater diameter.

EE3c: Same as EE1a, except beads are overlaid with Olivella type 3b beads set in asphaltum.

Types EE1a and EE1e do not appear to be diagnostic of any specific archaeological horizon in Central California (Davis and Treganza, op. cit., p. 35). Type EE3c occurs in another Middle Horizon site in Alameda Province (Ala-309), although here the type of bead on the overlay is Olivella 3c (Gifford, 1940, p. 180). However, Olivella type 3c as well as type 3b beads may be viewed as diagnostic of the Middle Horizon in Alameda Province (Davis and Treganza, op. cit., p. 30). The generic trait of applying shell beads to bird bone beads, tubes, and whistles is fairly common in Components B and C of Ala-328 (ibid., p. 31), table 9) and in other Middle Horizon Components (Heizer and Fenenga, op. cit., p. 382; Beardsley, 1948, p. 13; 1954, p. 83).

Type EE1c is present in various Late Horizon sites (Lillard, Heizer and Fenenga, op. cit., p. 80; Beardsley, 1948, p. 18; 1954, p. 85) and the two specimens in the present collection appear to be associated with Component A (Phase II, Late Horizon).

Asphaltum beads. Associated with cremation 7, at a depth of 54 inches, were four ellipsoidal, nearly doughnut-shaped beads of what appears to be asphaltum mixed with some other substance. Their average size is 19 by 15 mm. across opposing transverse axes by 10 mm. average thickness. A central perforation averaging about 2 mm. is present in each specimen. These beads represent a unique type in Central California.

Bear canine tooth pendant. At a depth of 96 inches was recovered a canine tooth of a bear. The root of the tooth has been ground down and a biconical perforation 4 mm. in diameter has been drilled through this end. The entire surface of the pendant appears to have been quite highly polished. It was not a grave accompaniment. Its length is 72 mm., width 20 mm., and thickness 13 mm. (See pl. 1v for illustration.) Two other examples of perforated bear canine teeth have been recovered archaeologically from Central California sites. Uhle (1907, p. 83, fig. 36) describes and illustrates one recovered from level V at Ala-309. This has been designated by Gifford (1940, p. 185) as type UU3 (perforated mammal tooth). Another is known from the central Sierran region. This was found in a mortuary cave yielding typical Central Californian Middle Horizon artifact types (Gonsalves, 1955, p. 37 ff. and pl. 1L).

An unperforated bear canine tooth which was probably suspended from a string affixed to the root end with asphaltum is known from the Middle Horizon at Ala-328 (Davis and Treganza, op. cit., p. 25), and because of the depth of occurrence of the present specimen, it is assumed to be associated with the Middle Horizon Component in this site.

Prismatic obsidian objects. Recovered from depths which range from 0-48 inches was a series of five elongate obsidian objects whose transverse cross-sections range from trianguloid through subspherical. These specimens are evidently of natural origin, and all have been subjected to some degree of heat which has modified the original gloss of the surfaces. Lengths of these objects range from 48 to 90 mm., the mean average length is 58 mm. None of the specimens was associated with a burial.

It has been recorded by Goddard (1903, p. 19), Kroeber (1925, p. 76), and Driver (1939, p. 392) that similar obsidian artifacts were attached to the fringe of women's skirts, aprons, and hair ornaments for decoration. Beardsley (1948, p. 13; 1954, p. 46 ff.) found comparable objects to be much more numerous in the Middle Horizon in the Marin Province, but not restricted to it. From the depth of their occurrence at CCo-259, we may assume that they occur in Phases I and II of the Late Horizon at this site. Similar objects were also present in the Interior Province during the Early Horizon (Heizer, 1949, p. 24).

Bird radius "hairpin." At a depth of 24 inches a single bird radius pin (Gifford's [1940] type A4aI) was recovered. The proximal epiphysis had been removed, but the cut edge had not been ground down. The distal end has a long, tapering, ground point. Measurements of the specimen are: length, 143 mm.; diameter, 6 mm.

Numerous similar specimens occur in the Alameda Province, a few are known from the Interior Valley Zone, and they are most abundant in Middle Horizon Components of the Littoral Zone (Davis and Treganza, op. cit., p. 37).

Forked headscratchers. Four long, slender bone implements, having an expanded, grooved end (Gifford's [1940] type 02) were associated with two burials.

Burial F-1, at a depth of 124 inches, possessed two such artifacts. Each is fashioned from a longitudinal section of deer cannon bone which had been highly polished. The width of the object gradually expands from a point at one end to a flared, expanded and flattened termination. At the flat end are four grooves which allow five finger-like tines to project (see pl. 1d).

One of the implements is 244 mm. long, 5 mm. thick, and 20 mm. wide at the flared end. The measurements for the other specimen are: length, 250 mm.; thickness, 5 mm.; width, 24 mm.

These objects were found under the sternum of a ventrally flexed female burial also possessing two long pointed bone "hairpins" and a medial fragment of what is possibly another bone pin. Red ochre was liberally sprinkled in the grave.

Associated with burial H-2 (1938), at a depth of 72 inches, were two similar artifacts. They are fashioned from the same kind of bone but are somewhat smaller and more delicate than those previously described. Each has only three tines, rather than five. One has a conically drilled perforation 4 mm. in diameter at the expanded end (see pl. 1n). Widths at the forked ends are 9 mm. and 10 mm. Each is 3 mm. thick.

The burial with which these objects were associated was considerably disturbed but possessed, in addition to these objects, a Haliotis shell ornament, Olivella beads, and red ochre.

Similar forked objects are known from numerous sites in the Littoral Zone

(Davis and Treganza, op. cit., p. 75, table 21) and are apparently recovered only in a Middle Horizon context (Beardsley, 1954, p. 51).

E. Warfare and Hunting

Projectile points and blades. Twenty-eight types of projectile points and blades may be distinguished in the collection of one hundred nineteen classifiable specimens (see figs. 3, 4). Perhaps some of the distinctions are finely drawn, but it is felt in this case that the finer the distinctions the greater will be the ease of comparison with other collections. No specimen within any of the described and illustrated types varies to any significant degree in shape from that illustrated. The descriptions of the types follow (see table 2 for measurements):

L: Leaf-shaped
- a. Contracting base (less than 50 mm. in length).
- b. Contracting base (greater than 50 mm. in length).
- c. Expanding base (less than 50 mm. in length).
- d. Expanding base (greater than 50 mm. in length).

T: Trianguloid
- a. Convexly curved sides; straight base (less than 50 mm. in length).
- b. Straight sides and base with serrated edges.
- c. Convexly curved sides; straight base (greater than 50 mm. in length).
- d. Concavely curved sides; concave base.

S: Shouldered
- a. Sloping shoulders; contracting stem.
- b. Sloping shoulders; parallel-sided to slightly contracting; narrow stem; straight base.
- c. Rounded shoulders; slightly contracting broad stem with rounded base.
- d. Small sloping shoulders; slightly contracting broad stem with rounded base; serrated edges.
- e. Straight shoulders; parallel-sided stem with straight to slightly rounded base; serrated edges.

SN: Side-notched
- a. Expanding stem with straight to slightly rounded base (less than 50 mm. in length).
- b. Expanding stem with straight to slightly rounded base (greater than 50 mm. in length).
- c. Expanding stem with concave base (see Baumhoff, 1957, p. 10 and Baumhoff and Byrne, 1959).

SN: Side-notched
- d. Contracting stem; rounded base; serrated edges.
- e. Expanding stem; straight base; serrated edges.
- f. Expanding stem; concave base; serrated edges.

CN: Corner-notched
- a. Expanding stem with rounded base.
- b. Expanding stem with straight base; serrated edges.
- c. Expanding stem with straight to slightly rounded base.
- d. Wide notches; expanding stem; straight to slightly rounded base; serrated edges.

BN: Basally-notched
- a. Slightly contracting stem; straight to slightly rounded base.

E: Eared
- a. Large, broad, expanding concave base.

Some of the typological distinctions made here may or may not prove to be significant chronologically or geographically; however, it is felt that future comparisons might be facilitated by segregating as many distinct types as possible.

Large, stemmed projectile points of chert or slate, implying the use of the atlatl, are common in the Early Horizon (Heizer and Fenenga, op. cit., p. 381; Lillard, Heizer and Fenenga, op. cit., p. 74; Heizer, 1949, pp. 20-21).

Middle Horizon projectile points tend also to be large. Generally they are stemmed or concave-based in the Interior Valley Zone (Heizer and Fenenga, op. cit., p. 382; Lillard, Heizer and Fenenga, op. cit., p. 77) while in the Littoral Zone the most common types are stemless and leaf-shaped (Beardsley, 1948, p. 11; 1954, p. 83; Davis and Treganza, op. cit., pp. 38-39).

Small side-notched and corner-notched points, frequently with serrated edges implying the use of the bow and arrow, are the common types in the Late Horizon (Heizer and Fenenga, op. cit., p. 382; Lillard, Heizer and Fenenga, op. cit., p. 80).

Type SNc in this report is the Delta subtype of Baumhoff's Desert Side-notched point (Baumhoff, op. cit., p. 10; Baumhoff and Byrne, op. cit., passim) and is a marker trait of the Phase II of the Late Horizon (ibid., p. 45). The occurrence of this subtype at site CCo-259 expands its distribution westward from the Delta Province to Alameda Province.

F. Economic Complex

Mortars. Several types of mortars (see fig. 5) were recovered from the excavations. Following the mortar typology employed by Beardsley (1954, p. 9), the types and quantities present are:

A1a. Completely dressed stone; large, flat-bottomed, straight-sided, square rim, flattish or rounded bowl (8 fragments).

A1b. Like A1a, but with flaring sides and beveled rim (6 fragments).

A2a. Like A1a, but with curved sides and flat rim (4 fragments).

