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The Patterson Mound: A Comparative Analysis of the Archaeology of Site Ala-328

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DEDICATORY PREFACE

EDWARD WINSLOW GIFFORD, 1887-1959: AN APPRECIATION

The University of California Archaeological Survey dedicates the present report to the memory of the late Professor Edward Gifford who died on May 16, 1959 at the age of seventy-one. From 1912, when Professor Gifford joined the staff of the Department of Anthropology of the University, he was attached to the Museum of Anthropology until his retirement as Director of the Museum in 1955; the collections of the Museum were under his care, and he was therefore intimately associated with the prehistoric materials which came to the Museum.

Professor Gifford's interest in the archaeology of California is amply demonstrated by the fact that he published nine major contributions on the subject. In 1915 his first paper on the subject appeared in a brief article, The San Francisco Bay Shellmounds, published in California Out of Doors, in which he presented a general description of mounds of the San Francisco Bay region, with a valuable discussion of probable population of the Bay shore, and the composition of shellmounds. This was followed in 1916 by a monograph in the University of California Publications in American Ethnology and Archaeology entitled Composition of California Shellmounds, which was the first example of the application of a technique which has since become more widely used for determining the constituents of refuse deposits. In this paper the prehistoric ecology is determined and an effort is made to compute the age of shellmounds by estimating the rate of accumulation of the refuse deposits. In 1926 there appeared three papers which treated with prehistoric California materials. First is Californian Anthropometry, a major compilation of all available data concerning the physical anthropology of the living California Indians, as well as of all available archaeological skeletal remains, which appeared in Volume 22 of the University of California Publications in American Archaeology and Ethnology. A very useful summary of this large work was printed under the title Californian Indian Types in the same year in Natural History, and this synthesis has been reprinted in The Indians of California, published by the University of California Press in 1951. Also in 1926 Professor Gifford with W. E. Schenck, then Research Associate of the Department of Anthropology, studied local collections as well as materials in the University Museum of Anthropology and in their joint Archaeology of the Southern San Joaquin Valley, published in Volume 23 of the University of California Publications in American Archaeology and Ethnology, there are blocked out the major outlines of the prehistory of the area. Gifford and Schenck

succeeded in indicating the relative age of various sites and artifact types, and conclude that all evidence noted by them dates from the later prehistoric period, but believe that earlier remains could occur in the area and may be found in future.

Professor Gifford's program of a systematic survey and description of the collections of the Museum of Anthropology is first mentioned in print by him in an article, Typology for Archaeology, published in Volume 2 of the 27th International Congress of Americanists, Mexico, 1939. In this is a discussion of his system of typological designations using a letter and number system illustrated with data and conclusions reached by him in his study of shell and bone artifacts from California. He points out the importance of typological cognates used in effecting cross-dating, and illustrates this with reference to shell bead types manufactured on the California coast and found in Southwestern archaeological sites. One year later, in 1940, there appeared the volume Californian Bone Artifacts in the University of California Anthropological Records which comprises a systematic survey of bone artifact types in the Museum of Anthropology. Here are identified universally distributed Californian types, and a series of tables compares the occurrence of specific bone artifact types in series of sites in local regions of the state. The identification of forms occurring in prehistoric sites and among ethnographic groups suggests new evidence for the continuity of recent California Indian populations out of the prehistoric past. A second and final contribution to this program of analysis of museum materials came in 1947 with the publication of Californian Shell Artifacts in Volume 9 of the University of California Anthropological Records. Important in this work is the attention paid to changes of type through time insofar as these can be determined from materials deriving from stratified sites. Also of interest in this report is the comparison of all types represented in mounds of various areas (Sacramento Valley, Delta Region, San Francisco Bay, South Coast region, etc.). At the end of this work Gifford provides the details of the occurrence of Californian shell artifact types from Southwestern sites, a subject to which he returned in an article appearing in Volume 15 of American Antiquity entitled, Early Central Californian and Anasazi Shell Artifact Types. Also in 1949 Professor Gifford published in Volume 14 of American Antiquity an article, Diet and Age of Californian Shellmounds, in which he compares the constituents of Fijian and San Francisco Bay shellmound deposits and discusses various possibilities to account for the differences in amount of bone and shell found in the coastal shellheaps in the two areas.

The above review of Professor Gifford's contributions to the subject of California prehistory are, of course, only a fraction of his total writings which, in addition to contributions on the anthropological subjects of kinship

terminology, social organization, place names, ceramic technology, mythology, the archaeology of northern Mexico and Oceania, and ethnography, also include many contributions to conchology and ornithology.

Professor Gifford's lasting influence in anthropology is assured, and at Berkeley his influence will be felt throughout the future through his shaping the collections and organization of the Museum of Anthropology. Of him, one can say with truth, "Si monumentum requiris, circumspice."

Robert F. Heizer
Director
University of California
Archaeological Survey

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PREFACE

The excavations at the Patterson Site (Ala-328) reported on here began in the Fall Semester, 1949, as part of a field class in archaeological methods at San Francisco State College.* Ten seasons of active excavations have been carried on at this extensive village site and more excavation is planned for the future.

Early in the history of excavation, Mr. James T. Davis completed a major in Anthropology at San Francisco State College. With his predoctoral work started at the University of California, Berkeley, it was decided that the archaeological field data collected from the Patterson Site would provide the materials for an M.A. thesis. At that time five seasons of field work had been completed and the field data collected during this period were turned over to Mr. Davis. Presented in this paper are the results of his analysis. The information used by Davis was derived from two main sources: (1) the excavated materials from Site Ala-328, collected between 1949 and 1953, and (2) collections of artifacts from numerous Central California sites housed in the Museum of Anthropology at the University of California, Berkeley.

San Francisco State College has willingly offered the field data to Mr. Davis, and it should be noted that the main text represents his efforts at bringing them together in meaningful form. It is only fitting that his name should appear as senior author. As the second author, I have been mainly responsible for the collecting of the data upon which part of this paper is based and agree with Mr. Davis' descriptions of artifact types and in the general conclusions. Currently San Francisco State College retains all the original field data and artifacts and will publish a final report at such time as excavations are concluded at the Patterson Site.

Work on the Patterson Site represents more than just the routine excavation of a San Francisco Bay shellmound. It serves to illustrate the research possibilities within the reach of the limited facilities of the State College, provides a training ground for interested would-be archaeologists, many of whom, like Davis, have moved on to pre-professional status, and has created a cooperative venture between two State institutions--in this case publication has been made possible through the University of California Archaeological Survey.

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* Earlier investigations for the University of California were carried out by Waldo R. Wedel in 1935.

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Why ten seasons thus far have been devoted to a single site can be best understood in terms of the history of archaeology in California in general and the San Francisco Bay area in particular. If the Central California cultural sequence is to expand outward, such expansion must rest upon the intensive examination of type sites within specified geographic provinces. Such has been the procedure of Heizer for the Central Sacramento Valley and Meighan for the North Coast Ranges. (See Heizer, 1949b; Meighan, 1955.)

Absent from San Francisco Bay archaeology, however, has been any intensive study of a single large aboriginal habitation site where the emphasis has been directed toward accumulating quantitative data for purposes of providing a better understanding of the cultural and ecological pattern as this occupies some specific temporal-geographical niche. Work at Ala-328 has progressed in this direction, although it is not emphasized in this particular paper. Davis' handling of the data is a basic study in that it is descriptive, interpretative, comparative, and seeks for time and cultural relationships.

Beyond the duty of presenting data, there are other areas of interest either ignored or not recognized by many archaeologists. Cultural relationships and conclusions have tended to derive almost exclusively from artifact comparisons expressed through some arbitrary taxonomic system based upon such factors as weight, size, shape, or color. Absent or lacking in fullness are sections dealing with the bio-cultural and paleogeographic relationships. Though the general story of the past unfolds with the spade of the archaeologist, as is the case here, the details of this story must be reconstructed and superimposed on what we conceive to be the landscape of between 3000 and 4000 years ago.

Meighan et al. (1958, 1958a) have presented examples of positive ways of dealing with some of the human problems of a site in their "Ecological Interpretation in Archaeology." Tested techniques are presented whereby the archaeologist can derive conclusions concerning man's relationship to his environment. It is around this biocultural setting, or what might be called "innercultural" relationships, that problems have gradually been taking form in the Patterson Site. It is to be doubted that additional archaeological data will alter Davis' main conclusions other than to provide a few new types and a further refinement of what is now known. The problem now and for the future is to add cultural body to the archaeological skeleton, and this will mainly constitute the final report.

Any archaeological refuse dump or accumulated midden deposit presents a veritable paleo-museum, the content of which can be interpreted in terms of both biology and culture. With radiocarbon dates for the Alameda site

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revealing an age of 2339 years B.P., there immediately looms into prominence a physiographic landscape with its associated flora and fauna, a landscape much different from that presented to our eyes today. Against this background some sort of reconstructed culture must be erected. Man's tools, besides being viewed in terms of types which fit into sometimes extremely elaborate taxonomic systems, should also be seen as something functional to the economy or socio-religious life of the former population. Enough is known now about the Patterson Site so that in final publication there can be presented a reasonably complete list of faunal remains, notes on food preparation and butchering techniques, utilization of specific kinds of mammal bones for certain types of artifacts, and technological stages and processes in the manufacture of stone, bone, and antler tools.

Appreciation is extended to Mr. William Patterson of Newark, who, through the years of excavation, has been most cooperative in realizing the nature of our project and has permitted us to excavate on his ranch. To Dr. R. F. Heizer of the University of California we owe thanks for first encouraging the start of a field class in archaeological methods, during the first few years of which the Archaeological Survey provided much of the necessary equipment and data sheets. Of constant help has been Mr. L. L. Valdivia, who has given freely of his time as an excavator and as a professional bulldozer operator.

All of the students who have participated are too many to mention, but special credit should go to the following persons who contributed their time for several seasons in the field: Mr. and Mrs. Allen Cornish, Mr. and Mrs. Perry Allen, Mr. and Mrs. Donald Grisez, Richard Brooks, Thomas Thorp, John Sanchez, James Nichols, Ronald Waterbury, Harry Leffman, Franz Mangels, Clair Logan, and Etra Ranaglioli.

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INTRODUCTION

The archaeological site designated as Ala-328[1] was first recorded in anthropological literature by N. C. Nelson (1909, Map 1). A mound recognized as an ancient Indian habitation site appears on an early map of the San Francisco Bay area at the approximate location of Ala-328 (Whitney, 1873), but it is difficult to determine whether or not the map location represents site Ala-328 or 329; the latter is located some 300 yards woutheast of Ala-328. Unmistakably one or the other is represented since they are the only sizeable mounds in the vicinity.

The Patterson mound No. 1 is located in Alameda County on property presently owned by Mr. William Patterson, about 3 miles due south of the town of Alvarado, at grid coordinates 89050 rt./1643150 up, Hayward Quadrangle, War Department, Corps of Engineers, U. S. Army, grid zone "G," 1942. (See Map 2 for its location in a Central California context.)

Dimensions of the mound are approximately 350 feet along the north-south axis by 250 feet across the east-west diameter (see Map 1). It is ovoid in outline and has a known depth of 13 feet near its center. It rises from a flat alluvial plain, 6 feet above sea-level, to an elevation of 15 1/2 feet above sea-level at its highest point. Having been under intensive cultivation for a number of years, the uppermost level has been considerably disturbed (to a depth of 18 in. in some areas) by heavy farm machinery, root crops, and rodent activity (see diagrams Nos. 1 and 2).

The mound differs little in composition from other sites along the shores of San Francisco Bay (for description of mound character and constituents in the Bay and adjacent area see Nelson, 1909; Gifford, 1916; Cook, 1946, 1950; Cook and Treganza, 1947, 1950; Cook and Heizer, 1951; Greengo, 1951) except in the relatively low content of soft-shelled clams (Macoma nasuta) which may be due to ecological factors related to its location on the edge of a marshy slough (Greengo, 1952, p. 16). The most common shell, especially in the lower levels, is the oyster (Ostrea lurida). The preponderance of oyster and relative absence of soft-shelled clams was noted by Nelson in several Bay region sites (op. cit., p. 337).

Exploratory excavations were first conducted at the site during the fall of 1935 by W. R. Wedel and several students from the University of California; a copy of Wedel's field notes on this excavation is filed in the office of the University of California Archaeological Survey, Berkeley.

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1. See End Notes, p. 80.

In the fall of 1949, Professor A. E. Treganza of San Francisco State College undertook further excavations at the site as a part of curricular activity, offering interested students an opportunity to learn archaeological techniques in the field. This work has continued each fall semester since its beginning in 1949. Including the collections of W. R. Wedel, approximately 169 burials and 1,000 artifacts have been recovered with less than 20 percent of the site having been examined. By 1958, with 25 percent of the mound dug, burials numbered 260, artifacts, 2,000. This represents one of the largest documented series of burials and artifacts from the Bay area. A few large collections have been made from other sites adjacent to the shore of San Francisco Bay, but are, for the most part, the result of early salvage operations at a time when the sites were being largely destroyed.

Prior to the salvage operations, however, two limited samples of mounds were excavated by Max Uhle (1907) at Emeryville and Nelson (1910) at Ellis Landing. Subsequent to these controlled excavations the three largest mounds (Emeryville, Ellis Landing, and West Berkeley) were almost totally destroyed. A report on the limited excavation and extensive salvage operation at four small mounds at Richmond, California, was completed by L. L. Loud (1924) during this period (1910-1930), and the results of the Emeryville salvage were published (Schenck, 1926); field notes of the other salvage operations are on file in the office of the U. C. Archaeological Survey. Schenck's paper on the Emeryville site marks the last of the published site reports on mounds along the eastern shore of San Francisco Bay.[2]

Beardsley's examination in 1948 (Beardsley, 1948; 1954) offered a new interpretation of the available data in light of the culture horizons established for archaeological sites in the Interior Valley region by Lillard, Heizer and Fenenga (1939) a decade before.[3]

A review of certain aspects of the determination of cultural sequence in Central Californian archaeology is necessary for orientation before proceeding with a discussion of the present findings.

Lillard, Heizer and Fenenga's analysis had established a three-fold sequence of archaeological cultures in the Sacramento Valley and Sacramento-San Joaquin Delta regions. These culture sequences were first termed "Early," "Transitional," and "Late." Later, the Transitional period was termed "Middle" to avoid the connotation that it had necessarily evolved from the Early period. The possibility had also been suggested that this sequence was reflected in the sites bordering the shores of San Francisco Bay (Heizer and Fenenga, 1939, p. 396). It was this latter possibility which led R. K. Beardsley to reexamine the data from sites in the Bay region

and to the analysis of data collected from sites in Marin County, north of San Francisco.

The results of this investigation led Beardsley to organize the sites examined by him into a taxonomic framework to illustrate the degree of relationship between the sites. The basic unit in this taxonomy is the "component" which is employed "to designate an archaeologic record of human occupancy at a single locality at a specific time" (Beardsley, 1954, p. 6). Many sites reflect the presence of more than one component. These "components of a multi-settlement site are denoted by letters (A, B, and so on) suffixed to the site name in order of increasing age" (loc. cit.), e.g., Ala-328A is the most recent, Ala-328B is more ancient. The components which demonstrate a strong cultural relationship are grouped under a "facies." Facies illustrating certain cultural resemblances and geographical proximity form a "province." "Zones" are delimited on the basis of both cultural and geographical distance. Two such zones, the Littoral and the Interior Valley, were distinguished in Central California. Related facies exhibiting also a demonstrable culture-historical sequence are differentiated into a "phase" of a "horizon." Phases have been established only for the most recent horizon. A horizon represents a cultural entity composed of sequentially related components. This sequential relationship may or may not eventually prove to be in terms of actual age; at present it is based upon "cultural stratification" (except the Early Horizon which is separated from succeeding cultures by physical stratigraphy also) and sequence of components at several key sites (ibid., p. 7). The relationships of these taxonomic categories may be shown as follows:

Temporal-cultural:
- I. Horizon
  - A. Phase
    - 1. Facies
      - a. Component

Geographical-cultural:
- I. Zone
  - A. Province

Each of these terms is used in this paper with meanings identical to those described above.

GEOGRAPHICAL SETTING

On the Whitney map the site is located on the edge of a marshy slough of which the present Coyote Hill Slough is a remnant. The old slough and tidal marshlands have been reclaimed subsequent to 1917 by a system of levees for developing farmland and the construction of numerous and extensive ponds for the purpose of extracting salt and other minerals through solar evaporation.[4] Due to these factors, the shore of San Francisco Bay, once immediately adjacent to the site, has been removed a distance of approximately 3 miles to the northwest. One-half mile to the west lie the Coyote Hills, averaging 200 feet in elevation and extending about 3 miles in a northwest-southeast axis and about one-half mile in width. Six miles to the east lies the base of the coast range foothills, rising abruptly to elevations exceeding 1,000 feet. Northwest and southeast for many miles stretches the flat plain of an extensive depression or coastal valley of which the Santa Clara Valley and San Francisco Bay itself are a part (Holmes and Nelson, 1917, p. 7).

This flat valley land was doubtlessly a favorable habitation area in aboriginal times, supporting a variety of plants and animals economically useful to the inhabitants. Stands of the valley oak (Quercus lobata), remnants of which may be seen today, covered the valley floor, and in the foothills two species of coastal live oak (Q. agrifolia and Q. wislizenii) are plentiful, as well as the buckeye (Aesculus californica). Willow (Salix) grew in abundance along the watercourses, and along the edge of the slough and marshland stands of tule were available. In the nearby waters were to be found numerous species of edible molluscs; the oyster (Ostrea lurida), mussel (Mytilus edulis), a small marsh snail (Cerithidia californica) were especially abundant (Greengo, 1951, p. 16). These are but a few of the molluscs available to and gathered by the aboriginal population (see Greengo, op. cit., and Bonnot, 1940, p. 237 for species occurring in and gathered by the Indians around San Francisco Bay). Mammalian species of doubtless importance, judging from their osteological remains in the site, were the deer (Odocoileus), antelope (Antilocapra americana), elk (Cervus), sea- and river-otter (Enhydra), racoon (Procyon lotor), badger (Taxidea), coyote (Canis latrans), to mention a few. Occasionally seal (Phoca), sea-lion (Zalophus), and even whale (genus unknown) were utilized by the occupants. Migratory and local birds and fowl were abundant in the slough and marshlands in the immediate vicinity, and were doubtlessly a very important item of diet. Fish, especially the sturgeon, were taken from the slough and nearby watercourses, but were apparently

not as important as a food source as other items, probably because of the ready availability of other more desirable foods which could be gathered in quantity with little expenditure of time and effort.

Coupled with the richness and variety of floral and faunal species available was a mild climate with an annual mean average of 56° F. and an annual variation of the mean of about 10° (summer mean 60°, winter mean 51°). One rainy season each year (from November to April) deposits an annual average rainfall of about 21 inches. All in all, the area was much more ideally situated for human occupation than the interior valley and was a close rival to the Delta area in abundance of food resources. Culturally, however, these coastal dwellers never achieved the refinement and elaboration of their less ideally situated neighbors in the interior valley.

DESCRIPTION OF ARCHAEOLOGICAL REMAINS

A. Note on the functional interpretation and organization of data.

"Archaeology has two chief aims, the reconstruction of the life of the people in the past and the arrangement of this life into an historical development" (Vaillant, 1930, p. 9). This quotation sounds the keynote of the following study. While this paper is not primarily concerned with theoretical pros and cons of what the archaeologist should or should not, can or cannot do or attempt to do with his limited data, it is necessary to explain the outlook underlying a "functional" interpretation of archaeological remains. The basic concept for such an approach is set forth and elaborated upon elsewhere (Taylor, 1948, esp. pp. 113-51; Clark, 1952). It is felt by the present writer also that the task of the archaeologist should be more than the mere categoric description of bone, stone, shell, and other preserved remains. The importance of archaeology as a science lies in the attempt to learn as much of the total culture of prehistoric populations as possible so that meaningful interpretations of culture growth and change, human migrations, environmental limitations to culture growth, and many other phenomena of man's activities can be adequately proposed and studied for their broader implications. To do this the archaeologist must determine to the best of his ability what is inherent in the artifacts and other culture remains that will possibly shed light on other aspects of culture, such as how they were made, who participated in their manufacture, and the like. Obviously certain aspects of culture lend themselves more readily to such analysis, such as economic pursuits and technology, but with careful study much can be learned of many non-material aspects of prehistoric societies as well. The limitations concerning the

non-material aspects of culture can be partly compensated for by offering possible alternatives based upon environmental limitations and comparative ethnographic study of similar groups with similar material equipment coping with the same general environmental conditions. This is not to say that all non-material aspects can be accurately and entirely reconstructed by such methods. Such things as religion and social organization are far too complex and variable to allow this, but the suggestion of possible alternatives based upon such studies are, it is felt, more meaningful than merely describing an item as a possible ceremonial object.

The present study lacks certain fundamental data, such as the determination of the sex of individual burials, a quantitative analysis of mound constituents,[5] and accurate identification and tabulation of animal remains, minerals, etc., which would no doubt permit the construction of a more comprehensive picture of the way of life of the aboriginal population as reflected archaeologically.

Following the pattern of data organization employed by Lillard, Heizer and Fenenga (op. cit., passim) and Beardsley (1954, passim), the artifact descriptions are subsumed under headings of societal activities, such as "military and hunting" and "ceremonialism"; from these data a brief summary of the "culture pattern" of the group is presented at the end of the descriptive section.

B. Note on typology.

Concomitant with the abundance and diversity of material culture elements is the perennial problem of systematically arranging them into a classificatory framework for the two-fold purpose of description and as an aid toward comparison with similar materials.

In any classificatory system based upon generic similarities, whether it be one for languages, cultures, living organisms, or artifacts, certain superficial resemblances often cause the lumping of quite dissimilar phenomena into a single "genus." On the other hand, differences which may not be at all significant to an actual relationship often tend to "split" related phenomena into separate generic units. Proponents of the two extremes, the "lumpers" and the "splitters," are, however, generally agreed on the fundamental point that differences, to some degree, must be taken into account if a classificatory framework for comparison of possibly related phenomena is to be achieved.

What should a typology demonstrate, one may ask? If a typology is to

be meaningful, it should demonstrate either temporal, areal, or functional differences or relationships. Several criteria may be considered in establishing these differences, such as source material, method of manufacture, stylistic characteristics (shape, decoration, size, etc.), and form. Obviously each of these criteria may not have equal value in establishing typologies. This subjective weighting of objective criteria is one of the principal points causing disagreement as to the validity of any typology. This is a statement of a problem, not a solution for it. The typologies employed in this paper are of different values in differentiating areal, temporal, and functional differences. Some, such as that employed for bone awls, may or may not have meaning; until additional detailed site reports become available the ultimate determination of any significance must be held in abeyance.

Since the primary aim of this work is to learn the relationship of Ala-328 to the archaeological horizons of the Central Californian area, it would be well to adhere to, as closely as feasible, the typologies employed in establishing those horizons. Therefore, the materials are arranged in categories employing the typological designations utilized by Beardsley (1954, passim). It has, of course, been necessary to add certain types where an existing one did not accurately describe some of the present specimens.

By far the greatest number of artifacts dealt with here are manufactured from bone. Since Beardsley employed a broad descriptive typology for his bone tools, those same designations are used here for parallel and similar types (with some leeway in the latter instance). In addition, bone artifacts are correlated with Gifford's (1940) typology when such cross-reference is accurate.

C. Mound character and structure.

The mound, as stated previously, is elliptical in outline and rises from an alluvial plain to a height of 15 1/2 feet above sea-level. The soil of the fan is a member of what has been termed "Dublin adobes" (Holmes and Nelson, op. cit., p. 101 and map). The usual sub-stratum underlying this recent alluvium is a yellowish-brown clay (ibid., pp. 101-02). The sterile soil upon which the site rests is also a yellowish clay (see diagrams 1 and 2) which may indicate that the mound deposition originated before the Dublin adobe soil began being built up in the area. Holmes and Nelson (op. cit., p. 103) suggest no specific age for the laying down of this adobe soil; they state simply that it is of "recent-alluvial material."[6] In light of the fact that the mound rests upon the normal sub-stratum of this series it is possible to suggest an approximate beginning date for the

deposition of the Dublin adobe in this particular area of ca. ±2,500 years before the present time (B.P.), for a radiocarbon date obtained from charcoal from the lower level of the site has been secured (Libby, 1954, p. 138, sample C-690); this date, based on two counts, averages 2,339 ± 150 B.P. The cultural significance of this date is discussed in a separate section of this paper.

The internal composition of the Patterson mound resembles that of other sites along the shores of San Francisco Bay, although the shell content is apparently lower than that of other Bay sites. This fact has previously been noted (Cook and Heizer, op. cit., p. 304, Table 7).[7] Shell, in general, is scarce in the upper level, occurring principally in concentrated lenses. In the lower portion of the site, shell (predominantly oyster) is much more in evidence, occurring in several large beds or "strata" (see diagrams 1 and 2). The extensive thick shell lens near the bottom of mound mass B shown in the diagrams possibly extends northward for some distance, for Wedel's notes state, "Lenses of nearly unmixed oyster shell, with a few small clam and mussel shells, from 1-3 inches thick, [occur] between 8 and 10 feet [depth]" (Wedel, op. cit., p. 9).

