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CHAPTER III

TRADITIONAL BEADS AND GLASS TRADE BEADS: AN ECONOMY IN TRANSITION

The antiquity of bead and ornament distribution in California attests to an extended history of long distance trade and intercultural contact (Lillard, Heizer, and Fenenga 1939; Gifford 1947; Bennyhoff and Fredrickson 1967). Such items frequently had economic significance, but also functioned in ceremonial, status, and aesthetic contexts (Chagnon 1970:7; King 1978:61). This chapter describes the traditional beads and ornaments and glass beads recovered from sites used in this research. The temporal significance of particular bead types is considered. Functional similarities between traditional bead use patterns and glass bead use are suggested. Color preferences may also be indicated in the glass beads from this collection.

The transition from prehistoric trade patterns to a global capitalistic exchange system had profound repercussions for the economy and culture of the Central Sierra Miwok. The great difference between the Miwok and Euro-American technologies was an important aspect of these changes. During the initial period of direct contact, fundamental differences in economic expectations were manifest in trade relations between Indians and whites. Glass beads played an important role in these interactions, as traditional beads had in exchanges between Indian groups during prehistoric times. Some of these social and economic aspects of beads are considered in the following presentation.

the prehistoric sites in the New Melones area, then the data described in Appendix A and depicted in Figure 3.1 would support the pattern noted by King. Furthermore, it appears that shell bead trading proliferated during the same period in which many of these sites were originally occupied (after A.D.1500), since extensive samples from several of the older sites used in this research indicate a constant but very limited recovery of shell beads dating to before A.D.1500. These conclusions will remain tentative until they are tested on additional prehistoric sites in the area however. It should be noted that age inferences made from individual beads (rather than large lots), particularly from sites with presumed great antiquity, should be made with caution.

The Introduction of Glass Trade Beads

Although occasional glass trade beads may have reached the Miwok as early as the sixteenth century, it was not until the late eighteenth and early nineteenth centuries that glass bead trading truly proliferated in California. Traded extensively by Spanish missionaries and exploratory parties; Russian, American, and Hudson's Bay Company trappers; early colonists such as John Sutter; and finally, by a very large influx of gold seekers, glass beads played a major role in intercultural exchanges.

Their principal consumers were Indians, although they have also been recovered in urban Euro-American archaeological deposits (Motz and Schulz 1980). As indicators of the interactions between Indians and whites, glass beads are laden with cultural significance. They

afford an unique opportunity to examine the ways in which value is defined at a crosscultural interface, and in particular, how this contact altered the economy of the Central Sierra Miwok. In many cases, glass beads survive as the sole testimony of the contact between two vastly different world views.

Despite the complexity of the interactional spheres represented in California during the historic period, the patterning and distribution of glass beads has not been easily reduced to tightly dated or sourced sequences. This is largely due to the fact that although glass bead factories existed as early as 1632 in Jamestown, Virginia, 1591 in Japan, as well as in Czechoslovakia and possibly China by the early nineteenth century (Meighan 1979), the world market was dominated by Venetian manufacturers. As a result,

> It is clear that it is not possible to identify the trade beads in California as "Spanish," "American," or "Russian," since the persons who traded beads to the Indians were merely middlemen and not the producers of the glass beads. Furthermore, all of the middlemen were obtaining their beads through the same market system, nearly always going back to the Venetian factories (or at least Venetian styles and models) (Meighan 1979:10).

Taking this problem into consideration, it is reasonable to assume that the Central Sierra Miwok were probably only indirectly exposed to the trade in glass beads during the period of the first Spanish exploratory expeditions into the interior of California. At least 29 large forays into the Valley occurred between 1804 and 1840, and "traces exist of many other expeditions, usually conducted under illegal or private auspices" (Cook 1976:200). Until approximately 1813, these expeditions were principally exploratory in character, but

through time they became more military, eventually replaced by numerous retaliatory excursions of a smaller private nature following the secularization of the mission system in 1834.

Beginning in 1826, significant numbers of American and Hudson's Bay Company trappers also began to ply the Sacramento and San Joaquin Valleys and their tributary waterways. Hill noted the presence of the Americans:

> From 1826 to 1832 may be characterized as the period of the opening of the trappers' trails to California. During this period trappers made their way to California over at least six different trails through the southwest--the Pattie trail, the Jackson trail, the Young trail, the Armijo trail, thw Wolfskill trail, and the Smith trail. The number of persons engaged in the trade during this period must have aggregated into the thousands (1932:4).

In addition, the path from San Francisco to the Columbia River "has been travelled twice annually for the last fifteen years [beginning in 1827], by from one to two hundred persons of the Hudson's Bay Company, with a good number of pack horses" (Marsh 1890:220 cited by Meighan 1979).

Regarding this period, Meighan notes "from about 1830 on, the trade beads used in California are apparently derived almost exclusively from Hudson's Bay Company sources" (1979:10). Gold Rush period sources may have broadened this range of middlemen once again, although the manufacturers probably remained primarily Venetian. By 1853

> E. Fitzgerald and Company of San Francisco . . . had on hand "an unusually full stock of every variety required for trade" including 10,0001b of red and blue styles and 20,0001b of "Mammoth size white" beads (*Sacramento Union*, Jan. 12, 1853:1).

In order to provide precise information on absolute sourcing and dating of glass trade beads needed for a sophisticated analysis of international trade networks and interaction spheres, it will first be necessary to apply X-ray fluorescence and neutron activation techniques. Refinements of hydration techniques may also be useful as an absolute dating tool for glass beads, although calibration of hydration rate differentials for glasses with different chemical compositions may prove prohibitive. These methods were beyond the scope of this research, but offer many opportunities for further study.

In the absence of such techniques, meaningful data have been developed through seriation of datable types and the particularities of glass bead distributions as they have been noted for other sites in California. Such information enables conclusions on a number of levels including the mechanics of interaction networks, as well as the underlying structures of meaning which define such behavior.

This analysis provides basic data which is followed by one possible interpretation. Other interpretations may pertain when new questions are posed, or further information is gathered. This research was guided by the following general considerations:

1. Interaction Spheres: Who was trading with whom, and at what times? (Behavioral dynamics).
2. Interactional Semiotics: What were the differences between Indian and Euro-American structures of meaning, and by what processes were values defined and redefined at the crosscultural interface? (Mental dynamics).
3. Economic Transformation: How did the Central Sierra

> Miwok economy redefine itself in relation to the larger white system, particularly with regard to the abstraction of value and labor? (Mental dynamics reflected within economics).

While only the first question is truly amenable to proof, the other considerations are also addressed in light of the glass bead data that follows.