A2b. Like A1a, but with rounded sides and bottom and sharp rim (3 specimens).

A2c. Like A1a, but less than one-half modal size of A1a; sides rounded, rim with outside bevel (1 specimen).

C. Miniature or "paint" mortar (4 specimens).

D1. Hopper mortar with shallow bowl pecked in face of flat slab. (Inferred to have been used because of presence of pestle type A3.)

E. Rough sandstone slab with bowl-like depression (6 specimens).

Mortar types A1a, A1b, and A2a are Late Horizon types (Beardsley, 1948, p. 18; 1954, p. 60). Probably they were not used as mortars for everyday food preparation. Small fragments (frequently burned) of these types are generally all that are recovered. No complete specimen is known from the Fernandez site, but numerous fragments apparently represent the range of these types.

Three complete mortars of type A2b were recovered, in each instance as a grave accompaniment (see table 1 for a tabulation of these associations). Extreme outside diameters of these mortars are 265 mm. and 142 mm., with an average of 204 mm. Inside bowl diameters range from 205 mm. to 95 mm., with an average of 147 mm. Bowl depths range from 141 mm. to 45 mm., with an average of 94 mm.

Two of the type A2b examples are of metasedimentary rock, and one is hard sandstone.

Type A2b mortars are relatively common in the Ellis Landing Facies of the Middle Horizon (Beardsley, 1954, p. 83; Davis and Treganza, op. cit., pp. 42, 45, table 13, 58). The association of this mortar type with the flexed burials of C Component at the Fernandez site offers further confirming data on this observation.

Type C mortars are represented by a series of four tiny specimens whose outside diameters range from 133 to 55 mm., with an average of 85 mm. Inside bowl diameters range from 83 to 40 mm., with an average of 61 mm. Bowl

depths of this mortar type range from 30 to 11 mm., with an average of 23 mm. One of these is basalt, two are of sedimentary rock, apparently of different grades of sandstone, and one is of a globular concretion evidently of a sedimentary rock heavily charged with oxides of iron. The basalt specimen appears to have been made from the distal end of a broken pestle. Two grooves, apparently the result of sharpening bone awls, are present in the bottom of one sandstone specimen.

Type C mortars are present throughout the known archaeological record in the Alameda Province, and in the present excavation they were recovered from depths between 6 and 109 inches. In the Interior Valley these small mortars are attributed mainly to the Middle Horizon (Heizer and Fenenga, op. cit., p. 78).

A finely-made sandstone mortar of type A2c lacks data as to its depth of occurrence and association. It is 111 mm. in outside diameter; the inside bowl diameter is 76 mm., and the depth of the bowl is 46 mm.

Several sandstone slab mortars (type E) were recovered from the site during the course of the mound leveling operations in 1958. These range from relatively small, thin, rectangular slabs about 300 by 200 mm. (ca. 100 mm. in thickness) to very large ones about twice the size stated.

The use of the hopper mortar (type D-1) is inferred from the recovery of two flat-ended pestles (type A3) which are presumed to be used in conjunction with the hopper mortar.

Pestles. Nine individual types of pestles (see fig. 5) may be established on the bases of shape, degree of finish, modification of the end, and presence of pecked pits. The types and quantities are:

A. Conical shape
    1. Non-dressed or partially dressed rough cobble, ends rounded. Extreme lengths, 145 to 260 mm.; average length, 214 mm. Medial diameter extremes, 60 to 115 mm.; average, 79 mm. Materials include sandstone, granite, and basalt (9 specimens).
    2. Entire surface dressed, either pecked and/or ground; ends rounded. Extreme lengths, 107 to 285 mm.; average length, 195 mm. Medial diameter extremes, 50 to 76 mm.; average 62 mm. Materials include basalt, sandstone, and metasedimentary rock (28 specimens).

3. Entire surface dressed, large end flattened; possibly used in conjunction with hopper mortar. Extreme lengths, 97 to 142 mm.; average length, 120 mm. Medial diameter extremes, 40 to 42 mm.; average, 41 mm. Materials include basalt and sandstone (2 specimens).
4. Entire surface dressed, encircling pecked groove near small end (2 sandstone fragments).
5. Entire surface dressed, ends rounded; 1 to 4 pits pecked into stone at approximate midpoint of length. Extreme lengths, 162 to 181 mm.; average length, 172 mm. Medial diameter extremes 58 to 70 mm.; average, 64 mm. Materials include granite and sandstone (2 specimens).
6. Entire surface dressed, large end rounded, small end expands into flange which has a pecked cup. Length, 455 mm.; medial diameter, 60 mm. Material is basalt (3 specimens).
7. Entire surface dressed, large ends rounded; small end expands into flange, beyond flange end tapers to small cone (1 basalt fragment).
8. Entire surface dressed, large end rounded; transverse pecked groove across small end. Length, 352 mm.; medial diameter, 57 mm. Material is basalt (1 specimen).

B. Sub-cylindrical
1. Entire surface dressed, ends rounded. Extreme lengths, 160 to 185 mm.; average length, 176 mm. Medial diameter extremes, 59 to 71 mm.; average, 67 mm. Materials include basalt and granite (3 specimens).
2. Entire surface dressed, ends rounded; 1 to 4 pits pecked into stone at approximate midpoint of length. Extreme lengths, 131 to 137 mm.; average length, 134 mm. Medial diameter extremes 72 to 73 mm.; average, 72.5 mm. (2 specimens).

With the exception of types A6 and A7, which are associated with type A1 mortars in the Late Horizon (Beardsley, 1954, p. 61; Davis and Treganza, op. cit.; p. 43), pestle types appear to have little diagnostic temporal value.

Manos. Four rather small hand stones were recovered from depths ranging from 24 to 123 inches. Two of the examples are unifacial and two are bifacial. Their lengths average 102 mm.; widths, 78 mm.; thicknesses, 54 mm. None of the specimens was associated with a burial.

These implements occur throughout the archaeological record in Central California (Heizer and Fenenga, op. cit., p. 381; Lillard, Heizer and Fenega, op. cit., pp. 74, 78; Heizer, 1949, p. 20; Harrington, 1942, p. 12; Beardsley, 1948, p. 11).

Notched bone. Six fragmentary specimens of notched deer scapula (Gifford's [1940] types H1, H2, H3) were recovered from depths ranging from 6 to 84 inches. The scapular spine is trimmed down on each specimen and only the posterior border is notched.

A small fragment of a serrated fish gill-plate was recovered at a depth of 124 inches, and a small piece of a notched mammal rib, having a perforation 5 mm. in diameter at the distal end, was found at a depth of 30 to 36 inches. None of these specimens was associated with a burial.

The possible utilization of these implements is discussed by Gifford (1940, p. 172). (See also Heizer, 1953, p. 268 ff.)

Little temporal significance is attached to the distribution of these artifacts. They are found in considerable quantity in the Ellis Landing Facies of the Middle Horizon (Beardsley, 1948, p. 12; Davis and Treganza, op. cit., pp. 49-50).

Baked clay balls. Recovered with burial B-A, at a depth of 24 inches, were two large, smooth, subconical lumps of fired clay. Each was apparently fired under an uncontrolled temperature condition. Various shades of brown, red, and black appear on the surface and the interior of the specimens. Grit temper was employed as a binding agent for the paste.

One specimen is 98 mm. long and tapers from a rounded end 68 mm. in diameter to a small rounded cone at the opposite end. The other specimen is broken and has a diameter of 82 mm.

No function for these implements is suggested other than the possible use as "cooking stones" as described by Heizer (1937, passim), nor are they significant chronologically except that they are noted in much greater profusion in the Late Horizon (ibid., 1949, p. 25) than in the Middle Horizon of the Central California sequence.

Girdled cobble. A single, large, subspherical, sandstone cobble, possessing an encircling groove at the midpoint of its length, lacks depth data. It is 138 mm. long, 120 mm. wide, and 91 mm. thick. It is pecked all over except

where three angular natural plane facets remain at the smaller end. No battered areas appear on the specimen, such as might result from use as a hafted hammer (see pl. 2w). In spite of its relatively large size, it may have been used as a fishnet sinker or anchor stone (e.g., Barrett and Gifford, 1933, p. 188, fig. 27). Similar large girdled stones are known from Ala-328, as well as from other sites in Alameda and Marin Provinces (Davis and Treganza, op. cit., p. 47).

Compound fish spear point of bone. Two examples of these implements (Gifford's [1940] type MM2b) were recovered, one from a depth of 116 inches in pit A-5; the other lacks specific data on its depth of occurrence. It was recovered from the lower levels during the destruction of the mound in 1958. Lengths of these objects are, 37 and 49 mm.; widths, 6 and 10 mm.; thicknesses, 5 and 5 mm.; respectively.

It has been suggested by Bennyhoff (1950, p. 296) that these implements were lashed on opposing sides of a fish spear and, even though lacking barbs, could still be effectively employed in taking fish.

It is fairly well established that these artifacts are restricted to Middle Horizon settlements in both the Littoral and Interior Valley Zones (ibid., p. 307 ff.; Davis and Treganza, op. cit., p. 46). For site by site distribution of these artifacts, see Bennyhoff (op. cit., p. 307 ff.) and Davis and Treganza (op. cit., p. 75, table 21).

G. House Remains

No complete housefloors were excavated, although a portion of one was encountered. It consisted of a sloping layer of ashy, compacted clay about 4 inches thick. No postholes were evident in the segment excavated.

H. Miscellaneous Remains

Perforated mussel shells. Associated with burial N-1, at a depth of 60 inches, was a group of seven half-shells of river mussel (Margaritifera margaritifera), each possessing a punch perforation near the anterior margin. The dorsal margin of each shell has been ground down to the point where the hinge is completely removed.