A difference in the degree of compactness of the mound mass between the upper and lower levels is quite apparent, the lower portion being considerably more compact than the upper. The line of this difference in "hardness" of the mound is shown in the stratigraphic diagrams referred to, and separates what is being termed "mound mass A" and "mound mass B." Wedel (op. cit., pp. 3-4) notes this difference in compactness, but states that it occurred at depths between 22 and 48 inches in his excavations, which is considerably higher than the present results demonstrate. This difference suggests the possibility of time difference between two periods of occupation at the site, but the analysis of the vertical distribution of artifacts fails to conclusively demonstrate such abandonment and subsequent occupation of the site at this depth. The lines of cultural cleavage are at depths of 30 and 79 inches, while the physical difference in the mound mass occurs at an average depth of 68 inches.[8] No explanation for this difference is suggested at present.

D. Burial complex.

A total of 169 burials have been recovered from the site, 70 (41 percent) of which were accompanied by one or more artifacts, excluding 5 burials accompanied only by red ocher. Flexure has been the posture of nearly three-quarters (71 percent) of the skeletons. The flexure appears to be indiscriminate as to right or left side and the direction in which the face is turned,

and only 2 burials were found in a seated position. No distinctions are here being made between the degree of flexure because burials from top to bottom occur with various degrees of flexure exhibited. (For illustration of various degrees of flexed posture see Fig. 1).

Five burials were extended, of which 3 were adults and possessed artifact accompaniments (see Tables 1, 2, 3, and 4 for tabulations of burial data). The heads of two of the extended burials were oriented to the east, one to the south, and the orientation of two was indeterminable. No significance is attached to the presence of these extended burials in the site; specifically they are not to be considered as a manifestation of the Early Horizon, presently known only in the Interior Zone (Heizer, 1949), because the grave offerings are typical of the Ellis Landing Facies of the Middle Horizon, such as Olivella type 3c beads and type A2a mortar.

Two types of cremation were practiced at two different periods in the mound's history. Type I is characterized by total or partial cremation in which grave offerings were placed. Occasionally the flaming pyre was extinguished shortly after the body had been placed upon it, which did not allow the complete burning of the corpse. Such cremations are readily recognized because the underside of the skeleton is only scorched, and a lens of charcoal is found immediately below the skeleton. This type of burning is restricted to the upper mound, occurring at depths between 0 inches and 30 inches.

Type II cremation is characterized by the occurrence of a small handful of human bone, predominantly skull fragments, dissociated from any charcoal or ash lens. Two occurrences of such a means of disposal were found 4 feet apart at depths of 100 and 101 inches, in each case an artifact and red ocher powder was in direct association with the remains. These occurrences perhaps represent the practice (widely carried out in the ethnographic period) of cremating the corpse of an individual who died while away from the village and returning the cremated bone fragments to the settlement for interment.

Orientation in the upper levels is so indiscriminate as to be meaningless. At a depth of 80 inches and below, however, 68 percent of all burials are oriented with the 90 degree arc between north and west, while the burials accompanied by artifacts at this depth are oriented within this arc in 99 percent of the cases. The percentage of burials with associated artifacts is also greater in the lower mound than in the upper levels. (See Tables 2, 3, and 4 for tabulation of burial complex data.)

One definite cemetery has been located near the base of the mound in

trench A between pits 4 and 7 at depths between 94 and 116 inches. Twenty burials have been excavated between these depths in a contiguous area of 400 square feet. This is one burial every 20 square feet; assuming the average size of a flexed grave to be 3 by 3 feet square there is little room for other cultural features. In addition, the burials and their accompaniments (ocher, Olivella bead type 1a, Haliotis ornament type III and IV) are so consistently similar, as well as the direction in which the skulls are oriented, that it would appear to be an established cemetery requiring a relatively fixed mode of interment.

One other probable cemetery is located at depths between 0 and 30 inches in pits 5 and 6 in trenches B, C, D, E. This is the area from which have been recovered all but one of the type I cremations, and represents the probable cemetery of the population occupying the site in Phase II of Late Horizon times.

Type I cremations first appear in the Interior Valley in Middle Horizon components, but are much more common in the Late Horizon where they are associated with the clam disc bead complex.[9]

Concentration of burials, as noted in A and C components of Ala-328, is a feature common to both the Middle and Late Horizons.

Flexure originates in Middle Horizon times and carries on through the Late Horizon.

E. Ceremonial complex.

Charmstone. It has been deemed necessary to employ a different typology for charmstones than that utilized by Beardsley (1954, p. 10) because certain areal and temporal differences have come to light which were not made apparent by the application of his typology. The following typology has been adopted and revised from that used by Gifford and Schenck (1926, p. 94) in their report on sites in the southern San Joaquin Valley. It will be noted that the first typological criterion is the presence or absence of perforation; the second, the presence or absence of shaped ends; the third, shape; the fourth, the differences between the shape or modification at the ends.

	Number of burials	Percent of level total	Percent of site total	Number of burials	Percent of level total	Percent of site total	Number of burials	Percent of level total	Percent of site total	Total in site	Percent of site total
Depth in inches:		0-30			31-79			80-120			
Cremation type I	7	16	4							7	4
Cremation type II							2	5	1	2	1
Flexed	28	64	17	60	68	35	31	84	18	119	71
Extended				4	5	2	1	3	1	5	3
Incomplete data	6	14	4	24	27	14	3	8	2	33	20
No location	3	7	2							3	2
Totals	44	101	27	88	100	51	37	100	22	169	101
Orientation: N	5	11	3	16	18	9	5	14	3	26	15
NW	2	5	1	8	9	5	10	28	6	20	12
W	3	7	2	6	7	4	10	28	6	20	12
SW	1	2	1	1	1	1				2	1
S	5	11	3	10	11	6				15	9
SE	1	2	1	4	5	2	1	3	1	6	4
E	4	9	2	13	15	8	4	11	2	20	12
NE	1	2	1	4	5	2	2	5	1	7	4
Indeterminate	22	50	13	26	30	15	5	14	3	53	31
Totals	44	99	26	88	101	52	37	102	22	169	100
Burials with artifacts	20	45	12	31	35	18	20	54	12	70	41

Table 1. Burial data arranged by "culture strata."

Depth in inches	Burial number	Cremation type I	Flexed	Orientation	Olivella bead 3a1	Olivella bead 1b	Spatulate whale bone	Quartz crystal	Miscellaneous charmstone	Notched scapula	Pestle type IIB4	Pestle type IIA1	Red ocher	Haliotis ornament type II	Projectile point fragment	Carbonized cordage	Clam disc bead	Olivella bead 1a	Miscellaneous worked bone	Pestle fragment	Awl fragment	Hammerstone	Unmodified bone in grave	Bird bone whistle type I	Pestle type IIB1a	Incised bird bone tube	Girdled stone	Antler wedge	Bird bone tube	Haliotis ornament type I
No loc.	W24					6																								
8	W8				3					1																				
8	129	x			3		1	1	1		1	1	x																	
9	36		x	N						1																				
10	W11		x	S						1																				
11	2		x	W	10									1	1															
12	130	x	x		5								x			x	3	1	1											
12	131	x	x	NW	4						1	1	x			x				1										
17	38			SE						1			x								1	1								
18	47	x			1													138												
19	5		x	S																			x							
21	W9		x	W	411												18													
22	40	x				15							x			x		2						3						
24	49		x	S																					1					
24	65	x			5								x			x														
26	W4		x	E																						1				
28	11		x	S																1							2	1		
30	37																											1	1	
30	98		x																	1										
30	99		x																											4

Table 2. Data on burials with accompaniments in Component A.
Note: Two burials accompanied only by red ocher are not included.

Depth in inches	Burial number	Flexed	Extended	Orientation	Whole *Haliotis* shell	*Haliotis* ornament type I	Awl fragment	*Olivella* bead type 3c	Awl type A1bII	Antler wedge	*Olivella* bead type 3b	Canid tooth bead	Red ocher	Bird bone bead	Antler flaker	Miscellaneous worked bone	Unmodified bone in grave	Charmstone type I	Notched scapula	Notched fish bone	*Olivella* bead type 1a	Pestle fragment	*Olivella* bead type 1b	Bird bone whistle type II	Bone fishhook MM2b	Projectile point fragment	Mortar type A2b	Awl type A1aI	Thatching needle	Antler digging tool	Scapular scraper	Awl type A1eII	Mortar type A2a	Abrading stone	*Olivella* bead type 3b1	Mammal bone tube	*Haliotis* bead type 3	Bird bone tube
32	14				1	20	1	54																													
35	12								2	1																											
36	102									1																											
36	138	x		E							283																										
37	18	x		E								13	x																								
38	W18												x	1																							
40	70	x		W											1																						
42	4							16					x																								
42	87	x		S												1																					
43	3	x															x																				
43	66	x		E														1																			
44	127	x		E															1																		
46	23			NE																1																	
48	W3	x		NW				193													30																
48	74						1															1															
48	85	x		S															1																		
50	W2																						34														
50	75	x		W				*		1														2*													
53	7	x		N				452																	1												
53	82	x		SE																						3											
54	68	x		S								7		8										3			1										
54	76	x		N													x											1									
55	43	x		SE																									1								
56	28								1																					1	1						
57	25	x		N								1	x	5										1							1	1					
60	90	x		S							7																										
60	142	x		E				156																							1	1				
66	W6		x	E		1		13																													
72	W1		x							1																							1				
78	35	x		SE									x																					1			
79	58		x	SE			1	399*					x			1			1																14	2	1	2*

Table 3. Data on burials with accompaniments in Component B.
Note: Two burials accompanied only by red ocher are not included.
***Indicates bead overlay on items numbered in same burial similarly starred.**

Depth in inches	Burial number	Flexed	Cremation type II	Orientation	Quartz crystal	Bird bone whistle type II	Projectile point type NAa	Thatching needle	Mussel shell pendant	Sting-ray spine	Rib strigil	Pecking stone	Miscellaneous worked bone	Antler wedge	Unmodified bone in grave	Red ocher	Haliotis ornament type III	Olivella bead type 1a	Awl type AlbII	Bird bone tube	Projectile point fragment	Mussel shell scraper	Haliotis bead type 3	Haliotis ornament type IV	Bear canine tooth	Type I charmstone	Olivella bead type 3d	Notched scapula	Awl fragment	Wedge maul	Mammal bone bead	Miscellaneous charmstone	Bipointed bone pin	Basally drilled antler tine	Steatite tubular bead	Pebbles in grave	Drilled bird femur
80	32	x		N	1											x																				
87	103	x		W		1										x																				
88	115	x		N			1									x																				
94	139	x		N				1	3	6	2	1	3		x																					
96	29	x		N										1		x																				
96	121	x		NW												x	2	94																		
100	55	x		W												x		119	1	1																
100	57	x		E												x					1															
100	54	x		W												x		327		2*		1	64*													
100	92	x		W	1											x	2	133						1												
100	106		x													x									1											
101	100		x													x										1										
102	107	x		NW												x	1	140						2												
102	108	x		W										1		x	1	229																		
105	119	x		W												x	1	141		2*			1				111*									
105	120	x		W											x	x	3	626										1								
108	80	x		NW												x		156		2*							*		1							
108	126	x		NW										3		x		26												1	1					
116	42	x		NW		7									x	x	2	261						2		7			1			2	3	2	1	20	4
116	50	x		NW												x	1	100																		

Table 4. Data on burials with accompaniments in Component C.
Note: One burial accompanied only by red ocher is not included.
*Indicates bead overlay on items similarly starred.

I. Single, biconical perforation near one end.

II. Not perforated.
- 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.
  - 3. Symmetric spindle-shaped.
    - a. Perforated end squared off and grooved longitudinally, opposite end curved, blunt tip.
  - 4. Cylindrical-shaped.
    - a. Perforated end grooved longitudinally.
- B. End(s) piled (i.e., shape of 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.
    - d. One end "phallic," opposite end with button-like pile.
    - e. One end with large simple pile, other end with large button-like pile.
  - 2. Symmetric spindle-shaped.
    - a. Both ends "phallic," perforated end grooved longitudinally.
    - b. One end shouldered, tip pointed, opposite end with simple pile.

M. Miscellaneous (see Plate 3 for illustration of types excluding types IIB2b and IIA2a).

Charmstones are represented by 48 specimens comprising 13 separate types. Stratigraphically these objects prove to be distinctive elements in the Patterson mound. (See Table 5 for the vertical distribution of these artifacts.) Two factors distinguished those charmstones recovered above and below 27 inches: 1) typologic classification, and 2) lithic material (not considered in typology). More specifically the types above 27 inches are all of type II (not perforated) and are made from a dark, microcrystalline sedimentary rock. Neither of these factors characterizes a single charmstone recovered below the depth of 27 inches. Lithic material for charmstones below 43 inches (no charmstones occur between 27 inches and

42 inches) is, with two exceptions, steatite; the exceptions are each made from a micaceous schist and were associated with burial No. 42.

Some of these objects are symmetrical and polished or abraded smooth over the entire surface, others are not perfectly symmetrical and exhibit a pock-marked surface from pecking.

A common feature of many of these charmstones is the presence of considerable battering at one (rarely both) end.

There has long been a tendency toward recognition of perforated charmstones as being earlier in Central California than the non-perforated forms (Kroeber, 1936, pp. 108-15; Heizer and Fenenga, op. cit., pp. 385-86), and the present evidence adds additional support to such an observance.

The phallic forms, also common in the Early Horizon (Lillard, Heizer and Fenenga, op. cit., passim; Heizer and Fenenga, op. cit., passim; Heizer, 1949b, passim) are carried over into the Middle and Late Horizons, but in considerably changed form (cf. Pl. 3k, 1, of this work with Heizer, 1949b, Fig. 10). Beardsley hesitates to assign phallic charmstones to the Middle Horizon in the Bay area (Beardsley, 1948, p. 13), but evidence resulting from the present study demonstrates that it is a frequent trait in the Middle Horizon, occurring in numerous Middle components (Son-299, Ala-307, CCo-295, Mrn-342, Sol-2, Sol-236). A slightly different type of phallic form occurs in the Late Horizon in Marin Province (Beardsley, 1954, p. 50).

Type II charmstones are very common in Late Horizon components, especially in the Bay region.

Quartz crystals. Occurring in 4 instances, 3 of which were as grave accompaniments, quartz crystals have been found in the upper and lower depths of the site (see Table 6). One was lying beneath the skeleton of burial No. 54 at a depth of 100 inches. Another was associated with burial No. 32 at a depth of 80 inches. One other specimen was associated with burial No. 129 at a depth of 8 inches. The fragment of a small crystal was found at a depth of 24 inches and lacked association.

The points of two crystals have been heavily battered, and the point of one other has been slightly worn and chipped. This factor suggests a possible utilitarian function for these objects. Possibly they were battered in the same manner as charmstones, although this may be unlikely for the reason that the difference in the hardness of steatite, quartz crystals, and the fine grained sedimentary rocks must be considered since the degree of battering is approximately the same regardless of rock hardness.

Depth in inches	IIB2b	IIB1b	IIA2a	IIB1a	IIB1c	Incipient II	Fragment	IA2b	IB1d	IB2a	IA1	IA3a	IA4a	IB1c	Miscellaneous	Sedimentary rock	Steatite	Micaceous schist	Battered end(s)
No loc.							1								1	2			1
Surface	1															1			
6							1									1			
8															1^{1}	1			
12		1														1			1
18			1	1			1									3			3
22					1											1			1
23		1														1			1
24						1										1			
27						1										1			
43								1^{1}									1^{1}		1^{1}
60															1		1		1
92									1								1		1
94							1										1		1
96								1									1		1
101										1^{1}							1^{1}		1^{1}
103										1							1		1
116							2^{2}		1^{1}	2^{2}	1^{1}	1^{1}	1^{1}	1^{1}	1^{1}		8^{8}	2^{2}	5^{5}
Totals	1	2	1	1	1	2	6	2	2	4	1	1	1	1	4	13	15	2	19

Table 5. Vertical distribution of charmstone types.
Superscript numbers indicate number of specimens occurring with burials.

These objects occur throughout the Central Californian archaeological record (Heizer, 1949b, passim), but are especially important in Early and Middle Horizon components (Heizer and Fenega, op. cit., passim).

Pebbles in grave. A group of 20 small, waterworn pebbles, some of which appear to be slightly polished, were a part of the rich mortuary accompaniment of burial No. 42. Three are marble size and white or pinkish colored, 5 are chicken egg size and shape, 2 are small flat discs, and the remainder are assorted sizes, colors, and shapes. It is quite probable that these pebbles formed a portion of a shaman's bundle.

This trait is relatively frequent in the Early Horizon (Heizer, 1949b, passim).

Red and yellow ocher. By far the most frequent occurrence of these minerals is red ocher. In addition to those pieces, both lump and powder, in graves (see Tables 2, 3, 4), five lumps of red and one of yellow ocher have been found associated at various mound depths. None of these specimens has been worked, and no marks of wear appear on them. It seems likely that they were used as raw pigment for body paint and coloring of various objects. As a grave accompaniment ocher was associated with 20 percent of all burials, while in 40 percent of graves containing one or more preserved artifacts ocher was a concomitant. This percentage of burials with associated artifacts also accompanied by ocher changes significantly in the different components of the site: in the upper level, 0-30 inches, 30 percent of burials with artifacts also were accompanied by ocher, in the next level, 31-79 inches, 20 percent, and at depths 80 inches and below, 80 percent possesed this trait. In addition, 5 burials not included in the tabulations were accompanied only by ocher.

A possible source of hematite in the San Francisco Bay area is to be found in East Oakland where an aboriginal hematite quarry was located (Wallace, 1947; for other possible source see Heizer and Treganza, 1944).

This trait is more frequent in Middle Horizon times (Beardsley, 1948, passim), but also occurs frequently with type I cremations in the Late Horizon (ibid, 1954, passim).

Steatite pipe. Unfortunately both pipe specimens were found in the disturbed stratum of the site, and neither of them was associated with a burial. Each one is a distinct type. One is a cone-shaped, highly polished, dark steatite bowl which retains traces of an unidentified mastic in the stem end, undoubtedly representing the former presence of a stem. The bowl diameter tapers from a maximum of 3.5 cm. to 7 mm. at its base or stem end; its bowl depth is 5 cm., and its overall length is 5 cm. (see Pl. 3q).

Depth (inches)	Steatite pipe	Girdled stone	Baked clay pipe	Quartz crystal	Mano
0-6	1	1			
7-12	1		1	1^1	
13-18		1			
19-24		1		1	
25-30		2			
31-36					
37-42					
43-48					
49-54					
55-60					
61-66					
67-72					1
73-78					1
79-84				1^1	
85-90					
91-96					
97-102				1^1	
103-108					
151-156					1*
Totals	2	5	1	4	3

Table 6. Vertical distribution of selected stone and baked clay artifacts.

Superscript numbers indicate number of specimens occurring with burials.
*Indicates association with Feature No. 1.

The other specimen is a finely made tubular pipe of a highly polished dark steatite. It is bi-conically drilled and has a grooved flange 2 cm. from its stem end. Its length is 9.5 cm.; the diameter of its stem hole is 1.4 cm.; its bowl diameter is 1.7 cm. and the depth of its bowl is 6.3 cm. (Pl. 3r).

Flanged-stem steatite pipes are relatively abundant in Late Horizon components (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.), and stone pipes are totally lacking in the Valley in Middle Horizon times (Heizer and Fenenga, op. cit.; Beardsley, 1954), but a small, cup-shaped stone, presumed to be a pipe-bowl insert occurs on the coast during this period (Beardsley, 1948).

Baked clay pipe. The most notable object of baked clay is a crudely modeled pipe (see Pl. 3p). It is roughly conical in shape, having a maximum outside diameter of 4.5 cm., an overall length of 7 cm., and a bowl depth of 5 cm. A remnant of its bird bone stem is retained in place at its base. The stem appears to have been fixed into position prior to the firing of the object, and there are no traces of asphaltum or other mastic visible. Though its bowl has been smoothed and is fairly well-shaped, its exterior surface is rough, bumpy, and not symmetrical, and its walls are very thick. One side is blackened through carbon reduction while the other is a dull yellow buff color. It was fired in an open fire with its stem end up. Possibility of its local manufacture is suggested by its crudity and location in the upper mound level. As were the stone pipes, this specimen was recovered dissociated in the disturbed stratum of the site.

A similar specimen is known from the Emeryville Mound, and the generic trait of baked clay objects is widely distributed in time and space in Central California.[10]

Bird bone whistle. A series of 48 single-holed whistles of bird bone (Gifford's type FF2), which may be segregated into two types, has been recovered. The basis for typological segration is based upon relative size and degree of finish of the specimens. Type I (see Pl. 2A, r, s) is short (av. 7.6 cm. in length), both ends are carefully trimmed, and the hole is cut on the convex or flat side of the bone. Type II (see Pl. 2A, o, p, t, u) lengths range from 7.5 cm. to 23.5 cm. (av. 14.6 cm.), both ends are only roughly trimmed on a few of the specimens (as a rule only one end is trimmed), and the hole is invariably cut on the concave surface of the bone. None of the specimens is incised, and only two, a pair with burial No. 75, retain an overlay of Olivella bead type 3c set in a mastic of asphaltum. A pair of whistles was inserted in the mouth of burial No. 68, suggesting that they may have been bound together, although no other evidence of such being the

case is present. The pair of decorated whistles with burial No. 75 preserves impressions of a fine binding material in the asphalt on the bone surface, suggesting that they also may have been bound together or had some decorative element, such as feathers, attached.

On the majority of specimens the hole is cut at a point approximately one-third of the total length from the end of the bone; it occurs more nearly in the center on type I. The shape of the holes range from round or ovoid through elongated longitudinal openings to pyramidal or subrectangular patterns. Asphaltum stop plugs are retained at one end and in the hole of many of the specimens. Few of these instruments display any appreciable degree of polish; however, some care appears to have been taken in their manufacture. Several of them have light longitudinal scoring, as if they had been rubbed with some rough abrasive; also, the nodes for feather attachment have been trimmed down on many of the ulnae.

The most common bones are duck ulnae and humerii, and crane (or heron) and condor are also represented.

A high percentage (35 percent) of the total sample was associated with burials. (See Table 7 for the vertical distribution of these implements in the mound, and Tables 2, 3, and 4 for their burial associations.)

The distinction made here between types I and II bird bone whistles appears to have the same temporal significance in the remainder of Central California, but a further study and definition of this possibility is needed to definitely establish such a relationship. At any rate bird bone whistles in general are relatively much more frequent in Middle Horizon components (Beardsley, 1948).

Forked "headscratcher." A short fragment of a polished rib implement found unassociated at a depth of 114 inches resembles in general the forked headscratchers common to the McClure Facies of the Coastal Province. The finished end remaining has four shallow grooves cut into the bone in a manner resembling the tines of a fork (see Pl. 2e). It is not as well-defined as those described by Beardsley (1954, p. 51), but its possible relationship to these objects is obvious.

These objects, as stated above, are most common in the McClure Facies, but also occur in several other Middle Horizon components, principally in the Littoral Zone (Beardsley, 1948).

Rib "strigil." Eleven polished objects of mammal rib have been found at various mound depths below 38 inches (see Table 8). One complete speci-

Depth (Inches)	Whistles		Beads and tubes					
	I	II	EE1a	EE2b	EE1e	Bird bone tube	EE1b	Mammal bone tube
7-12			1					
13-18								
19-24	3^{3}		1					
25-30			1^{1}	1^{1}	1	1		
31-36		3	1					
37-42			2^{1}					
43-48		4	2					
49-54		8^{5}	8^{8}					
55-60		5^{1}	6^{5}					
61-66		3						
67-72			1		1	1	1	
73-78		3	1					
79-84		2	1			2^{2}		2^{2}
85-90		4^{1}					1	
91-96		1				2		
97-102			1			3^{3}		
103-108		1				4^{4}	1^{1}	
109-114			1					
115-120		11^{7}	1					
Totals	3	45	28	1	2	13	3	2

Table 7. Vertical distribution of bird bone whistles and bird and mammal bone beads and tubes.

Superscript numbers indicate number of specimens occurring with burials.

men, recovered from a depth of 80 inches, is 21 cm. long, 9 mm. wide, and 1.5 mm. thick (see Pl. 2A,n). Both ends are neatly trimmed, gradually tapering from a width of 9 mm. at its base to a width of 4 mm. at its blunt, square-cut tip. It is convex, following the natural curvature of the rib from which it was made and is highly polished on both surfaces. Its suggested use is as a sweat-scraper or "strigil."

A group of at least six fragmentary specimens similar in all respects to the one described above, occurred with burial No. 139 at a depth of 94 inches. The largest of these fragments is figured on Plate 2m.

The remainder of the examples included in this category are small fragments from which little additional information can be determined.

These objects have no exact parallel in other sites, and temporal relationships beyond Ala-328 must await future investigation.

Drilled bird femora. These objects are represented by 4 specimens recovered with burial No. 42. They are matched as to size and type of bone (identified as California condor) and are longitudinally drilled at each end and through the epiphysis. Only one specimen remains complete; it is 13 cm. long, having a midpoint diameter of 1.8 cm. Each of the joint ends has a drilled hole 6 mm. in diameter, but except for these perforations the natural ends are unmodified. The shaft of the bone exhibits light longitudinal scoring as from an abrasive polishing agent. The 3 fragmentary specimens are identical in size and type of modification as the complete one described. The longitudinally drilled holes suggest the possibility that these objects had been strung in some manner or perhaps utilized as sucking or blowing tubes. In any event there is considerable evidence to believe that their function was primarily ceremonial in nature.

These unique specimens have no parallel in other sites discussed in this report.

