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No. 59

THE ARCHAEOLOGY OF BOWERS CAVE, LOS ANGELES COUNTY, CALIFORNIA

Albert B. Elsasser and Robert F. Heizer

and

REPRINTS OF EARLY NOTES ON SANTA BARBARA ARCHAEOLOGY

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Albert B. Elsasser and Robert F. Heizer

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INTRODUCTION

Tales of caves loaded with the treasures of the ancient Indians of California are so common as to make any person concerned with checking their authenticity skeptical each time he hears a repetition of the familiar story.

One of the distinctive features shared by many of these accounts is the report that the caves are virtually inaccessible, or that they may no longer exist. The story of Bowers Cave is unusual in that for sixty-five years artifacts said to have been recovered from a cave in the San Martin Mountains in northern Los Angeles County have been known to exist, although the exact location of the cave itself remained a mystery. A collection of specimens from the cave was purchased from Reverend Stephen Bowers by the Peabody Museum of Harvard University and are briefly described in the Annual Report of that institution for 1887. They were part, or all, of a collection said to have been acquired in 1885, or a short time before, by Rev. Bowers. The cave was reported as having dimensions of about 12 by 16 feet, and to have contained nine baskets which ranged from 6 to 20 inches in diameter. Apparently the larger baskets were used as receptacles for a number of other specimens which, together with these baskets, are the subject of the present report. The cave gave no evidence of having been used for any purpose other than as a depository for these articles. At the time of their acquisition in 1887, it was not known what period, prehistoric or historic, was represented by the specimens. Rev. Bowers suggested that they may have been there for centuries.

After the specimens finally came to rest at the Peabody Museum, several of them became relatively well-known from published descriptions. In 1887, for example, three stone specimens from Bowers Cave were figured and described by Henshaw (1887:29) in a discussion of the aboriginal use of perforated stones in California, and Mason's (1904, pl. 201) monumental report on basketry illustrated two coiled baskets which were found in the cave.

Apart from these references and the tantalizing but superficial description by Bowers (1885) in a journal which he himself edited, the specimens received little study or attention until relatively recently. This neglect was unfortunate for the collection, taken as a whole, appears to be of considerable value in filling in some of the gaps of our knowledge of the late prehistoric or early historic Chumash culture

in the Santa Barbara region. It is seldom, indeed, in California that what seems to have been an intact mass of ceremonial objects is encountered in a situation which suggests that they refer to a specific and limited time period. This time period is implied by the nature of the artifacts themselves, but another circumstance has added interest and information concerning the time of placement of the collection in the cave.

About twelve years ago, the late Richard van Valkenburgh was engaged in archaeological field work in Los Angeles County. An old local resident, while looking at van Valkenburgh's collection, recalled that a friend of his had found in a cave, many years before, a number of storage baskets which contained feathered robes and some clubs. Van Valkenburgh evidently surmised that this might be a reference to the Bowers Cave collection, and when he finally interviewed the old man, who was named Everett Pyle, van Valkenburgh learned that a cave had been discovered in the San Martin Mountains in 1884 and Pyle and his brother had removed a great number of Indian relics from the place. Subsequently, these relics were sold to Bowers, who in turn sold part of them to the Peabody Museum (van Valkenburgh 1952:7).

Bowers stated in his 1885 article that he himself had visited the cave and excavated there, finding several artifacts. It is not known whether he meant to represent himself as the original collector of the entire lot of material. In any case, Pyle, supposedly the original discoverer, gave van Valkenburgh specific directions on how to get to the cave, which was situated in extremely difficult terrain far off any well-traveled trails in the San Martin range.

When the cave was revisited in 1951 or thereabouts, evidence was found which indicated that Pyle's story was true. Additional digging brought to light fragments of basketry which are apparently similar to some specimens in the original Bowers collection. The finding of some blue and rose-colored glass trade beads near the spot where the original cache was probably located suggests, but does not prove, that the time of placing the material in the cave was around 1800 A.D. The glass beads found in 1951 are not, however, associated with certainty with the Bowers material since the two lots were collected by different persons working sixty-five years or so apart. If glass trade beads had been contained in the baskets acquired by Bowers, they would presumably have been saved and thus be part of the collection. We assume, therefore, that two temporally separate events account for the lack of association of the glass beads and the deposition of the baskets in the cave. The baskets themselves and their placement in the cave may date from the post-Spanish or mission period (i.e. 1770 or later), but we cannot affirm or deny this with the

information now available. Some pottery fragments of Verde black-on-gray ware, dated in the Southwest from the thirteenth century, were also discovered (van Valkenburgh 1952:8). These were obviously trade pieces, and there is no way of knowing why they were deposited in the cave or even if they were directly associated with the cache allegedly found by Pyle.

Although the roof of the cave was blackened as if by the smoke of old fires, no hearths were found in van Valkenburgh's excavations, and this, together with the almost inaccessible location of the place, serves to mark it as a hideaway rather than as a cave frequently visited or used as a regular camping site.

Despite the heightened interest which resulted from van Valkenburgh's discovery in the early 1950's, it was not until the summer of 1960 that it became possible for the present authors to complete the study of the Bowers collection. Dribbles of minor published or unpublished references to the collection had been accumulating for a number of years in the Department of Anthropology at the University of California, Berkeley, but a final visit to the Peabody Museum was necessary before the project of describing the collection could be completed. Through the good offices of Dr. J. O. Brew, Director of the Peabody Museum of Archaeology and Ethnology at Harvard University, a long-delayed visit to the collection was made in July, 1960, for the purpose of measuring and photographing the specimens, some of which are on semipermanent display at the Museum. We wish to express our appreciation to Dr. Brew for placing the entire collection at our disposal, and for his encouragement in the completion of the study project.

We have mentioned the potential value of the Bowers Cave specimens as a possible source of information about certain types of equipment or implements observed to have been in use in ethnographic times, for example, in the late eighteenth or early nineteenth centuries in California. Before discussing this, however, we should like to point out some of the interpretive problems presented by the cave cache, as indeed the Bowers collection appears to have been.

First of all, the circumstances of the initial collection are quite unclear, and we have no way of knowing whether all of the material represents a single event, or whether there may have been several deposits of material made at different times. Secondly, the suggestion by van Valkenburgh that glass trade beads of the early historic period of California were associated with this material cannot be fully accepted on the strength of his circumstantial report.

What we are left with, then, are numerous speculations concerning the identity of the types of artifacts found in the cave compared with

types definitely known to have been used in the general region in the ethnographic period. Although Bowers Cave is located in territory which could have been occupied either by the Chumash Indians of the hinterland or by a Shoshonean-speaking and definitely noncoastal people, namely, the Alliklik (see Kroeber 1925, pl. 48), it seems that where comparisons are possible the Chumash are indicated as the group which once used the specimens found in the cache. Unfortunately, to our knowledge little of the material culture of the Alliklik has been preserved, and these comparisons are in a sense not very meaningful. Although one specimen, a wooden object resembling a hook (pl. 6c) has a nautical look to it and may therefore relate to the essentially maritime Chumash group, it is also possible that this specimen was the kind of esoteric object which could have been used equally well by the Chumash or Alliklik.

DESCRIPTIONS OF SPECIMENS

In the descriptions of the various categories of specimens presented here, we shall follow in most instances the plan of commenting on the possible age or areal relationships at the end of each section. The material is subdivided as follows: basketry; feather bands; bone whistles; bullroarers; stone clubs; and miscellaneous items.

Basketry

Nine baskets are contained in the Bowers collection. Of these, five presumably are storage baskets. The remaining four are: one small, well-made bowl-shaped specimen; one tray; and two straight-sided bowls. Only one of the nine baskets is decorated; this is one of the finely-made straight-sided specimens.

All of the baskets are coiled, but are not of the same detailed construction. Besides variability in size and form, there are differences among them, for example, in materials, type of stitching, and closeness of coiling. In general, the large storage baskets are crudely constructed, while the smaller baskets are carefully woven. In Table 1 (p. 10) we have summarized data derived from measurements, together with analytical comments. Below we present some observations on individual specimens. In these descriptions, the category "direction of work" is omitted since in all cases where observation was possible the direction left to right was indicated.

The rims of the baskets can, except in one specimen, be characterized only as self-rims, since the final or completion coils of most of the baskets are badly worn, or not even present in some cases. Specimen

39247* (pl. 1e, f) shows plain wrapping on its rim, alternating with the regular interlocking stitching of the body of the basket.

Techniques of splint insertion and termination appear to be constant in most of the specimens. In starting a new splint, this was evidently pulled through the foundation until just enough of the fag end remained, subsequently to be placed alongside the foundation and covered by about 5 stitches of the now moving splint. The moving end of the splint was in some cases simply tucked back under the already executed splint, or was placed parallel along the foundation and covered or secured with about 5 stitches of the newly inserted splint. Although most of these insertions or terminations are easily noted in the crude specimens, and seem to occur at random on either side of the basket, it is noteworthy that in the one complete and finely made small basket (39250; pl. 2e, f) the fag ends are quite evident on the outside or working surface of the basket.

Materials of all the storage baskets are grass (Muhlenbergia [Epicampes] rigens), used as foundation bundles or rods, and rush (Juncus sp.), used as the stitching material (splints). In the four remaining baskets, E. rigens appears to have been used as the foundation of all except the small bowl (39250) which has part of its foundation of grass and part of rush (3 rods). On both the decorated bowl (39246) and its counterpart in form (39247) sumac (Rhus laurina ?) is employed as splint material.

Storage basket no. 39240 (pl. 1a, b, d; see also Mason:1904, pl. 202, lower):— This is a conically-shaped specimen which was apparently provided with a closely fitting cover. The latter, we judge, was originally the bottom of another basket. It is in a semicrushed state and, in addition to asphalt covering both sides (with a mixture of what seems to be dust and food remains, perhaps acorn meal) and adhering to the inside surface, it has several large repair or reinforcing splints of Juncus covering from 2 to 8 coils. This cover measures about 32 cm. in diameter and is 3.5 cm. deep. Its flat part and its wall or "rising" portion show two different kinds of stitching, as follows:

	Flat	Wall
Stitches per 10 cm.	30	46
Coils per 10 cm.	22	32

* All numbers shown are Peabody Museum numbers.

These figures are given here to emphasize one of the salient features of the basketry in the Bowers collection, that is, the patches and "composite" nature of many of the specimens. We incline to the assumption that the storage baskets were looked upon as crude but serviceable pieces, used over a period of years for a specific purpose, in much the same manner that individuals in modern civilizations would retain a battered storage trunk, adding reinforcement or sealing where needed, and not replacing it with a new trunk for reasons of economy.

The basket proper is divided into three sections, designated as follows (see table 1): a, bottom, including 9 cm. of total depth of basket; b, center, 23 cm. of depth; and c, top, 2.5 cm. of depth. In Plate 1a, the top section, c, is hidden by the separate cover of the basket. The top and bottom sections are of the same coarse coiling while the center section is of relatively fine coiling. It seems clear that this finer center section was originally part of another basket, made in the conventional way, but, having lost its bottom, possibly by being burnt, it was adapted as a storage basket by simply having added to its wider diameter the crude coiling that was to form the new bottom of the storage basket. In support of this idea is the observation that where the coiling of this lower section reaches the part where incurving occurs, it continues on, in coils of ever-decreasing size, until the center of the bottom is reached. No starting knot is found at this point. The technique of incoiling, as we term it here, is easily recognizable when we observe the position of the point of insertion of the splint with regard to the coils and the manner of the occasional splitting of a stitch. An example of this technique is shown in Plate 3c.

Careful examination of the tray-like specimen illustrated in Plate 3e shows that the grass foundation bundles and occasional stitches are split on their under sides, opposite to the side they would be split in working out from the center of a basket. Evidently this method was used predominantly in patching large baskets in the Santa Barbara region. An archaeological specimen in the Lowie Museum of Anthropology of the University of California, Berkeley, (1-14498), listed as being recovered from a cave in the Cuyama Mountains, is a large, twined water jug (illustrated in Kroeber 1925, pl. 53d) with a coiled bottom. This bottom is in the form of a large patch, with the first (and largest) coil evidently applied to the twined lower portion of the jug, and successive (and smaller) coils working toward the center of the new bottom.

About 5 courses from the top edge of the center portion of the basket is what appears to be an encircling reinforcement. This is composed of the same material (Juncus) as the heavy splints of the basket. It extends over from 2 to 6 coiling courses. At irregular intervals the

essentially horizontal reinforcement (that running parallel to the course of the coiling) gives way to a vertical herringbone pattern of reinforcement, and asphalt is applied over the entire addition.

Storage basket no. 39241 (pl. 3d):— This specimen is similar in workmanship to that described above (39240) and, like the latter, is composed of three separate fragments, with the center piece (22 cm. of total depth) of finer coiling than either the top or bottom sections (6 and 12 cm. respectively of total depth). The top fragment is attached to the center one by a separate splint with coarse stitching, while the bottom fragment is attached to the center merely by a continuation of the finer stitching of the lower course of the center to the bottom section. In Table 1, a, b, and c, refer to bottom, center, and top, in that order.

The patch on this basket is composed of 9 courses of the same type of foundation as that found in the upper and lower parts of the basket. These were added in hurriedly and irregularly, and the fag ends of some of the splints can be seen tucked under about 3 stitches along the foundation.

A circular, flat tray-like specimen (pl. 3f, 4a) accompanying this storage basket in the collection probably served as its cover. It is 30 cm. in diameter, and has approximately the same construction as the lower part of the basket proper. This specimen probably once served as the bottom of another basket, perhaps a food basket since one side is freely covered with asphalt while the other has what seems to be a mixture of grit and acorn meal (?) thoroughly embedded in its coils. There is no starting knot apparent in the center of this specimen, and the points of insertion of the splints again indicate that we are dealing with an incoiled specimen.

Two other flat, circular specimens in the collection, one unnumbered (pl. 3e) and the other numbered 39249 (pl. 4b) could also have been used as covers for the storage basket (39241), and are therefore described here. Specimen 39249 is a fragment 22 cm. in diameter, of similar material to the preceding specimen but more crude in construction (9 coils and 10 stitches per 10 cm.) and with occasional double and split stitches. This fragment has a starting knot in its center, and appears to have been coiled in the conventional manner—from the center outwards.

The unnumbered specimen illustrated in Plate 3e is the best example of the incoiling technique in the collection. It is 24 cm. in diameter, with 17 coils and 26 stitches per 10 cm. The material and techniques used here are the same as in preceding specimens, except that this specimen shows slightly closer coiling and also has a few interlocking stitches near its outer edge.

Storage baskets nos. 39242, 39243, 39244 (pls. 1c, 3a, b, c; see also illustration of 39242 in Mason 1904, pl. 202 upper):— These three specimens, unlike those previously described, are complete; they are not made up of fragments which have been added to, presumably after being damaged. All have asphaltum on their outer surfaces, especially on the lower portions. Specimen 39244 has asphaltum on its inside also; the other two baskets are clean inside except for their bottoms, which are partly covered with an agglomerate substance perhaps identifiable as acorn mush mixed with fine sand or silt. The starts of these two baskets are slightly reinforced by the sewing of a few stitches of grass at their bottom centers. The start of specimen 39244 is obscured by the asphaltum.

The rims of these baskets, except that of specimen 39242 which is missing but which was probably the same as the others, are of the type called self rims, as stated above. The last coil of the basket is therefore much like the preceding coil in structure, except that the grass foundation bundle is thinned down near its end. The moving end of the last splint was secured simply by running it back under 5 or 6 stitches and then passing it through the foundation itself.

Decorated basket no. 39245 (pl. 2c, d):— This specimen may be described as a deep, open dish. It is the only decorated specimen in the collection. The bottom of the basket is missing and its rim is broken; hence there are certain features about its construction which cannot be determined. This basket is of finer manufacture than the storage baskets, as will be seen from the data in Table 1. Also, its splint material (sumac) is different from the Juncus stitching of the latter. The decoration consists of twenty-one separate "block" or "step" designs completely encircling the basket. The individual design elements run diagonally from top to bottom, and are of 3 steps each, with the bottom step obscured, possibly by excessive handling when the basket was in use. We have examined ethnographic Chumash specimens in the Lowie Museum of Anthropology at Berkeley and have found no designs which exactly match this one, although the general step-design is common among Chumash baskets (cf. Kroeber 1922).

The decorated splints (dyed black) and the undyed splints were evidently carried along on the same coil where indicated. In the 2 stitches of the vertical "risers" of the step design, however, the dyed splint was inserted for these 2 stitches only and was discontinued until another vertical line pattern was reached, when another short piece was inserted.

This specimen is one of those illustrated by Mason (1904, pl. 201, upper). Decoration of the specimen is just barely discernible in Mason's

reproduction on the outside of the basket. Actually, the inside of the basket shows the decoration to best advantage.

Straight-sided, deep dish type basket no. 39246 (pl. 2a, b; see also Mason 1904, pl. 201 lower):— The largest intact part of this fragmentary specimen, comprising the sides and upper rim (a in table 1), resembles the decorated specimen (39245) in shape. Other details of the two baskets do not correspond, for example, in material of manufacture and lack of decoration of basket 39246. When received at the Peabody Museum, the inside of the specimen was covered with a heavy coating of asphalt (Mason 1904:487) and other material; hence it could not be adequately described. In its present partly-cleaned state, description suffers because of the fragmentary nature (i.e. the loose fastening together) of its three component parts.

Shallow tray or plaque no. 39247 (pl. 1e, f):— This basket consists of two separate fragments, each of slightly different construction. The larger part (a in table 1) shows a slight concavity which may be referred to as the inside of the specimen. However, the inside of the tray was covered with asphalt while the outside was free of this substance. The only new feature encountered in this basket is the structure of the rim, which is a modified self-rim, being composed of alternate wrapping and interlocking stitches. The rim thus appears to have twice as many stitches per 10 cm. as the body of the basket.

The small section of the basket which may once have been its center has varying amounts of asphalt on both sides; in addition, one side shows food remains.

