

THE ABORIGINAL CEMETERY AT LAS FLORES CREEK,
CAMP PENDLETON

by

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ENCLOSURE (1)

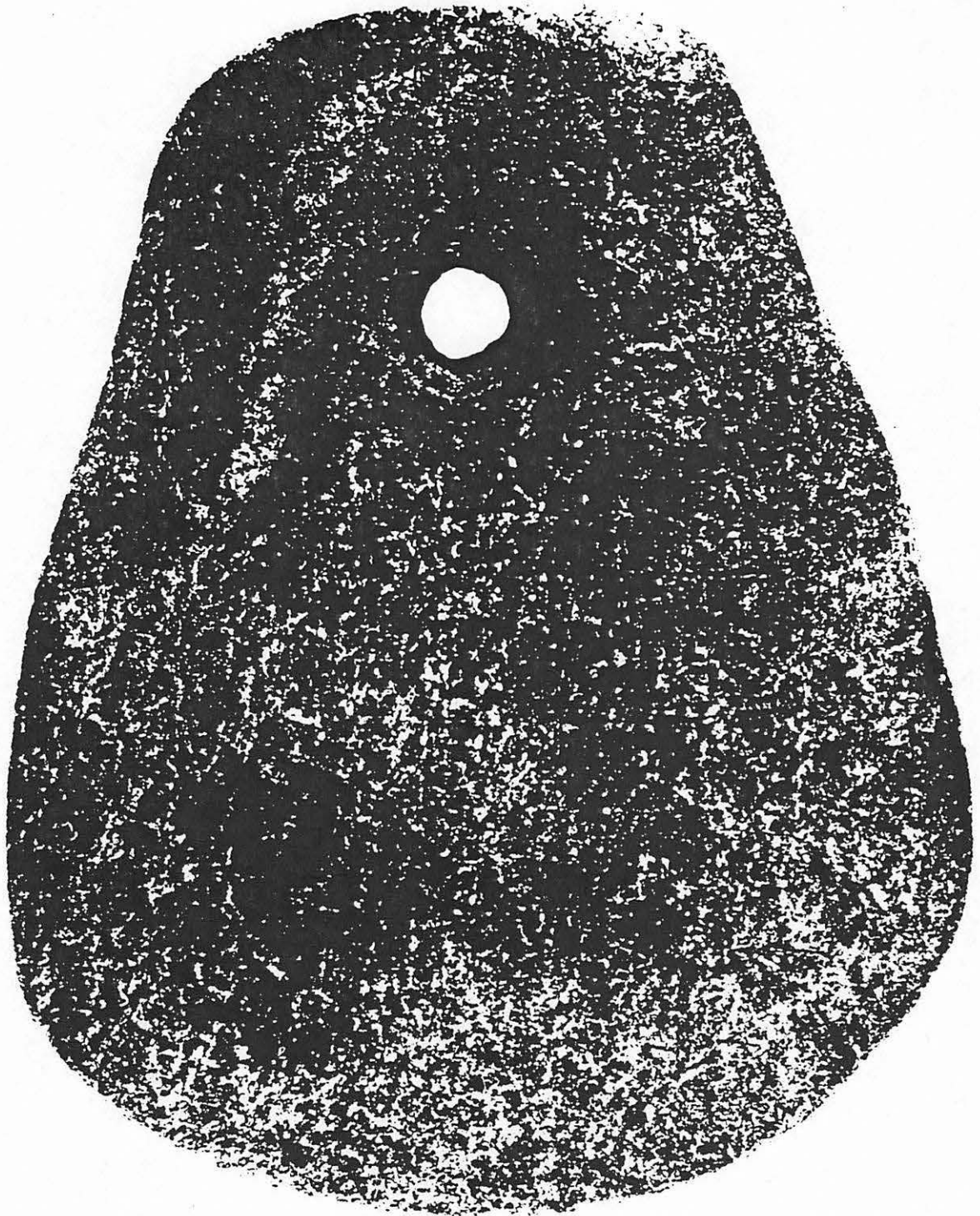


Fig. 1. Warming stone, obverse side. Scale 1:1.

ACKNOWLEDGEMENTS

In attempting a work such as this one seems to create an ever-widening circle of persons who, by one means or another, contribute. Often it is not possible to list them all, if for nothing else because one's memory may prove faulty. If I have thus overlooked a helper I regret that lapse of memory. Through his interest, enthusiasm, and perseverance, Paul L. V. Campo, Geologist for the Marine Corps at Camp Pendleton, brought this project about. An unknown number of Marines, from the Commanding General on down, contributed permission to enter and work on the Reservation and sentries to protect the site (and the excavators) from molestation. Charlie Bull and Sue Ann Cupples gave unstintingly of their time when asked during the preparation of the report. Dr. Lois Lippold donated her time in the field and Diane Brockman cheerfully answered a string of questions from me. Professor Madelon E. Heatherington, of the English Department, Montana State University at Bozeman, interrupted her Christmas vacation to edit the first half of the paper; if the latter half does not read as smoothly as the first half it is because she has not yet had a chance to complete her editing. Sue McClure cheerfully endured my delays, insertions, and other plagues to the typist resulting from authorship. And my wife, Greta, in addition to doing some editing herself, endured my pre-occupation toward her without complaint--on the contrary, she encouraged it as a means of speeding the work along. That

some of those people received some monetary reward does not discharge the debt of gratitude I owe.

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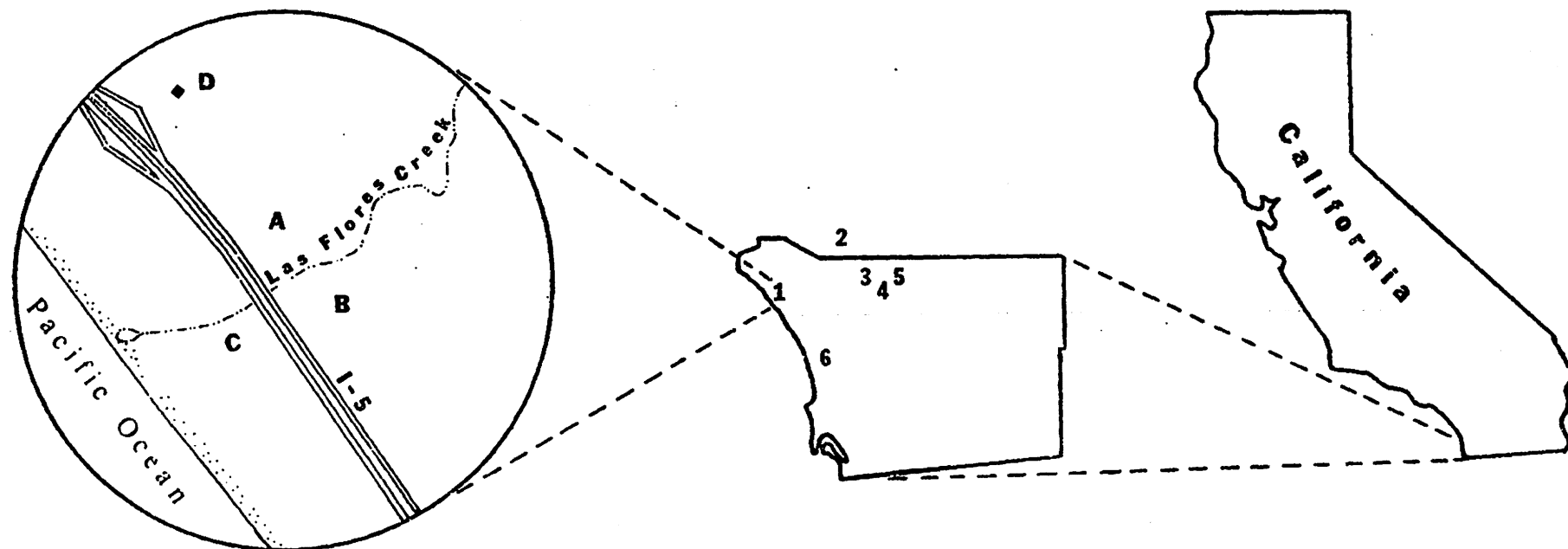
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THE BACKGROUND

This report describes the results of an unanticipated series of excavations conducted during the periods June 7, 10, 18-29, July 1, 1973, and May 29 and 30, 1974, in the area (Fig. 2) on the north side of Las Flores Creek, Camp Joseph H. Pendleton Marine Corps Reservation, where construction had begun on a wildlife sanctuary. When the construction of a marsh-and-pond habitat was being planned by the Marine Corps in 1971, Mr. Paul L. V. Campo, a geologist in the Natural Resources Office of the base, asked me to go with him to see whether any archaeological resources existed in the area. With no funding in the budget for archaeology, there was no thought of an excavation program at that time; instead, the general plan was to design the sanctuary around any archaeological sites, should any be found, in order not to disturb them.

The locality chosen for the wildlife sanctuary appeared a most unpromising one for an archaeological site. The area of the future sanctuary occupied part of the flood plain of Las Flores Creek; the silty deposit which covered that plain gave evidence of the periodic flooding to which it had been subjected in times of high water in the past. The few rocks which could be seen on the surface showed no signs of having been altered by human activity, nor was any shell noted-- usually the first seen indication of past human presence. The only elevation apparent to the unaided eye was, and is,



- A Cal. A:11:3
- B Cal. A:11:15
- C Cal. A:11:6
- D Asistencia de
Las Flores (ruins)

- 1 Las Flores Creek
- 2 Temecula
- 3 Pala SDI. 132
- 4 Pauma Val. Rincon 47
- 5 Palomar Mtn. State Park
- 6 Great Western Site

1/2/75 MJH

Fig. 2. Map showing location of the aboriginal cemetery at Las Flores Creek and of relevant archaeological sites in San Diego County.

occupied by the buildings of the hacienda of Las Flores, about one quarter of a mile to the north of the proposed refuge area. An aboriginal site had been found on a previous field class survey a few yards to the north of the ruins of Las Flores' asistencia (a place with a structure where the religious needs of a community could be ministered to, but with no priest in residence or even visiting it at predictably regular intervals). The asistencia ruins are on the ridge which overlooks the hacienda to the south.

Because such a situation for a site conformed to the pattern for location of sites in this part of California, and in view of the evidence for flooding, it was thought not surprising that no surface evidence of aboriginal occupation was found, since there probably had been no occupation of that floodplain. Consequently, I assured Mr. Campo that the construction could proceed as planned without provision for preservation of archaeological resources, since none appeared to exist. But I did suggest to him that we would appreciate being notified of anything interesting.

Then, on June 6, 1973, my telephone rang and Paul Campo announced, "Hey, buddy, we got a skeleton up here, and it looks as if he was buried standing up!" Upon discovery of the burial, construction had been halted, and idle equipment and men were eating up the construction budget. Campo had had a line of barbed wire strung on posts around the area and had sentries visiting the site periodically until we could confer on how best to proceed. I sent a graduate student, Dana Isham, and his wife, who had worked on

the excavations at Buckman Springs the preceding summer, to investigate further. His report, summarized below, appears as Appendix I. Isham discovered that the individual had been buried in a flexed position but, contrary to expectation from previous evidence for San Diego County (e.g., Shumway, Hubbs, and Moriarty 1961:63, Fig. 8, and 64, Fig. 9), had been placed in a prone position (on his back), which accounts for the impression that the individual had been buried standing up. The right arm was extended along the side of the torso, while the left forearm was crossed diagonally over the abdominal region toward the pelvis. Specimen 1972-24-7, the only projectile point found at the site, lay 25.5 cm (10 inches) distally (toward where the feet would have been in an extended burial) from the left side of the pelvis and 15.3 cm (6 inches) below the surface which had been created by the grading.

On Sunday, June 10, 1973, graduate student E. J. Germeshausen, Jr., who had been excavation foreman on the Buckman Springs project during the summer of 1972, and Joan Germeshausen, who had been cataloguer on that project, accompanied me to the site. We were joined there by Paul Campo, Staff Sergeant Dodson, Marine Corps dental technician Sydney Logsdon, and Lois Logsdon, who also had archaeological experience.

While excavation and recording of burial 1 was being completed, we attempted to identify the boundaries of the site by visual inspection. Expectably, this proved difficult,

not only because of the transportation of evidence brought about by the grading, but also because no marked change in soil color or composition set off the site from the rest of the general area until one had moved quite far from the burial location. Then it could be seen that the soil was generally somewhat lighter in color, although still of the same texture, and patches of darker soil were assumed to represent transportation and redeposition by the graders. On these bases, an area lying mostly north and east of the burial, and measuring approximately 50 meters/yards in an east-west direction by 35 meters/yards in a north-south direction, was marked off as including somewhat more than the probable site area.

The material removed by the graders--it was to form the dikes and levees which would impound the water to construct the sanctuary--consisted of uniform, finely sorted silt deposited in a layer some 18 inches (50 centimeters) thick over the flood plain of Las Flores Creek. That half-meter stratum, sterile and virtually devoid of larger particles, had completely masked the site from pre-construction observation. Excavation of the burials provided an indicated depth for the site of only about 50 centimeters. Even after excavation, the layers were still poorly defined, with the upper and lower strata tending to grade into each other rather than being marked by sharp contrast, but excavation did make the culture-bearing stratum more distinct from the culturally sterile deposit on which it rested.

Later excavation of a test unit at the edge of the yet ungraded area provided inconclusive evidence that the blades had probably removed not more than 5 to 10 centimeters (2 to 4 inches) from the top of the site. This was substantiated to some extent by the discovery, in the course of the 1973 excavations, that there was a qualitative difference between the silty overburden and the substratum on which it lay, the substratum containing more clay and being more dense and compact. To a skilled equipment operator, the change in pitch in the engine of his machine would have been readily reflected in the depth of "bite" set by him on his blade.

At the time of discovery, Paul Campo had marked a fragment of bone lying 13.2 meters (14.5 yards) south-southwest from the burial. Despite the periodic checking by sentries, this piece of bone had disappeared. Investigative excavation revealed another burial at the spot where the bone had been; the missing fragment of bone had probably been a portion of the cranium (Campo 1972). When excavated, this second individual showed the same attributes as the first in most respects--flexed, prone, the head to the east but turned toward the right side so that the individual had been facing north.

Assuming that the piece of bone from burial 2 had been lost to souvenir-hunters, we determined that the only feasible means of protecting and preserving the remains was to remove them for safe-keeping after recording. At the close of the field work in 1973, these remains were

reinterred at the spots from which they came, and all burials were masked so as to obscure their precise locations in order to preclude further souvenir collecting. Other than the point found with burial 1 by Isham on June 7, 1972, no other cultural remains were found in the course of the excavation of the two burials, but two small hearths, Features 1 and 2, were identified, excavated to the degree necessary for photographic recording, and left intact as found, since they offered nothing attractive to souvenir hunters. The Marine Corps did not wish to give up plans for construction of the wildlife refuge and thus see no benefit resulting from the funds already invested in it. Since the site appeared small and the recognizable artifacts apparently few, it was decided that if funds could be found, an exploratory excavation would be carried out.

Problems and Methods

Three problems were defined for the excavation: (1) to determine more precisely the lateral extent of the site area in order to mark the perimeter (and a bit over), so that construction could proceed with no chance of further transgression on the site; (2) to make an intensive inspection of the surface, seeking more cultural material in an effort to establish the cultural affiliation of the group which had used the spot; and (3) to obtain subsurface shell for radio-carbon dating. Based on the evidence available to us at the time, an estimate of the funds necessary to seek answers to

these problems was given Paul Campo, who was able to obtain the estimated funds from the Marine Corps by May 1973.

At this point, however, changes of circumstance required changes in approach, particularly in method. First, the funds had to be committed before the end of June or be lost. Second, by this time of year, most of the competent personnel known to me were already otherwise committed, so that I foresaw considerable difficulty in assembling an adequate crew with which to carry out the excavation using the customary methods originally planned. And, finally, although no one had actually reminded me of the delay, I was uneasily aware of how long construction of the bird sanctuary had already been postponed, awaiting completion of the excavation.

In view of those considerations, I therefore used a backhoe to cut trenches so that the sidewalls of the trenches could be speedily inspected to determine the perimeter of the culture-bearing area. A pair of experienced archaeology students was to be on the ground watching the backhoe for cultural materials brought up from below the surface; Charles Bull, a graduate student, and Sue Ann Cupples had worked on the Buckman Springs excavation during the preceding summer, after completing the courses in field methods in archaeology at San Diego State, and had in addition participated in numerous surveys.

