EARLY PERIOD CRANIAL METRICS AND THE CA-MNT-386/387 AND 391 POPULATION

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ABSTRACT

Prehistoric human crania from the Early Period Rossi and Saunders sites (Mnt-386/387 and Mnt-391) offer an opportunity to compare these remains with other early sites in California. The data for this analysis were derived from 107 crania from archaeological sites in the Lower Sacramento Valley, San Francisco Bay area, Monterey Bay area and Santa Cruz Island. Analysis of 19 metric variables using ANOVA tests and lateral cranial contour drawings of the craniofacial complex reveal that the Rossi and Saunders site females show a generalized morphological pattern, whereas the males display a craniofacial pattern consistent with that found in the Lower Sacramento Valley.

INTRODUCTION

The Rossi and Saunders sites (Mnt-386/387 and Mnt-391) are early period sites located on the Monterey Bay Peninsula. As the Rossi and Saunders sites both contain Early Period inhumations, with grave lots of a very similar nature and are located a short distance apart, for the purpose of this paper they are referred to as the Saunders site (Mnt-391). This analysis explores the biological relationships of the indigenous population recovered from the Saunders site and other early sites from California. The analysis is based on comparisons of cranial morphology. Rather than relying solely on statistics for interpretation of the crania we have also constructed lateral cranial contour drawings. These drawings aid in interpretation by providing a visual representation of the similarities and differences of the size and shape of the crania. A brief archaeological overview is included of the areas in the comparisons: the Monterey Peninsula, Santa Cruz Island, the San Francisco Bay region and the Lower Sacramento valley (Figure 1).

According to Breschini and Haversat (1980) the archaeological data found on the Monterey Peninsula represents two diverse adaptation modes. Breschini and Haversat defined these as a Sur pattern and a Monterey pattern. Breschini and Haversat characterize the early, Sur