Small, globe-shaped basket no. 39250 (pl. 2e, f):— This is the best preserved specimen in the entire collection of basketry from Bowers Cave. The point of change in structure of the foundation from grass bundle to rods can be plainly seen in Plate 2e, about 4 coiling courses from the bottom. When the rim of the basket was reached by the maker, the grass bundle foundation was again utilized. Double stitching occurs here and there throughout the rod-foundation part of the basket (b in table 1), especially at the beginning near the lower one-third of the specimen.

Discussion. We have already stated our belief that the specimens from Bowers Cave are more likely to have been used by the late prehistoric or early historic Chumash rather than the Alliklik. Comparisons of the basketry with other specimens that have been found in the Chumash area support this idea. First of all, specimens in the Lowie Museum of Anthro-

TABLE 1
Summary of Basketry Data

Peabody Museum No.	Max. (cm.) Dimensions		Coiling Technique	Coils per 10 cm.	Stitches per 10 cm.	Illus. Plate	
	Depth	Diam.					
39240	35	53	Single grass bundle foundation split by noninterlocking stitches	<u>a</u>	10	16	1a, b
				<u>b</u>	26	44	
				<u>c</u>	10	16	
39241	44	45	Ditto	<u>a</u>	11	13	3d
				<u>b</u>	27	40	
				<u>c</u>	11	22	
39242	25	43	Ditto	11	24-26	1c	
39243	29	53	Ditto	9-10	22	3a, b	
39244	40	46	Ditto	11	24	3c	
39245	11	37	3-rod triangular, top rod split by noninterlocking stitches	30	72	2c, d	
39246	11	36	a. Single grass bundle foundation split by noninterlocking stitches	30	80	2a, b	
			b. 3-rod triangular, top rod split by noninterlocking stitches	29	70		
			c. Same as a.	28	52		
39247	--	42	a. Single grass bundle foundation split by interlocking stitches	21	20	1e, f	
		14	b. Same as a, but with noninterlocking stitches	35	65		
39250	7.2	10.3	a. Single grass bundle foundation split by noninterlocking stitches	30	40	2e, f	
			b. 3-rod triangular, top rod split by noninterlocking stitches				

pology, listed as having been found in a cave in the Cuyama Mountains (Kroeber 1925, pls. 53, 54), show coiling with grass bundle foundation which is almost the exact duplicate of that in the storage baskets from the Bowers collection. M. R. Harrington (1942:141) illustrates similar coiled basketry discovered in a cave near Sespe, which he refers to as the site of a former Chumash village. The Sespe specimen also shows several repairs or additions which were executed in a manner resembling that used on the Bowers Cave storage baskets.

The baskets described by Heye (1926:193-198) were also recovered from a cave in what was probably Chumash territory, El Blanco canyon in the Sespe Mountains. Seven archaic baskets were found, and again the crude coiling technique of the Bowers Cave specimens is represented, for example, in a large storage basket (*ibid.*, fig. 66). In another, decorated, specimen (*ibid.*, fig. 67), the block-step design appears. Although this is only roughly equatable with the design on the one decorated specimen from Bowers Cave, the identification of the motif itself is suggestive of relationship.

Two Canaliño or late prehistoric Chumash coiled baskets, reported by Rogers (1929:70) as being recovered from a rock shelter, appear also to be similar to some of the Bowers Cave baskets. Both of Rogers' specimens are decorated, one with the block-step design represented by parallel diagonal elements, the other with a more complicated design which cannot properly be called block-step and which, furthermore, is not characterized by parallel diagonals.

Recently Kowta and Hurst (1960) have reviewed the subject of coiled basketry in southern California. Their report refers to the published material cited above, plus the available material on basketry from Bowers Cave (Mason 1904), and adds descriptions of six fragments of single coarse-grass-bundle foundation coiled basketry, each fragment showing left to right direction of work. This basketry also was recovered from a dry deposit—the Triunfo Rockshelter in the historic territory of the Ventureño Chumash.

Kowta and Hurst (1960:203) note that coiling on a foundation of a bundle of grass is of wide distribution in California; Chumash, Coast Salinan, Yokuts, Mono, and some Miwok are cited. To this list may be added the Cahuilla (Schumacher 1880). Kowta and Hurst (1960:205) note that this kind of coiling may "signify a trend diagnostic of a temporal factor" so far as the relative use of the 3-rod foundation is concerned.

Kroeber's statement (1925:560) that the historic Chumash substituted the 3-rod for the grass bundle foundation characteristic of the Shoshoneans of southern California may indicate that the grass bundle foundation, being much more widespread, was the earlier of the two types. However, since Bowers Cave offers evidence of both types of foundation, our opinion is that no indication of a temporal difference is to be inferred on the basis of a comparison of these two traits in the Bowers Cave basketry.

There is certainly no doubt that the coarse coiling technique has a wide distribution in the American Southwest and southern California, and there is evidence that baskets employing split grass bundle foundations were also used in these regions. Haury (1934:76) reported these grass bundle foundations from a ruin in Arizona probably dating from Pueblo III times and notes that this kind of foundation occurs in recent Pima and Papago basketry.

Putnam (1879:243) also describes basketry fragments discovered in an archaeological context on Santa Catalina Island. Evidently the single grass bundle foundation again is represented, and again a parallel is drawn between the archaeological specimens and those of the "present Indians of some parts of California."

The application of melted asphalt to basketry, either for sealing or repair purposes, may have been a widespread trait in California, especially among coastal groups where asphalt was readily available (Heizer 1940). The use of pebbles for lining baskets with asphalt is attested by both the early and late archaeological periods known in the Chumash region (Olson 1930:7); hence the presence of asphalt on the large storage baskets from Bowers Cave is not unexpected.

We have noted that several of the Bowers Cave baskets must have had lids. This may represent a late prehistoric or an early historic trait, since J. P. Harrington (1942:23) was unable to find any modern Chumash who reported lids used for baskets in aboriginal times. Kroeber (1922:178) states that it is uncertain whether lids were made in historic times for native use or only on baskets made for sale to Europeans. Until provably pre-Spanish period baskets with lids are found archaeologically, there will be no means of settling the question of whether lids are prehistoric or not.

In summary, we can only reiterate that all of the basketry from Bowers Cave can easily fit into a Chumash context. Kroeber's (1922:177) list of distinctions between (prehistoric) Chumash and (historic) Mission baskets, and between the Chumash and surrounding groups such as the

Fernandeño and Gabrielino, would not seem to provide any basis for setting apart the Bowers Cave specimens from the general Chumash type. Even if there were no other chronological indications present at Bowers Cave, we would hazard the guess that our specimens are not very much older than the earliest historic Chumash baskets heretofore known—that they were manufactured by the ancestors of the Chumash probably not more than fifty years before effective white contact around 1770 A.D.

Feather Bands

In the relatively meager literature on feather bands, the designation "head bands" is usually applied, although it is known that in historic times feather bands were used by the Chumash for other purposes. J. P. Harrington (1942:17), for example, lists, besides use as bands worn on the forehead, down the back, and as a bandolier, feather bands hung on poles as banners. For southern California in general, Hewes (1952:151) states that among the Luiseño, flicker quill bands "poorly trimmed and of 'darker feathers' were used to decorate outdoor dance enclosures for toloache or jimsonweed initiation rites, but were not worn as part of the dance costume. The Mountain Cahuilla and Cupeño did the same. Serrano did employ them as veritable headbands as well as for belts and bandoliers."

Of the 33 specimens in the Bowers collection (selected examples are illustrated in pl. 5a, b), 15 are obviously complete. Of these, 9 are between 66 and 99 cm. long, 5 are between 104 and 129 cm., and 1 is 162 cm. long. Of the 18 incomplete specimens, only 2 evidently were not usable fragments (47 and 59 cm. respectively in length). The remainder may be specimens which lack but a few centimeters of their original length; 11 are between 61 and 98 cm. long, 5 are over 100 cm., with the longest being 130 cm. We have quoted these figures in order to indicate that the specimens could have served any of the purposes indicated by Harrington or Hewes. Presumably they would not all have been used as head bands, for in this case a more nearly constant length would have been observed. Furthermore, the majority of the complete specimens lack substantial tie strings at their ends, which would ordinarily be used if the specimens were forehead bands. Obviously, there are optimum lengths for feather bands, depending upon their use. Merriam (1955, pls. 12, 13) illustrates ethnographic Pomo use of feather bands, showing variant lengths of forehead bands and those which hang down the back of the wearer. The lengths of the forehead bands are estimated at about 60 cm., while those extending from about the neck to below the wearer's knees are about 120 cm. long.

If the function of the bands varied from region to region in ethnographic California, at least it may be said that they were used most often

in formal ceremonies, although Hewes (1952) states that they were used "in the western Great Basin in what seems to be a fairly modern, social rather than religious dance." In any case, the details of construction vary considerably, especially between central and southern California. According to Hewes, "Costanoans, Salinans, Chumash and Gabrielino apparently made flicker quill headbands resembling existing Luiseño museum specimens—that is, with continuous, poorly trimmed tufts instead of neatly trimmed tufts and tuftless quills." Kroeber (1925:665) has stated that the yellowhammer forehead band typical of central California is not found in most of the southern parts of the state. In an unpublished manuscript on feather headbands, Kroeber (n.d.) observes that, while in northern and central California quills are of the yellowhammer or red-shafted flicker, in southern California feathers from other birds are frequently used.

The Bowers Cave specimens certainly bear out Kroeber's observation, as here were found feathers from several avian species.

In the table that follows it will be noted that no tabulation of the presence of wing or tail feathers has been made from the Bowers Cave feather bands. The reason for this is that although the majority of the feathers apparently are wing feathers, there is a mixture in some of the bands. Also, since some of the vanes have either been trimmed at their tips or, in some cases, destroyed by insects, it is often difficult to distinguish wing from tail feathers used in construction of the bands. Sometimes the relative curvature of the quill may be used to make such distinctions, and, in the case of the flicker, there is a color difference between the quills from the wing (red) and those from the tail (red and some black). Harwell (1939) presents data of interest in a description of a flicker feather headband bought from an Indian in Yosemite National Park, who had purchased it in turn from another Indian:

"This dance ornament is twenty-six inches [66 cm.] long and six and one-half inches [16.5 cm.] wide. Eighty-four tail feathers and three hundred and twenty-eight wing feathers of the Red Shafted Flicker are used in its construction. There are ten feathers in each flicker's tail, only six of which are usable in this type of band because the two outer feathers are one-sided and the two central ones are black-shafted which would spoil the color pattern desired. Each flicker wing contains seventeen primary feathers, the outer one of which is discarded because too short, so the tails of fourteen of these woodpeckers had to be secured and the wings of eleven for this one headband."

TABLE 2
Feathers Used in Bands

Quills from	No. of Bands on Which Feathers Occur	No. of Complete Bands
Red-shafted flicker (<u>Colaptes cafer</u>)	16	4
Crow (<u>Corvus brachyrhynchos</u>)	12	2
Brown pelican (<u>Pelecanus occidentalis</u>)	10	5
Condor (<u>Gymnogyps californianus</u>)	10	2
Red-shouldered hawk (<u>Buteo lineatus</u>)	8	5
Snowy egret (<u>Egretta thule</u>)	6	*
Bald eagle (<u>Haliaeetus leucocephalus</u>)	3	*
Steller's jay (<u>Cyanocitta stelleri</u>)	2	1
California bluejay (<u>Aphelocoma californica</u>)	1	-
Band-tailed pigeon) (<u>Columba fasciata</u> ?))	1	-
Grouse) (<u>Dendragapus</u> sp. ?))		

* Occur infrequently in bands

The lengths of the Bowers Cave bands have already been given. The widths of these 33 bands range from 12 to 29 cm., with concentrations at

15 cm. (4 specimens), 18 cm. (6 specimens), and 20 cm. (4 specimens). This variation reflects the number of species of bird in the headband assemblage at Bowers Cave. Specimens measured at the Peabody Museum showed about 40 feathers per 10 cm. in the case of the pelican, and 64 feathers per 10 cm. in the case of the (smaller) California jay. The flicker feather band from Yosemite National Park referred to above (Harwell 1939), in these terms, had about 61 feathers per 10 cm.

A nearly constant feature of the Bowers Cave specimens lies in their method of alternating the direction of the quills and in the number of courses of cordage used in binding the feathers together. In all but one instance, the quills, some of them having been cut off at their tips, were pierced and then sewn to adjacent quills with tips pointing in opposite directions. In one specimen only, the feathers were laid in groups of two, side by side, in alternate directions. In all but one instance, each quill is pierced in two places, so that the binding cordage is composed of two parallel courses running through the quills at points near their tips and near where the vanes extend out from them. Evidently a single length of cordage was used in most cases, as in the complete specimens there is a tight loop at one end; at the other end the free ends of the cordage are either dangling or secured by knots.

The cordage used in all cases is of dogbane (Apocynum cannabinum) fibers, and is of 2-ply S-twist. Twenty-two of the band specimens have cordage which is 1 mm. in diameter. Of the remaining 11 specimens, one is 0.9 mm. and 10 range from 1.2 to 1.8 mm. The small average thickness is explained by the nature of function of the cordage, which is more like that of fine thread than of banding string.

Although the cordage is consistently of S-twist, in two specimens the loose ends are drawn together to form a single Z-twist piece consisting of the two 2-ply elements. Spare cordage at the ends of the bands is minimal, although in two specimens there are lengths of 50 and 100 mm. extending beyond the last course of feathers. Some of the cordage lengths hang free, while others are knotted together in a casual way. Knots represented are overhand, square, granny, two half hitches, and a reeving line bend. Finally, in 6 of the bands, there is terminal reinforcement where the two cordage ends are knotted, then twined or woven back over varying courses or warps of quills. This back-weaving technique is haphazard, however, and differing numbers of quills or warps (from 2 to 8) are included in separate passings of the cordage wefts.

After these descriptions, there is little left to say about relationships of these feather specimens to like objects from other parts of

California or western North America. It appears, in summary, that we are dealing with typical "Southern California" feather bands of the ethnographic period. There is little likelihood that we shall ever be able to identify exactly the Bowers Cave specimens as of Chumash or Alliklik derivation.

Bone Whistles

Forty-five bone whistles (each numbered 39259), all of approximately the same size and varying but slightly in details of manufacture, were found in Bowers Cave (pl. 6a, b). All of the bones are tibiae, 24 from the right leg and 21 from the left leg of the California mule deer (Odocoileus hemionus). The relatively unvarying sizes of the specimens suggest that they may have been made according to a set pattern and that each pair (right and left) came from the same animal. All of the specimens appear to have holes punched or gouged in them on the smooth, concave lateral wall of bone, just below the proximal epiphyses. It is suggested that these holes were made for the purpose of extracting the marrow and cancellous bone from the interior, after the distal end of the bone had been sawed or broken off. Although the shell or bone covering of these holes is missing on 9 specimens, it is evident that the holes had once been covered. Traces of the asphalt used for applying or sealing the shell or bone discs still may be seen around their edges. The exposed holes are from 10 to 15 mm. in diameter (one odd specimen has an elongated hole 29 mm. in largest measurement) and were all obviously punched out roughly.

TABLE 3

Approximate Measurements of 45 Bone Whistles

(cm.)	Min.	Max.	Aver.	(mm.)	Average
Length	23.0	27.0	24.7	Outside diam. of shaft between hole and cut end	17 x 22
Diam. of whistle hole	0.7	1.1	0.9	Inside diam. of shaft at cut end	11 x 15
Distance center of whistle hole from end of specimen	2.2	5.6	4.0	Diam. of hole	9.3
				Opening allowed by asphalt stop in hole	4.3

The mouthpiece ends of the whistles have all been ground off squarely and their edges polished, probably both by design and use. The whistle holes on the sides were evidently made by sawing across the bone, and then drilling and polishing the resultant aperture into a subcircular form. All the specimens have asphalt hole plugs, or traces of these, placed directly opposite the opening simply as small blobs or buttons.*

In general, there is little difference in specimens made from the right or left tibia. The data in Table 4 apply to the whistles as a group, and the differences in number of right or left specimens found are carried through about proportionally in the matter of occurrences of elements. Observation of 23 of the 45 specimens, where identification of the lateral hole coverings was possible (i.e. where asphaltum did not obliterate the discs), however, disclosed that there were differences in the material used for covering the holes. Thus, only 4 of the left tibiae have Haliotis discs as against 13 covering the holes of the right tibiae. There is one disc (H. cracherodi) in the collection which has been detached from the bone; all of the attached discs have their nacreous sides exposed, and thus do not effectively allow species identification. Only left tibiae showed mussel (Mytilus sp.) shell or bone discs covering the holes. This particular set of occurrences could be entirely accidental, or it is possible that here is a weak reflection of some sort of ceremonial distinction between slightly different natural objects.

Several of the specimens are distinctly polished near their cut ends, as if from having been held in the hands. There are traces on some of random incisions on the surface, but these also may be fortuitous and have nothing to do with decoration

The Juncus wrappings (table 4) that appear to have been part of the decoration of practically all of the specimens are closely spaced (ca. 28 coils per 10 cm.) and secured in place by their own tension and by having their ends tucked under one or two wrapping courses at each end. In addition, asphalt is smeared over parts of the wrapping and this serves to hold it in place. On two specimens only (pl. 6a, b) the asphalt is applied in a series of chevrons (5 on each whistle), which

*Izikowitz (1935) refers to the Bowers Cave type of instrument as a "duct flute without stop." The asphalt pieces in his terminology, accordingly, are "deflectors." Kaudern (1940:49) doubts Izikowitz' interpretation of the direction of air through the lateral hole or sound orifice; hence even use of the term "deflector" may be questioned.

TABLE 4
Selected Data on 45 Bone Whistles

Element	Occurs on (No. of Specimens)
Applied asphaltum	45
<u>Juncus</u> wrapping	27
Trace of <u>Juncus</u> wrapping	13
Abalone (<u>H. cracherodi</u> ?) covering lateral hole	17
Other shell (e.g. mussel) covering lateral hole	4
Bone covering lateral hole	2
Uncovered lateral hole (disc missing)	9
<u>Olivella</u> beads applied in asphalt	4

surely must represent additional attempts at decoration. Evidently, the Olivella beads deeply embedded in the asphalt of 4 specimens represent another slight effort at decoration of the whistles. These beads are either of Type Glc or X3B1 described and illustrated by Gifford (1947: 69, 98). Exact identification is not possible without extracting the beads from their asphalt matrix. In any case, it appears that there is no chronologically significant difference between the two types of beads; both were used in the ethnographic period in southern California (ibid., p. 35).