Spatulate whale bone object. A polished spatulate whale bone object of uncertain function was associated with burial No. 129 at a depth of 94 inches. The implement is flat and tapers gradually from a width of 4 cm. at its squared base to a moderately sharp point. It is 26.5 cm. long and 1 cm. thick although its thickness decreases towards the pointed end; it is lenticular in cross-section (see Pl. 2A,b). The edges are not keen enough to have served as a cutting implement, and they do not show wear or polish to indicate use as a scraper or fleshing tool; neither does the point exhibit any degree of wear. The excellent quality of workmanship coupled with the presence of other presumed ceremonial paraphernalia in

Depth in inches	Canid tooth bead	Eyed needle	Scapula scraper	Antler digging tool	Bone fishhok MM2b	Bird radius pin	Rib "strigil"	Pendant	Sting-ray spine	Thatching needle	"Fiber-stripper"	Bipointed pin
0-6	1											
7-12												
13-18												
19-24		1	1									
25-30				1								
31-36				1	2	1						
37-42	13^{13}			1	1		2					
43-48		1					1	1	2			
49-54	7^{7}				2^{1}			1				
55-60	1^{1}		1	1^{1}						1^{1}		
61-66	1			1		3						
67-72						2				1	2	
73-78	2			1						1	3	
79-84						2	1			1		
85-90										2	10	
91-96							7^{6}		3^{3}	1^{1}	8	1
97-102											7	
103-108		1									8	
109-114						1					3	
115-120											5	3^{3}
No loc.					1							
Totals	25	3	2	6	6	9	11	2	5	7	46	4

Table 8. Vertical distribution of selected bone artifacts.

Superscript numbers indicate number of specimens occurring with burials.

the grave, such as a quartz crystal and red ocher (see Table 4) suggests a possible ceremonial function or symbolism for this implement.

Similar objects are present in the Marin Province in Middle Horizon times, but a direct comparison of the two is not made here.

Basally drilled antler object. A matched pair of deer antler tines was associated with burial No. 42 at a depth of 116 inches. Unfortunately only one of these is preserved, the other was crushed over the burial by the weight of the earth above and was too fragmentary and powdery for preservation; however, it was measured and described prior to its removal. The preserved specimen is 31.5 cm. long, and although nearly all of the dermal layer has rotted away, traces of it that remain exhibit a high polish and light longitudinal scoring (see Pl. 2A, a) Its base was drilled to an unknown depth (the present depth is 3.5 cm.), and the diameter of the hole is 1.3 cm. Traces of asphaltum remain on the inside edge of this hole, and other traces of this substance extend for 2 cm. from the base on the exterior of the tine. Burial No. 42 is the most elaborately equipped with grave offerings yet recovered, and it is highly probable that some sort of ceremonial object, such as a stone, feathers, or rattle had been attached to the base of this object and held fast by asphaltum. It is presumed that the other specimen had been treated in like manner since it was of the same length and type of bone.

This artifact type is unique to the present site; therefore, no temporal significance can at present be attached to it beyond its Middle Horizon occurrence in Ala-328. However, Beardsley noted, "Typical of the Middle Horizon are confusing assortments of bone and antler objects of ornamental, ceremonial, or conjectural use, of which each component produces new types as well as previously known ones" (Beardsley, 1948, p. 12).

Bear canine tooth. Accompanying a type II cremation (burial No. 106) at a depth of 100 inches was a single bear canine tooth. It is unmodified except for considerable battering and scoring along the surface of its leading convex edge and traces of what appear to be asphaltum at the root end. It is quite probable that this object may have been suspended and possessed ceremonial as well as decorative value.

This trait perhaps should be included, for comparative purposes, in the larger context of "animal ceremonialism."

Animal ceremonialism. The practice of interring animal remains by the Indians of Central and Northwest California is well known but of sporadic occurrence.[11] Rarely are complete or partial animal remains buried separ-

ately. Of more common occurrence is the finding of certain unmodified animal bones associated with human remains (Heizer and Hewes, op. cit.; Heizer, 1951; Haag and Heizer, 1953; Gifford and Schenck, 1926, pp. 111-12). Evidence of each of these practices is present in Ala-328.

Recovered at a depth of 59 inches in the northwest corner of pit A-1 were the skeletal remains of twin kids not more than a few weeks old. No artifacts accompanied the remains, nor was the presence of ocher apparent. The burial was somewhat disturbed, but the head of each skeleton appeared to be oriented in a southerly direction. It is probable that they are the remains of new-born prong-horned antelope (Antilocapra americana). The normal birth of this species is two young, occurring between April and early June. The habits of the doe after dropping her young are consistent, and a wise hunter could easily kill the mother and pick up the helpless kids. (See McLean, 1944, esp. p. 228 for the distribution and habits of the species in California.)

In addition to the above, 7 burials were accompanied by unmodified pieces of animal bone (see Tables 2, 3, and 4 for depth occurrences of this trait). Burial No. 42 possessed 1 right deer mandible, 1 right canid (coyote?) mandible, 2 bird ulnae, 1 large bird breast bone, 7 small articulated bird wing bones (radii and ulnae), and 5 raptorial bird claws. In light of the rich mortuary accompaniments of this burial (see Table 4), it is assumed that these objects served a ceremonial or decorative purpose, with the possible exception of the 2 bird ulnae which may have been kept aside to manufacture into whistles.

In the grave of burial No. 5 was a sea-otter skull and a bird breast bone. Burial No. 43 was accompanied by a sea-otter claw and the flipper of a small sea-mammal (probably harbor seal but specimen was lost prior to accurate identification). Associated with burial No. 142 were 2 bird ulnae and 2 sea-otter fibulae. Three burials, Nos. 3, 120, and 139, were accompanied by a single bird ulna, and it is again suggested that these may have been kept aside to manufacture into whistles. The grave of burial No. 139 in addition contained 2 unworked bird radii.

The practice of interring animal remains in individual graves or certain unmodified animal bones with human burials is apparently an ancient one that has persisted through time from the earliest to the most recent archaeological horizon in Central California, and at present little, if any, temporal significance can be attached to its archaeologic occurrence. (Heizer and Hewes, op. cit.; Heizer and Fenenga, op. cit.; Heizer, 1951; Haag and Heizer, op. cit.; Lillard, Heizer and Fenenga, op. cit.; Heizer, 1949b; Heizer, 1953, p. 272. Beardsley, 1948, p. 13, attributes greatest

frequency of this trait to the Middle Horizon. For an ethnographic account of a bird cult among the Miwok, see Gifford, 1926.)

Cache of Cerithidea shells in grave. In the grave of burial No. 54 at 100 inches was a cache of 127 Cerithidea shells, the spires of all but a half dozen of which were broken off. Since this small marsh snail was historically known to be an item of diet in this region, it is quite possible that these represent a food offering to the deceased. The tight spiral of these shells and the fact that a few of them retain their tip precludes the possibility of their being beads. They were found in a small concentrated pocket, as if they had been in a basket or other perishable container, near the ribs of the skeleton.

Two burials in site SCl-1 apparently also possessed this trait (Beardsley, 1954, p. 93).

"Shaman" burial. One burial in particular deserves special description in this section because of its rich adornment with what are probably ceremonial objects.

Burial No. 42 at a depth of 116 inches was accompanied by 7 type I charmstones, 2 charmstone fragments, and 1 small mortar-like charmstone of steatite (Pl. 3h, n), 7 bird bone whistles, 3 bird ulnae, 4 longitudinally drilled condor femora, 2 long basally drilled antler tines retaining asphaltum in the holes, 1 awl fragment, 20 smooth pebbles, 3 bipointed bone pins, 2 type III and 2 type IV Haliotis ornaments, a necklace of 261 type 1a Olivella beads, 20 pieces of unworked animal bone (including a large bird radius and ulna) and a quantity of powdered red ocher. With the possible exception of the awl fragment and the bipointed bone pins, all of these objects could have what appear to be ceremonial, or at least non-utilitarian, functions. This inventory of grave furnishings is quite similar to ethnographic shamans' "bundles" in the possession of the University of California Museum of Anthropology. One of these in particular (UCMA catalog numbers 1-84644 through 1-84667) contains several similar items, such as charmstones, smooth pebbles, pieces of animal bone, and other more perishable equipment. In light of this it is quite probable that burial No. 42 is that of a shaman, and that parts of birds (breast and wings, for example) formed an important decorative or ceremonial function.

F. Dress and ornamentation.

Shell bead. Nine types of shell beads are represented in the present collections. Seven types are either whole or cut shells of Olivella bi-

plicata, one type is of Haliotis, and one type is of clam shell (Saxidomus nuttalli).

Several shell bead types have proven to be distinctive elements in establishing the culture affinities of a given site, and the present study further defines and substantiates the previous recognition of this fact. (See Tables 17-20 for site by site distributions, and Table 9 for the vertical distribution in the Patterson Mound.)

Following the typology of shell beads established by Lillard, Heizer and Fenenga (op. cit.) and employed by Beardsley (1954), the following types of beads occur in the present site:

Olivella types:

1a; small whole shell with spire ground off square.
1b; same as 1a except much larger.
3a1; centrally perforated, cupped saucer retaining inner whorl remnant at one edge.
3b; "saddle-shaped" bead rectangular to oval in outline with longitudinal curve in cross-section.
3b1; large oval to subrectangular saucer-shaped bead with whorl remnant at one corner.
3c; flat circular disc with fairly large central perforation, may be slightly saucer-shaped.
3d; same as 3c but much smaller and often with smaller perforation (average ca. 1/2 modal size of type 3c).

Haliotis type:

3; flat circular disc with central perforation.

Saxidomus type:

1; flat circular disc with central perforation; of various sizes and degree of finish.

The vertical distribution and burial association of shell bead types is presented in Table 9.

The type occurring most frequently, in 23 percent of the graves containing associated objects, and representing the greatest numerical recovery is Olivella type 1a. These beads have rarely been found with burials from the upper mound levels, but with burials containing mortuary offerings below the depth of 80 inches they were a concomitant in 67 percent of the cases (excluding the 2 type II cremations). Olivella type 1b is represented by 3 occurrences above the depth of 53 inches. Type 3a1 is a frequent occurrence

at depths above 30 inches, occurring with 40 percent of the burials in this level having associated artifacts; it is absent at depths below 30 inches. Type 3b occurs only twice and is associated with burials between 36 inches and 60 inches. Type 3b1 occurs but once, with a burial at the depth of 79 inches. Type 3c occurs with frequency between the depths of 32 inches and 79 inches, in 26 percent of the burials with accompaniments between these depths; in one instance it is present as an overlay in asphalt on a pair of bird bone whistles and once as an overlay on a pair of bird bone tubes (see Tables 3, 4, and 7). Type 3d is restricted to depths below 104 inches; in each of its two occurrences it is overlaid on bird bone tubes, in one of these instances it is also present as a "necklace."

Haliotis bead type 3 occurs with 3 burials, a single specimen each in two instances and once as an overlay on a pair of bird bone tubes as well as being in "necklace" form with burial No. 119. These beads have not been recovered above the depth of 79 inches.

Clam shell disc beads occur but twice, in each instance with a type I cremation also possessing Olivella type 3a1 beads.

The following outline arrangement reviews the temporal significance of these bead types in the present site as well as for Central California generally.

1a: This bead type is much more frequent in the earlier archaeologic cultures although it occurs sporadically throughout the archaeological record (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.; Beardsley, 1954; Heizer, 1949b). In the Patterson Mound this type occurs in significantly higher proportion in the lower levels. This general fact may indicate ecological changes through time affecting the size of Olivella, a difference in locality from which they were gathered, or merely a cultural preference for the smaller shells in earlier times. (See Tables 17-20 for the correspondence and site by site distributions of all bead types discussed here.)

1b: The reverse situation is true for the larger bead; its highest frequency of occurrence is in the later archaeological components, although it also occurs in a Middle Horizon context in many sites.

3a1: This type is invariably associated with Late Horizon components and is a prominent member of the "clam disc bead complex (ibid.).

3b: This is one of the predominant members of the "3b-3c bead complex" of Middle Horizon components and does not occur outside of this context (ibid.).

3b1: This type is also a member of the Middle Horizon bead complex but is a less frequent occurrence than types 3b and 3c (ibid.).

3c: This type is the other predominant member of the Middle Horizon complex and, like types 3b, 3b1, and 3b2, does not occur outside of this context (ibid.).

3d: In the Bay region this type is most often found in Middle Horizon components, but it also occurs here and elsewhere in Phase I of Late Horizon times (ibid.).

Haliotis type 3: These beads are also associated exclusively with Middle Horizon components in the Bay region, but they occur in the central valley in both the Middle and Early Horizons (ibid.).

Clam disc bead: This is the diagnostic trait of Phase II, Late Horizon in both the Littoral and Interior Valley Zones (ibid.) where with tubular clam beads, Olivella type 3a1 beads, and tubular magnesite beads (as well as several other traits) they form the "clam disc complex" (ibid.). Two occurrences of conically drilled clam disc beads, lacking association with other elements of the clam disc complex, are known from the Middle Horizon (Heizer, 1950, p. 16) at sites CCo-137 (the "Concord Man Site") and Sac-73, each of which is a pure manifestation of the Middle Horizon. The clam disc beads from CCo-137 are so badly eroded that little can be determined from them except that they were made from clam shell. I was unable to locate the clam disc beads reported from site Sac-73.

Haliotis ornament. A difference exists between the types of ornaments in the upper levels and those recovered below the depth of 96 inches. Only one specimen occurred between 32 inches and 96 inches, with burial No. W1 at 72 inches, and it is a generalized type apparently related to those of the upper level.

It is not possible to correlate all of the ornaments from Ala-328 with the typology utilized by Beardsley (after Lillard, Heizer and Fenenga, op. cit.) because two types are unique (types II and III) and all of the specimens of one type are fragments (type 1A). Type IV is directly comparable to Beardsley's type RC1.

Five types of ornaments are segregated in the present collections (see Figs. 2 and 3 for illustrations of the types):

	Depth in inches	Clam disc bead	3a1	1b	1a	3c	3b	3b1	Hali-otis 3	Oli-vella 3d	Burial number
Component A	No loc.			6							W24
	8		3								129
	8		3								W8
	11		10								2
	12		4								131
	12	3	5		1						130
	18		1		138						47
	21	18	411								W9
	22			15	2						40
	24		5								65
	Totals:										
	No. of graves	2	8	2	3						10
	No. of beads	21	442	21	141						625
Component B	32					54					14
	36						283				138
	42					16					4
	48				30	193					W3
	50			34							W2
	50					*					75
	53					452					7
	60					156	7				142
	66					13					W6
	79					399*		14	1		58
	Totals:										
	No. of graves			1	1	8	2	1	1		10
	No. of beads			34	30	1173	290	14	1		1542
Component C	96				94						121
	100				327				64*		54
	100				133						92
	100				119						55
	102				140						107
	102				229						108
	105				141				1	111*	119
	106				626						120
	108				26						126
	108				156					*	80
	116				261						42
	116				100						50
	Totals:										
	No. of graves				12				2	2	12
	No. of beads				2351				65	111	2527

Table 9. Distribution of shell bead types by grave occurrence.
*Occurs as overlay on bird bone tubes or whistles.

Type I: Small thin, triangular to subrectangular in outline with a single perforation at one end.

IA: Same as type I except having serrated edge and possibly circular shape.

II: Large, thin, ovoid with two perforations at one edge and two "tabbed" ends.

III: Large, thick, subrectangular, single perforation near one edge.

IV: Ring-shaped, thick.

Types III and IV are restricted to the bottommost depths of the mound where they are a very common grave accompaniment, with 40 percent of the burials possessing artifacts below 80 inches, co-occurring in every instance with Olivella 1a beads.

All of the specimens (except one type III specimen) were made from the green-backed abalone shell (H. cracherodii).

Types I, IA, and II on the other hand are found only above 32 inches with the previously noted exception (see Table 10).

This decorative element seems to be little developed in the upper levels which is contrary to the usual prevalence of a variety and profusion of Haliotis ornaments in Late Horizon times in the Delta and Sacramento Valley regions (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.; Beardsley, 1948, 1954). Though considerable attention is given to this form of body ornament in the lower mound, the workmanship is quite crude and little variation in shapes is present.

In each instance type IV has co-occurred with type III, and each of these types was located in the frontal cervical region of each burial, usually close under the mandible. Burial No. 42 had one of each type under the chin and one of each type on the underside of the cervical vertebrae. Little doubt exists that these two types at least were worn in pendant fashion about the neck.

As previously stated type III is a unique type known only from Ala-328 at present. Type IV is characteristic of the Middle Horizon (ibid.).

The predominance of green- over red-backed abalone shell as an ornament material in the Middle Horizon is well known (ibid.).

Types I and IA are too little represented in the present excavations to determine their temporal relationships.

Bird and mammal bone beads and tubes. Two of the 30 bird bone beads recovered are Gifford's type EE1e, i.e., are of the "bushing" type (see Pl. 2C, h), a bead of lesser diameter being inserted into one of greater diameter. One of these is 3 cm. long and 7 mm. in diameter; the other is 1.8 cm. long and also has a diameter of 7 mm. (these measurements are for the outer bead in each case). The remainder of these beads are Gifford's type EE1a, being merely short lengths of cut bird bone (Pl. 2C, i). All of the specimens are polished, but only two of them have been uniformly smoothed at the cut ends. The others, including EE1e, exhibit rough, jagged edges. The lengths of these beads range from 6 cm. to 1 cm. Only two multiple occurrences of these objects have been recovered, in each case as grave accompaniments and co-occurring with canid beads in each case.

Thirteen bird bone tubes (distinguished arbitrarily by length greater than 10 cm.) have been recovered. These implements exhibit a high polish and may have served a variety of functions, such as ear or nose ornaments, drinking or sucking tubes (Pl. 2A, q, v).

Recovered with burial No. 37 is a fragment of a tube 7 cm. long and 1 cm. in diameter. It is highly polished and has two transverse parallel striations near its ground off end; these lines continue half way around the bone.

Two matched heavy bird femora overlaid with Haliotis bead type 3 set in an asphaltum mastic were associated with burial No. 54.

Two other matched specimens in the grave of burial No. 58 differ from the above in that they are ulnae and are overlaid with Olivella 3c beads held fast by asphaltum. No particular design arrangement of the beads is evident on any of the specimens. The beads are merely set approximately 1 mm. apart in longitudinal straight lines.

The single example of an incised bird bone tube (Gifford's type EE2b) was in probable association with burial No. W4 at 26 inches. It is a fragment, but the design element is clear; two parallel lines containing closely spaced, short, straight lines spiral to the right around the tube. This element is interrupted by two parallel lines containing cross-hatching which encircle the tube in a straight rather than a spiral pattern. The tube is broken at this point, and further elements of design are unknown.

Three mammal bone beads (Gifford's type EE1b) have been recovered (see Table 7 for vertical distribution of these and bird bone beads and tubes). One such bead was associated with burial No. 126. One specimen is 6.5 cm. long, the other two are 2.7 cm. long.

Depth (inches)	Burial association	Type II	Type I	Type Ia	Type III	Type IV
11	2	1				
30	99		4			
32	14		15	5		
72	W1		1			
96	121				2	
100	92				2	1
102	107				1	2
102	108				1	
105	119				1	
106	120				3	
116	42				2	2
116	50				1	
Totals		1	20	5	13	5

Table 10. Vertical distribution and burial association of Haliotis ornament types.

Two matched elk (?) tibia tubes were recovered from the grave of burial No. 58 at a depth of 79 inches. They are 5.5 cm. long and slightly tapered due to the natural tapering of the bone section from which they were cut. The greater outside diameter is 4 cm., the lesser outside diameter is 3.2 cm. They are perfectly matched as to bone, size, and shape (see Pl. 2B, a, c). Longitudinal scoring is present on the inside surface, but the outside surface is smooth, highly polished, and unmarked. One was recovered on each side of the skull. This fact suggests two possibilities: one, in spite of the large diameter, they may have been used as ear plugs; two, there is the possibility that these people in the past wore their hair long, and these objects may have been used to hold two long strands of hair in place; in any event they were no doubt ornamental.

Incised bird bone tubes with geometric, repetitive designs are known principally from the Late Horizon (ibid.), but first appear in a few Middle components of the Valley (Heizer and Fenenga, op.cit.).

Type EE1a beads, EE1e, and bird bone tubes are prevalent in the Middle Horizon (Beardsley, 1948, 1954) but are not restricted to it.

Mammal bone beads occur in both Middle and Late Horizons in both the Littoral and Interior Valley zones (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, 1939; Beardsley, 1948, 1954).

Perforated canid tooth bead. A single bead of this type (see Pl. 2C, e) was found unassociated in the disturbed stratum of the site; two others at a depth of 74 inches also lacked association; a third dissociated occurrence of a single bead was recovered from a depth of 62 inches. The remainder of 20 beads was associated with three burials: No. 18 at a depth of 37 inches possessed 13 beads, burial No. 68 at 54 inches had 7 beads, and burial No. 90 at 60 inches, one bead. Each specimen is biconically drilled at the root end of the tooth, polished, and the root of each has been ground slightly. Traces of what appears to be asphaltum are present on a few of the specimens. In two of the three instances where these beads accompanied burials, the graves also contained small bird bone beads (see Table 3).

This type of ornamentation is unknown from Late Horizon components, but is relatively frequent in those of the Middle Horizon (ibid.) and two occurrences are known from the Early component of the Windmiller site (Sac-107) (Lillard, Heizer and Fenenga, op. cit.; Heizer, 1949b).

Pendant of bone. A fragment of a probable bone pendant was found unasso-

ciated at a depth of 50 inches. It is a small fragment broken on three sides, the other side being one of the finished straight edges. A punctate design has been worked into one surface. The individual marks of the design are sub-rectangular, and appear to have been punched into the bone because of their uniform shape and the fact that no scratch marks surround them.

Another fragment of a highly polished bone object, also broken on three sides, was recovered from a depth of 44 inches. Part of a conical perforation remains at one broken edge and another unfinished hole has been partially worked through the bone 1 mm. distant from the break. The possibility of the perforation serving as a suspension hole is obvious.

These objects are relatively more frequent during the Middle Horizon than in the Late (Beardsley, 1948, 1954).

Steatite pendant. A highly polished, mottled, green-brown steatite pendant was recovered from the disturbed stratum of the site (see Pl. 3o). It is a flat fragment 5.5 cm. long, 1.8 cm. wide, and 5 mm. thick. The unbroken end is grooved around its entire circumference, probably for suspension, and is rounded off in knob-like fashion.

This is a unique specimen apparently unrelated to other (usually perforated) stone pendants in other sites.

Steatite bead. A single biconically drilled and polished steatite bead of "hour-glass" shape was a part of the mortuary accompaniments of burial No. 42 (Pl. 3i). It is constricted at its mid-section where its diameter is 1.4 cm.; its flared ends have a diameter of 1.7 cm. and its length is 3 cm. It may well have been either a labret or a bead, but it was found among charmstones near the skeleton's pelvis rather than in the vicinity of the skull.

One other steatite bead is a tiny disc measuring 3 mm. in diameter and 1 mm. thick. It was associated with burial No. 130 at a depth of 12 inches.

The hour-glass shaped bead is a unique specimen, and is not related to the small spool or hour-glass shaped beads of Late Horizon times (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.).

The tiny steatite disc bead is apparently related to those of the clam disc complex which may have been carried over from Middle Horizon times (ibid.; Beardsley, 1948, 1954).

Bipointed bone pin. Occurring with burial No. 42 at a depth of 116 inches were 3 bipointed "pins" of unidentified bone having a cellular structure similar to antler or whale bone. They are cylindrical in cross-section, having their maximum diameter at the mid-point of their length, from this point the shaft tapers gradually to a fine point at each end. They range in length from 21.2 cm. to 14 cm. (Pl. 2A, k, l).

One other specimen recovered at a depth of 92 inches is a fragment 14 cm. long and rectangular in cross-section. It is much heavier than the other specimens and one point and a portion of the shank is missing. It has been included here because it tapers from its tip to a maximum diameter from where it decreases in diameter to the break.

Similar implements are a fairly common occurrence in Middle Horizon components on the coast, but a somewhat shorter type occurs in the Valley in Late times (Beardsley, 1954).

Bird radius "pin." Nine sharpened bird radius "pins" have been recovered (Gifford's type A4aI). Four are complete, having the distal epiphysis intact and a slanting cut or abraded tip. The remaining five are fragments lacking the head and may have been bipointed, although no complete examples of bipointed radius pins have been found to date. The complete specimens range in length from 11.5 cm. to 12.8 cm. Only one of the 9 specimens has been recovered above the depth of 62 inches and none were recovered above a depth of 32 inches, nor were any of these implements associated with burials. (See Table 6 for their vertical distribution and Pl. 2A, i for illustration.)

These, like the bipointed bone pins described above, are much more frequent in Middle Horizon components but are not restricted to it.

Carbonized hairnet (?). Bits of burned cordage were recovered from 4 cremations at depths above 24 inches. The fibers have not been identified. Two- and three-ply cords are present and are twisted to the right (clockwise) in each instance (this feature is designated as Rh in Table 11). Three knotted pieces are preserved, the knots of which cannot be discerned with certainty. It is probable that these fragments represent portions of cordage hairnets or foundations for feather headdresses. One specimen, associated with cordage fragments with burial No. 65, appears to be a portion of the foundation of a headdress; it consists of a rod foundation 3 mm. in diameter, which is wrapped with a single strand element .5 mm. in diameter which passes over the foundation 70 wraps per 10 cm.