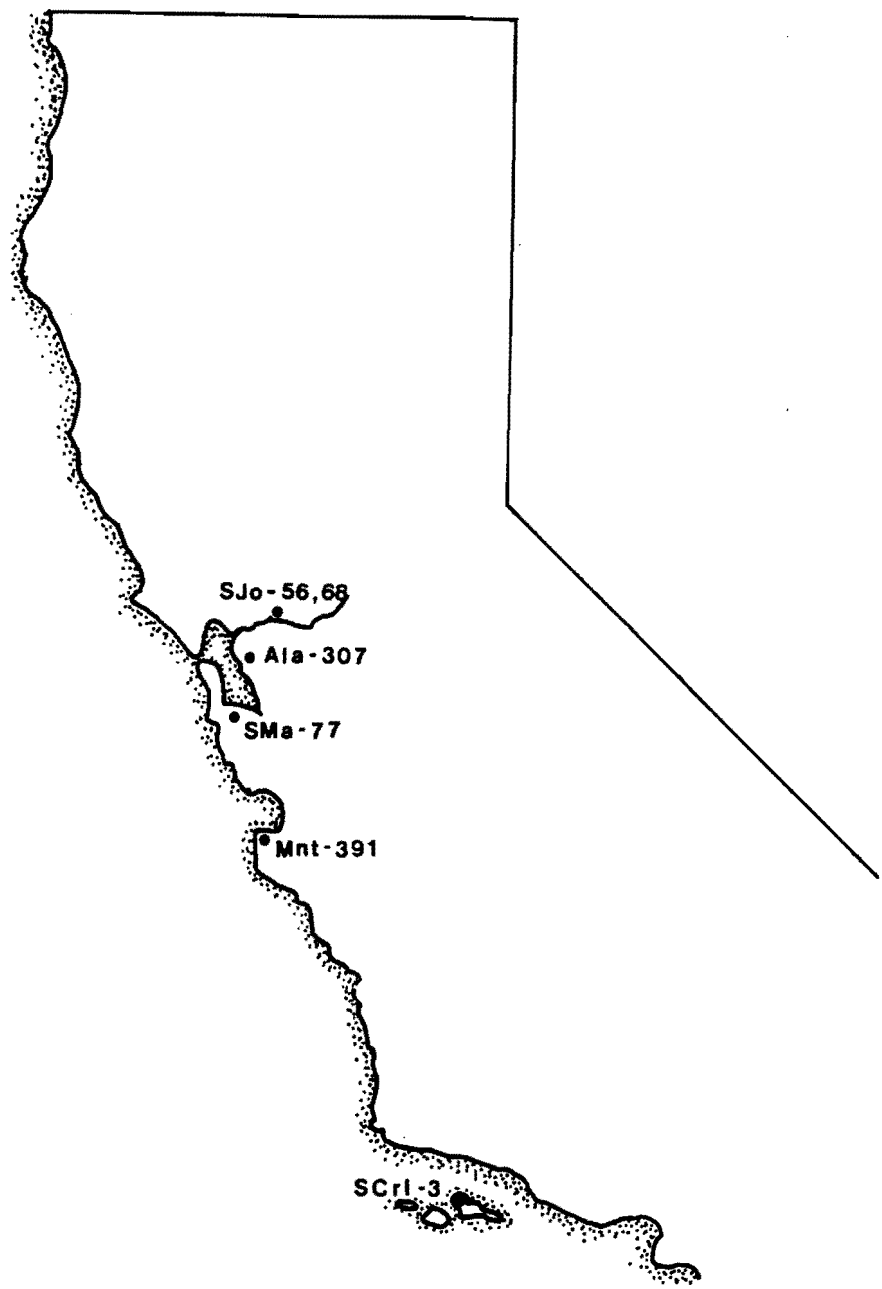


FIGURE 1. The study area showing the locations of the sites referred to in the test.

pattern as a more generalized subsistence mode, associated with foraging. They define the later, Monterey pattern as a collecting life-style, with specialized sites associated with specific collecting activities. In surveys conducted on the Monterey Peninsula from 1976 through 1979, Dietz and Jackson (1981) found evidence of a change in artifact types that would support Breschini and Haversat's theory of subsistence change. Breschini and Haversat speculate that this change took place circa 500 B.C. and that the shift represents an influx of people into the Monterey Peninsula from the San Francisco Bay area. On the other hand, Pilling (1955) cites artifacts found on the Monterey Peninsula, such as abalone dishes containing asphaltum, shell fishhooks, and pictographs, which are similar to those found in the Santa Barbara area, suggesting a possible relationship. Pilling concludes that a continuity in culture exists along the coast from the Santa Barbara area to the Monterey area which ends at the southern end of the San Francisco Bay area.

R.L. Olson (1929) made the first organized, stratified excavations on Santa Cruz Island. The excavations made by Olson enabled him to define a separation of cultural sequences. SCrI-3 belongs to Olson's Early Island period. He classifies this Early Island period as a maritime economy. Shell fishhooks are common in both early and late sites on Santa Cruz Island. Charmstones and bone pendants are found in the Early sites, but are absent in the Late Island sites. Olson believed that the gradual nature of change in artifact types on Santa Cruz Island indicated that these cultures had evolved without influence from outside cultures.

Gerow (1968) demonstrated a close relationship both culturally and physically between SMa-77 and Ala-307. Due to the resemblance between these two sites, Gerow suggested the presence of an Early culture in the San Francisco Bay Area. Gerow contrasts the Early Bay sites with the Lower Sacramento sites:

> "University Village and these other early complexes outside of the Delta region are characterized by higher incidences of powdered red ochre absolutely and relatively to other types of grave associations and lack the Windmiller facies pattern of extended burials in a ventral position oriented westerly, and high incidences of drilled shell fractions relative to spire-abraded whole *Olivella* shells, flaked stone points relative to simple flake/core tools and seed grinding implements, quartz crystals, and other forms of ornamental stone" (Gerow 1968:123).

Moratto (1984:279) suggests, however, a close relationship between SMa-77 and the Monterey area people based on projectile points of Monterey chert and other artifacts. Moratto suggests that SMa-77 represents a Hokan

population which had ties to the Monterey Bay area, but was being influenced by the East Bay culture.

Cultural data also suggests a relationship between Ala-307 and the Early Sacramento Valley sites. According to Moratto (1984:259), the similarities include charmstones, non-obsidian lithics, and various bead types and shell ornaments. However, there are also differences, including burial posture and orientation, baked clay balls and a higher incidence of quartz crystals in the Lower Sacramento Valley. Ala-307 offers a higher incidence of flexed burials, and cremations, which are virtually unknown in the Early Horizon from the Lower Sacramento Valley. It seems possible that the relationship between Ala-307 and the Valley was restricted to trade and does not represent a biological continuity with the San Francisco Bay population.