Discussion. The whistles from Bowers Cave are closely similar in form to those designated as Type FF1C by Gifford (1940:181, 230) and those in the archaeological collections of the University of California. All of the 10 specimens described by Gifford are from the Santa Barbara Channel region, and appear to have been associated with deposits which have been identified as occurring late in the prehistoric period. On 6 of Gifford's (op. cit., p. 181) 10 specimens "a piece of Haliotis shell is attached with asphaltum on the concave surface near the proximal end; another 4 specimens have asphaltum at this end and probably once had Haliotis attached. Most have asphaltum over greater part of surface but give no evidence of what was attached."

Although there is no positive indication that the Bowers Cave specimens were ever used as double whistles, a note by F. W. Putnam (Abbott 1879a:237) suggests that both the asphalt and the Juncus wrapping on the Bowers Cave specimens actually may have served as binding agents rather than as purely decorative features, as we have implied. We quote at length from Putnam's description since the similarity of the whistles, except for the idea of use of two together, is so striking:

"From the graves at the isthmus, on the island of Santa Catalina, Mr. Schumacher obtained eight whistles of a different form from any found during the early explorations, and from a grave on the island of San Clemente he secured another of the same kind. These instruments are made from the tibiae of the deer, two of the bones being required to form the perfect instrument. As shown in Fig. 120, the two bones were placed side by side and held in position by a large mass of asphaltum at one end, and by carefully winding thin strips of bark around the bones. [The specimens figured by Putnam are almost exactly like the Bowers Cave whistles shown herein in Plate 6a, b.] This lashing of bark was covered by a light coating of asphaltum, and extended nearly the whole length of the instrument. Inside the tube, formed by scraping out the cellular portion of the bone, and opposite the lateral opening a mass of asphaltum has been placed in such a position and of such size as to leave but a small space above or below the lateral opening."

Apart from these definite occurrences of deer tibia whistles, several other perhaps more questionable specimens are known from private collections. Such specimens as we have seen appear remarkably more elaborate than the Bowers Cave whistles, often being covered with shell beads inlaid in a coating of asphaltum on the bone. One such example, illustrated in Natural History (Anon., 1960:26), is described as a "heavily inlaid flute of steatite [sic]—precontact work of California's Chumash tribe, may mimic bird's head." In this case, the relatively large disc of Haliotis near the proximal end of the tibia is no doubt thought to represent the large eye of a bird (cf. specimens in pl. 6 herein looked at as if lying on side).

Without considering the latter specimens, or others of the same genre which in our opinion may be forgeries, we can utilize the well documented occurrences to confirm the idea that the Bowers Cave examples are part of a definite Southern Coast (Chumash) cultural complex, dating from late prehistoric or early historic times.

Of significant relevance to the present discussion of whistles

made of tibiae of deer are three ethnographic specimens now in the Musée de l'Homme, Paris, which were collected eighty years ago by Leon de Cessac. These three specimens were formerly numbered 84.91.3024, 84.91.3025, and 84.91.3026. New numbers have been assigned to these specimens, their present designations being 82.30.95, 82.30.96, and 82.30.97. These whistles were secured by de Cessac by purchase, probably at Santa Ynez, and are therefore presumably of Chumash origin. They are much used, and may in fact date from pre-Spanish times, having been preserved as heirlooms, or possibly they were made during the mission period and were still extant in 1880 when they were secured by de Cessac.

Specimen 82.30.97 (pl. 7a, b) is 26.5 cm. long, has an asphaltum plug (or "deflector," see fn. p. 18), and a hole in the shaft 9 mm. in diameter. The shaft is pretty well covered with a layer of black asphalt in which are embedded small, broken bits of abalone shell. A hole has been broken through the wall of the bone just below the proximal articulation, and this opening is covered with a roughly regular piece of abalone shell embedded in asphalt mastic.

Specimen 82.30.96 (pl. 7c, d) is 27.3 cm. long. The asphalt plug is missing, having presumably become dislodged and lost. Remnants of asphalt on the shaft of the whistle bear impressions of a wrapping of some fiber 3 to 4 mm. wide, apparently of the same material which is preserved on the shaft of the third whistle which is described below. The punched hole in the articulated end is now open, but was once covered with a piece of abalone shell as indicated by a small remaining fragment embedded in asphalt. Not far below the hole, punched into the wall of the proximal articulated end, is a band of asphaltum in which are embedded a number of rough bits of white clamshell. It is presumed that the specimen was originally wrapped over the entire medial surface of the shaft up to the point of the exposed asphaltum band containing ornamental clamshell bits, and that the wrapping was continued from the edge of this band up to the point where the abalone covered over the hole punched in the side wall cover.

The third specimen, 82.30.95 (pl. 7e, f), is complete. It is darkened and well polished from much use and handling, and bears small, adherent bits of sinew. It is 26.5 cm. long, has a hole 5 mm. in diameter, and an asphalt plug. The spiral wrapping of some unidentified material resembling bamboo, or perhaps the split surface of some shrub, is 2.5 to 3.0 mm. wide, and extends from the edge of the whistle hole in the side of the shaft for a distance of 11.2 cm. The vegetal wrapping is held in place at the upper (proximal) end with a band of asphaltum.

These specimens are actually very similar to archaeological examples from the Santa Barbara area (some of which show evidence of a vegetal wrapping) as well as to those from Bowers Cave. No more convincing evidence of the late chronological placement of these whistles can be desired.

Bullroarers

Four of the Bowers Cave bullroarers have already been described by Heizer (1960). Twelve of the bullroarers recovered are complete, and 2 are fragmentary. All specimens bear one number (39260) in the Peabody Museum catalogue. Included among the specimens illustrated here (pl. 4c, d) are several of those shown in Heizer (op. cit., pl. 1a-d). To avoid confusion, however, data given below, and especially in Table 5, will refer to the entire lot of bullroarers without regard to previously published descriptions.

There is little doubt but that we are dealing with true bullroarers in these wooden specimens from Bowers Cave. All except one midsection of a specimen may be characterized as thin staves with holes near their ends. The wood from which they are made appears to be the same for all specimens, that is, wood from a coniferous tree. One specimen, thought to be representative of the lot, was identified by the University of California Herbarium as Douglas fir or a closely related Pseudotsuga species.

The holes are mostly biconically drilled, although 9 bullroarers of the 13 which contain end holes evidently were roughly bored. The surfaces of the remaining 4 holes are smooth, perhaps having become this way through excessive use. All except 2 specimens have rounded holes—the exceptions have slitlike holes, one transverse and one longitudinal.

Thirteen of the specimens have lateral notches cut in both sides. The purpose of these notches was probably decorative, although they may somehow affect the "whirring" sound produced by the bullroarers. Notched examples have not been reported among early ethnographic specimens in California. However, Kelley (1936:138) notes for the Chemehuevi (Southern Paiute) "bullroarers of mountain sheep horn which were grooved or notched with a stone knife—these objects were used for rainmaking."

Some of the bullroarers are decorated with paint. In Plate 4c (two specimens on left) it may be seen that the bullroarers are smeared or smudged with the same kind of mixture of sand and organic substance (?) as was found on the walls of several of the baskets from the cave.

TABLE 5
Measurements of Bullroarers

	Minimum	Maximum	Average
Length (cm.)	24.0	35.0	30.5
Width (cm.)	2.6	5.1	3.4
Thickness (mm.)	4.5	9.0	6.4
Hole diameter (mm.)	3.0	7.0	4.6
Distance of hole from end (mm.)	12.0	27.0	18.4

The decoration consists of full staining with black (3 specimens) or red (1 specimen) pigment, or partial staining with a "chevron" or "track" design (3 examples). Of the latter, one specimen shows on one side but a faint outline of 8 chevrons pointing away from the perforation at one end of the bullroarer (pl. 4c, second from right). One other specimen also has a chevron design, but here the chevrons appear on both sides and are alternately colored black and red. The points of the chevrons face toward the hole (pl. 4d, second from left). The track design appears on but one side of one bullroarer. It is composed of a red stripe about 12 mm. wide running the length of the stave, supplemented by 16 "cross-pieces" in black paint on either side of this stripe (pl. 4d, center). On the reverse, the simple red stripe is repeated, without the cross-pieces.

On 2 specimens there remain evidences of cordage. One shows an extremely fragmentary piece, consisting of 2-ply, S-twist Apocynum cordage about 2.2 mm. in diameter and having a double overhand knot tied at the perforation of the stave. The specimen shown in Plate 4d, left, has a long (135 cm.), perhaps functional, piece of wrapped braid which is parted at the hole end, with the two elements then tied together in a granny knot to secure it to the bullroarer. Although the 5-strand braid is of Apocynum, the wrapping is of a different material, probably Xerophyllum tenax. X. tenax has a natural distribution which does not include the Santa Barbara region; hence, if used, it must have been secured by trade. J. P. Harrington (1942:25) notes denial of the practice of braiding among the aboriginal Chumash, and suggests that they learned the process during the Mission Period. This may seem peculiar in that braiding has been reported in other parts of California, for example, among the Western Mono (cf. Gifford 1932:28), and also the

braiding technique evidently has long been known in the Great Basin as well as in the American Southwest. Loud and Harrington (1929, pl. 37), for example, show braids ranging from 3 to 16 strands from Lovelock Cave, Nevada, while Haury (1934:85) describes braiding from a ruin in Arizona which probably dates from Pueblo III times.

Discussion. Heizer (1960) has described the distribution and function of bullroarers among recent California tribes and has summarized other occurrences of prehistoric specimens in the region of Santa Barbara. There is no question but that the Bowers Cave specimens can easily be considered as Chumash items.

Stone Clubs

Four perforated stone objects mounted on wooden handles were recovered from Bowers Cave. Of these, only three are available for our present study. These objects are numbered 39261, 39262, and 39264 at the Peabody Museum. Drawings of all three specimens are given in Henshaw (1887:29, 30), and specimens 39264 and 39261 are illustrated here in Plate 5c, d. Since the same three specimens which we have examined have been so well described by Henshaw (op. cit., 28-31), we shall give his verbatim presentation here, together with comments and minor additions which we have noted.

"Stones with handles:— In connection with the subject of ceremonial stones, attention may be drawn at this point to four unique specimens discovered by Dr. Stephen Bowers in a cave in the San Martin Mountains, Los Angeles County, California, and described in Pacific Science Monthly, June, 1885. They are unique because they are the only perforated stones thus far found in the United States which are attached to handles.

"These specimens have been added to the collection of the Peabody Museum, and three of them are now before me for examination, through the courtesy of Professor Putnam, who has kindly permitted them to be figured for use in the present paper.

"As the accompanying figures [see pl. 5c, d] afford an excellent idea of their peculiarities, a brief description will suffice. The disks are of a kind frequently found in California, and, in themselves, are not especially noteworthy. They are made of moderately hard stone, from $4\frac{1}{4}$ to $5\frac{1}{2}$ inches in diameter [see table 6]. The holes were probably made by first being pecked from either side and subsequently drilled, and, as is frequently the case, are made smaller at the center, presenting somewhat the shape of a double cone. All three of the stones retain plain traces

of paint markings, which, as will be seen in the illustrations, are disposed in regular patterns.

"It is to be noticed that the edges of the stones are smooth and show no evidences of abrasion by blows or other rough usage, a fact not at all agreeing with the idea that they served for hammers of any kind.

"The handles are from 15 to 18 inches long, and are made apparently of rather tough wood [Arctostaphylos sp.; manzanita?]. All three are natural branches, dressed only to the extent of removing the bark and paring off the twigs, so that the natural inequalities of the wood, the knots, &c. are plainly visible. They are smooth as though from the friction of much use. The handle of one [39261, pl. 5d] is marked transversely by a series of cuts, disposed for the most part in regular rows, and presenting the appearance of tallies.

"A most interesting feature of these specimens is the method by which the heads are fastened by the handles, which is done by asphaltum, a mineral which abounds in many localities of Southern California and was much used by Indians for fastening, mending, &c. The sticks are thrust through the stones so as to project slightly beyond, and as the holes are much larger at the circumference than at the center, the handles, if set at right angles to the stone, would bear only upon the center. Under the circumstances, it would perhaps be a rather nice matter to adjust and cement them at right angles; and either from accident or from design, they are set at an acute angle to the base of the stones, the angle being greater in the specimen shown in [pl. 5c] than in the others. The unoccupied space above and below the stones is packed with asphaltum, which in one specimen [pl. 5c] projects above the stone in a knot or button. The cement thus employed affords a fairly strong attachment, but one that apparently would not stand very rough usage. The strength of the attachments is a matter of some moment, since one of the uses which has been suggested for these implements is as clubs. To have secured a much stronger attachment it would only have been necessary to drill out the holes, so as to permit a larger surface for the handles to bear upon, which, too, would have permitted the handles to be set at right angles to the stones.

"In connection with their possible use as clubs, it should be mentioned that the handles are neither roughened nor knobbed for secure grasping, but, on the contrary, are perfectly smooth. The handle of [specimen 39262] is stouter than either of the others, being about an inch in diameter at its largest part, stout enough to serve as a club handle; but the handles of the other two are much smaller, being each

about one-half inch thick. So slender are they, and so heavily weighted, that it is evident they would be broken at a single hard blow. So similar, however, are the three in general form and features, that, notwithstanding the difference in the size of the handles, it cannot be doubted that they were designed to fulfill the same function, and that what one is all are.

"Ceremonial implements:— After careful consideration of these implements I am convinced that their peculiarities accord best with the idea that they were the property of medicine men or conjurers, probably used in dances or superstitious ceremonies, as rain making, curing the sick, &c., this being the alternative suggested by Dr. Bowers. Not only does the character of the implements themselves agree best with this idea, but it is borne out also by the rest of the cave contents. The rudely painted notched sticks [bullroarers], the feather headdresses, and the bone whistles are all strongly suggestive of 'medicine practices.' Notched sticks similar to the ones found in the cave by Dr. Bowers are used in certain sacrifices by the Navajo, as Dr. W. Matthews informs me, and also disks of stone; the latter, however, are not perforated. Moreover, I was informed by an Indian in Santa Barbara County that feather bands or gorgets, of which a specimen similar to those found in the cave was shown me, were worn by all their medicine men in their ceremonies, and that the feathers of the red-shafted flicker, which occur in the specimens found in the cave, were peculiarly efficacious in rain making. I was also told that bone whistles were used by the medicine men in their invocations. As already stated, therefore, a consideration of all the above facts justifies the conclusion, in my opinion, that the specimens in question, together with the rest of the contents of the cave, were the implements of trade of medicine men or the property of some religious order."

Table 6 below is a summary of the measurements not specifically mentioned by Henshaw.

Supplementary observations to those made by Henshaw are as follows:

Specimen 39261: Material, igneous rock; the stone head is set off 10 degrees from the right angle which would be formed by the handle and the transverse plane of the stone; the small, transverse cuts (tallies ?) mentioned by Henshaw are about 6 mm. long, spaced 5 cm. apart, and extend almost the total length of the haft; red ocher decoration now consists of 4 encircling bands about 8 mm. wide, 3 on the side of the stone and 1 on the distal end, concentric with the perforation; end of haft extends 17 mm. beyond the outer edge of central perforation.

TABLE 6
Measurements of Hafted Stones

Specimen No.	Outside Diam. of Stone (cm.)	Thickness of stone (cm.)	Diam. of Perforation (mm.)		Handle Length (cm.)	Handle Diam. (mm.)
			Outer	Inner		
39261	11.5	4.8	33.0	27.0	50.0	15.0
39262	9.7	4.9	35.0	16.0	45.0	14.0
39264	13.0	4.0	?	?	46.5	15.0

Specimen 39262: Stone of same material as 39261, and canting of head with relation to haft is also similar; heavy cordage is wrapped around haft on both sides of stone head and is smeared with asphaltum to act as reinforcement for attachment on haft; haft extends 11 mm. beyond distal side of stone; smears of red ocher and some kind of black dye are faintly present—there are also extremely faint traces of black-painted radial lines from outer edge of perforation on distal side of stone.

Specimen 39264: Stone head of hard, fine grained sandstone is doughnut-shaped in plan but lenticular in cross section; head canted more than in other 2 specimens (18 as against 10 degrees); perforation of stone is heavily smeared on both sides with asphaltum, making accurate measurement of hole diameter difficult (probably measurements of hole are about the same as those of other 2 specimens); handle extends 16 mm. beyond distal side of stone and is wrapped with Z-twist cordage about 2.5 mm. in diameter and impregnated with asphaltum; decoration consists of 15 small *Olivella* beads like those on the bone whistles (i.e. type Glc or X3B1 of Gifford 1947:69, 98), embedded at random in asphalt; faint traces of red ocher appear on the proximal side of the stone head—on the distal side are 13 radial lines, in red ocher, each about 10 cm. wide, extending from the central perforation to the outer edge of stone.

Speculations as to whether the hafted stones were used as digging stick weights, gaming implements, net weights, spindle whorls, or club heads (for warfare or ceremonial use) cannot be positively confirmed by the Bowers Cave specimens, although their presence with other probably ceremonial objects such as bullroarers would support Henshaw's idea that "ceremonial clubs" indeed are represented. The shafts are so slender and the weight of the discs so slight that serious consideration of their being weighted digging sticks is rejected. Since these specimens have

remained as unique since 1877, to our knowledge, there can be no meaningful discussion here of distributional or chronological comparisons.

Miscellaneous Specimens

Wooden "dagger" (pl. 4d, extreme right; 39266):— This object was evidently manufactured from the same kind of soft wood as the bullroarers; in fact it may originally have been intended as a bullroarer. It is 27.5 cm. long, 24 mm. wide, and 8 mm. thick. The wood is smoothed all over and one end of the specimen forms a definite point. The broad surface of the opposite end is thinned on one side so that a 22 mm. long section of the specimen is actually only 3 mm. thick. Cordage (2-ply, S-twist) about 1 mm. thick is wrapped around about half of the thinned end of the specimen and probably the putative handle as well, with asphaltum used to seal and cover the joint.

