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Two Proposed Projectile Point Types for the Monterey Bay Area: Año Nuevo Long-stemmed and Rossi Square-stemmed

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OVER the course of the last decade the Monterey Bay area of California has been the focus of continuing attempts to model prehistoric culture change. These efforts were given their primary impetus when Breschini and Haversat (1980), on the basis of test results from MNT-170, proposed that two economic patterns were evident along the prehistoric shores of Monterey Bay: an earlier forager pattern dating ca. 4,500-2,500 B.P., and a later collector pattern dating circa 2,500 B.P. to contact. The earlier pattern was associated with speakers of Hokan languages who were later replaced by speakers of Penutian languages. Using Fredrickson's (1974) chronological nomenclature, Breschini and Haversat dubbed the earlier pattern the "Sur," and the later pattern the "Monterey." Soon afterwards, on the basis of excavation results from 19 Monterey Bay shell middens, Dietz and Jackson (1981) concurred on the presence of these two economic patterns, but refrained from the use of the proposed pattern designations. Since then, minor alterations have been made to the model as more data have accumulated from the region (Breschini 1981, 1983; Breschini and Haversat 1982; Breschini et al. 1983). In 1984, Moratto presented the most widely read version of the Monterey Bay forager/collector model as part of his synthesis of California archaeology.

All of this work has been done in the absence of a regional chronology. Although the Monterey and Sur "Patterns" have been proposed, there has never been any definition of the artifacts that represent them, despite the fact that, in Fredrickson's chronological system, the term "pattern" implies not only an economic lifeway, but a distinctive set of artifact types as well. The Berkeley Pattern, for example, is represented by Excelsior and leaf-shaped projectile points, while the lower Borax Lake Pattern is represented by Borax Lake Wide-stem points (Fredrickson 1974:45). The points serve both as temporal and spatial markers of the pattern, as well as manifestations of distinctive economic practices. In contrast, definitions of the "Patterns" proposed for the Monterey Bay area consist solely of unquantified and undemonstrated descriptions of economic practices (Jones 1988; Dietz et al. 1988:14). This lack of clear, solidly-grounded definitions would be less problematic if not for the fact that, since its initial development, the Monterey/Sur model has been used continually as if it were, in fact, a chronology. In Moratto (1984:248-250), for example, many sites have been assigned to a pattern solely on the basis of their radiocarbon results--with absolutely no demonstration that their constituents represent one particular set of economic practices or another.

Recently Dietz et al. (1988) have made some headway toward development of a chronology for the central California coast. Based on their assessment of radiocarbon dates, obsidian hydration readings, and grave lots from the Monterey Bay area, they proposed a chronological framework in which the 10,000 years of Monterey Bay area prehistory are assigned to five periods, each of which is marked by distinct artifacts. Projectile point types are included in the chronology but, due to the constraints of the project in which the authors were involved, the point types are not fully defined. In this paper we build on that foundation by advancing the beginning of a projectile point typology for the Monterey Bay area. Specifically, we formalize two projectile point types that are readily definable in local collections: the Año Nuevo Long-stemmed and the Rossi Square-stemmed. The morphological distinctiveness of these points has been recognized in preliminary, site-specific typologies (Gerow [1968]: Type I from CA-SMA-77 for the Año Nuevo type; and Roop [1976]: Type CS-7 from CA-SCR-20 for the Rossi type; see Fig. 1 for site locations). Our objective has been to identify the attributes that define these types with the hope that they will eventually prove useful as time markers.

METHODS

Our methods follow those employed by western Great Basin archaeologists in the 1950s and 1960s to establish the projectile point typology that now serves as the chronological backdrop for Basin prehistory (see Baumhoff and Byrne [1959]; Lanning [1963]; and O'Connell [1967], among others). We have attempted to isolate types on the basis of large samples of morphologically discrete points from a few well-dated sites. In the western Basin this approach led to the establishment of binomial terminology, in which the first term refers to the location of the type site and the second to a distinctive morphological trait. Some of the realities of coastal archaeology have forced us to modify this procedure slightly. Because of the preponderance of shell in coastal sites, artifact density is frequently low, and meaningful artifact samples are often difficult to generate from a single site or small group of sites. MNT-391, for example, produced 51 projectile points but only after the excavation of over 200 $m.^3$ of midden (Cartier 1984). Of course, there also are functional reasons for the low frequency of formed tools in coastal middens, and there is evidence of diachronic variation in tool frequency (Dietz et al. 1988:403-404) in Monterey Bay sites that probably relates to shifts in subsistence strategies.

Not only have most Monterey Bay sites produced small samples of points, but many local assemblages also exhibit considerable typological variability. While numerous factors undoubtedly contribute to this diversity, three seem particularly worthy of mention. First, the diverse fauna available to aboriginal hunters in this region (open coast, estuarine, and terrestrial) undoubtedly would have fostered the development of a wide assortment of hunting tools, and it is not unlikely that different point types were developed to accommodate hafting and size requirements of these different weapons. The large size and the wide range of neck widths in the 51 projectile points from MNT-391, for example, suggest strongly that weaponry was not limited to the bow and/or atlatl (Cartier 1984). Second, typological variability probably also is a result of periodic forays made to the coast by groups, such as the Yokuts (Pilling 1950) and the Miwok (Barrett and Gifford 1933:251), who normally resided much further inland. Third, exchange between coastal and inland peoples also may have led to the arrival of different types into the central coast area, although this problem may be resolved when we obtain a better understanding of the range and distribution of locally available lithic materials.

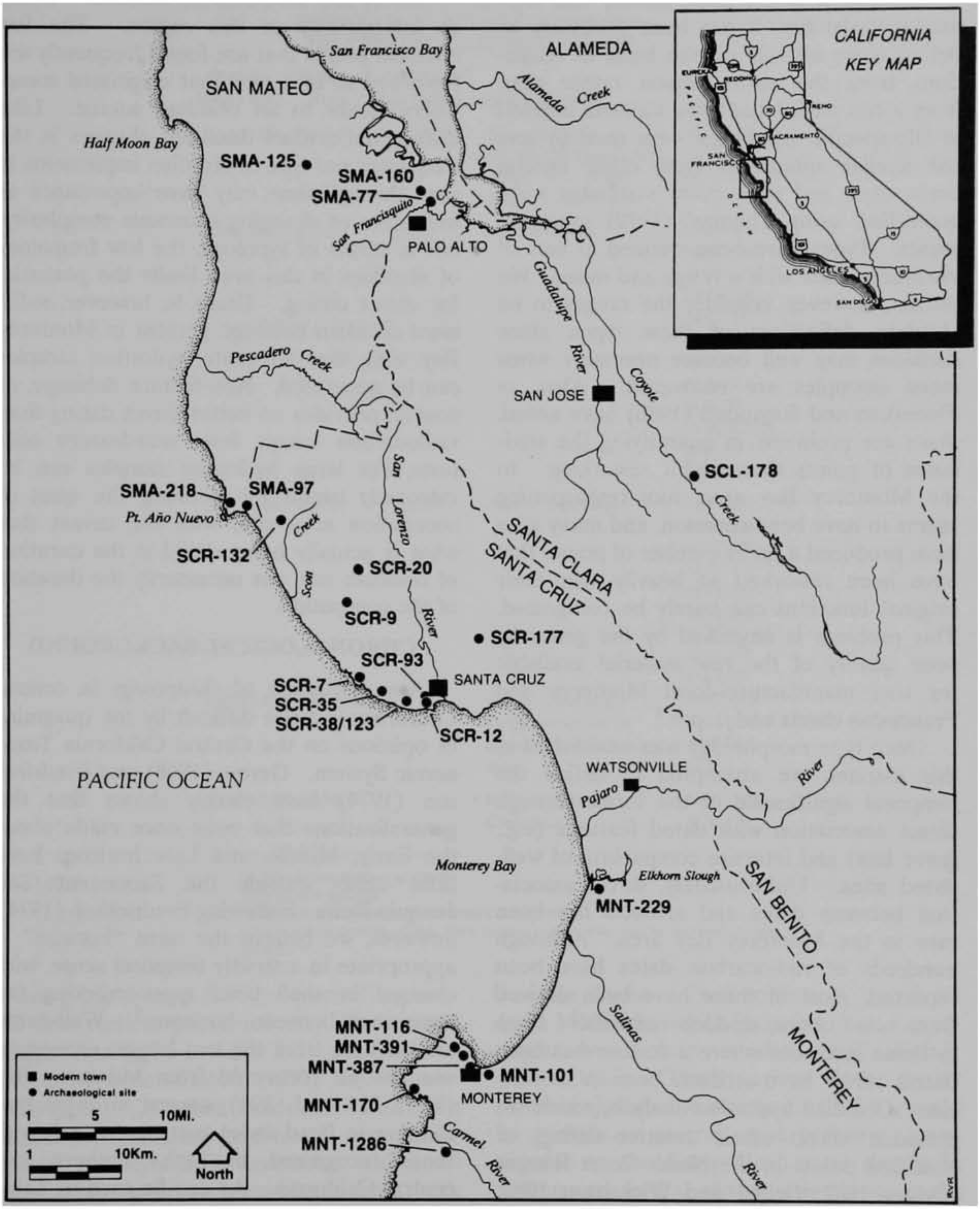

Fig. 1. Relevant archaeological sites on the central California coast.