In order to realize these explanatory potentials, it was necessary to somehow organize and render sensible the patterning of glass trade beads in their archaeological contexts. Classificatory schemes of infinite variety may in theory be derived from any single group of data, yet the relevance of a particular system depends largely on its ability to address meaningful research questions. The questions posed in this analysis consider glass beads as commodities in a crosscultural trade scheme of international scope. Within such an orientation a series of economic exchanges were represented between individuals whose perceptions and motivations often differed radically. It therefore seemed prudent to select a typology which would create relatively refined types, lest potentially significant distinctions remain unrecognized. Because bead manufacturers probably discriminated with more sophistication (technologically speaking) than the other individuals in their economic circuit, a typology of glass beads which incorporated manufacturing techniques was determined to be the most appropriate for this research.

It should be noted that a multiplicity of glass bead typologies exist for California (cf. Bone 1975; Dietz 1976; Gage 1970; Gibson

1976; King and Gibson 1972; Meighan 1979; and Motz and Schulz 1980). This has tended to make comparative studies a prohibitive task. Many of these systems were organized numerically, rather than systematically. Those which did systematize relied on written descriptions and schematic depictions of the beads.

For this reason the Kidd and Kidd (1970) typology was chosen for this analysis. It is a readily available, systematized, open-ended classification scheme with printed color charts to reduce the confusion prevalent in written descriptions. It classifies glass beads on the basis of manufacturing techniques, as well as color, clarity, shape, and size.

Manufacturing Techniques

Glass beads were hand crafted commodities whose color, shape, and other physical characteristics consequently exhibited a certain amount of variability. This lack of uniformity was primarily a function of the relative crudeness of the technology prior to the nineteenth century. The chemistry of the glass used in beadmaking was often quite variable, due to both poor control over recipes and the uncertain purity of the raw materials used to make it. Made primarily of silica, alkali, and a stabilizer, a coloring agent was usually added to the glass. Gibson (1975:106) notes that some of the following chemicals were used to create coloration in glass: copper, to obtain a turquoise blue; cobalt for a darker navy blue; charcoal to create a yellow-brown; manganese dioxide to produce violet; selenium, to make a bright red; chromium, for bright green; and gold, to obtain a wine red tint.

The presence of impurities such as iron often added a light green tinge. The molten amalgam was then manipulated by several methods while in a plastic state.

Beads were either drawn, wound, molded, or blown, and frequently attained their final form through some combination of these techniques (Motz and Schulz 1980). In addition, the unformed glass could be repeatedly dipped in other batches of differently colored glass (thus producing a compound or polychrome bead); pressed, marvered, or molded into many-sided, grooved, or otherwise shaped patterns; and twisted as the cane or individual bead was being manufactured (van der Sleen 1973; Kidd and Kidd 1970). After cooling, subsequent treatment by chopping, hot tumbling, and grinding were often used (Woodward 1965; Orchard 1975). Striped beads could also be produced by inlaying glass rods in the molten gathering before it was pulled or twisted.

Woodward (1965:7) quotes a correspondent for *Scientific American*, who signed himself "JTB" in the June 14, 1856 issue in which he describes the drawn or hollow cane method of manufacture in detail:

> When the mass is sufficiently fused the coloring pigment is thrown in and mixed with the molten glass. When thoroughly amalgamated the workman gathers a couple of pounds of the metaled [sic] matter upon the end of an iron rod which he withdraws from the furnace and manipulates upon an iron slab; after this he plunges the glass into a tub of water. When it is sufficiently cooled he sticks it into the furnace again where it remains until melted; then it is taken out and fashioned into a shape resembling a bottle, with the bottom broken out.
>
> Another workman now brings a similar lump attached to another rod; the two are welded together; then a couple of boys take each one of the rods and "travel" in opposite direction to either end of the long shed. As these boys run away from each other, the glass is drawn out into long tubular wires, so

> to call them, and lies along the ground, where it is suffered to remain until cooled, after which it is broken up into lengths or tubes three feet long and sold to bugle makers (a distinct class of operatives) or sent into other rooms in the same establishment where workmen break them into minute particles.
>
> This operation is performed by men, women and boys--who have before them an iron gauge into which with one hand they thrust fifteen or twenty tubes at the same time, and with an instrument (resembling a hatchet head) in the other hand, they rapidly chop off the ends of the tubes, according to the size adjusted by the gauge. The cuttings are then taken below where they are put in a furnace over a pretty hot fire. A boy gives a revolutionary motion to the barrel until the sharp edges are properly shaped, when they are taken out of the barrel and polished by being poured into bags and shaken from side to side by the force of two men.

Orchard (1975:98) noted the additional introduction of plaster and other materials into the hot tumbler to prevent coalescence:

> The tubes . . . are then placed in a pear-shaped drum of beaten iron containing a mixture of plaster and plumbago or of charcoal dust mixed with clay. The drum being placed on a furnace, the workman gives it a continual rotary movement by means of an iron axle which passes through it, so that the tubes softened by the heat lose the salient parts of their extremities from the constant friction with each other and take a spherical form. The office of the plaster and charcoal in the work is to prevent the tubes at the time of softening of the glass, from adhering together.

Slight distortions in the shape of the beads and their bores may have resulted frequently from this process.

Later, to produce wound beads, a solid cane or rod of glass was first made. Such a rod was then reheated over a small torch and hand wrapped around a wire or mandrel, after which it was spun above the flame to even its shape. When cooled, the differential contraction of the glass and the metal enabled it to be easily removed from the wire

(van der Sleen 1973:23).

Molten glass, as well as formerly drawn, wound, or blown beads could, while still in a plastic state, be molded or pressed in one or two-part molds to create facetted or otherwise desirably shaped beads (Kidd and Kidd 1970:49-50). Facetted beads were also produced by holding short lengths of hollow cane momentarily against an abrasive wheel (Woodward 1965:10). This also facilitated snapping the glass tubes into individual beads. Frequently, facets were ground on molded beads to eliminate unsightly equatorial seam marks, though some remnant is usually visible. It is potentially significant that in his *Treatise on the Origin, Progressive Improvement, and Present State of the Manufacture of Porcelain and Glass* written in 1832, Lardner mentions only the production of simple and compound cane beads. Facetted beads are generally diagnostic of the period after about 1820 or 1830 in California, but may have been produced in limited quantities before then.

Blown beads were manufactured by reheating hollow canes, which were then either freeblown into symetrical shapes, or blown into molds (van der Sleen 1973:26). Their shapes are characteristically more diverse than beads produced by other methods, and they are commonly embellished with grooves or other designs.

Methodology

Some of the glass beads analyzed in this thesis have been classified by other typologic systems (Gage 1970; Johnson 1973; Peak 1973; Moratto 1976b; INFOTEC 1981). The largest sample of previously typed

beads came from site 04-Cal-S-286, many of which were reburied following their analysis. All of the glass beads which were recovered from that site were typed using the Kidd and Kidd system (INFOTEC 1981). For the sake of consistency, all glass beads that were available for inspection have been reexamined for this study.