Wooden daggers or swords have been noted in prehistoric Chumash sites by Abbott and Putnam (1879:232). A wooden sword 47 cm. long, with abalone shell inlay in the handle, was recovered from a burial on Santa Cruz Island. Abbott and Putnam (op. cit., p. 231) point to the important use of asphaltum as a joining material on wooden objects, and state: "The early writers who have left us brief accounts of the weapons of the Californians have mentioned that they had swords made of bone and wood, and of these materials are several found in the graves, both by Dr. Yarrow's party on the mainland and by Mr. Schumacher and others on the islands."

Wooden "hook" (pl. 6c; 39265):— The wood from which this specimen was manufactured is oak (Quercus sp.). It is gnarled and the hook is not symmetrical in long section, that is, one side is actually almost flat while the other (illustrated) has two tapered surfaces, brought about by beveling of the head and by grooving and subsequent carving or abrading between the head and the shank of the hook. The specimen is 21.4 cm. long, 10.8 cm. wide at center, and 2.7 cm. thick.

The chief reason why this object, thought to be unique in the Southern Coastal region of California, has been classified as a hook is because it resembles in general shape the form of a modern metal hook. Although it would seem to be a functional object, it is conceivable that the hook also served a ceremonial purpose. If one views the specimen in the upside down position, it will be seen to bear a slight resemblance to the smaller steatite specimens which have been found in burial association in the Santa Barbara region. De Cessac (1882) considered such specimens to be bird effigies although it was not possible for him to determine from

native informants what species was represented. Abbott (1879b:214, 215), on the other hand, noted the resemblance of the steatite or serpentine objects from the same region to hooks: "That they are implements and not ornaments is apparent from signs of use which they all more or less exhibit." J. P. Harrington (1942:14) records the probable presence of these steatite "hooks" among some ethnographic Chumash groups.

If the wooden object from Bowers Cave were actually used as a hook, it appears to be best suited to a marine environment, that is, it is the kind of implement which one might expect to find among the seagoing Chumash rather than the landbound Alliklik. On the other hand, if it were a ceremonial piece, it would be at home equally well in either group.

Haliotis shell "cup" (pl. 4g; 39274):— This is a complete H. cracherodi shell, unmodified except for the addition of remnants of S-twist apocynum cordage running in and out of five of the siphonal openings. This was evidently done to seal the holes in order to allow use of the shell as a liquid container. Three remaining open holes on the outer portion of the hole series no longer contain this cordage sealing.

The prehistoric Chumash method of sealing Haliotis shells for use as containers evidently was to employ asphaltum as plugs for the holes (Gifford 1947:7). J. P. Harrington (1942:12) lists natural shells as common household implements (spoons) among the ethnographic Chumash.

Haliotis bead (pl. 4f; 39275):— Perhaps this shell specimen should be referred to as a "ring" rather than as a bead, although the distinction is admittedly arbitrary. Since both of its sides are highly polished, accurate species identification is not possible. The ring is slightly oblong, with outside diameters of 16 and 14 mm. It is about 2.5 mm. thick and evidently drilled or finished from one side only; the hole thus formed is also oblong, with diameters of 4.5 and 2 mm. A short length (5 cm.) of apocynum, in 3-strand simple braid about 3 cm. thick (cf. remarks concerning braiding in section titled "Bullroarers" above) still remains in the hole.

Gifford (1947:13) classifies such rings as type J2aIII. They occur in late prehistoric associations in the Chumash region, and the present specimen could easily have been a survival from this period.

Steatite arrow straightener (pl. 4e; 39273):— The one-piece arrow straightener is such a widespread element in southern California that lengthy descriptive and distributional data would be superfluous here. The single Bowers Cave specimen is fragmentary and seems rather out of place among most of the other specimens so far mentioned because

one cannot easily assign it a ceremonial function. On the basis of J. P. Harrington's (1942) reporting of the occurrence of 2- or 3-transverse groove arrow straighteners among the Chumash, and the fact that one of the remaining grooves in our fragment is deeper than the other (1.3 as against 4.0 mm.), we would surmise that the specimen was originally a 3-groove type, with the center groove deeper than those toward the ends of the specimen. If this is correct, the measurement of the reconstructed length would be 8.6 cm. The width is 4.5 cm. and the thickness 2.5 cm.; thus the specimen must have had a typical "loaf" shape before being broken. The material is steatite, with some chlorite inclusions. Decorative parallel striations appear on the top end of the fragment, and there is a crisscross pattern engraved in the space between the upper edges of the transverse grooves. On its sides are a few uneven striations. The grooves themselves are highly polished, while the end of the fragment is slightly polished and without striation.

Antler (elk ?) wedge or gouge (pl. 4h; 39267):— Four antler specimens were among the Bowers Cave artifacts. Three of these are barely worked, hence are not illustrated and do not require detailed description. One of the latter (39268) is 15 cm. long and appears to have been crudely chipped rather than ground along its side near one end. It is flattened rather than pointed at this (working) end. The other specimens in this category (39269, 39270) are simply antler tips, probably deer, which display but slight wear or polish on their ends. These tools may have been used in chipping or flaking stone, but whatever the case, they did not suffer much modification, either from design or usage.

The specimen illustrated in Plate 4h, on the other hand, had a certain amount of care expended in its manufacture. The tapered long section and slightly rounded end suggest a wedge. It is 11.5 cm. long and 33 mm. wide. A distinct polishing has taken place on about one-half its length on one side and on about 15 mm. near the tip on the other side, which mostly shows cancellous type tissue. The proximal end of the specimen has a square break which is not polished. At this end there is a wrapping (5 spirals) of Z-twist, 2-ply cordage 4.5 mm. thick. One end and a short length of the cordage have been covered by the spirals, and the other end terminates toward the tip end of the bone. The cordage is heavily impregnated with asphaltum which serves also to attach it to the bone. Probably the cordage was used as a sort of handle, but whether or not this was the case, we must again point to a specimen rarely encountered in a southern Californian archaeological context—what at least appears to be a hafted wedge.

J. P. Harrington (1942:13) cites the wide use of wedges of deer horn among the Chumash. As Bowers' account shows (Appendix A of this

paper), the antler pieces and abalone shell cup were found during excavation of the infilling of the cave and are therefore probably not associated with the basket cache itself.

SUMMARY

We have seen that most of the comparisons of the Bowers Cave material point to a Chumash origin, probably at a time not long after the first effects of contact with the Franciscan missionary fathers were felt, in the latter part of the eighteenth century. The lack of perfect correlation of the individual specimens with known ethnographic items may be attributed to the ceremonial or esoteric nature of the cached material. Nevertheless, such correlations as we do have, that is, in basketry, feather bands, and bone whistles, all suggest a specifically Chumash context.

Alternately, if we are dealing with the accouterments of a fairly widespread native religious cult in southern California, namely the Chinigchinich cult (Kroeber 1959), the specimens then could possibly be of an intertribal character. If this were so, it would not matter what the tribal identity of the original possessors may have been. The remote location of the cave in the territory of a little-known group like the Alliklik is probably only incidental. If the time of deposition of the cache suggested here is correct, we are entirely justified in looking upon these artifacts as the vestiges of a dying native religion, placed in the cave for safekeeping. It is not improbable that these specimens were also used as the outward symbols of the kind of Messianic movement which is known to have occurred among the Santa Barbara Indians in the first quarter of the nineteenth century (cf. Heizer 1941).

In 1824 there occurred a revolt apparently originating at Purisima Mission, but involving also Indians attached to other mission establishments in the Santa Barbara area. The details of the revolt and fighting between the mission troops and the Indians, and the flight of some numbers of Indians to Tulares (southern San Joaquin valley) are recited by Bancroft (1886:5, 27 ff.), who mentions (p. 53) the recapture of some of the renegades and the fact that forty fugitives were missing. In 1833, Zenas Leonard, who was attached to the Bonneville-Walker party, found, probably in Walker Pass, an Indian village whose inhabitants can have been none other than the missing fugitives of the 1824 revolt. His brief account (Leonard 1904:229-230) is reproduced here, and of particular interest is the fact that the rebels still retained various Catholic religious tokens which they had brought with them at the time of the revolt some nine or ten years earlier.

"We at length arrived at an Indian village, the inhabitants of which seemed to be greatly alarmed on seeing us, and they immediately commenced gathering up their food and gathering in their horses—but as soon as they discovered that we were white people, they became perfectly reconciled. After we halted here we found that these people could talk the Spanish language, which we thought might be of great advantage to the company, and on inquiry ascertained that they were a tribe called the Concoas (we are unable to locate among the California Indians any tribe of this name), which tribe some eight or ten years since resided in the Spanish settlements at the missionary station near St. Barbara, on the coast, where they rebelled against the authority of the country, robbed the church of all its golden images and candle-sticks, and one of the Priests of several thousand dollars in gold and silver, when they retreated to the spot where we found them—being at least five or six hundred miles distant from the nearest Spanish settlement. This tribe are well acquainted with the rules of bartering for goods or any thing they wish to buy—much more so than any other tribe we met with. They make regular visits to such posts where they are unknown, and also make appointments with ship-traders to meet at some designated time and place; thus they are enabled to carry on a considerable degree of commerce. They still retain several of the images which they pilfered from the church—the greater part of which is the property of the chiefs. These people are seven or eight hundred strong, their houses constructed of poles and covered with grass, and are tolerably well supplied with house-hold furniture which they brought with them at the time they robbed the church. They follow agricultural pursuits to some extent, raising very good crops of corn, pumpkins, melons, &c. All the out-door labour is done by the females. They are also in the habit of making regular visits to the settlements for the purpose of stealing horses, which they kill and eat."

While we cannot prove anything about Bowers Cave by the 1824 revolt, the fact of the abortive Messianic movement of 1801, plus the retention of church "images," may provide us with some hints to the interpretation of the cache of ceremonial paraphernalia in Bowers Cave. Whatever the case, the Bowers Cave specimens provide a rare glimpse of the variety of perishable artifacts which may have been utilized in one sector of a culture which was eliminated with few surviving traces by the intrusion of the white man.

APPENDIX A

RELICS IN A CAVE*

Stephen Bowers

Sometime since the editor visited a cave in the San Martin mountains, Los Angeles county, which contained some interesting Indian relics. It is in a wild, rugged and picturesque region, and the cave which is one thousand four hundred feet above the sea level, situated on the south side of a steep mountain, is difficult of access. It is a natural grotto in a somewhat friable rock, composed largely of small petrified oyster shells, most likely of pliocene origin. The excavation is about twelve feet deep and sixteen feet long, and not sufficiently high for one to stand upright. The bottom was covered with sand caused by the disintegration of portions of the roof and surrounding walls.

In this cavern were deposited nine baskets manufactured from tule, and varying in size from six to twenty inches in diameter. With the exception of the smallest basket, which was found inside of a larger one, each was covered with a neatly fitting cap woven from the same material, and each basket stood on a mat of the same. Three or four of the baskets were in a good state of preservation, while the others were askew, or had been gnawed by wood rats which are abundant in this section, and had constructed a large nest in the cave.

One of these baskets contained fourteen notched sticks an eighth of an inch thick, from one to two inches wide, and from ten to fourteen inches in length. These sticks have been painted, some crosswise and others lengthwise, with streaks of red and probably blue paint. It is most probable that they were used for chronological purposes, each notch indicating a moon or other specific period. Some of these sticks have as many as one hundred notches. They are made of red wood and are perforated at each end.

Another basket contained thirty-three head-dresses of birds feathers. The wing and tail feathers of a variety of birds have been used, but the flicker (*colaptes chrysoides*) predominates. They were made by lapping the quill ends and sewing them together after which the feathers were alternated until the desired length was obtained. These

*Pacific Science Monthly, Vol. 1, pp. 45-47, 1885.

dresses are from five or six inches to nearly a foot in width and from two to five feet in length. Some are plain white while others are more ornamental, being made of different colored feathers.

In another basket was found forty-five whistles, made from the tibiae of the deer, about ten inches in length. One end had been cut off and the bone dressed down forming a mouth piece, after which the cellular portion of the bone had been removed and a lateral opening made about three-sixteenths of an inch in diameter opposite which asphaltum had been placed in such a manner as to cause the instrument to emit one or more sounds, when the operator blew in the end. These bones had been wrapped with bark or some other pliable substance and a mass of asphaltum fastened on the larger end into which was imbedded a small piece of haliotis shell.

But still more interesting specimens were found in another basket. These consisted of four perforated stone discs or hammers containing handles. The discs are probably serpentine and measure from four to five and a half inches in diameter. The sides have been reamed, in the usual method of perforated discs, leaving the hole much smaller at the center. The handles are of toyon or bear-berry which is amongst the hardest woods in southern California, and are from thirteen to seventeen inches in length. The handles are set a little slanting to the base, or flat side of the disc, and are fastened with an asphaltum cement. Two of the discs still retain paint markings. For what purpose they were intended is not quite clear to us. If for hammers, they are the only ones of the kind of which we have heard in this country. The usual method of fastening the handle is by groove and withe, and not by drilling a hole through the implement. We are inclined to the opinion that these were used as implements of war, or were used in religious rites. But whatever may have been their use they are unique, as far as we know.

In excavating the bottom of the cave we found considerable basket work as though it has been covered with this material. A wedge was found made of the base of a deer's antler, 4 1/2 inches long by 1 3/8 inches in diameter, wrapped securely at the larger end with some kind of cord to prevent splitting when in use. Also a haliotis shell, *Haliotis cracherodii*, having the holes filled with a cord, and used, probably, for a drinking cup. A shell ornament and portions of deer's antlers, and a serpentine implement for smoothing and straightening the tules for their basket work, were also found. The cave bears no evidences of having been used for a place of residence but simply as a deposit for these specimens, most or all of which have doubtless been used in their dances and religious rites and ceremonies. How long these specimens have remained in the cave, it is difficult to determine. Being perfectly dry and beyond the reach of rain or sunshine they would remain for a great length of time without decay.

The researches of archaeologists and ethnologists during the past decade have thrown much light upon the character of the race inhabiting this country in past time. It was formerly believed that the mound-builders of the Mississippi valley were an entirely different and superior people to the present race of Indians, but more recent researches have caused an abandonment of this theory by our best versed archaeologists. The great mound at Selzertown, fourteen miles from Natchez, described by Squier and Davis as covering five acres, and rising to the height of fifty feet, was recently examined by Dr. Jones of Tennessee. He drove a trench into the mound fifteen feet deep, coming upon cedar posts and charcoal mixed with ashes, beneath which he discovered a fragment of French burr millstone weighing about eight pounds. This had doubtless been brought to this country from France by the whites. In opening a mound near Baraboo, Wis., we came upon evidences of its recent origin. It was thirty-seven feet in diameter and four feet high. We excavated a hole about five feet in diameter from the top of the mound. On reaching the original surface we found that a hole had been excavated to the depth of three and a half feet, the bottom covered with charcoal and ashes, and containing about thirty stone implements. Among these were two pipes manufactured from catlenite, or pipestone, one of which was patterned after the modern clay pipe used by the whites; the other was unfinished. A hole had been excavated where these things were deposited after which the mound had been erected over them. The excavation, which was something more than four feet in diameter, could easily be traced, and had doubtless been made after the tribe had made the acquaintance of the white race. It is confidently asserted that white men are still living who have seen Indians erect mounds similar to those in the Mississippi valley.

APPENDIX B

EXCERPT FROM THE TWENTIETH ANNUAL REPORT OF THE PEABODY MUSEUM*

F. W. Putnam

We have also received, by the payment of expenses to the collector, a singular and important collection of objects, found by the Rev. Stephen Bowers in a small dry cave in the San Martin Mountains, Los Angeles Co., California, in 1885. The following abstract of Rev. Mr. Bowers' account of the objects and their discovery will give an idea of these interesting articles which, very likely, had been hidden in the cave by Indians many years ago. They may have been the property of some leading man of the tribe, but the number of each kind is remarkable.

"The cave was about twelve feet by sixteen. In it were nine baskets from six to twenty inches in diameter, made from tule, one of which contained fourteen pieces of red-wood about a foot long, notched and painted with red and blue in streaks. Some of these sticks had as many as one hundred notches, and each stick was perforated at one end. Another basket contained thirty-three headdresses, from four to five feet in length, made of feathers; another, forty-five whistles made from the tibiae of deer, the 'stop' being formed by inserting a mass of asphaltum, and the larger end of the bone covered with asphaltum in which is embedded a piece of haliotis shell. The most important objects found were four perforated stones mounted on handles of the hard wood of the bear-berry, held fast in the holes by asphaltum. The cave gave no evidence of having been used for any other purpose than as a place of deposit for these articles. Considerable basket work was discovered in the debris, as also a haliotis shell-cup, a shell ornament, an implement made of deer's antler, and a smoothing implement made of serpentine. No determination could be arrived at as to the length of time the articles had been in the cave; but, as it was perfectly dry, they may have been there for centuries."

Of particular interest in this lot are the four perforated stones, of the same character as hundreds which have been found in the Indian

* F. W. Putnam, Curator. Twentieth Annual Report of the Trustees of the Peabody Museum of American Archaeology and Ethnology, Vol. III, No. 7, pp. 541-543. Cambridge, 1887.

graves in southern California and also in various other parts of the world. That such circular stones of different sizes, with central perforations, were used for many purposes I have pointed out in an account of "perforated stones" published several years ago,* and I then suggested that some of the California stones were probably mounted upon handles for use as clubs. The four specimens from the cave show at least one method of mounting such stones on short handles by means of a fastening of asphaltum. However, only one of the four handles is of a convenient size for holding in the hand, the other three being so slender that unless the wood, when fresh, was of extreme toughness, the handle would have snapped if a hard blow had been given with the club. The handles are also perfectly straight, without knobs or a rough portion at the end, but an African club in the Museum has a straight, smooth handle, and the terminal knob of most club-handles must be regarded as a developed feature of the weapon. If, however, such short-handled clubs as those from the cave were used for throwing, as were the African knob-kerries, the smooth handle would be desirable and its size would not be of much account if of sufficient strength to sustain the stone when thrown.