As a result of the proposed relationships between these areas, we have selected these populations for comparison with the Monterey Bay sample. We make use of sagittal cranial contour drawings to show morphological differences in the face and vault of these early groups. Statistical tests are made on the variables used to construct the drawings.

MATERIALS AND METHODS

Cranial remains used in this analysis are from the Early Period of California. The samples from the San Francisco Bay region are represented by University Village (SMa-77) and West Berkeley (Ala-307). The lower Sacramento Valley material is from the Phelps site (SJo-56), and the Blossom site (SJo-68). The Monterey Peninsula samples are from the Rossi site (Mnt-386/387) and the Saunders site (Mnt-391). Southern California is represented by Santa Cruz Island (SCrI-3). A total of 107 crania are utilized, 55 males and 52 females. Only adult crania with no obvious pathological defects that might alter cranial shape and size were included in the analysis.

Sex determination was based on pelvic morphology and general robusticity of the postcranial skeleton following the procedures outlined by Bass (1971). In cases where postcranial remains were not available, sex determination was based on the skull morphology. Exceptions are the material from SMa-77, where sex determinations were taken from the literature (Gerow 1968).

All material comes from sites with well-provenienced radiocarbon dates (Table 1) which were taken from Breschini *et al.* (1986).

TABLE 1

RADIOCARBON DATES AND DISTRIBUTION OF SEX BY SITE

Site Number	Male	Female	Date*
Ala-307	8	8	2700-3860 B.P.
SMa-77	4	3	2596-3640 B.P.
SCrI-3	13	16	2160-5190 B.P.
SJo-56	4	4	2855 B.P.
SJo-68	15	13	2980-4350 B.P.
Mnt-391	11	8	3200-4910 B.P.
Totals	55	52	

* The date ranges shown in the table represent multiple C^{14} dates.

All crania were measured by the authors, with the exception of the material from Mnt-386/387 (Pierce 1988). Equipment used included standard sliding and spreading calipers. Measurements employed in the study are as defined by Howells (1973). Exceptions are the measurements bregma-prosthion, basion-nasospinale, basion-lambda, and nasion-lambda. Due to the damaged nature of the crania examined, estimates of some measurements were made in order to retain as many crania as possible. These estimations were made in accordance with Howells (1973) methods and do not exceed an estimated error level of 2 mm.

A total of 19 measurements were taken on each cranium when possible. Means and standard deviations were calculated for each site separately for males and females (Appendix 1). Samples for each variable were examined for normal distribution using normal probability plots. ANOVA tests were run by site for each variable and the results were submitted to a Fisher Least Significant Difference test using the statistics package NCSS, on an IBM compatible PC. The ANOVA test was used to reduce the accumulated errors of repeated T-tests. The Fisher test was used to determine which variables show significant differences between the samples at the 0.05 level.

The interpretation of the data was facilitated by the use of lateral cranial contour drawings. The use of contour drawings was patterned after methods used by Frayer (1984) and Carlson (1976). In Frayer's study porion was used as a fixed reference point and 15 vault measurements were used to analyze cranial size and shape differences. Carlson, on the other hand, used radiographs with sella as the fixed point of reference. His method employed 37 measurements of the vault and mandible.

In our study the means of 19 variables were used to con-

struct the drawings. Males and females were drawn separately. The cranial contour drawings were superimposed using the fixed points of basion and basion-bregma line for orientation. These drawings provide a visual method to analyze the morphological patterns associated with size and shape between the samples in the sagittal plane. Percent differences were calculated for the groups using the formula; Sample A - Sample B / Sample A x 100.

RESULTS

The results of the statistical intersite comparison are presented as follows. Among the male groups from the San Francisco Bay sites, only one variable, foramen magnum length, was found to be significantly different at the 0.05 level. Between the Valley site males two measurements, nasal height and occipital chord differ significantly. No measurements differed significantly between the female samples from the San Francisco bay or the Lower Sacramento Valley. Due to the apparent homogeneity of the groups from the two areas these samples were pooled to give a Bay and a Valley population. The tests were repeated on the pooled samples, the SCrI-3 sample, and the sample from Saunders site. Variables with significant differences are presented in Table 2. The results are presented by sex and locality.