G. Military and hunting complex.

Projectile points (knives and saws). A striking feature of the cultural remains recovered in the course of the present excavations is the paucity of flaked stone implements. Of 36 projectile points, only 15 are complete enough for typological classification. The typology employed is that modified by Strong after Gifford and Schenck and utilized by Lillard, Heizer and Fenenga, and Beardsley.[12] The description of the point typology follows (type SDa was added by the present author for a specimen not included in Strong's classification):

N; Non-stemmed.
S; Stemmed.
NAa; Leaf-shaped, pointed at both ends.
NAb1; Leaf-shaped, pointed at one end.
NAb3; Leaf-shaped, pointed at one end, concave at other.
NBa1; Triangular, straight base, 2 side notches.
SCa1; Expanding stem, shouldered with convex base.
SDa; Parallel-sided convex stem, single side shoulder.

Sixty-four percent of the points were manufactured from black obsidian. In addition to this material, 5 specimens are of Franciscan chert, and 7 are of Monterey chert, 1 is quartzite.

Sixty-seven percent of these implements have been confined to depths below 72 inches. Except for type NAa which occurs vertically throughout the midden, the types are restricted to a single occurrence each and therefore cannot be considered statistically significant. (See Table 12 for vertical distribution and Pl. 3s-bb for illustrations of the types.)

These objects were not a common grave accompaniment, and in the case of the blade associated with burial No. 115, it is quite likely that it was not an offering, more likely it was the instrument causing death (see below for discussion of this occurrence), and it is felt that one of the other burial occurrences was probably accidental. The only multiple occurrence, at 53 inches, was in definite association with burial No. 82 but the specimens were lost prior to examination and are not included in the tabulations.

The average weight of type NAa is 9.2 grams, extremes being 3.3 and 25.5 grams; their length is 65.3 mm., extreme lengths are 35 and 132 mm. Type NAb1 is 80 mm. long, 30 mm. wide, and weighs 23.1 grams. Type NAb3 is 40 mm. long, 22 mm. wide, and weighs 5.9 grams. NBa1 is 30 mm. long, 18 mm. wide, and 4.6 grams in weight. SCa1 is 49 mm. long, 20 mm. wide, and weighs 8.9 grams.

Depth (inches)	Burial number	Direction of twist	No. of strands in cord	Diameter of strands mm.	Diameter of cord mm.	No. of twists per 10 cm.
8	130	Rh	2	1	2	50
8	130	Rh	2	.5	1	70
12	131	Rh	2	1	2	40
22	40	Rh	3	2	3.5	50
22	40	Rh	3	2	4	35
24	65	Rh	3	1.5	4	40
24	65	Rh	2	1.5	3	40
24	65	Rh	3	1.5	3.5	40
24	65	Rh	2	2	3.5	35

Table 11. Burial association and measurements of carbonized cordage.

Note: Rh means right-hand twist, i.e., twisted in a clockwise direction as viewed from end of cord.

The weights of these points suggest their possible function as atlatl dart heads (assuming that they were projectile points rather than lance heads, knives, saws, etc.) (Fenenga, 1953, p. 323).

In general the flaking technique is rather crude compared with that characterizing the points from the Interior Zone. An outstanding exception to this crude flaking is the blade associated with burial No. 115 which is finely pressure-flaked in oblique, lateral "ribbon" style (Pl. 3s) which is characteristic of the Delta and Sacramento Valley areas in Middle Horizon times (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.; Beardsley, 1948, 1954). It is significant to note the absence of small finely made points normally associated with late cultures in Central Californian archaeological sites (Heizer and Fenenga, op. cit.). Beardsley considered type NAb3 to be the most characteristic form of point in the Valley in Middle Horizon times (Beardsley, 1954), but subsequent investigations do not bear this out and the typical Bay region form in this period is type NAa (ibid., 1948), which carries over into the Late Horizon and also occurs in the Early period (Heizer and Fenenga, op. cit.; Heizer, 1949b). Type SCa1 is a rare occurrence, but is known from the Early Horizon (Heizer, 1949b).

Atlatl hook. A small well made antler object which may have functioned as an atlatl hook was found at 44 inches. It measures 4 cm. long, 1.3 cm. wide, and 1.6 cm. maximum thickness. One end is cut away to form a shank 1.5 cm. long, the other end is concave, forming two conical projections. The bottom three-quarters of the object retains traces of what appears to be asphaltum, and the shank has a shallow groove on its upper surface; this groove and asphalt may have served to bind the hook to the shaft (see Pl. 2C, f).

This specimen is unique to the Patterson Mound, and is the first such object whose suggested function as an atlatl hook can be demonstrated.

Evidence of violent death. Burial No. 115 at a depth of 88 inches was accompanied by a long, thin, finely flaked obsidian blade. It was not imbedded in any of the bones, but it is broken near its tip in a manner suggesting that it had snapped off on impact with a resistant object. At the point of fracture a jagged piece has been shattered away from one edge as if through heavy impact. Also, the skull of the skeleton is missing from the grave. These two factors strongly suggest the possibility that the individual had died in warfare, his head taken as a trophy by the victor, and his headless body carried home for burial.

Depth (inches)	NAa	SCal	SDa	NAb3	NAbl	NBal	Fragment	Obsidian	Monterey chert	Franciscan chert	Quartzite
0-36							5[1]	3[1]	2		
37-42	1							1			
43-48	1									1	
49-54											
55-60	2	1						2			1
61-66							1	1			
67-72	1								1		
73-78			1				3	2	1	1	
79-84	2						1	2	1		
85-90	2[1]			1	1		3	6[1]	1		
91-96							3	3			
97-102							2[1]		1	1[1]	
103-108	1					1				2	
109-114											
115-120							2	2			
No loc.							1	1			
Totals	10	1	1	1	1	1	21	23	7	5	1

Table 12. Vertical distribution of flaked stone projectile points. Superscript numbers indicate number of specimens occurring with burials.

Note: Burial No. 82 at a depth of 53 inches was accompanied by 1 chert point, 1 obsidian point, and 1 obsidian fragment, all of which were lost prior to examination of the collection.

Evidence of this sort is a common Early and Middle Horizon occurrence (Lillard, Heizer and Fenenga, op. cit.; Beardsley, 1948, 1954; Heizer, 1949b) and the practice of head-taking is known ethnographically (Kroeber, 1928; Harrington, 1942, p. 34).

H. Economic complex.

Mortar. It proves extremely difficult to correlate the mortars and pestles in the present collection with the typology employed by Beardsley, since most specimens are small fragments lacking diagnostic features, and to assign a particular fragment to a specific type would be more of a guess than objective reality.

Two large complete mortars occurred with burials. Associated with burial No. W1 at 72 inches was a small type A2a mortar (pecked and shaped over the entire surface with a flat circular bottom, flaring sides and a flat rim). Measurements of this specimen are: height, 23.5 cm; outside diameter, 30 by 33 cm. (slightly ovoid); inside bowl diameter, 23 by 27 cm.; bowl depth, 17 cm. A type A2b mortar (pecked over the entire surface with rounded sides and bottom and a sharp rim) was under the rib cage of burial No. 76 at 54 inches. It is a large cobble having the following measurements: height, 18 cm.; outside diameter, 23 by 26.5 cm.; inside bowl diameter, 19 by 21.5 cm.; bowl depth, 15 cm. The bowls of each of these mortars is slightly ovoid, large, and relatively deep. Neither of these specimens was "killed" by breaking prior to interment.

Another type A2b mortar occurred at a depth of 60 inches, and was broken into four large fragments. A large fragment, identifiable as belonging to type A2b was recovered at a depth of 44 inches.

Two small "paint" or miniature mortars (type C) were found at depths of 18 inches and 56 inches. Six fragments identifiable as type C were recovered at various depths of the mound (see Table 13 for the vertical distribution of these artifacts).

In addition to these identifiable specimens are 36 unidentifiable fragments.

Many of the fragments have been fire-cracked and burned. Whether this was the cause of the original breakage or whether the pieces were used as cooking or hearth stones after breaking is unknown.

Type A2b mortars are prevalent in the Ellis Landing Facies of Middle

Horizon and type C is also prevalent in this facies as well as in the McClure (Beardsley, 1948, 1954).

Pestle. The following types of pestles are represented in the collections from Ala-328; the typology follows that used by Beardsley (1954). (Measurements refer only to specimens from the Patterson Mound.)

Type IB; relatively short natural cobble with little or no exterior finish, one or both ends used. (Lengths range from 15.1 to 18.5 cm., average 16.7; medial diameters range from 5.0 to 7.2 cm., average 6.1 cm.)

Type IIA1; cylindrical with dressed exterior, taper only slightly, if at all, from one end to the other, one or both ends used. (Lengths range from 18.5 to 26.5 cm., average 23.6 cm; medial diameters range from 6.0 to 7.0, average 6.6 cm.)

Type IIB1a; conical shape, dressed on exterior, one end used. (Two specimens, one is 21 cm. long, having a medial diameter of 5.8 cm., the other is 24.5 cm. long and has a medial diameter of 6.3 cm.

Type IIB4; conical shape, dressed on exterior, flange or knob at proximal end. (Two specimens, one is 32.3 cm. long with a medial diameter of 6 cm., the other is 65.1 cm. long and has a medial diameter of 6.3 cm.)

Type III; short natural cobble with pit on one surface, one or both ends used. (Lengths range from 10.1 to 12.9 cm., average 11.1 cm.; medial diameters range from 5.3 to 8.1 cm., average 6.3 cm.)

The only pestle type whose vertical distribution is significant is IIB4 (see Table 13 for the vertical distribution of these implements). This type is represented by 4 distal fragments lacking association and 2 complete specimens. Two type I cremations were accompanied by one type IIB4 and one type IIA1 pestle each, in addition one possessed an untypeable fragment. All of the type IIB4 pestles were recovered from depths superior to 24 inches. The other types are either not numerically frequent enough to be significant or occur throughout the deposit and are therefore typologically insignificant.

Type IIB4 also has broader temporal significance, being a diagnostic trait of the Late Horizon (ibid.).

Mano. Three such implements are in the present collection. One specimen is bi-facial; the faces are parallel and each has been "sharpened" by pecking. A small, shallow pit has been worn into one of the pecked surfaces which may indicate use as an "anvil." The stone is flat on both sides, thick, and heavy, and one side has apparently seen additional use as a hammerstone. This specimen is 12.6 cm. long, 9.7 cm. wide, and 5 cm. thick.

Another bi-facial mano is rather large, measuring 14.5 cm. long, 9.7 cm. wide, and 4.8 cm. thick, and is quite heavy. It is ovoid in outline and each of the flat surfaces has been "sharpened," and each end has also been pecked. This specimen was recovered with a sub-mound cache of mortar fragments and other worked stones (Feature No. 1, p. 57).

The remaining mano is fairly small, measuring 11.9 cm. long, 6 cm. wide, and 4.6 cm. thick. One side and edge have been planed off through a pecking and grinding process. The other broad surface is convex and has also been pecked, but not ground. It is oblong in shape and both ends are slightly worn, as if it had seen utility as a hammerstone. (See Table 6 for the vertical distribution of these implements.)

It should be noted that no metates or fragments of them have been unearthed in the site to date.

Manos and metates are known from both the Early and Middle archaeologic horizons in Central California, and have been described as the typical grinding implement of the Early Horizon (Lillard, Heizer and Fenenga, op. cit.; Heizer, 1949b); they have also been reported ethnographically for the Costanoans (Harrington, op. cit., p. 12; Broadbent, n.d., p. 22, passim).

"Cooking stone." Many fire-cracked pebbles ranging in size from that of a golf ball to fist-size were encountered throughout the midden, and it is quite probable that they served as cooking stones by being heated and placed in baskets containing the substance to be prepared.

No temporal significance is attached to the occurrence of this trait in the Bay area, but an areal difference is demonstrable between the coast and Delta regions. In the stone-free delta of the Sacramento-San Joaquin Rivers, baked clay lumps were employed in lieu of suitable lithic materials (Heizer, 1937).

Bone fishhook. This category is represented by 6 specimens which may have functioned as either the shank portion of a compound fishhook or as

Depth (inches)	Mortars				Pestles					
	C	A2b	A2a	Fragments	IIB4	IIA1	IB	III	IIB1a	Fragments
0-6					3		1			1
7-12					2^2	3^2				3^1
13-18	1							1		1
19-24					1				1^1	1
25-30	1			1		1	2	1		2^2
31-36				1			1			3
37-42				2			1			
43-48		1		1					1	2^1
49-54	2		1^1							3
55-60	2	1		5						
61-66										
67-72		1^1		1						1
73-78				1				1		
79-84						2				
85-90				2						
91-96				1		1				2
97-102				2						
103-108	1			1						
109-114	1									2
115-120				4			1			2
121-126										1
127-132										
133-138										
139-144				1						
145-150										
151-156				10*						1
No loc.				3						6
Totals	8	3	1	36	6	7	6	3	2	31

Table 13. Vertical distribution of mortar and pestle types. Superscript numbers indicate number of specimens occurring with burials.

*Note: Nine of the specimens are associated with Feature No. 1.

the piercing point of a compound fish-spear (Lillard, Heizer and Fenenga, op. cit.; Gifford, 1940, p. 183 [Type MM2b]; Bennyhoff, 1950, p. 296). One complete specimen was found clutched in the right hand of burial No. 7 at a depth of 53 inches. Two examples lacking only the shoulder portion occurred at depths of 42 inches and 36 inches. Though fragmentary, there is little reason to doubt that they are equivalent to the four complete examples in the collection--the break on each is at the slenderest part of the shank, immediately below the side shoulder. Two of the remaining three specimens were recovered from depths of 52 inches and 30-36 inches; the other lacks specific data as to its location. Each of these objects is finely made and exhibits light longitudinal scoring on its polished surface. The average length of these artifacts is 6.8 cm., extremes being 8.1 cm. and 5.7 cm.; widths range from 1 to 1.2 cm., the average being 1.1 cm. (See Table 8 and Pl. 2C, a, b, for the vertical distribution and illustration of these specimens.)

One other specimen resembles a very crude example of type MM2b, but lacks the side shoulder. This piece measures 6.3 cm. in length, is 1.5 cm. wide, and 7 mm. thick. It occurred at a depth of 122 inches and is highly mineralized.

A single bipointed bone gorge fishhook was recovered from a depth of 108 inches. It is 4.7 cm. long, 7 mm. wide, and 4 mm. thick at its mid-point (Pl. 2C, d).

Twine binding impressions are preserved in asphaltum on a small antler object which may also have been a part of a compound fish-spear or hook. It was found at a depth of 36 inches and measures 5.9 cm. in length and 8 mm. in central diameter. Its cross-section is circular. Each end is bluntly pointed, and the asphalt traces extend from one end for a distance of 3.5 cm. (Pl. 2C, c).

A comprehensive study of certain California fishing equipment has been completed (Bennyhoff, op. cit.), and the present study supports the conclusions reached by Bennyhoff concerning the temporal significance of type MM2b fishhook described above, i.e., that they are restricted to the Middle Horizon components in both the Littoral and Interior Zones (ibid., p. 307 ff.). This relationship had previously been suggested by Lillard, Heizer and Fenenga (op. cit.), and others (Heizer and Fenenga, op. cit.; Beardsley, 1948, 1954), and has been strengthened by subsequent research.

Small bipointed bone gorge hooks are common to all periods (ibid.).

Girdled stone. This class of artifacts is marked by the relatively large size of the stones as compared to the bulk of girdled or notched stones (fish net sinkers?) in the collections from other sites in the coastal region (Loud, op. cit.; Beardsley, 1948, 1954). The sample consists of five specimens, four of which are broken at the point of the groove. Two of them, associated with burial No. 11, are fire-cracked, as if they had seen secondary use as cooking stones after their original utility had been destroyed. The approximate diameter of three of the stones is 9 cm. One fragmentary specimen has two grooves 6 cm. apart and has been broken at each of these points. All of these stones have been recovered from depths above 30 inches.

The large size of these stones is puzzling, for they would be too heavy to allow a hand net to be cast any distance. Girdled stones of comparable size have occasionally been recovered in both the Bay and Marin areas. It is possible that they weighted heavy, stationary nets, such as gill nets near the mouth of streams (see Heizer and Mills, 1952, p. 176 for a description of ethnographic use of such nets by the Yurok) rather than hand nets.

Bone awls or perforators. It has been found convenient to employ Gifford's awl classification in the present paper because all of the identifiable specimens from Ala-328 fall within the established types illustrated and discussed in his work (Gifford, 1940).

Eleven distinct types of awls are represented (see Pl. 1B, a-v, for illustration of the types and Table 14 for their vertical distribution). Seven are type AlaII; 2, AlbI; 19, AlbII; 1, AlcII; 1, AlcI; 3, Alg; 2, A2; 1, Ald; 2, AleI; 1, A3; 1, AlaV. In addition are 30 fragments of cannon bone awls and 20 fragments from unidentified bones.

In the present excavations type AlbII awls are restricted to depths below 31 inches. No significance is attached to this fact, or to the distribution of awls in general, because they occur quite commonly in components of the Middle and Late Horizons irrespective of type; they are, however, rare in the Early Horizon (Heizer, 1949b; Beardsley, 1948, 1954).

Bone wedge. Ninety-three such implements (Gifford's HH) have been recovered from all depths of the mound; this represents the largest series from any site yet excavated. (See Table 15 for vertical distribution of these tools, and Pl. 1A, a-h, for illustration of a representative range of sizes and shapes.) They range from chisel-like forms, through scraper-

Depth (inches)	A1cII	A1aII	A1g	A1bII	A1cI	A1d	A1eI	A1bI	A3	A2	A1aV	Fragments
7-12	1	1										1
13-18												2^1
19-24			1									3
25-30		1										4
31-36		1		2^2								2^1
37-42			1	1								5
43-48					1							3^1
49-54												2
55-60		1	1	4^1		1	2^1	1				3
61-66				1				1	1			1
67-72		1										5
73-78										1		5
79-84				2							1	1^1
85-90				4								2
91-96				1								6
97-102				2^1						1		
103-108		1										1^1
109-114		1										
115-120				1								2^1
No loc.				1								2
Totals	1	7	3	19	1	1	2	2	1	2	1	50

Table 14. Vertical distribution of bone awl types. Superscript numbers indicate number of specimens occurring with burials.

like tools, to well-defined wedges with battered polls. Lengths range from 5.4 to 26.5 cm., and their diameters, at the broadest point of the wedging plane, range from 1.1 to 5.5 cm. (the length measurements are for well-defined complete wedges). Their average length is 13.5 cm. and their average diameter is bimodal at 1.7 and 3 cm. Both deer and elk antlers were utilized in all levels of the mound. Three whale bone specimens are represented; they are all fragments, the longest of which is 19 cm. Many of the specimens exhibit heavily battered polls and polished wedging planes. A few of the smaller examples have freshly cut bases with highly polished wedging surfaces and square-cut tips, which may suggest use as a hafted chisel blade or merely secondary cutting of a battered poll to offer a new striking platform. On many of these tools the proximal end of the antler was utilized as a natural striking surface. The angular cut forming the wedging plane was made on only one side, evidently to take advantage of as much of the tough dermal layers as possible.

Wedges sporadically occur as grave accompaniments throughout the midden. Nine graves at depths from 28 to 108 inches contained a single specimen each; an additional grave at 108 inches contained three finely made specimens and represents the only multiple occurrence of this tool form to date.

The high frequency of occurrence and numerical representation of this tool form in an area where woodworking was little or not at all developed is puzzling. The most plausible suggestion of their function that comes to mind is as a driftwood splitting implement for firewood. One who has camped in the open for a period of weeks, even in a wooded region, realizes how quickly the supply of firewood is depleted. In the absence of chopping implements this would create a real problem for a large group of people constantly using an open fire for warmth and cooking purposes. It is suggested that these antler wedges were used for splitting driftwood for use as a fuel (see also Beardsley, 1954, p. 58). Their highest frequency of occurrence and greatest numerical representation is in the Littoral Zone where driftwood would have been abundantly available and each new tide would add more to the potential supply. The tabulation of site by site frequency on page 75 demonstrates the much greater use of this implement on the coast.

These tools are much more plentiful in Middle Horizon components than others, but they are by no means restricted to this period (Beardsley, 1948, 1954). Beardsley notes a temporal difference in the size of whale bone wedges in Marin Province (ibid., 1954, p. 35) but such a difference is not apparent in other areas.

Notched bone. Beardsley's comparable type is limited to notched scapulae,

but in the present excavations five separate types are distinguishable on the basis of the type of bone utilized. These types are: deer or elk scapulae (Gifford's type H1), 59 examples; 8 are fish bone (Gifford's H3); 1 is of a mammal rib (Gifford's H2); 4 are pelves, 2 deer, 2 sea-otter; and 1 is made from the left side of a very large elk mandible. These implements, in common with wedges and awls, are present at all depths of the mound (see Table 15 for their vertical distribution), although fish bone examples are restricted to depths below 32 inches. Few of these articles are complete, and the following measurements are based on these specimens. Overall lengths of scapulae range from 13.5 to 21.5 cm., although a nearly complete specimen, lacking only the proximal or handle end, is 25.8 cm. long. One complete fish bone example is 13 cm. and one fragment is 14.1 cm. in length. Two complete pelves measure 20 cm. (deer) and 9.5 cm. (sea-otter); the rib fragment is 10 cm. long, and the elk mandible fragment is 15 cm. in length. (See Pl. 1A, i-p, for illustration.)

One of the scapula pieces (Pl. 1A, o) has a cut hole 11 mm. in diameter near the vertebral border, but is the only specimen so modified.

The possible utilization of these implements is somewhat conjectural, but a recent analysis of them has been published, and the present writer agrees that the most likely use of these tools is as grass or tule cutters as suggested by Bennyhoff (1953; see bibliography and discussion of these tools). The examples from this site exhibit the range of characteristics on which the various interpretations, such as grass cutters, seed beaters, rasps, fiber separators, hide scrapers, rest. Some are highly polished and finely made, others crudely; on the teeth of many is a siliceous polish; tooth wear patterns vary from being smoothly worn to very unevenly, and one side of the working edge shows greater wear on some specimens. A few possess square serrations, others triangular, still others are jagged, and a few have combinations of these. Various degrees of wear scars are present, from little or none to deep, heavy scoring. The scapular spine, always trimmed down, is also polished through wear on a number of the specimens, and on several both the anterior and posterior borders are notched (Pl. 1A, k). There appears to be no consistent correlation between any two or more of these characteristics or between bone type and any of them.

The areal distribution of these scapulae is much the same as that noted for bone wedges, i.e., they are much more common numerically and by site occurrence on the coast. Beardsley notes that these artifacts are more common in components of the Middle Horizon (Beardsley, 1948, 1954). This is generally true, but at Ala-328 scapulae are common in the upper as well as in the lower portions of the mound.

Depth (inches)	Wedges		Notched bones					Flakers		
	Antler	Whale bone	Elk mandible	Scapula	Pelvis	Fish bone	Rib	Antler	Os penis	Ulna
7-12	4		1	5^{3}				2		
13-18	5			6^{1}				1	1	
19-24	7	1		6				4		
25-30	6^{2}			3	1			1		
31-36	3^{2}			3		2		1		
37-42	2			4	1	1		3^{1}	1	2
43-48	7^{1}			8^{2}		1^{1}		1		
49-54	5			2				3		2
55-60	7			3	1	2		2		1
61-66	8			1		1		2		1
67-72	4^{1}							1		
73-78	2							1		
79-84	5			5^{1}				1		
85-90	5^{2}			1						1
91-96	3^{1}	1		3	1					
97-102	4^{3}			1			1			
103-108	2	1		3^{1}		1		1		
109-114	1			3						
115-120	1			2						
121-126	3									
No loc.	3									
Totals	90	3	1	59	4	8	1	24	2	7

Table 15. Vertical distribution of bone wedges, notched bones, and flakers. Superscript numbers indicate number of specimens occurring with burials.

Flaker. Three distinct types of flaking or stone chipping tools are distinguishable. Seven specimens are made from the ulnae of deer (Gifford's type C2); 2 are sea-otter penis bones (Gifford's C6); and 24 are antler tips showing some degree of wear at the pointed end. Only one of these objects was associated with a burial, an antler tine tip with burial No. 70 at 40 inches. (See Table 15 for the vertical distribution of these implements and Pl. 1B, w-bb, for illustration of the types.)

One of the penis bone flakers exhibits a fairly high polish and is trimmed at the base, but it is the only one of the group that has been modified beyond necessity.

Each of the antler flakers is relatively short, the longest being 10 cm., and has been cut from the distal end of the spike. The short length suggests that this type of flaker was hafted to a length of wood for leverage and control in flaking the stone. This inference is substantiated by ethnographic accounts in other areas of California (Squier, 1953; Heizer, 1951c).

These implements are a very common Middle Horizon occurrence (Beardsley, 1948, 1954) and it appears that the ulna flaker is a diagnostic trait of the Middle Horizon components in the Napa region (Heizer, 1953).

Eyed bone needle. Each of the three specimens of this type was recovered dissociated at various depths of the mound. (See Table 8 for the vertical distribution of these artifacts and Pl. 2A, f, h, j, for illustration.) Lengths of the specimens are 3.7, 15.3, and 9.6 cm. Each is biconically perforated at one end and sharply pointed. The head of the shortest example is expanded to accommodate a relatively large perforation, and the implement is ovoid in cross-section. One of the other specimens is also ovoid in cross-section, the other is flat with parallel sides and beveled edges. These artifacts are directly comparable to Gifford's type P3a.

These implements are relatively much more common in Middle Horizon components in both the Interior Valley and Littoral Zones (Beardsley, 1948, 1954). Their highest frequency of occurrence is at Son-299, an exclusively Middle Horizon component.