Then, as is the case probably with nearly all primitive weapons, such clubs might pass insensibly into ceremonial objects, or staves, or insignia of office. A Peruvian club with a copper head having five plain points and mounted on a smooth, short handle of wood is in the Museum, and with this is another star-shaped head of copper which has each point carved to represent a human head and face. The former may well be called a club and the latter may have been the head of an official staff.

There is, also from Peru, a star-shaped stone with five big points, fastened to a plain staff, now broken, but which must have been four or five feet long, which, it seems to me, must be regarded as a weapon. In contrast with this is a similar stone, but with the rays reduced to slight rounded projections, which is mounted on an elaborately carved and decorated staff about three feet long. This can hardly be a weapon and is probably a ceremonial staff.

From the same region in Peru from which these pointed club-heads came, we have three human skulls with circular indentures and holes, just

* Vol. VII, pp. 135-189, with illustrations, United States Geographical Surveys West of the 100th Meridan, under Lt. G. M. Wheeler, United States Engineers, Washington, 1879.

such as would be made by blows given by pointed club-heads like these of which we are speaking; hence it is presumable that such were used as clubs, although similar objects were also mounted on staves, probably for ceremonial purposes.

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AAnt	American Antiquity
AMNH	American Museum of Natural History
-AP	Anthropological Papers
-J	Journal
MAIHF	Museum of the American Indian, Heye Foundation
-IN	Indian Notes
SI	Smithsonian Institution
-BAE-B	Bureau of American Ethnology Bulletin
SWM	Southwest Museum
-M	Masterkey
UC	University of California
-AR	Anthropological Records
-AS-R	Archaeological Survey Report
-PAAE	Publications in American Archaeology and Ethnology
USGS	United States Geographical Surveys West of the 100th Meridian
-A	Archaeology

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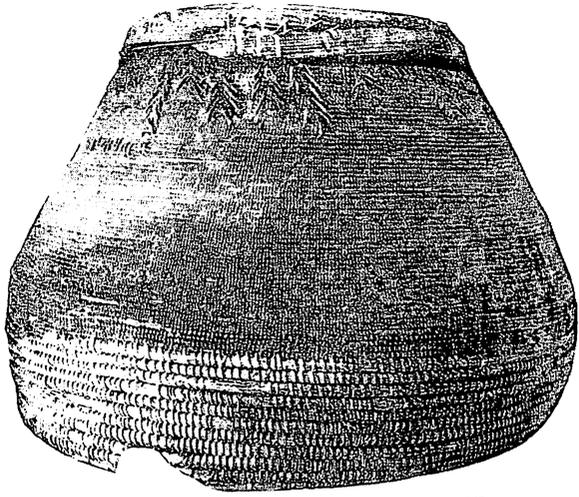
Specimen numbers are those of the Peabody Museum
of Archaeology and Ethnology, Cambridge

- Plate 1. a,b. Coiled basket with lid; bottom view of specimen; 39240
c. Globe-shaped basket, 39242
d. Lid of basket shown in a, 39240
e,f. Upper and lower sides of coiled basketry tray, 39247
- Plate 2. a,b. Deep dish type coiled basket viewed from bottom; and
from top; 39246
c,d. Decorated basket, three-quarter view; same specimen
viewed from top; 39245
e,f. Well preserved bowl-shaped basket, side and bottom
views respectively; 39250
- Plate 3. a,b. Side and top views of coiled basket, 39243
c. Side view of basket, 39244
d. Side view of basket, 39241
e. Unnumbered plaque or bottom (or cover) fragment of
basket (probably with d, 39241)
f. Another plaque, bottom, or cover fragment, 39241
- Plate 4. a. Reverse of specimen 3f above, 39241
b. Plaque, bottom or cover fragment, 39249
c. Assorted bullroarers and fragments, 39260
d. Assorted bullroars, 39260; specimen in extreme right
is a wooden dagger, 39266
e. Steatite arrow straightener fragment, 39273
f. Haliotis sp. bead or ring with short length of braid
through hole, 39275
g. Complete Haliotis cracherodi shell with siphonal
openings sealed with cordage, 39274
h. Bone implement with cordage and asphalt hafting (?)
remains, 39267
- Plate 5. a. Feather bands: upper, mainly flicker quill band, 39256;
lower, pigeon or grouse (?) quill band, 39254
b. Feather bands: upper, mainly pelican quill band, 39251;
lower, mainly blue jay quill band, 39252
c. Perforated stone club, complete handle not shown, 39264
d. Perforated stone club, complete handle not shown, 39261

- Plate 6.
- a. Deer tibiae whistles, 39259
 - b. Same specimens as in a, with full view of holes at proximal end of bone
 - c. Wooden hook (?), 39265

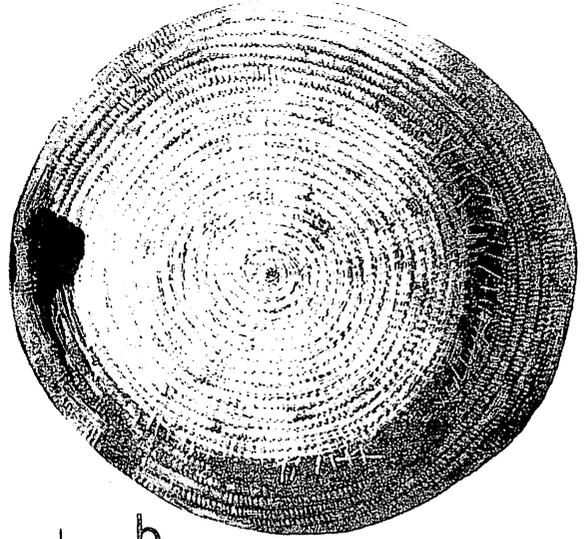
Plate 7. Deer tibiae whistles from Cessac collection
(Musée de l'Homme specimen numbers)

- a,b. Specimen has asphaltum plug and hole in shaft, latter largely covered with asphaltum in which are imbedded small, broken bits of abalone shell; 82.30.97
- c,d. Asphaltum plug missing, rough bits of white clamshell imbedded in band of asphaltum below hole; 82.30.96
- e,f. Complete specimen, with asphalt plug and spiral vegetal wrapping; 82.30.95