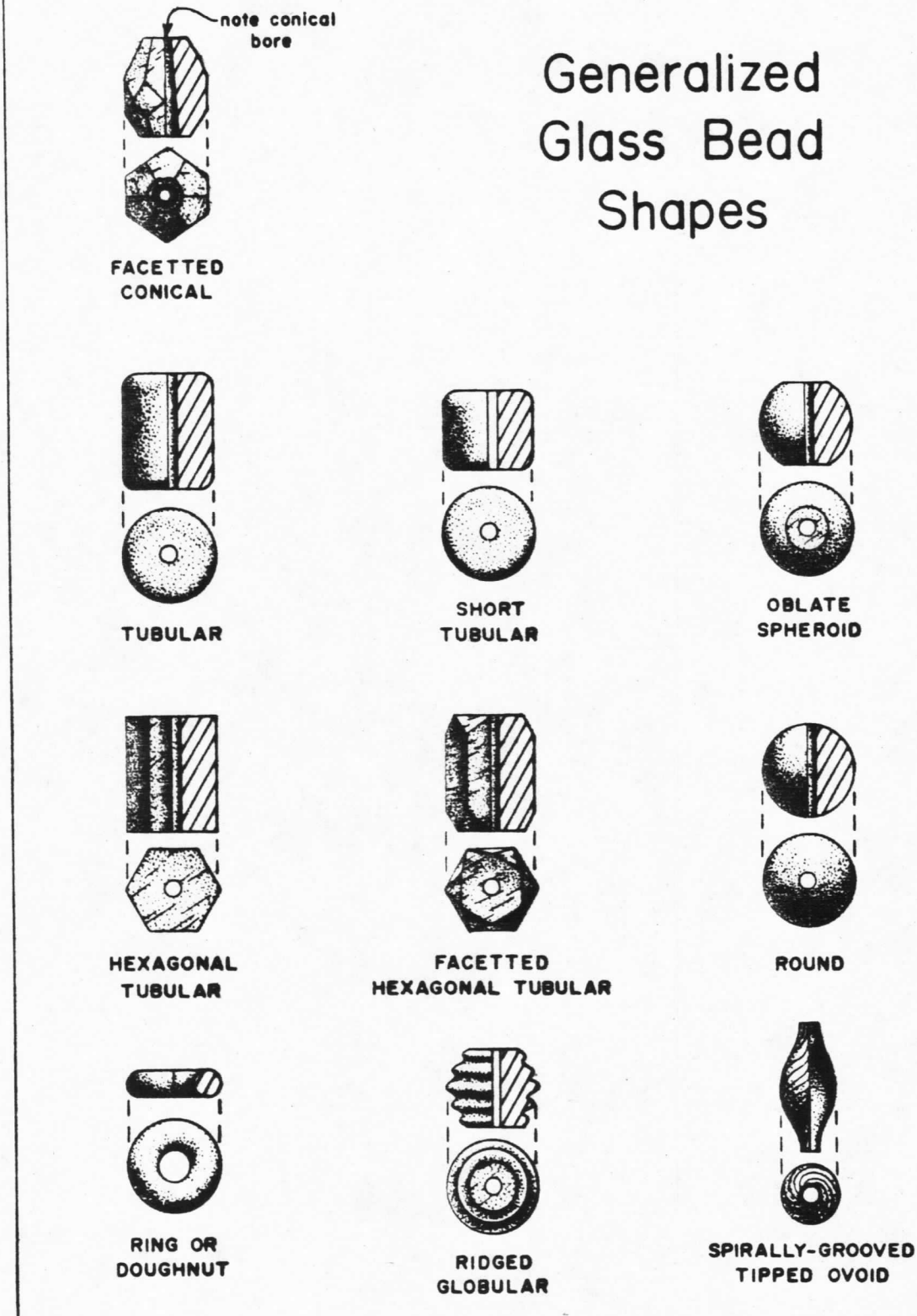
Identifications were based upon wet examination with a 75 watt incandescent light source, supplemented by a 3.5X binocular microscope when gross visual inspection failed to distinguish the details of manufacture. Metric data was obtained for each bead to the nearest 0.1 mm in all but the largest lots, where mean dimensions were taken and the beads roughly classified within the following size ranges based on their diameter:

very small	=	less than 2.0 mm diameter
small	=	2.0-4.0 mm diameter
medium	=	4.0-6.0 mm diameter
large	=	6.0-10.0 mm diameter
very large	=	over 10.0 mm diameter

An effort was made to identify melted and fused glass beads. The presence of highly melted and fused groups of beads in the context of a cremation was easily identified; however, more caution was exercised in unknown contexts where slightly melted beads might easily be mistaken for those distorted during the hot tumbling process.

Bead shapes display a great deal of variation resulting from their handcrafted manufacture. The terms used in this thesis follow Meighan (1979), and are depicted schematically in Figure 3.2. Some of the bead types described in Appendix B are assigned a range of bead

Figure 3.2


note conical bore
Generalized Glass Bead Shapes
FACETTED CONICAL
TUBULAR
SHORT TUBULAR
OBLATE SPHEROID
HEXAGONAL TUBULAR
FACETTED HEXAGONAL TUBULAR
ROUND
RING OR DOUGHNUT
RIDGED GLOBULAR
SPIRALLY-GROOVED TIPPED OVOID
TVB 1982

forms, for instance: from oblate spheroid to tubular. Shapes are lumped together in one type when the technology involved in producing them is identical.

The relative clarity of the glass used in each bead type was also assessed. A bead which transmitted no light when held before the light was called opaque, while those which allowed a small quantity of light through but did not permit observation of the perforation through the side of the bead were labelled translucent. If the central perforation could be clearly seen through the sidewall of the bead it was identified as transparent, and completely colorless beads were called clear.