Flat thatching needle. Since all of the specimens of this type are fragments possessing only the distal (pointed) end, it is impossible to accurately correlate them with Gifford's typology, for it is not determinable whether they were square-based, perforated, or bipointed.

Seven pointed objects, flat or lenticular in cross-section, are included. All are highly polished and exhibit light longitudinal scoring, probably from the polishing agent rather than use. The points are all evenly worn and taper gradually from the shank. The longest fragment is 13 cm.

One specimen occurred in the grave of burial No. 90, and one was associated with burial No. 139. All of these implements were recovered from depths below 55 inches.

Beardsley found these implements to be most common during the Middle Horizon (ibid.) and the vertical distribution in the Patterson Mound is in agreement with such an observation. (See Table 8 for the vertical occurrence of these implements and Pl. 1A, c, d, for illustration.)

"Fiber-strippers." These implements (see Pl. 1C, j-1), represented by 46 specimens, form a unique type in the present site excavations. None is associated with burials or other features, and all are confined to depths below 67 inches (see Table 8) and are highly mineralized. The type designation "fiber-strippers" is employed for lack of a better term and is based solely on subjective analysis of their possible function.

All but two of these tools are less than 10 cm. in length, and many of them are adapted from what has been termed "fortuitous splinters" of bone. Five are from the proximal end of split cannon bone, the epiphyses of which are not trimmed; 5 are from the distal end of cannon bone, the ends of which are complete and unmodified; one is made from a deer scapula; 7 are of bird bone, 2 humeri, 3 ulnae, 1 tibia, and 1 unidentified; 9 are mammal tibia; one is a mammal radius, and the remainder of 18 specimens are splinters of cannon bone and unidentified bone.

The wear patterns on all of these objects are quite similar, exhibiting, of course, some degree of variation. Common features are: the lack of a smooth, evenly-worn tip; a roughened, scratch-marked, unevenly-worn point rather being the case; a smoothing through wear on the edges for some distance up the shank, this wear generally being more pronounced and extending for a greater distance on one side or the other, which may suggest right- or left-handedness being a factor in its use.

Variable features are: the degree of wear and siliceous polish displayed, which may be accounted for by the length of time the tool had been in use and individual preference of fibers; the type of bone used varies from the relatively fragile bird bone to fairly stout cannon bone and tibia; lengths vary from 4 cm. to 10.7 cm., the average length is 7.1 cm.; many of the specimens possess a concave indentation near the tip on one or more sides.

No care seems to have been taken in their manufacture; it is as though any readily available short length of bone was picked up, sharpened, and utilized.

From the foregoing description we may suggest the following possibilities as to their employment:

At first glance one would suggest their use as flakers, but the semi-encircling scratch-like marks extend too far beyond the working tip, the worn edges extend too far up the shank for such use, and many of the points are highly polished.

If they had been used as awls, punches, or perforators, the tip would tend to be more or less evenly worn, the shank descending to a relatively fine working point.

The general pattern of scratch-like marks suggests the possibility of their use as a pry to open molluscs, but they are neither flat enough to pass between the shells nor sharp enough to sever the tough muscle. In ethnographic times the usual procedure was to cook the molluscs before removing them from the shell; on cooked molluscs no pry is needed.

Several factors point to their possible use as fiber-strippers. Assuming that this work was in the realm of women's tasks, the small size of many of these objects would be no great handicap; even the shortest one rests comfortably in the crook of the index finger with enough of the point extending to be workable, and enough leverage can be applied even in this limited manner to accomplish the proposed task. The previously described wear pattern could easily result from drawing strips of tule, cattails, or other silica-coated stalks or roots across the tip, using the thumb as a guide. This would account for the concave indentations near the tip and also for the semi-encircling scratches and greater wear on the leading edge. A fairly fragile bone would serve nearly as well as a stouter one. The points are blunt enough to prevent injuring fibers being separated, yet sharp enough to separate fibers from pulp. It is quite understandable that little time would be spent in manufacturing a tool often being used, almost continuously worn by the abrading action, and soon discarded.

Why bone was used rather than a sharpened stick, and why the tools are not present in the upper levels of the site where basketry is known to have been manufactured, is puzzling. Several possibilities exist, such as, sticks may have been used exclusively in the upper levels and not preserved, or it may denote a change in basketry or matting techniques and materials.[13]

Seventy-three percent of these artifacts were recovered from 27 percent of the area that has been excavated to mound base, and they were concentrated in the area of the sub-mound cemetery.

Since all of these objects were located at depths below 72 inches, and none was associated with a burial, the establishment of separate types has been omitted.

These implements occur in the Middle Horizon components of the largest of the Bay mounds (Ala-307, 309) and in a Middle Horizon site at Half Moon Bay (SMa-22). Their only occurrence in other than a Middle Horizon context is at the adjacent Patterson Mound No. 2 (Ala-329) which at present appears to be a "pure" Phase I Late Horizon component.

Antler digging tool. Three "Y" shaped antler racks with cut bases and artificially worn tine tips form a part of this group. One was associated with burial No. 90 at a depth of 66 inches, and the other two were found unassociated at depths of 31 inches and 40 inches. Their wear patterns suggest a fairly heavy duty usage, and their shape and length would allow efficiency as a hand digging tool such as might be used in root gathering in addition to a sharpened shaft of wood. Three other antler tine objects also suggest this use. They are single tines whose lengths vary from 17.5 to 20 cm. They fit comfortably in the hand and enough of the tip remains to penetrate at least 4 inches of soil. The ends of all specimens exhibit marks of fairly rough usage.

It might be suggested that the "Y" shaped racks of deer antler may have been part of a hunting disguise, but the antlers have been removed from the skull and no evidence of binding or other fastening is preserved on any of the specimens.

No temporal significance is attached to these generalized tools.

Antler haft. Two pieces of worked antler should be included in this type, although only one of them is strictly Gifford's type JJ; the other is fashioned from the distal end of the antler rather than the proximal base. The one manufactured from the base of the antler is 7 cm. long and has a fairly constant diameter of 3 to 3.5 cm. for its entire length. The drilled hole is 2 cm. in diameter and 3.5 cm. deep. It was recovered at a depth of 60 inches (see Pl. 2B, b).

The other, cut from the distal end of the antler, is reamed at the end

of increasing diameter. The hole is ovoid, having a narrow diameter of 1 cm. and a greater diameter of 1.5 cm. and is 2 cm. deep. Its overall length is 6 cm., but the tip of the tine is broken off. The rough edges of the broken end have been smoothed, apparently from natural wear rather than artificial abrasion, as if the breakage did not materially affect the implement's utility. At the drilled end are rough encircling grooves which suggest that a binding element had been used to hold a tool in place. It is longitudinally scored over its entire surface. It was found at 18 inches depth.

No traces of asphaltum or other adhesive are present on either specimen; however, this fact should not preclude the possibility of their use as hafts. Neither of these specimens was associated with burials or other features.

The first of these implements described is a rare element occurring only in Middle Horizon components (ibid.).

Pitted cobble. A fire-cracked and broken pitted cobble from a depth of 32 inches may have been in the initial stage of manufacture of a type C mortar. The diameter of the remaining fragment is 11 cm. The pecked depression is quite shallow, and has a diameter of 5 cm. After the stone had been broken, it had probably seen secondary utility as a cooking stone.

Hammer or pecking stones. No true hammerstones, that is, fist size, hard, battered rocks, are included in the present materials.

This category is composed of three types of stones: battered quartzite pebbles, two occurrences; small elongate stream pebbles, four specimens; elongate miniature pestle-like stones more than 9 cm. in length, twenty-five examples. Each of these types is marked by battering at one or both ends. It is likely that they served a variety of functions, for example, as pecking stones to shape other stones, chipping stones to block out projectile points; or as a light, all-purpose hammer. No significant breaks occur in the vertical distribution of these tool forms, occurring at depths between 18 and 122 inches. They are the sort of tool picked up near at hand and used without modification by most any group.

No temporal significance is attached to these implements except in the Marin Province, where Beardsley found a local stratigraphic difference in types (Beardsley, 1954, p. 32 ff.)

Abrading stones. The basis for such a description for a sample of 5

stones is their smoothed surfaces and their relatively sharp or beveled edges. The best defined specimen was associated with burial No. 35 at a depth of 78 inches. The others were found at depths of 18, 44, 61, and 96 inches. No areal or temporal significance is attached to the occurrence of these implements.

Scrapers and choppers. Eleven flaked stone scrapers or choppers have been found concentrated in the lower mound depths. Three are obsidian, 1 is Franciscan chert, 2 are unidentified cherts, and 4 are basaltic or fine-grained meta-sedimentary stone. Nine of the specimens may be termed "side scrapers" or choppers because only one side of the stone has a flaked edge with a plano-convex cross-section. None of these specimens was associated with a burial, but 3 of them were associated with a submound cache of worked stones at a depth of 156 inches (see below).

Cache of stone artifact fragments (Feature No. 1). An unusual association of stone artifacts, mostly broken, was unearthed in pit C-1 in the submound yellow clay one foot below the midden accumulation (156 inches deep). Heaped together in a pile were 10 mortar fragments, 9 of reddish-brown sandstone and one of a granitic stone, a single short pestle, a crude maul-like stone, a mano, a core chopper, an elongated flake knife or scraper. This association is difficult to explain since all but the mortar fragments are in usable condition, no human bones were found in the vicinity, and no other clues to a possible interpretation of their meaning, such as a house floor or pit, were found. They must have been buried in a pit, however, probably before much midden had accumulated at the spot.

At a depth of 60 inches were found 4 fragments of a thick-walled sandstone mortar neatly stacked together which, when combined, formed a complete type A2b mortar. A small, slightly pecked elongate stone lay a few inches distant, but it was probably not a part of the mortar's accessory equipment as it is much too small.

Mussel shell spoon. A unique specimen is a half shell of a large salt water mussel (Mytilus californianus). It is 11.5 cm. long. The shell has been little altered, the only modification being at the unhinged end which has been ground off roughly square. It is heavy enough to have served as either a scraper or a spoon, and its shape and lack of identifying wear marks allows either possibility. It was recovered with burial No. 54 at a depth of 100 inches.

A fragment of a fresh water mussel shell was recovered at a depth of 94 inches with burial No. 139. It is perforated at one end--the other end is broken. This specimen is too fragile to have served as a scraper, but may well have been a spoon or a pendant ornament.

I. House remains.

Ten samples of baked clay are apparently pieces of house flooring or chinking. These retain impressions of grass, sticks, tule and rushes. Each of these specimens was recovered from the disturbed stratum of the site. Their baking is possibly the result of the slow radiation of heat from the central fire-pit within the house, burning of a house, or perhaps it is due to prolonged sun-drying if plastered on the outside of the structure.

In addition to these clay fragments, a nearly complete house floor was excavated by Wedel. It measured approximately 16-18 feet in diameter, was saucer-shaped, having a central hearth 24 inches across. Surrounding the hearth at about 2 1/2 feet distant were 4 evenly spaced post holes 7-12 inches in diameter containing bits of charcoal. The floor was hard-packed clay, and a hard, greenish clay covered a circular area about 12 feet in diameter surrounding, covering, and extending about 2 1/2 feet beyond the square formed by the post holes. This greenish clay covering is puzzling, since it contained no impressions of building materials as do the samples described above. Wedel suggests that the clay might have been a roof covering which fell down on the original floor upon the destruction of the building (Wedel, n.d., p. 18). It is possible that the four stout center posts could have supported such a heavy roof, but this matter must at present remain unknown. An entrance to the structure was not located, and the margins of the floor that would have the outline of the wall poles curved up into the plowed zone, and no information regarding either of these features is therefore available.

Several portions of house floors were encountered throughout the midden. One was cut through across its approximate central diameter, and an excellent cross-section of it is preserved in the west side-wall of trench D in pits 5 and 6 (see Diagram 2 for the outline and position of this feature). It is composed of a greenish-gray packed clay about 4 inches thick. It is a saucer-shaped depression 11 feet long from edge to edge. The depth of the depression from the upturned rim to its center is 18 inches.

J. Miscellaneous remains.

Sting ray spine. A single burial, No. 139, at a depth of 94 inches, was accompanied by 3 spines from the sting ray. Two other specimens lacking association were unearthed at depths of 46 and 48 inches. Each of these objects retains the barbs along both sides, but some degree of polish is present on all examples, and the barbs have been partially worn down on 2 of the objects (see Pl. 2A, g). Whether or not they served a utilitarian function is problematical. Gifford illustrates a sting ray spine from site Ala-309 with the lateral barbs removed (Gifford, type A5a). (See Table 8 for the vertical distribution of these objects.)

Whale bone object. A highly mineralized whale bone implement of unknown function was found unassociated at a depth of 102 inches. It appears to be complete, measuring 8.7 cm. long, 2 cm. wide, and 1 cm. thick. It tapers abruptly to an even, blunt point and is smoothed on all sides and edges except at its square-cut base.

Worked sea-mammal vertebra. From a depth of 58 inches was recovered a sea-mammal vertebra with the spines removed.

Flaked bone fragments. Several pieces of crudely flaked bone have been recovered from the lower mound depths. Each of the 6 specimens has been pressure-flaked along one edge. These objects may represent fragments of scrapers, fleshers, and the like. All of the specimens were found at various depths between 75 and 102 inches.

Sharpened elk ulna. The wear pattern on the rather blunt point of this implement resembles that exhibited on "fiber-strippers," but it lacks the characteristic polish along the shank which is typical of the "fiber-stripper." It lacks depth data and measures 15.1 cm. in length.

Worked human bone. From a depth of 84 inches was recovered the proximal portion of a human femur which had been cut off 15 cm. below the proximal epiphysis.

Worked elk antler. The base of a large elk antler, cut at the fork of the rack, was found at 36 inches. Probably it had been discarded after the removal of the tines for wedges.

Conical-headed bone object. Associated with burial No. 139 at a depth of 94 inches was a three-quarter-grooved conical-headed bone object which measures 3.1 cm. long, 1.3 cm. wide, and 9 mm. in thickness (see Pl. 2C, g). It is bi-plano in cross-section, and the conical head shows considerable polish. A groove, 3 mm. wide, is cut into three sides at the midpoint of its length. From the groove, one end tapers back to a blunt point, the other end expands into a blunt, conical head. The ungrooved plane surface exhibits traces of asphaltum. This is a sporadically occurring trait in Middle Horizon components (Lillard, Heizer and Fenenga, op. cit.; Heizer and Fenenga, op. cit.; Beardsley, 1948, 1954).

Concave-based antler tine tip. The depth location of this specimen is unrecorded. It is the tip of an antler tine 8.4 cm. long and 1.5 cm. thick at its concave base. No traces of asphalt are apparent, and no possible function is suggested for it.

Drilled canine tibia. A longitudinally drilled canine tibia fragment 17 cm. long occurred unassociated at a depth of 85 inches. Its exterior is polished and has fine marks of abrasion along the shaft. A drilled hole 1 cm. in diameter is present at the distal epiphysis.

Baked clay. Two golf ball size lumps of baked clay from a depth of 18 inches resemble the baked clay balls of the Delta region. No basketry impressions appear on either specimen.

Three fist-size specimens are quite heavy and fire-cracked. They may have been used as cooking stones. Since the immediate area around the site is a relatively stone-free alluvial fan, suitable cooking stones were scarce and had to be transported from the larger creek beds nearby. This situation is much more acute in the Delta region where baked clay balls were used almost exclusively for cooking stones, and it is quite likely that this trait diffused from that region in weak form to the inhabitants of the Patterson site. The three objects referred to were recovered from depths of 12, 50, and 60 inches.

The four remaining examples are merely nondescript lumps of a reddish (after firing) clay.

Little stratigraphic significance is apparent from the vertical distribution of baked clay in the site, except to observe that the better made specimens are from the upper mound level.

K. Inferences of culture change.

As has been long established by numerous investigators, burials with their accompanying artifact associations form the primary basis in California for cultural interpretations of archaeological remains both within a site and comparatively with others (Lillard and Purves, 1936; Lillard, Heizer and Fenenga, op. cit.; Heizer, 1949b; Beardsley, 1954).

The present excavations have unearthed 169 burials, 70 (41 percent) of which possessed grave offerings. This represents one of the largest documented series from a site in the Littoral Zone and expectedly sheds additional light on the prehistoric culture of the Alameda Province.

The percentage of burials with mortuary offerings is approximately equal to the norm for the San Francisco Bay region, but somewhat below the usual percentage for the Marin and Central Valley regions.

In such a site as the present one, where physical stratigraphic breaks are lacking,[14] the alternative is to determine, if possible, the existence of "cultural strata." Toward this end both burial accompaniments and artifacts dissociated in the midden have been studied. Present evidence suggests a difference in culture content in three vertical portions of the mound, at depths of 0-30 inches (Component A), 31-79 inches (Component B), and between 80-156 inches (Component C). These differences are not sharply distinguishable, rather they grade one into the other, and a significant number of elements are unique to each component.

Tables 2, 3, and 4 present the vertical distributions of the 70 burials having associated artifacts (each table represents an individual component as indicated), and Table 16 combines the data of selected artifacts occurring as grave accompaniments with those dissociated in the midden deposit.

These distinctive traits fall into one or more of the following categories:

1. Those elements which are present in any burial complex, such as body position, type of disposal, and orientation.

2. Those elements exhibiting stylistic, typological, or material changes as to design, materials, or methods of manufacture, such as charmstones, shell beads, and ornaments. All of the elements selected fall into one or both of these categories, and all are multiple occurrences, with the exception of one type of shell bead. These traits may be listed under the following two categories:

(a) Those elements having multiple occurrences but which are restricted to a particular component, such as clam disc beads in Component A and canid tooth beads in Component B.

(b) Those elements changing significantly in frequency of occurrence in a progressive frequency continuum from one component to another, such as Olivella bead type 1a and red ocher in the grave.

A study of Table 16 will show that 9 elements are distinctive of A Component, 2 traits link Components A and B, 8 are unique to B Component, 15 traits link B and C Components, and 5 are distinctive of Component C, and the frequency of 4 traits changes significantly from A to C Components.

It is anticipated that future excavations will necessitate some revision of the present findings, perhaps adding new "marker" traits and/or canceling others, but the existing differences described here are a step forward in arranging the present data in organized form for comparisons with collections from other sites. The particular burial complex which begins at approximately the 80 inch level and becomes well established at 94 inches and below is so definite that there is little reason to expect a drastically different complex at the same level in future excavations (unless, of course, it is in an area of the site removed some distance from the present one). The same may be stated for the burial complex of the uppermost level.

Any archaeological report based on only partial mound excavation must be considered as a progress report, and it must be recognized that future excavations may alter the conclusions based upon incomplete evidence. In the present instance, a glance at Map 1 will show that the digging, for the most part, has been carried on in one quadrant of the site while much of Wedel's excavations were not carried to the submound sterile clay. In the absence of objective, verifiable sampling techniques, it is not known whether the present sample is representative of the total mound. Future excavations will, with little doubt, shed additional light on this problem.

L. The "culture pattern" as inferred from archaeology.

The Patterson mound is located in territory occupied in historic times by the Costanoan tribes (Kroeber, 1904; 1922, Map 1), and it is possible that the occupants of the site during Phase II of the Late Horizon (Component A) were a member of this group because of the recency of the probable beginning of this period in this area. Whether or not the same linguistic stock occupied B and C Components of the site is impossible to determine. In view of the general similarity of the archaeological remains, the reconstruction of the basic "culture pattern" will generally ignore time differences.

Depth in inches	Steatite pipe	Type II charmstone	Girdled stone	Clam disc bead	Olivella bead type 3a1	Pestle type IIB4	Bird bone whistle type I	Incised bird bone tube	Type I cremation	Type I Haliotis ornament	Olivella bead type 1b	Bone pendant	Awl type AlbI	Olivella bead type 3c	Olivella bead type 3b	Olivella bead type 3b1	Mortar type A2b	Bone fishhook MM2b	Perforated canid tooth bead	Haliotis bead type 3	Bird bone whistle type II	"Fiber-stripper"	Sting ray spine	Bird radius pin	Thatching needle	Awl type AlbII	Rib "strigil"	Ulna flaker	Notched fish bone	Mano	Type I charmstone	Type NAa projectile point	Extended burial posture	Type II cremation	Type III Haliotis ornament	Type IV Haliotis ornament	Bipointed bone pin	Olivella bead type 3d	Olivella bead type 1a	Burials with red ocher	Burial orientation N through W	Burials with associated artifacts	
0-30	2	6	5	2	8	6	3	1	7	19	2																												3	8	10	20	No. of Specimens
				2	8	2	1	1	7	2	2																												3	8	10	20	No. of Graves
				10	40	10	15	5	16	10	10																												15	18	23	45	% of Total Burials
31-79										1	1	2	2	8	2	1	3	5	5	1	23	5	2	6	3	8	3	6	7	2	1	5	4						1	8	30	31	No. of Specimens
										1	1			8	2	1	1	3	1	3					1	2			1		1		4					1	8	30	31	No. of Graves
										3	3			26	6	3	3	3	10	3	10				3	6			3		3		5					3	9	34	35	% of Total Burials
80-156																				2	22	41	3	3	4	11	9	1	1	1	12	5	1	2	13	5	4	2	12	17	25	20	No. of Specimens
																				2	2		1		1	1					2	1	1	2	8	3	1	2	12	17	25	20	No. of Graves
																				11	11		5		5	5					11	5	5	11	42	16	5	11	63	46	68	54	% of Total Burials

Table 16. Vertical distribution of selected traits illustrating "culture strata".

Note: The first horizontal line of figures gives the total number of specimens of each type occurring in that level. The second line of figures indicates the number of burials accompanied by the artifact indicated. The third line of figures indicates the percentage of the burials with associated artifacts in each level that possesses the trait (excepting burial complex traits, such as orientation, and also the occurrence of red ocher, which are expressions in percentage of all burials in each level).

The primary orientation of the cultural activities of the inhabitants of the Patterson Mound was toward first of all economic activities, and secondarily toward ceremonial aspects of life and death. By far the abundance of preserved remains point to such an inference, assuming that their functions are correctly interpreted. Ethnographically these same primary orientations were in evidence in Central California (see, for example, Kroeber, 1925, 1932; Loeb, 1926; Barret and Gifford, 1933).

The earliest inhabitants of the site utilized the mortar and pestle and possibly the metate (as inferred from the well-defined mano from the submound cache of stone implements) for grinding seeds and probably acorns from the grasses and stands of oak. In all probability such foods were prepared in the manner described by Gifford (1936), employing the "stone-boiling" method of cooking. Molluscan foods were gathered from the nearby shore and probably either eaten raw, cooked by various methods as described by Greengo (1952, p. 77), or dried for future consumption. Other animal foods, especially waterfowl and deer, were hunted and trapped in the nearby region. The atlatl was possibly the primary hunting weapon of the earliest period (as judged by the large projectile points and the single "atlatl hook"); although snares, traps, deadfalls, and possibly communal drives were also employed as a means of catching game. The abundance of animal bone suggests communal as well as individual hunting techniques. The antler racks suggested as being used as digging implements may equally well have been part of a decoy costume for stalking deer. Fishing was apparently of little importance throughout the occupational period. At first the principal method of taking fish was by means of a compound, barbless spear which was later replaced by the use of stationary nets placed near the mouth of a stream.

With the abundance and variety of food sources readily available, the number of burials encountered, and the mild climate, it seems probable that the site was occupied throughout the year.[15] Brief sojourns were probably made by a few individuals on trading expeditions for Haliotis shells, minerals, and possibly other materials.[16]

A rich ceremonial life is attested, especially in the earliest period, by the frequent occurrence of red ocher in the graves and carefully made charmstones. That these charmstones had other than ceremonial implications is possible, but the bulk of the available information suggests a ceremonial utility (Yates, 1889, pp. 299-301; Latta, 1949, pp. 205-08). The less elaborate forms in the later period probably also possessed supernatural qualities. Whether the lavishly equipped graves of relatively few individuals reflect social prestige or individual wealth (which may be one and the same thing) is not known, but the suggestion is that those

possessing some sort of ceremonial power or function (judging from the inferred use of grave accompaniments) were more highly regarded than others.

Bodily adornment, whether as wealth display or personal inclination, was also important to these people. The abundance of shell and bone beads and ornaments and bone "hairpins" attests to this fact.

In all probability these people were a fairly peaceful group, for evidence suggesting violent death is relatively scarce.

The culture pattern revealed is generally similar to that of the ethnographic tribes of Central California, certain implements and practices died out, new ones were added, but the totality of culture orientation has apparently remained relatively stable from the first occupants of the site some 2,000 years ago to the populations encountered in the early historic period in surrounding regions. This general fact was noted by Kroeber (1943, pp. 140-43) in the past, and only the earliest cultures of the interior of Central California demonstrate a departure from this general pattern (Heizer, 1949b; Treganza, 1952; Treganza and Heizer, 1953).

COMPARATIVE DATA

A. Note on method.

This study has involved the firsthand examination of artifact collections from 67 archaeological sites in Central California housed in the University of California Museum of Anthropology, in addition to that of Ala-328. (See Map 2 for the locations of these sites and the Appendix for a concordance of their previous designations and those presently assigned.)

Each type of artifact occurring at Ala-328 was compared with those from all other sites listed. From the tabulations of co-occurrence, 45 types were selected on the basis of comparability, frequency, and diagnostic value. In addition, the distribution of 4 shell bead types not occurring at Ala-328 were plotted because of their diagnostic value.

Quantities of shell beads from one grave were counted as one occurrence for that burial regardless of the actual number of beads present. In addition, one occurrence is counted for groups of 4 or more beads found together in the midden but lacking specific burial association. No other occurrences were assigned frequencies, but for a bead type not occurring with any burial in the site but found dissociated in the midden, a plus mark is used to

identify its presence in the site. A plus sign then may represent the find of a single dissociated bead, or 10 finds of 3 or less beads of a type not occurring with any burial in the site.