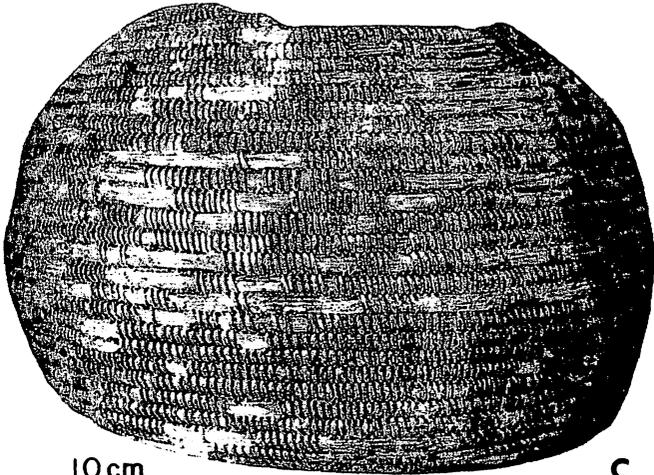


a

25 cm

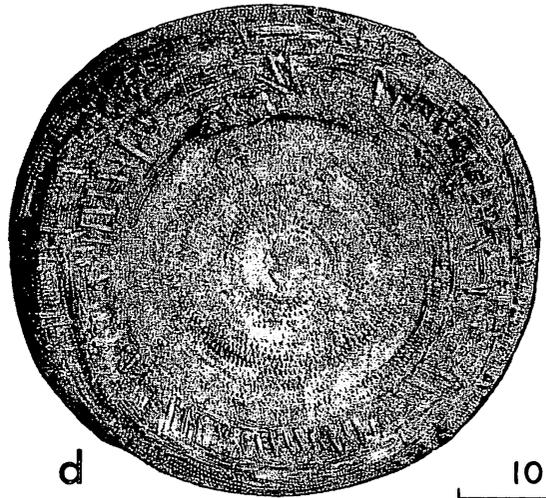


b



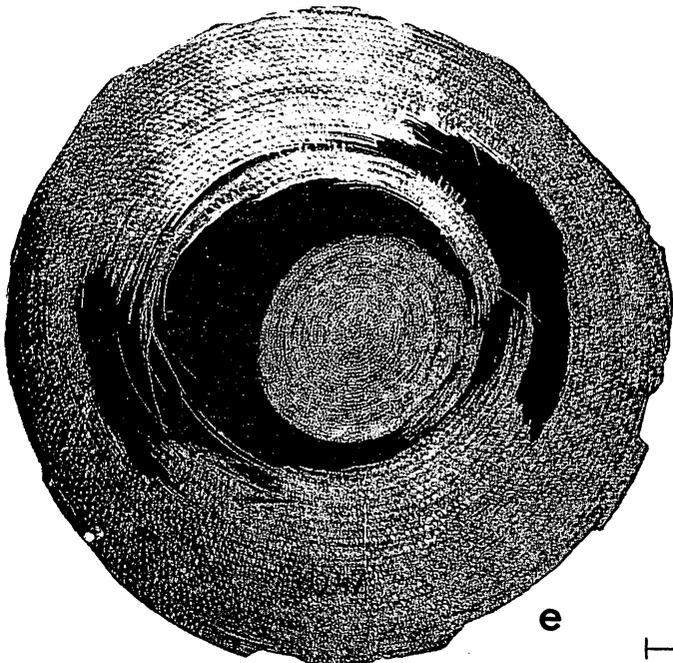
10 cm

c



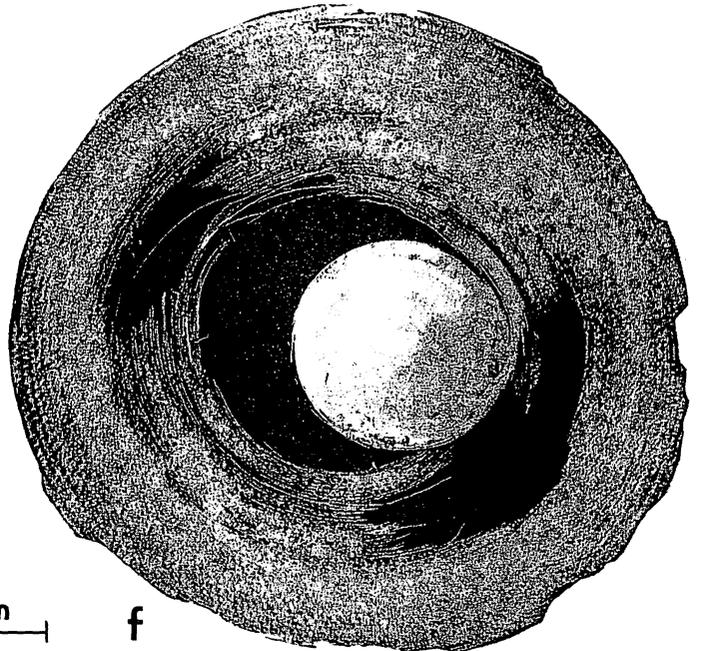
d

10 cm

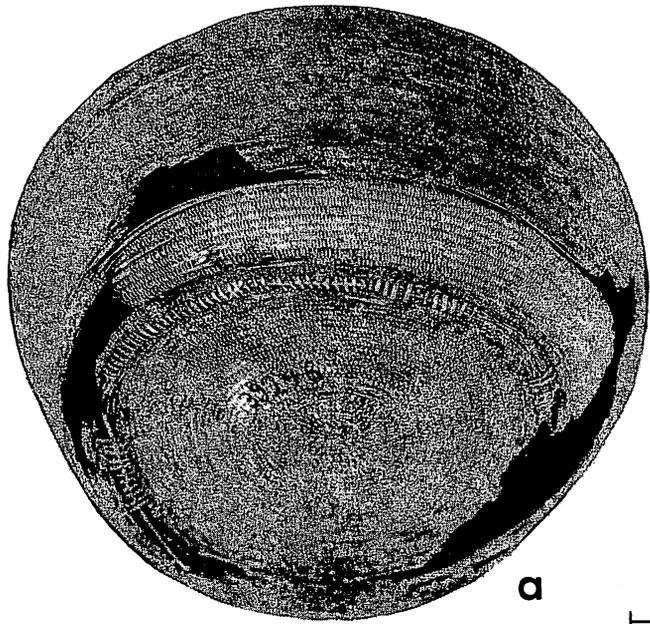


e

10 cm

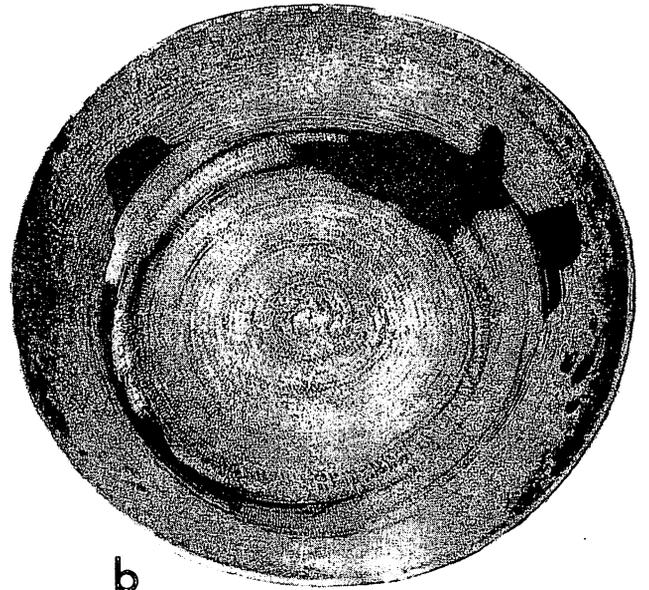


f

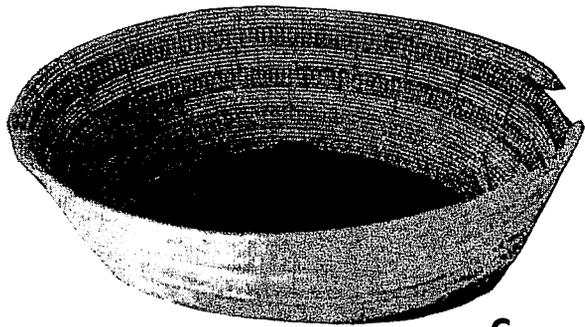


a

10 cm

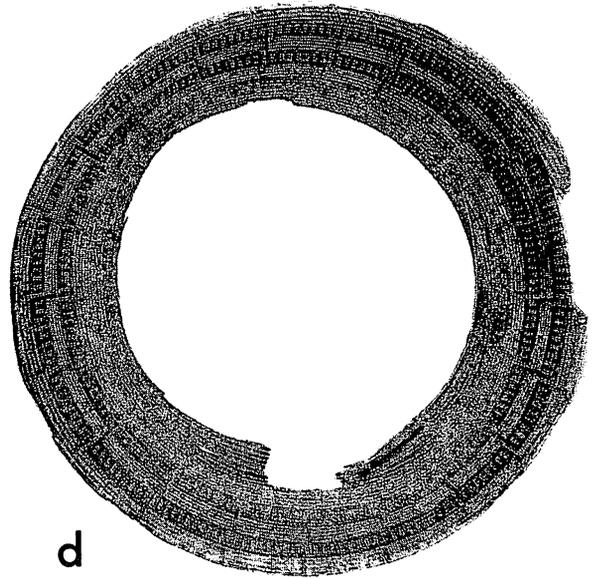


b



c

10 cm

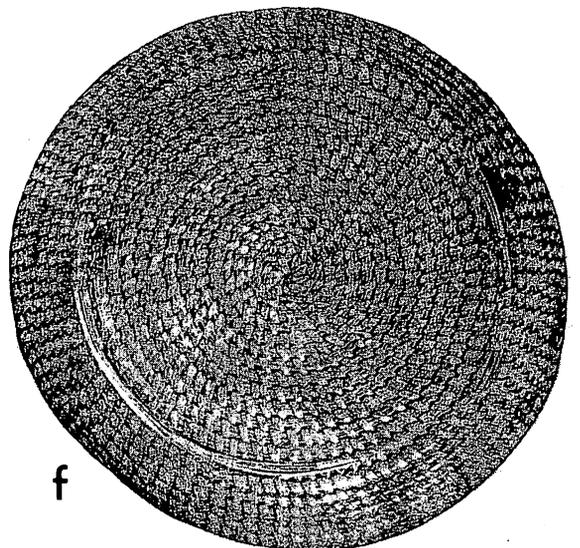


d

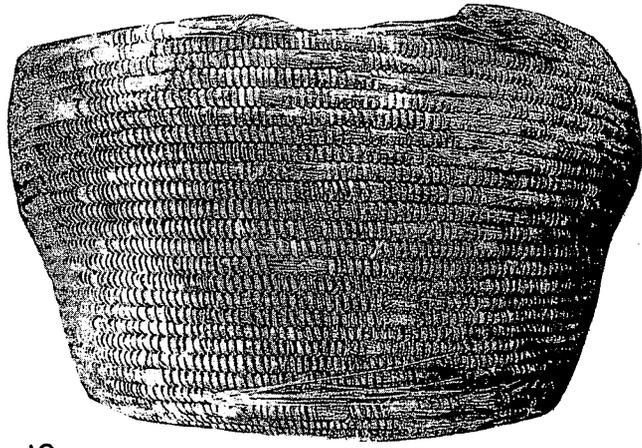


e

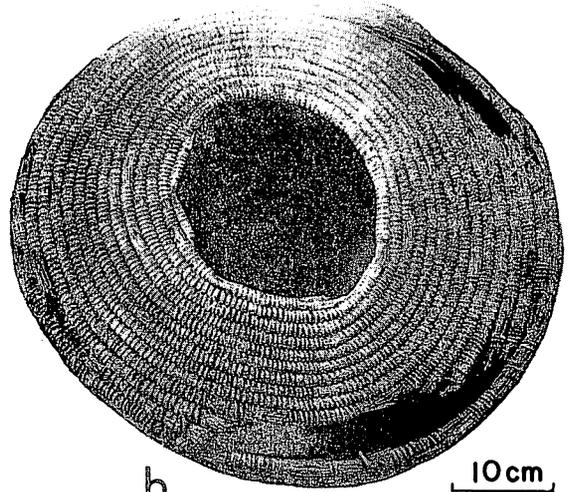
3 cm



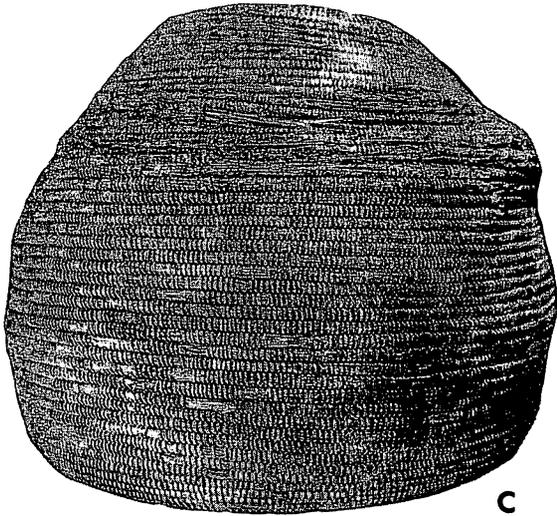
f



a



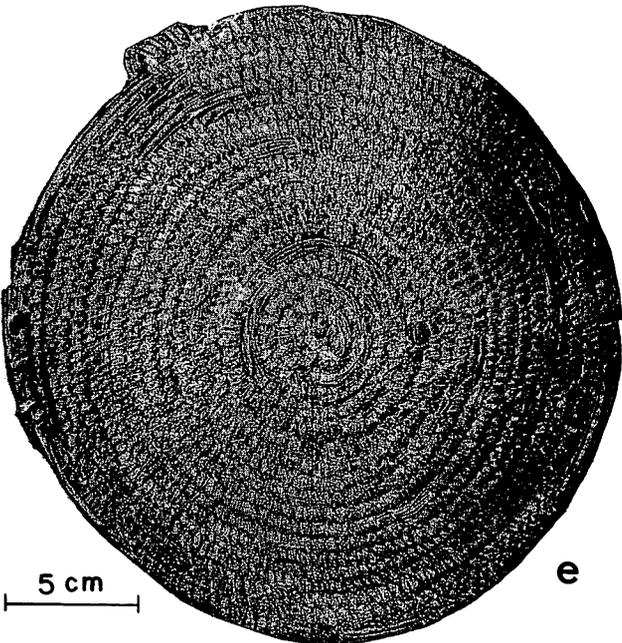
b



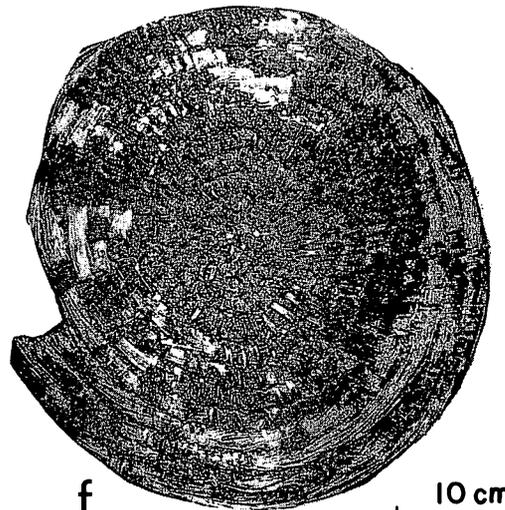
c



d

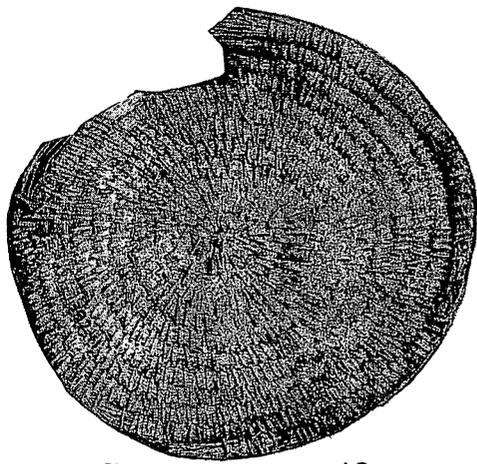


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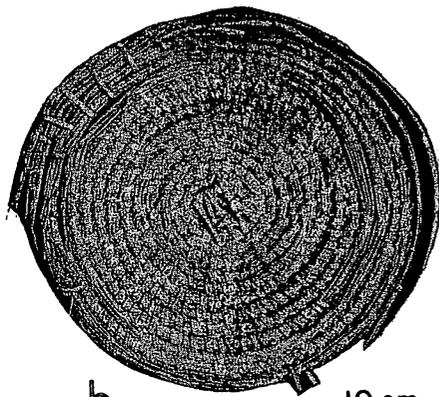
f

Plate 3



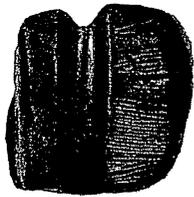
a

10 cm



b

10 cm

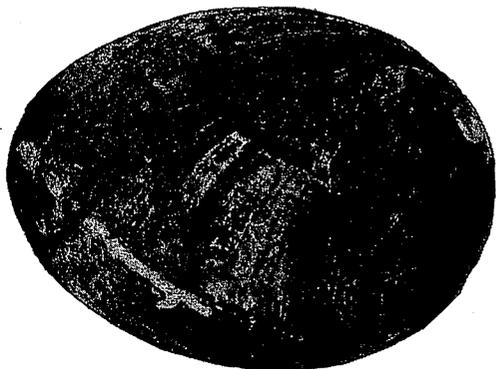


e

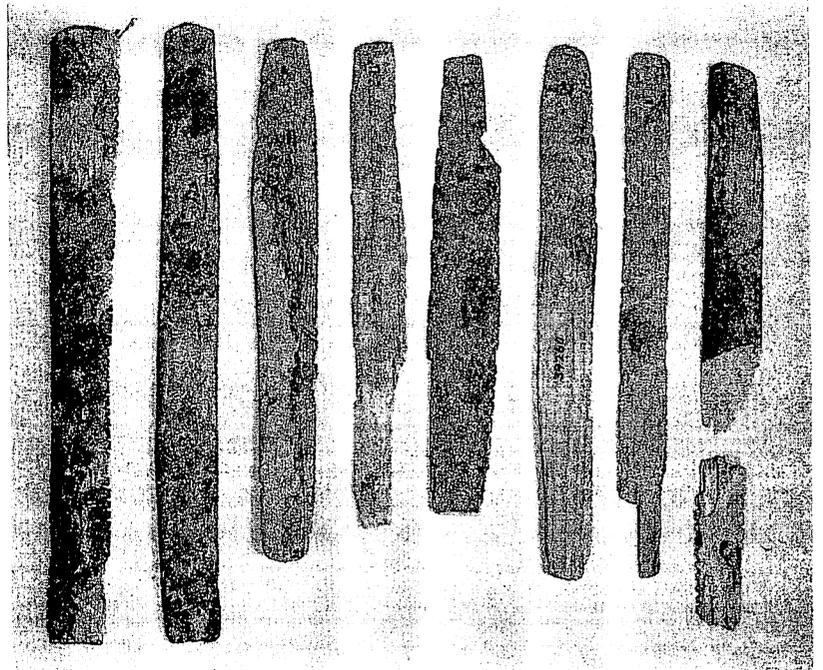
3 cm



f

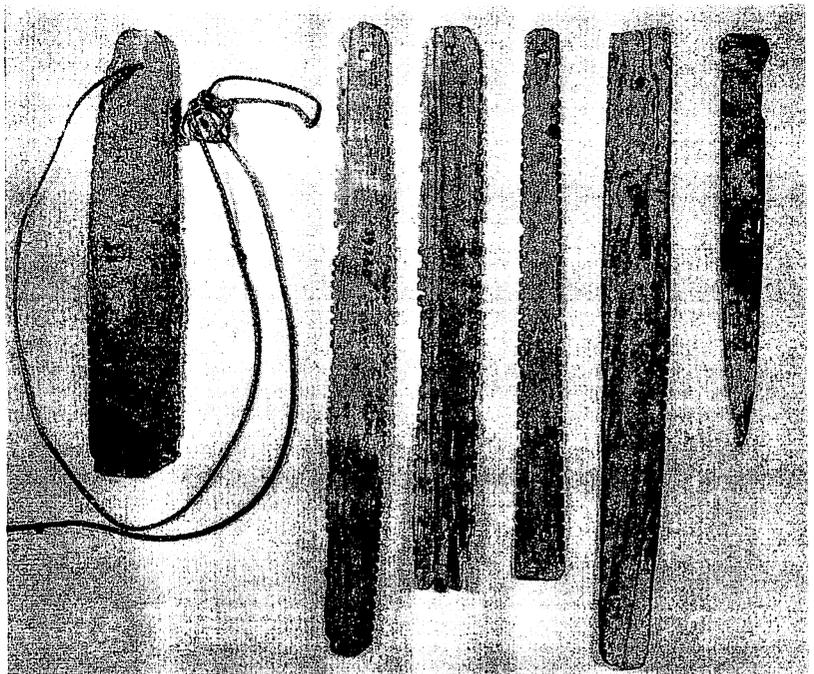


g

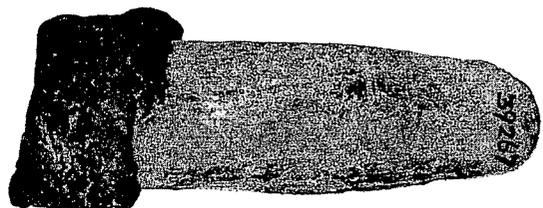


c

10 cm

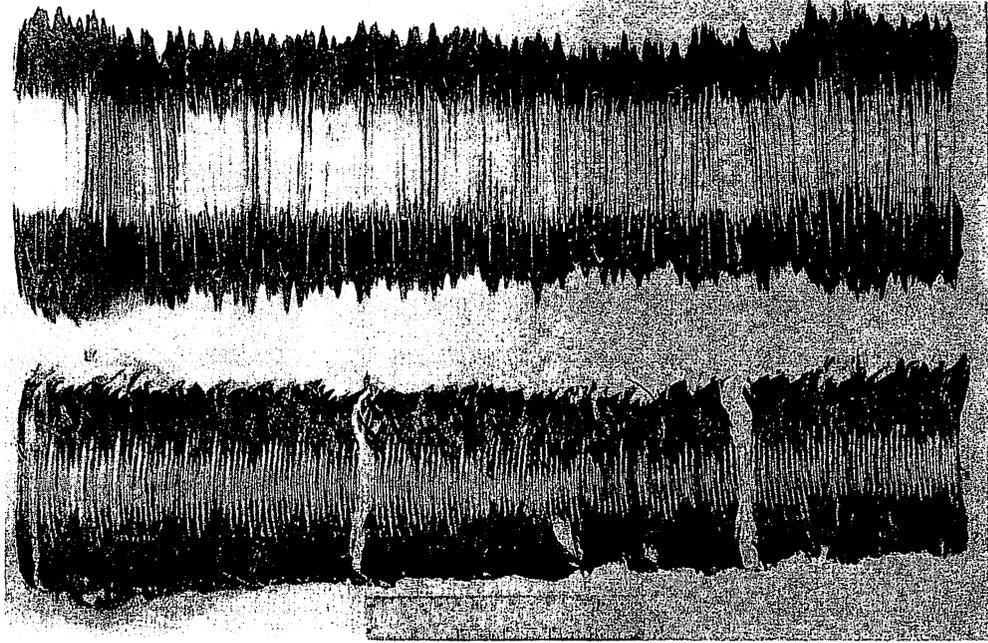


d

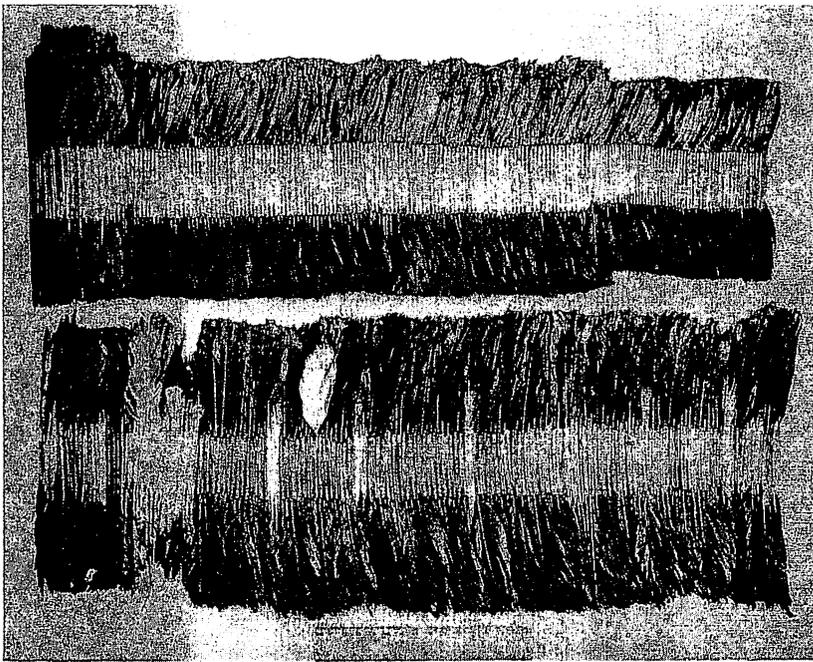


h

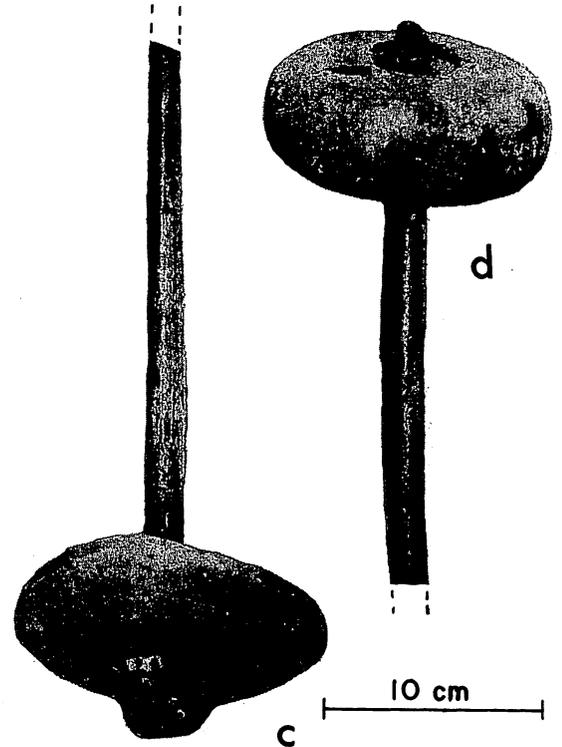
3 cm



a



b



c

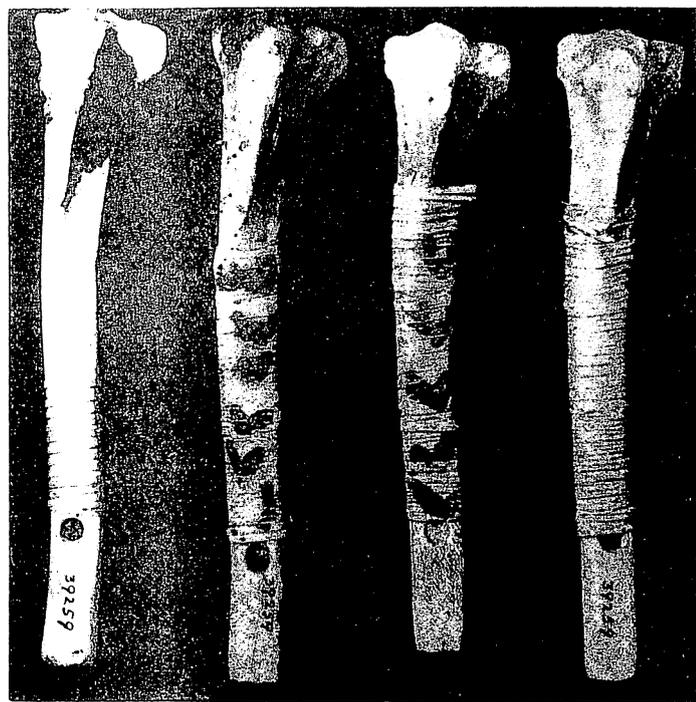
d

10 cm

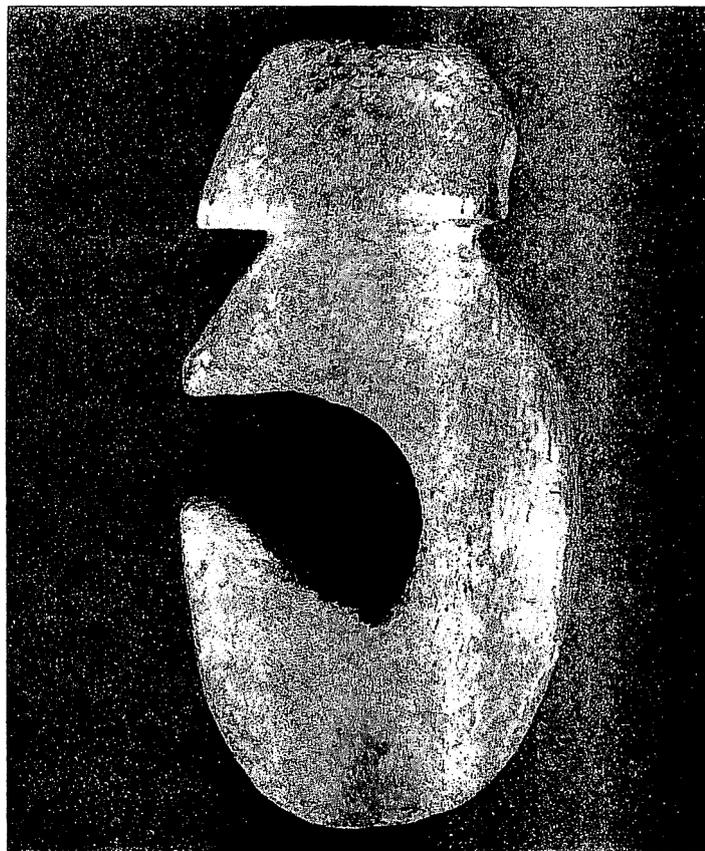


a

5 cm



b



c

5 cm



scale 15 cm.