A single fragment of a salt water mussel (Mytilus edulis) shell has a small, conically drilled perforation near the dorsal margin. It was found in the midden unassociated with a burial.

Polished stone slab. According to the catalog of the University of California Lowie Museum of Anthropology, a polished stone slab was in the grave of burial C-4; however, it could not be located in the collection.

Cache of stone implements. From a depth of 89 inches was recovered a tightly-packed cache of five stone implements composed of two relatively short, pestle-like stones (pestle type A2), a spatulate pecking stone, a short, cylindrical hammerstone, and a charmstone of type IIA2b. The measurements of the two pestle-like forms are: length, 107 and 123 mm.; diameters, 50 and 55 mm., respectively. One of these stones is basalt, the other is sandstone.

The cylindrical hammerstone of basalt is dressed all over and heavily battered at both ends. It is 77 mm. long and has a diameter of 60 mm.

The spatulate pecking stone is sandstone and its measurements are: length, 118 mm.; width, 50 mm.; thickness, 10 mm.

The material from which the charmstone was manufactured is micaceous schist. Battering scars are present on both ends of the stone, especially on the wide end. It is 110 mm. long and has a diameter of 41 mm. at its thickest point.

I. Technology

Under this heading are described those tools which are assumed to have been employed in manufacturing or modifying other artifacts.

Bone awls. Even though little has been recognized concerning temporal or areal specialization in the preference of bone awl types (Heizer, 1953, p. 297 ff.; Beardsley, 1954, p. 35 ff.; Meighan, 1953), those in the present collection will be correlated with Gifford's (1940, p. 168 ff.) typology of bone awls. Following is the classification in which the various types occurring at CCo-259 may be included:

AaII Ulna awl (both carnivore and artiodactyl ulnae), head of bone intact.
AaIV Tibia with distal end as handle.
AbII Artiodactyl cannon bone with proximal end as handle, head of bone intact.
AbIV Radius awl, head of bone intact.
AcII Artiodactyl cannon bone with head of bone partly worked down.

Ad Awl of mammal leg bone with head entirely removed.
Ag Sharpened outer vestigial metatarsal of deer.
A2 Awl of sharpened mammal rib.
A5 Stingray spine with barbs partly ground down.
A6 Various "splinter" awls (include Gifford's [1940] types Ae, AeI, AeII, AeIII).

Thirty-nine awls, complete enough to allow typological classification were recovered. In addition to these were found numerous tips of sharpened bone implements, which were assumed to be the tips of awls, perforators, pins, and the like.

Two type Ad awls occurring with burial F-1, at a depth of 124 inches, should perhaps not be classed as awls. They are very finely made and show no marks of usage. It is possible that they were hair skewers; associated with two forked "headscratchers," they appear to have an ornamental rather than a utilitarian value.

Since many of the awls present a fine needle point, it may be assumed that they were employed in sewing coiled basketry.

Awl sharpeners of sandstone. Nineteen irregularly shaped pieces of very soft sandstone possessing one or more grooves have been recovered from depths between 0-112 inches. None of the specimens was associated with a burial. Each of the objects possesses one or more "V" or "U" shaped grooves on one or more faces of the stone. These grooves vary from light scratches to depressions 9 mm. wide and 9 mm. deep. A reasonable assumption which may be made concerning their probable function is that they were employed to sharpen awls and other pointed tools which became dull periodically. No areal or temporal significance is attached to the occurrence of these artifacts.

The deposit of soft sandstone utilized for these implements at CCo-259 lies in an outcropping about 200 yards southeast of the site.

Perforated bone object. In the grave of burial H-2, at a depth of 84 inches, was a fragment of a biconically perforated bone object. It is 13 mm. wide and 4 mm. thick at the perforated end and is ovoid in cross-section.

Since the tip and a portion of the shaft is missing, it is not possible to ascribe a specific function for this specimen. It could have served a variety of purposes, e.g., awl, perforator, dagger, needle, etc. (cf. Gifford, 1940, p. 174 ff., types P1, P7).

Perforated bone tools are relatively more common in the Middle Horizon than in the later periods (Beardsley, 1948, p. 12).

Grooved bone pin. Associated with cremation 14, at a depth of 48 inches, was a flattened bone (Gifford's [1940] type B8) pin 71 mm. long, 7 mm. wide, and 3 mm. thick, having a lenticular cross-section. An encircling groove has been cut around the shaft 8 mm. from the head. The implement is highly polished; no traces of mastic are present in the groove.

Antler flaking tools. Two distal fragments of what appear to be antler flaking tools were recovered from depths of 16 and 24 inches. Neither specimen was associated with a burial.

Ulna flakers. Three bluntly pointed implements (Gifford's [1940] type C2) of deer ulnae were found unassociated in the midden, each at a depth of 24 inches. The tip of each specimen is broken; therefore, the tools may be of any one of three types of implements as defined by Bennyhoff (see Heizer [ed.], 1953, p. 269 ff.), i.e., matting tools, fiber stripping tools, or stone flaking implements.

Areal and temporal distributions of these implements reveal nothing of particular significance, except that they are most common in sites of the Littoral Zone (ibid., p. 299).

Bone flaking tool. A fragment of a single example of a bone flaker was found on the surface of the site. The species of animal from which the bone was taken is not determinable.

Antler wedges. As has been suggested and as would be expected in a site removed some distance from the bay or coastal shore is the relative infrequency of bone wedges (Davis and Treganza, op. cit., p. 47 ff., p. 75, table 21; Beardsley, 1948, p. 58).

Three such implements, each made from a deer antler, were recovered from the site at depths ranging from 18 to 72 inches. None was associated with a burial. Lengths of the two complete specimens range from 48 to 72 mm., and their width is 38 mm. at the widest point of the wedging plane.

Hammerstones of Franciscan chert. Three fist-size cobbles of Franciscan chert comprise this category of artifacts. One was found on the surface of the site, another was recovered from the 12-24 inch level, and the third from the 66-72 inch level. None was associated with a burial.

The specimens are characterized by numerous battered scars on the surface. No particular significance is attached to the occurrence of these rough tools.

Pecking stones. Six elongate stones, averaging about 145 mm. in length and 43 mm. in diameter, exhibit one or two battered ends. This probably resulted from their use as pecking stones utilized in shaping other stone implements, such as mortars and pestles. Four of these implements are hard sandstone, one is basalt, and the other metaigneous rock. These tools were recovered from the full depth range of the midden, and none was associated with a burial.

Spatulate abrading stones. Six flat elongate pieces of sandstone were collected from the surface of the site, to a depth of 39 inches. One or both faces of these specimens exhibit wear patterns which suggest that they had been used as abrading stones. Several of these implements also possess one or more beveled edges. None of the objects was associated with a burial.

Drills or reamers. Associated with burial H-11, at a depth of 50 inches, was a drill or reamer manufactured from a piece of black obsidian. In a transverse cross-section its outline is that of an irregular oblate spheroid. It is carefully flaked through a controlled pressure technique. The pointed end has been blunted through wear, and the sides exhibit scars. The object is 77 mm. in length, 17 mm. wide, and 13 mm. thick (pl. 1gg).

Two fragments of similar objects of black obsidian from the site lack depth data.

Flake and core scrapers, or cutting implements. Occurring throughout the deposit are numerous flakes and cores of chert and obsidian which posses some degree of secondary flaking along one or more edges. Most of them are nondescript, although it is apparent that they could have served as scraping or cutting tools. No typological distinctions are made here, and no temporal speculations are proposed. Many such implements were associated with several burials (see table 1).

Flaked bottle glass. Attributed to association with burial B-A, at a depth of 24 inches, was a fragment of a hand-blown, dark green bottle. It is a curved section representing about one-half of the deeply concave bottom. A portion of the edge near the apex of the arc has been crudely flaked back. It is possible that the object served as a scraping or cutting instrument;

however, it is also possible that the piece is intrusive in the site and the chipped edge was not the result of purposeful flaking by an aboriginal occupant. In the total excavation of the mound only one other object of Caucasian manufacture was recovered--a single milk-white glass trade bead--aside from a few nails and miscellaneous scraps of oxidized metal. It must be noted that a farm building was once situated on the site, and the possibility that the piece of glass may have originally been discarded by one of the Caucasian occupants should not be overlooked.

J. Culture Chronology

As stated in the Introduction to this paper, the Fernandez mound reflects a history of occupation stretching over a long time span and represents each of the major archaeological Horizons so far known in Alameda Province.

Because the bulk of artifacts not associated with burials lack data, it is necessary to rely almost entirely on burial data in order to establish a culture chronology.

Table 1 presents in graphic form the data on all burials accompanied by artifacts which have been recovered from CCo-259. On the basis of this table one may segregate three occupational Components labeled A, B, C, in order of ascending age.

A Component is the type site for Beardsley's (1948, pp. 4, 18-19; 1954, p. 86) Fernandez Facies and represents Phase II of the Late Horizon in Alameda Province. One may readily see from Table 1 that this component is characterized by the "clam-disc-bead-complex" whose main traits are:

Clam disc beads,
Cylindrical magnesite and steatite beads,
Olivella bead types 3a1, 3a2, 3e, 1c,
Biconically-drilled tubular stone pipes,
Unperforated charmstones,
Cremation.

B Component is Phase I of the Late Horizon in Alameda Province and may be assigned to the Emeryville Facies. It cannot be segregated by absolute depth from Component A, but the fact of the site's having been occupied during Phase I times cannot be doubted. The most important diagnostic trait of this horizon is the Olivella bead type 2a.

Middle Horizon occupation of the mound is well represented by eleven deep burials possessing such marker traits as Olivella bead type 3b, Haliotis

ornament type C(1), forked "headscratcher," abundance of powdered red ochre in the grave, perforated charmstone,* and absence of cremation. An additional trait which is unique to C Component is the high incidence of ventrally flexed burial posture. The bulk of the artifact inventory from Component C exhibits a strong affinity to the Ellis Landing Facies of the Middle Horizon.