Counts for artifacts other than shell beads were tabulated in a different manner. For such artifacts a single occurrence is counted for any object of that type found dissociated in the midden and one for each burial occurrence, irrespective of the actual number of such objects with an individual burial.

Tables 17 through 22 present the number of occurrences by site. Shell bead frequencies have been tabulated in a different manner than those for other artifacts because the majority of shell bead types can be assigned to their actual horizon affinity since nearly all represent burial occurrences. It has, however, been necessary to add a tabulation of bead occurrences whose horizon affinity has not yet been determined because of insufficient data (Table 20).

Other artifacts are not assigned to a specific temporal horizon because the majority of the finds were not associated with burials, and to assign frequencies to one period or another would not be accurate. However, certain single component sites, such as Son-299, reflect actual frequencies for the culture period represented (see Map 2 for the location of such sites).

The culture horizon affinity of each of the sites is graphically presented on Map 2 which is the key map on which have been plotted the locations of all sites utilized for comparative purposes.

B. Temporal and areal relationships in Central California.

Three primary works have previously been concerned with the relationships, areal and temporal, between archaeological sites in Central California (Lillard, Heizer and Fenenga, op. cit.; Heizer, 1949b; Beardsley, 1954).

The historical development leading to the determination of the archaeological culture sequence in Central California has been reviewed in the introduction to this paper and will not be reiterated here. The present study is primarily concerned with the determination of the areal and temporal relationship of Ala-328 to other Central California archaeological sites discussed in this paper. Since the distribution study presented here is confined to selected artifacts occurring at Ala-328, there will be no attempt to reconstruct the facies affinity of sites other than Ala-328. Such a determination can only rest on the comparative analysis of the complete

artifact content of each site (see Beardsley, 1948, p. 4, Table 1; Beardsley, 1954, Table 1 following p. 62; Heizer, 1949b, p. 3, Fig. 1 for listing of the various facies' components). It is, however, possible to present the horizon affinity of each of the sites discussed here (see Tables 17, 18, 19 and Map 2 for such relationships). It is also possible to arrive at some tentative conclusions concerning areal and temporal differences in specific trait content of sites.

A study of Table 17 demonstrates the fact that clam shell disc beads occur in greater quantity and frequency in the Interior Valley and Delta regions than on the coast where the raw material was obtained. The same is true of Olivella bead type 3a1. This fact is probably the result of influence from the interior creating a demand for these beads rather than direct coastal influence exerting itself on the interior groups. A similar situation is reflected in the Middle Horizon bead complex as shown in Table 19. The most characteristic bead of this period in the interior is the "saddle-shaped" bead (Olivella type 3b) while on the coast there appears to be a pronounced preference for the circular disc bead (Olivella type 3c). Evidently the interior groups created a demand for the "saddle-shaped" bead and the coastal groups merely acted as suppliers rather than as a dominant group exerting "sales pressure" on the people of the interior.

In Phase I, Late Horizon times, however, the characteristic bead type (Olivella 2a) was apparently more or less equally shared by both groups (see Table 18). A new type of bead (Olivella 3a2) occurs in the interior regions during this period which is not found on the adjacent coast. It does, however, occur in quantity in sites in the Santa Barbara region, and it is quite likely that they were traded up through the San Joaquin Valley at this time; Gifford and Schenk (1926, p. 59, Pl. 14e, f) found this bead type to be the most numerous of all types present in the southern San Joaquin Valley, especially in the vicinity of Alpaugh. The scarcity of Phase I coastal settlements (as shown in Table 18) may have caused the peoples of the interior to increase trade relations with their southern neighbors (see Heizer, 1939; Gifford, 1940, passim; 1947, passim, for other Sacramento Valley-Santa Barbara archaeological relationships).

These differences between coast and interior are reflected even more strongly in the distributions of types of bone and stone artifacts (see Tables 21 and 22). The limited number of traits whose distributions are plotted here clearly demonstrate the degree of difference between coastal and interior sites. Some of these trait differences may be due to ecological factors, but whatever the cause, the fact remains that culture differences did exist between the two regions in prehistoric times.

Bones having a serrate edge are extremely rare in the Interior Zone, while they are very common in coastal villages, occurring in considerable quantity in the larger sites. Wedges of bone are much more frequent and numerous on the coast, and a greater variety and abundance of awl types is also apparent in the coastal sites. The ulna and os penis flakers are also rare in the interior, except in the Napa region where the ulna flaker is a common occurrence. Its high frequency here is probably related to the abundance of easily obtained obsidian.

Other traits, such as canid tooth beads and bone fishhook MM2b, occur on the shores of San Francisco Bay and the Interior Valley but are rare or absent in the intervening and adjacent areas. This odd circumstance suggests direct contact, as through direct trade, rather than a slow diffusion from group to group. It is interesting to note that the traits exhibiting such distribution are characteristic of the Middle Horizon; what significance this may have is not understood at present.

Since the artifacts whose distributions were plotted are from a coastal site, it may appear that there is greater cultural development on the coast. This, however, is not the case. If the artifacts from an interior site were plotted in like manner, the picture would be reversed. Even from the limited number of traits considered here, it can be seen that some elements, such as incised bird bone tubes and bipointed bone pins, have their most pronounced development in the interior. Charmstones and pestles occur with frequency in the interior, but a glance at Table 22 gives the impression that they are quite rare. The fact is that their relative abundance is comparable, but each area is marked by different types (see Heizer and Fenenga, 1939, and Beardsley, 1954, for other coastal vs. interior culture differences). These observations point up the necessity of plotting the distribution of the total artifact content of sites in attempting to establish areal relationships.

A study of Tables 21 and 22 illustrates the close affinity of Ala-328 to sites adjacent to the shores of San Francisco Bay. The similarity in artifact content between Ala-328 and Ala-309 is particularly striking, nearly every trait whose distribution is plotted has a mutual occurrence in the two sites. Not only is specific content similar, but the actual frequencies are also closely similar. The next strongest relationship of Ala-328 appears to be with CCo-295, the type site of the Ellis Landing Facies of the Middle Horizon on San Francisco Bay. In spite of the absence of certain diagnostic traits, such as perforated ornaments of mica, circular Haliotis ornaments, and abundance of small grooved or notched pebbles (net sinkers), there is no hesitation in assigning the B Component of Ala-328 to the Ellis Landing Facies.

Component A of Ala-328 (in which occurs the clam disc bead complex) represents Phase II of the Late Horizon and may be assigned to the Fernandez Facies of that period in the Alameda Province.

Component C differs considerably in specific trait content from other sites in the Bay region and is therefore tentatively assigned to a new facies which will here be named the Patterson Facies. However, the general pattern of culture is clearly affiliated with the Middle Horizon, and the establishment of a second phase of the Middle Horizon will not be proposed on the basis of a single component. That this component is stratigraphically earlier than the Ellis Landing Facies is established in the text, and this fact should be kept in mind. Future investigations may offer further evidence to support the establishment of an earlier phase of Middle Horizon in the Bay region, but for the present such differentiation will not be made.

The following trait list for the Patterson Facies of Middle Horizon is offered as an aid for future comparison.

Burial complex:

1. Predominantly tightly flexed posture, although extended posture also is present.
2. The occurrence of type II cremation.
3. Exceptionally high incidence of skeletal orientation between north and west.
4. An unusually high percentage of burials accompanied by artifacts.

Ceremonial complex:

5. An exceptionally high incidence of red ocher in graves.
6. Abundance of finely made steatite charmstones with a single perforation near one end--phallic forms predominate.

Dress and ornamentation:

7. Exceptionally high incidence of Olivella type 1a beads with burials.
8. Large, subrectangular Haliotis ornaments of H. cracherodii with single end perforation and concave ends.
9. Ring-shaped ornaments of H. cracherodii.
10. Frequent use of shell bead applique on bird bone tubes.

Economic complex:

11. Abundance of short, blunt-pointed bone tools (fiber-strippers).
12. Abundance of antler wedges and notched scapulae.

A radiocarbon date of 2339 ± 150 years B.P. has been determined for the lower level of Component B in Ala-328 (Libby, 1954, p. 132, sample C-690).[17] This would place the beginning of the Ellis Landing Facies at 2000 years B.P. which is somewhat less than the dates estimated by Nelson (1909, pp. 345-46), Gifford (1916, p. 13), and Cook (1946, p. 51). These estimated dates average between 3000 and 4000 years. They were all arrived at by similar methods. Nelson's estimate is based upon the cubic inches of refuse accumulated per day per person. Gifford's estimate is based upon the weight of refuse accumulated per day per person, and Cook's estimate employs each of these methods based on the refuse resulting from food preparation and consumption per person per day. The surprising thing about these estimates is their relative consistency. For the present purpose, the radiocarbon dating will be employed.

From a study of the distribution of artifacts and the culture orientation and specializations revealed, it is suggested that the following components are approximately temporal equivalents:

Son-299; Mrn-266B; CCo-295B; Ala-307; Ala-309C; Ala-328B; and SCl-1B. The ages here suggested, in light of the known date at Ala-328, and cultural similarities and specializations at the other sites, are between ±2500 and ±3000 years B.P. It is further suggested that the lower levels of sites Ala-307, CCo-295, Son-299, and Ala-328 are the earliest, followed by Mrn-266, Ala-309, and SCl-1. These tentative conclusions, though based on an intimate knowledge of the total recovered culture content of each of these sites, are admittedly speculative.

This study has not allowed as complete an analysis as was desired or anticipated, but it has resulted in a clearer understanding of what is, and of necessity must be, involved in unraveling the picture of archaeologic culture sequence in Central California. The method itself appears promising to the authors, but each site must be examined first in its total content individually before a comparison with other sites attains its fullest value. The approach used here, i.e., attempting to relate one site to others on the basis of its content alone, is like looking through the wrong end of a telescope. The perspective is narrowed and lacks detail which would become more apparent if the view were broadened.

	Clam disc bead	Tubular clam	Olivella types					
			1a	1b	2a	3a1	3d	3e
SFr-1	+							
SFr-6	1							
Ala-309A	+					1		
Ala-328A	2		3	2		8		
Ala-330	1					1		
CCo-141A	5		1		1	4		
CCo-259A	19	1				7		4
CCo-295A	1					1		
CCo-297	2		3			3		
Sol-2A	13					7		
Sol-3	12					6		2
Nap-1A	5					2		
Nap-16	7					3		
Nap-32A	1		1	1				
Nap-39	*					*		
Nap-57	*					*		
Mrn-35A	1							
Mrn-232A	4		+			1		
Mrn-242A	6					4		2
Mrn-266A	19	2				6	1	
Mrn-275	2							
Mrn-307	+		+			+		
Mrn-201	*					*		
SJo-43	12					3		1
Sac-16A	46					10		3
Sac-28	8					2		
Sac-29	1					2		
Sac-56A	78					5		3
Sac-60A	8					8		
Sac-95	8					5		
Sac-109	1					1		
Sac-113	25					8		
Sac-120	17					3		
Sac-126	7		2	1		1		1
Sac-127A	20					1		
Sac-160A	13					2		

Table 17. Site distribution and frequency of occurrence of Phase II Late Horizon shell bead types.

+ Indicates dissociated occurrence in midden.
* Indicates occurrence but unknown frequency--specimens not located. (See Heizer, 1953, p. 301; Beardsley, 1954, p. 97; for evidence of occurrence.)

	Olivella bead type								Clam disc bead
	2a	3a2	1b	1a	3e	3a3	3d	3a1	
SFr-7A	3		2						
Ala-309B	22								
Ala-329	4		10	7					
CCo-141B	3			2			2		
CCo-150	4								
CCo-250A	9	4	3	1		3	1		
Sol-2B	10								
Sol-236	7		1	4					
SCl-1A	2							1	
Nap-1B	2								
Mrn-76A	3								
Sac-16B	2	1							
Sac-21	12	2	11	7	8			4	+
Sac-56B	3	1							
Sac-60B	6	2	3						

Table 18. Site distribution and frequency of occurrence of Phase I Late Horizon shell bead types.

+ Indicates dissociated occurrence in midden.

	Olivella bead types									Haliotis bead 3	Clam disc bead
	3b	3c	3b2	3b1	3d	2a	1a	1b	3a2		
SFr-7B		1									
Ala-307						5	6	3			
Ala-309C	16	10	18	3	1						
Ala-316			1								
Ala-328B	2	8		1			1	1		1	
Ala-328C					2		12			2	
CCo-137					2		3				3
CCo-139		6	11	1							
CCo-141C	1	5	5	6	1	2	1				
CCo-151	1		2								
CCo-250B	2	2		2		2			1		
CCo-259B		2									
CCo-267B	3	7		6							
CCo-283	1	4	1							1	
CCo-295B		5	4	1	2		2				
Sol-2C			4								
Nap-1C	1	2		4							
Nap-14		1									
Nap-32B	+	2	+	+							
Mrn-35B	4	3	2	2							
Mrn-76B		2									
Mrn-232B		1			1						
Mrn-242B		1	1								
Mrn-266B		12									
Mrn-315		2									
SMa-22	2		1	1							
Son-299	2	26		4			1				
SCl-1B	1		1	1							
Sac-43	1		4		1						
Sac-60C	6	1					1			2	
Sac-66	7	10	5	2		2		2		1	
Sac-73	1	3					1				*
Sac-99	10										
Sac-127B	1										
Sac-151	1	2	3		1						
Sac-160B	1										

Table 19. Site distribution and frequency of occurrence of Middle Horizon shell bead types.

+ Indicates dissociated occurrence in midden.
* Indicates occurrence but unknown frequency--specimens not located. (See Heizer, 1950, p. 16, for evidence of occurrence.)

	Olivella bead types					
	1a	1b	2a	3d	3e	3a1
Ala-309	21	20		2	2	
CCo-259	6				6	
CCo-297	3	1	1			
CCo-301	1					1
Sol-2	4	2				
SCl-1	2	2				
Nap-1	2	2			2	
Nap-14			1			
Nap-16		1	1			
Nap-32	10	4	1			
Nap-39	*	*	*			
Nap-57	*	*	*			
Mrn-76	1					
Mrn-168			1			
Mrn-232			3			
Mrn-242	1				2	
Mrn-266	3	2	1	1		
SJo-43	7	8	3			
Sac-16	3	4		1		
Sac-28			2			
Sac-29			2			
Sac-56	3	2				
Sac-95	2		5			
Sac-113			1			
Sac-120	1	7	5			
Sac-127	7	3				
Sac-160			1			

Table 20. Site distribution and frequency of occurrence of shell bead types whose horizon affiliations have not been determined.

* Indicates occurrence but unknown frequency--specimens not located. (See Heizer, 1953, p. 301, for evidence of occurrence.)

	Ala-328	Ala-307	Ala-309	Ala-329	Ala-330	CCo-151	CCo-259	CCo-283	CCo-295	CCo-300	CCo-301	SCl-1	SFr-7	SMa-4	SMa-22	Son-299	Sol-2	Sol-236	Mrn-76	Mrn-115	Mrn-168	Mrn-232	Mrn-242	Mrn-266	Mrn-275	Mrn-307	Nap-1	Nap-14	Nap-16	Nap-32	SJo-43	Sac-16	Sac-21	Sac-28	Sac-43	Sac-56	Sac-60	Sac-66	Sac-99	Sac-122	Sac-126	Sac-127
Antler wedge	90	33	35	9		3		2	3	4	1	7	1	2	1	49	2	1	1	1		7	1	3	5	4	3	1	1			14	4			1		1	3	1	6	4
Whale bone wedge	3														2							10	1	7	15	10														2		
Awl types: AlaII	7		1	1	1	1						1				2		1									1								2							
AlbI	2	1	7						3				1			1		1	1								1					5			1			1		1	3
AlbII	19	15	52	6		1	2		15		2	3	7	1	4	2		6	4	1		18		3		16	12		3		2	17	25	1	8	6		1	7	5	21	19
AlcII	1	2	4	2				1	4	2		1	2		1			1	1			1					2				3										
Alg	3	1	9			1	1					4				11				1						1	4			4											
A2	2	1	15									1	1						1								1			1											
A3	1		1	1					1																																
Notched scapula	59	15	45	23	1	1	1	1	4	1	2	5		1				3		3				2		1	16		4												
Notched fishbone	8		4			2			1																																
Notched rib	1	1		2								1																														
Bird bone whistle	38	6	46	14		4	13		2	1		1	7	2		24		2	1		3			3		2	3		2	1	1	3	4		3			1		1	5	17
Bird bone bead	17	3	9	12		1	8	1	6	1			1			11		3	1	1		1	1	2		5	6		1	2	2	1			1	1		1	1		9
Mammal bone bead	3		2	2			4		2									5											1												1	1
Bird bone tube	9	1	4			1		1	5	4		1				5	2		1		1	1				7	3								1	2					
Incised bird bone tube	1						2		1																		10						2	4	*	*		*				*
Bird radius pin	9		4						1			1				1						1		1			1					2						1				
Ulna flaker	7	1	6	1			2						4	1		9	1		4	1	2	1	1			2	22	11		9									1		
Os penis flaker	2	3	2						1					1																											
Bipointed pin	2									2						5	1													1	1	1	6	1	3						
Fishhook MM2b	6		4											1																	1			2		4	14		1	1	
Canid tooth bead	7		1																																2		2				1
Eyed needle	3	1	6			1							1			26		1	1					10											1	2		1			
Forked head-scratcher	1		2				2	1	1							2					1	1		7																	
"Fiber-stripper"	46	11	4	5											1																										
Sting-ray spine	3		3	1		2	1		1			2							1																						

Table 21. Site distribution and frequency of occurrence of selected bone artifacts.

Note: See Map 2 for location of sites.
*Indicates occurrence but unknown frequency.

	Ala-328	Ala-307	Ala-309	Ala-329	Ala-330	CCo-142	CCo-151	CCo-259	CCo-283	CCo-295	CCo-300	SFr-7	Son-299	Sol-2	Sol-236	Mrn-76	Mrn-168	Mrn-232	Mrn-242	Mrn-266	Mrn-275	Nap-1	Nap-14	Nap-32	SJo-43	Sac-16	Sac-28	Sac-43	Sac-56	Sac-66	Sac-60	Sac-99	Sac-127
Mortar type C	8	6	2	7	1	3	1	2		3	2		1		1	1		1	1	2		1	1	4		2	1		1			3	
Pestle type IIB4	6			4		1				5										1													
Quartz crystal	4	4	1			2	1	1	1	1			4		2	2	2		1	1		1		7	1	4	2	3	20	10	5	5	1
Charmstone types:																																	
IIA2a	1		1		1			1																									
IIB1a	1		3	3	1					7																							
IIB1b	2		6	4	1				1	2					4																		
IIB1c	1		3		1					2		1		4	2																		
IIB2b	1		1		1					4																							
IB2a	3	1								1			1						1		2					2							

Table 22: Site distribution and frequency of occurrence of selected stone artifacts.

Note: See Map 2 for location of sites.

APPENDIX

Concordance of Archaeological Site Designations

Prior to the establishment of a uniform system of numbering archaeological sites in California by the University of California Archaeological Survey (UCAS) (Heizer, 1948, 1949a), several major series of number designations were employed by various archaeologists and institutions. In the following list these designations are correlated with their UCAS numbers and the most common names by which they have been known. The prefix C- refers to a series of site designations originating with Schenck and Dawson (1929) who utilized it in their work on the northern San Joaquin Valley. This system was continued by the University of California for sites in and around the Central Valley area until the establishment of the UCAS. The prefix N- refers to site designations assigned by N. C. Nelson (1909) in his survey of the region immediately adjacent to San Francisco Bay. The prefix PB- denotes the designations employed by Peters and Bryant for sites in the vicinity of Tomales Bay and Drake's Bay on the Marin County coast.[18] Those sites prefixed by S- represent those recorded by the Sacramento Junior College. In many instances names were assigned to sites by the original recorders, in others they are subsequent designations. The UCAS follows a system of recording sites by county, using an abbreviated three-letter designation, followed by unit numbers within the county, for example, SFr-1 means site number 1 recorded in San Francisco County.

UCAS Number	Previous Number	Site Name
SFr-1	None	Farallon Island
-6	N-417	Presidio
-7	N-387	Bayshore
SMa-4	N-372	Sewell No. 1
-22	N-407	Princeton
Ala-307	N-307	West Berkeley
-309	N-309	Emeryville
-316	N-316	None
-328	N-328	Newark No. 1 (Beardsley); Patterson No. 1
-329	N-329	Newark No. 2; Patterson No. 2
-330	N-330	Newark; Haley Road
CCo-137	C-137	Monument; Concord Man
-139	C-139	Simone; Simoni
-141	C-141	Orwood No. 2
-142	None	Orinda Country Club

UCAS Number	Previous Number	Site Name
CCo-150	C-150	Veale Track No. 1
-151	None	Philippi
-250	N-250a	Maltby
-259	N-259	Fernandez; Rodeo
-267	N-267	San Pablo
-283	N-283	Potrero
-295	N-295	Ellis Landing
-297	N-297	None
-300	N-300	Stege; Richmond
-301	N-301	Point Isabel
SCl-1	N-356	Castro; Ponce; Mayfield
Sol-2	None	Peterson No. 2
-3	None	Peterson No. 3
-236	N-236	Glen Cove
Son-299	None	Bodega Bay
Mrn-35	N-35	Belvedere
-76	N-76	Greenbrae
-115	N-115	Thomas
-168	N-168	None
-201	PB-201	Tom's Point
-232	PB-232b	Estero
-242	PB-242	Cauley
-266	PB-266	McClure
-275	PB-275	Mendoza No. 1
-307	PB-232c	None
-315	N-86c	San Rafael
Nap-1	None	Goddard; Oakville
-14	None	Las Trancas
-16	None	Suscol No. 1
-32	None	Kolb; Rutherford; Pistorias
-39	N-229	Tulukai
-57	None	Peripoli
SJo-43	C-43	McCauley; Tracy Lake No. 2
Sac-16	S-16	Bennett
-21	S-66	Hollister
-28	S-28	Strawberry
-29	S-29	King Brown No. 1
-43	S-43	Brazil
-56	S-56	Mosher
-60	S-60	Hicks No. 1
-66	C-66	Morse; Glenn

UCAS Number	Previous Number	Site Name
Sac-73	S-73	Van Lobensels
-95	C-95	Allyn No. 2
-99	S-99	Deterding
-109	C-109	Drescher
-113	C-113	Calquhoun
-120	C-120	Goethe No. 1
-122	C-122	Eichenberger
-126	C-126	Booth
-127	C-127	Augustine
-151	C-151	Need
-160	None	Richards

Concordance of Shell Bead Typologies

The following tabular arrangement of a concordance of shell bead typologies correlates those utilized in Lillard, Heizer and Fenenga (1939), Gifford (1947), and Heizer (1953). It will be noted that several of Gifford's types are listed as being equivalent to a single one of Lillard, Heizer and Fenenga's categories. This does not mean that all of the specimens in Gifford's types are directly equivalent to those of Lillard, Heizer and Fenenga. The type of bead in Gifford's typology corresponding most strongly to the one in the column at the left is underlined, but some examples may be found in the other types as indicated. These differences may be more apparent than real. The third typology is one used by students in the preparation of the paper reporting the archaeology of the Napa region. Beardsley (1954) utilized the typology of Lillard, Heizer and Fenenga with the addition of two rare types not discussed in this work.

Lillard, Heizer and Fenenga	Gifford	Heizer
1a	F5b	1, 2, and 3
1b	F5b	1, 2, and 3
2a	X3aI, X2a, X3aII, X3aIII, X3c	7
3a1	X2b, X3bII, X1b	5, possible rare inclusion of 4
3a2	X1a	Not present
3a3	X2b	Not present
3b	X3bI	Not distinguishable

Lillard, Heizer and Fenenga	Gifford	Heizer
3b1	X2b, X1b	4
3b2	X3c, X3bI	Not distinguishable
3c	X3bI	6
3d	X3bI	Not distinguishable
3e	X4	Not distinguishable
Clam disc bead	VlaV, VlaII, VlaI, VlaIII	Clam disc bead
Haliotis bead 3	J2aI	Not present

END NOTES

1. This is the official number assigned by the University of California Archaeological Survey under a system put into operation in 1948 (see Heizer, 1948 and 1949a). For a concordance of site designations previously applied to sites discussed in this paper and those later assigned by the UCAS see Appendix.

2. Excavations have since been carried out at a few of the sites, notably West Berkeley (Ala-307), and a detailed report on the West Berkeley mound is being prepared.

3. See also the summary report of Heizer and Fenenga, 1939. For a historical review of Central California archaeology and the changing attitudes concerning cultural development in the region see Beardsley, 1954.

4. The soil map of Holmes and Nelson, 1917, shows the existence of the slough little altered from the Whitney map. A few small salt evaporation ponds had been constructed by 1917, but they had not yet materially altered the landscape.

5. This has proven to be an invaluable technique in California for examination of archaeological sites. For an examination of methods and conclusions derived from such techniques see: Gifford, 1916; Cook, 1946; Cook and Treganza, 1947; Treganza and Cook, 1948; Cook, 1950; Cook and Treganza, 1950; Heizer and Cook, 1950; Cook and Heizer, 1951; Greengo, 1951; Heizer and Squier, 1953.

