CHUMASH PREHISTORY

BY

RONALD L. OLSON

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ABBREVIATIONS USED

A	Anthropos.
l'A	L'Anthropologie.
AA	American Anthropologist.
AAA-M	American Anthropological Association, Memoirs.
ArA	Archiv für Anthropologie.
AES-P	American Ethnological Society, Publications.
AGW-M	Anthropologische Gesellschaft in Wien, Mitteilungen.
AJPA	American Journal of Physical Anthropology.
AMNH	American Museum of Natural History—
-AP	Anthropological Papers.
-B	Bulletin.
-M	Memoirs.
-MA	Memoirs, Anthropological Series.
-MJ	Memoirs, Jesup Expedition.
BAE	Bureau of American Ethnology—
-B	Bulletins.
-R	(Annual) Reports.
CNAE	Contributions to North American Ethnology.
CU-CA	Columbia University, Contributions to Anthropology.
FL	Folk-Lore.
FMNH	Field Museum of Natural History—
-M	Memoirs.
-PAS	Publications, Anthropological Series.
IAE	Internationales Archiv für Ethnographie.
ICA	International Congress of Americanists (Comptes Rendus, Proceedings).
IJAL	International Journal of American Linguistics.
JAFL	Journal of American Folk-Lore.
JRAI	Journal of the Royal Anthropological Institute.
MAIHF	Museum of the American Indian, Heye Foundation—
-C	Contributions.
-IN	Indian Notes.
-INM	Indian Notes and Monographs.
PM	Peabody Museum (of Harvard University)—
-M	Memoirs.
-P	Papers.
-R	Reports.
PMM-B	Public Museum (of the City) of Milwaukee, Bulletin.
SAP-J	Société des Américanistes de Paris, Journal.
SI	Smithsonian Institution—
-AR	Annual Reports.
-CK	Contributions to Knowledge.
-MC	Miscellaneous Collections.
UC-PAAE	University of California, Publications in American Archaeology and Ethnology.
UPM-AP	University of Pennsylvania (University) Museum, Anthropological Publications.
USNM	United States National Museum—
-R	Reports.
-P	Proceedings.
UW-PA	University of Washington, Publications in Anthropology.
ZE	Zeitschrift für Ethnologie.

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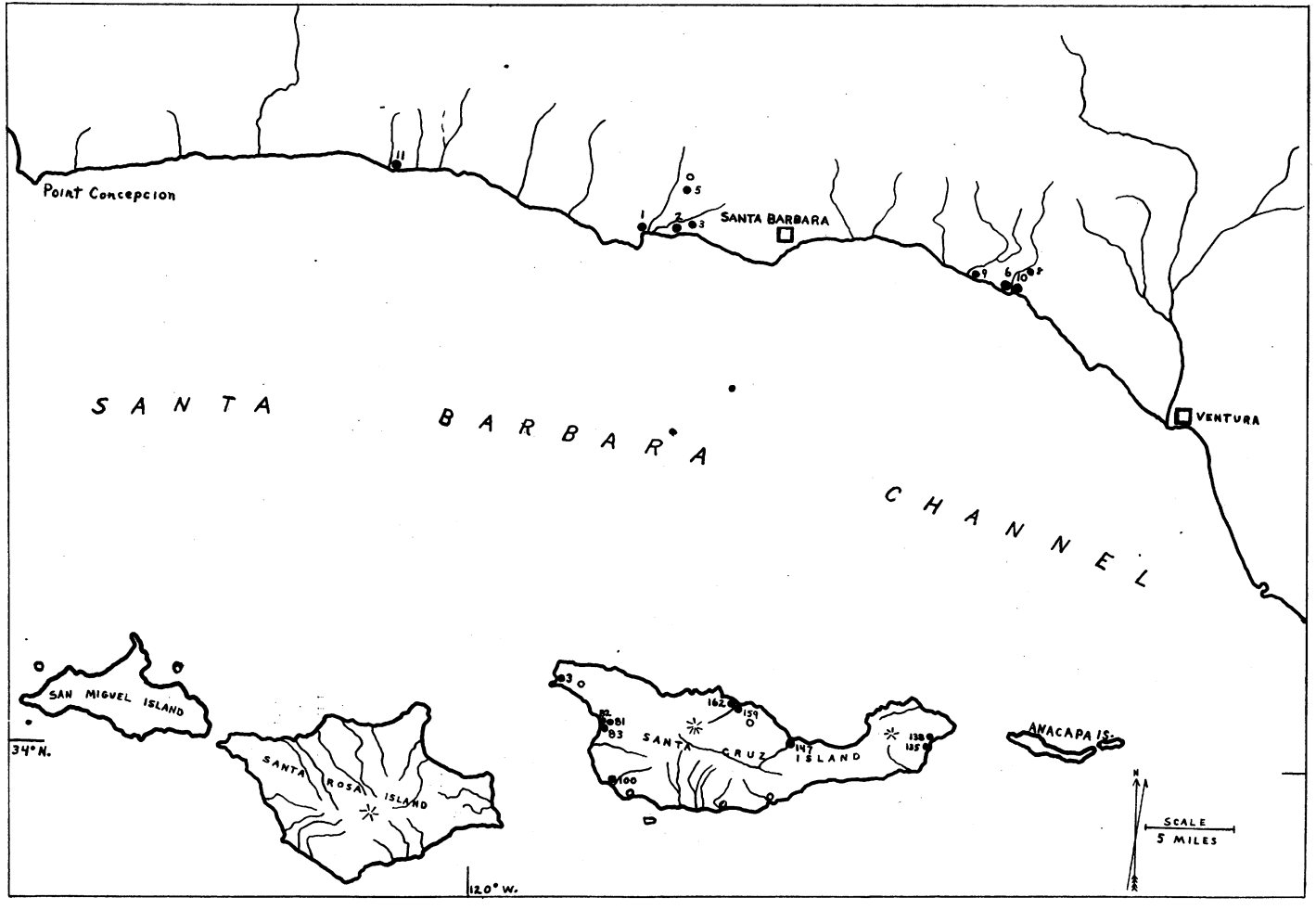

THE CENTRAL CHUMASH COAST

Disks, sites discussed in this paper. Circles, other sites at which excavations were made.

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INTRODUCTION

This account of two summers' archaeological work in the vicinity of Santa Barbara and on Santa Cruz island is intended as a brief résumé of some of the more important general findings. For this reason it deals, in the main, with stratigraphic work and with site differences based upon the relative frequency of occurrence of various types of objects. A detailed, systematic account of the excavations made, of general geography and site location, and of the objects found, grave by grave, is reserved for a future publication.