Based upon typological relationships to the other Central California sites which have been dated by means of radioactive carbon 14 analysis, the following are the currently available dates for the three Components in the Fernandez mound:

Component A	1600-1850 A.D. (Heizer, 1958, p. 6)
Component B	300-1600 A.D. (Ibid.)
Component C	2393 B.C.-300 A.D. (Ibid., samples C-690, L-187A, B, M-121 through M-127)

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AAnt	American Antiquity
UC	University of California
-AR	Anthropological Records
-AS-R	Archaeological Survey Report
-PAAE	Publications in American Archaeology and Ethnology

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*Incorrectly listed in Table 1 as type IIBld; should read Charmstone type IBlb.

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LIST OF TABLES AND ILLUSTRATIONS

Table 1. Burials and Associated Artifacts Illustrating the Three Components of the Fernandez Mound.

Depth measurements are expressed in inches from the surface of the mound. Depths of burials whose numbers are prefixed by the letter "D" are estimated as depths from the proposed original mound surface (explained at length under "Mound constituents and structure" and illustrated on Map 1 and Diagram 1.

Letters prefixed to the burial numbers indicate (in chronological order) from which excavation the burials were recovered.

N - Nelson, 1910 (flexed burial).
B - Barker, 1935 (all cremations except B-1).
C - Cremations recovered by U.C. field party in 1938.
H - Flexed burials recovered by U.C. field party in 1938.
P - Perryman, 1958 (all cremations).
F - U.C. field class, 1959 (all flexed burials).
D - UCAS, 1959 (all flexed burials).

Table 2. Measurements of Projectile Points and Blades.

Plate 1 (All numbers given are those of the University of California Lowie Museum of Anthropology, Berkeley.)

a. Bird bone whistle (1-223065).
b. Bird bone whistle (1-223045).
c. Bird bone whistle (1-16983).
d. Forked "headscratcher" (1-222990).
e. Bone "hairpin" (1-222992).
f. Bone fishspear point (1-222979).
g. Bone awl, type A1g (1-137081).
h. Grooved bone pin (1-50742).
i. Bone awl, type A1bII (1-50783).
j. Bone awl, type A1cIV (1-223090).
k. Bone awl, type A1aII (1-137094).
l. Ulna flaker (1-137124).
m. Bone awl, type A1bII (1-222965).
n. Forked "headscratcher" (1-50750).
o. Eyed bone needle (1-50749).
p. Antler wedge (1-222970).
q. Bird bone bead, type EE1c (1-16984).
r. Bird bone bead, type EE1c (1-50633).
s. Cylindrical magnesite bead (1-137130).
t. Bird bone bead, type EE3c (1-223051).
u. Bird bone bead, type EE3c (1-223051).
v. Perforated bear canine tooth (1-223128).
w. Notched deer scapula (1-222977).
x. Haliotis ornament, type Ra (1-50681).
y. Haliotis ornament, type Ra (1-50683).
z. Haliotis ornament, type Rb (1-222984).
aa. Haliotis ornament, type Ea (1-223055).
bb. Haliotis ornament, type Cc (1-222985).
cc. Haliotis ornament, type Cb (1-50771).
dd. Perforated river mussel shell (1-18691).
ee. Projectile point, type Lb (1-50693).
ff. Projectile point, type Ea (1-50648).
gg. Obsidian reamer (1-50694).
hh. Projectile point, type BNa (1-50766).
ii. Projectile point, type Sb (1-223048).
jj. Projectile point, type CNc (1-50733).
kk. Projectile point, type Sa (1-137172).
ll. Projectile point, type La (1-223040).
mm. Projectile point, type CNd (1-50645).
nn. Projectile point, type CNc (1-50646).
oo. Projectile point, type SNd (1-223089).

Plate 1: (cont'd.)

pp. Projectile point, type CNc (1-137188).
qq. Projectile point, type SNa (1-137179).
rr. Projectily point, type SNd (1-50734).
ss. Projectile point, type SNe (1-50652).
tt. Projectile point, type Ta (1-64692).

Plate 2:

a. Charmstone, type IIB1b (1-50641).
b. Charmstone, type IIB1b (1-50640).
c. Charmstone, type IIB1b (1-223110).
d. Charmstone, type IIB1b (1-137054).
e. Charmstone, type IIB1b (1-223109).
f. Charmstone, type IIB1b (1-137055).
g. Charmstone, type IIA2b (1-137069).
h. Charmstone, type IIA2b (1-223123).
i. Charmstone, incipient, type IIA3 (1-50690).
j. Charmstone, untypable (1-137142).
k. Charmstone, type IA3a (1-137143).
l. Charmstone, type IB1b (1-223047).
m. Sandstone tubular pipe (1-137056).
n. Fired clay figurine fragment (1-137082).
o. Fired clay figurine fragment (1-223136).
p. Conical steatite pipe (1-50639).
q. Tubular steatite pipe fragment (1-50672).
r. Lump of fired clay (1-137058).
s. Sandstone awl sharpener (1-137117).
t. Pestle-like hammerstone (1-223119).
u. Pestle, type A5 (1-223076).
v. Pestle, type B2 (1-223114).
w. Girdled cobble (1-137199).

Figure 1: Charmstone Types, CCo-259.

Figure 2: Haliotis Ornament Types, CCo-259.

Figure 3: Projectile Point Types, CCo-259.

Figure 4: Projectile Point Types, CCo-259.

Figure 5: Mortar and Pestle Types, CCo-259.

Figure 6. Miscellaneous Artifacts.

Map 1: Excavations.

Diagram 1: Schematic N-S Transection of Trench A.

Depth	Burial Number	Perforated mussell shell	Bird bone whistle	Awl type AlbII	Bird bone bead EElc	Unmodified bone	Cremation	Charmstone type IIBlb	Tubular stone pipe	Baked clay ball	Bottle glass scraper	Pestle type A1	Unmodified shell	Bird bone tube	Projectile point fragment	Pestle type A6	Projectile point type SNb	Antler flaker	Clam disc bead	Olivella bead type 3a1	Stone flake scraper	Projectile point type Lb	Cylindrical magnesite bead	Olivella bead type 1c	Haliotis ornament fragments	Pestle type A2	Pestle fragment	Mortar type E	Awl fragment
?	N-1	7	13	1	1	1																							
?	B-1		2																										
24	B-A		2				+	2	1	2	1	1	4																
30	P-2					1	+							1	2	1													
30	P-5						+								2		1	1											
30	P-3						+												3	147									
30	B-D						+		1						1						1	1							
33	C-3					4	+						2						1										
36	B-B						+					1																	
36	B-F						+												259				2						
38	C-13						+														1								
42	B-H						+												40				4	50	2				
44	C-2						+												43							1			
44	C-1						+														1						1		
45	C-9						+																					1	
48	C-14					1	+								1			1		10	6	1							1
48	B-E						+						1							210			1						
48	B-G						+																3						
48	P-4						+							1															
50	C-10						+												8										1
50	C-11						+								2			1		276		3							
51	C-4				1		+						6							6	4	1	4						3
54	B-2						+												539						2				
54	B-C						+														5								
54	C-12		28				+												30									1	
54	C-7						+		1										26	210		1	2	51					
54	C-6						+							1				1	14	18		3	1			2			1
56	C-5						+																						
56	C-8						+													23									
60	P-6						+															1		61					
66	H-1																												
66	P-1						+																						
72	P-7						+																						
72	C-15						+												35		1				1				6
84	H-2																												
92	D-7																												1
100	D-12																												
102	D-4																												
103	D-2																				2								
104	D-6																												
104	D-13		2											1															
109	F-2																												
109	D-11																												
111	D-8		6			2								4															
124	F-1																												

Depth	Burial Number	Prismatic obsidian flake	Projectile point type CNa	Olivella bead type 3a2	Projectile point type SNd	Projectile point type CNc	Olivella bead type 3e	Olivella bead type 1a	Mortar type C	Charmstone type IIA3	Charmstone type IIA2	Bird bone bead type EEla	Unmodified stone	Projectile point type Ea	Quartz crystal	Polished stone slab	Conical stone pipe	Projectile point type CNd	Projectile point type BNa	Pestle type B1	Incised bird bone tube	Shaped red ochre lumps	Red ochre powder	Haliotis ornament type Ra	Asphaltum beads	Mortar fragment	Cylindrical steatite bead	Pestle fragment	Olivella bead type 2a
?	N-1																												
?	B-1																												
24	B-A																												
30	P-2																												
30	P-5																												
30	P-3																												
30	B-D																												
33	C-3																												
36	B-B																												
36	B-F																												
38	C-13																												
42	B-H																												
44	C-2																A												
44	C-1																												
45	C-9																												
48	C-14	1	1	3	1	1																							
48	B-E						3																						
48	B-G						1*	483																					
48	P-4																												
50	C-10								1	1	1																		
50	C-11			18																									
51	C-4	1	6									14	1	1	1	1	1	2	1										
54	B-2						21																						
54	B-C												1							1									
54	C-12							40													1	+							
54	C-7							52				1											+	6	4				
54	C-6							12															+			3	1	1	
56	C-5		1																										1
56	C-8							12																		2			
60	P-6													1															
66	H-1												17				B												
66	P-1																												238
72	P-7																							2					1626
72	C-15												9																
84	H-2																						+						
92	D-7																						+						
100	D-12																						+						
102	D-4																						+						
103	D-2							3				6											+						
104	D-6												3				C						+						
104	D-13							18															+						
109	F-2							1															+						
109	D-11																						+						
111	D-8																						+						
124	F-1																						+						

