Cottonwood Triangular Points from Northern San Diego County, California

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THERE is little argument concerning the utility of arrow point series as time-markers for certain parts of western North America, particularly the Great Basin (Thomas 1970, 1981; Bettinger and Taylor 1974; Heizer and Hester 1978; among others). Adoption of similar temporal assumptions in regions west of the Sierra Nevada has proven more problematic. It has become increasingly evident that priority must be directed toward regional assessments correlating well-defined and areally specific point series with other data, especially radiocarbon dates and, where possible, relative sequences provided by obsidian hydration studies. A primary consideration is a clear definition of points or point series by a formulation of standardized attributes and by defining variant forms within the series on the basis of those attributes. The following discussion is an effort to develop a model of descriptive attributes for variant forms of the Cottonwood Triangular point as it is represented in the coastal and inland valley area of northern San Diego County, California, and, tentatively, of how this description may help temporally define the late prehistory of that area.

Originally described by Riddell (1951) for Owens Valley, the Cottonwood Triangular point style clearly is associated with the late prehistoric sites in the north-central and coastal regions of San Diego County (Meighan 1954; True et al. 1974; True 1966, 1970; True and Waugh 1981, 1982). Following Lanning (1963) morphological variation for this type primarily has been described in terms of basal configuration: straight base and concave base. As True (1970) has stated, variations in regard either to basal configuration or other morphological characteristics such as edges that are serrated, convex, or concave may or may not have cultural or temporal significance. Efforts to identify such significance rarely are reported in the literature aside from citations that place this series, as a whole, in coastal southern California in a post-A.D. 1300 period.

One effort in this regard was an analysis of Cottonwood series projectile points for Ystagua (SDi-4609), a coastal Ipai (Northern Diegueño) settlement. In that study (Carrico and Taylor 1983), it was proposed that certain morphological attributes of Cottonwood Triangular points, particularly those that pertain to basal morphology, have temporal significance, and in association with other data, these attributes can aid in developing a chronology for the region. That analysis described four variant forms for this type derived from basal morphology: straight, shallow, broad, and deep base. Generalized attributes form the basis for these distinctions; quantitative parameters were not presented.

The following analysis is based on a description of standardized attributes of basal morphology for an assemblage of Cottonwood Triangular projectile points from several sites in northern San Diego County that have been identified as representative of the San Luis Rey sequence (Waugh 1986). The discussion concludes with considerations of chronological implications, and how these implications compare with that proposed for the Ipai site of Ystagua.

MORPHOLOGY

Empirical Determination

Recovered from several archaeological investigations at Silver Crest and Frey Creek in northern San Diego County (Fig. 1) and surface surveys at Frey Creek (True and