Because of low artifact density and high formal variability, it has been necessary to define types initially on the basis of collections from the entire region rather than from a few well-dated sites. Criteria defined in site-specific typologies were used to sort out similar specimens from other central coast sites, and then point attributes were quantified using Thomas' (1970) measurements. Types have been defined as sets of attributes, each with a range and mean. We do not, however, consider the ranges to be absolute definitions of these types, since revisions may well become necessary when more examples are recovered. Also, as Flenniken and Raymond (1986) have noted, there are problems in quantifying the attributes of points that exhibit reworking. In the Monterey Bay area, tool resharpening seems to have been common, and many sites have produced a great number of points that have been reworked so heavily that their original functions can barely be recognized. This problem is amplified by the generally poor quality of the raw material available for tool manufacture--local Monterey and Franciscan cherts and jasper.[1]

Once type morphology was established in this manner, we attempted to define the temporal significance of the forms through direct association with dated features (e.g., grave lots) and intersite comparison of well-dated sites. Unfortunately, direct association between dates and artifacts has been rare in the Monterey Bay area. Although hundreds of radiocarbon dates have been reported, most of these have been derived from non-feature, midden contexts.[2] Even in those instances where a feature has been dated, rarely have artifacts been in association. Obsidian hydration analysis, which has provided direct--albeit relative--dating of classified points in the North Coast Ranges (Origer 1982; Origer and Wickstrom 1982; White et al. 1982), is of little utility in the Monterey Bay area because obsidian is found so infrequently in this region. The few obsidian points that are found frequently are reworked or of a type that originated somewhere closer to an obsidian source. Like differential artifact densities, changes in the frequency and type of obsidian implements in sites through time may have importance as indicators of changing economic complexity, but in terms of typology, the low frequency of obsidian in this area limits the potential for direct dating. There is, however, sufficient obsidian debitage present in Monterey Bay sites that adequate hydration samples can be generated. Non-feature debitage, of course, provides no better direct dating than radiocarbon assays from non-feature contexts, but large hydration samples can be extremely useful for defining the span of occupation at a site, with the caveat that what is actually being dated is the duration of obsidian use, not necessarily the duration of site occupation.

CHRONOLOGICAL BACKGROUND

Any discussion of chronology in central California is made difficult by the quagmire of opinions on the Central California Taxonomic System. Gerow (1968) and Fredrickson (1974) have clearly shown that the generalizations that were once made about the Early, Middle, and Late horizons have little utility outside the Sacramento/San Joaquin Delta. Following Fredrickson (1974), however, we believe the term "horizon" is appropriate in a strictly temporal sense, with changes in shell bead types marking the transitions between horizons.[3] Well-dated assemblages from the two largest excavation samples yet recovered from Monterey Bay (MNT-229 and -391) suggest strongly that changes in bead styles correspond well with those recognized in both southern and central California. As can be seen in Table 1, MNT-391 has produced 22 radiocarbon

Table 1
PROPOSED CULTURAL PERIODS FOR THE CENTRAL CALIFORNIA COAST[a]

Period (Years B.P.)	OH Range[b] Napa	OH Range[b] Casa Diablo	Period Markers[c]	Sites
Post-1,000	0.8-2.2	0.8-2.2	Clam shell disk *Olivella* full-lipped bead *Olivella* M rectangle *Olivella* cupped bead	MNT-112 MNT-229[d] SCR-20
1,000-2,800	2.3-4.1	2.3-4.5	*Olivella* saucer	MNT-101 MNT-170[d] MNT-185 MNT-229 MNT-282 MNT-391[d] SCR-9 SCR-12 SCR-35 SCR-38/123 SCR-93 SCR-132
2,800-4,000	4.2-5.1	4.6-6.5	*Olivella* L rectangle	MNT-101 MNT-116 MNT-170 MNT-229[d] MNT-387 MNT-391 SCR-38/123 SCR-93[d] SMA-77
4,000-5,500	no obsidian		*Olivella* L rectangle Large proportion of quartzite core and flake tools	MNT-170 MNT-254 MNT-391 SCR-7
5,500-10,000	5.7-8.0		Millingstones Crescentics	MNT-229? SCR-177

[a] Modified from Dietz et al. (1988).
[b] Hydration in microns.
[c] Bead types from Bennyhoff and Fredrickson (1967).
[d] Only a minor portion of this site's occupational history can be ascribed to this period.

dates taken from a full spectrum of horizontal and vertical proveniences. These dates range from 2,200 to 4,900 B.P. As has been noted by both Gibson (1987) and Cartier (1984), the 2,262 shell beads recovered from this site (dominated by Class L rectangular beads) are stylistically consistent with comparably dated bead assemblages from both Santa Barbara and the Sacramento/San Joaquin Delta. Furthermore, a burial lot from MNT-391, which included Class L rectangles, was directly dated to 3,620±90 B.P. (Beta-11618). These various finds, in our opinion, justify the recognition of a period or periods in central coast prehistory comparable to the Early Horizon in the Delta region and several of the early phases in the Santa Barbara region.

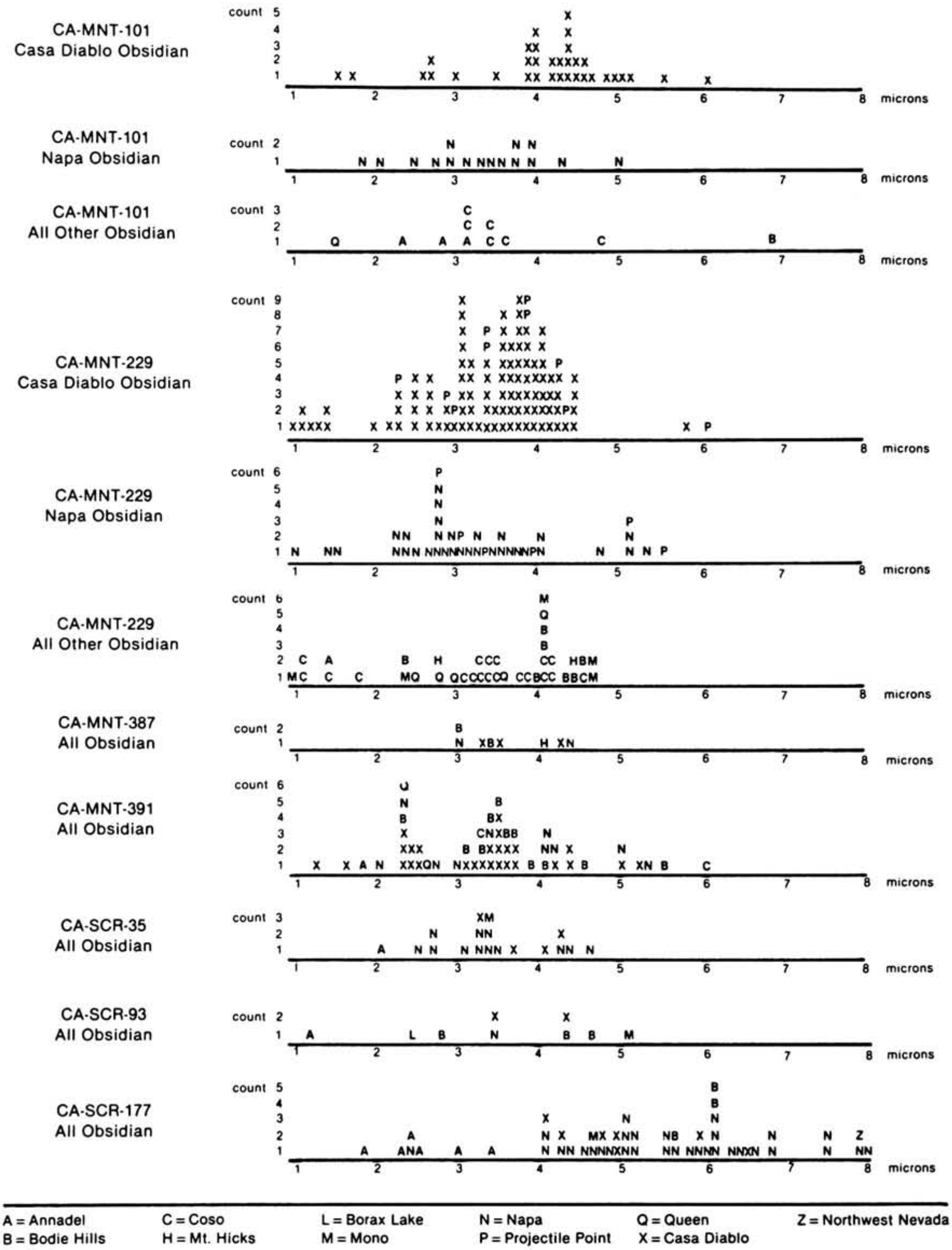

Fig. 2. Obsidian hydration readings from Monterey Bay area sites.