Depth	Burial Number	Projectile point type Tb	Haliotis ornament type Ba	Haliotis ornament type Cb	Haliotis ornament type Rd	Haliotis ornament type Rb	Haliotis ornament type Rc	Haliotis ornament type Aa	Haliotis ornament type Ab	Haliotis ornament type Tg	Haliotis ornament type Tf	Haliotis ornament type Tc	Haliotis ornament type Tl	Haliotis ornament type Td	Haliotis ornament type Te	Forked headscratcher	Olivella bead type 3b	Eyed bone needle	Mortar type A2b	Ventrally flexed	Projectile point type Sb	Charmstone type IIBld	Birdbone bead EE3c	Haliotis ornament type Ea	Projectile point type La	Haliotis ornament type C(1)	Awl type Ald
?	N-1																										
?	B-1																										
24	B-A																										
30	P-2																										
30	P-5																										
30	P-3																										
30	B-D																										
33	C-3																										
36	B-B																										
36	B-F																										
38	C-13																										
42	B-H																										
44	C-2																										
44	C-1																										
45	C-9																										
48	C-14																										
48	B-E																										
48	B-G																										
48	P-4																										
50	C-10																										
50	C-11																										
51	C-4																										
54	B-2																										
54	B-C																										
54	C-12																										
54	C-7																										
54	C-6																										
56	C-5	1																									
56	C-8																										
60	P-6		1																								
66	H-1																										
66	P-1																										
72	P-7			1	1	4	2	1	1	1	1	1	2	1	1												
72	C-15																										
84	H-2															2	156	1									
92	D-7																		1	+							
100	D-12																		1	+							
102	D-4																			+							
103	D-2																31			+	1	1	14	6			
104	D-6																			+					1		
104	D-13																			+							
109	F-2																31			+						2	
109	D-11																		1	+							
111	D-8																			+							
124	F-1															2				+							2

* Inserted in end of cylindrical magnesite bead.

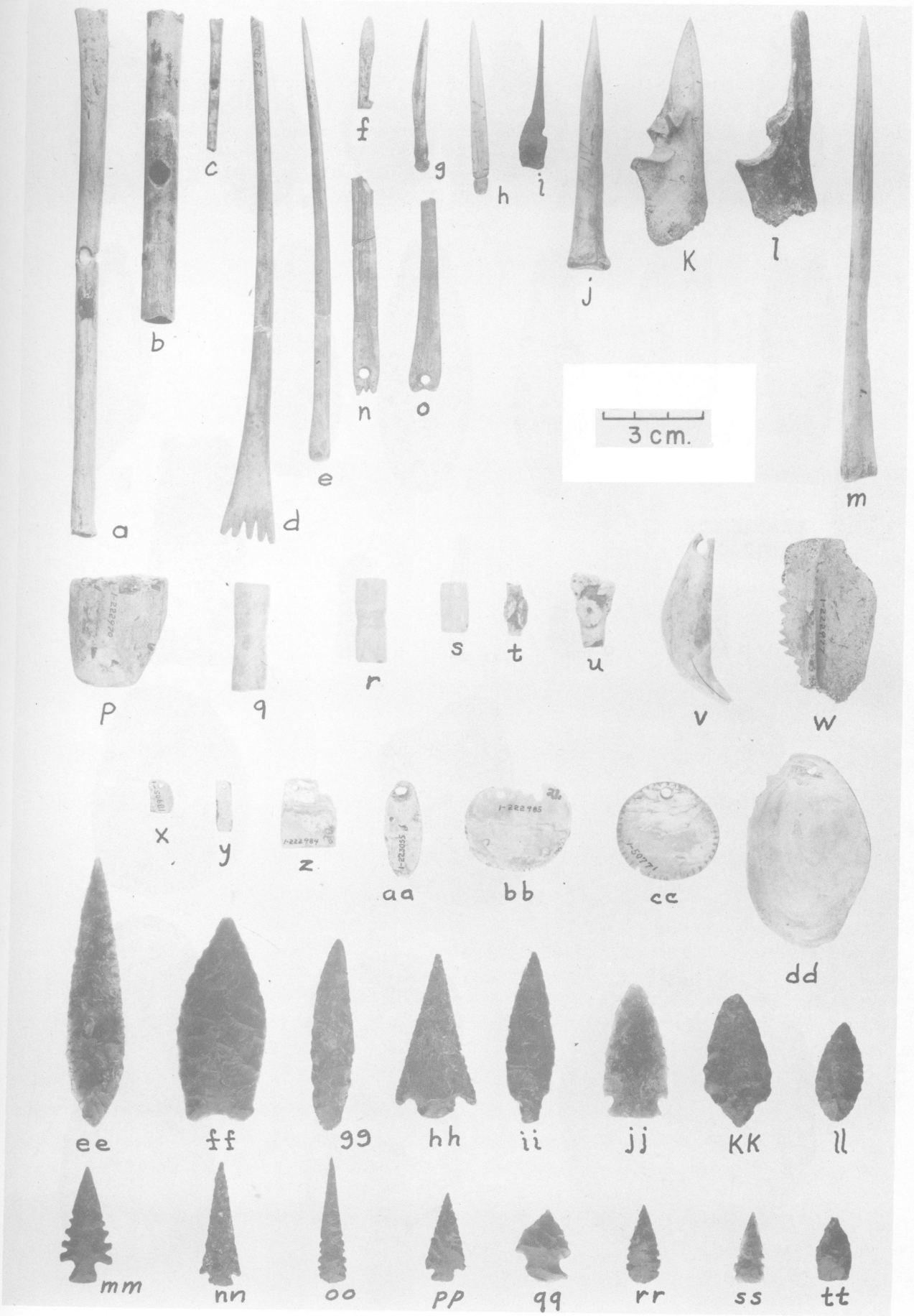
TABLE 1. BURIALS AND ASSOCIATED ARTIFACTS ILLUSTRATING THE THREE COMPONENTS OF THE FERNANDEZ MOUND.

(A = Phase II, Late Horizon; B = Phase I, Late Horizon; C = Middle Horizon)

TABLE 2

Measurements of Projectile Points and Blades

Type	No. of spec.	Length (mm.)			Width (mm.)			Thickness (mm.)			Weight (gr.)		
		Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.
La	2	42	41	41.5	21	20	20.5	9	8	8.5	6.5	6.2	6.3
Lb	19	111	52	79.6	27	15	22	9	5	8	20.6	4	12.8
Lc	3	35	29	31.3	17	14	15	7	5	6.5	4.8	3.4	3.9
Ld	6	60	--	--	25	--	--	7	--	--	11	--	--
Ta	3	28	20	24	14	11	12.5	5	4	4.5	1.6	1.3	1.4
Tb	4	31	29	30.3	13	12	12.3	4	2	3.3	1.2	.9	1.1
Tc	1	56	--	--	29	--	--	7	--	--	10.6	--	--
Td	2	51	39	40.5	31	30	30.5	10	7	8.5	10.3	--	--
Sa	3	67	34	52.6	29	15	20.3	9	6	7.3	12.4	7.3	10.9
Sb	2	70	67	68.5	28	20	24	10	9	9.5	12.7	12	12.3
Sc	1	49	--	--	23	--	--	7	--	--	6.1	--	--
Sd	3	24	22	23.3	15	13	14	5	5	5	1.3	1.2	1.2
Se	1	50	--	--	14	--	--	6	--	--	4.9	--	--
SNa	10	43	29	36	22	14	18	6	4	4.8	3.1	1.3	2.1
SNb	2	88	--	--	28	--	--	8	--	--	--	--	--
SNc	1	33	--	--	13	--	--	3	--	--	--	--	--
SNd	18	51	25	35	14	11	12.5	5	3	3.9	1.9	1	1
SNe	1	30	--	--	12	--	--	3	--	--	--	--	--
SNf	2	48	--	--	16	--	--	7	--	--	3.7	--	--
CNa	25	50	30	35.6	23	14	17.4	5	2	3.7	2.7	1.4	1.9
CNb	2	39	--	--	18	--	--	3	--	--	--	--	--
CNc	1	55	--	--	27	--	--	8	--	--	10.7	--	--
CNd	5	48	26	35	21	11	14.7	5	5	5	3.8	1.2	2.1
BNa	3	67	--	--	32	--	--	8	--	--	10.2	--	--
Ea	2	130	85	104.5	51	35	43	12	10	11	28.6	--	--


a
b
c
d
e
f
g
h
i
j
K
l
m
n
o
3 cm.
P
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X
y
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aa
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PLATE I