TABLE 2

MEASUREMENTS WITH SIGNIFICANT DIFFERENCES

Males	
Lower Sacramento: Valley Monterey	
Basion-prosthion	Lambda-opisthion fraction
Foramen magnum length	
Santa Cruz Island: Monterey	
Basion-bregma	Nasion-bregma
Basion-nasion	Basion-prosthion
Nasion-prosthion	Bregma-prosthion
Nasal Height	Basion-lambda
Nasion-lambda	Nasion-bregma fraction
Bay Area: Monterey	
Nasion-bregma	Basion-prosthion
Basion-nasospinale	Nasion-lambda
Lambda-opisthion	Lambda-opisthion fraction
Females	
Lower Sacramento Valley: Monterey	
Basion-bregma	Foramen Magnum length
Santa Cruz Island: Monterey	
Bregma-prosthion	Nasion-prosthion
Nasion-bregma fraction	Nasal Height
Bay Area: Monterey	
none	

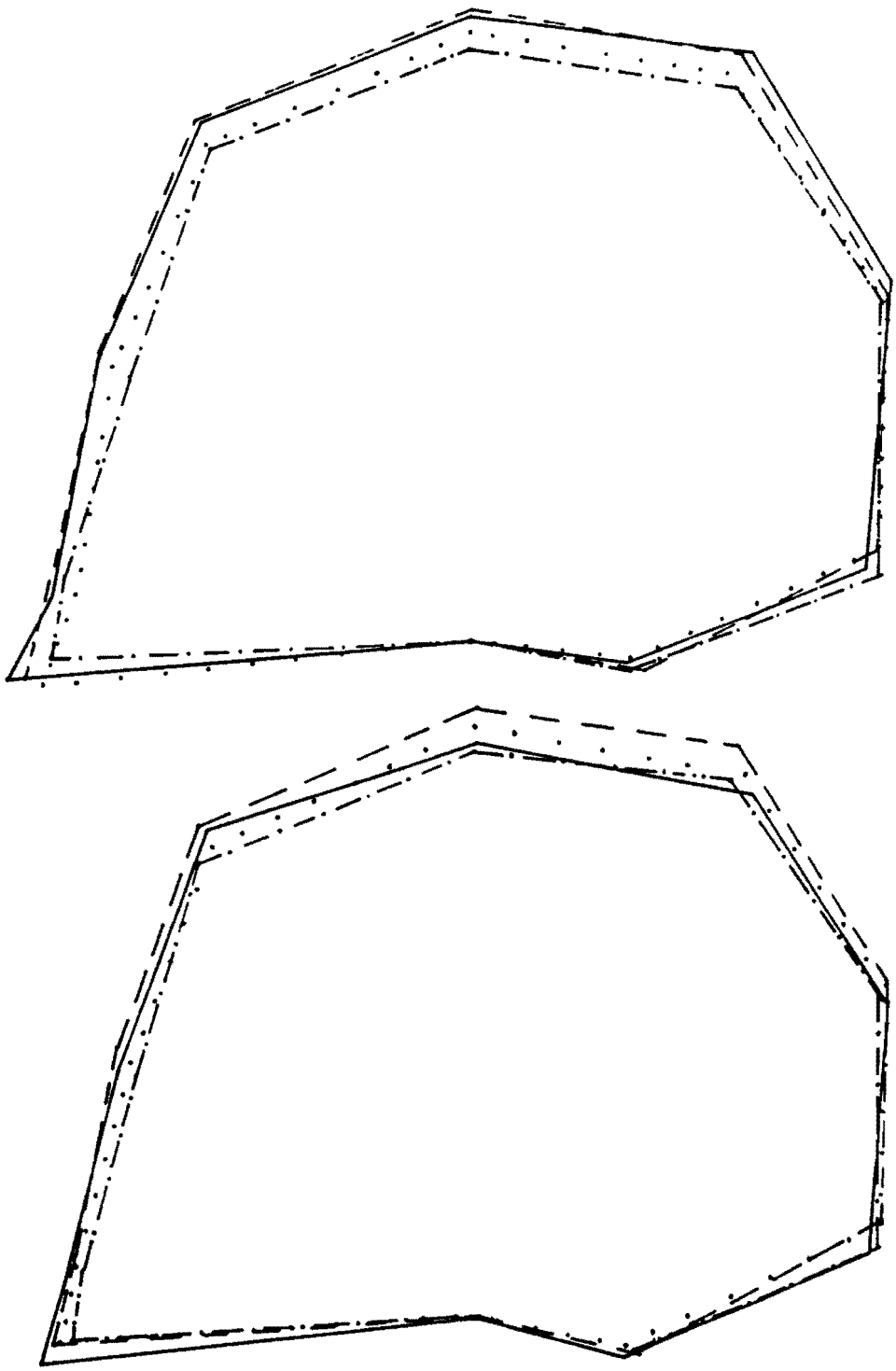
The lateral cranial contour drawings show the patterns of morphological variation between the four groups examined (Figures 2 and 3). Superimposing the male and female groups graphically displays the interpopulation variation in size and shape. Table 3 shows the percent of differences between Monterey and the three other samples. A positive number indicates that the measurement from the Monterey sample is larger than the comparative sample.