Although I adopted that course somewhat uneasily, I felt that the risk was calculatedly slight that additional burials might be found. At the time, judging by the presence

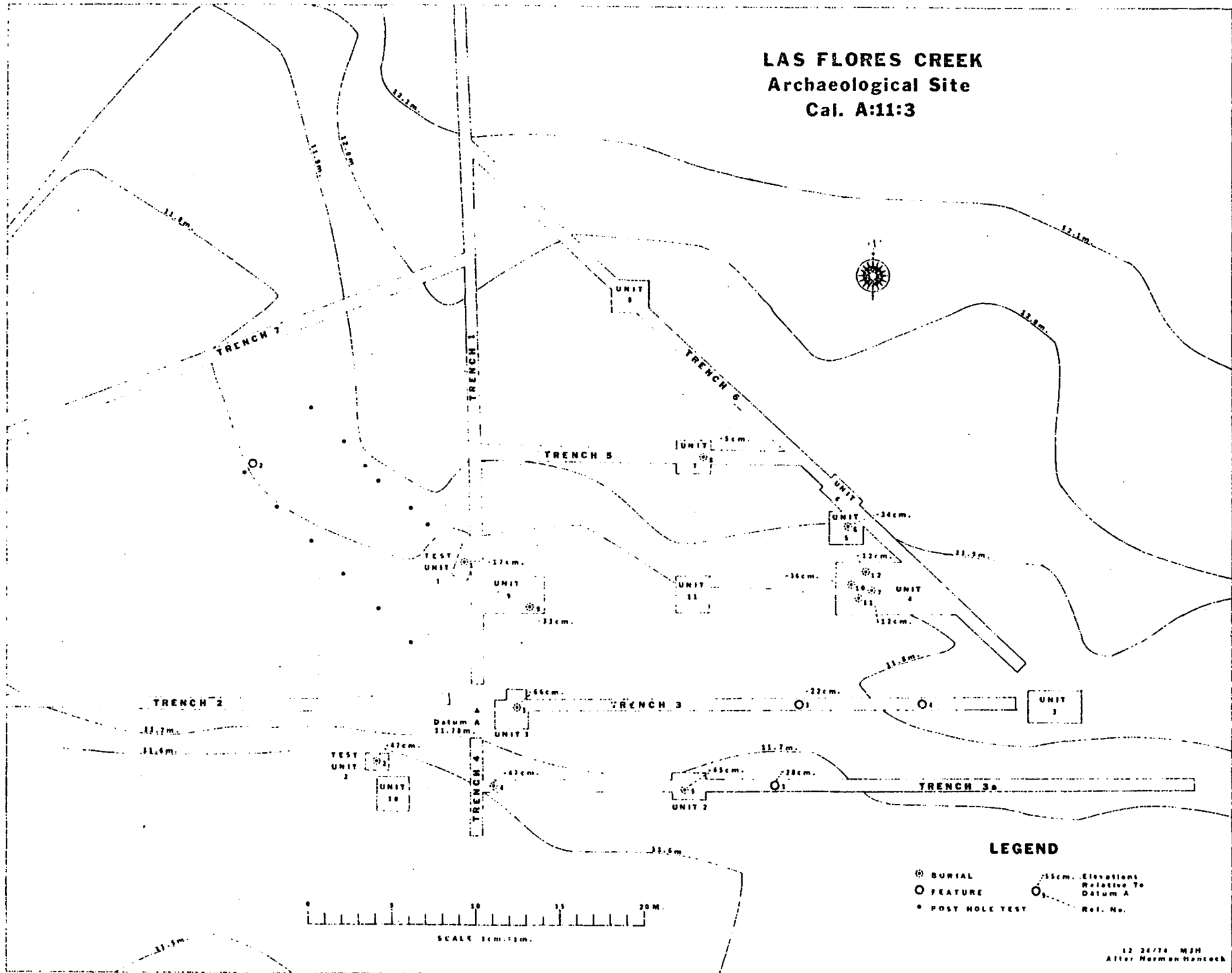
of flexed inhumations and what few examples of the technology were available, I had evaluated the site as late La Jolla, although I was puzzled to account for the prone burials. My knowledge of such sites in this part of California was well expressed by Shumway, Hubbs, and Moriarty (1971:93:41):

"Although shell middens are numerous along the California coasts, middens with burials are not abundant." Except for donax ("bean" or "depression" clam), so little shell was present as to suggest only slight exploitation of shellfish resources, and thus I did not perceive the site as a "shell midden." And this was certainly no Scripps Estate site in appearance of size, depth, and indicated number of burials.

Excavation was thus begun on June 11, 1973, as soon as final examinations were over. Bull watched the bucket of the backhoe as it passed through the ground, Sue Cupples recorded and watched the backdirt as the bucket was emptied, and Sue Szydelko cataloged items brought to her by Bull and Cupples without waiting on final or precise identification. Mapping was kept current daily by Norman Hancock, who had laid out the grid of 4-meter squares before excavation was started (Fig. 3). Stratigraphic profiles (Fig. 4) were drawn in the field by Clarence Richie as each trench or unit was completed. In addition to the exploratory trenches, a number of units other than the burials was excavated by hand.

Throwing all my calculations off, by June 13 two more burials had been found, and a larger crew had to be put to

LAS FLORES CREEK
Archaeological Site
Cal. A:11:3



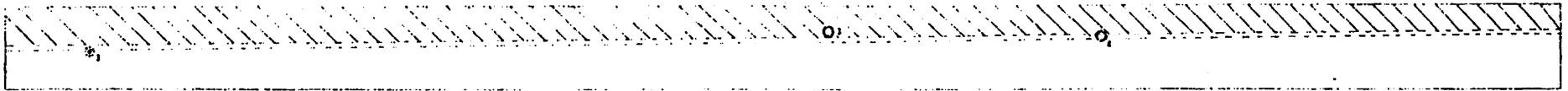
LEGEND

- ⊙ BURIAL
- FEATURE
- POST HOLE TEST
- 55cm. Elevations Relative To Datum A Ref. No.

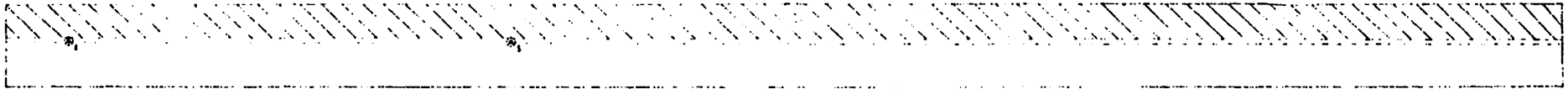


LAS FLORES CREEK CAL. A:11:3
Soil Profiles

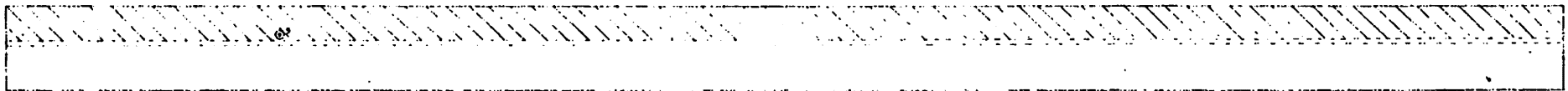
TRENCH *3



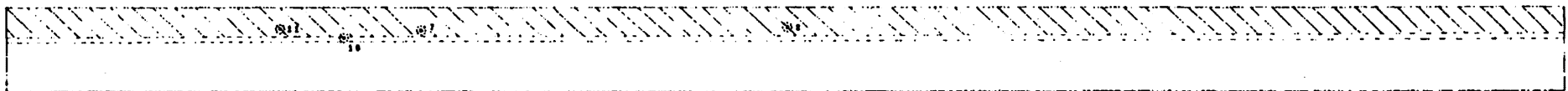
TRENCH *3a



TRENCH *1



TRENCH *6



LEGEND

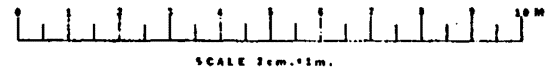
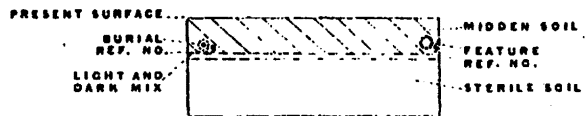


Fig. 4

work, with Bull as foreman and Cupples recording full time. An around-the-clock guard was provided by the Marine Corps so that the burials could be left in place. As each burial was uncovered, Cupples filled out a standardized burial record. By June 29, to our dismay, a total of 12 burials had been located, excavated, and recorded in the course of seeking the answer to our first question. Mr. Paulsen, the operator of the backhoe, quickly developed a "feel" for his task; after the first burial he found, he was able to control the bucket so delicately that the backhoe caused almost no disturbance to subsequent burials--far less than had been caused by the graders, but they had been caught by surprise.

On Sunday, July 1, 1973, Dr. Lois Lippold, physical anthropologist; her assistant, laboratory technician Diane Brockman; and Dr. Larry Leach, Chairman, all of the Department of Anthropology, San Diego State University, made measurements and observations of the burials in place. (The data on the physical anthropology of the burials are presented in Appendix II by Brockman.) As their study was completed for each burial, it was promptly re-covered with earth, so that finding the burials again without the aid of the site map and the datum point which we had established would be virtually impossible.

THE SETTING

Shortly after emerging from the Santa Margarita Mountains to the east, Las Flores and Las Pulgas Creeks join into one

stream. On its way to the sea, the stream has carved a valley through the piedmont which extends from the mountains to the ocean, leaving mesas on the north and south sides of the bed. Before the recent dry cycle, the stream had evidently been a meandering one, changing its course a number of times, for one of the former channels was found during the excavation (Fig. 4). Owing to their elevation and their proximity to the sea, the Santa Margarita Mountains would have received considerable precipitation during wet periods, and the catchment basin drained by Las Flores and Las Pulgas creeks would have provided the resultant single stream with a head of water sufficient to cause it to spill out of its channel. Such overflow must have happened repeatedly, until comparatively recent times, as evidenced by the deposit of silt covering the floor of the valley on which the aboriginal cemetery was located. Even in dry weather, when the cemetery site could have been occupied, the creek probably carried water, judging by the account given of the locality in 1860 by Judge Benjamin Hayes (1929:119). Should the creek have run dry, however, there was evidently a spring near the present location of the Hacienda de Las Flores (Hayes 1929:118) from which the Indians could have obtained water.

Because such an environment offered an advantageous opportunity for stock raising, an asistencia of Mission San Luis Rey was established near an Indian settlement at Las Flores in about 1823 (Rush 1965:93). Even before that, however, the stock of the mission had been ranging over the

area. By 1860, at least, some of the land near the site of the present hacienda was being cultivated, for Hayes (1929: 119) reported a Mexican couple ". . . living in a little shed, open on three sides and roofed with straw. They are here, for the present, in order to watch their cornfield nearby against the inroads of Mr. Forster's cattle at night."

With the construction of the hacienda after Hayes' visit, the impact of the cattle-raising and planting on the surrounding area was so increased that the floodplain biome of Las Flores Creek would have been changed drastically. Hancock (1973), for example, has told of sub-soiling (deep plowing) having been carried out by Magee, the last occupant of the hacienda. The marks of the teeth of such an implement appear on some of the artifacts recovered (see Fig. 5c).

In view of such changes, including the deposition of the silty overburden on top of the cemetery, one can only speculate as to what plant and animal life may have existed in the area when those aboriginal creators of the cemetery would have been exploiting the natural resources. Presumably then, as now, doves, quail, several kinds of aquatic birds, brush rabbits, ground squirrels, and deer would have been available, as well as a variety of seed-producing plants. If they did not grow close around the spot, oaks would have provided acorns nearby in the mountains.

In the summers of 1972 and 1973 I completely misinterpreted the significance of donax shells at Las Flores.

Because the shells had been widely distributed around the site by the grading, because I did not consider the improbability of a shoreline 30 feet above the present sea level, and because the donax shellfish is so small that ordinarily it is not thought worth exploiting, I attributed its presence to what I thought to be a past beach line, before silting had raised the land level. (In fact, during the Depression, people did use donax for food, hence one of its common names, "Depression clam"; and Campo [1974] states that in the earlier years of the century, the clams were even exploited commercially in San Diego.) Then, when construction was resumed in the spring of 1974, the graders uncovered two more burials a thousand feet away from the main part of the cemetery; those burials--not included in the map (Fig. 1) because of the size which would be required--were treated as the others had been, with an emergency crew supervised by Charles Bull and Phyllis Eastland. But since the grading of the two had not been carried so far as with the earlier burials, it was possible to see here that donax and cultural debris (fire-cracked rocks and flakes) were distributed essentially coincidentally. The people of Las Flores had obviously exploited these small shellfish extensively, despite the low yield of food per clam.

STONE TECHNOLOGY

Of hand specimen petrology and typology

The great majority of the specimens recovered was made on well rounded and often polished cobbles and pebbles representing secondary deposition following long stream transportation from many widespread sources. The source for the tool materials probably was the channel of Las Flores Creek nearby; thus, unless a more precise identification were possible (in the case of vesicular basalt, for example), the specimens were identified generally, using the criteria set forth by Pirrson and Knopf (1947). For example, the term "felsophyre" was used for light-colored rocks of porphyritic texture rather than attempting to distinguish among rhyolite, trachyte, quartz latite, or latite porphyries.

In an attempt to avoid the unintentional misrepresentation brought about by the use of terms which, traditional though they may be in archaeology, nevertheless convey connotations about use/function which may not be demonstrable, the attempt at a non-connotative typology set forth by Kaldenberg (Kaldenberg and Ezell 1974:122-145) will be followed in this paper. As that work is as yet generally unavailable, descriptions appropriate to this collection will be quoted in full. Ground/pecked stone tools usually give little difficulty, so that terms such as "hammerstone," "mano," "metate," "mortar," and "pestle" should not need definition. It is in the category of tools produced by

Table 1. Statistics on ground/pecked stone artifacts.

<u>Type</u>	<u>Catalog no.</u>	<u>Material</u>	<u>Form</u>	<u>Weight (g)</u>	<u>l., w., t. (cm.)</u>	<u>Provenience</u>
hammerstone	1972-24-146	basalt	unshaped	165.3	7.0 x 4.4 x 3.6	Unit 9
hammerstone	1972-24-52	felsite	unshaped	322.7	7.0 x 6.7 x 5.0	surface
hammerstone	1972-24-129	felsite	unshaped	357.2	8.1 x 7.2 x 4.0	surface
hammerstone	1972-24-84	basalt	unshaped	1763.2	12.8x10x2x9.4	surface, NE quad.
mano, unshaped	1972-24-123	felsophyre	unifacial	247.9	8.5 x 6.3 x 3.0	surface
mano, unshaped	1972-24-150	felsophyre	bifacial	569.9	10.4 x 9.1 x 4.1	surface
mano, unshaped	1972-24-22	felsophyre	bifacial	592.8	11.3 x 8.0 x 4.5	Trench 1
mano, unshaped	1972-24-30	felsophyre	bifacial	624.3	10.5 x 9.0 x 4.2	Trench 3
mano, unshaped	1972-24-38	felsophyre	bifacial	752.1	9.8 x 9.2 x 5.8	Trench 3
mano, unshaped	1972-24-50	felsophyre	bifacial	1402.5	12.8 x 11.5 x 6.6	surface, NE quad.
mano, unshaped	1972-24-142	granite	bifacial	1542.0	13.5 x 12.3 x 6.3	surface
mano, shaped	1972-24-17	felsophyre	bifacial	934.3	10.9 x 9.8 x 6.8	Trench 1
mano, shaped	1972-24-149	basalt	4-sided	1142.7+	13.5 x 7.7 x 7.5	surface
mano, non-diag.	[97] -- ---		fragments	23.3 kg.		
metate, unshaped	1972-24-18	sandstone	basin	1701.0	21.5 x 14.7 x 8.0	Trench 1
metate, unshaped	1972-24-41	felsophyre	basin	----	4.8-3.4	near burial 3
metate, unshaped	1972-24-44	felsophyre	basin	----	5.7-3.9	Trench 4
metate, unshaped	1972-24-73	sandstone	basin	----	9.8	Trench 1, N12
metate, unshaped	1972-24-139	sandstone	basin	----	6.8-4.5	surface
mortar	1972-24-33	felsophyre	fragments	----	----	Trench 3
mortar	1972-24-144	basalt	fragments	----	----	surface
mortar	1972-24-8	felsophyre	fragments	----	7.0	Trench 1
mortar	1972-24-12	basalt	fragments	----	7.5	Trench 1
bowl? shaped	1972-24-141	basalt	fragments	----	----	surface, NE quad.
pestle, unshaped	1972-24-148	felsite	pebble	1492.5	21.5 x 9.0 x 5.4	surface
problematical	1972-24-143	quartz	pebble	65.5	5.0 x 4.7 x 1.8	surface
problematical	1972-24-11	basalt	pebble	71.3	4.2 x 3.7 x 3.4	Trench 1
problematical	1972-24-63	felsophyre	pebble	113.1	8.0 x 4.9 x 1.1	Trench 3
problematical	1972-24-68	dolomite	pebble	170.3	8.4 x 5.7 x 2.2	Trench 6, N8E24
problematical	1972-24-132	dolomite	pebble	125.9	8.2 x 4.5 x 2.6	surface
problematical	1972-24-5	schist	?	----	----	surface
problematical	1972-24-37	steatite	shaped	1846.0	18.5 x 14.5 x 4.1	Trench 3

fracturing the material that the greatest confusion over terms occurs, and it is those definitions which will be quoted at the beginning of the discussion of the appropriate artifact class.

Ground/Pecked (Table 1)

hammerstones

Considering the number of flakes recovered, four hammerstones seem an unexpectedly low number for this type of artifact, nor do the ones found show signs of much use. Specimens 1972-24-52, 129 and 84 are pebbles unaltered except for the flaking and battering caused by use as hammers. One, 1972-24-146, shows very little use, perhaps as a consequence of having been broken before much battering was achieved. Its use as a hammerstone may, in fact, have been secondary for, unlike the other three, this one is a portion of a once large thick flake, probably a split cobble.

With so small a sample, only little weight can be given to any inferences regarding these artifacts. The considerable disparity in size between the three complete specimens might mean different flaking tasks in terms of the force of the blows required. Certainly the larger one shows much larger flake scars than does the smaller. In addition, a pattern can be suggested of not deliberately shaping the hammerstone, but of simply using any convenient pebble.

manos

Eight of the nine specimens recovered which have been classed as manos do not show a degree of faceting indicative

of long-continued use. The range in size is considerable; see the columns headed "weight" (in grams) and "dimensions" (length, width, thickness, in centimeters). Since specimen 1972-24-123 may not have been used in food processing, perhaps it should not be included in this class. Owing to its small size, when compared with the others in the collection and with others described for other sites in northern San Diego County, it is more like the artifact described as a "rubbing stone" (True 1958:3:259) or a smoothing stone (True, Meighan, and Crew 1974:11:59).

If that specimen be excluded from this artifact class for the sake of comparisons both within the collection and with those described for other sites in northern San Diego and southern Riverside Counties, the remaining artifacts still encompass a range of 972 grams in weight.

Table 2. Comparisons of manos by reported dimensions (except Molpa, where maxima and average had to be calculated), and attributes of form. SDi 132 (Meighan 1954:2:218), Temeku (McCown 1955:18), Rincon 47 (True 1958:3:258), Great Western (Kaldenberg and Ezell 1974ms:131).