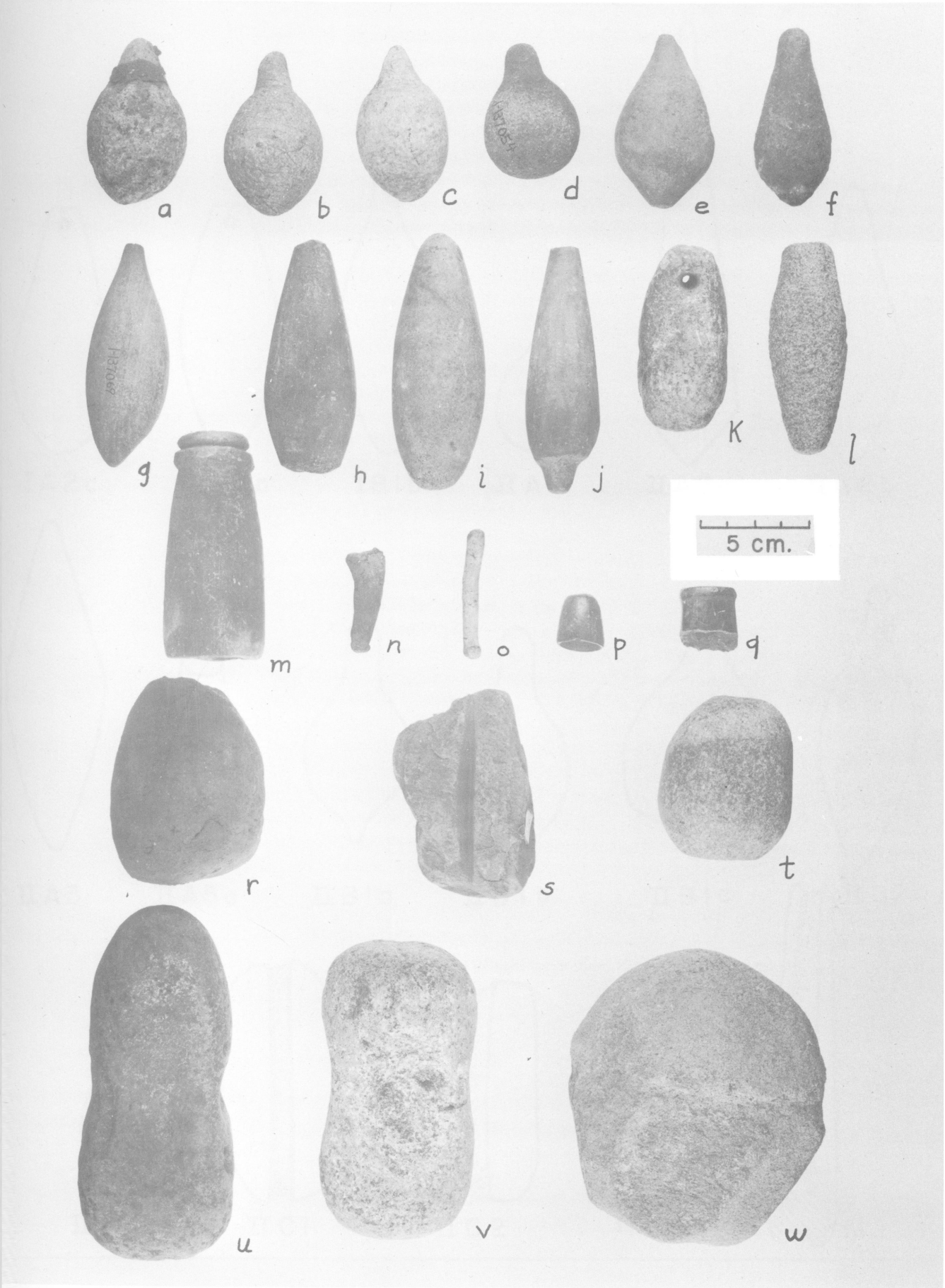
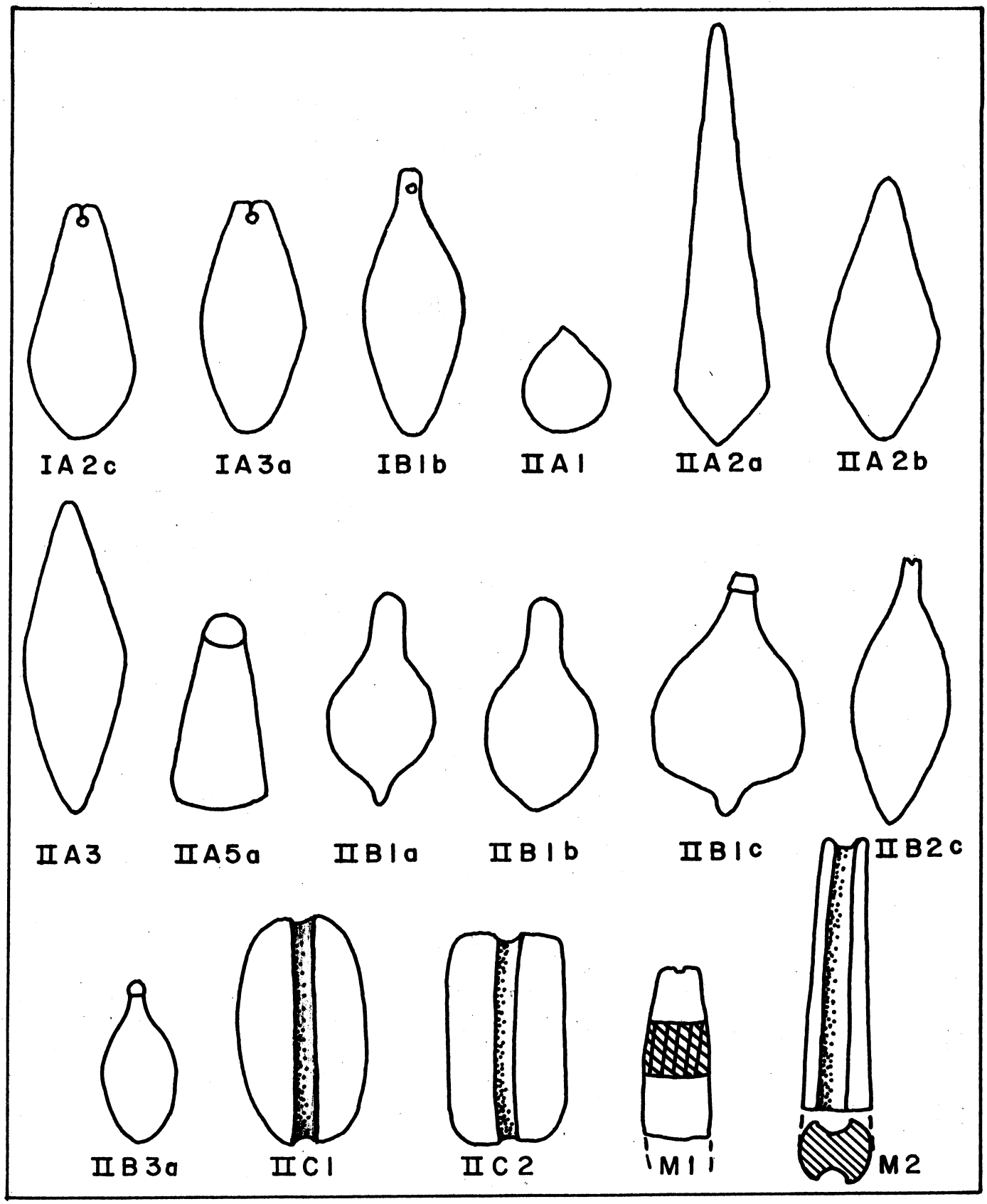