TABLE 3

PERCENT OF DIFFERENCES
BETWEEN AREAS

	MALES			FEMALES		
Measurement	MNT:BAY	MNT:LSV	MNT:SCrI	MNT:BAY	MNT:LSV	MNT:SCrI
Basion-bregma	2.32	-1.05	4.92	-2.51	-6.10	1.22
Basion-nasion	3.01	-0.75	7.45	1.61	-3.42	4.43
Frontal chord	3.45	0.94	4.65	0.18	-1.99	2.54
Basion-prosth	7.29	3.97	9.65	3.73	2.52	6.46
Nasion-prosth	1.73	-1.06	11.73	3.31	-0.14	8.51
Bregma-prosth	3.64	1.14	7.44	0.29	-3.32	2.55
Nasal height	3.49	2.20	12.86	4.00	2.60	8.40
Basion-nasosp	6.04	-0.62	2.50	1.59	2.44	3.95
Parietal chrd	-0.61	-2.29	2.29	-0.45	-1.08	3.07
Basion-lambda	3.24	2.29	4.35	-2.45	-2.87	0.50
Nasion-lambda	4.08	2.45	6.75	-0.05	-1.16	3.36
Occipital chd	6.24	3.68	3.50	-0.19	-1.28	1.98
Foramen mag l	-4.51	-13.27	-5.64	2.01	-6.91	-2.30
Nas-breg frac	7.64	4.47	8.95	8.31	7.73	16.63
Nas-breg subt	6.61	0.41	-2.89	14.44	9.62	5.92
Breg-lam frac	7.90	3.78	3.26	1.89	7.93	8.44
Breg-lam subt	10.74	4.07	9.25	2.91	-4.58	0.41
Lam-opis frac	17.83	12.76	9.96	5.41	2.91	2.08
Lam-opis subt	6.02	11.44	-6.02	-0.65	3.25	-8.14

As seen in the lateral cranial contour drawings for the male groups (Figure 2), the Monterey Bay group and the lower Sacramento Valley group reveal a pattern that is similar in size and shape. Facial height is very similar in the two groups compared both relatively and absolutely. Of significant difference is the lower facial protrusion, which is greater in the Monterey Bay sample. In dimensions of the vault, the lower Sacramento Valley males display a higher vault, as indicated by a greater distance between basion and bregma. In regards to the position of lambda, a more superior placement is evident in the Monterey Bay males. The foramen magnum is larger in the lower Sacramento Valley sample. The frontal bone presents a similar contour, whereas differences occur in a rounder parietal and the occipital



MNT: _____
LSV: - - - - -
BAY: . . . . .
ScrI: -.-,

FIGURE 2, Male cranial profiles.
FIGURE 3. Female cranial profiles.

curve in the Monterey Bay group. The lower Sacramento Valley group exhibit a slightly more pronounced occipital region. The mean difference between the two male groups is 3.8%.