<u>Site</u>	<u>Range in cm.</u> (l., w., t.)	<u>Average (cm)</u> (l., w., t.)	<u>UU</u>	<u>UB</u>	<u>WB</u>	<u>SB</u>	<u>MP</u>	<u>SU</u>	<u>AS</u>
Las Flores	10.4 x 9.1 x 4.1 13.5 x 12.3 x 6.3	11.0 x 9.4 x 4.2 11.0 x 9.4 x 4.2		8					1
SDi 132	ca. 8-12 dia.	8.3 length				17		11	2
Temeku	3.0 x 2.5 x 2.0 14.0 x 11.0 x 7.0		24		5	30			
Rincon 47	9.7 x 7.1 x 5.8	11.6 x 8.6 x 5.5	11	4		11		5	
Molpa	12.8 x 9.2 x 5.7	9.0 x 7.0 x 4.7	6	11	5	39	7	5	
Great Western	6.0 x 5.0 21.0 x 13.0								

Since the attributes of dimensions were reported differently for those other sites and the weights not reported at all,

only limited conclusions can be drawn from an attempt at comparison among the sites. The manos from Las Flores appear somewhat more consistent in size than those from the other sites, since the range in dimensions is not as great at Las Flores as at the others. There was less variety of form in the manos from Las Flores, but far fewer Las Flores manos showed deliberate shaping. Where comparison of average size can be made, the manos from Las Flores average slightly larger than those from other sites except Rincon 47, where the manos averaged the largest of all the sites. Pecking of the grinding surfaces on manos was only reported for Rincon 47 (True 1958:3:258), where it was found to be "common," in contrast to those of Las Flores where none showed pecking. Two (1972:24:30 and 38) which at first appeared to have been pecked are now seen as doubtfully so; the dimpling appears to be the result of breakdown of phenocrysts.

Turning to the attribute of form, inspection of Table 1 shows that, excluding specimen 1972-24-123, six of the remaining eight were simply collected and used, acquiring thereby some slight faceting and polishing on both faces which permit their identification (e.g., see Fig. 5a). One (Fig. 5b) had been lightly trimmed around the perimeter, producing an approximation of a disc.

One (Fig. 5c) had been substantially trimmed around the perimeter, producing an oval which almost approaches a rectangle. This one has all its surfaces worked, but nevertheless does not compare closely with Meighan's Type 3

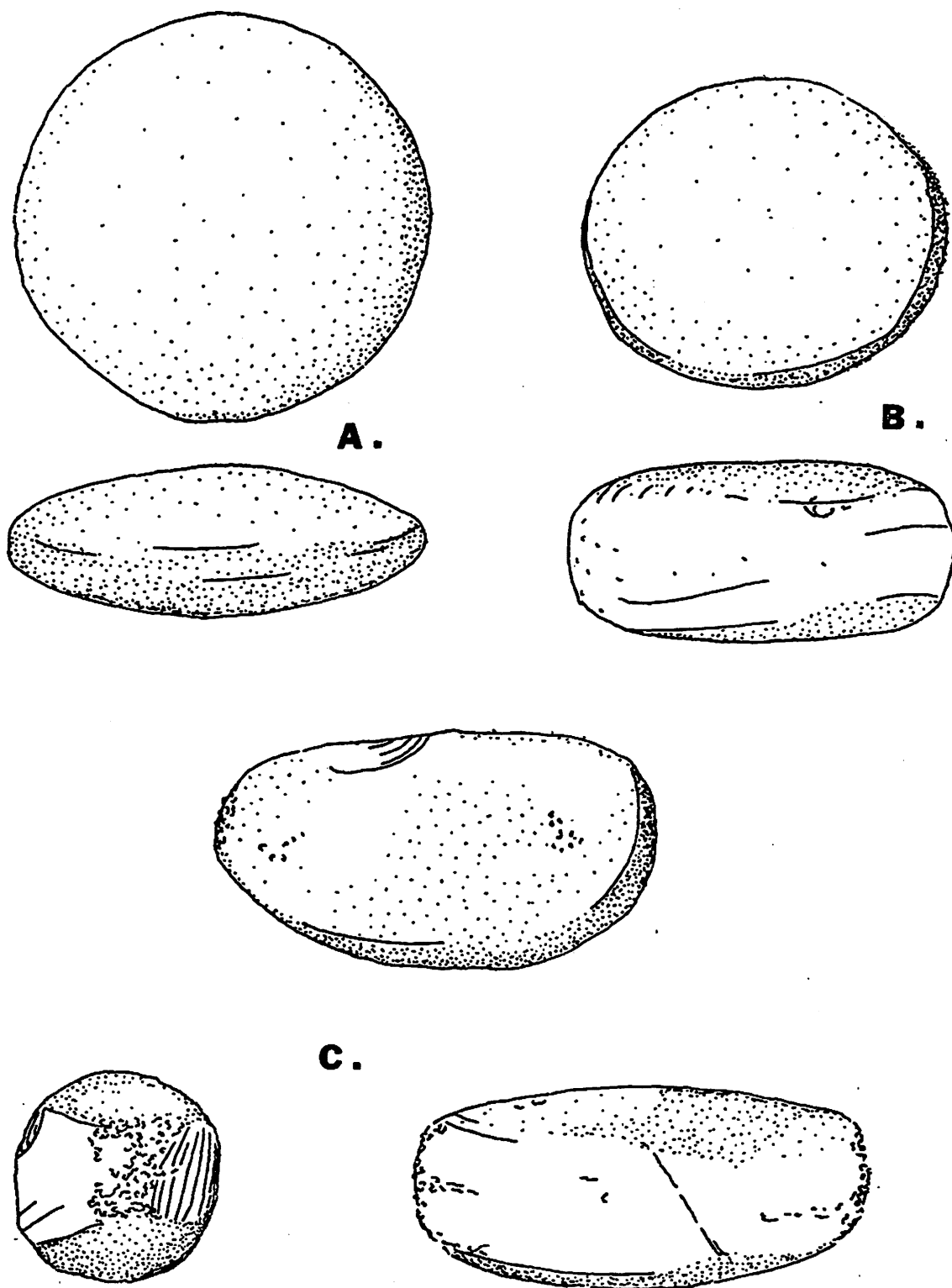


Fig. 5. Manos; unshaped, a; shaped, b and c. Length of c, 13.5 cm. (5 5/16 in.).

(1954:2:218 and Plate 1h), a type he describes as sharing the attribute of having all its surfaces shaped. Of all the artifacts in this class from Las Flores, this one shows the greatest polishing on the two opposed grinding surfaces. One may speculate, then, that unlike the rest of the manos, it had been made and used elsewhere and brought to the site in its finished form.

metates

One complete specimen and four fragments of this class of implement were recovered. The only phenomenon possibly diagnostic about these artifacts is that all, including the complete one (Fig. 6a), were evidently simply cobbles which, owing to their shape, were convenient for the purpose with a minimum of preparatory work. Specimen 1972-24-18 apparently had required only pecking of a naturally concave side over an ill-defined area of approximately nine by thirteen centimeters, to create a milling implement. So far as can be judged from the fragments, they were created the same way. Although they lack significance at the present, the maximum and minimum thicknesses (except 1972-24-73, where no realistic minimum thickness can be reported) are given in Fig. 4. It might be that if enough such data are reported, something of use may emerge.

As with the manos, none of the specimens show signs of much use. The pecked surfaces of the sandstone ones exhibit no polish, and the examples made of aphanitic rocks only slight polish; the difference may more likely be due

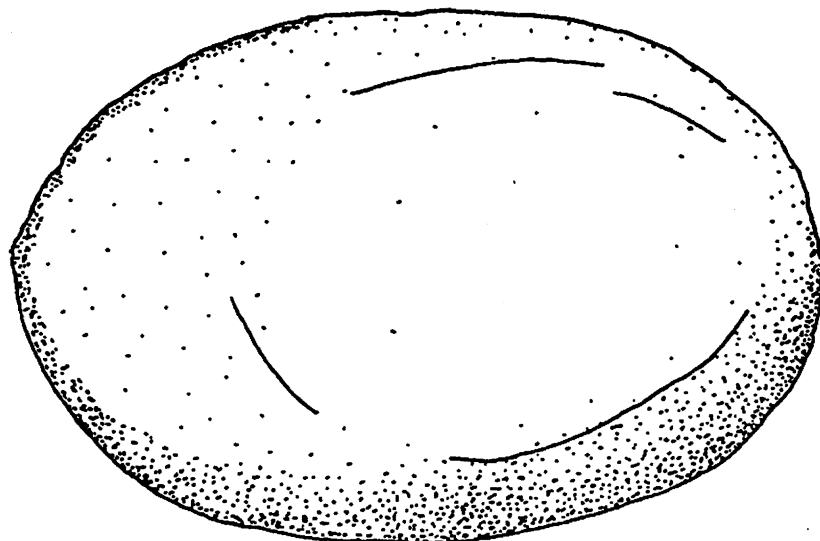
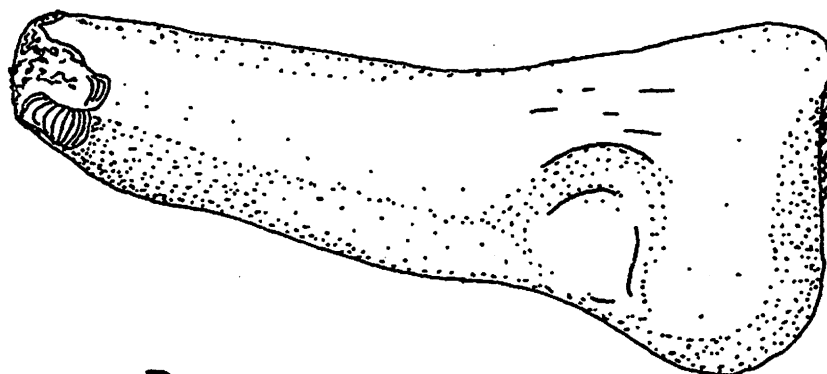
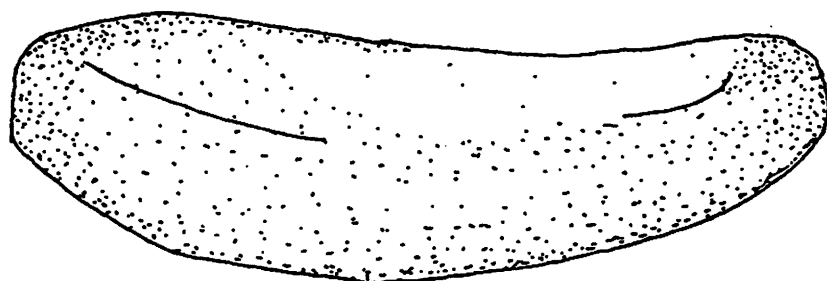
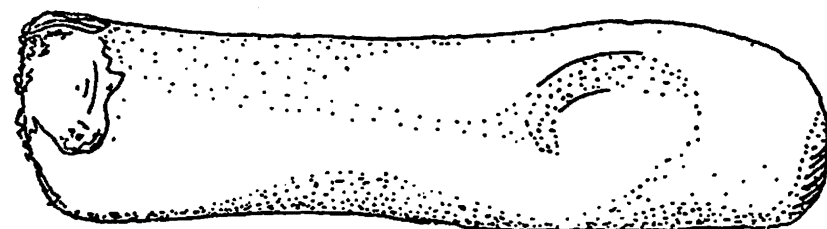
**A.****B.**

Fig. 6. Metate, a; pestle, b. Length of each, 21.5 cm. (9 ⁷/₁₆ in.).

to the nature of the material than to any difference in use.

Although True (1958:23:258) describes deep basin metates at Rincon 47, no evidence was reported of these implements either at Molpa (True, Meighan, and Crew 1974:11:36-37) or at SDi 132 (Meighan 1954:218). Since nothing was said about shaping the metates at those two sites, it might be presumable that they were unshaped, but no comparison made on such a presumption would be of any value.

Comparing the ratio of manos to metates at Las Flores with ratios at three of the other sites reveals a much lower ratio at Las Flores. At Las Flores the figure was only 1.6 to 1--that is, there were fewer than two manos per metate. At SDi 132, however, this ratio was 5.0 to 1, at Molpa 4.0 to 1, and at Great Western 5.5 to 1. As always, it can be argued that nothing but differences in collecting is reflected, but this difference may equally be a function of different uses having been made of different sites.

mortars

With no complete examples and so few (four) specimens recovered, only partial inferences about the form of these artifacts can be attempted. Two fragments of rims, 1972-24-33 and 144, show a rounded profile (Fig. 7a and c), unelaborated by flattening or lipping. The angle formed by the exterior and interior surfaces is much greater for number 33 than for number 144, which may be an indication of number 33's lesser depth. The curvature of number 144, when the rim is oriented to the horizontal, indicates that the greatest

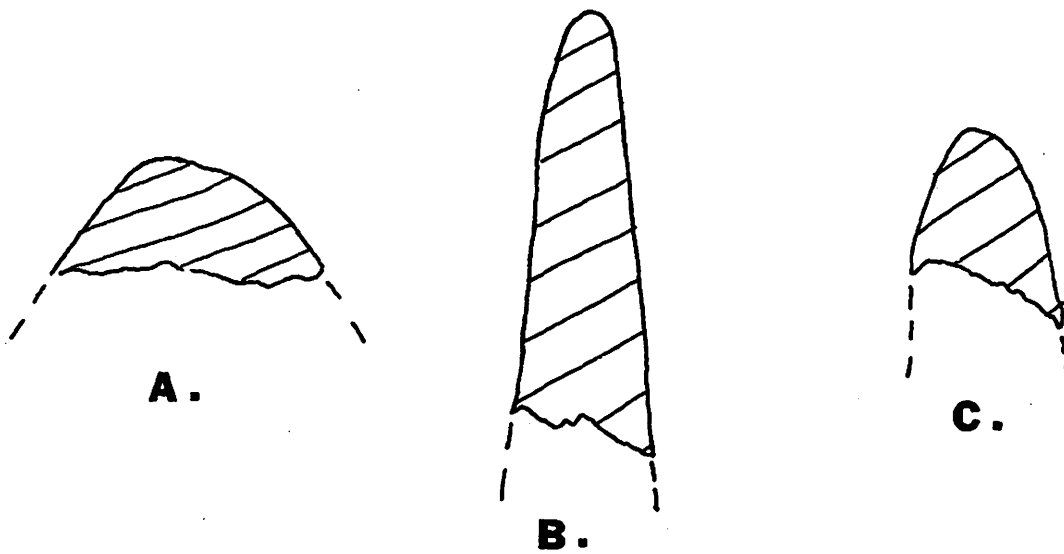
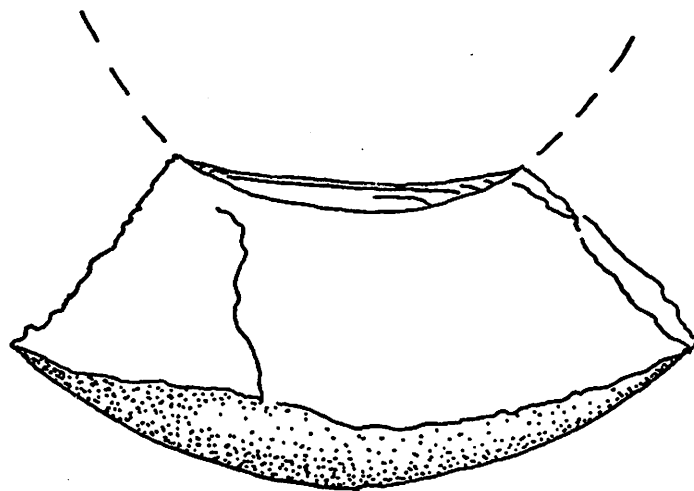


Fig. 7. Profiles of rim fragments of mortars, a, b; bowl?, c.



A.

Fig. 8. Fragment from bottom of mortar.

outside diameter of the implement was somewhere below the rim, implying that the complete implement was in some degree spherical. Since number 33's arc was so short, it was not possible to project that arc of the rim in order to estimate the original diameter of the mouth of the mortar. For number 144, an approximate diameter of 23.5 cm. at the inside of the rim was projected. The exterior surfaces of both specimens are so smoothed--and number 33, perhaps because of the material of which it was made, even shows some polish--as to promote the conclusion that the artifacts had been completely shaped on the exterior.

Specimens 1972-24-8 and 12 are fragments from very near to, if not actually at, the bottoms of two other mortars. The exterior surface of number 12 clearly shows that it had been shaped to an evenly rounded bottom. The exterior of number 8 (Fig. 8), while curved as evenly as number 12, shows no marks of manufacture; thus, number 8 may as likely have been naturally rounded as shaped. Although portable mortars were reported from SDi 132 and Temeku (Meighan 1954:2:220, Fig. 2; McCown 1955:16 and Plate 7a, b, c), the data are inadequate for any comparison among them.

Again, with so small a sampling, and that consisting only of fragments, comparisons are of dubious value, but it seems a curious coincidence that the ratios of mortars to metates reflects the ratios of handstones to metates in the three sites. (These mortars were portable only; with no bedrock outcrops in the vicinity, bedrock milling was not an

activity which could have been carried on at Las Flores.) At Molpa there were 1.5 mortars for every metate; at SDi 132, it was 1.6 to 1; but at Las Flores, there were only .6 mortars for each metate. Again, this coincidence may derive from collection accident, but may also reflect a different set of processing activities.

bowl/mortar

This ambivalent identification for specimen 1972-24-141 (Fig. 7b) has been chosen because the thickness of the vessel wall in proportion to the size of the fragment is markedly less than is the case with the other fragments of mortars collected. On the other hand, the material (vesicular basalt) is frequently found used for mortars in the Pinacate area of northwestern Sonora (Hayden 1967:154), and may be the "lava" used for the mortars from Temeku reported by McCown (1955:16 and Plate 7b, c). The wall of specimen 141, however, is markedly thinner than the walls of the Temeku mortars, hence its designation as "bowl." The interior of the fragment shows smoothing from abrasion but it is not possible to determine whether that resulted from simply finishing the artifact or from abrasive use, although the latter origin is more likely because the smoothing appears only on the inside. Projection of the arc of the rim of number 141 yielded an approximate interior diameter at the rim of 17.7 cm.