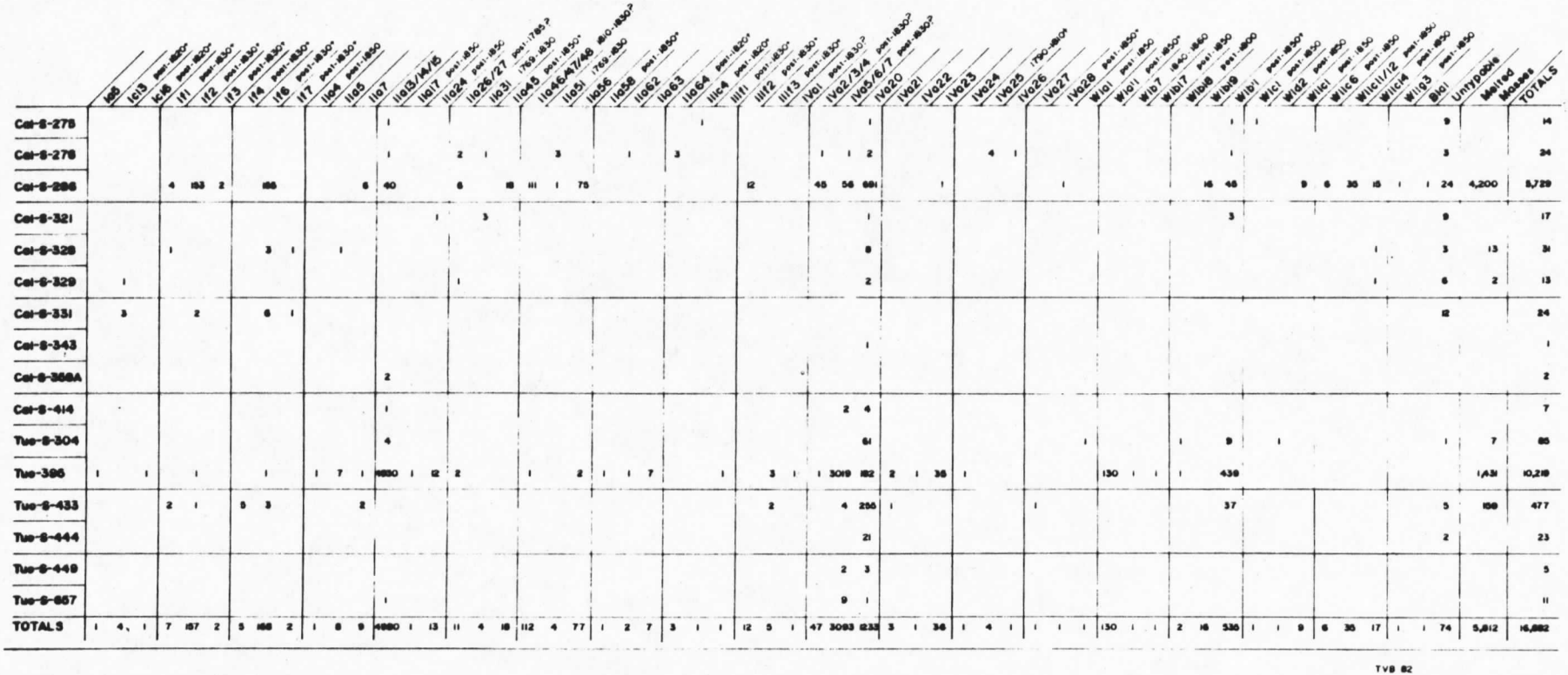
The glass bead data for this thesis has been compiled in Appendix B, and the distribution of the beads is presented in Figure 3.3. Beads were occasionally found in fused masses which preserved the original sequence in which they were strung. This information is also compiled in Appendix B.

The Interpretation of Glass Bead Data

The glass beads described in this thesis can provide insights into several aspects of Indian life in the New Melones area. These include the definition of the period during which each site was used by the Indians, the degree of economic interface they may have had with the white economy, the cultural affiliation of the Indians who used particular sites, and the significance and uses which the glass beads had to the Indians. The glass bead data presented in Appendix B and Figure 3.3 offer some limited insights about these questions.

Figure 3.3

Distribution of Glass Bead Types



TV8 82

Date ranges for specific types represent distributions noted by Meighan (1979)

While many of the glass beads that were recovered in New Melones sites are types widely distributed throughout the colonization of California, and therefore not useful for temporal interpretations, several types with more restricted periods and areas of distribution were also found. These temporally restricted types represent beads associated almost exclusively with the Hudson's Bay Company, or other sources dating to the period after 1848. These correspond with the general characteristics of the glass bead complex associated with the Sutter period (1839-1850) and the American period (post-1850) among the Plains Miwok noted by Bennyhoff (1977:42-43). Two factors probably account for this glass bead distribution pattern. First, direct contact between whites and the Central Sierra Miwok was negligible prior to about 1848 (Hall 1978). Second, it is probable that few, if any, glass beads were acquired from other Indian groups before the Gold Rush either because trade networks were severely disrupted by the epidemic of 1833, or because the very limited recovery of traditional beads discussed above would seem to suggest an equally or possibly more constrained marketplace for glass beads prior to direct contact between the Miwok and whites.

One significant exception appears to represent the retention of glass beads by a mission Indian who immigrated to the New Melones area. The presence of several glass bead types generally associated with a Spanish mission distribution concentrates in site 04-Cal-S-276, where they are associated with a yellow metal crucifix (described in Chapter VI). The immigration of missionized and valley Indians into the area was noted by many whites. One early Sonora resident wrote in

February, 1850, that "the tribes of Indians inhabiting these mountains . . . are not the depredators on the white settlements; but they harbor, in large numbers, the 'Mission Indians,' of the lower country" (Perkins 1964:123). It is probable that these beads and crucifix represent such a presence.

The quantity of glass beads found in these sites is particularly significant when compared to the much smaller numbers of traditional beads which were recovered considering that almost every site had a prehistoric component. In some sense glass beads offer a crude index of the intensity of economic interaction between Indians and whites, and implies the operation of at least some new economic activities by the Central Sierra Miwok. The atrophy of some traditional economic activities took place as major alterations in subsistence strategiies were forced upon the Miwok in 1848. As noted by Rawls (1976) and Hall (1976, 1978), many Indians also voluntarily worked either directly for white men mining gold, or by trading the gold they had mined by their own devices for desired commodities. The initial distribution of large quantities of glass beads probably dates to this period, and would have been severely curtailed following the exclusion of Indians and other minorities from most mining activities by 1849 and 1850.

Direct glass bead trade between Euro-Americans and Indians evolved as an expression of essentially different expectations. While white men used glass beads as a kind of currency, the same items seem to have functioned principally as commodities for the Miwok. This conclusion is evinced by the uses to which the Miwok put the beads. Continuity between traditional bead use and glass bead use is strongly in-

dicated. Barrett and Gifford (1933:227-229) describe many Miwok dance costumes which incorporate both shell and glass beads, as well as cloth and other articles of nontraditioanl manufacture. Glass beads were retained for ceremonial and personal use, which indicates that we must expect some time lag prior to their deposition (Commonly in mortuary contexts). They were also incorporated into ongoing trade relations with the Mono (Davis 1974).