A different pattern is seen between the Monterey Bay males and the San Francisco Bay males. All linear measurements, except the parietal chord and foramen magnum length are greater in the Monterey Bay group. Of interest is the upper facial length, which is greater in absolute terms in the Monterey males, although relatively higher in the San Francisco Bay sample in relation to cranial height. Lambda occupies an inferior position in the San Francisco Bay sample, both relatively and absolutely. In the sagittal plain, the frontal and parietal portions of the vault display a flatter profile in the San Francisco Bay males, but a greater occipital protrusion. As in the previous groups compared, the Monterey Bay sample exhibits a greater alveolar prognathism. A 5.6% difference exists between these two male samples.

The graphic displays for the Monterey Bay males and Santa Cruz Island males reveal the most striking case of interpopulation variation. In this case the Monterey Bay males are larger in 16 of the 19 variables used. The upper facial length is shorter in both relative and absolute terms in the Santa Cruz Island group. The amount of lower facial prognathism is less as well. Cranial height is 4.9% greater in the Monterey Bay sample, but lambda occupies an inferior position relatively. Again, the foramen magnum length is shorter in the Monterey Bay males. In relative terms the Santa Cruz Island sample presents a higher frontal, flatter parietal contour, and a more pronounced occipital protrusion, which is positioned higher on the vault. A total mean difference of 6.5% distinguishes Santa Cruz Island from Monterey Bay sample.

As seen in the male mean configurations, the female mean configurations display distinct morphological patterns. The contour drawing of the females, figure 3, reveals a pattern dissimilar from that observed in the male graphics.

Unlike the Monterey Bay male and lower Sacramento Valley males, which display a convergent morphological pattern, the females from the two areas present a pattern which is divergent. The upper facial height is similar absolutely in the two groups, but is larger relatively in the Monterey Bay females due to their shorter vault height. The mean vault height for the Monterey Bay group is 6.1% less than the lower Sacramento Valley group. Greater lower facial prognathism is in evidence in the Monterey Bay group as well as a lower placed alveolare. In the sagittal plain, the Monterey Bay group reveals a more curved frontal bone, a depressed parietal section and a more slightly expanded occipital region, which is found in a more inferior position. The

foramen magnum length is shorter and forms a more oblique angle from basion to opisthion in the Monterey Bay sample. The mean percent of difference between these groups is 3.78.

The craniofacial morphology, as displayed by the drawings, reveals a less divergent pattern between the Monterey Bay females and the San Francisco Bay females. In this case 13 of the 19 measurements employed are larger in the Monterey Bay group. The Monterey Bay group also displays a significantly greater amount of alveolar prognathism. Lambda is positioned marginally higher relative to cranial height and the frontal morphology indicates a higher, more rounded forehead in the Monterey Bay females. The parietal curvature is also fuller, but slightly less occipital protrusion is exhibited in the Monterey females. The length of the foramen magnum is 4.5% shorter and opisthion is located inferiorly on the Monterey Bay sample. The San Francisco females present a basion-bregma length 2.5% greater than Monterey Bay females. The mean difference between the two groups is 2.9%.

When comparing the Monterey Bay females and the Santa Cruz Island females, the Santa Cruz Island group is larger in only two variates, foramen magnum length and occipital subtense. The upper facial length is greater both in absolute and relative terms in the Monterey sample. The vault height is greater in the Monterey Bay group, but lambda is found in a more inferior position. The sagittal contour of the Monterey Bay crania presents a higher, more curved frontal, flatter parietal, and less protruding occipital. Total mean difference for the Monterey Bay females and Santa Cruz Island females is 4.8%

DISCUSSION

Lateral cranial contour drawings were constructed to graphically display intersite differences in morphological patterns, male and female contours were superimposed separately. As revealed by the mean configurations, the male samples appear to reflect local patterns. The following patterns can be observed: a large robust group situated in the lower Sacramento Valley, a moderately proportioned population in the San Francisco Bay area and a small, gracile group located on Santa Cruz Island. Comparing the male crania from the Monterey Bay Peninsula with the male crania from the other areas shows a cranial morphology consistent with the morphology present in the lower Sacramento Valley population. Both the size and shape of the crania are similar, the differences occurring in the occipital region, which is more pronounced in the lower Sacramento Valley group, and the lower face, which is more prognathous in the Monterey group.

The greater size of the Monterey males differentiate

them from the San Francisco Bay and Santa Cruz Island groups, although there is a similarity in the cranial base between the Monterey Bay and San Francisco Bay populations. Of special note is the foramen magnum length of the Monterey Bay males, which is the smallest of all groups. The mean percent of difference between the Monterey Bay and San Francisco Bay, and Santa Cruz Island male groups are 5.6% and 6.5% respectively.