Table 2
RADIOCARBON DATES FROM SITES MENTIONED IN TEXT

Site	Unit	Depth	Laboratory Number	Sample Composition	Age	Reference
MNT-391	7N-8W	20-30 cm.	Beta-9294	Shell-*Haliotis rufescens*	2,210±80	Cartier 1984
MNT-391	7N-8W	40-50 cm.	Beta-9295	Shell-*Haliotis rufescens*	2,470±70	Cartier 1984
MNT-391	7N-8W	60-70 cm.	Beta-9296	Shell-*Haliotis rufescens*	2,390±70	Cartier 1984
MNT-391	7N-8W	80-90 cm.	Beta-9297	Shell-*Haliotis rufescens*	2,850±110	Cartier 1984
MNT-391	7N-8W	100-110 cm.	Beta-9298	Shell-*Haliotis rufescens*	4,020±100	Cartier 1984
MNT-391	7N-8W	120-130 cm.	Beta-9299	Shell-*Haliotis rufescens*	4,910±100	Cartier 1984
MNT-391	23N/15W	40-50 cm.	Beta-9302	Shell-*Haliotis rufescens*	4,090±90	Cartier 1984
MNT-391	23N/15W	90-100 cm.	Beta-9303	Shell-*Haliotis rufescens*	4,660±10	Cartier 1984
MNT-391	40N/80W	20-30 cm.	Beta-9300	Shell-*Haliotis rufescens*	3,480±100	Cartier 1984
MNT-391	40N/80W	110-120 cm.	Beta-9301	Shell-*Haliotis rufescens*	4,810±80	Cartier 1984
MNT-391	Shell Stack		Beta-11616	Shell-*Haliotis rufescens*	3,160±90	Cartier 1984
MNT-391	Burial 22		Beta-11617	Shell-*Haliotis rufescens*	3,270±90	Cartier 1984
MNT-391	Burial 23		Beta-11618	Shell-*Haliotis rufescens*	3,620±90	Cartier 1984
MNT-391	Burial 25		Beta-11619	Shell-*Haliotis rufescens*	4,080±80	Cartier 1984
MNT-391	Feature 4		Beta-11614	Shell-*Haliotis rufescens*	4,670±100	Cartier 1984
MNT-391	Feature 4		Beta-11615	Shell-*Haliotis rufescens*	4,460±90	Cartier 1984
MNT-391	2	0-10 cm.	WSU-2987	Shell-*Mytilus californianus*	3,400±85	Breschini et al. 1988:18
MNT-391	2	40-50 cm.	WSU-2988	Shell-*Mytilus californianus*	3,635±90	Breschini et al. 1988:18
MNT-391	2	70-80 cm.	WSU-2989	Shell-*Mytilus californianus*	4,630±70	Breschini et al. 1988:18
MNT-391	3	38 cm.	WSU-2578	Shell-mixed	3,660±80	Breschini et al. 1988:18
MNT-391	11	50-60 cm.	WSU-2580	Shell-*Haliotis rufescens*	3,290±95	Breschini et al. 1988:18
MNT-391	11	50-60 cm.	WSU-2579	Shell-*Haliotis rufescens*	3,480±110	Breschini et al. 1988:18
MNT-229	4	80-90 cm.	Beta-11025	Shell-*Mytilus edulis*	860±60	Dietz et al. 1988:123
MNT-229	4	150-160 cm.	Beta-11026	Shell-*Mytilus edulis*	2,090±80	Dietz et al. 1988:123
MNT-229	4	220-230 cm.	Beta-11027	Shell-*Mytilus edulis*	2,310±70	Dietz et al. 1988:123
MNT-229	5	140-150 cm.	Beta-11028	Shell-*Tresus nutallii*	6,080±170	Dietz et al. 1988:123
MNT-229	6	30-40 cm.	Beta-11021	Shell-*Mytilus edulis*	1,380±70	Dietz et al. 1988:123
MNT-229	6	70-80 cm.	Beta-11022	Shell-*Mytilus edulis*	2,000±60	Dietz et al. 1988:123
MNT-229	6	150-160 cm.	Beta-11023	Shell-*Mytilus edulis*	2,780±80	Dietz et al. 1988:123
MNT-229	6	180-200 cm.	Beta-11024	Shell-*Mytilus edulis*	3,180±80	Dietz et al. 1988:123
MNT-229	11	160-170 cm.	WSU-3302	Shell-*Protothaca staminea*	6,240±145	Dietz et al. 1988:123
MNT-229	12	100-120 cm.	WSU-3314	Bone-elk distal right tibia	7,020±170	Dietz et al. 1988:123
MNT-229	13	120-125 cm.	WSU-3309	Shell-*Mytilus edulis*	2,570±60	Dietz et al. 1988:123
MNT-229	13	120-140 cm.	WSU-3310	Shell-*Protothaca staminea*	6,580±80	Dietz et al. 1988:123
MNT-229	14	160-180 cm.	WSU-3303	Shell-*Protothaca staminea*	1,760±80	Dietz et al. 1988:123
MNT-229	15	60-80 cm.	WSU-3312	Bone-elk distal left radius	1,980±75	Dietz et al. 1988:123
MNT-229	20	100-120 cm.	WSU-3313	Bone-elk cervical vertebrae	1,980±70	Dietz et al. 1988:123
MNT-229	21	100-120 cm.	WSU-3304	Charcoal	2,070±90	Dietz et al. 1988:123
MNT-229	21	100-120 cm.	WSU-3305	Shell-*Mytilus edulis*	2,475±110	Dietz et al. 1988:123
MNT-229	21	100-120 cm.	WSU-3306	Shell-*Protothaca staminea*	4,120±90	Dietz et al. 1988:123
MNT-229	31	0-20 cm.	WSU-3297	Shell-*Protothaca staminea*	1,920±130	Dietz et al. 1988:123
MNT-229	32	40-60 cm.	WSU-3290	Shell-*Protothaca staminea*	7,700±90	Dietz et al. 1988:123
MNT-229	32	60-80 cm.	WSU-3299	Shell-*Protothaca staminea*	1,700±70	Dietz et al. 1988:123
MNT-229	32	100-120 cm.	WSU-3300	Shell-*Protothaca staminea*	6,510±80	Dietz et al. 1988:123
MNT-229	32	120-140 cm.	WSU-3301	Shell-*Protothaca staminea*	6,820±100	Dietz et al. 1988:123
MNT-229	40	20-40 cm.	WSU-3311	Bone-deer distal metatarsal	1,380±100	Dietz et al. 1988:123
MNT-229	Burial 5	136 cm.	WSU-3308	Beads-35 *Olivella* saucer G6	2,780±200	Dietz et al. 1988:123
MNT-229	Burial 5	136 cm.	WSU-3320	Beads-44 *Olivella* saucer G6	2,720±140	Dietz et al. 1988:123
MNT-229	Burial 5	136 cm.	WSU-3321	Beads-39 *Olivella* saucer G6	2,270±135	Dietz et al. 1988:123
MNT-229	Burial 8	185 cm.	WSU-3307	Shell-*Mytilus edulis*	2,470±50	Dietz et al. 1988:123
MNT-229	Pollen Core	300-325 cm.	WSU-3358	Peat-charcoal	3,550±70	Dietz et al. 1988:123
MNT-101	2	107 cm.	Beta-11926	Shell-*Haliotis rufescens*	1,820±70	Dietz 1987:132

Table 2 (continued)

Site	Unit	Depth	Laboratory Number	Sample Composition	Age	Reference
MNT-101	2	148 cm.	Beta-11927	Shell-*Haliotis rufescens*	3,870±90	Dietz 1987:132
MNT-101	6	49 cm.	Beta-11921	Shell-*Haliotis rufescens*	1,020±60	Dietz 1987:132
MNT-101	20	48 cm.	Beta-11922	Shell-*Haliotis rufescens*	1,600±70	Dietz 1987:132
MNT-101	20	92 cm.	Beta-11923	Shell-*Haliotis rufescens*	1,880±70	Dietz 1987:132
MNT-101	20	135 cm.	Beta-11924	Shell-*Haliotis rufescens*	1,950±80	Dietz 1987:132
MNT-101	20	165 cm.	Beta-11925	Shell-*Haliotis rufescens*	2,100±80	Dietz 1987:132
MNT-101	24	63 cm.	Beta-11919	Shell-*Haliotis rufescens*	1,690±50	Dietz 1987:132
MNT-101	24	65 cm.	Beta-11920	Shell-*Haliotis rufescens*	1,820±60	Dietz 1987:132
MNT-387	Burial K		Beta-9305	Shell-*Haliotis rufescens*	3,200±130	R. Cartier pers. comm. 1984
MNT-387	Burial Feature B		Beta-6611	Shell-*Haliotis rufescens*	3,800±240	R. Cartier pers. comm. 1984
MNT-387	M12	110 cm.	Beta-3904	Shell-*Haliotis rufescens*	4,080±100	R. Cartier pers. comm. 1984
SCR-38/123	3	40-50 cm.	WSU-3532	Shell-*Mytilus californianus*	1,600±60	M. Hylkema, research notes
SCR-38/123	3	40-50 cm.	WSU-3533	Shell-*Mytilus californianus*	1,920±110	M. Hylkema, research notes
SCR-38/123	3	110-120 cm.	WSU-3534	Shell-*Mytilus californianus*	3,010±110	M. Hylkema, research notes
SCR-38/123	3	110-120 cm.	WSU-3535	Shell-*Mytilus californianus*	3,370±50	M. Hylkema, research notes
SCR-38/123	3	160-170 cm.	WSU-3536	Shell-*Mytilus californianus*	3,480±120	M. Hylkema, research notes
SCR-38/123	3	160-170 cm.	WSU-3537	Shell-*Mytilus californianus*	3,060±85	M. Hylkema, research notes
SCR-38/123	4	100-110 cm.	WSU-3538	Shell-*Mytilus californianus*	1,470±70	M. Hylkema, research notes
SCR-9	1	20-30 cm.	WSU-3530	Shell-*Mytilus californianus*	1,480±65	M. Hylkema, research notes
SCR-9	2	190-200 cm.	WSU-3203	Charcoal-200 grams	2,790±85	M. Hylkema, research notes
SCR-9	2	200 cm.	WSU-3204	Shell-*Mytilus californianus*	2,940±60	M. Hylkema, research notes
SCR-9	4	130-140 cm.	WSU-3170	Shell-*Mytilus californianus*	2,790±60	M. Hylkema, research notes
SCR-9	5	140-150 cm.	WSU-3171	Shell-*Mytilus californianus*	2,730±60	M. Hylkema, research notes
SCR-132	1W	30-40 cm.	WSU-3205	Shell-*Haliotis* sp.	1,900±50	M. Hylkema, research notes
SCR-93	Feature 1		WSU-3177	Shell-mixed	2,830±75	Bourdeau 1986
SCR-93	Feature 2	105-110 cm.	WSU-3178	Charcoal	2,725±75	Bourdeau 1986
SCR-93	1	0-10 cm.	WSU-3179	Charcoal	2,055±105	Bourdeau 1986
SMA-218	3	20-30 cm.	WSU-3425	Shell-*Mytilus californianus*	2,880±75	M. Hylkema, research notes
SMA-77	Pit 4		I-7592	Shell-*Ostrea lurida*	3,265±85	B. Gerow pers. comm. 1985
SMA-77	Pit 4		I-7591	Shell-*Ostrea lurida*	3,050±85	B. Gerow pers. comm. 1985
SMA-77	Burial 19		UCR-953a	Bone	3,000±90	B. Gerow pers. comm. 1985
SMA-77	Burial 19		UCR-954	Charcoal	3,200±240	B. Gerow pers. comm. 1985
SMA-77	Burial 23-35, 37-38		L-0187A	Charcoal	2,950±350	B. Gerow pers. comm. 1985
SMA-77	Burial 24, 25		UCR-957	Charcoal	2,630±150	B. Gerow pers. comm. 1985
SMA-77	Burial 24, 25		UCR-956	Charcoal	2,700±150	B. Gerow pers. comm. 1985
SMA-77	Burial 24, 25		UCR-958	Shell-*Ostrea lurida*	2,900±150	B. Gerow pers. comm. 1985
SMA-77	Burial 24, 25		L-01876	Charcoal	3,400±300	B. Gerow pers. comm. 1985
SMA-77	Burial 36		UCR-960	Charcoal	3,060±160	B. Gerow pers. comm. 1985
SMA-77	Burial 36		UCR-955a	Bone	3,070±160	B. Gerow pers. comm. 1985
SMA-77	Burial 36		UCR-959a	Bone	2,920±70	B. Gerow pers. comm. 1985
SMA-77	Burial 36		UCR-961	Shell-*Ostrea lurida*	3,460±150	B. Gerow pers. comm. 1985