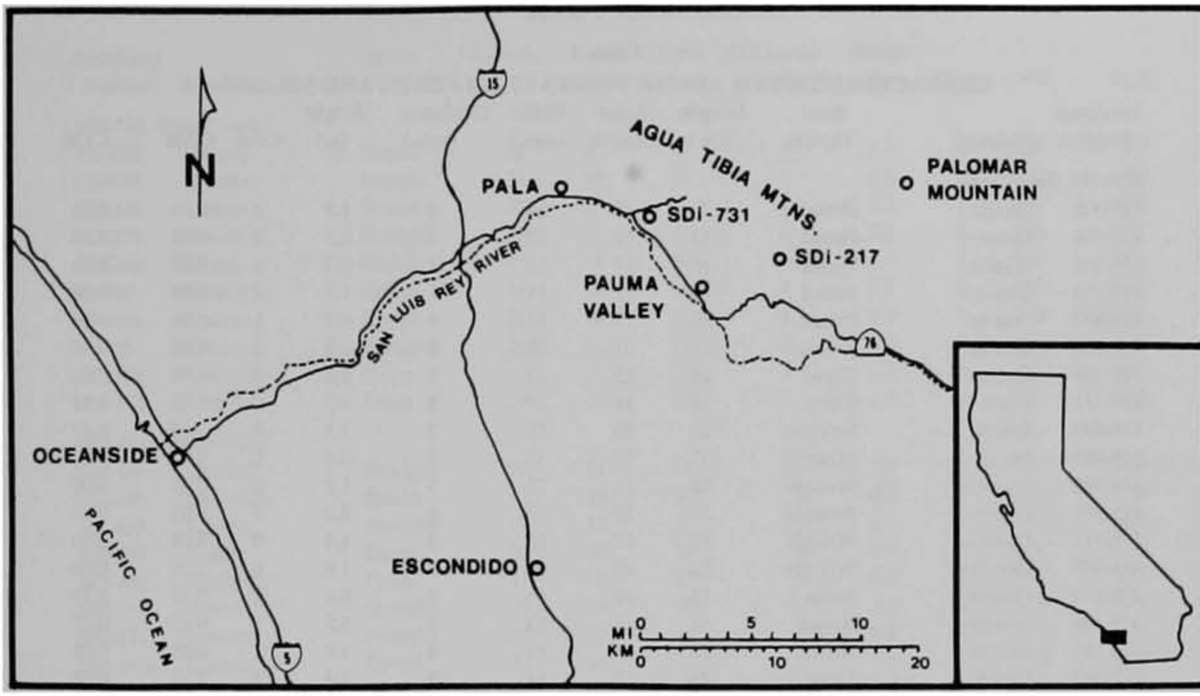

Fig. 1. Location of sites in the research area.

Waugh 1981; Waugh 1986), 85 projectile points were identified as the Cottonwood Triangular type. Attributes of these are given in Table 1. The strictly descriptive measurements for the points in this sample compare well with the range reported by Lanning (1963:250) from the Rose Spring site. They are slightly thicker and heavier than those described by Thomas (1981:25) from Monitor Valley, Nevada; however, this difference may be a function of material. Measurements for points within the sample conform to the following parameters:

Length: $\leq$ 37 mm.; Width: $\leq$ 20 mm.
Thickness: $\leq$ 6 mm.; Weight: $\leq$ 2.9 g.
Axial length $\leq$ length; Cord: $\leq$ 4 mm.
Cord/Width Ratio (CWR) $\leq$ 0.3;
Cord/Length Ratio (CLR) $\leq$ 0.2

The descriptive term "axial length" refers to the distance between the tip and the basal indentation while "cord" refers to the depth of the basal indentation (Fig. 2). Three forms were defined for the sample: concave deep base, with a deeply indented basal configuration; concave broad base, with a shallow indented basal configuration; and straight base (Fig. 3). Forty-two complete points afforded data for the simple statistics that provided mean measurements for the form variants. Distinguishing criteria for these forms are:

Straight Base: Cord < 0.5 mm.
Broad Base: Cord $\leq$ 2 mm. and CLR $\leq$ 0.10
Deep Base: Cord > 2 mm., or
CLR $\geq$ 0.10 and CWR $\leq$ 0.15

Statistical Determination

As Thomas (1981:14-15) noted, length and weight are the least stable attributes in the definition of criteria for projectile points. Breakage, edge attrition, rejuvenation, or a number of modifications can account for reduction or change of point size or conformation. It is recognized that such attrition

Table 1
CHARACTERISTICS OF ARROW POINTS FROM SDI-731 AND SDI-217[a]