In 1927 two weeks were spent in work on the Mainland, eleven on Santa Cruz island; in 1928 seven weeks were devoted to the Mainland, six to the Island. The sketch map indicates the sites at which excavations were made. On the Mainland fairly extensive work was done at four sites (nos. 1, 2, 6, and 10), and casual excavations made at the others. Island sites, 3, 83, 100, 122, 131, 135, 138, 147, 159, and 162 were each worked for a week or more. A number of other sites were given some slight attention. Sites 1 and 2 proved to be the only Mainland sites whose cemeteries had not been rifled by previous investigators or by vandal amateurs. The result is that it was impossible to verify the apparent site and depth differences by means of excavations in the relevant cemeteries. The sites on the Island's northern shore have for the most part suffered the same fate as those of the Mainland, and it was only with difficulty that sites were found which had not been plundered by relic hunters.

The sites of the area which lie near the ocean front are, for the most part, of the familiar shellmound or kitchen-midden type, and do not differ materially in composition from their counterparts in other parts of California.[1] In size the middens vary from an insignificant scattering of a few thousand shell fragments to deposits nearly twenty feet in depth. The area covered varies just as greatly: a site half a mile in length may average but a few inches in depth, while other sites which may be no more than two hundred feet long may be many

[1] E. W. Gifford, Composition of California Shellmounds, present series, 12: 1–29, 1916.

feet in depth. Site 3 on Santa Cruz island is probably the largest of the entire region in respect to cubic content. It measures some 600 by 700 feet and averages about 6 feet in depth, giving about 2,500,000 cubic feet (93,000 cubic yards). The shell content, however, is unusually low, so that these figures give a somewhat exaggerated idea of its actual size. Probably the average of the more important middens on the island is under 300,000 cubic feet. Sites on the Mainland would average considerably less.

Without any systematic effort or sacrifice of time, 120 sites were located on the Island in addition to the 86 mapped by Mr. Leonard Outhwaite in 1918. Of these 206 about 10 per cent. have been touched by the archaeologist's spade, but the treasures of more than double that number have been looted by trophy hunters. While considerable collections could still be obtained, the more promising sites have all been more or less systematically excavated.

The usual plan followed in the excavation of large sites was first to sink a stratigraphic pit about three by thirty feet in the deepest part of the mound, using 6 or 12-inch intervals. Following this the cemetery or cemeteries were worked by series of pits. In the smaller mounds the same procedure was used, except that small stratigraphic pits were dug and the materials from them were not screened. In the stratigraphic pits all objects, fragments of objects, and animal bones were saved and segregated according to depth. Materials from the cemeteries were segregated according to burials. Whenever possible, skulls, pelves, and long bones were saved.

In all about 725 burials were unearthed, but in only about one-half of these were the bones firm enough to permit handling, and not more than 100 were sufficiently well preserved to allow the entire skeleton to be saved. A feature which greatly hampered operations was the occurrence of large numbers of burials in restricted areas. Within a space 75 feet square as many as 150 burials were found. The natives had a sophisticated attitude toward earlier interments and the digging of a new grave was often, even usually, accompanied by displacement of the remains of several previous burials. In most such cases little could be done with the disturbed bones in the way of allocating them with the proper skulls. Out of perhaps 300 individuals who at one time or another had been buried in cemetery 1 of site 83, only 107 were found in an undisturbed condition. In view of this state of affairs it hardly need be added that the depths at which bodies and objects are found in the cemeteries is seldom a criterion of relative antiquity.

GEOGRAPHY

Kroeber, in his Handbook of the Indians of California, outlines the territory occupied by the Chumash as follows:

> They held the three northern large islands of the Santa Barbara archipelago—Anacapa does not appear to have been inhabited permanently. They clustered thickly along the calm shore from Malibu Canyon westward to Point Concepcion and from there extended northward along the more boisterous and chillier coast as far as Estero Bay. Inland, in general, they reached to the range that divides the direct ocean drainage from that of the great valley; except that in the west their frontier was the watershed between the Salinas and the Santa Maria and short coast streams; and in the east, some small fragments had spilled into part of the most southerly drainage of the San Joaquin-Kern system. The Carrizo plains are doubtful as between Chumash and Salinan and may not have contained any permanent villages.[2]

The mountainous nature of the mainland portion is relieved only by the valleys of the Santa Maria, Santa Ynez, Ventura, and Santa Clara rivers, a few smaller valleys, and the narrow intermittent coastal plain between Point Concepcion and Point Mugu. Most of the river valleys begin as narrow defiles which gradually widen as they approach the coast. The coastal region, moistened by more abundant rains and by frequent fogs,[3] contrasts with the semi-desert of the interior, where only the mountain slopes give relief from the monotony of chaparral, cactus, and random oaks by presenting a generous clothing of conifers. Most of the small watercourses are dry the greater part of the year; and even the rivers fail to maintain a continuous flow all the way to the sea.

The islands, like the mainland, are cut by deep narrow valleys, though here and there fairly gentle slopes stretch from the higher peaks to the ocean. Sandy, surf-pounded beaches alternate with forbidding cliffs. The groves of large oaks, common on the mainland, are restricted to the wider and more sheltered valleys.

The flora and land fauna of the hinterland occupied by the Chumash offered no exceptional inducements to the native. It was otherwise along the coast, where sea mammals, fish, and shellfish are abundant. Accordingly we find a concentration of population along the coast, especially along the more favored ocean frontage between

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[2] Bureau of American Ethnology, Bull. 78:550–551.

[3] The average annual rainfall at Santa Barbara, based on a 54-year period, is 18.68 inches. It is considerably less in the interior. Precipitation is almost wholly limited to the period between the first of November and the end of March.

Point Concepcion and the Ventura river. The islands were in some ways even more favorable than the mainland coast—at any rate the sites are here both larger and more abundant. Higher winds and frequent fogs, especially at the western ends of the islands, are compensated for by the abundance of sea life.

Along the coast from Estero bay to Malibu canyon as well as on the islands, shell heaps which mark the old camp and village sites are found at the mouth of nearly every canyon, and frequently near springs as well. Obviously a supply of fresh water was a potent factor in the determination of village and camp locations. It seems certain that many, perhaps the majority, of these sites were not inhabited the year round. The acorn harvest, seasonal presence of game, and an intermittent water supply were probably the major features which influenced occupancy in such cases. It was along these shores where the population was concentrated that all our archaeological work was done. In the remainder of Chumash territory nothing was attempted beyond the briefest reconnaissance.