The ensuing Middle Period is represented by MNT-229, where 15 radiocarbon dates and 192 obsidian hydration readings indicated that most of the site deposit represented occupation spanning from 2,800 to 1,000 B.P. The bead assemblage from this site was dominated by a local variant of the *Olivella* saucer (Class G in Bennyhoff and Fredrickson [1967]). Direct dates of a sample of 118 *Olivella* G6 beads from a grave lot produced radiocarbon dates of 2,780±200 B.P. (WSU-3308), 2,720±140 B.P. (WSU-3320), and 2,270±135 B.P. (WSU-3321) (see Table 2).

The chronology offered by Dietz et al. (1988) incorporates the various chronometric data presented above. The cultural periods they proposed are presented in Table 1 with the hydration readings on which the periods are based. Radiocarbon dates are shown in Table 2. Hydration results proved particularly useful for defining sequence breaks, in that fairly strong clustering was evident in the micron spans (see Fig. 2), with gaps suggesting large-scale settlement shifts. This chronology contrasts with the Monterey/Sur model, in which each pattern was defined as a time span and components assigned to a pattern on the basis of radiocarbon results. The artifact inventories that correspond with the periods defined in the current scheme were discussed by Cartier (1984), Jones et al. (1987), and Dietz et al. (1988). Detailed definitions, however, can be provided only for the two projectile point types introduced below; more comparative analysis must be undertaken before a complete regional chronology can be presented.

AÑO NUEVO LONG-STEMMED

In his report on SMA-77, the University Village site, Gerow (1968) described 13 unusual projectile points characterized by long, poorly defined contracting stems and exaggerated or "apiculate" tips. Many of the specimens, which he classified as Type IA, exhibited pointed bases that might have been identified as tips, had it not been for the presence of asphaltum. Few exhibited any clear shoulder marking where the blade gave way to the hafting element. Gerow found Strong's (1935) classificatory framework unsatisfactory for these points, since the only category that came close to the University Village specimens was the "stemless" type, which did not accurately reflect the attributes exhibited in his sample. He also had only very limited success in locating morphologically similar specimens from the surrounding area; he was able to identify three similar specimens from across San Francisco Bay: one from Ellis Landing (CCO-295) reported by Nelson (1910:390, Plate 44, Fig. 2) and two from Emeryville (ALA-309) described by Uhle (1907:Plate 6, nos. 1a, 20). He suggested general affinities with Rogers' (1929) Oak Grove and Hunting cultures, as well as Lake Mohave and Cascade points.

Since that time, points similar to those from University Village have been recovered from a number of private collections and excavations from San Mateo, Santa Cruz, Santa Clara, and Monterey counties. Alan Leventhal and Gary Parsons of San Jose State University recorded a number of long-stemmed specimens from the surface of sites at Año Nuevo Point in San Mateo County (Fig. 1) that show clear stylistic affinity with the SMA-77 examples. A group of specimens, known as the Harris collection, stored at San Jose State University, were collected from SMA-218 at Año Nuevo and are particularly striking in their similarity to the University Village points.

The visual attributes that distinguish these specimens as a distinctive point type are: (1) a long, tapering, often poorly defined stem; (2) a pointed or almost pointed base; and (3) an "apiculate" or exaggerated tip. Secondary characteristics include substantial length and thickness. Table 3 presents the measurements garnered from Gerow's (1968) type IA specimens from University Village (SMA-77) and 28 other specimens from Año Nuevo. The ranges and means of the attributes that characterize this style based on the Año Nuevo and University Village sample are presented in Table 4. All examples of this type manifested maximum width positions greater than 45%, which reflects stem length (cf. Thomas 1981:14). The vast majority also were greater than 50 mm. in maximum length, although reworked specimens were smaller.

Using both qualitative and quantitative criteria, 41 additional specimens have been

Table 3
ATTRIBUTES OF AÑO NUEVO LONG-STEMMED PROJECTILE POINTS FROM SMA-77 AND AÑO NUEVO[a]

Site (Collection)	Provenience	Cat. No.	Maximum Length	Maximum Width	Maximum Thickness	PSA	DSA	L/W	MWP	Weight	Fig.
Año Nuevo	Surface	201	63.8	30.9	10.8	80/85	250/250	2.21	60%	17.6	—
(Harris)		202	55.0	27.6	8.2	80/80	250/235	2.18	50%	9.7	3b
		97	67.6	23.8	7.8	60/65	240/240	2.30	60%	12.9	—
		168-14	53.8	33.5	7.85	65/65	245/246	2.27	55%	15.5	3l
		34	65.4	27.4	13.0	60/70	250/260	2.38	52%	14.9	—
		182-49	63.5	35.0	11.0	75/65	250/250	2.35	56%	20.0	—
		158-23	42.0	24.5	8.2	80/85	255/240	2.27	64%	7.0	—
		170-61	63.0	36.6	12.8	80/75	250/250	2.45	56%	21.55	—
		104-	50.0	23.4	8.2	80/75	255/255	2.63	58%	9.5	—
		143-06	70.7	31.6	12.4	80/75	250/245	2.23	54%	20.0	—
		129-05	71.6	34.8	10.8	70/60	245/250	2.00	56%	23.0	—
		122-04	50.6	27.3	7.5	70/75	243/249	1.90	58%	8.1	—
		121-03	57.2	26.3	7.7	68/70	250/254	2.20	60%	9.8	—
		183-10	56.7	27.5	9.0	75/80	250/245	2.20	65%	10.7	3a
		152-11	68.6	30.1	9.7	80/80	255/255	2.60	57%	20.0	3i
		133-15	61.0	34.1	9.6	75/75	245/250	2.30	54%	20.0	—
		86-	65.7	32.6	13.2	75/65	240/255	I	I	22.5	—
		123-13	58.9	27.1	11.5	70/60	250/240	2.10	50%	14.5	—
		134-20	53.5	25.0	8.9	70/75	245/255	I	I	11.0	—
Año Nuevo	Surface	VAN-13	41.8	22.1	6.3	75/80	250/250	1.80	62%	6.0	—
(Roehr)		203-	64.7	28.7	12.7	80/80	255/255	2.25	60%	17.8	—
		204-74e	69.0	38.0	11.4	65/60	245/240	1.80	60%	23.2	—
		VAN-14	69.5	30.4	11.5	75/70	250/250	2.28	48%	24.5	—
		VAN-15	56.0	29.0	9.0	60/70	260/250	1.92	52%	15.7	—
SMA-77	Burial 23	52-148	64.0	28.0	12.0	70/70	250/250	2.28	53%	19.6	—
	Feature X	52-74	60.0	35.0	12.0	60/60	250/240	2.14	63%	22.1	—
	Burial 14	52-271	65.0	30.0	13.0	80/80	235/230	2.16	50%	16.3	—
	Grading find	52-55	55.0	23.0	12.0	60/70	245/255	2.39	45%	14.4	—
	Burial 23	52-150	51.0	27.0	15.0	60/80	250/255	1.88	55%	11.8	—
	Near Burial 14	52-92	57.0	23.0	8.0	60/70	250/250	2.47	50%	9.3	—
	Burial 23	52-159	50.0	23.0	12.0	60/70	255/255	2.17	57%	10.2	—
SMA-218	Unit 1, 0-30 cm.	-	66.4	30.9	12.8	80/85	230/233	2.50	53%	20.2	3j
	Unit 2(T-B), 0-30 cm.	-	66.1	30.8	7.9	65/71	- -	2.14	51%	16.0	—
	Unit 2(T-B), 0-30 cm.	-	54.3	18.6	7.7	75/78	- -	2.91	53%	5.8	—
	Unit 2(T-B), 0-30 cm.	-	64.0	28.7	9.6	78/76	270/270	I	I	16.5	3k

[a] Material of all points is Monterey chert. Length, width, and thickness are in mm. PSA and DSA are in degrees. Weight is in grams. PSA = Proximal shoulder angle, DSA = Distal shoulder angle, L/W = Length/width ratio, MWP = Maximum width position. I = Point too incomplete to measure this attribute.

distinguished in other collections from Santa Cruz, Santa Clara, and Monterey counties. Table 5 presents the quantified attributes of these specimens, and Table 6 presents the ranges and means of key traits from the total sample of 76 specimens. A sample of these is illustrated in Figure 3.