Further support for the use of glass beads as commodities exists in the form of color preferences. Strong color preferences for white and red beads indicate that selection was taking place for these colors at most of the sampled sites. Table 3.1 presents the distribution of glass beads by color and facetting. While a wide variety of colors were available, as noted previously in the excerpt from the *Sacramento Union* and in the bead distribution patterns described by Meighan elsewhere in California (Meighan 1979), the Central Sierra Miwok chose white and red. These colors correlate with the almost exclusive use of white, red, and black in ceremonial contexts (Gifford 1955). Other color terms were recognized by the Miwok however. Freeland and Broadbent (1960) note at least five basic color distinctions that were made by the Miwok:

čititi (green/blue)

jolóli (red)

keléli (white)

kulúli (black)

tatati (brown/yellow)

If color selection was in fact taking place, as is argued here, then

Table 3.1 THE DISTRIBUTION OF GLASS BEADS BY COLOR AND FACETTING

Site	Facetted* Beads	White	Red	Blue°	Other Colors	Sample Size
04-Cal-S-275	1 (10%)	7 (70%)	2 (20%)	1 (10%)		10
04-Cal-S-276		3 (13%)	4 (18%)	6 (27%)	9 (41%)	22
04-Cal-S-286	392 (26%)	732 (49%)	171 (11%)	434 (29%)	168 (11%)	1505
04-Cal-S-321		1 (6%)	3 (18%)	12 (71%)	1 (6%)	17
04-Cal-S-328	6 (20%)	21 (70%)	3 (10%)	6 (20%)		30
04-Cal-S-329	2 (22%)	4 (44%)	1 (11%)	3 (33%)	1 (11%)	9
04-Cal-S-331	10 (48%)	3 (14%)	5 (24%)	12 (57%)	1 (5%)	21
04-Cal-S-343		1 (100%)				1
04-Cal-S-414		5 (71%)	2 (29%)			7
04-Tuo-S-304		73 (87%)	9 (11%)	1 (1%)	1 (1%)	84
04-Tuo-S-395	7 (<1%)	5148 (59%)	3599 (41%)	11 (<1%)	30 (<1%)	8788
04-Tuo-S-433	13 (3%)	360 (76%)	96 (20%)	19 (4%)	2 (<1%)	477
04-Tuo-S-444		21 (100%)				21
04-Tuo-S-449		3 (60%)	2 (40%)			5
04-Tuo-S-657		2 (18%)	9 (82%)			11
Total	431 (4%)	6384 (58%)	3906 (36%)	475 (4%)	213 (2%)	11,008

*Also classified by color

°Includes black and purple beads

this selection may have had religious significance or other value.

The value of different glass bead types was controlled by a combination of Indian preferences and the value attached by Euro-Americans to the products of Indian labor, particularly gold, but also including basketry, fish, and other items (Hall 1978). Glass beads never truly became monetized, and rapidly devaluated in relation to gold as the Indians became more familiar with the value white men attached to it. Instead, the beads functioned as commodities for the Miwok in a new system of economic exchange. Hall notes

> Many historians and chroniclers have remarked that the Indians did not understand the value of gold. More precisely, at first they did not understand the white's evaluation of the worth of gold. But they soon learned the fundamentals of an entirely new and complicated exchange system in which gold was weighed and converted either directly to goods or to dollars or pesos, which were further exchanged for goods. The examples cited show that the Native Californians were quite able to adopt [sic] their behavior to meet changing circumstances and to learn the new systems quickly. Yet they were continually cheated by the racist practices of the traders (1978:72).

By 1850, the Indians had been effectively excluded from all but the most meager mining activities. Pushed into marginal habitats and largely deprived of participation in the white economic system, their exchanges at this time related mainly to the acquisition of critical subsistence items. Booth noted that in 1849 "raisins sold at the mines for their weight in gold dust, also beads to the Indians. Now [1851] raisins are 50 cts, per lb., and beads are given away as unsalable" (1953:29).

This situation continued to characterize Indian life thereafter. While traditional subsistence activities and trade relations persisted,

a new set of adaptations developed from close contact with Euro-Americans, which enabled some of the Miwok to survive. They scavenged food and usable articles from miners' cabins and other white settlements (Kenny 1955:255; de Laittre 1910:11; Treganza 1952:21). As a result, glass bead distribution probably declined rapidly or ceased altogether soon after the initial Gold Rush period.

The economic transformation of the Central Sierra Miwok culture during the Gold Rush period and following it reflects the adoption of new subsistence strategies as the viability of traditional adaptations were greatly reduced by the encroaching white civilization. Within this context, glass beads functioned primarily as commodities, in much the same way their traditional bead counterparts had during the period before 1848. Thus, neither traditional beads nor glass beads ever became truly monetized. The selection of white and red colored glass beads which has been suggested may correlate with their use in ceremonial contexts, providing support for their functioning as commodities. The large proportion of glass beads that were recovered fused, melted, or directly associated with cremations is even stronger evidence for their use as ceremonial commodities.

The quantity of glass beads at any given site offer a rough index of the intensity of Indian interface with the introduced white economic system. Sites with large numbers of glass beads suggest that the Indians who occupied them may have adopted some new economic strategies, probably including gold mining. Many of the sites analyzed in this thesis had low frequencies of glass beads which seem to correspond with the remoteness of these sites from areas of white activity. Typo-

logical variations in glass bead assemblages from different sites suggest that at least one site (04-Cal-S-276) had a mission Indian presence. It is likely that other differences in glass bead assemblages also reflect additional non-Miwok occupations, however this thesis could not define such affiliations.

APPENDIX B

GLASS TRADE BEADS

During analysis of the glass beads from selected sites in the New Melones area it became necessary to expand the existing typology of Kidd and Kidd (1970) in order to accomodate previously undescribed types. Several of these new types were simply color variants of an extant classification series, and were therefore assigned a sequential number following the last Kidd and Kidd designation. In certain other cases where no typological analogues were present, both the series and number were assigned in conformance with the criteria established for the rest of the typology. All previously undescribed types and series are indicated below with parentheses.

Class Ia: Simple, drawn, monochrome, tubular, with a cylindrical perforation, and otherwise unmodified.

Ia5- Opaque white, 6.2 mm diameter, 9.3+ mm long, 2.2 mm bore (one example). Meighan Type 315.

*Other Occurrences: 04-Sis-262 (Meighan 1979)

Class Ic: Simple, drawn, monochrome, marvered, tubular, with a cylindrical perforation, and otherwise unmodified. Meighan notes:

> These faceted types occur in a great variety of sizes and colors and in either 6 or 7-sided varieties. They are made of glass tubing: if pieces are merely broken off they are straight on the ends, but many types are ground off leading to faceted ends as well as faceted sides. In California, all of the faceted beads like this are no doubt derived from Hudsons Bay Company sources. Most are quite late in California but some types may go back to 1820 (1979).

Ic13- (as described by Gage (1970)): Blue (as distinguished from turquoise), hexagonal (marvered ?) without additional facets, size range undescribed (four possible examples which were not available for physical inspection). Meighan Types 150 and 156.