STRATIGRAPHIC EXCAVATIONS

While exploratory pits to determine composition and depth, as well as to locate cemeteries, were dug in a great many sites, careful stratigraphic work was done at only seven sites, and in only five cases were the mound materials screened. Ordinary gravel screens with 3 or 4 meshes to the inch were employed. In most cases a sufficient portion of the comminuted shell passed through the mesh with the ash and soil to render the artifacts visible in the residue of rocks and coarse shell. In most instances the mound material was removed in 6-inch layers, but at Mainland site 1 and Santa Cruz island site 147, 12-inch intervals were substituted.

Table 1 lists the commonest objects and their frequency in intervals of two feet. For the sake of brevity the smaller intervals which were actually employed have been grouped into these larger strata. Certain types of objects which occurred too rarely to be tabulated here have been included in table 4. It should be borne in mind that in all the tabulations fragments of objects, unless obviously from the same original, are counted as if they were complete artifacts.

Site and depth differences.—In all the mounds there is a decided tendency in the direction of progressive diminution in number of objects as the bottom of the mound material is approached. This is

especially noticeable in the bottom two feet. At first glance this might be taken to imply a certain amount of "progress" through the centuries, of cultural development and enrichment. Actually the differences are more apparent than real. They are almost certainly due for

TABLE 1

STRATIGRAPHIC EXCAVATIONS

Sites	Depths	Mortars	Pestles	Metates	Mullers	Pseudo-metates	Flint points	Basket pebbles	Bone tools	Straight fishhooks	Circular type fishhooks	Ornaments, beads, etc.	Steatite objects	Presence of asphaltum	Animal bones (lbs.)	Totals
Mainland site 6, trench 47′×5′, screened	0–2′	15	11	1	0	0	13	39	38	3	0	0	0	×	20	119
	2′–4′	11	6	3	8	0	6	45	42	6	0	1	1	×	36	129
	4′–6′	3	1	15	67	0	5	42	42	3	0	3	0	×	16	181
	6′–6′8″	0	0	2	28	0	7	6	37	1	0	4	1	×	1	87
Totals		28	18	21	103	0	31	132	159	13	0	8	2		73	
Mainland site 10, trench 30′×3′, screened	0–2′	2	1	0	0	0	14	39	35	2	10	22	1	×	11	126
	2′–4′	2	1	0	0	0	27	41	73	0	16	20	0	×	14	180
	4′–6′	4	3	0	0	0	20	78	55	1	4	5	0	×	20	170
	6′–8′	0	0	0	0	0	12	47	23	3	2	10	0	×	15	95
	8′–10′6″	0	0	0	1	0	1	5	0	0	0	2	1	×	2	10
Totals		8	5	0	1	0	74	210	186	6	30	59	2		62	
Mainland site 1, trench 30′×3′, screened	0–2′	3	4	0	0	2	9	9	10	2	0	3	2	×	4	44
	2′–4′	2	2	0	0	3	1	3	5	1	0	0	0	×	12	20
	4′–5′	1	1	0	0	1	4	7	11	1	1	3	0	×	7	30
Totals		6	7	0	0	6	14	19	26	4	1	6	2		23	
Sta. Cruz Island, site 100, trench 30′×3′, screened	0–2′	0	0	0	0	1	14	17	15	7	3	11	0	×	8	68
	2′–4′	0	2	0	0	8	11	40	20	7	14	12	0	×	38	114
	4′–6′	5	4	0	0	3	6	105	14	4	10	5	1	×	33	157
	6′–6′8″	6	0	0	0	3	2	75	10	3	1	6	0	×	13	96
Totals		11	6	0	0	15	33	237	59	21	28	34	1		92	
Sta. Cruz Island, site 147, trench 40′×3′ to 6′, then 10′×3′, Items below 6′ multiplied by 4.	0–2′	10	3	0	0	6	22	99	57	11	9	36	0	×	40	253
	2′–4′	26	2	0	0	19	8	182	33	12	9	64	3	×	40	358
	4′–6′	20	6	0	0	4	20	220	55	16	13	18	0	×	48	372
	6′–8′	0	0	0	0	0	36	200	36	20	4	16	4	×	36	316
	8′–10′	0	0	0	0	8	8	68	16	4	4	0	0	×	20	108
	10′–12′*	0	0	0	0	0	0	4	8	4	0	0	0	×	16	16
	12′–14′†	0	8	0	0	0	0	0	4	0	0	0	0	×	16	12
Totals		56	19	0	0	37	94	773	209	67	39	134	7		216	

* Not screened below 10′.

† Shell ends at 16′6″. Mid-tide level at about 15′9″.

the most part to a decrease in the shell and bone in the lower levels. Intensity of occupation is no doubt indicated very largely by shell and bone proportions. Artifacts, shells, and bones undoubtedly find their way below the original surface of the site and since the trenches were consistently carried to the extreme limit of the shell, the tabulations cannot but indicate discrepancies between levels which are in all probability determined by natural forces rather than cultural factors. In harmony with this interpretation is the obvious positive correlation between frequency of animal bones and frequency of artifacts. The same relationship will be found to hold for percentage of shell and frequency of artifacts.[4]

Differences in pattern or style of the same objects are almost nonexistent as we pass from the lower to the upper levels of any one site. Nowhere was a definite or significant change observable. Mortars and pestles, metates and mullers,[5] flint work, fishhooks and barbs, ornaments—all these, if present at the various levels, show a drab uniformity throughout.

In comparing site with site, however, a few seemingly significant differences come to light. Mainland sites 1 and 10 and Island sites 100 and 147 are alike in nearly all particulars. With the exception of the absence of "pseudo-metates"[6] from site 10, all of the classes of objects occur in all these sites. Mainland site 6 alone stands out as differing from the others in some respects. Genuine metates and mullers, except for a single muller from the lower stratum of site 10, are absent in the other four sites but are present in considerable numbers in site 6. Furthermore the proportion of metates-mullers to mortars-pestles changes very materially as we proceed from the lower to the upper levels of site 6. In the lower 4½ feet of pits A and B, 112 metates and mullers were found while only 4 mortars and pestles appeared. The relative frequency is reversed in the upper 4 feet, which yielded 42 mortars and pestles but only 12 metates and mullers. The excavations at this site make it appear that while both the mortar-

[4] This need not be true in comparisons of site with site. Thus, Mainland site 1 at pit A probably contains a higher average of shell than Island site 147, but site 1 is considerably poorer in artifacts.

[5] The metates of the region are the rough coast type with oval depressions. No metates of the Southwest or Pueblo type were found. (See fig. 1.)