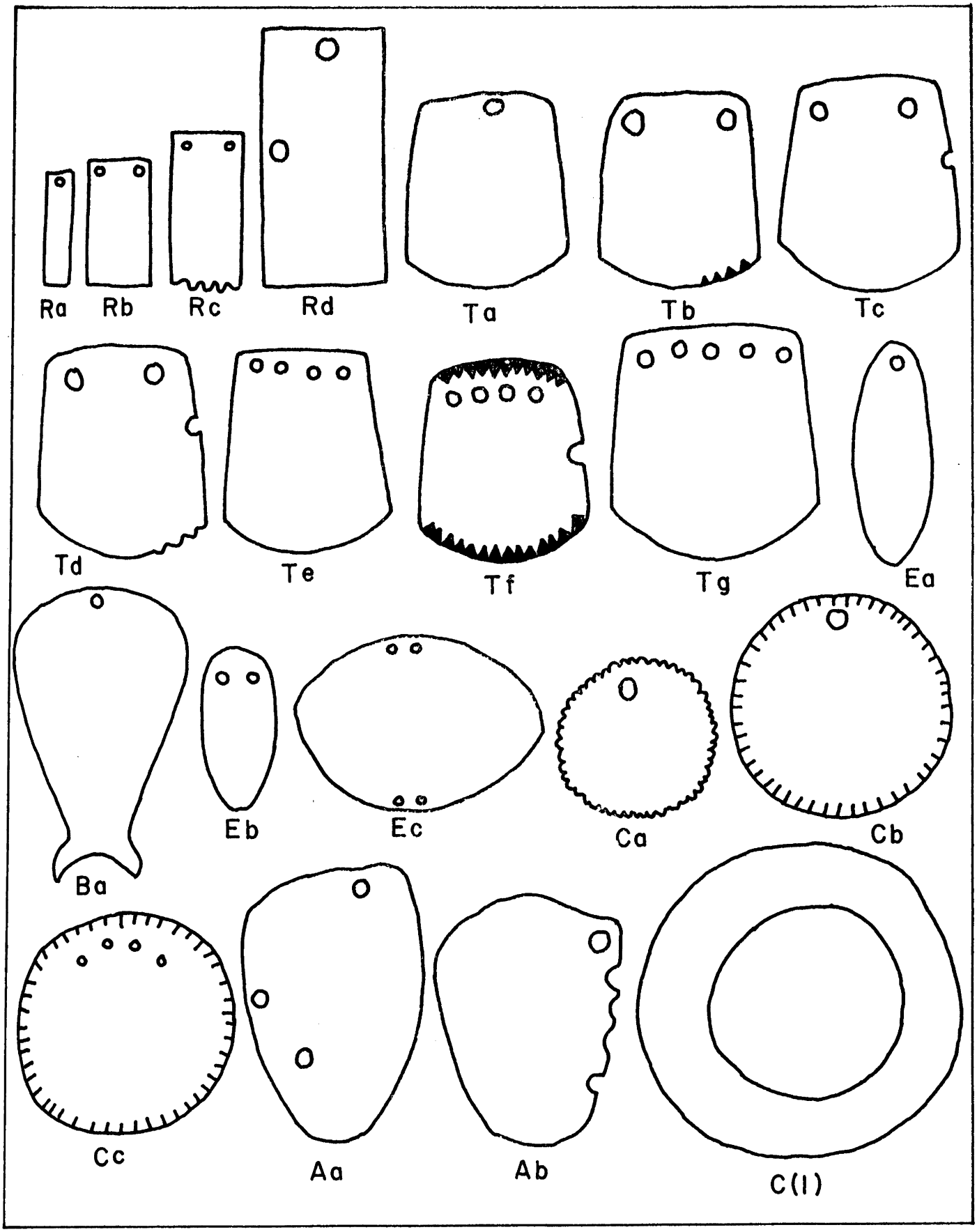
PLATE 2



Charmstone Types CCo-259

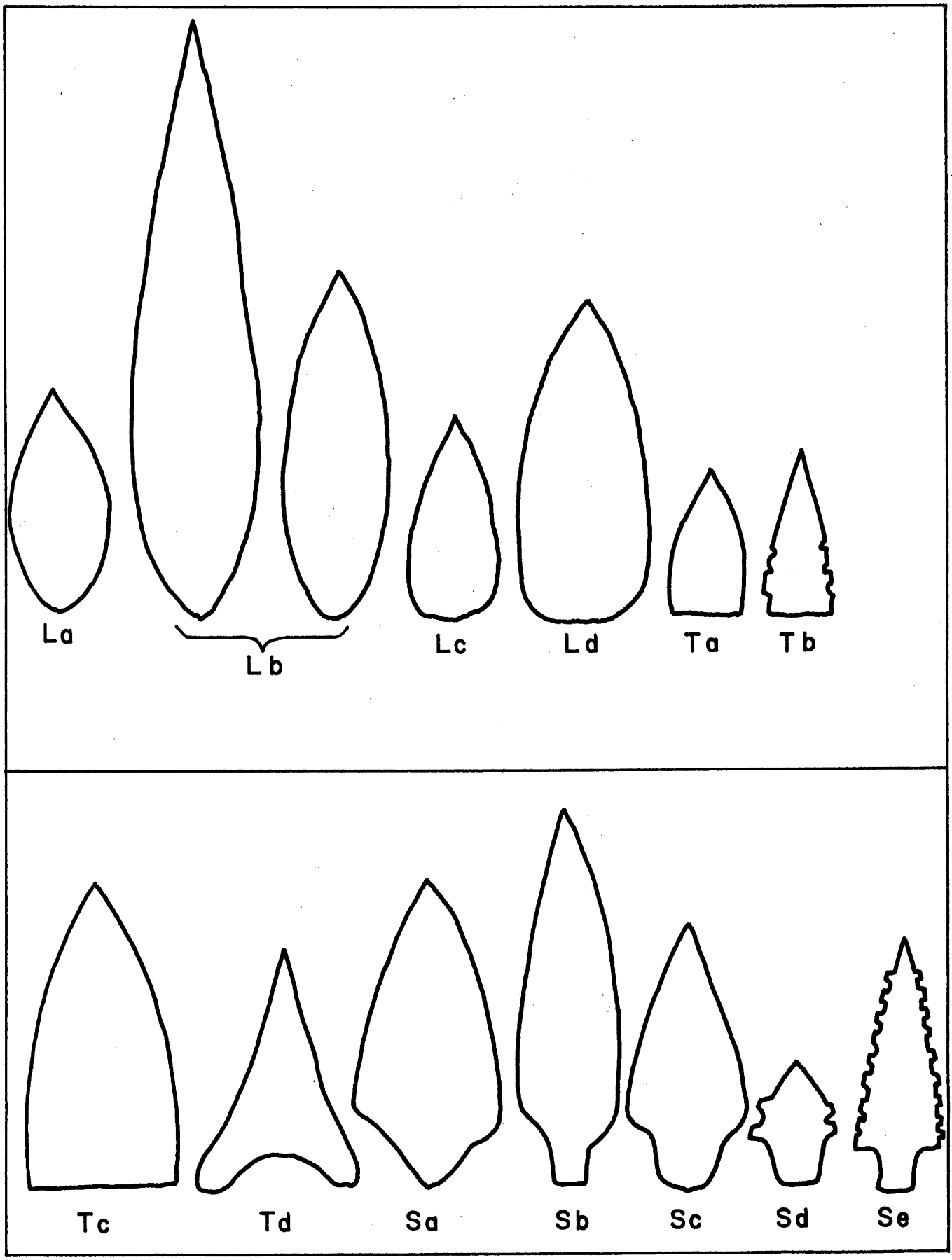
(all 1/2 size except Mf which is actual size)

Fig. 1



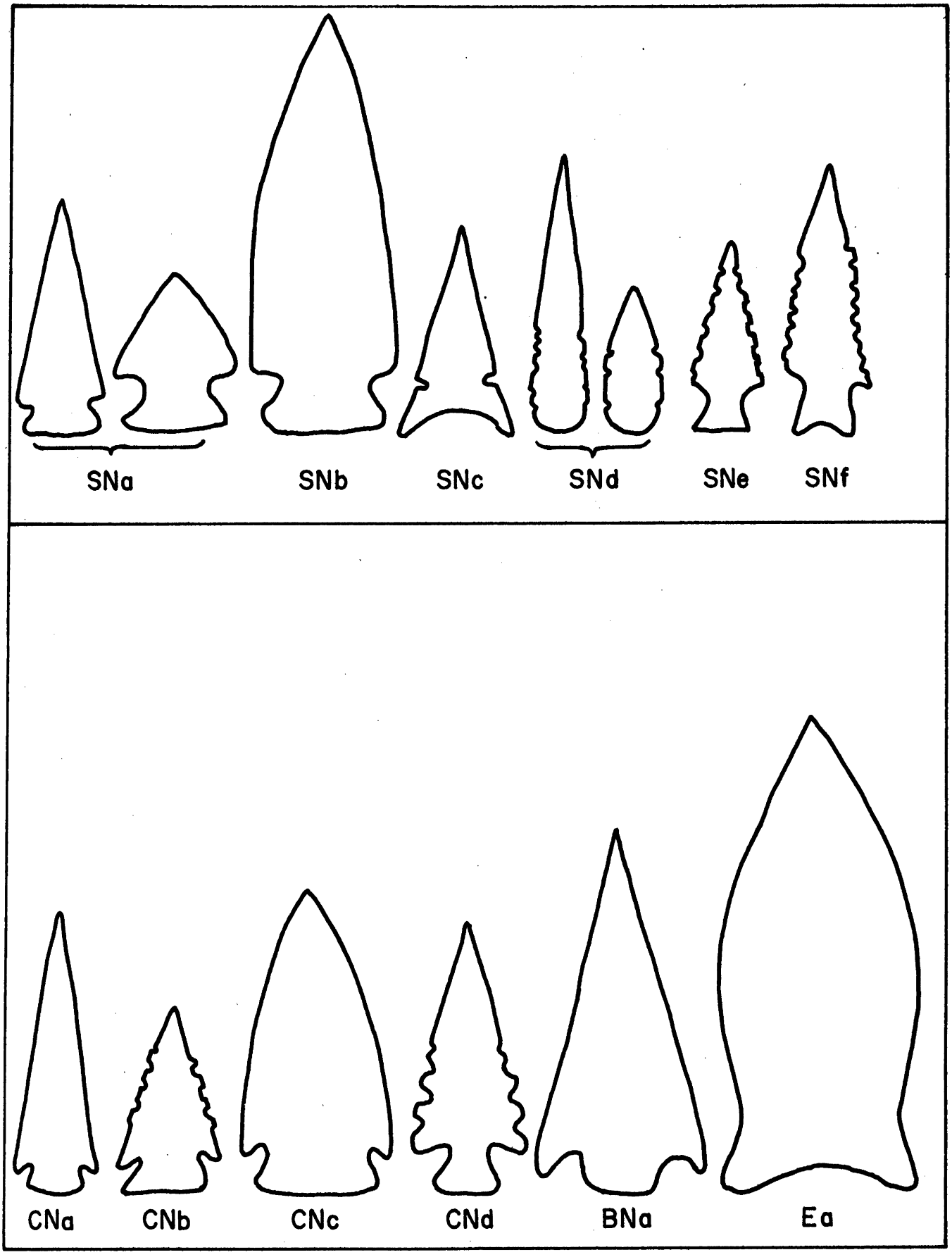
Haliotis Ornament Types, CCo-259
(actual size)