Since nothing similar was reported from the other sites, nothing more can be attempted in the way of comparison.

pestle

Only one example of this implement was recovered (Fig. 6b). As with the most of the manos, a pebble essentially rodlike by nature was put to use without any apparent alteration except the battering on both ends brought about by use. The material, a form of felsite, is one which lends itself well to pounding and hammering; two of the three hammerstones were also made of it or a closely related material.

With only one sample, any attempt at comparison is fruitless. Specimen 1972-24-148 does not fit the geological definition of a cobble (Pirsson and Knopf 1947:230) used here, so one can only note that the use of suitably-formed large pebbles has been reported for SDi 132, Temeku, and Molpa (Meighan 1954:2:216, McCown 1955:19, and True, Meighan, and Crew 1974:11:57). The case for Rincon 47 is not clear, and none were reported from Great Western. That different rocks were employed for pestles in the other sites can be attributed to the kind of resources available. While absence of evidence is not evidence of absence, and while completely shaped pestles (like those reported for Molpa and associated by the authors --on what seems adequate ethnographic evidence--with religion) may exist at Las Flores, identification by Meighan et al. of the unshaped pestles as "ordinary" food processing devices applies with equal reasonableness to specimen 1972-24-148.

problematical objects

Five of these objects are included as part of the collection, even though they show no signs of modification by any human activity, because their presence at the site requires

explanation. One anomaly is that the matrix of the site consists of a mixture of clay and sand--a deposit laid down by water lacking the force of flow to transport particles the size of these pebbles. Another is that the bulk of the stones found at the site were either artifacts, flakes, or fire-cracked. Finally, all specimens are eye-catching, either because of form, as in the case of number 1972-24-71, which is nearly spherical, or 1972-24-63, which is thin, flattened, and smoothed almost to the point of being polished, or 1972-24-143, which approaches a perfect disc in shape; or because of color, as in the case of 1972-68, 132, and 143, which are light cream to white.

For whatever reason these specimens may have been carried to the site, I feel that the possibility that they may have been so transported deserves testing; their presence at (or absence from) sites to be examined in the future should be recorded and reported. Such data may turn out to be meaningless, but we will not know that until they are collected, reported, and analyzed. It may be held that ethnographic examples of such transportation from other cultures from other parts of the world cannot be adduced in support of the hypothesis just presented. But McCown (1955:30) recorded the following incident:

While dining at the restaurant in Temecula with Mrs. Machada [evidently not a Luiseño (McCown 1955:opp. Plate 5)] one day in 1953, she opened her purse and showed me two obsidian nodules which she told me she had found in the Temecula area. She said she had carried them in her purse for many years as they intrigued her.

He went on to comment:

The Indians were accustomed to collecting interesting and intriguing objects and carrying them in small leather bags. Strange rocks are often found in the village sites which had been gathered and brought to the site merely because they were pretty or odd-shaped or intrigued the finder.

One problematical specimen (number 1972-24-5), along with others, made it past the cataloging table but, as so aptly observed by True, Meighan, and Crew (1974:11:11), has evidently ". . . been incorporated into museum middens," for it could not be located. This was a fragment of what may have been a disc of some sort, a schistose rock which appeared to have been worked at one portion of the perimeter, for the edge there was smoother than the other edges. The specimen was too small to be certain whether or not it had in fact been a disc or a pendant, nor could any meaningful measurements be taken.

About specimen 1972-24-37 (Figs. 1, 9 and 10), the only question is: "What is it?" The size of this item would cause most to regard it not as a pebble, but as a slab or tablet, although Winterbourne (1967:2&3:100) classed a grooved specimen (item 68) measuring nineteen by fourteen by seven millimeters as a pebble. The artifact was made of a hard variety of steatite; it can be cut with a knife, although not easily, and there is only a faint feeling of that "slickness" which has led to the common name "soapstone." Paul Campo (1974) has stated that he knows of no outcrop of steatite on the base. Comparison of this artifact with steatite artifacts in the Museum of Man in San Diego from the Cuyamaca

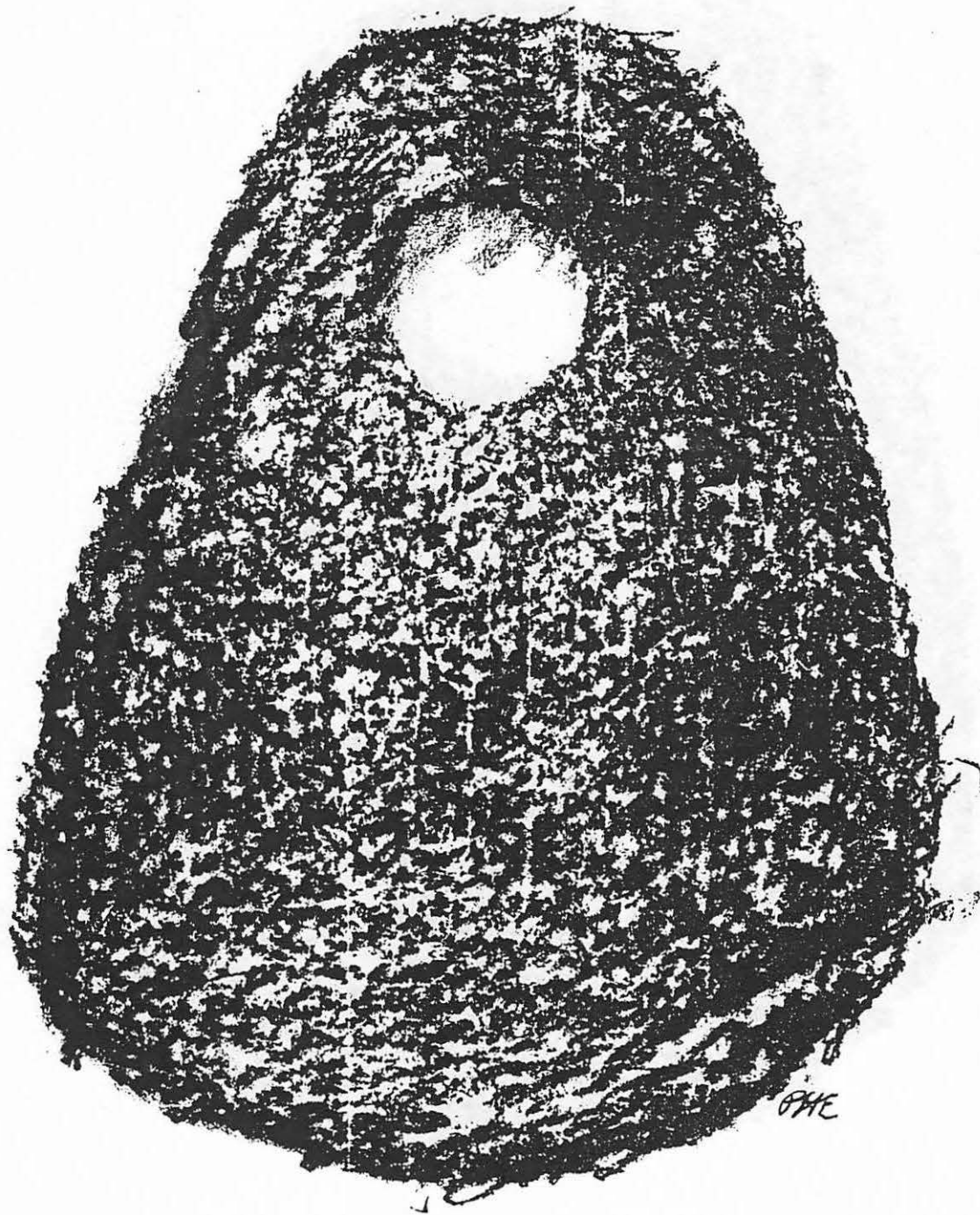


Fig. 9. Warming stone, obverse side. Length, 18.5 cm. (7 1/4 in.).

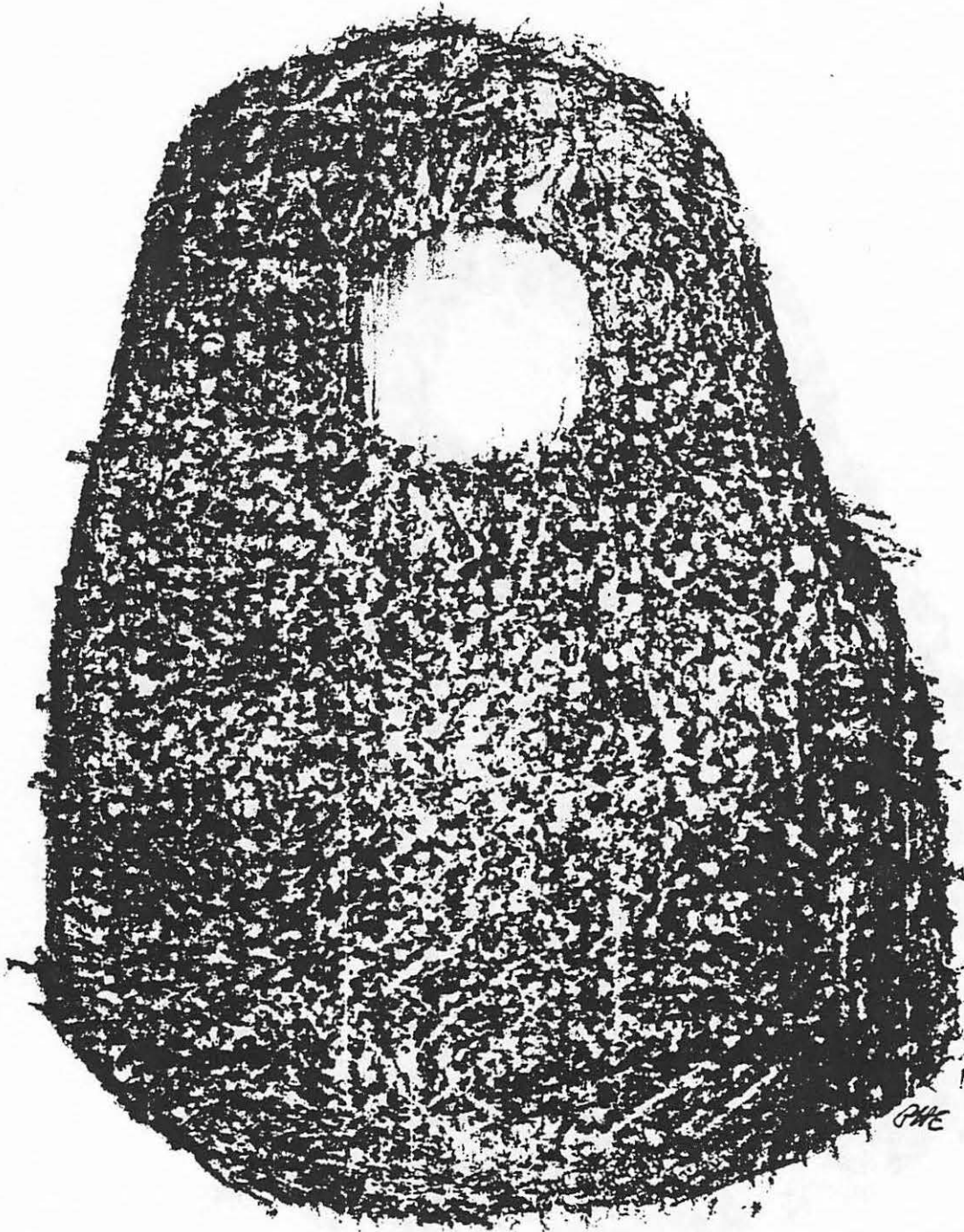


Fig. 10. Warming stone, reverse side.

Mountains, and with those from Cottonwood Creek and Kitchen Creek, shows that this one is from another source than the Cuyamaca and Jacumba quarries. Unless there is a hitherto undiscovered outcrop of steatite on Camp Pendleton, the most probable source for this specimen lies to the north, so the specimen represents an import, either as raw material or in its finished state.

Figures 9 and 10 are rubbings of the obverse and reverse faces, respectively, of specimen 1972-24-37. These rubbings are only partially successful because the surfaces of the object were not smoothed down sufficiently before the lines were incised to permit satisfactory rubbings.

All its surfaces have been ground smooth, with the edges to some extent squared off, although the angle between edge and side is a sharp curve rather than a corner, and the line of the edges undulates somewhat, as though original inequalities of line had been merely smoothed over rather than any attempt having been made to achieve regularity of outline by obliterating irregularities. All the specimen's surfaces are convex, whether on edges or side, although the edges tend generally to be less so.

In addition to the biconical perforation near the narrower end of the object, both facts have been incised with lines so faintly cut that any attempt to reproduce the complete pattern must be at least partly conjectural. On one side, the pattern appears similar to that on an incised slab or tablet reported from SDi 593 in Palomar Mountain State

Park (Karst in True, Meighan, and Crew 1974:11:150 and Plate 13), where the lines form a rough sort of crosshatching. On the other face, the pattern appears more complex, but the lines are also fainter, so that less of the pattern can be made out. In some places can be identified roughly parallel lines at some angle between the vertical and the horizontal; near the bottom is a suggestion of diagonal cross-hatching, and in the central portion just below the perforation is a suggestion of curving lines. In one place enough of the pattern can be made out to see that it is closely similar to, if not the same as, the pattern occurring among the pictographs recorded for another site on Camp Pendleton (Ezell 1972:32-33).

Inspection of Heizer and Clewlow (1973:2) shows that similar linear motifs are widespread in California rock art (e.g., Figs. 314b, 293c & d, 147b), whatever the medium. Thus, even were it possible to delineate all of the incising on this artifact, we would probably not be much farther along toward specifying either the artifact's cultural affiliation or its use. Neither, therefore, can we give it a name. The same motifs noted by Iovin (1963:16, 17) for Luiseño pictographs and petroglyphs appear on incised shaft straighteners and pebbles of local steatite found in Cuyamaca State Park (True 1970:38, 39; Polk 1972:3:11 Fig. 4d, e; 12 Fig. 5c, d; 22 Fig. 13e, f). A short leafing through the Annual Reports of the UCLA Archaeological Survey and the Pacific Coast Archaeological Society Quarterly for just recent years revealed so many reports of incised pebbles

throughout Southern California that it would be pointless to list them all or to survey all the archaeological literature for California.

Another possibility to be considered is that the stone may have been used in connection with cooking, but such a conclusion is not likely. Sparkman (1908:208) suggested as much, apparently on indirect evidence:

Flat perforated stones have been found. It is thought these were formerly used for cooking, the hole enabling them to be easily handled, when hot, by a stick thrust through them. They were probably also used for heating water.

True (1970:39) thought that some of the ". . . heavy relatively flat fragments of steatite . . ." in the Cuyamaca State Park collection ". . . probably represent Comals [sic]." As described by Curtis (1963:55) and Greenwood (1969:26-7)--to choose only two of the many reports on that type of artifact--a comal (griddle) may be convex on one side but not both. The other side is described by Curtis as flat, and Greenwood refers to the artifact as ". . . slightly dish-shaped . . ." with one convex surface. But specimen 1972:24-37 has all convex sides, none flat or concave; it would seem to have been poorly designed for use as a cooking implement, and that interpretation of its use is therefore improbable. As for Sparkman's suggestion, two pieces of evidence militate against it in the case of this specimen--the incising and some direct ethnographic evidence.

The incising represents an elaboration of the artifact beyond the requirements of intended use as a pragmatically

utilitarian implement. If, however, the item was intended for use in the conceptualized or supernatural world, not the mundane one, then the incising might very well have been as important as the form of the object in the minds of the maker and the users. Ethnographic evidence for identification as an object associated with the girls' puberty rite in Luiseño culture was presented by Kroeber in a note appended to an article by Rust (1906:31, 32):

The following information as to the girls' puberty ceremony was obtained on inquiry in 1903 among the Luiseño Indians of Pauma and Rincon in northern San Diego County. These Indians are of Shoshonean stock, while those at Campo described by Mr. Rust belong to the Yuman family.

A fire was made in a hole in the ground. In this tule was placed. The girls were laid on this on their backs. Two flat stones were heated and laid on their abdomens.

In 1925 this description had been slightly changed to read as follows:

The girls were then placed on their backs in a pit that had previously been lined with stones, heated, and then carpeted with tussock grass and sedge. Two warmed flat stones were put on the abdomen of each maiden (1953:674).

This constellation of attributes present in specimen 1972-24-37--an imported material notably different from the materials locally available, the shape of the artifact, the smoothing over all surfaces, the perforation, and the incising--is most likely explained by the hypothesis that it was a warming stone used, as Kroeber has described, some 1600 to 1800 years ago.

Flaked

When the implements formed by fracturing the rock are examined (Table 3), far fewer of them appear diagnostic than was the case with the artifacts shaped by grinding and/or pecking. This is to some extent a false impression, arising out of the circumstance that the flaked implements used for cutting-type tasks required little if any retouching for the adequate performance of many tasks. Furthermore, the kinds of tasks for which these tools were used were evidently not such as to impart much of a semblance of form to the tool as a result of wear, in contrast to the ground/pecked implements. The flaked tools convey the same impression of little use as did the ground/pecked artifacts. In addition there is ethnographic information for this part of California that, in the earlier years of the century before metal tools became plentiful and stone tools were still being used for some tasks, unretouched flakes were used a few times and then discarded. Rogers (1959) told of seeing women using flakes to trim off the excess end of a unit of the sewing element in basket making. The women kept a core and a hammerstone handy and, if a flake previously used could not readily be picked up again, a woman would strike off another rather than spend time searching for an already prepared flake.

pushplanes

These artifacts have also been referred to as "scraper-planes" (Rogers, 1939:Plates 5c, 8j, and 11c; Warren and True 1961:253 and 303, Plate 6H), as "planes" (Haury 1950:187,

Table 3. Statistics on flaked stone.