Specimen Number	Material	Base Variant	Length (mm.)	Axial Length	Width (mm.)	Thickness (mm.)	Weight (g.)	Cord	CWR	CLR
SDi-731 Frey Creek										
418-302	Quartz	Broad	20	18	14	4	1.0	2	0.14	0.10
418-306	Quartz	Broad	12	11	13	3	0.5	1	0.08	0.08
418-304	Quartz	Broad	18	17	15	3	0.7	1	0.07	0.06
418-308	Quartz	Broad	18	17	11	6	1.5	1	0.09	0.06
418-307	Quartz	Broad	18	17	12	4	0.7	1	0.08	0.06
418-498	Quartz	Broad	24	23	20	6	2.9	2	0.10	0.08
418-309	Quartz	Broad	16	15	13	5	1.0	1	0.08	0.06
418-511	Chert	Deep	16	14	13	3	0.7	2	0.15	0.13
418-493	Basalt	Straight	23	23	12	3	1.2	0	0.00	0.00
418-489	Basalt	Straight	37	37	15	5	2.4	0	0.00	0.00
418-760	Quartz	Straight	21	21	12	5	1.2	0	0.00	0.00
418-500	Quartz	Straight	20	20	17	6	2.2	0	0.00	0.00
418-311	Quartz	Straight	17	17	16	5	1.4	0	0.00	0.00
418-305	Quartz	Straight	22	22	15	5	1.6	0	0.00	0.00
273-173	Quartz	Deep	12	10	11	3	0.6	2	0.17	0.17
273-164	Quartz	Broad	14	13	13	2	0.5	1	0.07	0.07
273-165	Quartz	Broad	20	18	12	4	1.0	1	0.05	0.05
273-245	Basalt	Deep	25	22	14	3	1.4	3	0.12	0.12
273-207	Basalt	Straight	22	22	9	5	1.2	0	0.00	0.00
273-222	Basalt	Broad	28	27	17	6	2.2	1	0.04	0.04
273-288	Silicated wood	Broad	29	27	11	4	1.1	2	0.07	0.07
273-117	Basalt	Broad	29	28	16	4	2.2	1	0.03	0.03
273-093	Quartz	Broad	24	23	13	6	1.9	1	0.04	0.04
273-013	Quartz	Broad	17	16	13	5	0.9	1	0.06	0.06
273-092	Quartz	Broad	19	18	14	5	1.4	1	0.07	0.05
273-250	Quartz	Straight	17	17	14	5	1.2	0	0.00	0.00
273-310	Quartz	Straight	21	21	10	4	1.1	0	0.00	0.00
16-005	Quartz	Broad	25	24	13	4	1.0	1	0.08	0.04
16-025	Basalt	Broad	22	21	15	4	1.4	1	0.07	0.05
16-007	Quartz	Straight	25	25	15	4	1.7	0	0.00	0.00
418-312	Quartz	Broad	21	14	14	4	1.2	2	0.14	0.10
418-499	Quartz	Broad	21	20	15	4	1.2	1	0.07	0.05
418-509	Tuff	Deep	21	20	17	4	1.2	3	0.18	0.14
418-316	Chert	Broad	21	20	13	4	1.2	1	0.08	0.05
418-303	Quartz	Broad	23	21	14	4	1.2	2	0.14	0.09
418-502	Quartz	Straight	21	21	18	5	1.2	0	0.00	0.00
418-313	Quartz	Broad	21	20	14	4	1.2	1	0.07	0.05
418-494	Basalt	Straight	21	21	15	4	1.2	0	0.00	0.00
273-175	Quartz	Deep	21	20	18	2	1.2	3	0.17	0.14
273-221	Quartz	Broad	27	26	14	5	1.2	1	0.07	0.04
273-224	Quartz	Broad	18	17	14	4	1.2	1	0.07	0.06
273-218	Quartz	Deep	21	20	14	5	1.2	4	0.29	0.19
273-260	Basalt	Deep	21	20	18	3	1.2	2	0.11	0.10
273-167	Felsite	Broad	21	20	14	3	1.2	1	0.07	0.05
273-315	Quartz	Broad	21	20	13	4	1.2	2	0.15	0.10
273-256	Basalt	Broad	21	20	18	4	1.2	1	0.06	0.05
273-125	Basalt	Broad	21	20	17	4	1.2	2	0.12	0.10

Table 1 (Continued)