Regional Distribution

Sites that have yielded Año Nuevo Long-stemmed points cover most of the central coast between Monterey and San Mateo counties (Fig. 1). Although most of the sites are close to the shoreline, this may well be only a function of sampling bias related to cultural resource management

Table 4
SUMMARY OF ATTRIBUTES OF AÑO NUEVO LONG-STEMMED PROJECTILE POINTS FROM UNIVERSITY VILLAGE (SMA-77) AND AÑO NUEVO[a]

Trait	N	Range	Mean	Standard Deviation
Maximum length (mm.)	35	41.8-71.6	59.8	7.7
Maximum width (mm.)	35	18.6-36.6	28.7	4.6
Thickness (mm.)	35	6.3-15.0	10.3	2.2
Proximal shoulder angle (degrees)	70	60-85	72	8
Distal shoulder angle (degrees)	70	230-270	249	8
Length/width ratio	32	1.8-2.9	2.2	0.2
Maximum width position (percent)	32	45-65	55.5	4.9
Weight (g.)	35	5.8-23.2	15.4	5.4

[a] Measurements from complete elements and estimated complete measurements are used.

since much construction of the last decade has been in this area.

Examination of assemblages from surrounding areas suggests that similar point forms can be found along the coast for some distance to the south. Rogers (1929) illustrated a specimen similar to University Village Type I as representative of his Hunting Culture. Subsequent excavations of sites identified with the Hunting Culture (e.g., SBR-53, Harrison and Harrison [1966]) have not produced Año Nuevo-like specimens, but projectiles with pointed bases have been recovered from a number of other sites to the south, including SBR-54 (Harrison and Harrison 1966), SLO-175 (Abrams 1968), MNT-101 (Pritchard 1968), MNT-282 (Pohorecky 1976), and MNT-254 (Jones et al. 1987). Bates (1972:24) illustrated a specimen extremely similar to the Año Nuevo type from LAN-270. It is likely that long-stemmed points were used at least as far south as Los Angeles County, and that the Año Nuevo type may best be considered a regional variant of a series that had a wide geographic distribution. More comparative work will have to done in adjoining areas, however, before any temporal or cultural inferences can be drawn from this distribution pattern.

Temporal Significance

To date, there has been only a single instance of direct association between a radiocarbon date and examples of the Año Nuevo Long-stemmed type. Gerow (1968:44) recovered four long-stemmed points as part of the grave lot associated with Burial 23 at SMA-77, which produced a radiocarbon date of 2950±350 B.P. (L-0187A). There is, however, a fairly strong temporal pattern in the occurrence of this type at other sites. Año Nuevo Long-stemmed points are prevalent in components with radiocarbon dates between 2,800 and 1,000 years B.P. and obsidian hydration measurements of 2.3 to 4.1 microns on Napa obsidian and 2.3 to 4.5 microns on Casa Diablo obsidian. Most notable are the examples from MNT-101 and -229, and SCR-9, -35, and -93. The type also is not uncommon in components dating between 4,000 and 2,800 B.P.--notably SMA-77, MNT-101 and -391, and SCR-93--and this point form thus would seem to be diagnostic of the 4,000-1,000 B.P. time period. Ten examples also were recovered from SCR-20, which Roop (1976) considered to be a single-component, late-period site. A large portion of the assemblage from SCR-20 clearly is of

Table 5
ATTRIBUTES OF AÑO NUEVO LONG-STEMMED PROJECTILE POINTS FROM OTHER CENTRAL CALIFORNIA LOCATIONS

Site	Unit	Depth	Cat. No.	Material[a]	Length	Width	Thickness	PSA	DSA	L/W	MWP	Weight	Asphaltum	Figure[b]
Santa Cruz County														
SCR-9	1	30-40	9-1-4-2	MC	(58.0)	26.0	9.0	70/65	190/230	2.23	45%	>10.2	—	—
SCR-9	2	40-50	9-2-5-3	MC	(45.0)	18.0	7.0	80/80	250/250	2.50	56%	5.3	—	—
SCR-9	2	130-140	9-2-14-3	MC	(50.0)	26.0	10.0	70/70	250/250	1.90	50%	>10.2	—	—
SCR-9	3	0-10	9-3-1-3	MC	51.0	>21.0	15.0	70/85	260/260	(2.42)	I	>12.6	—	—
SCR-9	4	20-30	9-4-3-3	MC	61.0	28.0	10.0	70/80	250/220	2.10	75%	15.5	—	—
SCR-9	5	10-20	9-5-2-4	MC	72.0	25.0	13.0	70/80	250/252	2.80	50%	17.5	—	3h
SCR-9	5	50-60	9-5-6-3	MC	52.0	22.0	10.0	80/75	237/240	2.36	68%	9.9	—	—
SCR-9	5	100-110	9-5-11-4	MC	65.0	25.0	16.0	70/80	250/250	2.60	50%	21.6	—	—
SCR-12	E7	60	1332-125	MC	58.0	22.0	10.0	80/80	240/240	2.60	50%	NA	—	—
SCR-20	5B	40-50	20-437	FC	55.5	22.1	10.0	70/70	225/250	2.62	45%	9.61	—	—
SCR-20	7	0-20	20-103	FC	77.0	27.0	12.0	60/75	——	2.85	52%	23.2	—	—
SCR-20	7	20-30	20-365	MC	43.8	22.3	9.7	65/70	250/250	1.96	55%	7.0	—	—
SCR-20	7	60-70	20-311	MC	41.4	20.6	10.8	80/80	250/250	2.01	55%	7.8	—	—
SCR-20	21	10-20	173-378	MC	47.6	(23.6)	>6.5	65/75	240/ I	(2.02)	(60%)	>5.4	—	—
SCR-20	21	40-60	173-235	MC	35.6[c]	21.8	7.2	70/60	245/255	1.63	67%	4.8	—	—
SCR-20	21	60-80	173-274	MC	40.0	25.9	10.2	70/70	235/250	1.54	60%	7.8	—	—
SCR-20	21	120-140	173-368	MC	50.7	22.9	10.0	70/70	250/255	2.21	70%	8.3	—	—
SCR-20	29	50	173-25	MC	57.8	34.1	10.9	60/60	250/250	1.69	66%	16.7	—	—
SCR-20	31	0-20	173-76	MC	(54.3)	23.4	15.0	70/70	260/230	(2.32)	(60%)	>11.2	—	—
SCR-35	–	—	006	MC	51.3	18.7	NA	85/85	180/230	2.74	60%	NA	—	—
SCR-35	–	—	013	MC	(57.0)	22.2	NA	82/80	245/250	(2.56)	(67%)	NA	—	—
SCR-93	Sec.37	0-50	539(37-6)	FC	(75.0)	29.0	9.0	85/83	220/220	(2.58)	(64%)	>14.0	yes	3g
SCR-93	Sec.39	0-50	540(39-11)	FC	58.0	25.0	7.5	80/85	248/270	2.32	65%	10.6	—	3f
SCR-93	Sec.66	0-50	540(66-4)[d]	MC	(62.0)	I	9.0	75/72	200/203	I	I	>15.2	yes	3c
Monterey County														
MNT-101	15N-1E	0-20	622	MC	I	30.0	NA	80/85	210/230	I	I	12.7	—	—
MNT-101	3N-9W	40-60	894	RJ	53.0	21.2	NA	75/74	250/250	2.50	60%	10.31	—	—
MNT-101	3N-9W	100-120	913	MC	42.5	19.1	NA	85/60	250/250	2.22	55%	6.5	—	—
MNT-101	3N-9E	40-60	949	MC	(61.7)	23.4	NA	60/60	235/235	2.63	54%	13.0	yes	—
MNT-101	3N-9W	40-60	893	MC	(51.0)	19.1	NA	70/70	230/250	2.67	54%	6.1	—	—
MNT-229	8	60-80	8-021	MC	(79.0)	>29.0	13.0	74/70	235/ I	2.70	65%	18.7	—	—
MNT-229	–	197	M-062	MC	(61.0)	18.0	11.0	80/76	235/250	3.40	70%	I	—	—
MNT-391	A1	Level 2	172	MC	(55.0)	17.0	12.0	86/86	252/234	1.94	55%	6.5	—	—
MNT-391	B23	Level 3	706	FC	(57.0)	24.0	8.0	72/70	250/250	(2.37)	61%	6.3	—	—
MNT-391	B27	Level 3	784	MC	51.0	21.0	10.1	72/72	260/260	2.43	60%	9.3	—	—
MNT-391	F95	10-20	1173	MC	49.0	24.0	9.1	72/75	260/225	2.09	65%	9.6	—	3e