THE FISHHOOK INDUSTRY OF THE ANCIENT INHABITANTS
OF THE ARCHIPELAGO OF CALIFORNIA*

E. Hamy

Editor's Preface

The following article by E. Hamy, who was the founder of the Musée d'Ethnographie which later became the Musée de Trocadero and ultimately evolved into the present Musée de l'Homme, has been ignored perhaps because of its appearance in a series which is very rare, and, in our opinion, deserves publication in a more readily available source.

The process of manufacture of the curved shell hooks of the Santa Barbara region is described in essentially the same way by other authors, namely, Schumacher, 1875; 1877, pl. 22; Rau, 1884, fig. 212; Yates, 1900, fig. 378; Rust, 1907, pl. 31; Heye, 1921, pp. 135-136, pl. XCIX; Gruvel, 1928, pp. 102-103, fig. 87; Woodward, 1929, pp. 45-46, pl. 22; Colton, 1941, p. 6; Robinson, 1942, pp. 60-61; Irwin, 1946, p. 19.

Two general studies of curved shell fishhooks of the California coast are by Robinson, 1942, and Heizer, 1949. The student interested in Oceanian curved shell hooks may start with the works of Anell, 1955, and Emory, Bonk and Sinoto, 1959.

I am indebted to Miss Sonia Ragir for the translation.

Robert F. Heizer

* * * * *

The excavations performed for some years on the coast and offshore islands¹ of California have placed a great abundance of material into the hands of ethnographers, which permits recreation in the most minute detail of the daily life of the inhabitants who, at no point, had a knowledge of metal.

Every item in the enormous collections sent to the ethnographic museums of Washington, Cambridge, and Paris by the representatives of the Peabody Museum and by our Ministry of Public Information is informative,

* "L'industrie hamençonnière chez les anciens habitants de L'Archipel Californien," *Revue d'Ethnographie*, Vol. 4, pp. 6-13. Paris, 1885.

and among these there are none more interesting than the ancient fishing instruments from the islands of the California Archipelago which were collected by M. Léon de Cessac.²

The Trocadero Museum, in particular, possesses a complete technology of shell fishhooks³ whose industrial processes I am going to review briefly for the reader.

Paul Schumacher has already, it is true, called the processes of the fabrication of California fishhooks to the attention of men of science in a short note printed in 1875,⁴ and M. Putnam has returned to the same subject in his excellent studies of the archaeology of the Indians of the West.⁵

But these two ethnographic scholars did not, it appears, possess the considerable quantity of material which I have at my disposal thanks to the collection of M. de Cessac, and the information that I have brought together in the following pages is not redundant.

The haliotis shell, the main material of most of the Californian fishhooks, is first broken in pieces with the aid of a stone (fig. 6), then roughly retouched along the edges (fig. 7). The fragments thus prepared have very variable dimensions, the largest may attain 8 by 6 cm. and the smallest 2 cm. squared.

The workman then pierces the shell disc about the middle with the aid of a well-pointed flint (figs. 9 to 13). The hole obtained is of variable dimensions; I measured some not more than 2 to 3 mm. and others that attained, on the contrary, 1 cm. and more.

The placque thus roughed out is sometimes nearly round, but more often it results in the form of a triangle with a contracted base whose longest sides will be noticeably convex (figs. 14 and 15). The height of the triangle can vary from 2 to 8 cm. Its size at the base varies between 17 and 60 mm.

A new operation is undertaken for smoothing the contours of the perforated placque which one has just obtained: it is accomplished with the aid of a piece of flattened sandstone which one rubs around the circumference (fig. 16). The fabricator of the fishhook must then enlarge and round out the opening practically in the center of the plaque, which is done at first with the aid of a spindleform drill of hard and rough sandstone, by prolonged rotation of which the hole takes on a very exact circular form (fig. 17 and the following).

The internal and external circumferences tend more and more to harmonize, except at a point which corresponds to the apex of the triangle of which I spoke above, and which finally supplies the projection destined to suspend the fishhook. The manufacturer cuts little by little to obtain that kind of auricule, a portion of which he has left at the periphery of the piece, just as it is shown in the three figures attached (figs. 20 to 22).⁶ He does not stop then, for in order to complete the fishhook it is necessary to remove a small part of the circumference in front of this auricule with the aid of a small stone drill. When the fishhookmaker has finished the manufacture of the hook he has just obtained, and when he has hollowed out [a narrow channel] between the auricule and the other end of the piece, only then will his tool be completely finished.

Figures 23 through 25 represent three fishhooks of this type which were most [commonly] in use in the sites of the fishing tribes of the Californian shores.⁷ Figures 26 and 27 represent a variety of the same type which were less common and in which the auricule is shown much elongated.⁸

From the 4 to 12 mm. which the fishhooks of the first type usually attained, those of the second type shown here increase to 21 and 22 mm. in length, that is to say, to two- and even three-fifths of the total curve of the tool. However, not all of the shell fishhooks from the Californian archipelago possess all the more or less long appendages that I have just described. M. de Cessac has found that some have been fixed on a line with the aid of a transversal notch. Figures 28 and 29 reproduce two specimens of that kind of suspension. Still other fishhooks (these much more rare) were pierced with an eye (fig. 30) in which the suspending line was introduced and knotted.⁹

The preceding applies exclusively to fishhooks made of haliotis shell at San Miguel, San Nicolas, Santa Catalina, and San Clemente.

Various California tribes, those of Santa Cruz in particular, use both bone and shell fishhooks. Thanks to the barb provided on their external curve, a little beneath the point, these tools appear greatly superior to those of which I have been talking. M. Schumacher discovered fourteen of these fishhooks in his excavation of Santa Cruz; several were still fitted with their lines fixed in a notch of bone, transversely rolled on the end of the device to which it was secured by a thick layer of asphalt.

Two similar pieces from the collection of Cessac from the Trocadero

Museum (our fig. 31 represents the larger of the two pieces) are comparable to those which Schumacher and Putnam have represented, but one does not see any vestige of cord on the latter.

These bone fishhooks are, moreover, nearly identical to those that the Hawaiians formerly constructed with the aid of fragments of sperm whale tooth. I described, in 1879,¹⁰ one of these fishhooks, which was a part of the Ballieu collection deposited in the Trocadero Museum. That piece (fig. 32) reproduces nearly exactly the general form of the Californian bone fishhooks. The sole noticeable difference between the two types of implements consists in the direction of the groove (channel, furrow) for the insertion of the line, which is longitudinal to the side [on one type], the other, on the contrary, being transversal. The auricle of the Hawaiian fishhook, reduced to its minimum, forms the body with the rest of the piece; in place of its being separated by a furrow, the binding is effected at this place around the inside edge by means of a horizontal notch provided on its surface.

It is probably to this fishing instrument of the ancient Hawaiian Islands that M. Rau alludes when he says that the fishhooks of California "resemble very closely" pieces of the same nature and function (use) in the Pacific. The fishhooks of Tahiti, of Samoa, etc., appear in effect very different from those of the islands off California, composed as they are of two pieces, a hook of bone or shell without barbs, and a small placque of mother-of-pearl more or less curved, to the middle of which the hook is fixed by two lines which pierce it transversely.

The analogy of the fishhook forms from Hawaii and from Santa Cruz have an even greater interest for me because they do not constitute an isolated fact. This is a strong argument that the material culture is going to furnish for the ethnologists who consider a certain part of the coastal population of the New World between 30 and 40 degrees north latitude as coming from the west and originating in the Polynesian Archipelago.

Notes and References

1. These islands, which form a small archipelago situated at 33-34° N. latitude, are eight in number: San Miguel, Santa Rosa, Santa Cruz, Anacapa, Santa Barbara, San Nicolas, Santa Catalina, San Clemente.
2. This explorer [Cessac] has collected and brought back no less than 400 objects connected with the fishing industry.

3. About 250 pieces, of which a large number are duplications.
4. P. Schumacher. Die Anfertigung der Angelhaken aus Muschelschalen bei den früheren Bewohnern der Inseln in Santa-Barbara Canal. (Archiv für Anthrop. Bd. VIII, s. 223-224, 1875, in-4.)
5. F. W. Putnam. Reports upon archaeological and ethnological collection from vicinity of Santa Barbara, California, and from ruined pueblos of Arizona and New Mexico, and certain interior tribes. (United States Geographical Surveys west of the one hundredth meridian, vol. VII, p. 223, 1879.) Cf. W. W. Holmes, Art in Shell of the Ancient Americans (Second Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution. Washington, 1883, grand in-8, p. 209, pl. XXVIII.)
6. Cf. Putnam, op. cit., pl. XII, figs. 22, 27.
7. Cf. Schumacher, loc. cit., fig. 80; Putnam, loc. cit., figs. 24, 26.
8. Cf. Putnam, loc. cit., fig. 25; Ch. Rau, The archaeological collection of the United States National Museum (Smithsonian Contributions No. 287, Washington City, 1876, in-4, p. 69, fig. 256).
9. Cf. P. Schumacher, loc. cit., fig. 81; Putnam, op. cit., pl. XI, figs. 2, 3, 4.
10. E.-T. Hamy, Catalogue descriptif et méthodique de l'exposition organisée par la Société de Géographie, à l'occasion du centenaire de la mort de Cook, no. 305 (Bulletin de la Société de Géographie., 6^e sér., t. XVII, p. 474, 1879).

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Yates, L. G.

1900

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Fig. 6.

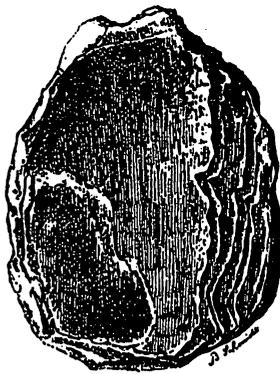


Fig. 7.



Fig. 8.

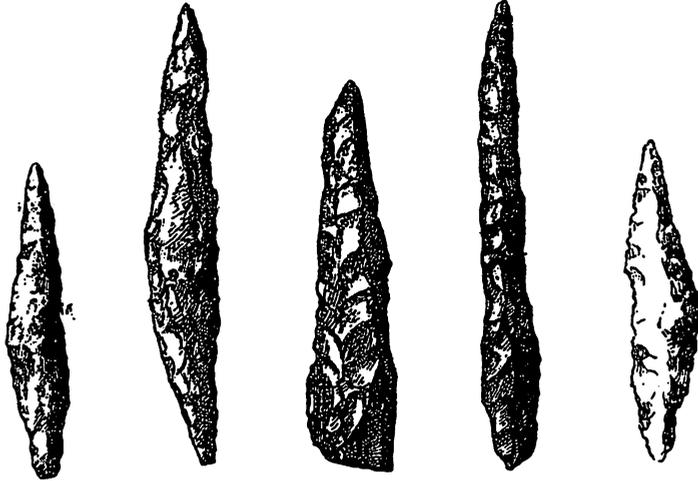


Fig. 9 à 13.

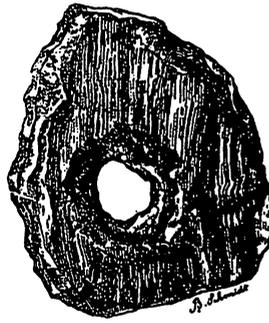


Fig. 14 et 15.

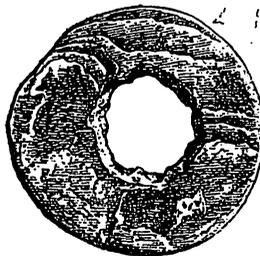


Fig. 16.

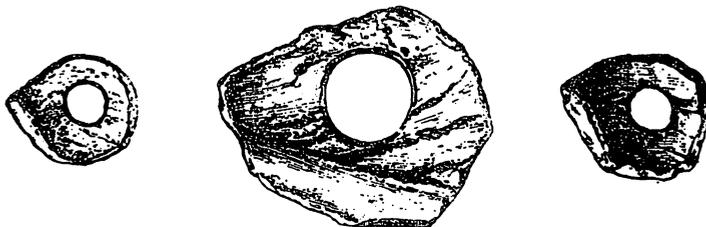


Fig. 17, 18 et 19.

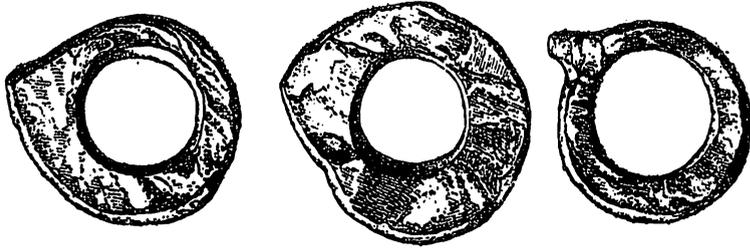


Fig. 20, 21, 22.



Fig. 23, 24, 25.

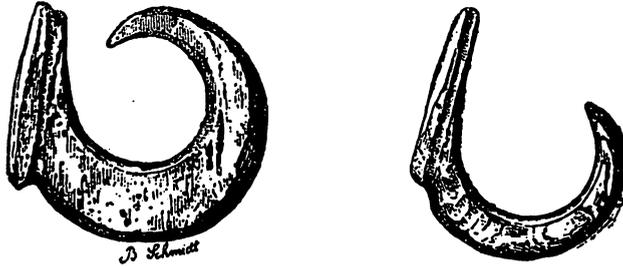


Fig. 26, 27.



Fig. 28.

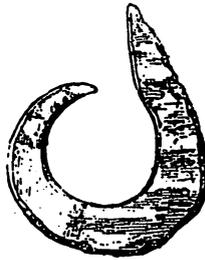


Fig. 29.



Fig. 30.

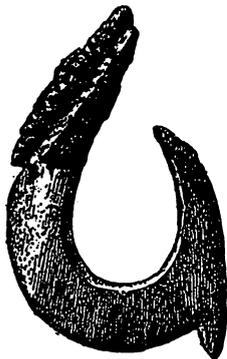


Fig. 31.

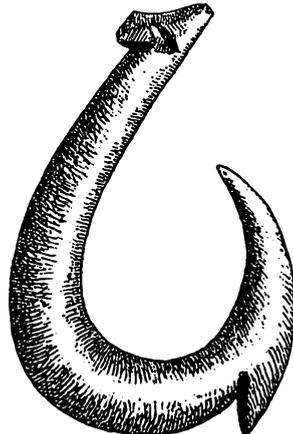


Fig. 32.

FISH-HOOKS FROM SOUTHERN CALIFORNIA*

Stephen Bowers

In plates xi and xii of Lieut. Wheeler's Report on archaeology there are several drawings of ornaments found near Santa Barbara, Cal., and on the adjacent islands, by Mr. Paul Schumacher and myself, which the editors are pleased to call fish-hooks. A writer in the Century Magazine for April presents drawings of other specimens of like character, found by myself in the same locality and now deposited in the Smithsonian Institution. I have also in my possession a series of these ornaments, but it would require a broad stretch of the imagination to believe that they were intended for fish-hooks. The point, which in many instances curves downward, comes so near the stem that it would be next to impossible for them to become hooked in a fish's mouth. The point of one of my best specimens, manufactured from the shell of the *Haliotis*, comes within the sixteenth of an inch of the stem or shank; and were a line to be looped on the stem and cemented with asphaltum, as was practiced by the California Indians, the space would be completely filled. My specimens range in size from one-half inch to two and a half inches in diameter, and were manufactured from *Haliotis* shells [fig. 1, p. 75 herein] and from bone [fig. 2]. The first of these ornaments of which I have any knowledge, I found in a rancheria at Rincon, on the line between Santa Barbara and Ventura counties; and during five years' subsequent residence at Santa Barbara, and the exploration of the mainland and islands, I had an opportunity to study them in every stage of development. I am convinced that, with few exceptions, they were designed for ornaments, as their shape precludes the idea of their use as fish-hooks. They were probably suspended from the ears, and possibly worn on other portions of the body. The true fish-hooks of what may be termed the Santa Barbara Indians have never, to my knowledge, been figured; yet they are more commonly met with in the rancherias and 'cementaries' in Santa Barbara and Ventura counties than the curved specimens we have been considering. I send you drawings of two specimens belonging to my cabinet [figs. 3 and 4]. These hooks were made of two slightly curved pieces of bone pointed at each end, and firmly tied together at the lower end and cemented with asphaltum. They are somewhat similar to those still in use by the South Sea Islanders. The larger specimen I found with a

* Science, o.s., Vol. 1, No. 20, p. 575. Boston, 1883.

skeleton at Point Dume, Ventura county. There were several others similar to the one figured still retaining the thong and cement that bound the parts together. The smaller specimen I found on the surface in a rancheria one mile west of the town of Ventura.

ABORIGINAL FISH-HOOKS*

Stephen Bowers

Four years ago the writer contributed an article which was published in Science on pre-historic fish-hooks, which he believes to have been the first description of the true aboriginal fish-hooks from this section of the country. Many of the specimens figured and described as "fish-hooks" are, doubtless, nothing more nor less than ornaments which were worn in the ears of the natives. This is true of Fig. 1, and possibly Fig. 2. The first was manufactured from haliotis shell, and the cut is the size of the original, which is true of all the specimens figured in this paper.

It will be observed that the point of the specimen first figured comes so near the shank that when the end of the line was looped upon it and cemented with asphaltum, which was universally the case, the space would be filled and certainly it would be out of the question to hook it into the mouth of a fish.

This may also be argued against Fig. 2. But from the fact that the latter specimen contains a barb, some archaeologists claim that it is a fish-hook. Yet it is by no means clear to my mind that it was designed for anything but an ornament for the person.

The true fish-hook, of what is known as the Santa Barbara stock of Indians, is represented in Figs. 3 and 4, and was manufactured from bone. Two slightly curved and doubly pointed pieces of bone were tied together at one end, the larger piece being used for the shank on which the line was fastened, and the shorter piece to pierce the mouth of the fish. Its form is similar to that still in use by the South-sea Islanders and manufactured from the shell of the pearl oyster.