Specimen Number	Material	Base Variant	Length (mm.)	Axial Length	Width (mm.)	Thickness (mm.)	Weight (g.)	Cord	CWR	CLR
SDi-731 Frey Creek										
273-025	Quartz	Broad	*21*	*20*	14	5	*1.2*	1	0.07	*0.05*
273-091	Quartz	Broad	*21*	*20*	16	6	*1.2*	1	0.06	*0.05*
273-326	Quartz	Broad	*21*	*20*	12	2	*1.2*	1	0.08	*0.05*
273-271	Basalt	Straight	*21*	*21*	17	3	*1.2*	0	0.00	0.00
273-242	Chert	Broad	19	18	*14*	4	*1.2*	1	*0.07*	0.05
16-013	Quartz	Broad	*21*	*20*	16	4	*1.2*	2	0.13	*0.10*
16-036a	Quartz	Broad	*21*	*20*	18	5	*1.2*	2	0.11	*0.10*
16-015	Quartz	Straight	21	21	14	4	1.2	0	0.00	0.00
273-134	Obsidian	Deep	*21*	*20*	17	3	1.2	3	0.18	0.15
273-252	Obsidian	Deep	*21*	*20*	10	4	*1.2*	2	0.20	0.10
SDi-217 Silver Crest										
542-146	Quartz	Straight	21	21	16	4	1.5	0	0.00	0.00
542-018	Obsidian	Broad	11	10	10	2	0.3	1	0.10	0.09
542-029	Quartz	Straight	17	17	10	4	0.7	0	0.00	0.00
542-058	Basalt	Deep	33	30	10	2	0.8	3	0.30	0.09
542-166	Obsidian	Deep	17	15	12	3	0.5	2	0.17	0.12
542-167	Chert	Straight	19	19	18	3	1.1	0	0.00	0.00
542-131	Quartz	Straight	21	21	12	3	0.8	0	0.00	0.00
542-145a	Quartz	Broad	17	16	13	4	0.9	1	0.08	0.06
542-115	Chert	Straight	21	21	13	6	1.3	0	0.00	0.00
542-201	Quartz	Straight	14	14	10	2	0.5	0	0.00	0.00
542-159	Quartz	Deep	16	13	12	4	0.5	3	0.25	0.19
542-200	Basalt	Straight	21	21	15	4	0.7	0	0.00	0.00
542-194	Basalt	Deep	*21*	*20*	16	3	*1.2*	3	0.19	*0.14*
542-189	Quartz	Deep	*21*	*20*	16	5	*1.2*	3	0.19	*0.14*
542-082	Basalt	Deep	33	29	*14*	4	*1.2*	4	*0.29*	0.12
542-015	Quartz	Deep	*21*	*20*	13	3	*1.2*	2	0.15	*0.10*
542-097	Quartz	Broad	18	16	*14*	4	*1.2*	2	*0.14*	0.11
542-321	Basalt	Deep	*21*	*20*	19	3	*1.2*	2	0.10	*0.10*
542-114	Basalt	Straight	*21*	*21*	18	5	*1.2*	0	0.00	0.00
542-064	Basalt	Straight	*21*	*21*	17	6	*1.2*	0	0.00	0.00
542-005	Quartz	Broad	*21*	*20*	16	3	*1.2*	1	0.06	*0.05*
542-016	Quartz	Straight	*21*	*21*	14	4	*1.2*	0	0.00	0.00
542-276	Quartz	Broad	25	24	*14*	5	*1.2*	1	*0.07*	0.04
542-019	Obsidian	Broad	*21*	*20*	10	3	*1.2*	1	0.10	0.05
542-017	Chert	Straight	*21*	*21*	12	4	*1.2*	0	0.00	0.00
542-359	Quartz	Straight	*21*	*21*	14	4	*1.2*	0	0.00	0.00
542-107	Quartz	Deep	*21*	*20*	*14*	3	*1.2*	4	*0.29*	*0.19*
542-063	Chert	Broad	23	21	*14*	5	*1.2*	2	*0.14*	0.09

[a] Italizied figures indicate missing variables replaced by mean for variant. Length = Maximum length. CWR = Cord/Width ratio. Width = Maximum width. CLR = Cord/Length ratio. Thickness = Maximum thickness.

may well have contributed to the size of the points described herein. Consequently, as most useful variables, thickness and basal shape appear not only to be most descriptively valuable, but often constitute the only remaining measurable attributes in the cases of breakage.

In order to determine variant forms for the sample from Frey Creek and Silver Crest, a Factor Analysis (Discriminant

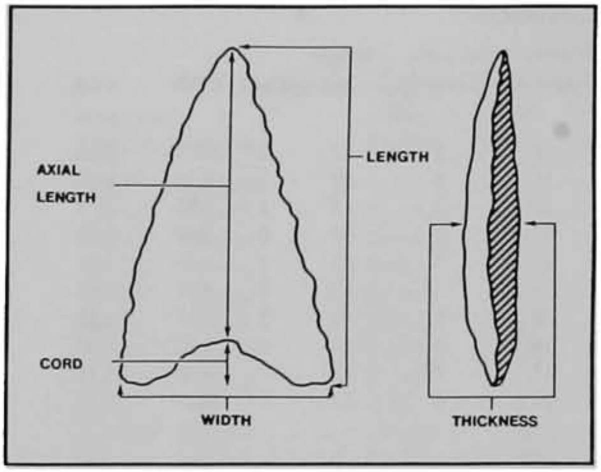

Fig. 2. Cottonwood Triangular projectile point–schematic.

Table 2
FACTOR ANALYSIS OF MORPHOLOGICAL VARIABLES[a]

	Factor 1	Factor 2	Factor 3
Length	*0.98438*	0.09661	0.08103
Axial length	*0.97871*	0.12243	-0.05529
Width	0.06021	*0.89564*	0.14120
Thickness	0.17201	0.54371	*-0.60810*
Weight	*0.60021*	*0.62880*	-0.26456
Cord	0.06049	0.13007	*0.89554*
Eigenvalue	2.324014	1.534416	1.271334
% explained	0.3873	0.2557	0.2119
Cumulative % explained	0.3873	0.6430	0.85488

[a] Factor loadings greater than 0.6 are italicized.