Table 5 (continued)
ATTRIBUTES OF AÑO NUEVO LONG-STEMMED PROJECTILE POINTS FROM OTHER CENTRAL CALIFORNIA LOCATIONS

Site	Unit	Depth	Cat. No.	Material[a]	Length	Width	Thickness	PSA	DSA	L/W	MWP	Weight	Asphaltum	Figure[b]
MNT-391	H115	40-60	1257	FC	57.0	24.0	9.0	81/82	230/231	2.38	54%	12.6	yes	—
MNT-391	H123	0-20	1526	RJ	(71.0)	22.0	11.0	87/87	252/250	(3.23)	56%	>15.0	—	—
MNT-391	H124	Level 1	1577	MC	(49.0)	18.0	11.0	79/80	244/240	2.72	(65%)	8.4	—	—
MNT-391	52W-25N	Level 3	1742	MC	(58.0)	22.0	10.0	83/80	240/245	2.63	(72%)	>8.4	—	3d
Santa Clara County														
SCL-1	Loud Collection		16976	MC	63.6	22.7	6.8	85/80	250/255	2.80	60%	9.8	—	—
SCL-178	3	60	58[d]	MC	54.7	23.9	9.1	70/80	245/235	2.29	53%	9.1	—	—

a MC = Monterey chert, FC = Franciscan chert, RJ = red jasper
b Depth is in cm., PSA = proximal shoulder angle in degrees, DSA = distal shoulder angle in degrees, MWP = maximum width position, L/W = length/width ratio, weight is in grams. Measurements in parentheses are incomplete specimens. '>' indicates actual measurement taken from incomplete specimen. I = point too incomplete to measure this attribute.
c Reworked specimen
d Specimen with ground basal edge

Table 6
SUMMARY OF ATTRIBUTES FROM ALL AÑO NUEVO LONG-STEMMED POINTS FROM SAN MATEO, SANTA CLARA, SANTA CRUZ, AND MONTEREY COUNTIES[a]

Trait	N	Range	Mean	Standard Deviation
Maximum length (mm.)	74	40.0-79.0	57.8	8.8
Maximum width (mm.)	74	17.0-36.6	25.8	4.9
Thickness (mm.)	69	6.3-16.0	10.3	2.2
Proximal shoulder angle (degrees)	152	60-87	73	10
Distal shoulder angle (degrees)	144	180-270	245	13
Length/width ratio (mm.)	71	1.54-3.4	2.3	0.3
Maximum width position (percent)	70	45-75	57.5	6.6
Weight (g.)	60	4.8-23.2	13.6	5.6

a Measurements from complete elements and estimated complete measurements are used.

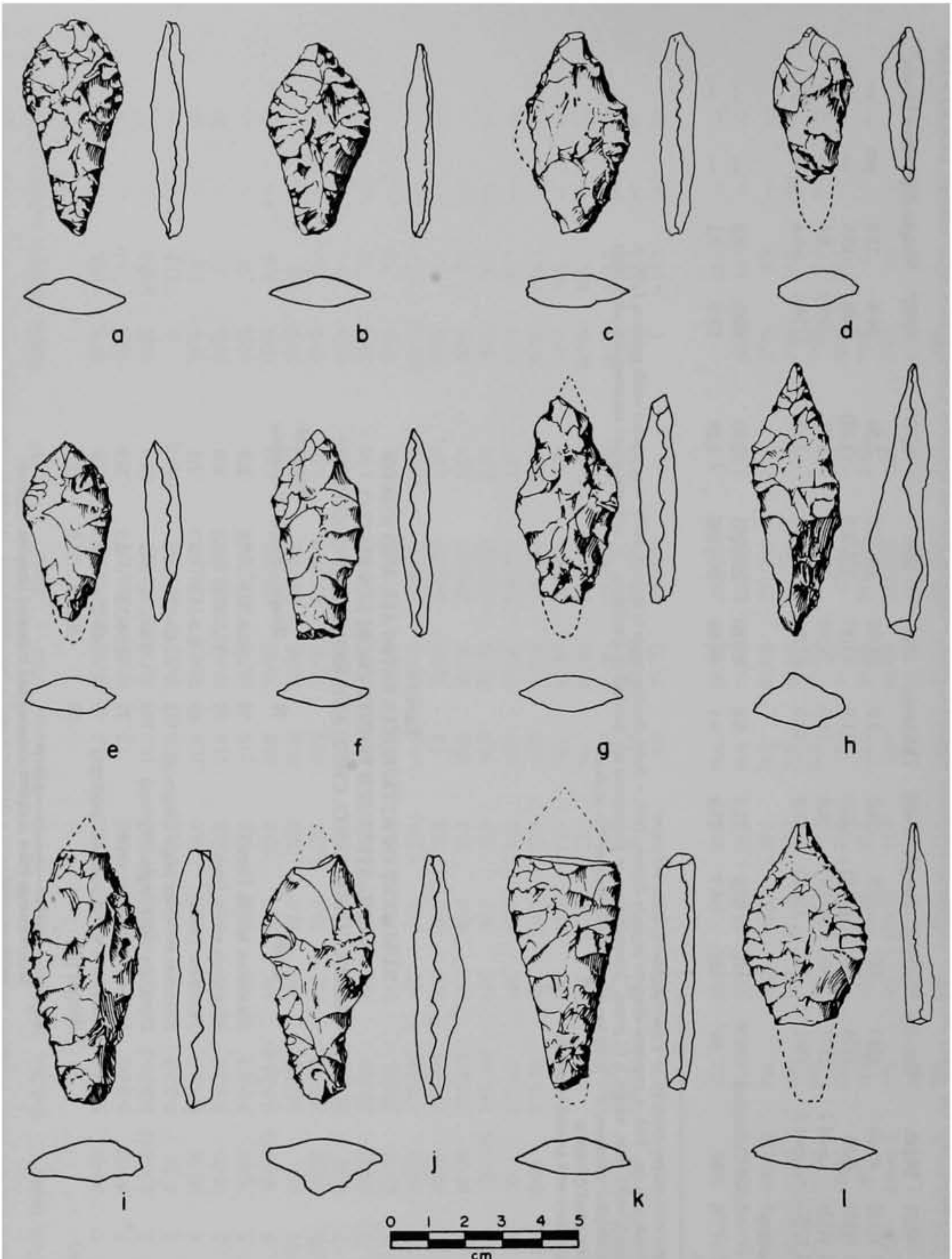

Fig. 3. Año Nuevo Long-stemmed projectile points. a: 183-10 (Año Nuevo, Harris Collection); b: 202 (Año Nuevo, Harris Collection); c: 541(66-4) (SCR-93); d: 1742 (MNT-391); e: 1173 (MNT-391); f: 540(39-11) (SCR-93); g: 539(37-6) (SCR-93); h: 9-5-2-4 (SCR-9); i: 152-11 (Año Nuevo, Harris Collection); j: SMA-218 Unit 1; k: SMA-218 Unit 2; l: 168-14 (Año Nuevo, Harris Collection).

late-period vintage (Desert Side-notched, small triangular, and serrated points, and split-punched *Olivella* beads), and since Roop had no other artifact or chronometric data at his disposal, this was a reasonable conclusion for the time. Based on our review of data collected since 1976, we believe it is equally likely that SCR-20 is a multi-component site, and that the long-stemmed points along with several other types are indicative of an earlier occupation.

ROSSI SQUARE-STEMMED

Also included in Roop's (1976) report on SCR-20 was a description of a large, thick, square-stemmed projectile point that he classified Type CS-7, "triangular, stemmed." This type was represented by a single specimen recovered close to (but in questionable association with) a burial. As more excavation data accumulated from the central coast, additional examples of this distinctive point type have been recovered. MNT-387 (the Rossi site) and MNT-391 have produced 10 examples of points that are remarkably similar to the SCR-20 specimen (Cartier 1984). All of these (examples of which are shown in Fig. 4) are large, with long, thick, often excurvate blades and short stems that range from square to slightly expanding. Bases are generally flat with a sharp angle between the base and the edge of the stem, although some have slightly rounded, convex bases. There seems to be little patterning in the angle formed at the juncture between stem and blade (distal shoulder angle), and some are noticeably asymmetrical, with different angles on each side of the stem. Measurements garnered from the MNT-387, MNT-391, and SCR-20 specimens are included in Table 7 and summarized in Table 8.

Using the quantitative and qualitative attributes represented in this sample, nine additional examples of this type have been recognized in the collections from SCR-9, -38/123, and -132, and MNT-101, -116, -229, and -1286. Measurements of specimens recovered from these sites are included in Table 9, and a summary of the attributes of all examples of Rossi Square-stemmed points so far identified on the central coast are presented in Table 10. The traits that appear to define this type are length, maximum width, thickness, proximal shoulder angle, basal width, and weight. At the present time, this type is considered distinct from both a larger, square-stemmed point that has been found only at the bottom of MNT-254 and MNT-391, and a much smaller, square-stemmed type reported from MNT-229, MNT-391, and SCR-93. Eventually, it may be appropriate to incorporate all of these into a regional stemmed series when adequate samples become available.

Regional Distribution

Although MNT-387 and MNT-391 have produced the largest samples of Rossi Square-stemmed points, similar examples also have been found infrequently at other central coast locations. On the Big Sur coast, Rossi-like points have been recovered from MNT-88 (Howard 1974), MNT-238 (Gibson et al. 1976), and MNT-254 at the Eselen Institute (Jones et al. 1987). In particular, Gibson's type IIIB from MNT-238 shows strong similarity with the examples from MNT-387 and MNT-391, and its depth distribution suggests it was most abundant during the earlier phases of occupation at MNT-238. Unfortunately, most of these examples have only been cursorily reported.