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:33), 04-Fre-27, 04-Fre-59, 04-Hum-169, 04-Iny-38, 04-Iny-304, north shore of Kern Lake, La Purisima Mission, Porterville, 04-Sha-20, 04-Sha-47 (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to after 1850 (Gibson 1976:123, Type F1a)

(Ic16)- Transparent shadow blue, hexagonally marvered, 4.7 mm diameter, 4.3 mm long, 2.5 mm bore (one example). Meighan Type 157.

*Other Occurrences: North shore of Kern Lake (Meighan 1979)

Class If: Simple, drawn, monochrome, marvered, tubular, with lateral facets ground at both ends, a cylindrical perforation, and otherwise unmodified. Meighan's comments cited above for Class Ic beads also apply to this category. This conflicts with the identification of this class, particularly the navy blue Type If6 and the compound beads of Class IIIf, with the true "Russian" beads which they resemble, and which were traded by the Russian American Fur Company along the northwest coast of California during the late eighteenth and early nineteenth centuries (Sorensen and Leroy 1968:45). Considering the distribution of these bead types in California, the Hudson's Bay Company is the most likely source for the majority of sites, however the trappers were merely middlemen and it is also quite probable that sites in the northwest coastal area were supplied by Russians. Regarding the foothill region of the Sierra Nevada, the Hudson's Bay company is the prob-

able source until the mid 1840s.

If1- Opaque black, hexagonally marvered, 4.3-8.8 mm diameter, 3.7-6.0 mm long, 1.7-3.3 mm bore (seven examples). Meighan Types 175, 176, 381, 382 (these represent size differences).

*Other Occurrences: 04-Hum-25, 04-Hum-112, 04-Lak-203, 04-Men-120, 04-Sac-1, Ledbedder Mound of Sacramento County (Meighan 1979), Old Sacramento dating to ca.1900 (Motz and Schulz 1980:54), 04-Sis-169, 04-Sis-262, 04-Yol-13 (Meighan 1979).

If2- Clear, colorless (described by Kidd and Kidd as clear, light gray), hexagonally marvered, 5.1-8.0 mm diameter, 4.5-7.8 mm long, 1.7-3.9 mm bore (157 examples). Meighan Types 161, 162, 299, and 383 (these represent size differences).

*Other Occurrences: Kelsey in Eldorado County, 04-Hum-112, north shore of Kern Lake (Meighan 1979), 04-Mrn-402 dated to 1833-1884 (Dietz 1976:130, Type 4), 04-Nev-1, 04-Sac-1, Ledbedder Mound in Sacramento County (Meighan 1979), Old Sacramento dated to ca.1885 (Motz and Schulz 1980:51, Type 2), 04-Sha-20, 04-Sha-207, 04-Sis-162, 04-Sis-169 (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to after 1850 (Gibson 1976:123, Type F5b), 04-Yol-13 (Meighan 1979).

If3- Transparent emerald green, hexagonally marvered, 6.1 mm diameter, 5.4 mm long, 2.5 bore (two examples). Meighan Type 167.

*Other Occurrences: 04-Sha-46, 04-Sha-47, 04-Yol-13 (Meighan 1979).

If4- Transparent turquoise blue, pentagonally marvered, 5.5-6.7 mm diameter 5.2-5.7 mm long, 2.9-3.7 mm bore (five examples). Meighan Type: no correlates.

*Other Occurrences: none noted.

(If6)- Transparent to translucent bright navy blue, hexagonally, and rarely heptagonally marvered, 4.4-9.1 mm diameter, 4.3-6.8 mm long, 1.1-4.7 mm bore (167 examples). Meighan Types

146, 147, 148 (these represent size differences).

*Other Occurrences: Mokelumne Hill in Calaveras County, 04-Fre-30, 04-Hum-112, 04-Hum-169, 04-Iny-2, 04-Ker-74, north shore of Kern Lake, 04-Lak-203, 04-Mad-12, Dillons Beach in Marin County (Meighan 1979), 04-Mrn-402 dated to 1833-1884 (Dietz 1976:129, Type 3), 04-Men-120, Modoc County ethnographic source dated to 1880, Napa County Indian burial dated to 1873, 04-Nev-1, 04-Sac-1, 04-Sac-33, 04-Sac-86, 04-Sac-127 (Meighan 1979), Old Sacramento (Motz and Schulz 1980:53, Type 18), 04-Sha-8, 04-Sha-20, 04-Sha-46, 04-Sha-47, 04-Sha-207, 04-Sis-169, 04-Sis-262, 04-Teh-58 (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to after 1839 (Gibson 1976:123, Type F1f), 04-Yol-13 (Meighan 1979).

(If7)- (as described by Gage (1970)): Red, hexagonal (marvered?), with multiple facets added to both ends of bead, no size range defined (two possible examples which were unavailable for physical inspection). Meighan Types 297? and 323?

*Possible Other Occurrences: 04-Sis-169, 04-Sis-262 (Meighan 1979).

Class IIa: Simple, drawn, monochrome, globular, oblate spheroid to short tube or ring, hot tumbled, with a cylindrical perforation, and otherwise unmodified.

IIa4- Transparent redwood red, round, 3.5 mm diameter (one fragmentary example). Meighan Types 183, 218, and 220 (these primarily denote size differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C6d), 04-Hum-169, 04-Ker-74, Walker's Yokuts Cemetery in Kern County, Dillons Beach Indian coffin burial in Marin County, 04-Men-120, 04-Sha-12, 04-Sha-20, 04-Sha-47, 04-Sha-207, 04- Sis-262, Fort Vancouver in Washington State (Meighan 1979, who comments that all of these occurrences represent the period after 1850).

IIa5- Transparent ruby red, round, 1.7-5.2 mm diameter, 1.6-3.8 mm long, 0.6-1.3 mm bore (eight examples). Meighan Type: see Type IIa4 above.

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31,

Type C6f).

IIa7- Opaque black, short tube, 3.1-6.5 mm diameter, 2.2-5.7 mm long, 1.1-2.3 mm bore (nine examples). Meighan Types 181, 189, 222, 248, and 252 (these denote size differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C8a), Jenny Lind in Calaveras County, Winters Site 3 and Howells Point in Colusa County, 04-Hum-112, 04-Ker-74, 04-Lak-203, La Purisima Mission, 04-LAn-52 (Meighan 1979), 04-Mrn-402(?) (Dietz 1976:131, Type 10), Dillons Beach in Marin County, 04-Mon-18 (Carmel Mission), Napa County in an Indian burial dated to 1873, 04-Nap-15, 04-Sac-1, 04-Sac-6, 04-Sac-86, 04-Sac-127, 04-SJo-105, Goleta Site 1 in Santa Barbara County, 04-SBa-60, Santa Clara Mission, Santa Rosa Island Site 4, 04-Sha-20, 04-Sha-46, 04-Sis-169, 04-Sis-262, 04-Son-293 (Meighan 1979), 04-Ven-87 (Ventura Mission) during 1785-1816? (Gibson 1976:122, Type C8a), 04-Yol-13, and the Yukon Territory dating to 1950 (Meighan 1979, who notes that these bead types occur throughout the temporal and geographical span of colonization in California).