[6] I have used this term for the various flat or concave slabs and fragments, which lack definite evidences of use as genuine mealing stones. That these stones were not genuine metates is borne out by the lack of mullers in the sites where they occur. Some show the marks of rubbing, but it seems likely that the grinding of shell ornaments and of bone implements rather than use as mealing equipment explains their peculiar form.

pestle and metate-muller modes of grinding were present almost throughout, there was a real change in the prevailing method. The metate and muller were used almost exclusively during the period when the lower strata were laid down, but gave way to the mortar and

Fig. 1. Oval metate of type found in site 6. Muller used with metates of this type; length 134 mm.

pestle in the later period. The very definite type of both metates and mullers found at this site (see fig. 1) makes it extremely unlikely that their absence from other sites should be an error of observation.

Site 6 also shows variation from the other sites in the absence throughout of the circular type of fishhooks. These are consistently

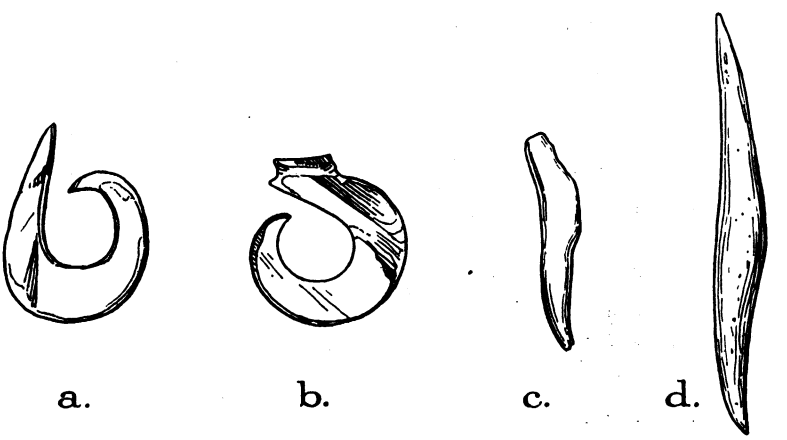

Fig. 2. *a, b,* circular type fishhooks of mussel and *Haliotis rufescens* shell; *c, d,* straight type fishhooks of bone.

present at virtually all levels of the other shell mounds. The straight type of hook seems to be present throughout in all mounds (fig. 2).

Relative age of sites.—Of the 5 mounds under discussion, post-European objects were found in 3 (sites 1, 10, and 147). Sites 83 and

100, judging by the preservation of perishable objects, are also relatively recent. Site 6, on the other hand, gave every indication of being considerably the oldest. Here the soil, shell, and ash have settled into a mass so compact that picks had to be employed before the shovel could be used.

The differences in texture of mound material, like the differences in types of objects, are not to be ascribed to local conditions, for sites 6 and 10 are only a few hundred yards apart and both have their seaward margins washed by the surf.

Furthermore, site differences in types of objects have been noted by other investigators. In 1877 at a site near Guadalupe, Stephen Bowers found more than 200 mullers as well as spearpoints, arrowpoints, and charmstones. In 1900 Dr. Philip Mills Jones visited the same site. I have gone over his materials from this site in the University of California Museum of Anthropology and find that exclusive of flint objects he collected 51 oval metates, 199 mullers, 11 mortars, and 3 pestles. Mr. David Rogers of the Santa Barbara Museum of Natural History has told me that he finds these definite types of mullers and oval metates restricts to certain sites.[6a] Mr. Malcolm Rogers of the San Diego Museum has written a paper[7] in which he

TABLE 2

TIME RELATIONS OF TWO SITES AT RINCON

Site 6										Site 10										
Depths	Pounds animal bones	Presence of asphaltum	Ornaments	Basket pebbles	Flint points	Bone tools	Circular hooks	Straight hooks	Mortars and pestles	Metates and mullers	Metates and mullers	Mortars and pestles	Straight hooks	Circular hooks	Bone tools	Flint points	Basket pebbles	Ornaments	Presence of asphaltum	Pounds animal bones	Depths
											0	3	2	10	35	14	39	22	×	11	0–2′
											0	3	0	16	73	27	41	20	×	14	2′–4′
											0	7	1	4	55	20	78	5	×	20	4′–6′
											0	0	3	2	23	12	47	10	×	15	6′–8′
0–2′	20	×	0	39	13	38	0	3	25	1	1	0	0	0	0	1	5	2	×	2	8′–10′6″
2′–4′	36	×	1	45	6	42	0	6	17	11	..	..	..	....	....	....	....	....	....	....	.....
4′–6′	16	×	3	42	5	42	0	3	4	82	..	..	..	....	....	....	....	....	....	....	.....
6′–8′6″	1	×	4	6	7	37	0	1	0	30	..	..	..	....	....	....	....	....	....	....	.....

[6a] Since this paper was transmitted Mr. Rogers has published the results of his investigations under the title, Prehistoric Man of the Santa Barbara Coast (Santa Barbara Museum of Natural History, 1929).

[7] The Stone Art of the San Dieguito Plateau, Am. Anthr., n.s., 31:454–467, 1929.

has stated that he believed the shell heaps which yield metates and mullers are the oldest sites in the San Diego region. This is substantially in harmony with the hypothesis of Mr. Rogers of the Santa Barbara Museum.

My own work in the Santa Barbara region bears out these findings in a more positive way, my proof being based on stratigraphy rather than on site differences alone. In site 6 the metate was the most common grinding tool during its earlier period, the mortar during the later. In adjacent site 10 no metates were found, and but one muller—and that in the bottom stratum. The recency of site 10 is proved by the presence of a Spanish coin (dated 1790) in the 2′ to 2′ 6″ stratum. It therefore seems likely that all, or most, of site 10 was laid down after site 6 was abandoned.

Table 2 represents what is probably the approximate time sequence of these two sites.

It is apparent from this tabulation that metates and mullers persist throughout the period of site 6 and into the beginning of the period when site 10 was being laid down. Circular fishhooks were unknown to the inhabitants of site 6 but were used during all but the earliest period of site 10. All other classes of objects were employed throughout the entire combined period.