6. This soil is still being deposited during the rainy season when excess

water backs up behind the levees. Wedel (n.d., p. 1) notes that the mound was isolated by flood waters during the spring of 1935, and the present writers have observed flood conditions in the area during several winter seasons. On each of these latter occasions a considerable amount of silt, corresponding to the description of Dublin adobe soil, was deposited over an extensive area in the fields surrounding the site and in the general vicinity of Alvarado, California.

7. In fact the scarcity of shell in the site led Wedel to observe, "it would appear that this is an 'earth mound' rather than a 'shell mound'" (loc. cit.).

8. See Diagrams Nos. 1 and 2 and tables of artifact distribution and burial data throughout the text. This same observation was made by Beardsley (1954) at the Emeryville site and sites in Marin County, and by Greengo (1951) at other sites in the Bay region.

9. The evidence for observations concerning the areal or temporal significance of artifacts described in this section is contained in and derived from five principal works; these sources are: Lillard, Heizer and Fenenga, 1939; Heizer and Fenenga, 1939; Beardsley, 1948, 1954; Heizer, 1949b. Each of these sources is a concise report, and specific paginal reference will not be cited since the information is contained throughout each work. When sources additional to these principal ones are used for reference, they are specifically cited in the notes.

10. Similar items are known from other sites in Central California; cf. Pl. 3p of the present work with Schenck and Dawson, 1929, Pl. 85a and p. 366; and Heizer, 1937, Figs. 3, 4 (18-22), 6 (a-d, k) for illustrations and distributions in Central California.

11. See Heizer and Hewes, 1940, p. 600, Table 1 for the Central California distribution of this trait, and Heizer, 1951, for a unique northwestern California occurrence.

12. This projectile point typology has long been employed in California archaeology and elsewhere by students familiar with California archaeology. See especially Gifford and Schenck, 1926, p. 80; Strong, 1935; Lillard, Heizer and Fenenga, 1939; Beardsley, 1954.

13. Dr. S. A. Barrett offered the information that short bone tools exhibing similar wear patterns were employed by the Yurok and other Northwest California groups as eel slitters, and the possibility that they may have served as fish slitters in the present instance should not be overlooked.

14. A division has, however, been made between the upper and lower mound mass based on the degree of compactness of the midden (see Diagrams 1 and 2).

15. For contrasting views on this point see Dodge, 1914; Gifford, 1936, 1939, p. 315; Pilling, 1950; Greengo, 1952, p. 70.

16. On this point see Barrett and Gifford, 1933, p. 251 ff.; Heizer and Treganza, 1944; Sample, 1950, p. 17; Treganza, 1952, p. 22.

17. For other dates obtained by this method from Central California sites see Johnson, 1951, p. 7, sample 186, p. 13, samples 440 and 522; Libby, 1952, p. 15; 1954, p. 138, sample C-691. For an assessment of certain of these dates see Heizer, 1951b.

18. Unpublished site survey data collected by two amateur archaeologists now on file in the office of the University of California Archaeological Survey.

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A Ant	American Antiquity
-M	Memoirs
CFG	California Fish and Game
UC	University of California Publications
-AR	Anthropological Records
-PAAE	American Archaeology and Ethnology
UCAS	University of California Archaeological Survey
-R	Reports
-Ms	Manuscript

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EXPLANATION OF PLATES

Plate 1: Selected Bone Implements

A. a-h. Antler wedges, type HH.
i-p. Serrated bones.

B. a. Awl, type AlbII
b. Awl, type A3.
c. Awl, type Ald.
d. Awl, type AlbI.
e. Awl, type AlaII.
f. Awl, type AlbII.
g. Awl, type AleI.
h. Awl, type AlbII.
i. Awl, type AlaII.
j. Awl, type AlcI.
k-l. Awl, type AlbII.
m. Awl, type AleI.
n. Awl, type AlbII.
o. Awl, type AlcII.
p. Awl, type AlaII.
q. Awl, type AlbII.
r-s. Awl, type Alg.
t. Awl, type AlbII.
u. Awl, type AlaV.
v. Awl, type AlbII.
w. Antler flaker
x. Flaker, type C2.
y-z. Antler flaker.
aa. Flaker, type C2.
bb. Flaker, type C6.

Plate 2: Selected Bone Implements.

A. a. Basally drilled antler object.
b. Spatulate whalebone implement.
c-d. Matting needle.
e. Forked head-scratcher.
f. Eyed bone needle, type P3a.
g. Sting-ray spine.
h. Eyed bone needle, type P3a.
i. Bird radius hairpin, type A4aI.
j. Eyed bone needle, type P3a.
k-l. Bipointed bone pin.
m-n. Rib strigil.

Plate 2 (continued):

A. o-p. Bird bone whistle, type II.
q. Bird bone tube.
r-s. Bird bone whistle, type I.
t-u. Bird bone whistle, type II.
v. Bird bone tube.

B. a. Elk tibia tube.
b. Antler haft.
c. Elk tibia tube.

C. a-b. Bone fishhook, type MM2b.
c-d. Bone gorges.
e. Canid tooth bead, type UU4.
f. Atlatl hook.
g. Conical-headed bone object.
h. Inserted bird bone bead, type EE1e.
i. Simple bird bone bead, type EE1a.
j-l. "Fiber-strippers."

Plate 3: Selected Stone and Clay Artifacts.

a. Charmstone, type IIB1b.
b. Charmstone, type IIB1c.
c. Charmstone, type IA4a.
d. Charmstone, type IIB1a.
e-f. Charmstone, type IA2b.
g. Charmstone, type IA3a.
h. Charmstone fragment.
i. Steatite bead.
j. Charmstone, type IB1c.
K. Charmstone, type IB1d.
l. Charmstone, type IB2a.
m. Charmstone, type IA1.
n. Charmstone, type M.
o. Steatite pendant.
p. Fired clay pipe.
q. Conical steatite pipe.
r. Tubular steatite pipe.
s-u. Projectile point, type NAa.
v. Projectile point, type NAb1.
w. Projectile point, type NAa.
x. Projectile point, type NAb3.
y. Projectile point, type NBa1.
z. Projectile point, type NAa.
aa. Projectile point, type SDa.
bb. Projectile point, type SCa1.

EXPLANATION OF FIGURES

Figure 1: Various degrees of flexure and position of burials. (Drawings by A. E. Treganza.)

Figure 2: *Haliotis* ornament types.
a-d. Type III.
e-f. Type IV.
g. Type III.

Figure 3: *Haliotis* ornament types.
a-c. Type I.
d. Type II.
e-g. Type IA.

EXPLANATION OF DIAGRAMS

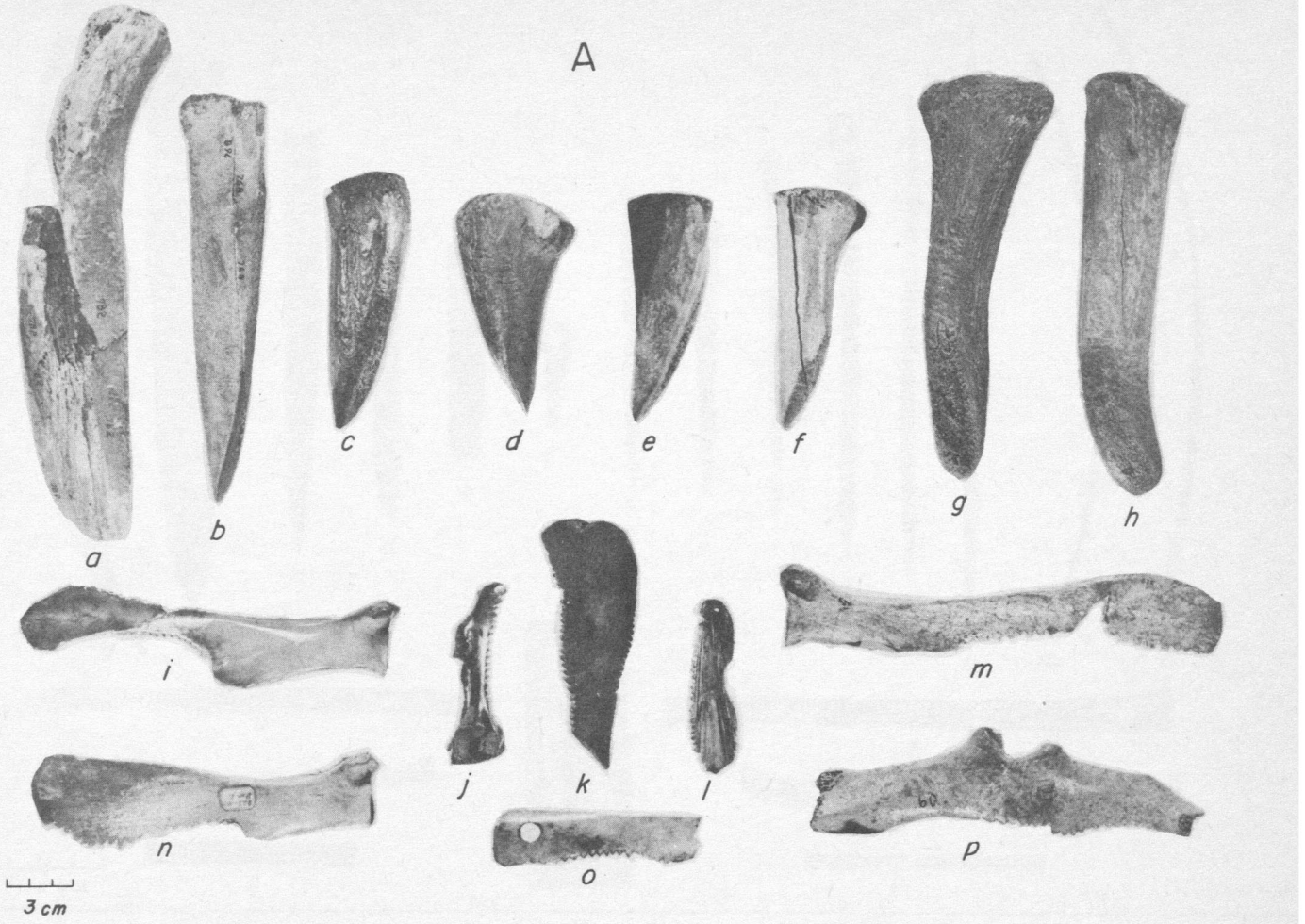
Diagram 1: Stratigraphic profile of west sidewall of pits 5, 6, and 7 in trench A.

Diagram 2: Stratigraphic profile of west sidewall of pits 4 and 5 in trench D.

EXPLANATION OF MAPS

Map 1: Contour Map of Patterson Site 1 (Ala-328).

Map 2: Archaeologic Horizon Affinity of Selected Sites.


A
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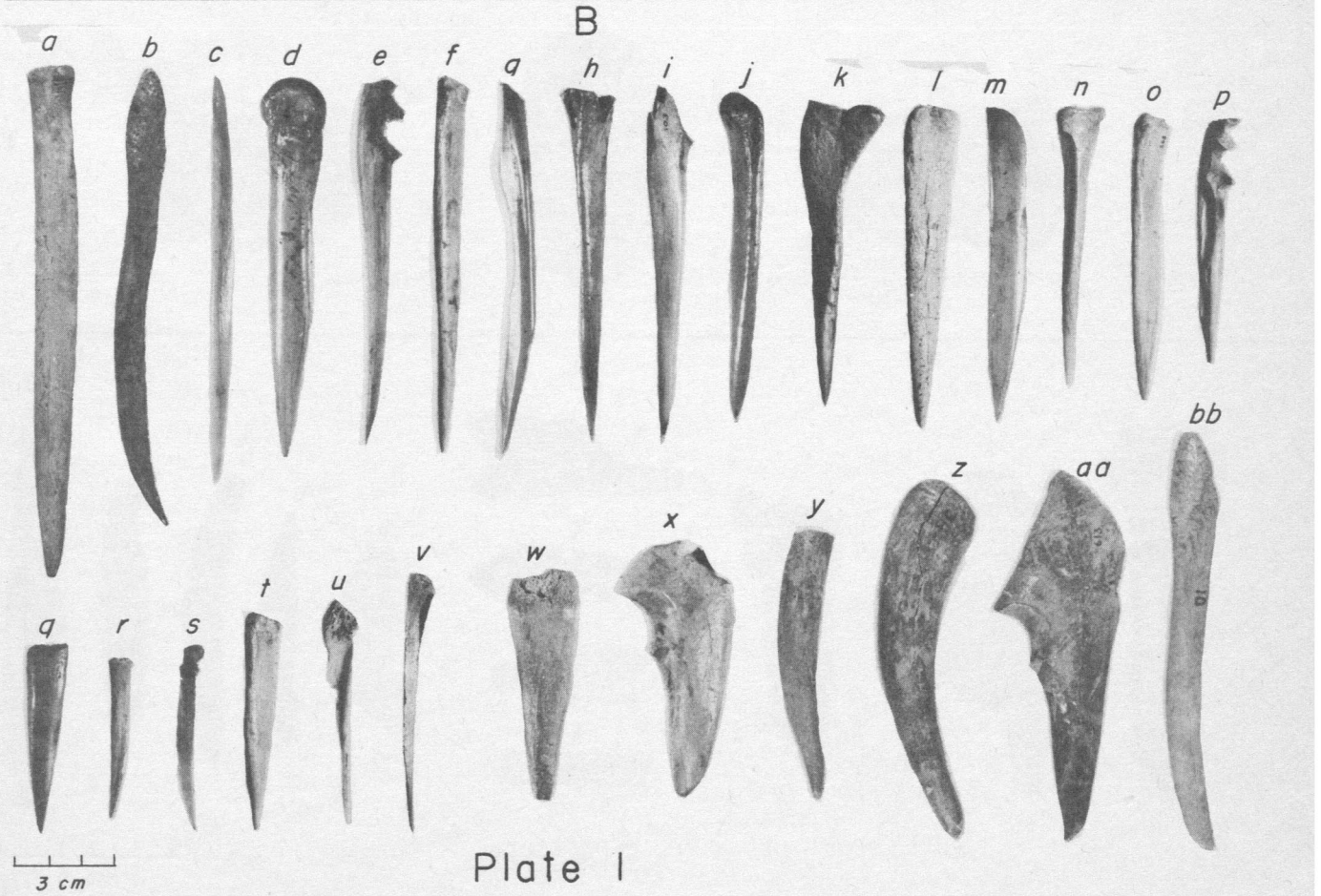
B
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3 cm

Plate I

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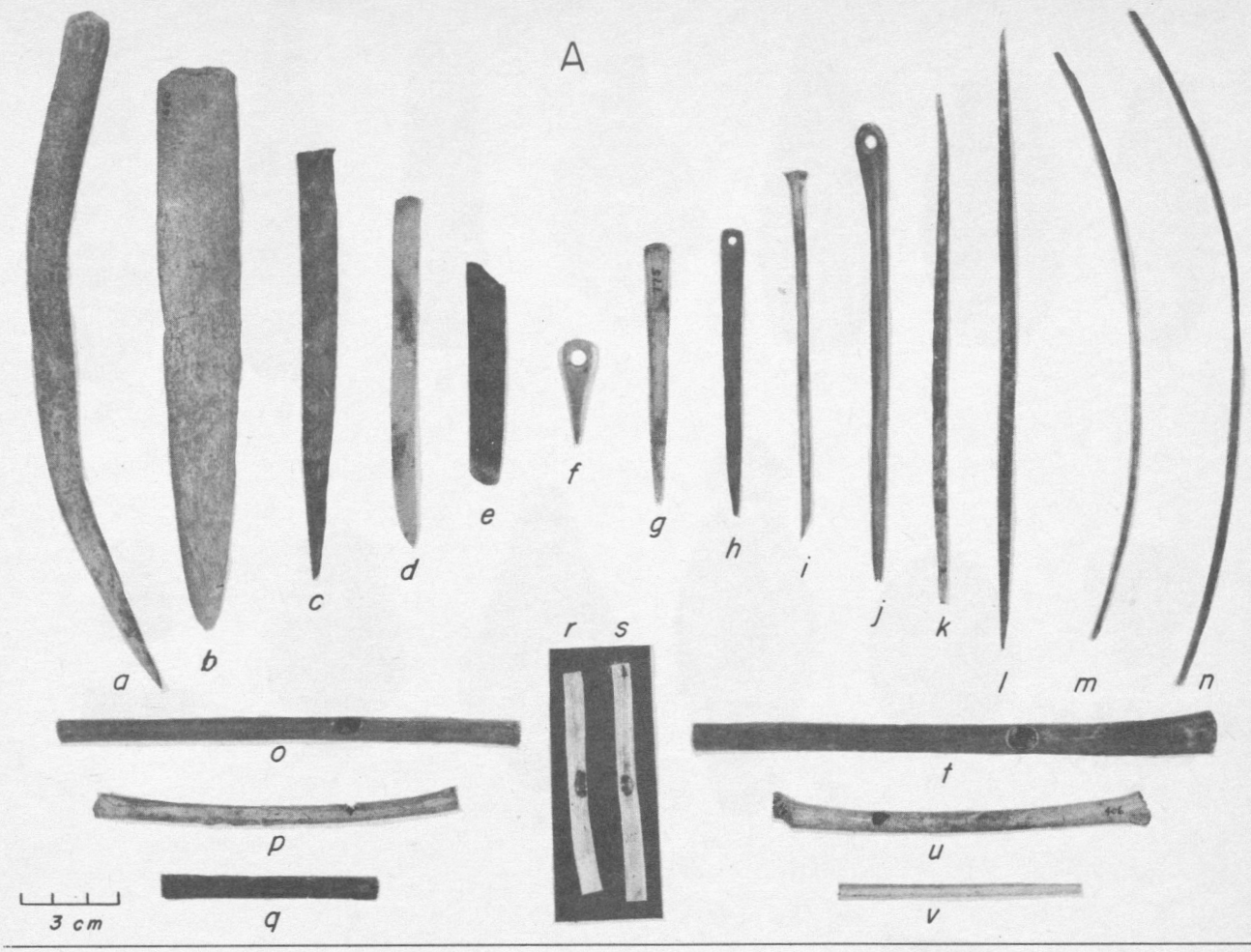

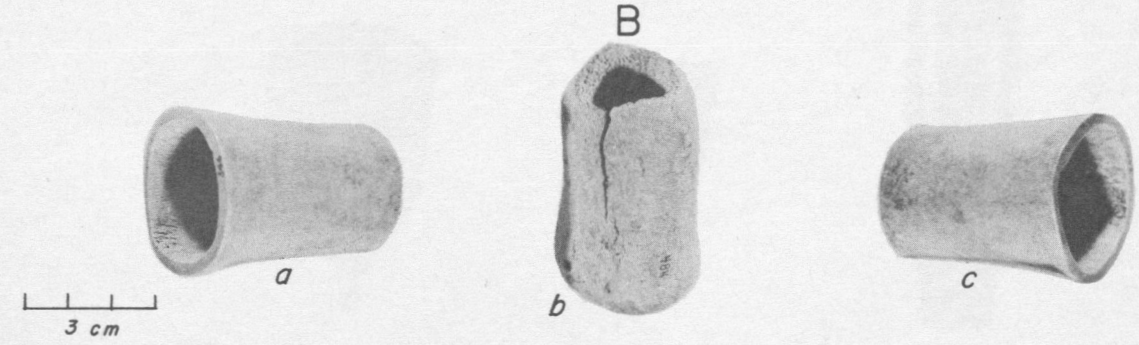

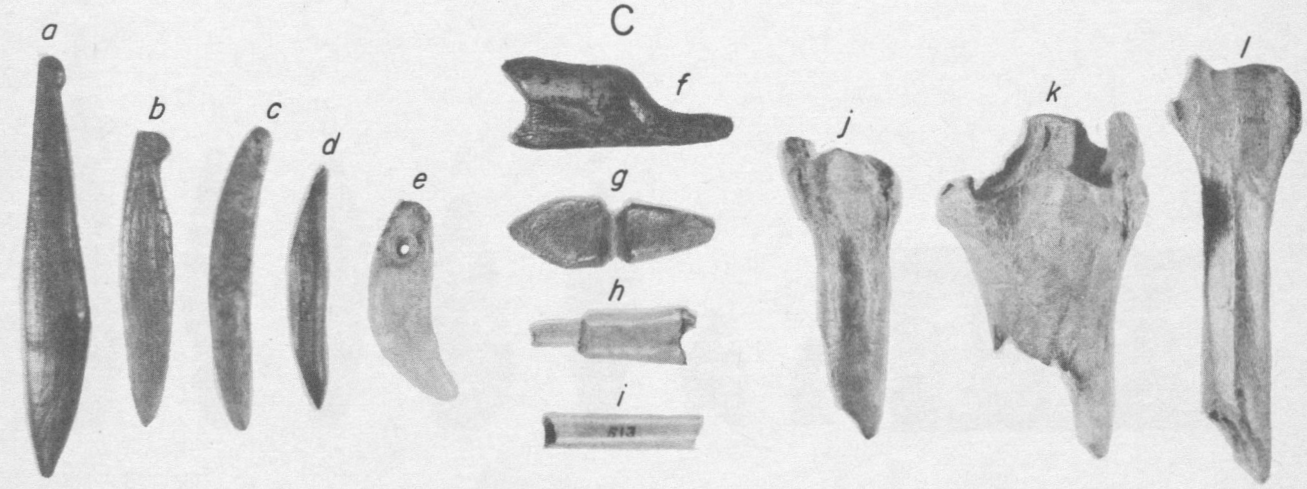

Plate 2

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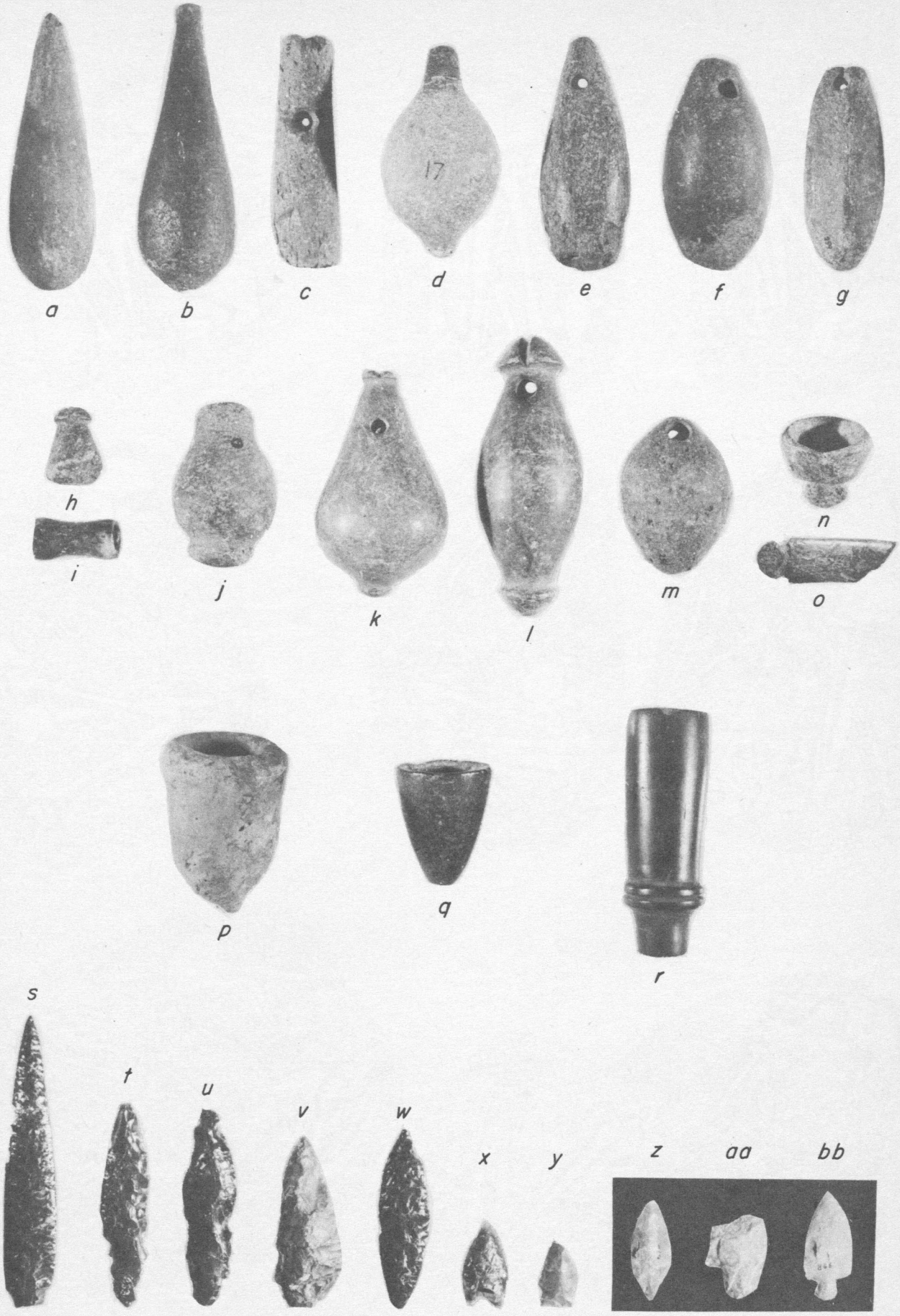