IIa13/14/15- Opaque white, oblate spheroid to short tube or ring, 1.6-8.3 mm diameter, 1.6-6.8 mm long, 0.6-3.1 mm bore (4,978 examples). This is a problematical type, characterized by a significant amount of variability mainly in size and shape, not color. Considering the manufacturing techniques and quality control involved in their production, it did not seem justified to minutely differentiate them. As handcrafted commodities, it would be possible to have as many as 4,978 separate types represented. While Meighan (1979) has differentiated at least 14 types which generally correspond to my classification, each suggested as having its own temporal and spatial referents, I strongly suspect that it will require sophisticated methods of chemical and physical analysis to validate the reality of these distinctions. This conclu-

ion is based on the logical possibility that there continued to be as much variability in any particular lot of beads traded by Euro-Americans during different periods of time, in different places, and with different people involved in the transactions. Further justification for the merger of these beads into a single type exists in the fact that most of Meighan's types have highly undiagnostic distributions both geographically and through time. Woodward (1965:11-12) notes that the larger sizes of this type were called "pony beads" or "white ponies," presumably from their distribution by fur trappers. Tiny beads of this type, as well as other Class IIa beads, were called "seed" beads, and were popular in Europe during the seventeenth century and again in the early nineteenth century. Meighan Types 178, 179, 180, 184, 185, 187, 194, 301, 364, 365, 367, 368, and 369.

*Other Occurrences: This type was widely distributed throughout the colonization of California.

IIa17- Opaque light gold, round, 1.8 mm diameter, 1.7 mm long, 0.6 mm bore (one example). Meighan Types 195, 196, and 198 (these represent size differences).

*Other Occurrences: 04- Hum-112, 04-Mad-12, 04-Sac-1, 04-Sha-12, 04-Sha-20, 04-Sis-169, 04-Yol-13, and the Palus Site in Washington State (Meighan 1979, who notes that these are all late types dating to after 1850, and probably post-1870).

IIa24- Opaque apple green, round, 1.7 mm diameter, 1.6 mm long, 0.7 mm bore (13 examples). Meighan Type 255.

*Other Occurrences: The Palus Site in Washington State, and ethnographically in the Yukon Territory dating to 1950 (Meighan 1979, who notes that this is a Czechoslovakian-made bead type with a

relatively late distribution).

IIa26/27- Transparent to opaque emerald green, round to oblate spheroid, 1.8-3.7 mm diameter, 1.6-2.3 mm long, 0.7-1.0 mm bore (11 examples). Meighan Type 225.

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C3a? or C3k), 04-Sha-12 (Meighan 1979, who notes that this site has dated burials with glass beads from 1900-1930, suggesting a late distribution for this type), 04-Ven-87 (Ventura Mission) dating to after 1785 (Gibson 1976:122, Type C3a).

IIa31- Transparent turquoise blue, round, 3.1 mm diameter, 2.3 mm long, 1.1 mm bore (One of four possible examples was available for physical inspection). Meighan Types 111, 201, 204, 211, and 247 (these represent size differences).

*Other Occurrences: 04-Iny-2, 04-Ker-37, 04-Ker-74, north shore of Kern Lake, *Oudjiu* in Kern County, La Purisima Mission, 04-LAn-52, 04-LAn-264 (Malibu Site), 04-Mrn-260, 04-Mon-18 (Carmel Mission), 04-Sac-6, 04-Sac-29, 04-Sac-56, 04-SDi-4443, Goleta Site 1 in Santa Barbara County, 04-SBa-46, 04-SBa-60, Santa Catalina Island, Mission Santa Clara, Santa Cruz Island Sites 135 and 138, Santa Rosa Island Sites 2, 4, and 15, 04-Sha-207, 04-Ven-11 (*Muwu*) Meighan 1979, who notes that these types are all diagnostic of the Early Mission period beginning prior to 1770, and went out of distribution by 1830 at the latest. Its distribution in the northern Sacramento Valley seems to dispute such a conclusion however), 04-Ven-87 (Ventura Mission) dating to sometime around 1769 or after (Gibson 1976:122, Type C2a).

IIa45- Opaque bright copan blue, oblate spheroid to short tube, 4.1-5.7 mm diameter, 2.9-4.5 mm long, 1.5-2.0 mm bore (18 examples). Meighan Type 208.

*Other Occurrences: 04-Hum-112, 04-Sha-22, 04-Sis-169 (Meighan 1979, who notes that this distribution probably reflects the period from 1870-1900).

IIa46/47/48- Opaque shadow blue to dark shadow blue, oblate spheroid to short tube, 2.6-3.9 mm diameter, 1.8-3.4 mm long, 0.6-1.7 mm bore (112 examples). Meighan Types 328 and 339.

*Other Occurrences: *Oudjiu* in Kern County, -4-Sac-160 in a burial dated to the Terminal Mission period, and Santa Rosa campsite 4 (Meighan 1979, who notes that these types seem to occur in the period 1810-1830, though the information is not conclusive).

IIa51- Transparent dark shadow blue, short tube, 3.3-4.2 mm diameter, 2.3-3.4 mm long, 1.2-1.5 mm bore (four examples).

Meighan Type 215

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C1d), 04-Ker-37, 04-Ker-74, north shore of Kern Lake, *Oudjiu* in Kern County, La Purisima Mission, 04-LAn-52, 04-LAn-264 (Malibu Site), 04-Mnt-18 (Carmel Mission), 04-Sac-6, 04-Sac-29, 04-Sac-56, 04-Sac-127, 04-SJo-105, 04-SBa-60, 04-SBa-516, Goleta Site 1 in Santa Barbara County, Santa Cruz Island Site 138, Santa Rosa Island Sites 2, 4, 15, 30, 32, and 04-Sha-47 (Meighan 1979, who suggests that this type began to be distributed in 1760 and ceased by ca.1830).