TABLE 3

STRATIGRAPHIC EXCAVATIONS: FREQUENCIES PER 1000 CUBIC FEET

Site	Depths	Actual cubic feet	Mortars and pestles	Metates and mullers	Pseudo-metates	Straight fishhooks	Circular fishhooks	All other objects	Total objects	Average per 1000 cu. ft.
Mainland site 6	0–4′	940	45	13	0	10	0	205	264	294
	4′–8′6″	828	5	135	0	5	0	182	323	
Mainland site 10	0–6′	540	11	0	0	4	48	857	920	616
	6′–10′6″	405	0	2	0	10	10	289	311	
Mainland site 1	0–5′	450	29	0	13	9	2	149	201	201
Sta. Cruz Island site 100	0–4′	360	6	0	25	39	47	447	564	616
	4′–8′6″	405	37	0	17	17	27	598	669	
Sta. Cruz Island site 147	0–6′	720	93	0	40	54	43	1232	1462	980
	6′–14′	240	8	0	8	29	17	436	498	

Table 3 presents the same data as table 1 in a different form. Mortars are combined with pestles and metates with mullers. By calculations of the frequency of types of objects per 1000 cubic feet, the figures are made directly comparable, and differences in frequency which may be dependent on size of excavation are eliminated.

The significant differences between frequencies of metates-mullers and mortars-pestles and of the two types of fishhooks stand out more clearly than in table 1. Table 3 shows more plainly than table 1 that Island sites are definitely richer in artifacts than those of the Mainland. Site 6 (early) exceeds site 1 (late) in number of artifacts per cubic foot but falls far below all other late sites. In average number of artifacts the mounds of the Santa Barbara region are much richer than those of San Francisco bay. Five Santa Barbara sites yielded an average of 14.6 artifacts per cubic yard; three San Francisco bay mounds, 0.9 artifacts; a single mound on Humboldt bay, 3.0.[8]

It is evident from the foregoing data that, so far as Chumash territory is concerned, the metate and muller precede the mortar and pestle as the type grinding implements; and that the circular (shell) fishhook was unknown until about the middle of the period represented by the sites excavated. In other respects few evidences of change in culture based on stratigraphic work are to be seen. Flint work, ornamental objects (beads, etc.) and bone tools show no marked differences in type or frequency; and asphaltum, steatite, and basket pebbles,[9] in spite of their specialized characters, seem to have been used during the entire period covered by the sites investigated.

The inferences drawn from the stratigraphic work are borne out by findings at other sites. Surface collections from site 8 (Mainland) yielded 15 metates and mullers, and but 5 mortars and pestles; Mainland site 3 produced 48 metates and mullers, only 2 mortars and pestles; at Mainland site 5 were found 25 metates and mullers, no mortars or pestles. The site near Guadalupe where Jones collected 150 metates and mullers and but 14 mortars and pestles has already been mentioned. At none of these sites were human remains located, and at none were European objects found.

[8] See Kroeber, Handbook, 919. The actual differences are in reality even greater. Localized cemeteries enabled us to avoid burials in stratigraphic pits, and the artifacts found with the very few burials encountered do not appear in my tabulations. Artifacts with burials have evidently been counted in the San Francisco bay calculations.

[9] Pebbles of walnut size evidently used in the process of coating baskets with asphaltum. They were apparently heated and dropped into melted asphaltum, which was then poured into the basket. The basket was then rotated, the hot rocks keeping the asphaltum in a liquid state sufficiently long to permit the asphaltum to be spread in a thin layer.

On the other hand, the Mainland sites which were occupied until European times give reversed ratios of these objects: site 1, mortars-pestles 42, metates-mullers less than 10; site 10, mortars-pestles 13, metates-mullers 1. Santa Cruz island sites yielded mortars and pestles numbering hundreds, but not more than a half-dozen genuine metates and not one muller. A number of these Island sites were occupied until European times. It seems to be definitely established, therefore, that so far as the Santa Barbara region is concerned, metates and mullers constitute the typical grinding tool of the "early" period, while mortars and pestles virtually displaced them in the later periods. There is good evidence that the circular fishhook (commonly of shell, rarely of bone) came in at a relatively late period. It is nowhere associated in time with metates and mullers. In Island sites it occurs in all but 2 sites; on the Mainland only in sites which are definitely late.

EXCAVATIONS IN CEMETERIES

Table 4 presents the majority of classes of objects found and their frequency in various sites. The assignment of sites to tentative periods is based on a number of considerations: cemeteries which yielded European objects are in all cases classed as "late"; Mainland cemeteries which contain objects typical of the early period exemplified by site 6 are classed as "early"; Mainland sites which lack the types of objects found in site 6 as well as European objects are classed as "intermediate." Island sites which yielded European objects are classed as "late." The "early" Island sites are less objectively classified. Thus, charmstones are wholly absent from late sites and accordingly their presence has been used as one of the criteria of the early Island period. Similarly, bone pendants are not found in late Island sites, but do occur in a number of others. The occurrence of circular fishhooks has been used as a fourth criterion in temporal determinations.

To a certain extent my impressions of the relative antiquity of a site, based on density or hardness of the mound materials, on degree of patination of objects, and on preservation of bones and artifacts, have also been used in the placing of sites chronologically. Such general impressions have in most cases been in harmony with the less subjective determination by similarities in types or occurrences of classes of objects.