Fig. 5 represents a metal fish-hook which the writer found in an Indian grave on the Conejo plateau, in this (Ventura) county. The shank was fastened into an olivella shell which had been notched as represented in the engraving. The shell was, doubtless, designed to attract by its glistening and shiny appearance. The specimen is somewhat restored in the cut, the original having been eaten with rust, but

* The West American Scientist, Vol. III, Whole No. 32, pp. 243-245. San Diego, 1887.

is still sufficiently perfect to show the outline and character of the implement.

On San Miguel Island, and in other places in this section, the writer has found the rude tools by which ornaments like Fig. 1 were made, and the specimens in various stages of development. The study of this kind of aboriginal work is invested with much interest.

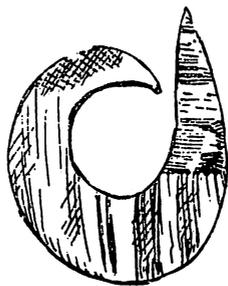


Figure 1.

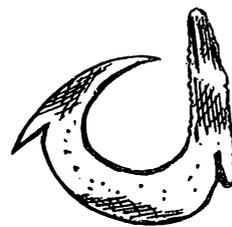


Figure 2.

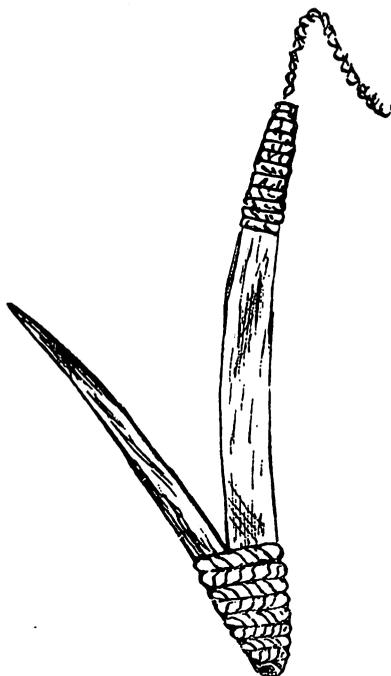


Figure 3.



Figure 4.

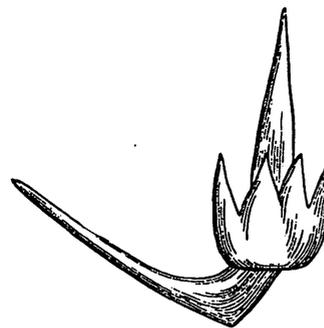


Figure 5.

THE METHOD OF MANUFACTURE OF SEVERAL ARTICLES BY THE
FORMER INDIANS OF SOUTHERN CALIFORNIA*

Paul Schumacher

In my investigations among the remains of the aborigines of the Pacific coast, south of San Francisco, I was always rewarded by finding the olla, one of the most beautiful utensils of genuine aboriginal workmanship. The pot is usually of globular form with a narrow opening on the top, sometimes pear-shaped, and others of the Mexican form with a wide opening. Illustrations of the main types are found in Bancroft's "Native Races of the Pacific States," Vol. IV, page 693, from my own drawings; and in Rau's "Archaeological Collection of the National Museum," page 36, from collections made by me two years ago. (Figures 1 and 2 represent two common forms of these pots, drawn from specimens in the Peabody Museum, collected by Mr. Schumacher.—F. W. Putnam.)

The stone of which this utensil for culinary purposes, and some other articles of our Indians, were worked out, has been well known and in use for like purposes since the classic times of Theophrastus and Pliny. The Magnesian stone, and the kind quarried at Siphnus and Comum—the lapis ollaris of a later period—of which, in ancient times, vessels were hollowed out in the turning lathe, and carved, coincide in nature and composition with the potstone of our Indians. The stone is steatite, and is usually of a greenish gray color, sometimes showing hexagonal prisms in stellated groups, with pearly lustre and greasy touch, especially when reduced to powder. It changes in some portions of the same ledge into a more flaky and micaceous character; while in neighboring deposits on Santa Catalina Island, it exists crystallized in stellated groups of well-developed hexagonal needles of glistening apple color, which are easily detached from the weathered surface. The living rock is not as bright or shining as are the fragments of pots that have been exposed to heat; it loses its greasy character the more a utensil has thus been in use, and the color is changed to a bright metallic lead color. Some years ago I showed a potsherd, the color of which had thus been changed by fire, to a mineralogist, who pronounced it Magnesian mica.

The first information I gained of the locality of quarries of potstone, or where pots were made, was from a venerable Spanish lady while

* From the Eleventh Annual Report of the Peabody Museum of Archaeology and Ethnology. Cambridge, 1878.

exhuming in Nipomo rancho, San Luis Obispo county, in the spring of 1874. She recollected a narrative of her mother, according to which the Indians had brought ollas in canoe-loads from the islands in Santa Barbara channel to the mainland, which they exchanged for such necessities as the islanders were in want of. Two years later, in Santa Barbara county, I received similar information from an old Mexican, then my guide. While making researches among the islands, at the joint expense of the Smithsonian Institution and the Peabody Museum, I gained the assurance, during my short stay on Santa Catalina, that the stone exists in certain places on that island, but did not then succeed in finding the quarries. But during my last expedition to that locality, in behalf of the Peabody Museum, and of which an outline is given in my prefixed letter, I made the discovery, found pits and quarries, the tools used and unfinished articles. I noticed that the softer stone usually obtained in pits, which is of a more micaceous character, was used for pots, while the close-grained rock of darker color, serpentine, was mainly used for the weights of digging sticks, cups, pipes, ornaments, etc.

While in camp at Little Springs, my attention was first arrested by a small mound of silvery hue, which same hue also extended over the adjoining ground. The mound is in front of a large outcropping rock of potstone, which I found to be an impressive witness of the tedious labors of the aborigines, it being entirely covered with marks where pot-forms had been worked out or left in various stages; some even were only begun and abandoned, while others were nearly worked out in rough outlines but still united with the living rock. At the foot of the bluff is a burrow in which, and among the débris forming the mound, many potsherds, a broken pot of which the outside had already been well worked, and even the hollow started, and a pot-form as broken from the mother rock, were brought to light, with many tools of hard slate in shape of chisels, and scrapers of quartz.

From the Little Springs we followed the cañon to the northward, and crossed the pass, easy of access from this side, into Pots Valley. It is a wide hollow cañon in which potstone, silicious slate and "float"-quartz are found abundantly. The potstone is found especially below the small spring, which makes out near the base of a very conspicuous, isolated, large rock, which stands nearly in the centre of the valley; while the slate, of which the chisels are made, crops out boldly, higher up, near the pass. Several hundred yards below the spring at the ravine to the right, going down, is found a pit; and the ledge of potstone close by forms a face in the ravine, which shows the same marks of the chisel as at Little Springs. About eight distinct marks cover the lower face, while others are obliterated by subsequent mining. One, having only been

commenced, shows the outlines of a pot-form in a circle worked to a depth of only an inch, and measures sixteen inches in diameter. Between this place and the second ravine about fifty yards to the northwestward, is another pit of larger dimension—about fifteen feet in diameter and still five feet deep—where, too, among the débris, potsherds and quantities of slate fragments and quartz are found, some of which had evidently been used in working the mine, and making the pots. Besides these places there are many more pits in the valley, and a quarry especially prominent about four hundred yards to the eastward from Pots Valley boat landing, close to the steep ocean shore. In fact, on entering the cañon by the pass, as we did, when the grand rock near the spring, the lesser cliffs and the scattered boulders can be overseen, I was struck, on examining the locality through a field-glass, by the discovery of so many silver hued mounds, the débris of pits, the rock quarries and open air workshops, so that I believed I had found the main factory of the ollas of the California aborigines. Even those not interested in aboriginal remains cannot fail to notice the manufacturing propensities of the people that formerly roamed here, and the locality was appropriately named.

In examining the slate quarry I found the rock had been first broken into accidental shape and size, and such pieces best adapted for chisels were then selected and trimmed.

The scrapers, usually made of milky quartz, found in abundance all over the island, are sometimes quite well chipped, but oftener simple flakes.

I will mention here that we detected among the chisel-marks on the living rock, as also on several potsherds, distinct signs of metallic tools having been used. These were probably of iron and like those which we frequently found in the burying-ground on the Isthmus.

Figure 3 illustrates a chisel of slate, half its natural size, and figure 4 a scraper made of quartz, of natural size.

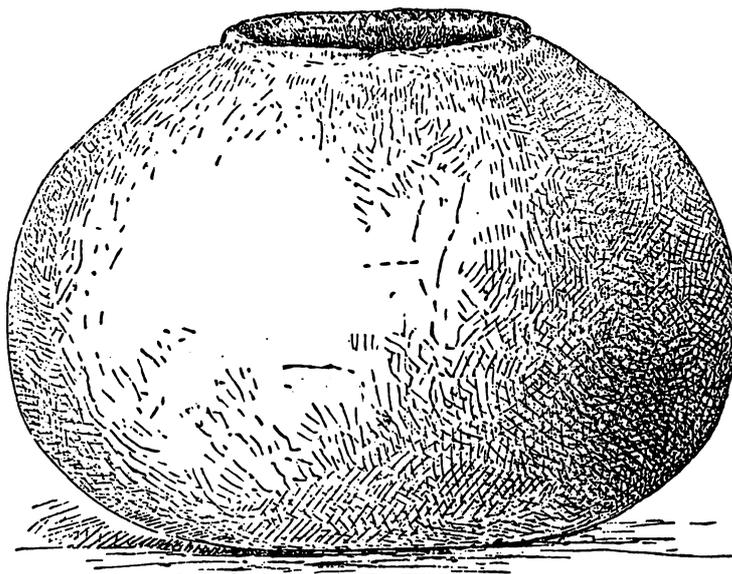
Figure 5 represents a part of the bluff near the boat landing, and will give a better idea of how the rough work of detaching the rock was carried on.

After the pot-form had been worked out, it was broken from the living rock by working under it and by the gradual pressure of the chisel around the base. The detached pot-boulder was next rounded into proper form; it was then hollowed out until a certain thickness of the pot was reached; and finally, carefully finished with the scraper. As the

thickness of the olla increases towards the bottom—it usually thickens from about half an inch at the rim to one and a half at the bottom—it requires skill to attain this evenly. No mechanical apparatus was used for this purpose (as shown by certain irregularities in the form of the pot) but simply the touch of both hands in antiposition, one gliding outside the already finished surface while the other worked inside towards the guiding hand. In this wise, with some practical experience, a greater accuracy is attainable than at first might be supposed, especially if the work proceeds from a known thickness to which reference can be taken, which is here the case as it progressed from the rim.

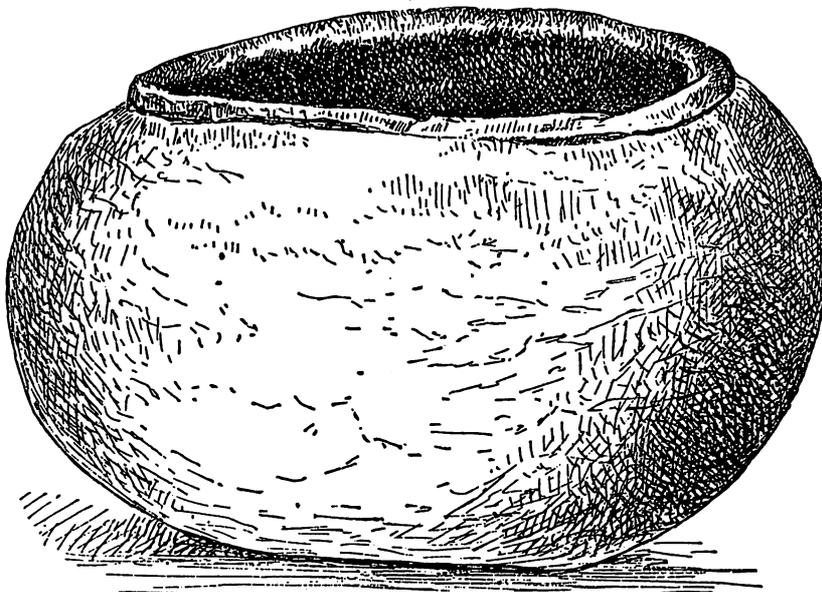
A new pot is without polish, and has only the smooth surface imparted by the scraper; while those which had been in use attained frequently a polished surface by wear, which the soft and greasy nature of the potstone is inclined to adopt.

Fig. 1.



Cooking Pot of Steatite, Dos Pueblos, Cal. P. M. No. 9202. $\frac{1}{4}$ diameter.

Fig. 2.



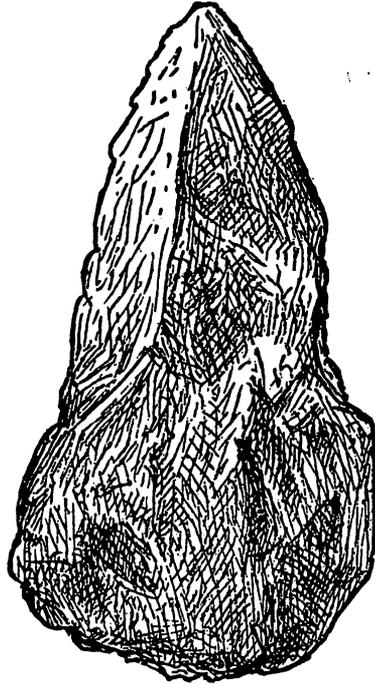
Cooking Pot of Steatite, Santa Cruz Island, Cal. P. M. No. 9273. $\frac{1}{4}$ diameter.

Fig. 3.



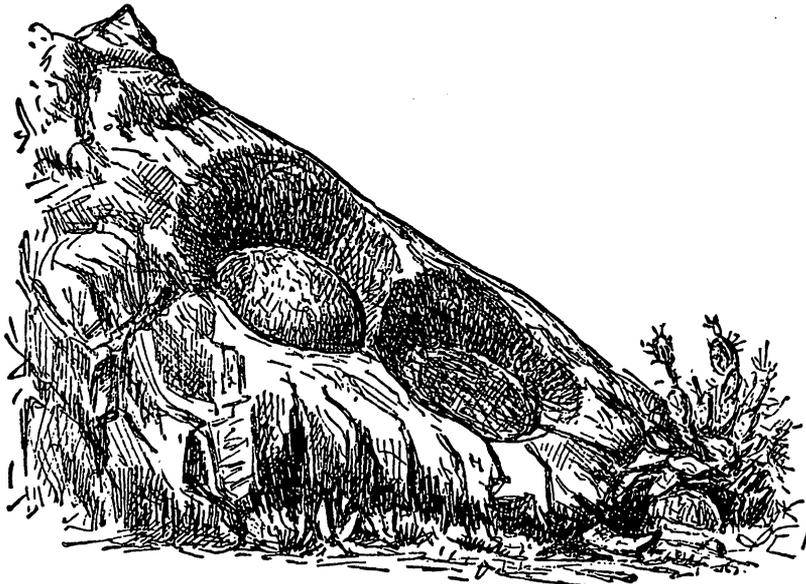
Rude Chisel of Slate used in making the steatite pots. P. M. No. 13411. $\frac{1}{2}$ diameter.

Fig. 4.



Rude Scraper of Quartz, used in making steatite pots. P. M. No. 13412. Actual size.

Fig. 5.



Ledge of Steatite, Santa Catalina Island, showing the method of detaching and shaping the pots.

ANCIENT OLLA MANUFACTORY ON SANTA CATALINA ISLAND, CALIFORNIA*

Paul Schumacher

During my explorations along the Pacific coast I paid much attention to the discovery of the workshops of one of the most beautiful articles of true aboriginal workmanship. It is the olla, a cooking vessel made of a species of steatite, the pot stone, or lapis ollaris of old, of which Theophrastus and Pliny speak as a material used for the manufacture of vessels among the ancient eastern nations. My observations and notes, which I made while working on the mainland, pointed to the islands in the Santa Barbara channel as the locality in which the manufacture was carried on. I expressed the opinion in my report to the Smithsonian Institution (Hayden's Bulletin, vol. iii, p. 50) that the site must be looked for on Santa Catalina island. During my last years' visit to the island, on behalf of the Peabody Museum, I discovered the first quarries in the locality called Pots valley. The pits and quarries revealed the busy hand of the aborigines, among the debris, in the partly-covered pits where cooking vessels were found in all stages of finish, from the boulder but partly worked out from the rock and still firmly attached to it, the globular form roughly rounded, the boulder in which the excavation has already been commenced, and so on to the smoothly finished pot. All the implements with which the task was accomplished were also found, and by observing the progress of the work in the many specimens discovered, it was not difficult to ascertain the mode of manufacture, the result of which I made a subject of an essay accompanied by illustrations (Report of the Peabody Museum, 1877). Not only were cooking vessels extensively manufactured on this island, but also flat dishes (which the Mexicans call Comáles), cups, pipes, stone rings which were used as weights for digging-sticks, and all kinds of trinkets. These articles constituted the money of the people of Santa Catalina, like the shell-beads of the neighboring island of Santa Cruz, where they were extensively manufactured by the aborigines, and whence they were distributed far along the coast, and to some extent into the interior. The quarries are more abundant in number towards the south-eastern end of Santa Catalina where for about two miles square not less than three hundred quarries and pits were discovered during my last visit, with a large number of pot-boulders, sherds, tools, etc.

* American Naturalist, Vol. XII, No. 9, p. 629. Philadelphia, 1878.

The following University of California Archaeological Survey Reports:

- No. 54 Trade Routes and Economic Exchange Among the Indians of California,
by J. T. Davis. 71 pp., 2 maps. 1961.
- No. 55 Original Accounts of the Lone Woman of San Nicolas Island,
by R. F. Heizer and A. B. Elsasser. 55 pp. 1961.
- No. 56 "The Nature of Land-holding Groups in Aboriginal California."
From Two Papers on the Aboriginal Ethnography of California,
by A. L. Kroeber. Pp. 19-58. 1962.

are now available, combined, in a paperback edition titled Aboriginal California,
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