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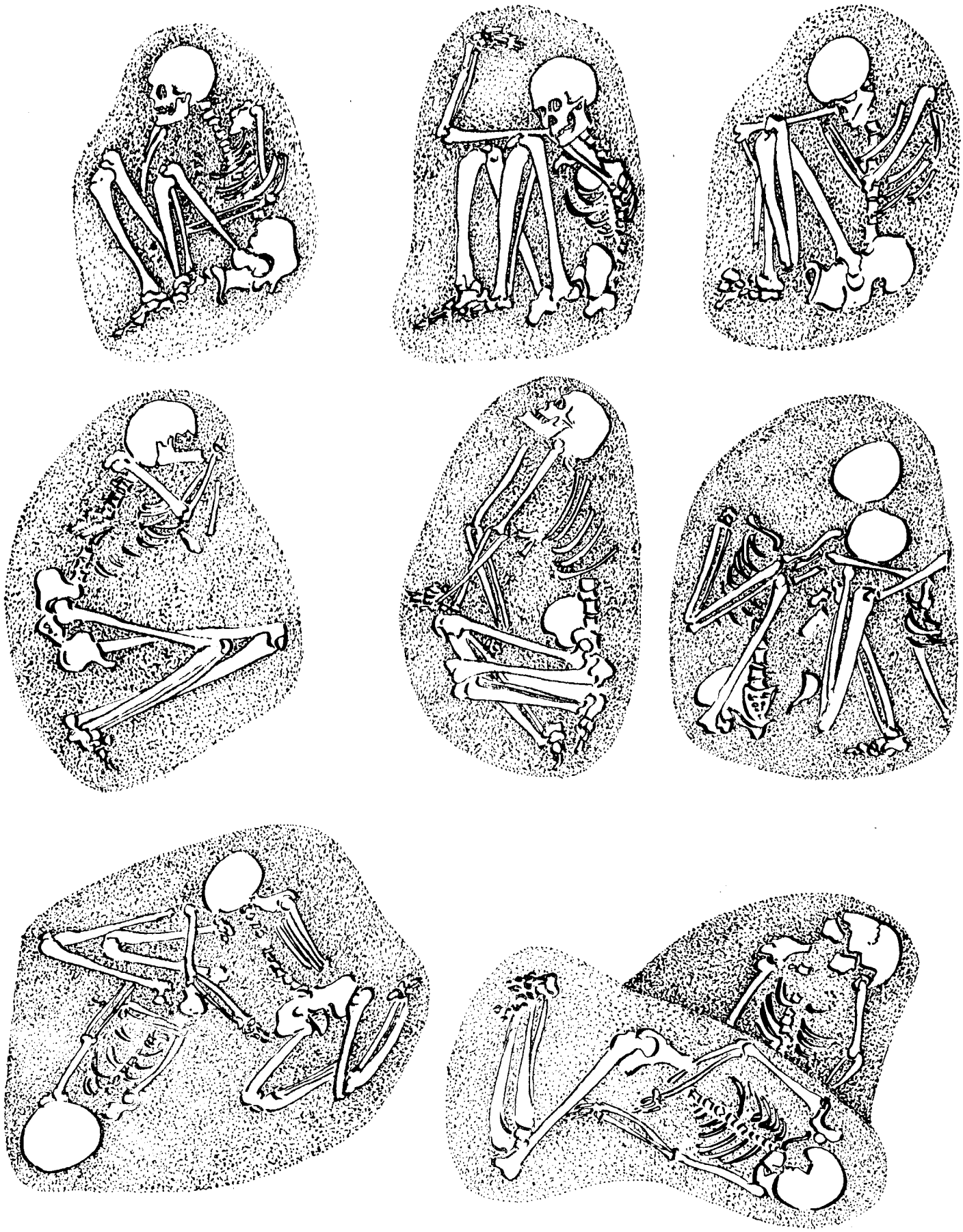

Fig. 1

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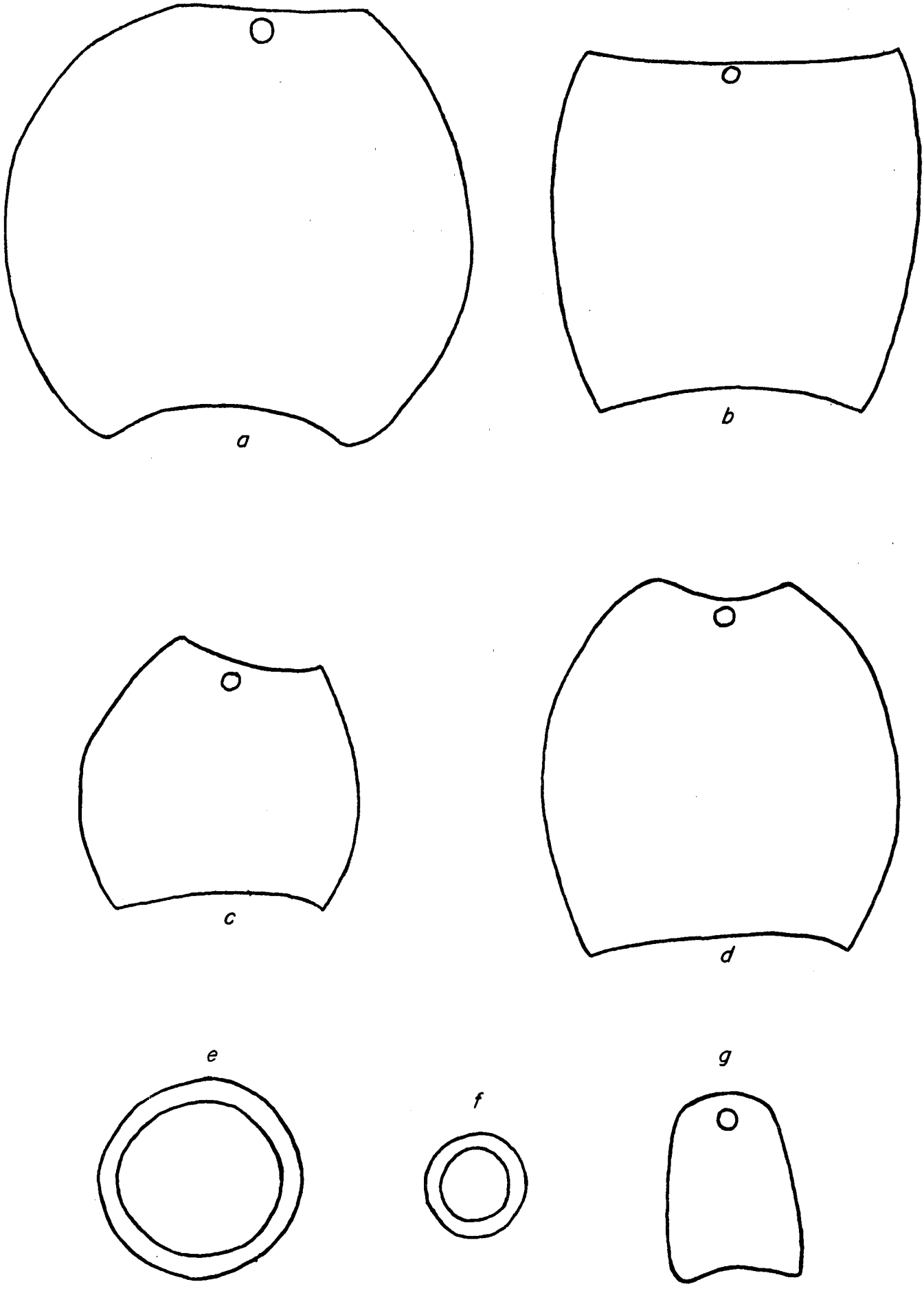

Fig. 2

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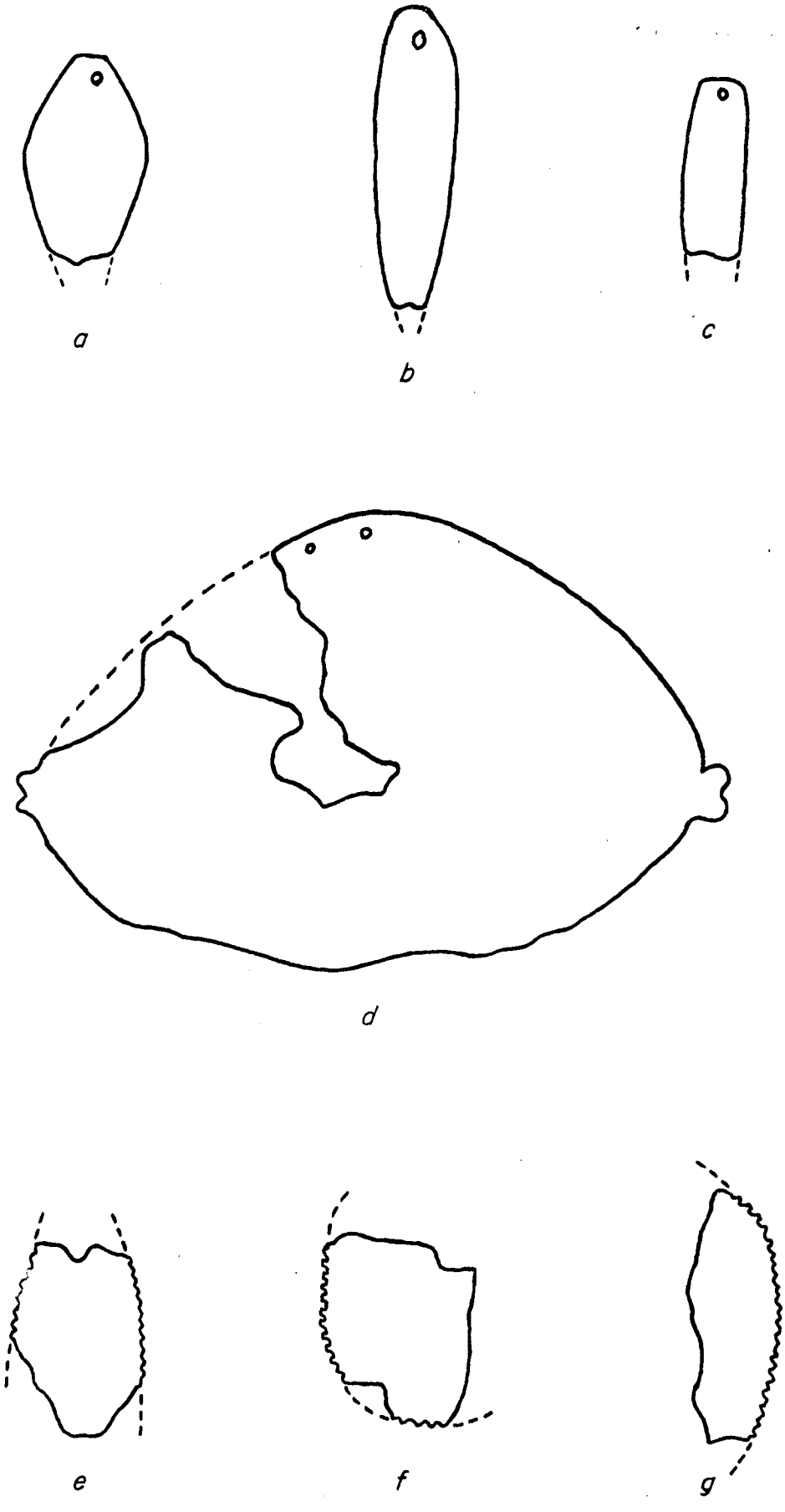

Fig. 3

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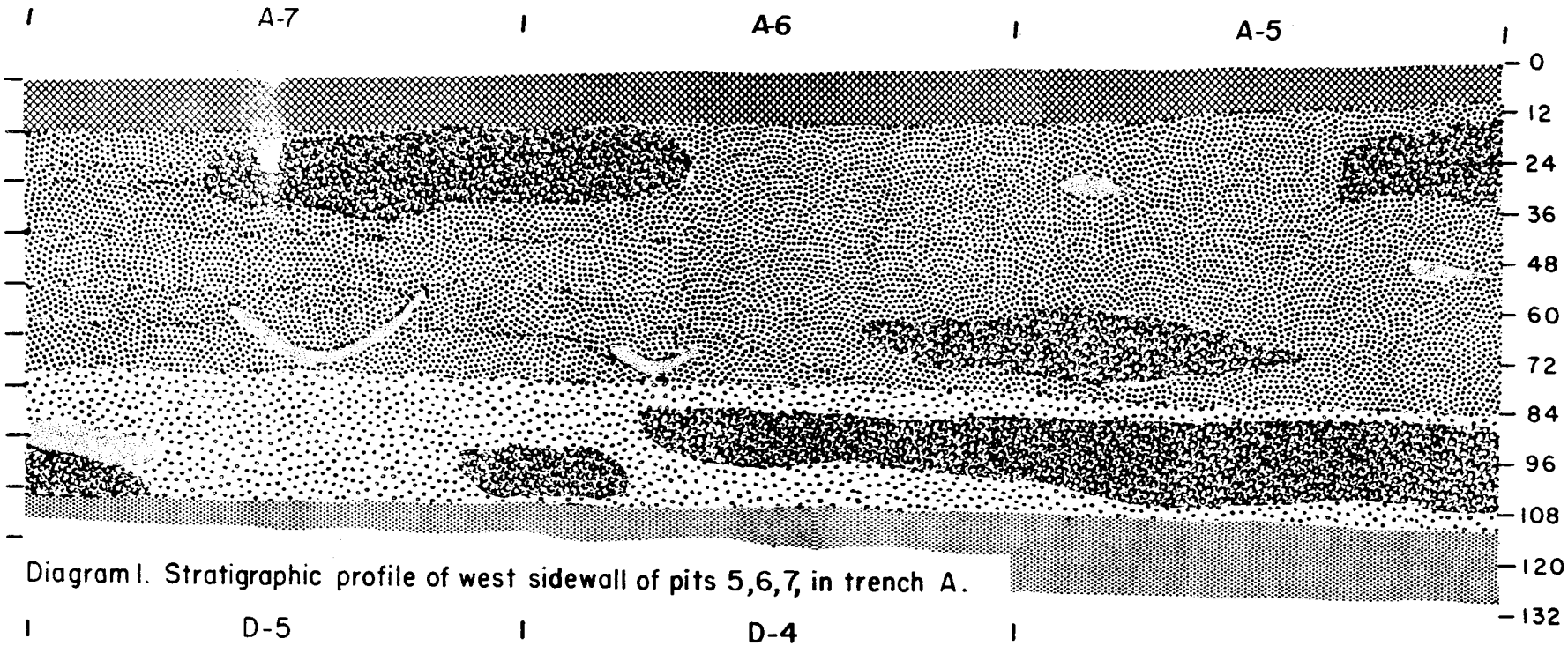

Diagram 1. Stratigraphic profile of west sidewall of pits 5,6,7, in trench A.

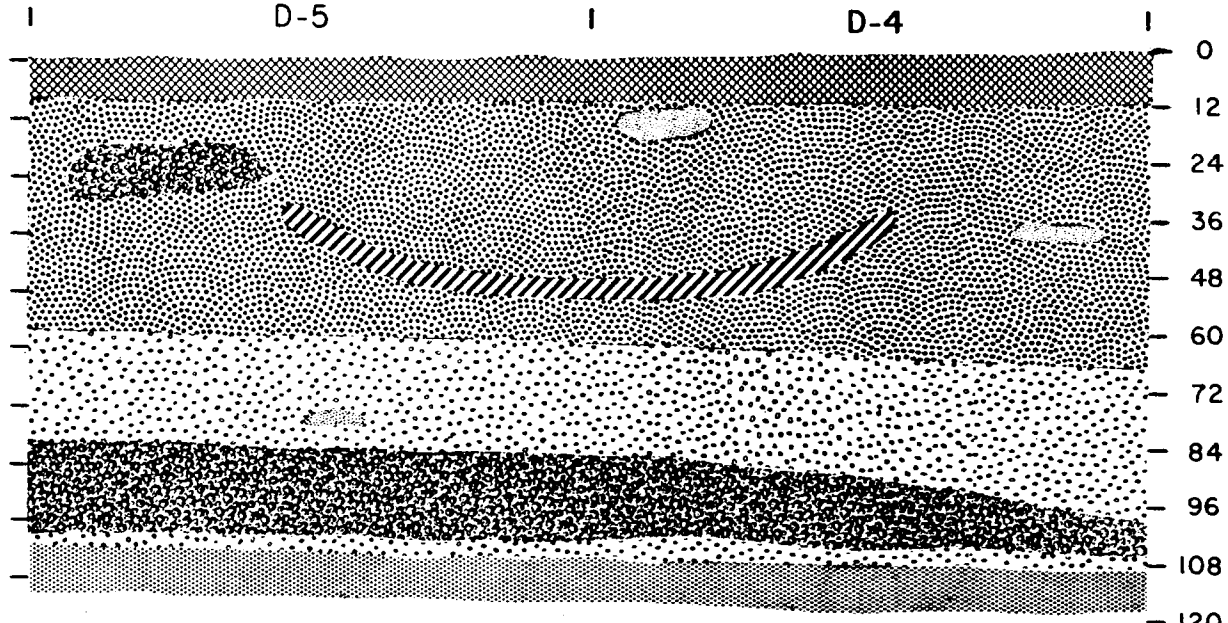

Diagram 2. Stratigraphic profile of west sidewall of pits 4,5, in trench D.

Legend:

1. Disturbed stratum.
2. Upper mound mass.
3. Lower mound mass.
4. Sterile sub-mound clay.
5. Shell concentration.
6. Ash concentration.
7. House-floor.

(Scale 12")

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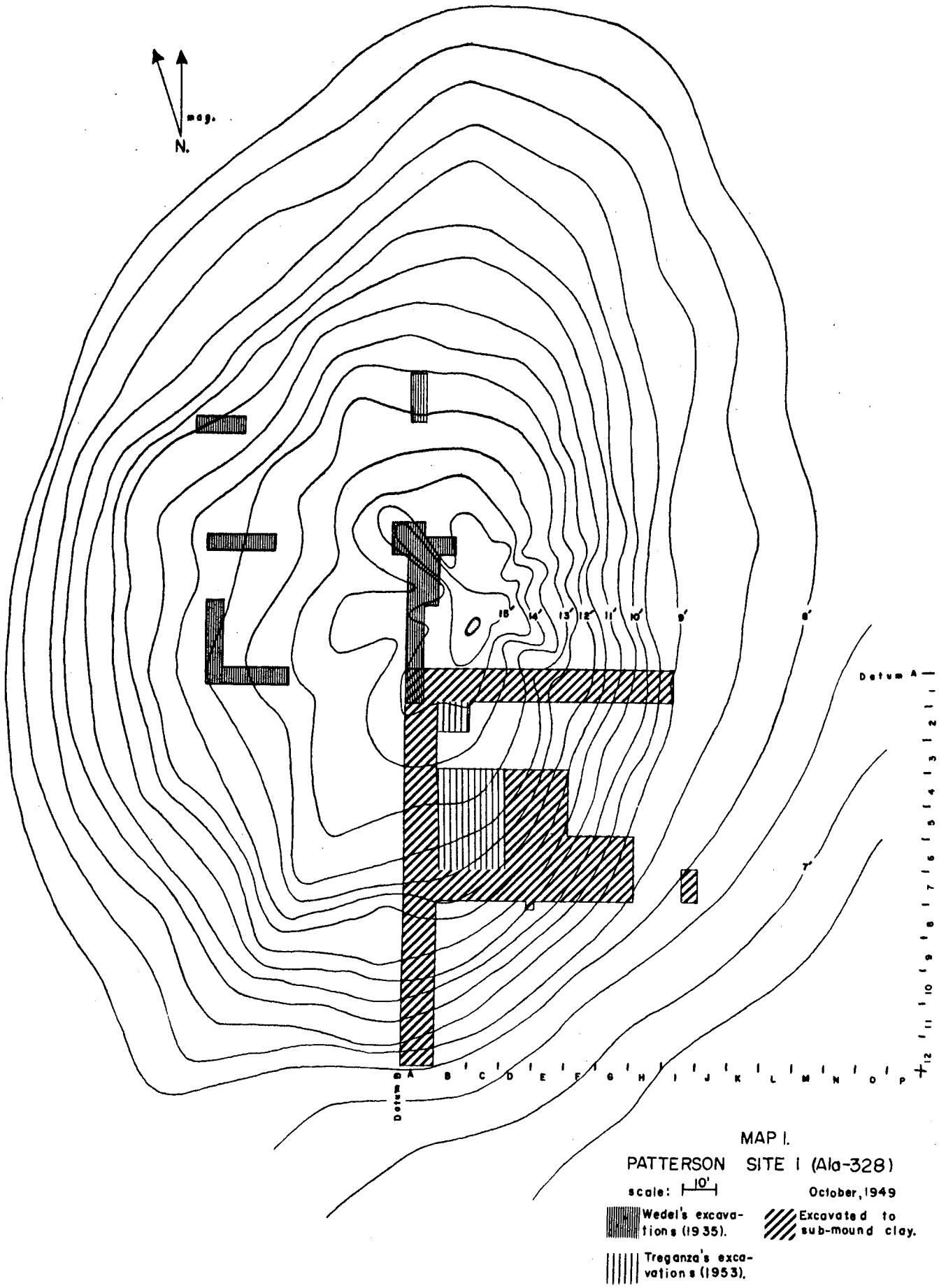

MAP I.

PATTERSON SITE I (Ala-328)

scale: 10'

October, 1949

Wedel's excavations (1935).

Excavated to sub-mound clay.

Treganza's excavations (1953).

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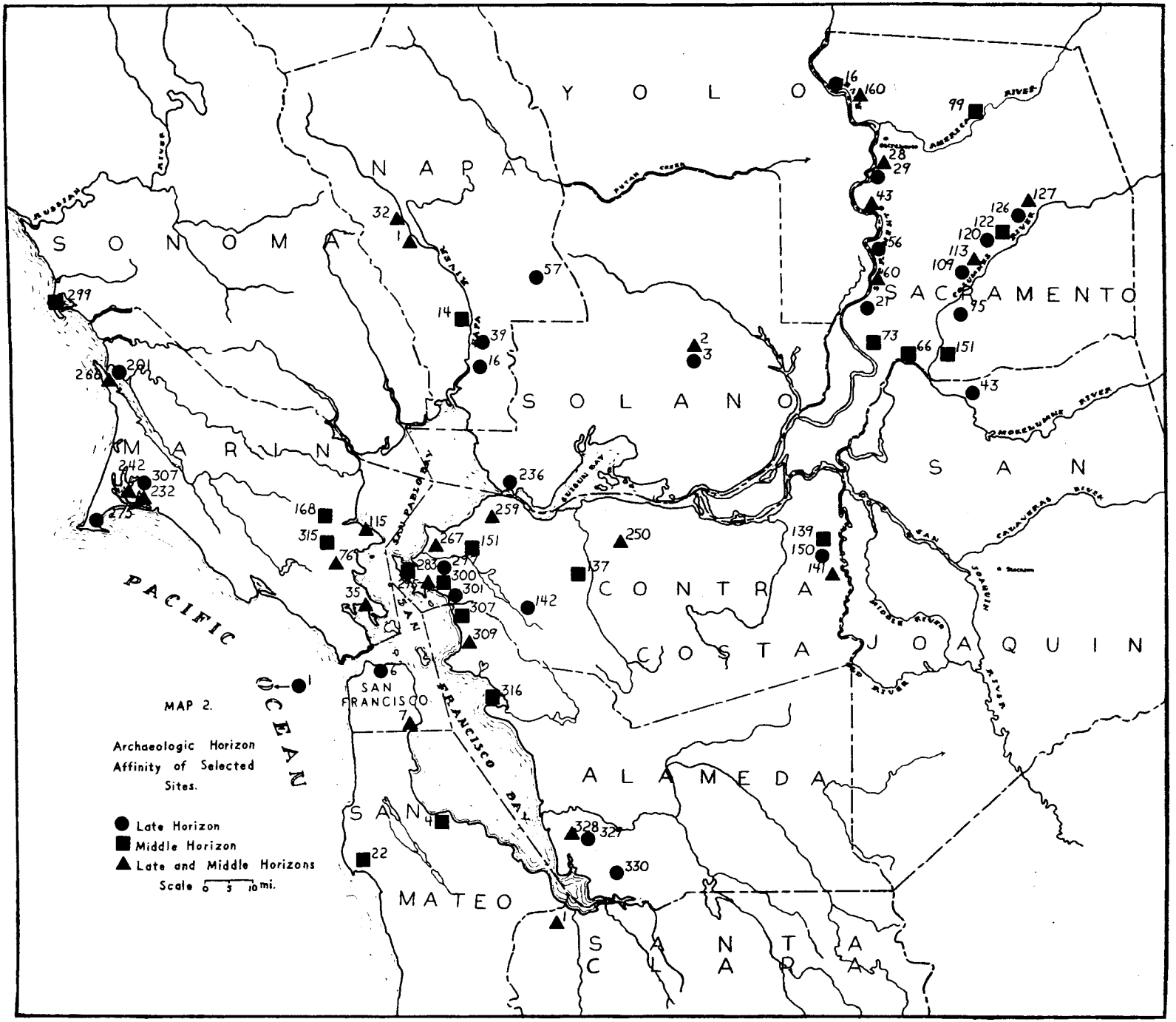
YOLO
NAPA
SONOMA
SOLANO
SACRAMENTO
MARIN
SAN
CONTRA
COSTA
JOAQUIN
ALAMEDA
SAN
MATEO
SANTA
CLARA
PACIFIC
OCEAN
SAN
FRANCISCO
SAN FRANCISCO BAY
SUISUN BAY
RUSSIAN RIVER
PUTAH CREEK
NAPA RIVER
SACRAMENTO RIVER
MOKELUMNE RIVER
CALAVERAS RIVER
SAN JOAQUIN RIVER
MAP 2.
Archaeologic Horizon Affinity of Selected Sites.
Late Horizon
Middle Horizon
Late and Middle Horizons
Scale 0 5 10 mi.