TABLE 4

CLASSIFICATION OF ARTIFACTS WITH BURIALS

	Materials from Cemeteries*																Materials from Stratigraphic Excavations							
Tentative period	Early Mainland		Intermediate Mainland		Early Island				Intermediate to Late Island						Late Mainland		Early Mainland		Intermediate to Late Mainland			Intermediate to Late Island		
Site number	2	11	1	1	159	162	3	83	83	81	100	82	135	138	1		6		10		1	100		147
Cemetery or pit numbers	....	....	1	2	....	....	....	2	1	....	....	....	....	....	3		A, B		A		A	H		A
Total burials	49	4	26	37	19	25	107	72	88	5	161	9	19	48	56		4′	4′6″	6′	4′6″	5′	4′	4′6″	6′ 8′
Mortars	17^{13}	6^{3}	12^{8}	3^{3}	0	1^{1}	10^{10}	12^{8}	7^{7}	0	4^{4}	0	3^{3}	0	14^{10}		25	3	8	0	6	0	11	56 0
Pestles	12^{6}	0	7^{7}	3^{2}	5^{3}	6^{5}	9^{6}	2^{2}	6^{4}	0	6^{5}	0	0	2^{1}	3^{2}		17	1	5	0	7	2	4	11 8
Metates	0	4^{3}	0	0	0	0	0	1^{1}	0	0	1^{1}	0	0	0	0		4	17	0	0	0	0	1	0 0
Mullers	1	4^{2}	2	0	0	0	0	0	0	0	0	0	0	0	0		8	95	0	1	0	0	0	0 0
Pseudo-metates	1	0	0	0	0	0	2	0	4^{4}	0	2	5	1^{1}	7^{3}	2^{2}		0	0	0	0	6	9	6	29 8
Flint points	21^{12}	7^{2}	2^{2}	26^{11}	6^{2}	4^{4}	14^{10}	7^{4}	40^{18}	2^{1}	53^{23}	1	8^{3}	6^{6}	14^{7}		19	12	61	13	14	25	8	50 44
Drills and picks	0	0	1^{1}	0	0	4^{3}	2	0	15^{7}	2^{1}	13^{13}	3	1^{1}	7^{7}	1^{1}		....	....	7	2	0	12	5	79 40
Perforated stones	0	0	0	0	2^{2}	14^{7}	21^{18}	16^{14}	9^{9}	0	11^{9}	0	1^{1}	5^{4}	0		0	0	0	0	0	0	2	3 4
Charmstones	9^{4}	0	0	0	4^{2}	2	1^{1}	0	0	0	0	0	0	0	0		0	1	0	0	0	0	0	0 0
Steatite pans	0	0	0	0	0	0	0	0	0	0	0	0	0	1^{1}	5^{4}		0	0	0	0	0	0	0	0 0
Steatite ollas	0	0	5^{5}	0	0	0	0	0	0	0	0	0	2^{1}	3^{2}	15^{9}		0	0	0	0	0	0	0	0 0
Steatite bowls	3^{3}	0	5^{4}	3^{3}	0	0	3^{3}	0	1^{1}	0	1^{1}	0	0	0	7^{4}		0	0	0	0	0	0	0	1 0
Steatite beads, etc	^{1}	0	11^{6}	17^{9}	0	2^{2}	^{21}	^{1}	^{14}	0	$^{10+}$	0	0	0	0		1	1	1	1	2	0	1	3 4
Pipes	9^{3}	0	0	0	1^{1}	1^{1}	0	2^{1}	2^{2}	0	2	0	1^{1}	1^{1}	6^{4}		0	0	0	0	0	0	0	0 0
Whistles	0	0	0	18^{5}	0	0	1^{1}	^{2}	8^{8}	0	6^{5}	0	0	0	1^{1}		0	0	0	0	0	0	1	1 0
Basketry	0	0	0	1^{1}	1^{1}	2^{2}	38^{35}	1^{1}	3^{3}	0	13^{13}	^{2}	0	5^{4}	0		0	0	1	2	0	2	1	42 4
Bone tools	2^{2}	2^{2}	9^{3}	9^{5}	12^{8}	3^{3}	89^{38}	18^{15}	57^{21}	3^{1}	42^{15}	^{3}	8^{3}	14^{9}	8^{5}		80	79	163	23	26	35	24	145 84
Circular hooks	0	0	1^{1}	1^{1}	0	0	0	0	42^{5}	20^{1}	55^{6}	0	0	1^{1}	3^{3}		0	0	30	0	1	17	11	31 8
Straight hooks	0	0	0	0	0	0	11^{5}	0	13^{7}	4^{1}	4^{3}	0	0	1^{1}	1^{1}		9	4	3	3	4	14	7	39 28
Haliotis shell dishes	5^{5}	0	3^{2}	2^{1}	3^{3}	^{7}	^{19}	^{11}	^{2}	1^{1}	17^{15}	0	1^{1}	0	12^{7}		0	0	0	0	0	0	9	6 4
Haliotis beads, etc	1^{1}	0	^{3}	^{2}	^{1}	^{5}	^{31}	^{8}	^{27}	^{1}	^{25}	^{3}	^{4}	^{11}	^{6}		0	0	2	0	1	1	1	7 0
Limpet shell beads	0	0	^{1}	^{9}	0	^{1}	^{6}	^{3}	^{7}	0	^{8}	0	0	0	0		0	0	3	0	3	2	1	3 0
Pismo clam beads	1^{1}	0	0	0	^{1}	^{10}	^{18}	^{16}	^{2}	0	^{2}	^{1}	^{3}	^{4}	0		1	0	3	0	0	2	1	12 0
Other shell beads	1^{1}	0	^{8}	^{9}	0	^{9}	^{52}	^{23}	^{17}	^{1}	^{46}	^{3}	^{4}	^{14}	^{6}		3	0	22	7	0	8	2	108 4
Bone beads and tubes	0	0	^{3}	12^{6}	^{5}	^{1}	^{5}	^{24}	^{19}	^{1}	^{11}	0	^{1}	^{2}	0		0	0	5	2	0	1	2	11 8
Bone pendants	0	0	0	2^{1}	1	1	2	19	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0 1
Inlay work	0	0	^{7}	^{6}	0	0	^{5}	0	^{5}	^{1}	^{5}	0	0	0	1^{1}		0	0	5	2	0	0	0	4 0
Ochre	^{11}	^{2}	^{2}	^{14}	^{5}	^{8}	^{35}	^{17}	^{12}	^{1}	^{27}	^{3}	0	^{8}	^{4}		0	2	6	2	0	3	2	0 0
Quartz crystals	2^{1}	0	3^{1}	3^{1}	0	0	0	1^{1}	0	0	5^{5}	0	2^{2}	4^{2}	1^{1}		0	0	0	0	0	0	0	1 0

* Large figures denote number of objects or fragments of objects, small superior figures the number of burials in which such objects were found.

TABLE 5

FREQUENCIES OF VARIOUS OBJECTS PER 100 BURIALS

Site number	2	11	1	1	159	162	3	83	83	100	135	138	1
Cemetery number			1	2				2	1				3
Tentative period	Early Mainland		Intermediate Mainland		Early Island				Intermediate to Late Island				Late Mainland
Number of burials*	100 (49×2)	100 (4×25)	100 (26×4)	100 (37×2.7)	100 (19×5)	100 (25×4)	100 (107×0.9)	100 (72×1.3)	100 (88×1.1)	100 (161×0.6)	100 (19×5)	100 (48×2)	100 (56×1.8)
Mortars and pestles	58	150	76	16	25	28	17	18	14	6	15	4	31
Metates and mullers	2	200	8	0	0	0	0	1	1	1	0	0	0
Pseudo-metates	2	0	0	0	0	0	2	0	4	2	5	14	4
Drills	0	0	4	0	0	16	2	0	16	8	5	14	2
Perforated stones	0	0	0	0	10	56	19	27	10	7	5	10	0
Charmstones	18	0	0	0	20	0	1	0	0	0	0	0	0
Steatite ollas and pans	0	0	20	0	0	0	0	0	0	0	10	8	36
Stone pipes	18	0	0	0	5	0	0	3	2	2	5	2	10
Circular hooks	0	0	4	4	0	0	0	0	46	33	0	6	5
Straight hooks	0	0	0	0	10	4	10	0	14	3	0	2	2
Bone pendants	0	0	0	2	5	4	2	25	0	0	0	0	0
Inlay work	0	0	28	16	0	0	5	0	5	3	0	0	2

* Figures in parentheses show basis of calculations.