<u>Type</u>	<u>Catalog no.</u>	<u>Material</u>	<u>Weight (g)</u>	<u>l., w., t. (cm.)</u>	<u>Provenience</u>	<u>Fig.</u>
UNIFACIAL						
pushplanes	1972-24-34	felsophyre	113.5	6.0 x 4.7 x 3.6	Trench 3	11
pushplanes	1972-24-85	basalt	679.9	13.2 x 9.7 x 5.7	Surface NE Quad	--
pushplanes	1972-24-46	basalt	1394.0	15.0 x 12.4 x 5.6	Trench 1	--
end scraper	1972-24-96	basalt	335.0	11.5 x 6.7 x 3.0	Burial 3	13a
side scraper	1972-24-42	felsite	234.1	8.6 x 7.6 x 3.1		12d
beaked tools	1972-24-86	basalt	159.8	7.5 x 7.5 x 2.4	Trench 3, 004E, S side	--
beaked tools	1972-24-159	basalt porphyry	229.5	8.1 x 7.7 x 2.8	Trench 3, Feature 8	--
beaked tools	1972-24-60	basalt	298.5	9.8 x 8.3 x 3.0	Trench 6	--
beaked tools	1972-24-54	basalt	370.2	9.8 x 7.8 x 6.1	surface	--
beaked tools	1972-24-95	felsophyre	452.5	11.4 x 10.0 x 3.5	surface	12c
choppers	1972-24-107	basalt	841.3	11.0 x 11.0 x 5.7	Trench 3A, Burial 4	12d
knives	1972-24-155	basalt	59.0	7.0 x 6.9 x 1.1	surface	--
knives	1972-24-76	basalt	146.0	9.0 x 7.2 x 1.8	Trench 3	--
knives	1972-24-152	felsite	379.4	11.3 x 9.5 x 3.0	Surface	--
multiforms	1972-24-102	felsite	356.7	11.4 x 8.6 x 3.0	Unit 9	--
multiforms	1972-24-158	felsite porphyry	617.0	11.4 x 8.7 x 4.5	Surface, SW Quad	--
BIFACIAL						
knives	1972-24-124	basalt	27.0	5.3 x 3.8 x 1.0	Surface	12b
knives	1972-24-155	basalt	94.0	8.4 x 5.4 x 2.0	Surface	--
knives	1972-24-131	basalt	115.8	8.0 x 6.7 x 2.1	Surface	--
knives	1972-24-110	basalt	199.2	10.0 x 9.0 x 2.0	Surface	13b
hammer, broken	1972-24-55	basalt	115.0	9.1 x 6.3 x 2.1	Surface, NW Quad	12a
hammer, reused	1972-24-147	felsite	197.0	6.6 x 6.6 x 2.8	Surface	12c
side scrapers	1972-24-56	basalt	229.5	8.8 x 6.8 x 3.7	Surface, NW Quad	--
side scrapers	1972-24-138	basalt	291.0	9.3 x 6.3 x 5.1	Surface	--
side scrapers	1972-24-90	felsophyre	321.0	9.3 x 8.0 x 4.5	Surface	--
choppers	1972-24-126	basalt	377.0	9.7 x 8.6 x 3.7	Surface	--
choppers	1972-24-130	basalt	843.0	13.8 x 11.3 x 4.4	Surface	--
points	1972-24-7	basalt	.4	2.5 x 1.4 x .4	Burial 1	14
cores	1972-24-103	quartz (4)	104.6	----	Unit 9	--
cores	1972-24-62	quartz	110.8	----	Trench 6	--
cores	1972-24-57	quartz	304.0	----	Surface, NW Quad	--
cores	1972-24-74	felsite	361.3	----	Burial 1	--

extracting fibers for cordage. Both specimens 1972-24-34 and 46 were made by splitting water-smoothed cobbles; number 34, however, was not then trimmed by flaking around the entire perimeter as was number 46 (Fig. 11).

end scraper

TYPE 12 ENDSCRAPERS

Any flake or blade which has continuous retouch at either its distal or proximal end, presenting a more or less rounded, rarely straight, working edge (Kaldenberg and Ezell 1974:139).

The sole example recovered of this artifact category, specimen 1972-24-96, is actually a multiple-use tool; the end opposite the cutting edge (Fig. 12a) has also been used as a hammer. In keeping with Kaldenberg's approach (Kaldenberg and Ezell 1974:127), however, this multiple-use tool is "arbitrarily defined by the tool [use] which appears less frequently in the archaeological record." With a population as small as we have from Las Flores, statistical occurrence probably has little, if any, meaning. As with the pushplanes, the cutting edge shows no signs of wear even under 10-power magnification.

sidescraper

SIDSCRAPERS

A sidescraper is an object made on a blade or flake, by continuous retouch, on one or more edges, so as to make a semi-sharp edge, straight, convex, concave, or any combination of the above, with or without notches, and sometimes with intentional denticulation present (Kaldenberg and Ezell 1974:145).

With only one example of this artifact type there seemed little to be gained by using space in Table 3 to note that

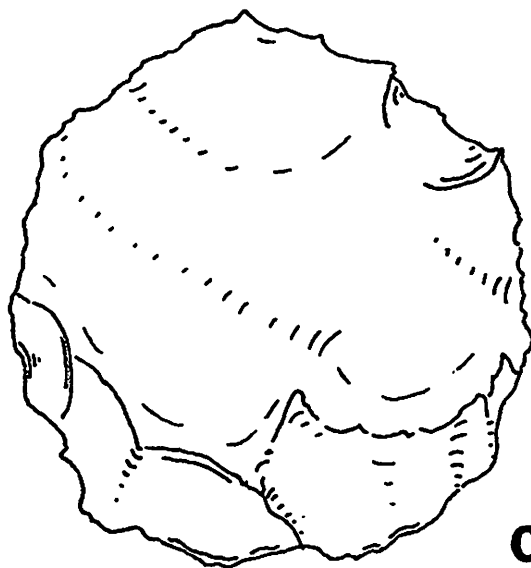
**A.****B.****C.**

Fig. 11. Scraper plane; a, dorsal view; b, lateral view; c, ventral view. Scale 1:2.

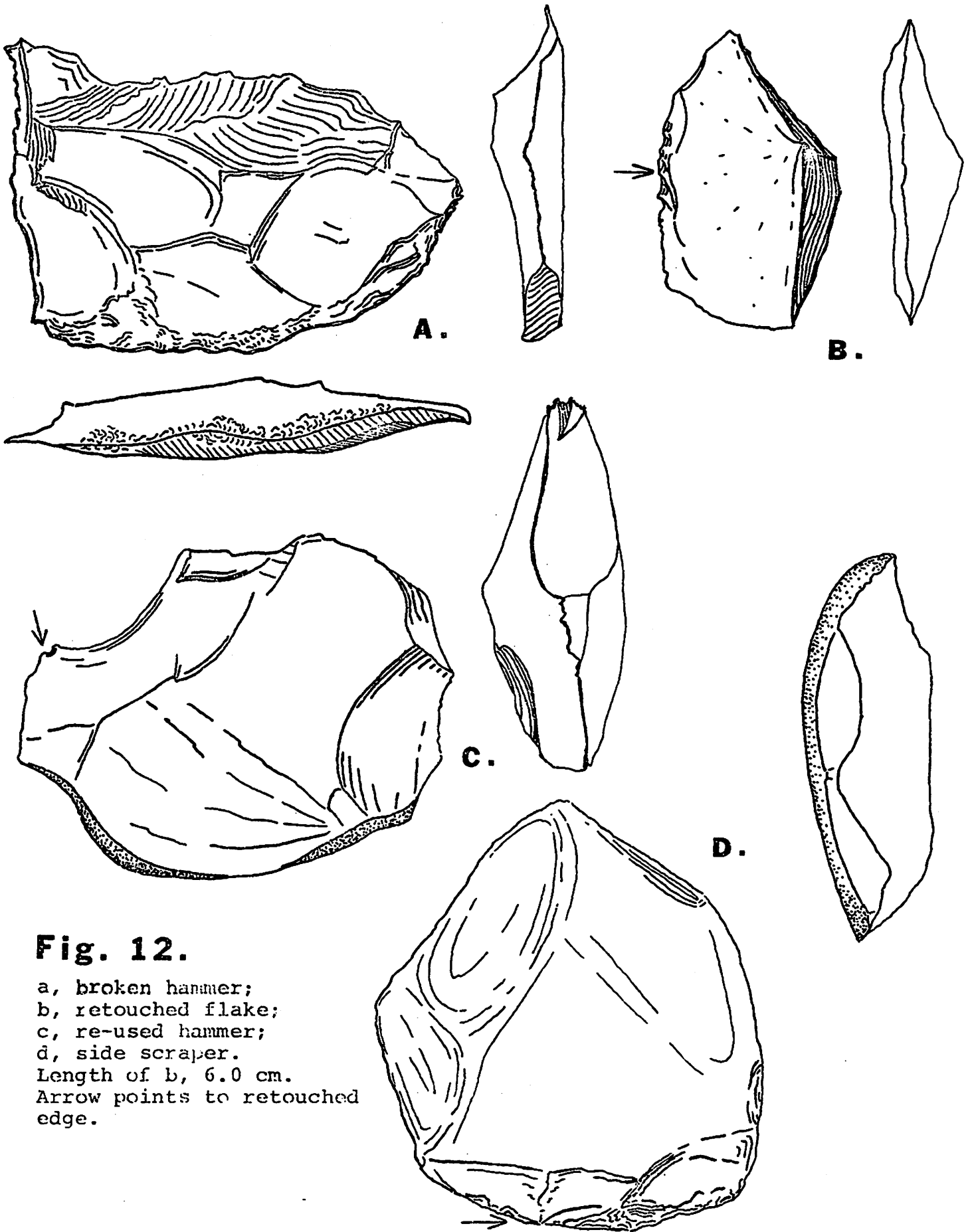


Fig. 12.

a, broken hammer;
 b, retouched flake;
 c, re-used hammer;
 d, side scraper.
 Length of b, 6.0 cm.
 Arrow points to retouched
 edge.

this specimen can be more precisely identified as Type 20, Convex Sidescraper (Kaldenberg and Ezell 1974:146). It also seemed more appropriate to quote the description of the general class of closely similar artifacts rather than the narrower description of this one. As with the others, inspection under a 10-power lens fails to reveal any wear marks.

beaked tools

In view of the scanty representation of other formally recognizable artifact types (except for bifacial manos) in the collection, the identification of five of these implements (Fig. 13c) comes rather as a surprise. Either they do not appear to be precisely the same as the Type 26, Denticulated Sidescrapers (Kaldenberg and Ezell 1974:149)--on three of the specimens from Las Flores the "tooth," or beak, is on the end rather than the side--or I give greater weight to the projection than does Kaldenberg. For that reason, Rogers' description (1966:189) of this artifact class is quoted instead of Kaldenberg's:

Beaked Scrapers

A great many artifacts in the Southwestern Aspect [of the San Dieguito Complex] have one or two little projections on them which might be called "beaks," but it is not always possible to determine if the spur is fortuitous or intentional. Probably, the majority of sharp little projections on San Dieguito artifacts were purposely left, since it would not be difficult to remove them.

The most common artifacts to occur with beaking are planes, discoidal scrapers, and convex scrapers.

It seems statistically improbable that in a collection of only 32 artifacts five would coincidentally bear

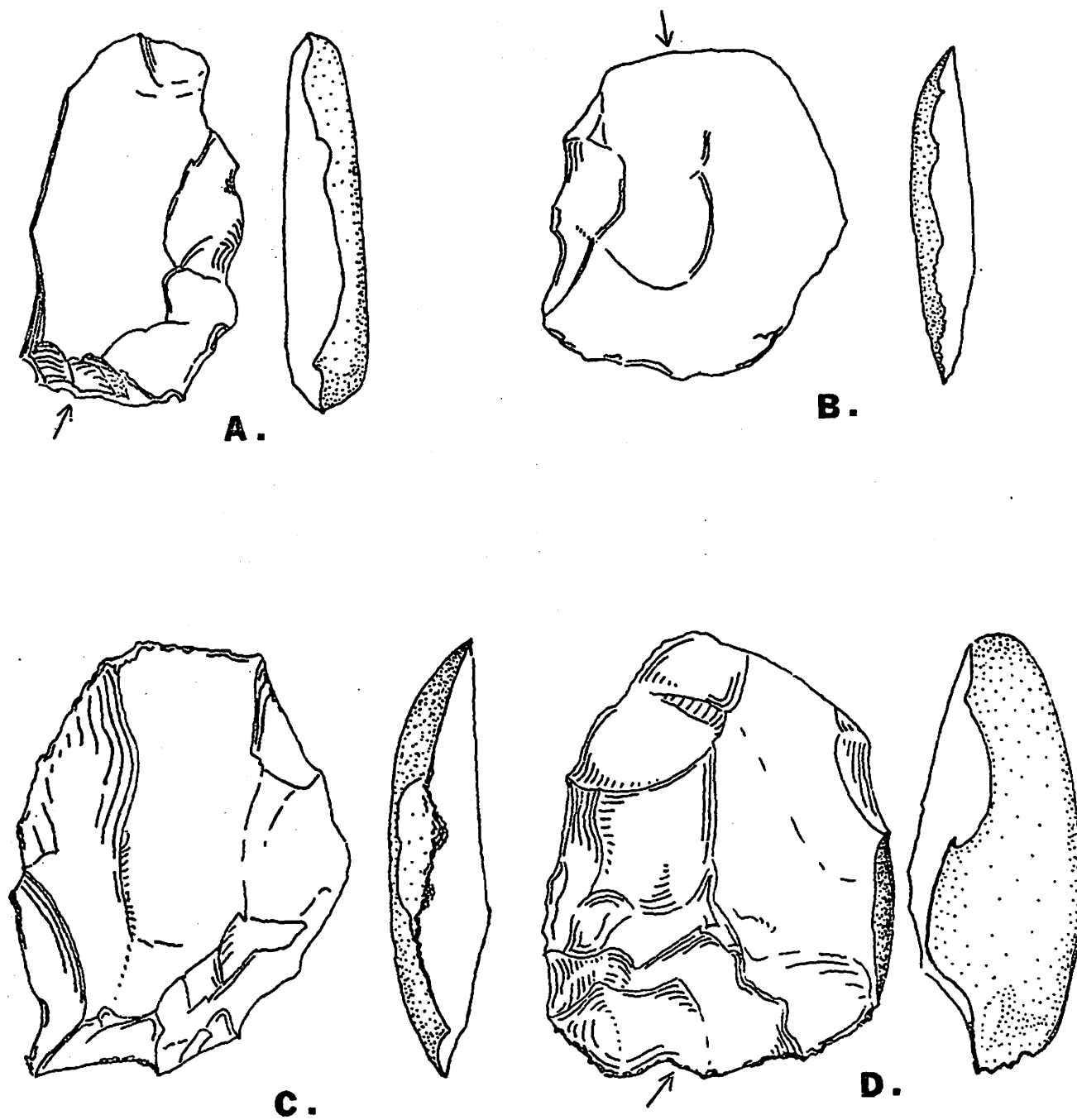


Fig. 13.

a, end scraper; b, "knife" (unifacial), c, beaked tool; d, chopper, unifacial. Length of a, 11.5 cm.

essentially the same type of projection on one edge. The specimen illustrated may, in fact, have two adjacent to each other. All were made on split, large pebbles and, if they were used as scrapers, the unaltered cortex surface would have been the ventral (belly, or down) side of the tool. Another use which can be suggested for this type of artifact is as a drill, although no wear marks indicating such application can be seen on any of these. One, number 1972-24-159, does show use marking on the tip of the projection, but that use was clearly as a hammer. One is immediately reminded of the pecking on the grinding surface of the metate (Fig. 6a), but it hardly seems necessary to have produced a special tool for that task.

choppers

TYPE 8

CHOPPERS

A tool which is usually fabricated on a pebble or a cobble, but they may be also manufactured on a large primary flake. The lateral edge is generally retouched unifacially, but may be at times bifacially worked. The cutting edge is generally convex but may be straight. The majority of choppers are considered to be core tools (Kaldenberg and Ezell 1974:134, 139).

Two of these artifacts, numbers 1972-24-107 (Fig. 13d) and 130 (not illustrated) were made by splitting cobbles. The flaking of specimen 107 was all from the cortex side, producing a unifacial flaked tool; on specimen 130, however, a single large flake was struck off the cortex side, producing a bifacially flaked implement. It is possible that the flake was accidentally struck off in use, but bifacially flaked choppers produced intentionally also are common in

other collections I have seen. The third specimen (not shown) had obviously been bifacially worked on a large pebble but, as it had been broken after manufacture, only a little of the original working edge remains. While the edges of the larger two show no signs of use, the remaining portion of the edge of the pebble chopper has been blunted by wear and, at the end, also shows use as a hammerstone.

knives

These artifacts do not conform to Kaldenberg's definition of "knives" (Kaldenberg and Ezell 1974:140) but rather to his definition of Type 38, Utilized Flakes (Kaldenberg and Ezell 1974:155). Both unifacial (Fig. 13b) and bifacial (Fig. 12b) forms, however, have been classed because the angle of the cutting edge is less than 45 degrees of arc. Such an edge, if used as a scraper, would reveal that use by minute secondary flaking on the retouch, and none of these specimens exhibits such flaking resulting from use. Instead, the edges of some have been blunted by some use which wore away the stone, rather than flaking it, and such wear marking can be discerned on them under a 10-power lens. A sawing or slicing motion is thus indicated but, as they are not serrated, they have been designated as "knives."

multiforms

This term has been chosen because these objects do not conform to Kaldenberg's (Kaldenberg and Ezell 1974:149, 152) criterion for apparently similar tools of having been made on a flake or a blade; instead, both have been made on split

cobbles. Both would be classed as some form of scraper, in that the angle of the cutting edges is greater than 45 degrees on three of the edges. Specimen 1972-24-102, however, has a second edge which is considerably less than 45 degrees of arc. The other (1972-24-158) has, in addition to two scraper edges, a third which, like the second edge on the other specimen, is concave in line, rather than straight or convex. Such an edge can conceivably be used only for scraping something rod-like in form, such as a shift--a digging stick or a spear shaft, for example--or, as demonstrated by Bordes in the film, *Early Stone Tools*, for cutting through such an object. This is one of the few instances among the flaked stone tools where use can fairly confidently be hypothesized. As with so many of the tools in this collection, the ventral surface, instead of being a flake scar or scars, is the unaltered surface of the cobble.

projectile points

TYPE 18 PROJECTILE POINTS
 Any flake or blade which is triangular, sub-triangular, or even lozenge-shaped, more or less elongated, with sharpened extremities which come to a point, generally produced by pressure flaking. A flake may be alternately or bifacially retouched. Its bulb may be removed, and the proximal extremity may be worked in various manners to facilitate hafting. The material is amenable to fine pressure working and consists of aphanitic basalts, quartz, and felsitic material (Kaldenberg and Ezell 1974:140-145).