Analysis Program, SAS Institute, Inc. 1984-85) was performed (Table 2). In this analysis the derived Factors 1 and 2 reflect size, and Factor 3 reflects shape. Expressed differently, variance is explained by each factor in the second part of Table 2.

Note that Factor 1, length and weight, and Factor 2, width and weight, show high factor loadings. These attributes are related most closely to point size. Conversely, in Factor 3, high factor loadings represent thickness and cord depth, attributes independent of size. The inverse relationship between these two attributes illustrates the empirical observation that the increase of cord is negatively correlated with thickness. Or alternatively, thinness is a function of the manufacturing process that produced the cord depth.

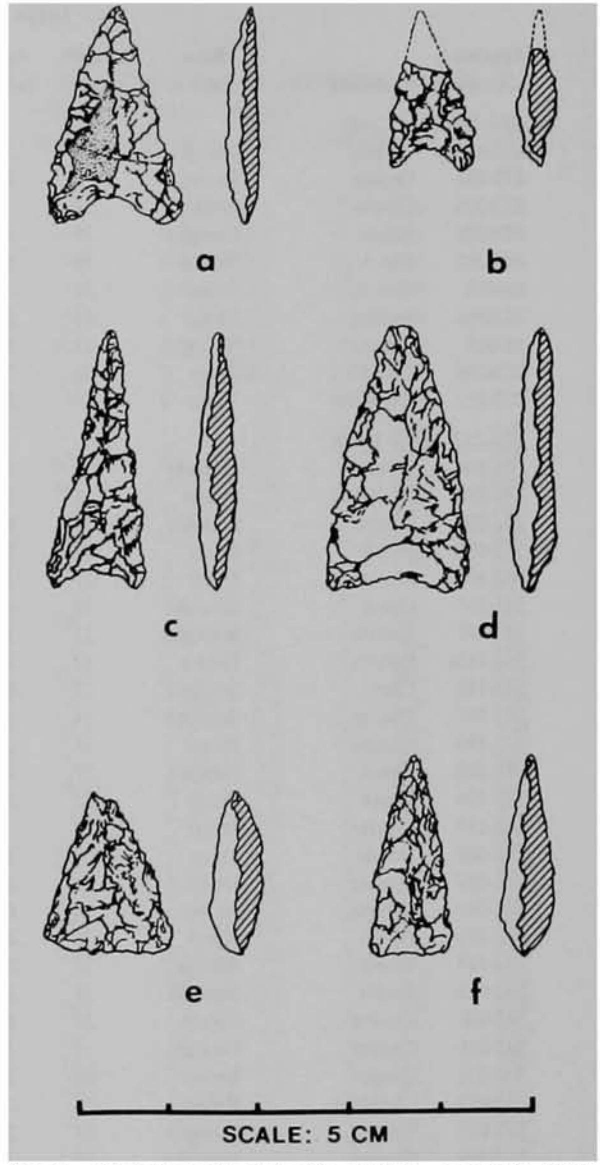

Fig. 3. Cottonwood projectile points. a and b, deep base; c and d, broad base; e and f, straight base.

An analysis of variance was performed where all morphological variables were treated as dependent variables and variant forms of points were treated as independent variables (Table 3). The null hypothesis,

Table 3
ANALYSIS OF VARIANCE OF MORPHOLOGICAL VARIABLES[a]

Dependent Variable	R^2	F	P	d.f.
Length	0.0034	0.14	0.8723	2,82
Axial length	0.0290	0.20	0.3073	2,82
Width	0.0037	0.15	0.8597	2,82
Thickness	0.1350	*6.25*	*0.0030*	2,82
Weight	0.0368	1.53	0.2224	2,82
Cord	0.8276	*192.04*	*0.0001*	2,82

[a] Independent variable = Basal variant. Italicized values indicate significant variation according to basal variant.