The stratigraphic materials presented in table 1 are in part duplicated on the right-hand side of table 4. In addition a number of objects obtained in stratigraphic work which could not be conveniently shown in table 1 are also indicated.

Table 5 presents some of the data of table 4 in a different manner. Types of artifacts which do not seem to be of chronological significance have been omitted, and the frequencies have been made equivalent by presenting the frequency per 100 graves rather than actual numbers found. Island sites 81 and 82 have been omitted. As in other tabulations, fragments of objects, unless from the same original, are counted the same as complete artifacts.

CULTURAL CHANGES AND DEVELOPMENTS

The data presented in tables 1 to 5 allow us to draw certain conclusions as to the changes, rather minor to be sure but perceptible, which came about in the course of time in the region under discussion.

The Early Mainland period.—The stratigraphic work at site 6 and the minor investigations made at sites 3, 5, 8, 9, and 11 enable us to characterize the period, though in an inadequate way. More complete results should be forthcoming with the excavations of cemeteries which have an equal antiquity. At the beginning of the period covered by these sites there was already a certain amount of local specialization—as is evidenced by work in steatite and by the use of hot pebbles and asphaltum in coating baskets. It seems reasonable, therefore, to infer a previous period during which these techniques were unknown.

The main sources of food were shellfish, fish, land and sea mammals, and probably acorns and other seeds. Perhaps the high frequency of metates and mullers denotes a specialization in vegetable foods. At any rate such an interpretation fits in well with the relatively small amount of shell in sites of this period. On the other hand low shell content may in itself be a correlate of the greater time factor, though this seems unlikely.

Mortars (both the basket mortar and deep types) and pestles were used, but to a minor extent. The bow and arrow, spear, flint scraper, chipped flint drill, and flint knife were expectably present. The ubiquitous bone awl and a fishhook (see fig. 2) with a straight, double-pointed bone barb are the only bone tools recovered. Ornamental objects consisted of steatite and shell beads and ochre. Evidence of basketry rests on the occurrence of basket pebbles, and these permit us

to infer that baskets were given a coating of asphaltum to render them water-tight. Charmstones complete the list of objects from site 6.

Site 2 is rather difficult to place chronologically, but it seems likely that it represents a late phase of this early period. The metate-muller has by this time all but gone out of use, to be replaced by the mortar and pestle. To the list of objects known in site 6 have been added small steatite bowls, steatite pipes, abalone shell dishes, and quartz crystals.[10] Sites 9 and 11 add nothing new in the way of artifacts, but the presence of metates and mullers stamp them as of this period. Sites 3, 5, and 8 also represent this early period.

The Intermediate Mainland period.—With the exception of the metate and muller the elements of material culture known in the earlier period have persisted into this. New elements are steatite ollas (nearly globular urns or bowls, 5 to 18 inches in diameter, usually with small mouths), inlay work of shell beads set in asphaltum, whistles, circular fishhooks, a variety of shell beads, and bone beads and tubes. Steatite beads have become more common.

Late Mainland period.—Culturally there is little to distinguish this period from the preceding. It is represented by only one of the three cemeteries of Mainland site 1. Only one new element is added, steatite pans (large slightly concave slabs of steatite, evidently used as frying or baking pans). The higher frequency of steatite ollas is probably explainable on the basis of Spanish-introduced horses and larger boats which made communication with Catalina island and the Mainland to the south easier. The late period culminates in the brief post-European phase of Chumash culture.

The Early Island period.—In point of time this period, represented by sites 159, 162, 3, and cemetery 2 of site 83, is probably equivalent to the last phase of the early Mainland and the beginning of intermediate Mainland. Mortars and pestles are known but are not so common as on the Mainland—probably due to the paucity of acorn-bearing oaks. Metates and mullers are rare or unknown. The presence

[10] These may, of course, have been known during the period represented by site 6. They would not be likely to occur in the normal refuse heap in which our site 6 trenches were dug. A curious, and at present unexplained, feature of site 2 is the abundance of spearpoints and the rarity or absence of points small enough to be used on arrows. About 40 large and small spearpoints were found but, except for less than a half-dozen surface specimens, not one point which could be classed as an arrowpoint. Certain other respects in which the artifacts of site 2 differ from those of other sites will be discussed in the final report. If the bow and arrow is really absent, there is a faint possibility that we are dealing with a distant relative of the Basket Maker culture of the Pueblo area. But until more extensive work is done in sites of this type, it is futile to discuss even a remote kinship.

of charmstones and of bone pendants, and the absence of steatite ollas, cooking pans, and circular fishhooks set this off from later Island periods.

The Late Island period.—The "late" sites designate those in which European objects were found or in which other factors indicate recency. The charmstone has now passed out of vogue and bone pendants have followed suit. There has been a decided development of work in shell and nearly every grave of this period yields some sort of pendants, beads, and various other types of shell ornaments. By far the most common are those of haliotis shell and these occur in a bewildering array of shapes and sizes. Ornamental objects in other types of shell are more stereotyped in pattern. As on the Mainland the steatite pan and the steatite olla come in late. The low frequency of these objects on the islands seems to indicate that most of the traffic in them was between Catalina island (which seems the most likely source) and the Mainland rather than between Catalina and the other islands.

MISCELLANEOUS ITEMS

Canoes.—Several fragments from canoes were found, but only one of sufficient size to warrant any interpretation as to form and type. Seven short pieces, evidently from the two top planks, average about two feet in length, four inches in width, and one inch or less in thickness. They were lashed together by means of cord or sinew which was passed through holes bored about one inch from the edge. There are no indications that ribs were used in construction. If no ribs were employed, it seems likely that the lower part of the hull was of the dug-out type, since planks of the type found would not provide a strong enough hull if used exclusively. The lack of rib marks on our bits of plank, however, cannot be considered conclusive evidence that ribs were not used, or that the bottom of the hull was of dug-out type.

Perforated stones.—No definite evidences of the use of these objects was obtained. Some show the marks of use as polishing implements, and were probably used in finishing arrow, spear, and harpoon shafts. There is some evidence that they were used as the "hoop" in the hoop and pole game. A number of considerations point to a purely ceremonial use, perhaps replacing the earlier "charmstones." Only a small percentage of the specimens have perforations large enough to permit use as digging-stick weights, and their occurrence in the graves of males also indicates other uses than that of auxiliaries to the digging-stick.