Looking farther afield, specimens showing some resemblance to Rossi Square-stemmed points also have been recovered in the surrounding area, many in temporal contexts consistent with their proposed Monterey Bay area time frame. In the San Francisco Bay region, similar points have been found at the Hiller Mound (SMA-160, specimen 52-828),

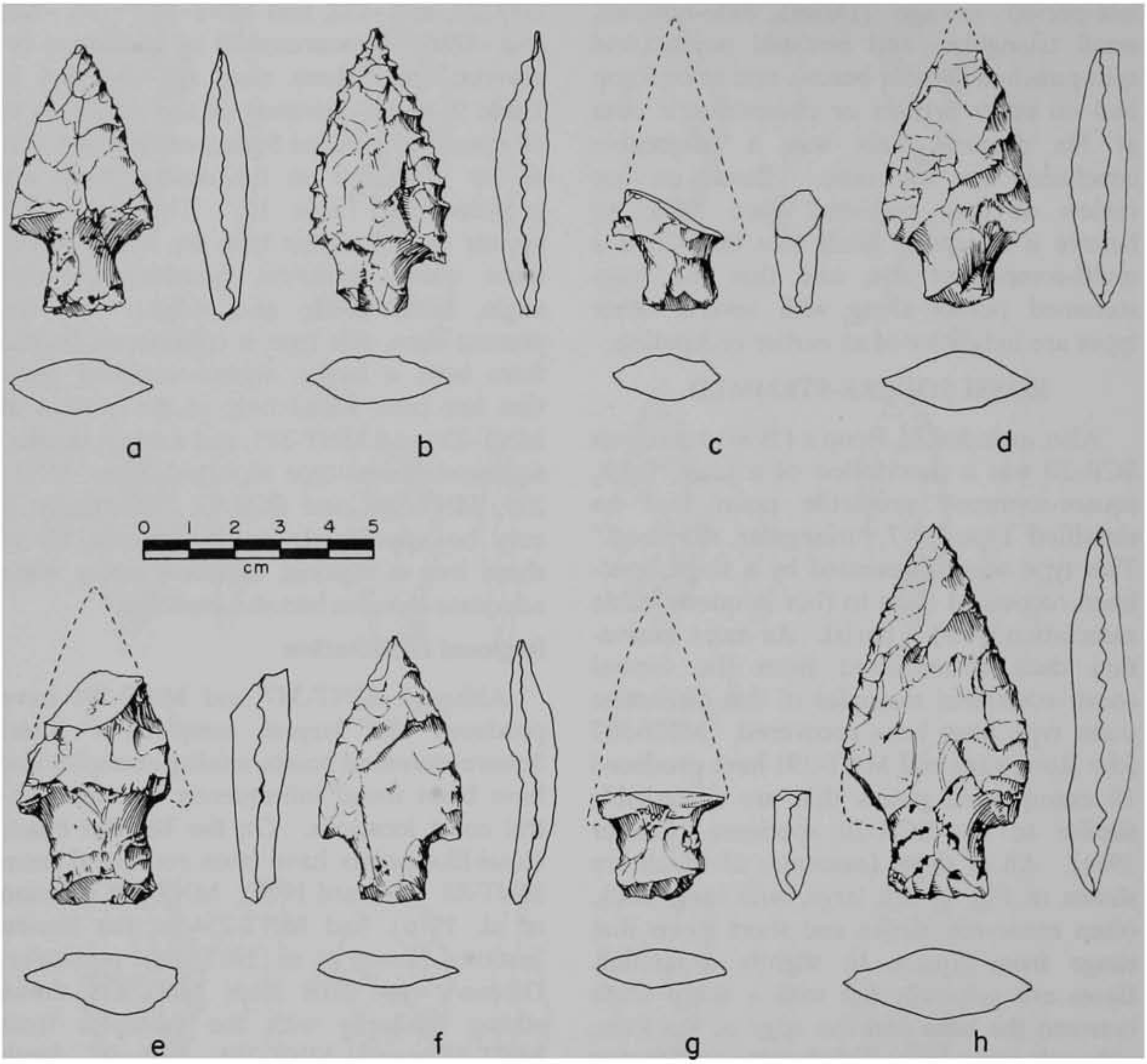

Fig. 4. Rossi Square-stemmed projectile points. a: 1920 (MNT-391); b: 9-2-16-3 (SCR-9); c: 1532 (MNT-391); d: 173-380 (SCR-20); e: SCR-132; f: 1918 (MNT-391); g: 1102 (MNT-391); h: 349 (MNT-387).

the Castro Mound (SCL-1, specimen 52-299), and SMA-125 (specimen 1-1012) (Bert Gerow, personal communication 1984). Stemmed points like those from the Monterey area also were found at the West Berkeley site (ALA-307), where Wallace and Lathrap (1975:11) reported eight examples of what they called leaf-shaped expanding stems. Table 11 summarizes the attributes of the points from ALA-307 listed in the site report. The West Berkeley points tend to be somewhat smaller than those from Monterey and most have convex bases; the difference in size may be the result of the differences in the workability of the raw material most commonly used at ALA-307 (obsidian) and that found in the Monterey area (Franciscan and Monterey cherts). An extremely similar

Table 7
ATTRIBUTES OF ROSSI SQUARE-STEMMED PROJECTILE POINTS FROM MNT-387, MNT-391, AND SCR-20

Site	Unit	Depth	Cat. No.	Material[a]	Length	Width	Thickness	PSA	DSA	NO	WB	NW	L/W	MWP	Weight	Asphaltum	Figure[b]
MNT-387	M12/13	50-60	349	FC	81.0	41.0	13.0	91	178	87	22	20	1.98	32%	38.8	Yes	4h
								92	210	118							
MNT-387	M12/13	100-110	386	MC	(52.0)	>24.0	10.0	90	220	120	16	16	1.92	33%	>12.2	Yes	—
								90	225	135							
MNT-391	Burial 22		1918	MC	57.0	31.0	10.0	90	176	86	16	16	1.84	26%	14.7	Yes	4f
								94	170	76							
MNT-391	Burial 22		1920	MC	68.0	31.0	12.0	108	210	102	18	15	2.19	28%	15.3	Yes	4a
								96	212	116							
MNT-391	Burial 23		1919	FC	69.0	29.0	15.0	110	214	114	18	15	2.38	25%	23.3	Yes	—
								105	208	103							
MNT-391	Burial 23		1934	FC	66.0	29.0	13.0	88	190	92	15	15	2.27	24%	18.7	Yes	—
								90	180	90							
MNT-391	Burial 23		1935	FC	73.0	29.0	13.0	110	170	60	17	15	2.52	25%	16.2	Yes	—
								108	210	102							
MNT-391	H85	0-20	1102	FC	I	28.0	>8.0	100	190	90	(19)	19	I	I	I	—	4g
								103	200	97							
MNT-391	H123	20-40	1532	MC	I	>23.0	10.0	102	218	116	16	15	I	I	I	—	4c
								102	220	118							
MNT-391	H121	40-60	1483	FC	I	I	>8.0	120	I	I	(18)	14	I	I	I	—	—
								120	I	I							
SCR-20	33S	0-55	173-380	FC	(66.0)	32.0	12.0	90	210	120	15	15	2.10	22%	18.7	—	4d
								90	195	105							

[a] FC = Franciscan chert, MC = Monterey chert
[b] Depth is in cm., PSA = proximal shoulder angle in degrees, DSA = distal shoulder angle in degrees, NO = notch opening in degrees, WP = width of base in mm., NW = neck width in mm., L/W = length/width ratio, MWP = maximum width position, weight is in grams. Measurements in parentheses are incomplete specimens. '>' indicates actual measurement taken from incomplete specimen. I = point too incomplete to measure this attribute.

Table 8
SUMMARY OF ATTRIBUTES OF ROSSI SQUARE-STEMMED PROJECTILE POINTS FROM MNT-387, MNT-391, AND SCR-20[a]

Trait	N	Range	Mean	Standard Deviation
Maximum length (mm.)	8	52-81	66.5	8.9
Maximum width (mm.)	8	28-41	31.3	4.2
Thickness (mm.)	9	10-15	12	1.7
Proximal shoulder angle (degrees)	22	88-120	95	21
Distal shoulder angle (degrees)	20	170-225	200	18
Maximum width position (percent)	8	22-33	26.9	3.9
Weight (g.)	7	14.7-38.8	20.8	8.4
Neck width (mm.)	11	14-20	15.9	1.8
Basal width (mm.)	11	15-22	17.3	2.1
Notch opening (degrees)	20	60-135	102	18

[a] Measurements from complete elements and estimated complete measurements are used.

specimen was also illustrated by Rogers (1929:Pl. 59) as an "arrowhead of the Hunting People." Unfortunately, subsequent excavations at Hunting Culture sites, most notably SBR-53 (Harrison and Harrison 1966), have failed to produce similar points.

Temporal Significance

Of particular significance to the temporal dimension of this type is the fact that several examples from MNT-391 were recovered from grave lots that have been dated. Burials 22 and 23, which yielded five examples of the Rossi Square-stemmed point type, produced radiocarbon dates 3,270±90 and 3,620±90 B.P., respectively, from abalone shells associated with the interments (Table 2). The other specimens from this site were recovered from the upper two-thirds of the deposit, suggesting they were restricted to the latter portion of the occupational history. Examination of other sites that have produced examples of this type shows that all were dominated by components dating 4,000-2,800 B.P. and 2,800-1,000 B.P., and it is more likely that this type was in use through these two spans. Rossi Square-stemmed points found at sites with components dated 2800-1000 years B.P., however, tended to occur toward the bottom of the deposits, and it is equally possible that this style was no longer in use after approximately 2,000 B.P. The dating of almost all other sites that have produced Rossi Square-stemmed points is compatible with a 4,000-2,000 B.P. time span, although there are no other directly dated specimens. Of particular note is SCR-9, which yielded two Rossi points and four radiocarbon dates in excess of 2,500 B.P. from its lowest levels. A single date of 1,500 B.P. was obtained from near the top of the site, but the projectile points were recovered at significantly greater depths. At SCR-132, a single Rossi specimen was located directly below an abalone feature that yielded a date of 1,900 ± 50 B.P. At West Berkeley, the expanding-stem projectile points had the greatest depth distribution of any point form, occurring only from 168 to 192 inches below the surface. Three radiocarbon samples from the 156-168-in. level produced dates between 3,500 and 3,860 B.P. The depth distribution of the points in relation to the dates suggests that they are confined to the early period of occupation at the site, and that their temporal span is consistent with that proposed for the Monterey Bay area.