The single specimen (Fig. 14) identifiable in this artifact category can be assigned to Meighan's Type 1



Fig. 14. Projectile point. Scale 1:1.

(1954:Plate 2d-j); it matches more precisely with the second variant of this type described by True (1970:21) in that the basal notch is both angular and "V" shaped. This type comprised 46% of the points reported on by Meighan and 37% of the points reported on by True, and the latter regards it as ". . . the most common point for this time period [1400-1850 A.D.] in San Diego County." Meighan (1954:216, 219, 223) reports it from sites known to be Luiseno, hence the point from Las Flores Creek, along with the warming stone, may be taken as indicating that the community which deposited the burials in the cemetery was of that people.

cores

TYPE 3 CORE

Any stone where one or more flakes have been intentionally removed and the core itself has not been utilized as a tool. In many cases an expended core has been utilized as a tool by further modification. Many push-planes and chopping tools may be expended cores. A core may be fashioned from any material exhibiting conchoidal fracturability (Kaldenberg and Ezell 1974:131).

Although, strictly speaking, cores would not be regarded as tools, since their use was to provide material for tools, they are nevertheless a part of culture, an essential component of stone technology. None of the cores from Las Flores Creek exhibit that patterning of preparation described for Europe (Bordes 1973:245)--they are simply lumps of rock off which flakes have been struck.

doubtful

Three specimens, 1972-24-56, 90, and 138 (not shown) were not included in the tabulation for lack of space and because I cannot be certain of any typological identification. Number 56 is a portion of a basalt cobble, 90 a portion of a felsophyre cobble, and 138 a portion of a felsite cobble. All have been substantially reduced by unifacial flaking and all show slight battering along a short length of the perimeter. They appear equally assignable to the categories of scrapers or expended cores secondarily slightly used as hammerstones.

debitage

TYPE 5

DEBITAGE

Any flake removed from either a core or from a primary flake less than 2 cm. in either length or width, or any irregular flake over 2 cm. in length and width without a striking platform or a bulb of percussion. Debitage can include core debitage, trimming flakes, small pressure flakes, small percussion flakes, or use flakes. In general debitage is any material without a regularized form and showing no sign of use or utilization (Kaldenberg and Ezell 1974:134).

As with cores, the by-products of making implements of any material are a part of culture even though not used to accomplish any task. Under conditions of greater control in excavation, the definition and delineation of areas in an archaeological site where certain activities were carried on in the past is sometimes possible by the distribution of debitage.

While relying most heavily on the last line of the

definition given above I have thought it of interest to separate the debitage according to whether one side of the flake consisted of the unaltered (cortex) surface of the original nodule or whether both sides of the flake bore scars from flaking. The former I have called "primary flakes," following Kaldenberg's definition:

TYPE 4 PRIMARY FLAKES
 Any flake which has been removed from a core and exhibits the following characteristics: it must be greater than 2 cm. in length and width; it should have a striking platform and/or a bulb of percussion and have two distinct lateral edges which are unretouched and show no signs of utilization or wear. Secondary flakes may also be classified under this type if they exhibit all the above characteristics yet have been removed from a large flake and not from a core (Kaldenberg and Ezell 1974:131).

Departing the last sentence of the definition, however, I have called the latter "secondary flakes."

Table 4. Debitage: weight in grams of primary flakes.

	<u>basalt</u>	<u>bas. porph.</u>	<u>felsophyre</u>	<u>quartz</u>	<u>quartzite</u>
			4.0		
			16.7		
				31.8	
			43.6		
			75.0		
	80.1				
	127.2				
	137.5				
			157.2		
			176.5		
		185.5			
	<u>244.4</u>	<u>185.5</u>	<u>473.0</u>	<u>31.8</u>	<u>185.5</u>
Total weights	589.4	185.5	473.0	31.8	185.5
Average weights	147.4	185.5	78.8	31.8	185.5

In order not to break up the tabulation, the distribution of secondary flakes by material and weight appears in Table 5 on page 53. Comparison of the two tables shows that, as might be expected, the average fragment weight for the primary flakes is greater than that for secondary flakes; that the former is almost double the latter may be coincidental. It seems odd, on the other hand, that the greatest number of primary flakes were of felsite, whereas the most secondary flakes fell into the basalt category. Since basalt was identified approximately three times as often among the flaked tools as among the ground/pecked tools, the explanation may indeed be that the material was preferred for cutting tools, rather than that the supply of basalt may have been more plentiful than that of the other materials.

One final category of stone implements of a particular kind remains to be dealt with--the 97 fragments of manos and the 154 pieces of rocks which, like the mano fragments, had been broken as a consequence of temperature change--hence the designation of "fire-cracked rock." As with cores and debitage, fire-cracked rock was an element of culture and, conceivably, could even be classed as an artifact of a particular kind used to accomplish two kinds of tasks. The use of heated stones for taking sweat baths and, in much of California, for carrying out the process of cooking known as "stone boiling" are so well known as to need no documentation--there is even a film showing the latter.

Table 5. Debitage weights by materials in grams.

	<u>basalt</u>	<u>bas. porph.</u>	<u>felsite</u>	<u>felsophyre</u>	<u>quartz</u>	<u>quartzite</u>
secondary flakes				2.8		
		2.9			2.7	
			3.5		4.6	
	5.1					
	6.0					
	6.0					
		7.5			6.3	
	8.8					
	10.5					
			17.3			
	18.5					
			19.5			
					21.5	
				22.0		
					23.1	
				26.0		
	27.7					
	27.8					
	28.0					
	32.9					
	32.9					
					34.3	
	34.9					
	36.5					
			37.2			
			43.3			
	44.5					
					52.9	
					54.6	
	55.0					
	55.2					
						59.7
	68.0					
			83.2			
			89.2			
	107.7					
	<u>166.3</u>					<u>111.9</u>
Total Weights	772.3	10.4	293.2	50.8	200.0	171.6
Total Fragments	19	2	7	3	8	2
Av. frag. wt.	40.7	5.2	41.9	16.9	25.0	85.8

Until I had realized the fact that the people responsible for the site at Las Flores had exploited donax ("bean" or "depression" clams) for food, I had attributed the presence of the fire-cracked rock to sweat baths. That explanation is still a possibility, but an equally good one is that some, perhaps not all, of the fire-cracked rock points to past clam chowder. By dropping heated stones in a basket containing clams and water, the water could be brought to a boil without burning the basket, causing the minute bivalves to open and, more often than not, the meat to fall out of the shells. Although many, if not all, kinds of shellfish have been (and still are) eaten raw, cooking in the case of donax made it possible to exploit them as a food source as they could not have been otherwise, owing to their small size.

Unlike the ground/pecked stone artifacts, those which were formed by fracturing are, with the exception of the projectile point, insufficiently patterned to have any diagnostic value. For that reason nothing is to be gained by attempting a comparison of artifacts from other sites as was done using Table 2, and one point offers too small a sample for anything to be added to what has already been presented regarding that artifact from Las Flores.

FAUNAL REMAINS

Most of the non-human bone recovered consisted of the bones of very small animals. Considering their delicacy and consequently greater susceptibility to destruction by

bacterial and chemical agents, when compared with the human remains, it seems doubtful that their presence at the site can be attributed to any human activity during the time people were using the site. Rather, it is more probable that they are the remains of much more recent animals, such as ground squirrels and/or brush rabbits, both of which were seen on the site during survey and excavation.

One small portion of a mandible (lower jaw bone) of an animal apparently of the cervine (deer) group--the fragment was too small for a more exact identification--may owe its presence there to past human activity.

The piece of whale scapula (shoulder blade) lying on top of the skeleton representing burial 15, however, certainly can be attributed to a specific event in the past--the interment of that individual. Occurring as it did it represents ritualistic, rather than economic, behavior and will be discussed under the section dealing with the burials.

SHELLFISH

A list of the species of shellfish identified is presented in Appendix III. Since, at the time of excavation, I had not yet perceived the significance of the donax (clams) shells, specimens were collected only for species identification, not for statistical representation. Belated recognition that the presence of the donax shells at the site could only be attributed to human activity in the past also provided the bases for inferences as to how those minute

shellfish may have been used for food, as was discussed in connection with the fire-cracked rock.

DATING

Ample shell was available for radiocarbon dating, but at this point only one sample has been offered for dating. That sample came from the fill of the grave in which burial 10 had been placed and, because of the presence of the whale scapula covering the skeleton, that burial was seen as of particular significance. The results of the dating process are presented in Appendix IV. As explained there, in order to arrive at the most accurate date two factors must be taken into account.

One of those is that we must consider alternative dates, not just one. One of these alternatives is the date of 2060 ± 60 years b.p. (before the present), i.e., by convention, before 1950 A.D., the year following the announcement of the new dating technique (Arnold and Libby 1949:110:678-680). The other alternative is the date of 2120 ± 60 years b.p., based on a corrected half-life of carbon-14, the radioactive element in the shell. For the sake of continuity in comparing dates archaeologists have continued to use dates based on the "Libby half-life," but for the sake of accuracy both will be considered here.

Those dates are referred to as "apparent ages" and, as Linick (1974) and Chace (1974:103) point out, the correction factor described by Berger, Taylor, and Libby

(1966:153:864-866) should be applied to them to derive the "corrected age" of a sample. Applying that correction factor of -2% to the two apparent ages thus yields corrected ages of 1648 ± 60 and 1696 ± 60 years b.p. respectively. Applying the plus-or-minus factor to those corrected ages gives us ranges in dating of 1588-1708 and 1636-1756 years b.p. respectively.

Translating those figures into our own calendar, they mean that, according to archaeological convention, those shellfish died sometime between 242 and 362 A.D. or, using the corrected half-life, 194 and 314 A.D. Discarding, for the moment, archaeological convention, and applying the corrected age to 1974 A.D., it is possible that the shellfish died sometime during the period 218-338 A.D., possibly about in the year 278 A.D.

It hardly matters whether we settle on the date of 278 or 302 A.D. as representing the period of time since the shells were deposited there, for the difference is not great and in either case we can conclude that it happened about the turn of the century. The question remains, however, as to whether the shells may have somehow come to be deposited either before or after the interment, and thus the dating of the shells may not necessarily constitute a dating for the burial.

As to the first possibility, it is almost a certainty that the shells were already present in order for them to have got into the grave. The second possibility can be

ruled out almost as categorically as the first accepted. The excavators and I would have detected any evidence of disturbance, and disturbance there would have had to be to intrude the shells into the grave once it had been filled in. That being the case, the question remaining is how long might the shells have been on (or in) the ground before the grave was dug? At the present we cannot give a hard and fast answer; such an answer would be sought by seeking additional radio carbon dates, now that we have the question to ask. Meanwhile, we can safely conclude that the grave was not dug before about the end of the third century after Christ.

THE BURIALS

Following the initial discovery in 1972, I unwittingly offended some Indian people in that I did not foresee the possibility that a news article with a photograph of the burial might be published and they would resent it. Strong representations were made to the Chairman of the Department of Anthropology and to me, protesting the publication of photographs of the remains of their (perhaps presumptive-- Heizer 1974:148) ancestors. The fact that I knew nothing of the news report and photograph until it had appeared is no excuse. Maynard (1974:402), among others, has pointed out how that kind of thoughtlessness has alienated Indians from anthropologists.

At the same time there is the professional obligation to report what has been learned, not only to one's fellow anthropologists but to anyone who cares to read and, in particular, to Indian communities with which a presumptive interest in a given site lies. Part of what has been learned consists of something of the mode of disposal of the dead so, in an effort to fulfill professional obligation without offending Indian feelings, I have chosen to substitute copies of the drawings made in the field for photographs. The archaeologists, after all, are interested in information on the burial pattern and, as a by-product of their profession, become freed from that morbid fascination with human physical remains (if they ever felt it) which turns an accident victim into a spectacle to be viewed.

In Table 6 on page 61, details of positioning the body in the grave are summarized, and in Appendix II information on age at time of death, sex, stature, and pathology are described. Inspection of Table 7 shows that, although there was some variation, a fairly consistent behavior pattern in the burial customs of the people of Las Flores can be reconstructed.

For those possible readers unfamiliar with this form of archaeological notation, "orientation" means the direction toward which the head is placed, i.e., an "N" means the body was placed with the head toward the north, and "facing r." means that the head was turned toward the right shoulder. An "f" stands for female, an "m" for male. A question mark in the column means that the information could not be obtained for some reason. In this case it was because the remains were incomplete when found. Burial 6, for example, consisted of nothing but an incomplete femur (thigh bone) found while hand excavating unit 5, and burials 8, 10, and 11 were infants whose bones were too fragile to have survived completely enough for us to determine the position of the body at the time of burial.

From the data presented in Table 6 it can be seen that tight flexure--doubling the legs so that the knees were nearly at the chin--was universal for the 11 burials where body position could be ascertained. Placement of the arms, however, varied; in 3 of the 11 the right arm was extended along the torso and the left was flexed enough to extend

Table 6. Burial positions.

No.	Orientation	flexed	sex	supine	prone	side	facing:			
							r.	l.	mid.	up
1	N10E	x	f	x						x
2	E	x	?	x			x			
3	NW	x	?			L		x		
4	N	x	f			L		x		
5	E	x	m	x						x
6	?	?	?							
7	W	x	m	x						x
8	N	?	?							
9	N	x	f		x			x		
10	N	x	m	x				x		
11	?	?	?							
12	?	?	?							
13	N	x	f	x						x
14	N	x	f	x						x

diagonally across the abdominal area, but in one both arms were folded across the torso. Arm placement could not be determined for the others because not enough of those lighter, hence more fragile bones had survived the centuries of chemical action in the earth.

With 8 of the 11 so placed that the head was toward the north a clear preference for that orientation can be demonstrated, but it was not as invariable as was flexure, for two individuals were oriented toward the east and one the west. With one exception, six out of seven for which the placement could be discerned were interred lying face upward; the exception, burial 9, had been placed prone--actually, it would have been on the arms and knees--with the face turned to the right. The distribution of orientations of the face is such that it was probably accident, not design, which dictated whether the individual faced straight ahead (mid.--midline) or to the side.

The preferred burial position is illustrated in Fig. 15--flexed, on the back, face usually straight ahead, with one arm extended along the trunk and the other folded loosely across the abdomen. Although other artifacts were recovered from the vicinity of other burials, only one certain instance and one possible instance of anything having been buried with a body can be identified. The location of the projectile point found with burial 1 was such that, taken together with the fact that it was the only point found, as to allow for the strong possibility that it may have been imbedded in the

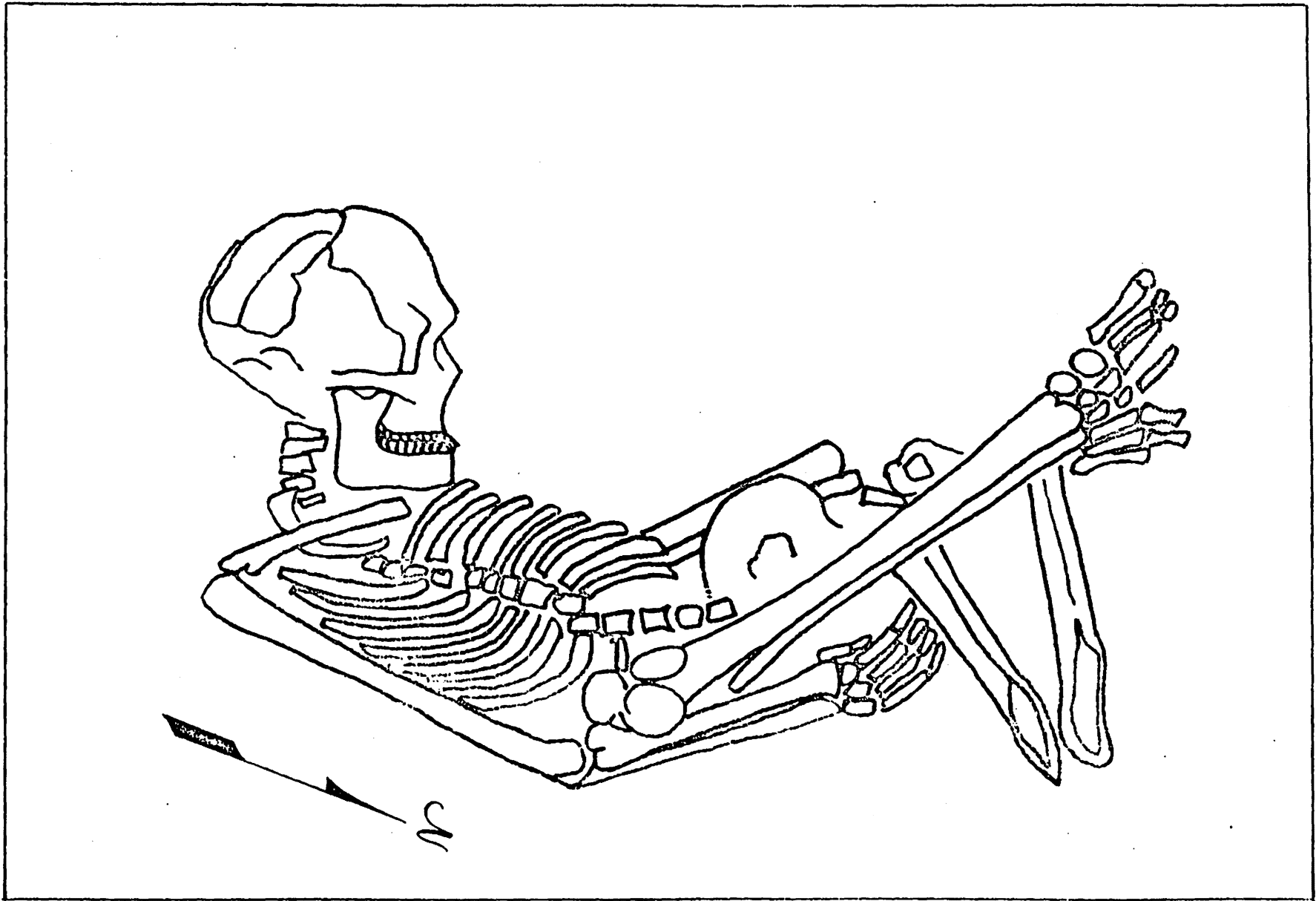


Fig. 15. Burial 5.

thigh at time of death, rather than having been there by accident or intention. If any other grave furniture had been provided, it must have been organic in nature and thus not survived in the archaeological record. So far as that record goes, grave furniture was provided only in exceptional circumstances.