Basketry.—The majority of our basketry remains consists of the asphaltum lining of water baskets. The fibers have decayed, leaving the imprint of the texture and weave. That nearly all the specimens are from Island site 3 is undoubtedly to be explained by the fact that a supply of fresh water is some one and one-half miles distant in summer, hence a need for a considerable number of water receptacles. Wicker, twined, and coiled forms occur but the wicker type seems to be the most numerous at this site. Wicker basketry seems to be rare or unknown in southern California in recent times.[11] Since site 3 is early, it is likely that wicker weaves were more common in the early period and that the coiled and twined types came to be almost the only weaves used in the late period. A few bits of basketry from late sites show a preference for the use of surf grass in open twined work. A few fragments of the coiled type were also found in late sites, but wicker weaves seem to be absent. Mats which probably served for wraps and bedding were common, with surf grass in twining the prevailing form.

Fetish bundles.—The identification of wrapped ceremonial objects as fetish bundles is based on comparable objects described by living Indians in southern California. Groups of objects with remains of the "bundle" or wrapping were rare; in most cases the mat or basket wrapping had probably disappeared. Of the contents of such bundles one example will suffice: painted fabric or basketry containing 2 perforated stones, 5 awl or spatula-like batons with quartz crystals set into the open ends, 3 loose quartz crystals, 2 steatite pipes, a small incised steatite dish, and a number of beads, pendants, curious shells, etc.

Pottery.—The Chumash did not manufacture pottery but now and then stray pieces were acquired by trade. Not more than a half-dozen sherds were found, and these were all found within three feet of the surface of the mounds or in post-European cemeteries. All the fragments are the rough, reddish ware common in southern California.

Houses.—It is noteworthy that not more than a half-dozen definite floor surfaces were encountered in all our work. Even pits dug in hut circles often failed to locate the floor levels. This may mean that the same spots were seldom occupied by houses for long periods of time or it may simply indicate that the débris of the shellmounds packs little and that the floor stratum does not become appreciably harder than the normal refuse.

[11] Kroeber, Handbook, 560–562, 698–702; Am. Mus. Nat. Hist., Anthr. Pap., 20:147–183, 1922.

One hut circle was completely excavated. The house was circular, 16 feet 8 inches in diameter, the floor rising a bit near the walls. The entire structure was evidently a hemisphere. The frame was of poles which were supported by 4 or 5 posts near the center. The door was formed by 2 whale ribs so placed as to form an arch. The roof was thatched with surf grass laid 2 or 3 inches thick. The fireplace was a slight depression at the center flanked by a rough circle of cobbles and flat stones. We can infer a smoke-hole at the crest of the dome. The entire floor was covered with a layer of clean beach sand. The door was to the north, in this instance the land and leeward side.

CULTURAL DEVELOPMENT

In the foregoing pages I have tried to indicate the evidences of culture changes from the early to the late periods. The culture of the region was already somewhat specialized during the earliest times of which we have information. This is indicated by the use of asphaltum and steatite. The capture of sea mammals and the gathering of shellfish indicate a culture already more or less maritime in its outlook. The mortar and pestle are gradually substituted for the metate and muller at what is perhaps the middle period. We can suppose that about this time the islands were populated. A little later the charmstone passed out of vogue and the circular shell hook was developed. Bone and whale-tooth pendants, often decorated with designs in dot depressions filled with black or red paint, seem to be a special development and are limited to the earlier Island culture. Perforated stones are of very rare occurrence in Mainland sites but are common enough in both early and late Island sites. Fishhooks of both types are much more numerous in Island sites—an indication that the Island culture was more maritime in nature than that of the Mainland. This inference is borne out by the lower frequency of mortars and pestles.

The changes in culture which the materials indicate are rather minor in nature and for the most part gradual. There are no indications of sudden or major shifts in pattern of culture. The tribal or linguistic groups may have changed a number of times in the several thousand years probably involved, but if so the newcomers must have taken over the culture of their predecessors substantially *in toto*. The material culture represented throughout gives evidence of no remarkable developments beyond the bare needs for a rather drab existence,

and here, as elsewhere where this is true, there is long adherence to primitive uniformity in the few objects needed to secure a livelihood.

The stable character of the culture, the few new developments, and the regional differences are diagrammatically represented in figure 3. Relative frequencies are based on tables 3 and 5.

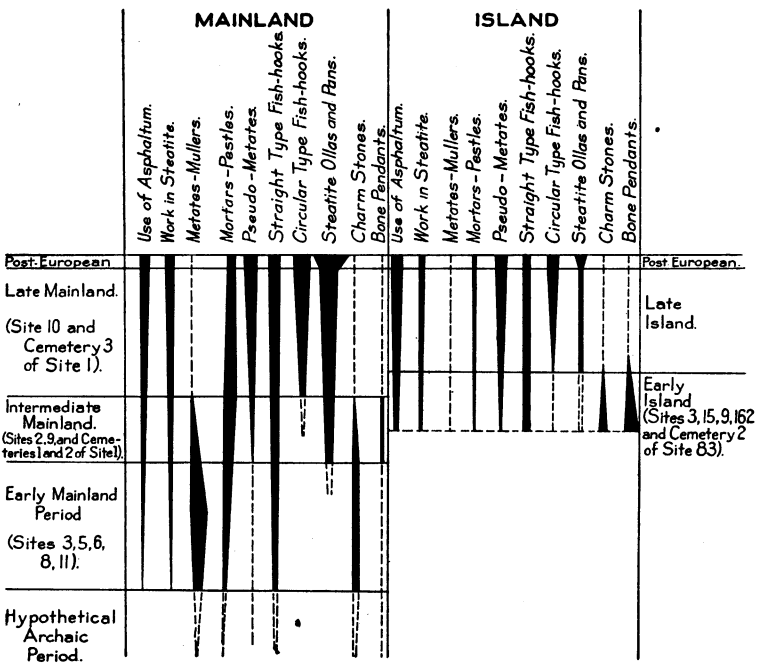

Fig. 3. Reconstruction of prehistoric cultural changes, Chumash area.

Possible Oceanic affiliations.—Southern California exhibits a number of traits in both material and social culture which have provided cause for the suspicion of Oceanic influences. But until some bit of definite evidence comes to light the safest attitude is one of cautious acceptance of the possibility of such affiliation. Our investigations yielded no such definite evidence. The late appearance of the circular shell hook, the perforated stone (which is a faint reminder of the club heads of Oceania), and, by inference, the plank canoe—all reminiscent of Oceanic culture—provide little grist for the mill of those who believe in these historical contacts. On the other hand, Oceanic provenience is not ruled out by any hoary antiquity for these artifacts, which are all relatively recent.

Transmitted June 14, 1929.

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