The female groups present a craniofacial pattern that differs from that observed in the male groups. Contrary to what would be expected, the Monterey Bay females show a generally divergent pattern from the lower Sacramento Valley females. The shape and size of the Monterey females reflect a more generalized pattern which does not appear to differ markedly from the patterns of the other areas studied. Similarities are evident in the anterior aspects of the Monterey Bay females and the lower Sacramento Valley females. As in the males, lower facial prognathism is greater in the Monterey females than in the other samples. In cranial height and occipital morphology, the Monterey Bay females show some resemblances to the Santa Cruz Island females. Similarities between the Monterey and the San Francisco Bay females can be seen in the relative position of lambda and the fullness of the occipital. The female groups showing the least percent of difference are the Monterey Bay and San Francisco Bay.

The results of this study, although based on small sample sizes suggest that the burials recovered from the Saunders site represent a population where the males show a large, robust craniofacial morphology which is consistent with the Early Period males from lower Sacramento Valley in size and shape. Alternately, the females from the Early Period reflect a generalized pattern which is observed over a broad geographical area.

ACKNOWLEDGMENTS

We wish to express our deep appreciation to Dr. Bert Gerow for allowing us to measure the material from SMa-77, Gary Richards for access to the material in the Lowie Museum of Anthropology, University of California, Berkeley, and Dr. Robert Cartier for letting us examine the Monterey Bay material.

REFERENCES CITED

Bass, W.
1971 Human osteology: A laboratory and field manual of the human skeleton. Columbia, Missouri: Missouri Archaeological Society.

Breschini, G.S., and T. Haversat
1980 Preliminary archaeological report and archaeological management recommendations for CA-Mnt-170. Aptos: Archaeological Regional Research Center, Cabrillo College.

Breschini, G.S., T. Haversat, and J. Erlandson
1986 Radiocarbon dates. Fourth edition. Salinas: Coyote Press.

Carlson, D.S.
1976 Temporal variation in Prehistoric Nubian crania. American Journal of Physical Anthropology. 45: 467-484

Cartier, R.
1985 Chronology at the Saunders Site: CA-Mnt-391. Paper presented at the Annual Meetings of the Society for California Archaeology, San Diego, 1985.

Dietz, S.A., and T.L. Jackson
1981 Report of archaeological excavations at nineteen archaeological sites for the Stage I Pacific Grove-Monterey Consolidation Project of the Regional Sewerage System. Santa Cruz: Archaeological Consulting and Research Services.

Frayer, D.W.
1984 Biological and cultural change in the European late Pleistocene and early Holocene. In Origins of modern humans. : 211-250, Fred H. Smith and Frank Spencer, eds. New York: Alan R. Liss.

Gerow, B.A.
1968 An analysis of the University Village Complex, with a reappraisal of Central California archaeology. Palo Alto: Stanford University Press.

Hintze, J.L.
1987 Number cruncher statistical system. Version 5.0, Kaysville, Utah.

Howells, W.W.
1973 Cranial Variation in Man. Cambridge: Papers of the Peabody Museum. 67:1-259

Moratto, M.
1984 California archaeology. Orlando: Academic Press, Inc.

Olson R.L.
1930 Chumash Prehistory. U.C. Publications in American Archaeology and Ethnology 28:1-22

Pierce, L.
1988 The Skeletal analysis of the burials from CA-Mnt-386/387 and 391. Manuscript on file, Archaeological Resource Management, San Jose.