And burial 10 (Fig. 16) was evidently just such a circumstance. A portion of the shoulderblade of a whale had been placed over the body, probably completely covering it for, when found, enough of the scapula--a fragile bone, even in whales, owing to its thinness--had survived chemical destruction that it still covered virtually all of the skeleton. And this culture element was as great a surprise as was the existence of the cemetery itself, for it is recorded ethnographically far to the north as part of the culture of the people living in the vicinity of the modern city of Santa Barbara (Bolton 1930:IV:254). On February 24, 1776, Fray Pedro Font, a missionary traveling with the Anza expedition en route from San Gabriel to Monterey, was describing the culture of the people along the Santa Barbara Channel. In his description of the funerary customs he noted that "Over the deceased they place the ribs or other large bones of the whales which are customarily stranded on those coasts."

For convenience sake, certain of the information contained in Appendix II is summarized in Table 7.

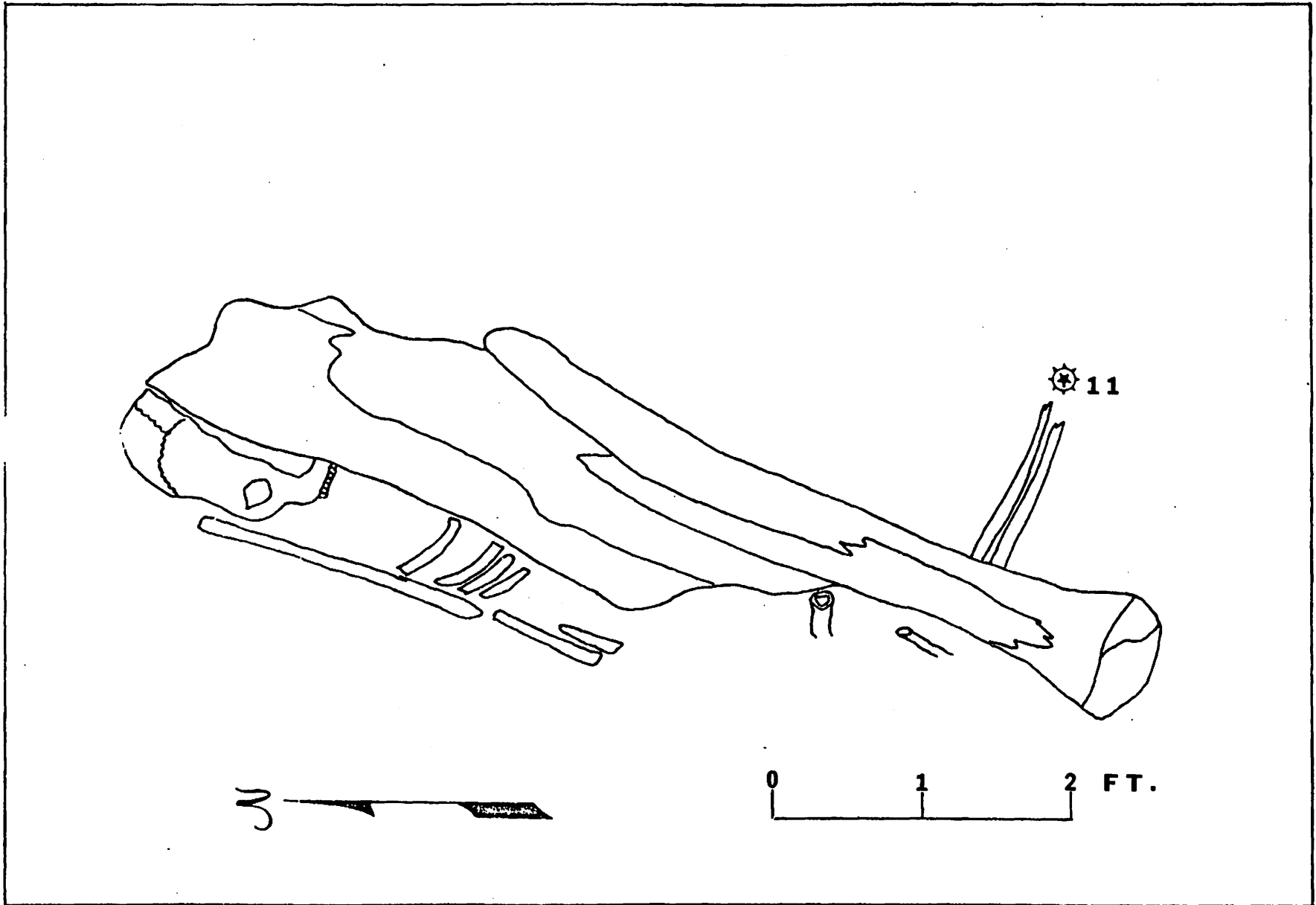


Fig. 16. Burial 10.

Table 7. Physical anthropology and pathology.

burial	sex	physical age	pathologies	condition of teeth
1	f	25-27	healed pelvic fracture?	worn down to pulp chamber
2	?	middle aged	arthritis	?
3	?	?	none noted	?
4	f	ca. 30	anemia, tooth cavities	great
5	m	40-47	arthritis, tooth cavities, abscessed molar	worn down to pulp chamber
6	?	?	none noted	?
7	m	15-20	none noted	worn down to pulp chamber
8	?	infant	none noted	?
9	f	45-50	abscess inside face behind nose anemia arthritis	worn down to pulp chamber no caries (cavities)
10	m	35-45	none noted	little wear, but caries
11	?	infant	none noted	?
12	?	infant	none noted	?
13	f	adult	anemia, arthritis	little, no caries
14	f	20-25	none noted	"in good condition"

Arthritis is detected by the growth on bones such as vertebrae which is called "lipping," and osteoporosis, as used by the physical anthropologists, is the term identifying the thickening of the bones of the skull brought about by anemia (Brockman 1974b), or by diabetes, scurvy, or a protein deficiency (Adams 1974). From examination of the data in Table 7 it is apparent that community health at Las Flores was not of the best, and Brockman (1974) agrees that a tenable explanation of the anemia might be dietary deficiency.

During the examination in the field, both Lippold and

Brockman commented repeatedly on the great amount of tooth wear apparent on five of the individuals--"worn down to the pulp chamber" was the phrase used even for the comparatively young person, burial 7. Such heavy tooth wear is readily explained by grit in the food; the source for the grit is more hypothetical. Among a mano-and-metate using people that technique of processing food is usually blamed for tooth wear, but I think an additional hypothesis must be considered here. The most frequently seen shellfish remains on the site were those of donax--other species were, in fact, rare. Lacking any feasible means of removing the sand from those bivalves before eating them would have substantially increased the amount of sand in the food over what would have resulted from grinding plant foods. The first pot of chowder I prepared attempting to use donax I found inedible for that very reason--but then I was not all that hungry.

SUMMARY

We have established to some extent the dimensions of the site and have one probable radiocarbon date--about the end of the third century A.D. The third problem stated, determination of the cultural affiliation of those pre-historic people who buried their dead in the flood plain of Las Flores Creek lends itself less easily to solution.

At first, the artifact inventory seemed to me to represent the culture pattern called La Jolla, and early

La Jolla at that, but I was puzzled by the presence of the late type of projectile point and the burial pattern so different from that of the La Jolla culture. The occurrence of the San Dieguito-like pushplanes can always be explained either as an instance of re-use by a later people of an artifact produced and left behind by an earlier group or as continuity of a culture element over a long period of time. When the Channel Islands element, the whale bone over burial 10, appeared, I felt even more puzzled.

The appearance of minimum shaping of the flaked stone artifacts and metates is one of the characteristics of La Jolla I of an age on the order of 7500 b.p. (Moriarty 1966: 21). Thereafter, changes in the La Jolla culture apparent in the archaeological record consist of additions to the artifact inventory and refinements in stone-working, resulting in more sophisticated and elaborate artifacts. Moriarty (1966: 21) attributes some, at least, of those changes to contacts between the La Jolla people and those of the Channel Islands and adjacent coastal areas.

Four points of evidence, however, militate against the identification of the site as a La Jolla site, however much it may appear to be so. One is the supine position of most of the burials; a second is the almost complete lack of burial offerings, one of the diagnostic features of the last phase of La Jolla culture (Moriarty 1966:22), although in other respects--segregation in cemeteries, orientation to the north, flexure--Las Flores does resemble the La Jolla culture. A third bit of evidence is the late type projectile

point and, fourthly, there is the date, some hundreds of years after the approximately 2000 b.p. disappearance of the culture pattern known as La Jolla (Moriarty 1966:23).

With the addition of one final bit of ethnographic evidence it is possible to advance some hypotheses. That evidence is that the Luiseno not only knew the balsa (boat of tules) but also the canoe--Kroeber (1953:654) thought that their name for it indicated a dugout and wrote that "It is said that canoe voyages were sometimes made to San Clemente Island." Putting this together with the late, demonstrably Luiseno, projectile point, and the radiocarbon date of about 300 A.D., it seems most probable, therefore, that the culture pattern at Las Flores was prehistoric Luiseno before the acquisition of pottery and the adoption of cremation, rather than inhumation, as the means of disposal of the dead. That being the case, we still must seek an explanation for the comparative poverty of the artifact inventory and for the La Jolla culture elements at a point so late in time.

For the former, the answer may lie in the most important attribute of the site--the burials. I suggest that the site was not a habitation site, but a site to which the people resorted for one purpose primarily--funeral ceremonies. Among virtually all the peoples of the world the rites surrounding death are elaborate and often lengthy. Unless fasting is the rule, people carrying out a funeral must eat, and for the people of Las Flores to eat a certain provision

of equipment would have been necessary. Such a hypothesis would at the same time account for the occurrence at the site or the rather limited artifact assemblage and of the simplicity of the flaked stone artifacts generally.

As for the La Jolla-like culture elements--flexed inhumations in cemeteries with a preference for orientation toward the north--Moriarty (1966:23) has presented archaeological evidence which supports the suggestion advanced by Rogers (1945:173) that the prehistoric Diegueno culture pattern emerged as a result of contact between people of the La Jolla culture and pottery-using and cremating people to the east. If that was what happened--and I see it as the best hypothesis--then it is possible that the site at Las Flores represents one community which, to some extent, retained some culture elements of the La Jolla pattern but had not yet received from their neighbors to the south the new culture elements of pottery and cremation which were part of the later prehistoric Luiseno culture.

The excavations at Las Flores have provided more questions than answers. When, on June 29, 1973, it appeared that the first question posed, the extent of the site, had been answered adequately, I recommended to Paul Campo that no more excavation be done. As the construction plans for the wildlife refuge included the construction of an island, I further recommended that the island be created by depositing earth over the cemetery to the desired depth for its better protection. In addition, I recommended that

the site be nominated for inclusion in the National Register of Historic Landmarks.

The subsequent analysis of the data, however, has pointed the way to some desirable further research which would not involve disturbance of any more burials. The discovery, in 1974, of burials 13 and 14 is evidence that the true extent of the site is after all imperfectly known. Furthermore, it is quite possible that more burials are there than is known at present. We have reason to believe that we can obtain the use of a resistivity surveying device by means of which any undiscovered burials may be located without the time-consuming and expensive process of archaeological excavation. If, as I believe, Las Flores was not a habitation site, then so little of the culture can be expected there that further excavation is not justifiable. Study of additional skeletons might provide more data on the physical anthropology of the prehistoric people, but I frankly doubt whether that information should be sought at the cost of further wounding Luiseno feelings.

A technique which would supplement the resistivity survey in determining more exactly the area of the site is pH analysis of the soil. Again, we have reason to believe we can obtain the use of a pH meter whereby that test could be carried out concurrently with the resistivity survey.

Finally, more radiocarbon dates on shell should be obtained, for two purposes. One is as a check on the single date we have; the other is to seek a date for the inception of the cycle of erosion and deposition which

covered the cemetery with the layer of silt. That date should mark the end of the use of the site as a cemetery, as well as add to our knowledge of the environmental history of this part of California, since a wider area than just the site of Las Flores would have been affected by it. We would propose, therefore, that while the other testing is being carried out, the silt be removed by hand down to the next underlying stratum at a number of spots and the shell collected from the contact zone between the strata. Test pits should then be taken down by hand at those spots to the second substratum and shell collected from that contact zone in order to ascertain, if possible, the beginning of deposition of the culture-bearing stratum.

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Appendix I

PRELIMINARY INVESTIGATION OF THE BURIAL FOUND AT LAS FLORES,
CAMP PENDLETON, CALIFORNIA, IN JUNE, 1973

by

Dana Isham

Department of Anthropology
San Diego State University

On June 7, 1973, at the request of Dr. Paul Ezell, Department of Anthropology, San Diego State University, an investigation was made into a report of human bones uncovered by bulldozers during the construction of the proposed wild-life sanctuary at Las Flores Creek on Camp Pendleton, California. A preliminary excavation was made of the burial by Dana Isham, graduate student in Anthropology, San Diego State University, and Takako Isham, assistant. Also present, representing Marine Corps Base Camp Pendleton, were Mr. Paul Campo, geologist, and Staff Sergeant D. L. Dodson, photographer.

Upon arrival at 10:30 a.m., the immediate area surrounding the burial was searched. The site had been freshly graded, exposing large concentrations of shell in most areas. No cultural remains were found in the area excepting that directly associated with the burial. Several small bone fragments were scattered around the burial but since no further remains were located, these were assumed to have been displaced by the graders.

The skeletal materials were well-preserved. The burial was oriented in a north-north-east direction. The left frontal portion of the skull cap had been removed from the skull by the blade of the graders, and the head was leaning slightly to the right of midline position. The teeth were intact but showed signs of considerable wear.

Excavation revealed that this individual lay on his back with his legs in a flexed position. This was suggested

by the location of the foot bones directly atop the pelvis. It was further supported by the location, position, and condition of the long bones which had been recently chopped off by the grader blade, leaving about three inches remaining of the distal and proximal ends. The right arm of the individual lay beside the body while the left forearm crossed toward the pelvic region. No skeletal remains were found below the pelvic region.

A small black metavolcanic projectile point was found ten inches below the left pelvis and six inches from the present ground level. This was the only artifact found associated with this burial.

No further excavation was attempted beyond what was necessary to reveal the position and cultural association of the burial. At approximately 4 p.m., the skeleton was covered with paper and dirt for protection until a more detailed examination could be made. The projectile point was given to Mr. Campo, who could deliver it into the hands of the chief investigator, Dr. Ezell. Sergeant Dodson offered to send copies of the pictures he had taken to Dr. Ezell and myself.

Appendix II

OSTEOLOGY AND PATHOLOGY OF THE CALIFORNIA INDIAN
REMAINS AT LAS FLORES

by

Diane K. Brockman

Department of Anthropology
San Diego State University

Between June, 1972 and May, 1974 a total of fourteen California Indian burials from the Las Flores site were examined to yield data concerning age and sex continuous and discontinuous traits, stature and pathologies. Since none of the skeletons could be removed from the field, examinations took place at the site. The specimens were in various stages of completeness and all were in good condition.

Fourteen individuals were examined and of these three were males and five were females. Sex could not be determined on three individuals due to the incompleteness of the specimens. Three infants whose sex could not be determined were also identified.

Age of the identified individuals was determined from tooth eruption, endocranial closure and condition of the pubic symphysis (McKern and Stewart 1957). The males ranged in age from 15 to 47 years, with an average age of 37 years old at death. The females ranged in age from 25 to 50 years with an average age of 35 years old at death.

Stature was estimated on the basis of the length of the long bones. The average height for the male specimens was 5 feet, 4 inches tall. The average height for the female specimens was 5 feet tall (Bass 1971).

Pathologies consisted of osteoporosis of the skull of three of the four female specimens. One female was noted to be extremely hyperbrachphalic, that is, had an extremely broad head. One female also had a lesion on the greater wing of the sphenoid. Lipping was noted on the metatarsals,

phalanges and olecranon process of one female as well as on the lumbar vertebrae of another female and on the atlas of a male. All but two of the adult specimens had a moderate to great amount of attrition on the teeth. One male exhibited a tooth abscess and caries while another male had extensive malocclusion of the teeth. Finally, a young male approximately 20 years old had double shovel shaped incisors, had retained his deciduous lower molars and had a very large undescended upper canine.