Table 9
ATTRIBUTES OF ROSSI SQUARE-STEMMED PROJECTILE POINTS FROM OTHER MONTEREY BAY SITES

Site	Unit	Depth	Cat. No.	Material[a]	Length	Width	Thickness	PSA	DSA	NO	WB	NW	L/W	MWP	Weight	Asphaltum	Figure[b]
SCR-9	2	150-160	9-2-16-3	J	61.5	29.0	11.0	94	170	76	(16.0)	15.0	2.10	27%	16.3	—	4b
								91	205	114							
SCR-9	5	140-150	9-5-15-3	MC	I	I	>8.6	100	185	75	I	14.0	I	I	I	Yes	—
								95	I	I							
SCR-38/123	—	Surface	P676-87-2	C	46.9	23.7	11.3	90	205	105	13.9	14.1	2.00	27%	10.0	—	—
								110	220	110							
SCR-38/123	4	30-40	P676-67-1	MC	(47.8)	23.6	9.4	100	215	115	14.1	13.0	2.00	40%	>8.7	—	—
								95	200	105							
SCR-132	1W	40-50	—	J	I	34.0	13.0	95	180	85	22.0	22.0	I	I	>19.8	—	4e
								95	200	105							
MNT-1286	Locus 8	Surface	DFG8	MC	(55.0)	28.4	11.6	90	180	90	(14.0)	14.0	1.93	24%	13.1	Yes	—
								95	185	90							
MNT-116	17	58-60	116-95	FC	(51.0)	22.7	12.2	105	210	105	16.5	15.5	2.20	29%	10.2	—	—
								107	220	113							
MNT-101	21	170-180	101-814	MC	(50.0)	27.3	10.4	85	210	125	14.0	14.0	(1.83)	38%	8.7	—	—
								90	220	130							
MNT-229	33	100-120	33-016	MC	40.0	27.0	11.0	93	190	97	18.0	15.0	1.50	32.5%	9.71	—	—
								110	180								

[a] J = jasper, MC = Monterey chert, C = chert, FC = Franciscan chert.
[b] Depth is in cm., PSA = proximal shoulder angle in degrees, DSA = distal shoulder angle in degrees, NO = notch opening in degrees, WP = width of base in mm., NW = neck width in mm., L/W = length/width ratio, MWP = maximum width position, weight is in grams. Measurements in parentheses are incomplete specimens. '>' indicates actual measurement taken from incomplete specimen. I = point too incomplete to measure this attribute.

Table 10
SUMMARY OF ATTRIBUTES OF ROSSI SQUARE-STEMMED PROJECTILE POINTS FROM THE MONTEREY BAY AREA[a]

Trait	N	Range	Mean	Standard Deviation
Maximum length (mm.)	15	40-81	58.9	11.4
Maximum width (mm.)	16	23-41	29.1	4.4
Thickness (mm.)	17	10-15	11.6	1.5
Proximal shoulder angle (degrees)	40	85-120	96	16
Distal shoulder angle (degrees)	37	170-225	199	17
Maximum width position (percent)	15	22-40	28.8	5.2
Weight (g.)	13	8.6-38.8	16.4	7.9
Neck width (mm.)	20	14-22	15.6	2.2
Basal width (mm.)	19	14-22	15.6	2.4
Notch opening (degrees)	37	60-135	102	18

[a] Measurements from complete elements and estimated complete measurements are used.

Table 11
ATTRIBUTES OF LEAF-SHAPED EXPANDING STEM POINTS FROM CA-ALA-307[a]

Trait	Range (mm.)	Mean (mm.)
Length	41-70	54
Width	19-26	23
Thickness	6-10	8

[a] From Wallace and Lathrap (1975:11); N = 8.

Table 12
SUMMARY OF MEASUREMENTS FROM TWELVE ARCHAEOLOGICAL ATLATL DARTS FROM NORTH AMERICA[a]

Trait	Range	Mean
Maximum length (mm.)	34.0-65.4	46.8
Maximum width (mm.)	15.4-29.9	23.4
Thickness (mm.)	3.1-7.2	5.0
Neck width (mm.)	10.3-16.9	13.8
Weight (g.)	1.6-9.1	4.8

[a] From Thomas (1978:466), Tuohy (1982:85), and Hattori (1982:122-125).

Suggestions for the persistence of this form beyond 2,000 B.P. come from SCR-20, SMA-160, which was excavated by Earnhart in the early 1970s and never reported, and SMA-125, which was excavated by both Gerow and Cartier and also not reported (Bert Gerow, personal communication 1984). The single Rossi Square-stemmed point reported from SCR-20 was in questionable association with a burial. Personnel from San Jose State University recently floated charcoal from within the cranium of the burial and subjected it to radiocarbon analysis, producing a date of less than 600 years (Alan Leventhal, personal communication 1984). The questionable association between the date and the artifact leaves us with no conclusive proof of a later terminal date for this point type. SMA-125 and SMA-160 both yielded single examples of Rossi Square-stemmed points. SMA-125 produced six radiocarbon dates between 500±110 B.P., or A.D. 1450 (I-7192), and 1,055±90 B.P., or A.D. 895 (I-6688) (Roop 1976:31); the dates, however, were obtained from depths of 63 and 49 cm., and the point was recovered at 190-200 cm. Cartier obtained a similar range of six dates from SMA-160 between 660±100 B.P., or A.D. 1290 (RS-1046), and 1,660±120 B.P., or A.D. 290 (RL-1043) (Breschini et al. 1988:58). Until all excavation data from these sites are published, it is impossible to judge whether or not they indicate a later terminal date for Rossi Square-stemmed points.

FUNCTION

In 1975, Wallace and Lathrap suggested that the stemmed specimens from ALA-307 functioned as dart points rather than arrow points because of their size and bulk. Although there has long been a debate over the specific weight and size limits for points used on arrow shafts (Fenenga 1953; Thomas 1978; Hamilton 1982:44; among others), the points constituting the Rossi and Año Nuevo types certainly were not hafted on arrows, regardless of which weight or stem-width criteria are used. A comparison of their attributes with dimensions of hafted atlatl dart points recovered elsewhere (see Table 12) further suggests that these stemmed projectile points probably were not used with atlatls. Both the Año Nuevo and Rossi points generally are much larger than those found on dart shafts. Major differences seem to be in thickness, weight, and length. The sites that have produced Rossi and Año Nuevo points include those with faunal assemblages dominated by marine taxa (notably MNT-391) and others dominated by terrestrial species (MNT-229 and SCR-9). It would seem that these points may have been used with unspecialized weapons appropriate for a variety of prey species. As proposed by Gerow in 1968, these weapons may have been thrusting spears.

SUMMARY AND DISCUSSION

In an attempt to build on the recent advances in Monterey Bay area chronology we have defined two projectile point types that are readily recognizable in local collections. Año Nuevo Long-stemmed points, characterized by exceedingly long stems (indicated by maximum width position greater than 45%) and overall large size, seem to be most common in assemblages dating between 4,000 and 1,000 B.P. Rossi Square-stemmed points, which have square to slightly expanding stems and are extremely large and thick, appear to be diagnostic of the 4,000-2,000 B.P. time period. The absolute temporal parameters of both types must be refined, however, and should be continually reassessed as data accumulate.

Given that these two points are now the only regional artifact types that have been defined for the central California coast, we seriously question whether there is any validity to the Monterey and Sur "patterns" that have been discussed by Breschini and Haversat (1980) and Moratto (1984). Certainly use of the term "pattern" is premature, since there has been virtually no clear definition of the nature of the patterned phenomena. Each supposed pattern has been proposed as a time period, with components being assigned to that pattern on the basis of radiocarbon dates, in an essentially tautological process. Although midden traits have been proposed as indicators of these patterns (i.e., Sur Pattern sites are said to be characterized by low shellfish density and Monterey Pattern components by high shell density), there has, in fact, never been any quantification of these traits. We also question the utility of such pattern indicators, given the multitude of noncultural forces that could affect midden shell density. We would argue that archaeology of the Monterey Bay area will be better served through continual development of a local chronology--one in which artifact types are clearly defined and their temporal meanings firmly established. With such a structure in place, it will then be more reasonable to assess some of the underlying economic propositions outlined in the Sur/Monterey model.

NOTES

1. Since we propose that these two projectile point types are chronologically significant, we obviously are not in full agreement with Flenniken and Raymond. While we do believe that

reworking poses problems for typologists, we certainly do not think that it completely compromises our ability to define temporally significant types. Furthermore, we have not found any indications of attempts at reworking the Año Nuevo or Rossi points into anything other than smaller-bladed versions of the original form.

2. Most of the radiocarbon dates relevant to the present discussion have been published several times in the recent past (Breschini 1983; Breschini et al. 1988; Moratto 1984; Patch and Jones 1984), and we see no reason to list them all one more time. Dates listed here are those obtained since the 1984 publications.

3. All bead types are from Bennyhoff and Fredrickson (1967).

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