Table 4
ANALYSIS OF VARIANCE OF MATERIAL CLASS[a]

Dependent Variable	R^2	F	P	d.f.
Length	0.1992	*6.55*	*0.0005*	3,82
Axial length	0.2131	*7.13*	*0.0003*	3,82
Width	0.1215	*3.64*	*0.0162*	3,82
Thickness	0.0799	2.29	0.0849	3,82
Weight	0.1484	*4.59*	*0.0051*	3,82
Cord	0.0316	0.86	0.4646	3,82

[a] Independent variable = Material. Italicized values indicate significant variation according to material class.

tested here with critical values of the F ratio, is that individual variables do not vary from one form to another. When an individual variable does vary significantly from one form to another, that variable is considered important in distinguishing between forms. As illustrated below, thickness and cord are those variables significant in this regard.

A second analysis of variance was performed to ascertain the relationship between morphological variables and material class (Table 4). All morphological variables were treated as dependent variables, and material class was treated as independent. Here, where length, width, and weight express size, and cord and thickness express shape, it is illustrated that size, and not shape, is affected by material.

Based on the factor analysis and analysis of variance, therefore, thickness and cord depth were determined to be the significant variables in differentiating between the shapes of those basal forms. Derived from the Discriminant Analysis Program, the linear classification functions for identifying the variant forms are as follows:

Straight Base = (TH)(4.47) + (CD)(-1.32) - 9.64
Broad Base = (TH)(3.94) + (CD)(4.72) - 11.21
Deep Base = (TH)(2.51) + (CD)(11.89) - 20.23
(TH: thickness; CD: cord)

Following these equations, one need only take the measurements of thickness and cord to the nearest millimeter and calculate scores for the function. The highest score indicates the variant form. For example, classification is established for one specimen whose thickness and cord depth are 4 mm. and 1 mm., respectively.

Straight Base = (4)(4.47) + (1)(-1.32) - 9.64 = 6.92
Broad Base = (4)(3.94) + (1)(4.72) - 11.21 = 9.27
Deep Base = (4)(2.51) + (1)(11.89) - 20.23 = 1.70

Consequently, this Cottonwood Triangular point would be identified as a concave broad base form as indicated by the highest score, 9.27. There is strong agreement between the empirical and statistical definitions of these points (Table 5).

Table 6 summarizes the statistical data developed herein.

CHRONOLOGY

In an effort to determine whether these forms suggest temporal differentiation or could suggest conclusions concerning possible stratigraphic "sub-components" within the sites, an analysis of variance (ANOVA) was undertaken for the points recovered from excavation at Silver Crest and Frey Creek. The goal of this analysis was to identify significant co-variation between point variants within site deposits and to determine any chronological implications of that variation.

Table 5
PERCENTAGE OF EMPIRICALLY DEFINED COTTONWOOD TRIANGULAR POINTS CLASSIFIED BY DISCRIMINANT ANALYSIS

	Statistical Definition (Discriminant Analysis)		
	Broad Base	Deep Base	Straight Base
Empirical Definition			
Broad Base	95.4	4.6	0.0
Deep Base	12.5	87.5	0.0
Straight Base	0.0	0.0	100.0

Relative dating of "late" sites within the research area often has relied in part on the occurrence of pottery. As only one sherd was recovered from the upper level of Frey Creek, such evidence was not useful in constructing chronology. Consequently, and because of the gradual and incremental differentiation of soils at both sites, arbitrary depth classes were constructed and characterized as a simple composite of all units. It is understood that such hypothetical divisions may not reflect actual depth in individual units and may mask some real differences between subcomponents. Moreover, the depth of deposit at each site is defined in terms of the deepest occurrence of points, not in terms of the depth of the midden deposit itself.

Two methods of constructing arbitrary strata were devised. The first method defined strata in the simplest manner--by dividing the deposit in half with each stratum characterized by a midpoint. For tabulation purposes, points were grouped in each stratum in terms of this midpoint. Thus, at Silver Crest the depth for all units was characterized at 100 cm. with the upper stratum extending from 0 to 50 cm. with a midpoint of 25 cm., and the lower stratum extending from 50 to 100 cm. with a midpoint of 75 cm. At Frey Creek the deepest level was 80 cm. with the upper stratum extending from 0 to 40 cm. with a midpoint of 20 cm., and the lower stratum extending from 40 to 80 cm. with a midpoint of 60 cm.