Burial #1

The incomplete specimen from this burial was comprised of portions of the skull, six thoracic vertebrae, maxilla and teeth, portions of the left innominate, the right and left humerus, the left clavicle and three metacarpals. The specimen was sexed as female on the basis of the innominate bone. She was determined to be between 25 and 27 years of age based on the condition of the pubic symphysis (McKern and Stewart 1957).

Dentition of the maxilla was complete. A moderate amount of attrition was noted as all the teeth were worn down to the pulp chamber. No caries were noted.

The only pathology for this specimen included what appeared to be fracture residuals in the ilium of the innominate.

Burial #2

This specimen was an incomplete skeleton comprising

broken portions of the skull, cervical and lumbar vertebrae, the left portion of the mandible with four teeth, a small portion of the innominate, right clavicle, one rib, a portion of a scapula and four metacarpals. Age nor sex of the specimen could be determined due to the incompleteness of the material.

Pathologies consisted of hypertrophic osteoarthritis of the vertebrae suggesting a middle-aged individual, and considerable malocclusion.

Burial #3

This specimen was an incomplete skeleton recovered in a tightly flexed position. The skeleton was comprised of a skull, broken portions of the right humerus, ulna and radius and portions of the left humerus, radius and metacarpals as well as two ribs. The sex of the individual could not be determined due to the incompleteness of the material.

No pathologies were noted for this specimen.

Burial #4

This specimen was complete except for the right humerus. The specimen was in good condition. The individual was sexed as female on the basis of the mastoid and the innominate bones. On the basis of the obliteration of the posterior portion of the sagittal suture the specimen was determined to be approximately 30 years old.

The skull exhibited a concavo-convex nasal profile.

The dentition was complete, but the teeth were small

and a great amount of attrition was noted on all the teeth except for the mandibular third molars. Caries were noted on the left mandibular third molars.

Pathologies of the specimen consisted of osteoporosis of the skull.

Stature was estimated on the length of the left humerus (129 mm.), and the specimen was determined to have been less than 5 feet tall (Bass 1971).

Burial #5

The specimen is complete except for the left femur, right radius, right and left fibulae and right and left ulnae which were lacking. The specimen, buried in a flexed supine position, was in good condition. The individual was sexed as male on the basis of a heavy supra-orbital torus, large mastoid process and innominate bones. As the sagittal, coronal and lambdoidal sutures were completely closed the specimen was estimated to be between 40 and 47 years old.

The skull, with a breadth of 135 mm and length of 178 mm, had a cranial index of 75.84 indicating the skull was of average dimension (Bass 1971:63). The skull had a large supra-orbital torus, supra-orbital notches and large mastoids. The nasal profile was concavo-convex. The mandible exhibited an extension of bone on the left gonial angle.

The dentition was complete except for the left maxillary first molar and right maxillary third molar. There was extensive malocclusion and evidence of an abscess was present

at the site of the missing left maxillary first molar. All the teeth were worn down to the pulp chamber. Striations were present on the maxillary and mandibular canines. The right maxillary third and fourth premolars were peg-shaped.

Few pathologies were noted in this specimen. There was evidence of an abscess in the socket of the missing left maxillary first molar and caries in the right maxillary second and third molars as well as in the maxillary and mandibular premolars. Some lipping was found on the atlas of the vertebrae.

Stature was estimated on the length of the left and right tibia (350 mm), right humerus (310 mm), left humerus (300 mm), left radius (235 mm), and right femur (435 mm): On the basis of these measurements the specimen was between 5 feet 4 inches and 5 feet 6 inches tall (Bass 1971).

Burial #6

This specimen comprised one left femur; the rest of the skeleton was completely lacking.

Due to the incompleteness of the skeleton, age and sex could not be determined.

No pathologies were noted on the femur.

On the basis of the length of the femur (430 mm) the specimen was estimated to have been approximately 5 feet 4 inches tall.

Burial #7

This specimen was complete except for the right tibia

and right femur which were lacking. The specimen was in good condition. The individual was sexed as male on the basis of the innominate bones. On the basis of the open sutures on the skull, the deciduous teeth, and the lack of fusion of the epyphysis on the humerus, femur and illium, the specimen was judged to have been between 15 and 20 years old.

The dentition was complete. There was great attrition on the incisors, canines and right mandibular premolar, the teeth being worn down to the pulp chamber. The maxillary central incisors were double shovel shaped in form. The maxillary left canine was deciduous with a large undescended permanent canine above it. The left mandibular first, second and third molars were deciduous, the right and left third molars being only buds. The right maxillary third molar was uncut and no bud was in evidence.

No pathologies were noted for this specimen.

Stature was estimated on the length of a femur (415 mm), and a tibia (359 mm). On the basis of these measurements the specimen was 5 feet 3 inches tall (Bass 1971:24).

Burial #8

This specimen was an incomplete skeleton of an infant. The specimen was in good condition.

The exact age and sex of the individual could not be determined.

No pathologies were in evidence.

Burial #9

The specimen is complete except for the right humerus and scapula which were lacking. The individual was in good condition. The specimen was sexed as female on the basis of the mastoid process and innominate bones. On the basis of suture closure on the skull and the breaking down of the ventral margin of the pubic symphysis the age of the specimen as determined to be between 45 and 50 years old (McKern and Stewart 1957).

The skull, with a breadth of 167 mm and a length of 180 mm, had a cranial index of 92.77 and thus could be characterized as hyperbrachphalic (Bass 1971:63). A wormian and an inca bone were noted in the lambdoidal area of the skull. The chin was triangular in shape.

Dentition was complete except for the post-mortum loss of the right maxillary lateral incisor. Great attrition was noted, as all the teeth were worn down to the pulp chamber. No caries were present.

Pathologies consisted of osteoporosis of the skull, a lesion on the right sphenoid and a moderate amount of lipping on the metatarsals and phalanges of the feet and olecronon process of the ulna.

Stature was estimated on the length of a femur (390 mm) and a humerus (115 mm). On the basis of these measurements the specimen was determined to have been approximately 5 feet tall (Bass 1971:25).

Burial #10

This specimen is complete except for the right humerus which was lacking. The individual was unearthed lying under a large whale bone, perhaps a whale scapula (Lippold). The specimen was in good condition. On the basis of the complete fusion of the sagittal and lambdoidal sutures and partial fusion of the coronal suture the specimen was determined to be between 35 and 45 years old. The individual was sexed as a male on the basis of the large supra-orbital torus and innominate bones.

The skull had a cranial length of 154 mm. The skull exhibited a large supra-orbital torus and had a wormian bone formation in the coronal and sagittal sutures and a partial wormian in the lambdoidal suture.

The dentition was complete and in good condition with little attrition. The right maxillary first molar had caries.

No other pathologies were in evidence for this specimen.

The stature was estimated on the basis of the length of the right humerus (310 mm). On the basis of this measurement the specimen was determined to have been 5 feet 5 inches tall (Bass 1971:25).

Burial #11

This specimen was an incomplete skeleton of an infant recovered near Burial #15. It consisted of portions of the skull, the right innominate, the right scapula, left and right ulnae and the left femur. The specimen was in good condition.

The exact age and the sex of the specimen could not be determine.

No pathologies were noted for this specimen.

Burial #12

This specimen was an incomplete skeleton of an infant recovered north of Burials #7 and 10.

Because of the incompleteness of the material the age and sex of the individual could not be determined.

No pathologies were noted.

Burial #13

This specimen was complete except for 1 left rib, 6 right ribs, 1 thoracic vertebra, left foot bones, metatarsals and phalanges, which were lacking. The specimen was in good condition. The individual was sexed as a female on the basis of the mastoid process and innominate bones.

The mandible of the skull had a mylohyoid arch.

The dentition was complete except for the post-mortem loss of the maxillary right incisors, canine and premolars which were lacking. Little attrition and no caries were noted for this specimen.

Pathologies consisted of osteoporosis of the skull and a moderate amount of lipping on the lumbar vertebra.

Stature was estimated on the length of a femur (405 mm), a tibia (330 mm), a humerus (295 mm) and an ulna (250 mm). On the basis of these measurements the individual was determined to have been approximately 5 feet tall

(Bass 1971:25).

Burial #14

This specimen was complete except for a portion of the frontal, the parietals, 2 left ribs, 3 right ribs, the left patella, the right hand bones, the left calcaneum, right talus, cuboid, cuneiform and phalanges, which were lacking. The specimen was in good condition. The individual was sexed as female on the basis of the innominate bones. On the basis of the partial closure of the sagittal and coronal sutures the specimen was estimated to be between 20 and 25 years old.

The dentition was complete except for the post-mortem loss of the right and left maxillary incisors. The teeth were in good condition. The right maxilla contained an extra lateral incisor which pointed up toward the nasal cavity.

No pathologies were noted for this specimen.

Stature was estimated on the basis of the length of a femur (403 mm), a tibia (327 mm), humerus (290 mm) and an ulna (234 mm). On the basis of these measurements the specimen was estimated to have been approximately 5 feet tall (Bass 1971:25).

Comparisons made between reported La Jollans (Rogers 1963, Noble 1973) and the Las Flores population demonstrates a series of traits in common. Several dental characteristics of La Jollan populations are seen at Las Flores; for instance, shovel-shaped incisors, worn adult dentition and periodontal disease were common. In both groups caries were few as were abscesses.

Like reported La Jollans (Rogers 1963, Noble 1973), pathologies were generally few in the Las Flores population. Those pathologies common to both populations include vertebrate lipping, arthritis condition of some joint areas (elbow, neck, etc.) and osteoporosis. As in some La Jollan populations (Rogers 1963) few wormian and inca bones were present in the Las Flores population.

Stature for the Las Flores population was found to be within the range for reported La Jollan populations (Rogers 1963, Noble 1973).

Unlike known reported La Jollans, Las Flores shows one specimen that is hyperbrachcephalic. All other characteristics noted in the Las Flores population coincide with traits reported from known La Jollan populations.

Appendix III

LAS FLORES SHELL SPECIES LIST

compiled by

Tim Gross

Department of Anthropology

San Diego State University

LAS FLORES SHELL SPECIES LIST

compiled by
Tim Gross

December 24, 1974

SOURCES

- Allen, Richard K.
1969 Common Intertidal Invertebrates of Southern California. Peck Publications, Palo Alto.
- Keen, A. Myra
1963 Marine molluscan genera of western North America. Stanford University Press, Stanford.

SHELL SPECIES

SCIENTIFIC NAME

COMMON NAME
(when known)

Pelecypods

<u>Chione californiensis</u> (Broderip, 1835)	
<u>C. fluctifraga</u> (Sowerby, 1853)	
<u>C. undatella</u> (Sowerby, 1835)	
<u>Aequipecten (Plagioctenium) circularis</u> <u>aquisulcatus</u> (Carpenter, 1864)	scallop
<u>Ostrea lurida</u> (Carpenter, 1864)	oyster
<u>Donax gouldi</u> (Conrad, 1849)	bean clam
<u>Tivela stultorum</u> (Mawe, 1823)	pismo clam

Gastropods

<u>Haliotis</u> sp. (possibly <u>fulgens</u>)	abalone
<u>Astraea undosa</u> (Wood, 1828)	wavy top
<u>Polinices</u> sp. ?*	moon snail
<u>Bursa californica</u> (Hinds, 1832). Specimen not in good condition.	
<u>Epitonium</u> sp. ? Not certain. Specimen in poor condition.	periwinkle
Land snail, species unknown.	

*Those listed as "?" are possibilities only, for a variety of reasons--e.g., only one specimen, or in poor condition.

Appendix IV

RADIOCARBON DATING OF SHELL FROM LAS FLORES

by

Timothy W. Linick

Mt. Soledad Radiocarbon Laboratory
University of California, San Diego



Mt. Soledad Radiocarbon Lab. S-003
POST OFFICE BOX 109
LA JOLLA, CALIFORNIA 92037

December 16, 1974

Dr. Paul H. Ezell
Mr. Russell L. Kaldenberg
Department of Anthropology
San Diego State University
San Diego, CA

Dear Dr. Ezell and Mr. Kaldenberg:

Enclosed are the results for the samples submitted to us for radiocarbon dating in October and November of this year. Four samples were dated, with the fifth not providing sufficient carbon for dating. I have enclosed a list of the results plus the information sheets partially filled out by you and completed by us.

All uncertainties given are the one-standard deviation uncertainties based only on the counting statistics of the sample, standard, and background. All data have been corrected in the accepted manner using the $\delta^{13}\text{C}$ values. The "% modern carbon" is essentially the percentage of original ^{14}C still present in the sample. The Libby age is calculated on the basis of the 5568-year half-life originally used by Libby, and it is wrong, but is accepted by archeologists for the sake of consistency in publications. The 5730 age is calculated on the basis of the currently accepted 5730-year half-life.

The ages of sea shells are really only "apparent ages." The shells were formed from the dissolved inorganic carbon present in the water in which the molluscs grew, this carbon having a lower radiocarbon level than the atmosphere at the same time. The upper 100 meters of the ocean was generally about 5% depleted in ^{14}C relative to the atmosphere, corresponding to an apparent age for surface water carbonate of some 400 years. (Below 1500 meters, the ocean carbonate has an apparent age of over 2000 years.) Thus, the shell ages given here are likely to be a few hundred years too high, with the exact difference very dependent upon local conditions.

We still have a lot of unneeded sample material here, and it may be picked up anytime.

Sincerely,

Timothy W. Linick

Radiocarbon results for samples submitted by Dr. Paul H. Ezell and
Mr. Russell L. Kaldenberg during October and November 1974:

LJ No.	Description	$\delta^{13}\text{C}(\text{‰})$	% Modern C	Libby age	5730 age
3159	Charcoal/Great W. Site A/Level IV No. 3/RA-J-6-4-C14	-23.2	91.7 ± 0.4	700 ± 40	720 ± 40
3160	Shells/Great W. Site A/Level VIII No. 11/Unit I-15	-0.1	36.9 ± 0.4	8020 ± 80	8250 ± 90
3161	Shells/Great W. Site A/Level XI No. 14/Unit I-15	+1.2	35.7 ± 0.4	8260 ± 90	8500 ± 90
3173	Shells/Las Flores Burial No. 15	-0.1	77.4 ± 0.5	2060 ± 60	2120 ± 60
3174	Charcoal(?)/Las Flores Burial No. 15	-----Insufficient carbon for analysis.-----			

RADIOCARBON LABORATORY
 MT. SOLEDAD LAB
 UNIVERSITY of CALIFORNIA, SAN DIEGO
 LA JOLLA, CALIFORNIA

(Please send in duplicate with each sample)

SUBMITTED BY: Dr. Paul H. Ezell
 ADDRESS: Department of Anthropology
 San Diego State University
 SUBMITTER'S SAMPLE IDENTIFICATION (Number, etc.):
 Shell from B#15.

SAMPLE DESCRIPTION (Charcoal, shell, etc.): Shell found in
 association with burial number 15.

DATE OF COLLECTION: July 1, 1973

LOCATION OF SAMPLE COLLECTION IN DETAIL: Sample was collected
 from the excavations at Las Flores, in alluvial
 deposit, T10S R6W SW $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 24, Las Pulgas

LONGITUDE: ^{topo.} 117°26'30"
 LATITUDE: 33°17'30"

SAMPLE PREPARATION (Washing, Chemical Treatment, etc.): None

Shells cleaned to remove dirt; outer layer of shells removed by 0.1M HCl treatment.

POSSIBLE IMPLICATIONS OF DATING: This sample came from a site
 which can not be assigned to a position in the
 existing structure of local prehistory. A date,
 therefore, will aid in the relative positioning
 ADDITIONAL REMARKS OR REQUESTS: of this manifestation.

FOR RADIOCARBON LAB USE

DATE RECEIVED: *Nov. 1974*

DATE COUNTED: *1-liter -- 24-27 Nov. 1974 / 400 cc -- 27-30 Nov. 1974*

COUNTER AND BOOK/PAGE NO.: *1-liter III -- p. 80 / 400 cc III -- p. 33*

AGE B.P.: *Libby (5568) age = 2060 ± 60 5730 age = 2120 ± 60*

δC^{13} : *- 0.1 ‰*

REMARKS:

RADIOCARBON LABORATORY
 MT. SOLEDAD LAB
 UNIVERSITY of CALIFORNIA, SAN DIEGO
 LA JOLLA, CALIFORNIA

(Please send in duplicate with each sample)

SUBMITTED BY: Dr. Paul H. Ezell
 ADDRESS: Department of Anthropology
 San Diego State University
 SUBMITTER'S SAMPLE IDENTIFICATION (Number, etc.):
 Charcoal (?) from B#15.

SAMPLE DESCRIPTION (Charcoal, shell, etc.): Charcoal (?) found in
 association with burial number 15.

DATE OF COLLECTION: July 1, 1973

LOCATION OF SAMPLE COLLECTION IN DETAIL: Sample was collected
 from the excavations at Las Flores, in alluvial
 deposit, T10S R6W SW $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 24, Las Pulgas

LONGITUDE: ^{topo.} 117°26'30"
 LATITUDE: 33°17'30"

SAMPLE PREPARATION (Washing, Chemical Treatment, etc.): None
 HCl/NaOH/HCl treatment.

POSSIBLE IMPLICATIONS OF DATING: This sample came from a site
 which can not be assigned to a position in the
 existing structure of local prehistory. A date,
 therefore, will aid in the relative positioning
 ADDITIONAL REMARKS OR REQUESTS: of this manifestation.

FOR RADIOCARBON LAB USE

DATE RECEIVED: Nov. 1974

DATE COUNTED: _____

COUNTER AND BOOK/PAGE NO.: _____

AGE B.P.: _____

δ C¹³: _____

REMARKS: Black crystalline substance melted under high heat to white substance,
 i.e., sample was not charcoal
 Insufficient carbon for dating.