Fig. 2



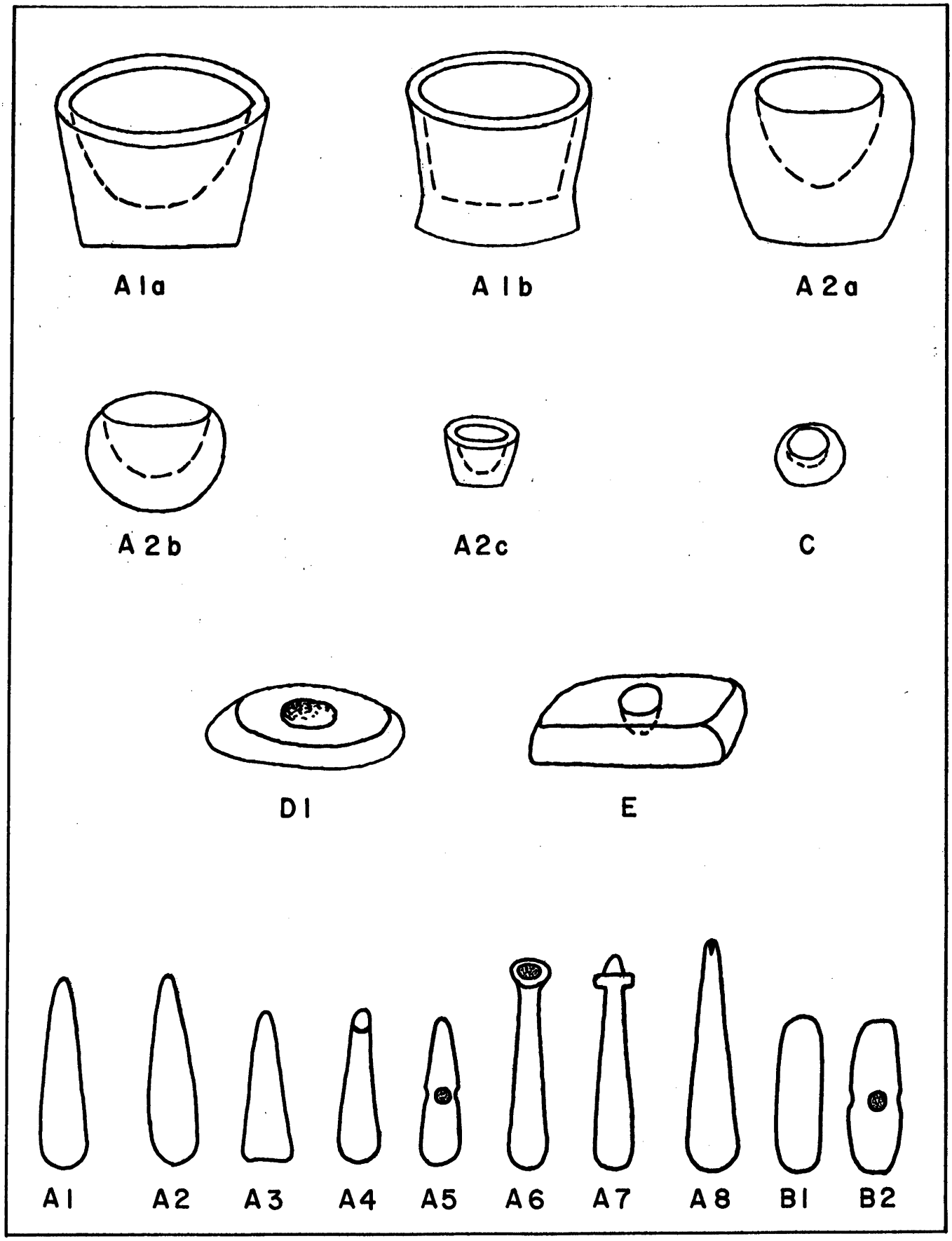
Projectile Point Types, CCo-259
(actual size)

Fig. 3



Projectile Point Types CCo-259
(actual size)

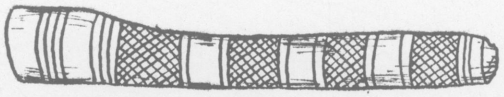
Fig. 4



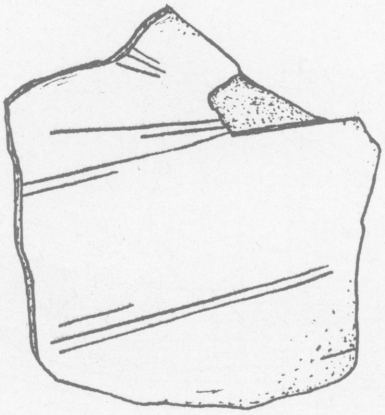
Mortar and Pestle Types, CCo-259
(not drawn to scale)

Fig. 5

a



b



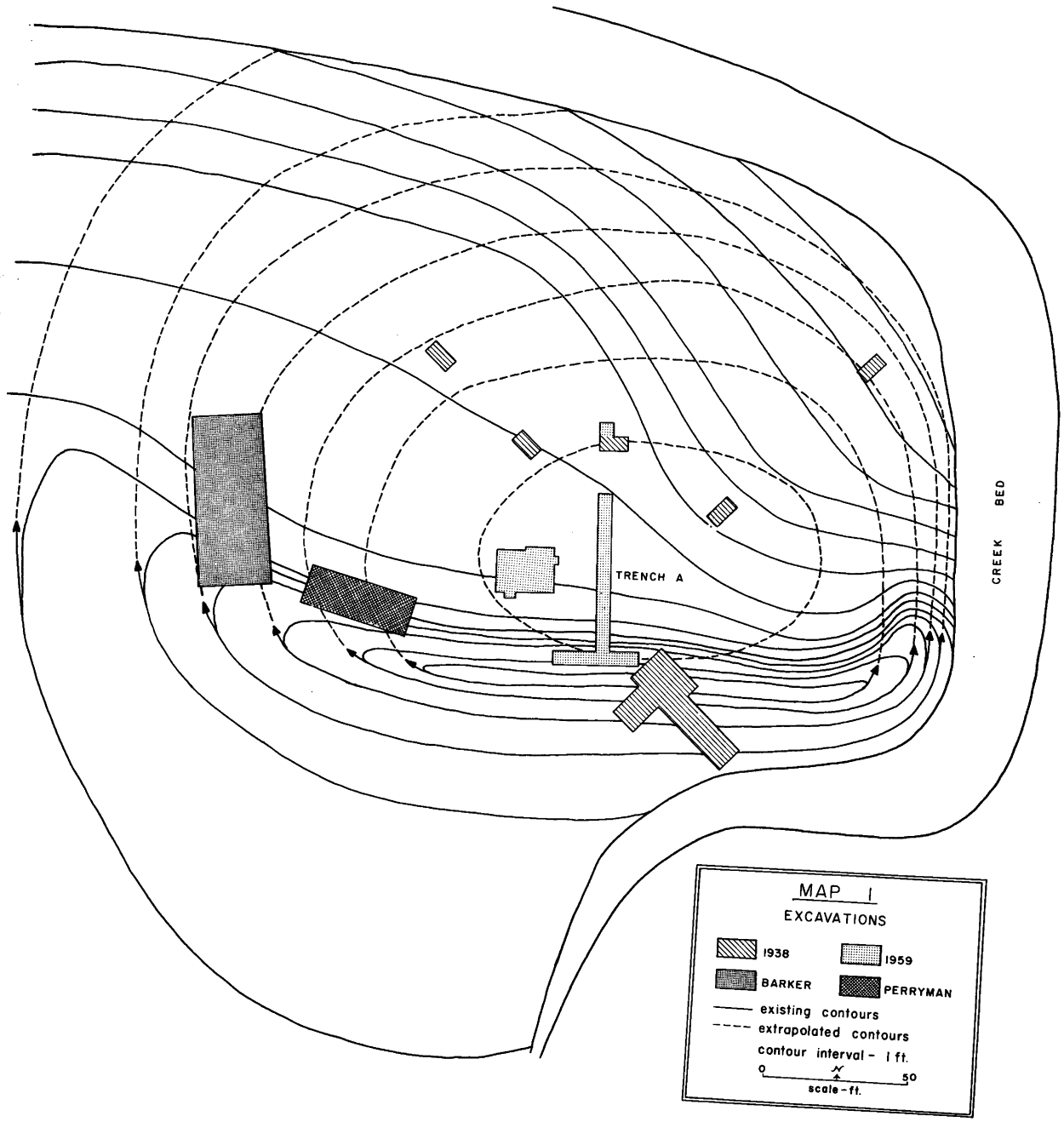
c

scale
1:1

d

e

Fig. 6


TRENCH A
CREEK BED
MAP 1
EXCAVATIONS
1938
1959
BARKER
PERRYMAN
existing contours
extrapolated contours
contour interval - 1 ft.
0
50
scale - ft.

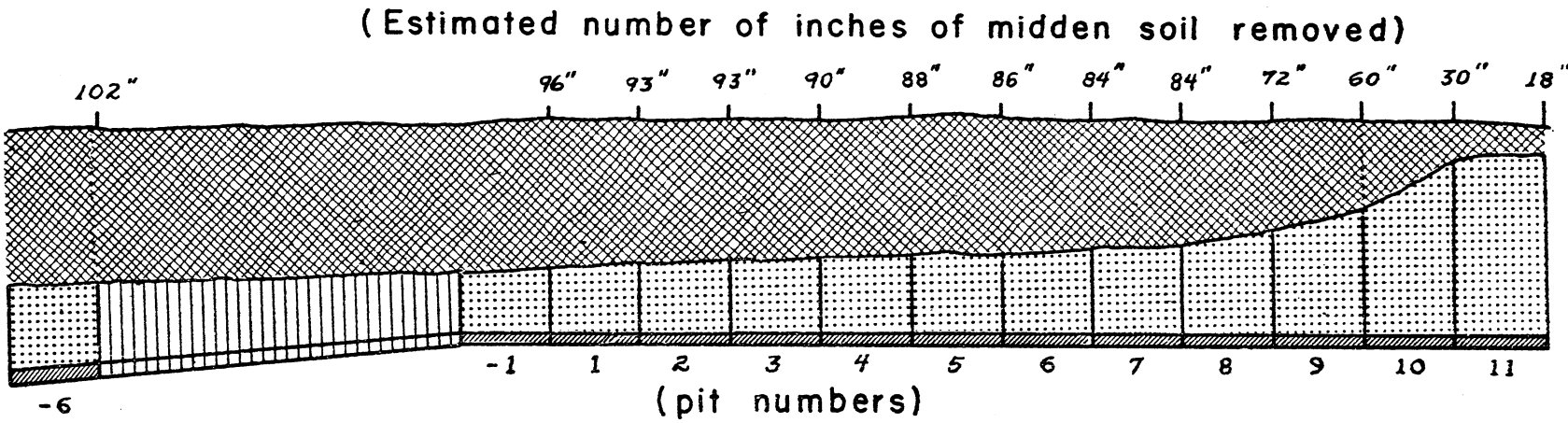


DIAGRAM I

SCHEMATIC N-S TRANSECTION OF TRENCH A

Destroyed midden

Excavated midden - 1959

Sub-mound clay

Unexcavated

0 25

Scale - feet