The second method for defining strata at

Table 6
Simple Statistics of Individual Variables Before and After Replacement of Missing Values

Variable	Number	Mean	Standard Deviation	Minimum Value	Maximum Value
Broad Base Variant, Total Number = 41					
Length	26/21	20/21	4.7/3.9	11	29
Axial length	26/41	19/20	4.8/3.8	10	28
Width	33/41	14/14	2.5/2.0	10	20
Thickness	41/41	4/4	1.1/1.0	2	6
Weight	19/41	1.2/1.2	0.7/0.5	0.3	2.9
Cord	41/41	1.3/1.2	0.5/0.4	1.0	2.0
Deep Base Variant, Total Number = 18					
Length	7/18	24/21	8.3/5.1	12	33
Axial length	7/18	21/20	7.9/4.8	10	30
Weight	15/18	14/14	2.5/2.5	10	18
Thickness	18/18	3/3	0.8/0.8	2	5
Weight	6/18	0.9/1.0	0.3/0.3	0.5	1.4
Cord	18/18	2.8/2.7	0.8/0.8	2.0	4.0
Straight Base Variant, Total Number = 26					
Length	17/26	21/21	4.9/3.9	14	37
Axial length	17/26	21/21	4.9/3.9	14	37
Width	25/26	14/14	2.7/2.7	9	18
Thickness	26/26	4/4	1.0/1.0	2	6
Weight	17/26	1.3/1.2	0.5/0.4	0.5	2.4
Cord	26/26	0/0	0/0	0	0

Table 7
SUMMARY OF ANOVA[a]

Dependent Variable = Depth (cm.)	R^2	F	P	d.f.
Silver Crest, SDi-217				
25, 75	0.1813	2.77	0.0821	2,27
25,50,75,100	0.0758	1.11	0.3448	2,27
Frey Creek, SDi-731				
20,60	0.1730	5.54	0.0065	2,53
30,60,80	0.0537	1.48	0.2378	2,53

[a] Independent variable = Form variants

Table 8
VERTICAL DISTRIBUTION

	Straight Base	Broad Base	Deep Base
Silver Crest, SDi-217			
Above 50 cm.	8	7	6
Below 50 cm.	4	-	3
Frey Creek, SDi-731			
Above 40 cm.	13	25	2
Below 40 cm.	1	6	7

Silver Crest was to divide the deposit into four equal strata, 0-25 cm., 25-50 cm., 50-75 cm., and 75-100 cm. For tabulation purposes in this case, the deepest measurement for each stratum defined deposition of points within that stratum. In similar fashion, the Frey Creek deposit was divided into three strata: 0-30 cm., 30-60 cm., and 60-80 cm., again with the base depth measurement marking deposition for points within that stratum.

Either method of defining strata demonstrated that the class of material did not affect morphological variability of the basal form of the points. The analysis of variance between strata and point form variants, however, did offer some different conclusions and is summarized in Table 7.

In the analysis of variance, depth classes for strata are treated as dependent variables and point form variants as independent variables. R^2 reflects the percent of variability accounted for in the dependent variable by the independent variable, and the F ratio is the test statistic. The p-value is the probability that the F ratio is greater than or equal to the critical value of $F_{0.05}$.

The analysis for Silver Crest shows no significant co-variation between point form variants in either method of strata division. For Frey Creek in the first division, the p-value is less than 0.05; significant co-variation is established in a bipartite division. Deep base points tend to be found deeper than either straight base or broad base forms (Table 8). It is important to note that even if the F ratio is significantly larger than the critical value of $F_{0.05}$, the R^2 is not particularly striking, and that a good deal of variation is not accounted for between form variants and their depth. With the three-way strata division, the first significant co-variation is weakened, and there is no significant correspondence between depth and form variants.

If the bipartite division of the Frey Creek strata is accepted, then the conclusion can be drawn that while deep base points may not necessarily be earlier than broad base points at this site, they do occur in later times with less frequency. Even more interesting is the distinctly later occurrence of the straight base points, further illustrated by the Silver Crest data. In terms of intra-site analysis, while the point data at Silver Crest do not demonstrate significant statistical co-variation in form, in intersite comparison they do not contradict the evidence at Frey Creek.