Pilling, A.R.
1955 Relationships of prehistoric cultures of coastal Monterey. Kroeber Anthropological Society Papers 12:70-87

APPENDIX 1
MALE MEANS AND STANDARD DEVIATIONS

	BAY			LSV			MNT			SCRI		
	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N
Bas-breg	138.8	1.2	8	143.6	5.5	19	142.1	5.5	7	135.1	4.4	12
Bas-nas	102.8	2.7	7	106.8	4.4	19	106.0	3.6	6	98.1	3.3	11
Nas-breg	111.9	4.1	12	114.8	5.6	19	115.9	4.9	9	110.5	3.6	13
Bas-pros	97.9	4.3	7	101.4	4.8	19	105.6	3.3	5	95.4	5.7	11
Nas-pros	73.7	3.8	11	75.8	5.3	19	74.8	3.0	7	66.1	3.5	11
Bre-pros	177.3	5.0	11	181.8	9.8	19	184.0	6.7	5	170.3	6.1	11
Nas Hgt	52.5	1.8	11	53.2	2.6	19	54.4	3.6	7	47.4	2.0	11
Bas-naso	90.2	3.7	8	96.6	4.1	19	96.0	1.6	4	93.6	4.8	11
Breg-lam	114.0	5.3	11	115.9	7.6	19	113.3	4.1	8	110.7	5.7	13
Bas-lamb	122.1	4.0	7	123.3	5.2	19	126.2	5.2	5	120.7	4.5	12
Nas-lamb	176.1	4.7	11	179.1	6.6	19	183.6	3.3	6	171.7	5.1	11
Lam-opis	99.1	2.2	8	101.8	6.2	18	105.7	7.3	7	102.0	4.9	13
For mag l	37.0	2.3	6	40.1	3.5	18	35.3	2.3	6	37.4	2.2	12
Na-br fr	49.5	6.0	8	51.2	3.8	18	53.6	3.2	6	48.8	5.3	12
Na-br s	22.6	2.3	8	24.1	2.0	18	24.2	2.0	6	24.9	2.1	12
Br-lam f	53.6	3.7	8	56.0	4.5	18	58.2	4.9	5	56.3	6.0	13
Br-lam s	24.1	3.2	8	25.9	2.7	18	27.0	3.7	5	24.5	2.2	13
Lam-op f	47.0	4.3	6	49.9	7.5	17	57.2	9.2	6	51.5	7.3	13
Lam-op s	31.2	2.7	6	29.4	5.3	17	33.2	3.5	6	35.2	4.5	13

FEMALE MEANS AND STANDARD DEVIATIONS

	BAY			LSV			MNT			SCRI		
	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N
Bas-breg	134.3	7.1	9	139.1	4.2	17	131.0	6.2	5	129.4	4.5	16
Bas-nas	97.7	2.6	9	102.7	5.2	17	99.3	2.6	4	94.9	3.0	16
Nas-breg	110.0	3.7	11	112.4	5.8	17	110.2	2.8	5	107.4	3.2	16
Bas-pros	95.3	4.3	9	96.5	4.4	17	99.0	3.5	3	92.6	3.7	16
Nas-pros	67.0	2.7	11	69.4	3.6	17	69.3	1.2	3	63.4	2.9	16
Bre-pros	167.9	5.1	11	174.0	6.4	17	168.4	4.3	2	164.1	3.7	16
Nas Hgt	48.0	2.6	10	48.7	2.2	17	50.0	1.3	3	45.8	2.1	16
Bas-naso	92.5	4.2	8	91.7	6.5	17	94.0	2.6	3	90.3	3.0	16
Breg-lam	111.1	6.2	11	111.8	6.8	17	110.6	4.7	5	107.2	5.9	16
Bas-lamb	121.2	7.1	8	121.7	5.3	17	118.3	8.8	3	117.7	4.9	16
Nas-lamb	172.3	5.4	11	174.2	5.9	17	172.2	5.2	4	166.4	4.9	16
Lam-opis	101.1	5.4	10	102.2	5.8	17	100.9	8.6	5	98.9	4.8	16
For mag l	34.0	2.0	8	37.4	2.3	17	34.7	1.7	4	35.5	1.3	16
Na-br fr	47.4	4.3	8	47.7	4.7	15	51.7	6.4	3	43.1	3.2	16
Na-br s	23.1	2.9	8	24.4	3.0	15	27.0	2.6	3	25.4	2.0	16
Br-lam f	56.9	3.0	8	53.4	5.5	15	58.0	10.6	3	53.1	3.8	16
Br-lam s	23.3	2.8	8	25.1	3.3	15	24.0	2.6	3	23.9	3.0	16
Lam-op f	45.4	5.9	7	46.6	5.5	15	48.0	7.3	4	47.0	4.8	16
Lam-op s	30.9	2.5	7	29.7	2.6	15	30.7	2.0	4	33.2	5.3	16