Any attempt to link the basal form variants to absolute chronology at the northern San Diego County sites is tenuous, as only a limited number of radiocarbon dates are available. At Silver Crest, no radiocarbon determinations were obtained that could shed temporal light on the late end of the San Luis Rey sequence. Based on minimal radiocarbon data at Frey Creek (True and Waugh 1983; Waugh 1986), a tentative chronological

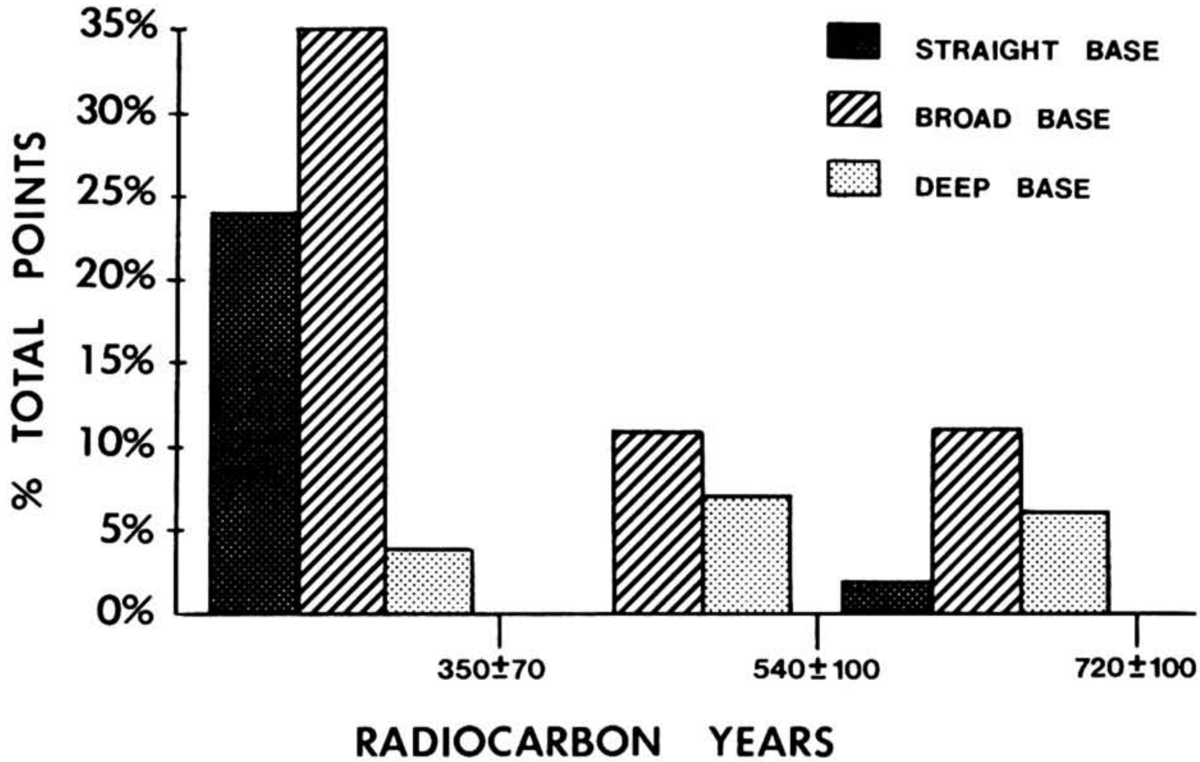

Fig. 4. Distribution of Cottonwood Triangular points in relation to radiocarbon dates at Frey Creek, SDi-731.

scheme can be postulated for the basal configuration of Cottonwood Triangular points at that site (Fig. 4).

For Frey Creek, the dominant variant form is the broad base point, and neither material nor size appear to have determining influence in this stylistic variation. The degree to which considerations, technological or otherwise, led to late increase of the straight base type approximately after A.D. 1600 is unknown. It is possible that there is a continuum in the production process from straight base to broad base, as has been proposed elsewhere (Carrico and Taylor 1983:103), with the deep base as an earlier variant. In this case the increase in this form may be merely a reflection of increased production of points. If hafting of the straight base pieces did not present a problem and these points did not represent merely a technological stage, the increase may reflect less preoccupation with formalized variation possibly in conjunction with more rapid manufacture of points.

For the Cottonwood Triangular point forms at Ystaqua, the Ipai site approximately 64 km. south of the research area, the proposed sequence postulates that the straight base form, together with the predominant broad and shallow forms, occur earlier than the deep base variant (Carrico and Taylor 1983:103). If these broad and shallow forms can be said to equate to the broad base form as described herein, this sequence appears to be at odds with the findings for Frey Creek and the adjacent mountain region in northern San Diego County as represented at Silver Crest.

For lack of comparable data, at this time it is not possible to extend these conclusions from the present research to other sites within the immediate area; however, it is expected that further comparative analyses can test these proposals. It is also hoped that the definition of attributes presented here will aid in these analyses by providing objective criteria.

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