IIa56- Translucent bright navy blue, round to oblate spheroid, 1.8-4.4 mm diameter, 1.7-3.7 mm long, 0.7-2.6 mm bore (77 examples). Meighan Types 101, 203, 214, 217, 249, and 260 (these represent size differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C1d), Howells Point in Colusa County, Kelsey in Eldorado County, 04-Ker-37, 04-Ker-74, *Oudjiu* in Kern County, La Purisima Mission, 04-LAn-52, 04-LAn-264 (Malibu Site), Dillons Beach in Marin County, 04-Mnt-18 (Carmel Mission), 04-Nap-1, 04-Sac-6, 04-Sac-29, 04-Sac-56, 04-SDi-4443, 04-SBa-46, 04-SBa-516, 04-SBa-518 (Santa Ynez Mission), Santa Cruz Island Site 138, Santa Rosa Island Sites 6, 50, 60, 114, and campsite 4, 04-Sha-12, 04-Sha-20, 04-Sha-22, 04-Sha-46, 04-Sha-207, 04-Teh-58, 04-Ven-11 (*Muwu*) (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to 1785-1816 (Gibson 1976:122, Type C1b), 04-Yol-13, Fort Vancouver in Washington State, and an ethnographic occurrence in the Yukon Territory dating to 1950 (Meihgan 1979, who notes that these types were in distribution from 1770 through the historic period in California without being diagnostic of any single time period).

IIa58- Opaque light cherry rose, round, 1.9 mm diameter, 1.7 mm long, 0.6 mm bore (one example). Meighan Types 231, 232, 304, and 305 (these represent size differences).

*Other Occurrences: 04-Hum-112, 04-Sha-12, 04-Sha-46, 04-Sis-169, 04-Sis-262, and the Palus Site in Washington State (Meighan 1979, who notes that this type is definitively restricted to the post-1850 period, and in most cases even later).

(IIa62)- Transparent to opaque deep royal purple, short tube, 4.1-9.0 mm diameter, 2.6-6.4 mm long, 1.3-3.8 mm bore (two examples). Meighan Types 221, 223, and 326 (these denote both size and shape differences).

*Other Occurrences: Howells Point in Colusa County, 04-Hum-112, 04-Ker-37, 04-LAn-52, 04-Sac-56, 04-SJo-26, 04-Sha-12, 04-Sha-20, 04-Sha-47, 04-Sha-207, 04-Sha-220, 04-Sis-169, 04-Sis-262 (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to between 1785 and 1816 (Gibson 1976:122, Type C9a?), 04-Yol-13 (Meighan 1979, who notes that these types are generally late, but may occur as early as the 1770s).

(IIa63)- Opaque lemon yellow, round to short tube, 1.7-1.9 mm diameter, 1.5-1.8 mm long, 0.6-0.7 mm bore (seven examples). Meighan Type 263.

*Other Occurrences: Ethnographic specimen collected in the Yukon Territory in 1950, and made in Czechoslovakia (Meighan 1979).

(IIa64)- Transparent amber, short tube, 3.4-3.8 mm diameter, 2.5-3.1 mm long, 1.3-1.5 mm bore (three examples). Meighan Types 311, 312, and 360 (these represent size differences).

*Other Occurrences: 04-Sac-1, 04-Sis-262, and 04-Yol-13 (Meighan 1979, who states that no direct information is known as to the distribution periods of his types). The distribution and time spans indicated by the sites where this type is found seem to suggest a Hudson's Bay Company source for these beads, which would place their use after ca.1827.

Class IIIc: Compound, drawn, bichrome, marvered, tubular, with a cylindrical perforation, and otherwise unmodified. The single specimen which falls in this category is included in the distribution comments by Meighan which have been cited above under Class Ic beads.

(IIIc4)- Transparent ultramarine blue outside, opaque white center, hexagonally marvered, 5.4 mm diameter, 5.3 mm long, 2.8 mm bore (one example). Meighan Type 149.

*Other Occurrences: North shore of Kern Lake, Dillons Beach in Marin County, 04-Men-120, 04-Sac-1, 04-Sha-22, 04-Sis-169, 04-Sis-262, 04-Yol-13 (Meighan 1979, who notes that this type may have been distributed from 1820 on into the twentieth century in California).

Class IIIf: Compound, drawn, bichrome, marvered, tubular, with additional lateral facets ground at both ends, cylindrical perforation, and otherwise unmodified. Along with Classes IIIc, Ic, and If, these beads generally were subject to the distribution noted by Meighan under Class Ic. Please refer to comments under Class If also.

IIIf1- Clear, colorless outside (described by Kidd and Kidd as clear, light gray), translucent white center, heptagonally marvered, 11.9 mm diameter, 10.2 mm long, 3.5 mm bore (one example). Meighan Types 159, 160, and 383 (these represent size differences).

*Other Occurrences: Jackson in Amador County, Mokelumne Hill in Calaveras County, Kelsey in Eldorado County, 04-Hum-112, 04-Hum-169, north shore of Kern Lake, 04-Lak-203, 04-Mad-12, 04-Men-120, Napa County Indian burial dating to 1873, 04-Nev-1, Ledbedder Mound in Sacramento County (Meighan 1979), Old Sacramento dated to ca.1860s (Motz and Schulz 1980:52, Type 6), La Purisima Mission in Santa Barbara County, 04-Sha-46, 04-Sha-207, 04-Sha-220, 04-Sis-262, Sonoma County, 04-Teh-58 (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to post-1850 (Gibson 1976:123, Type F5f), 04-Yol-13 (Meighan 1979, who notes that these bead types occur in post-1850 contexts).

IIIf2- Transparent ultramarine blue outside, translucent light aqua blue center, hexagonally marvered, 5.9-7.9 mm diameter, 4.8-7.5 mm long, 1.3-2.0 mm bore (12 examples). Meighan Types 373 and 374 (these represent size differences).

*Other Occurrences: 04-Yol-13 (Meighan 1979, who notes that this is consistent with the general distribution of this class of beads, namely, post-1827 with most bead types after 1850).

(IIIf3)- Transparent bright navy blue to shadow blue outside, opaque white center, hexagonally marvered, 4.6-6.3 mm diameter, 4.4-6.3 mm long, 1.9-3.7 mm bore (five examples). Meighan Types 145, 154, and 372 (these represent slight color and size differences).

*Other Occurrences: Jackson in Amador County, 04-Cal-83, Mokelumne Hill in Calaveras County, Kelsey in Eldorado County, 04-Hum-112, 04-Ker-74, 04-Lak-203, 04-Men-120, 04-Nev-1, 04-Sac-6, 04-Sac-86, 04-Sac-160, 04-Sac-192, the Ledbedder and Del Paso Mounds in Sacramento County (Meighan 1979), Old Sacramento? dated to the late 1870s (Motz and Schulz 1980:53, Type 19?), La Purisima Mission in Santa Barbara County, 04-Sha-20, 04-Sha-46, 04-Sha-47, 04-Sha-207, 04-Sis-169, 04-Sis-262, Sonoma County, Porterville in Tulare County, near Lovelock Cave In Nevada State, the Palus Site in Washington State, and Fort Yukon in Canada (Meighan 1979, who notes that dated findings of 1840-1870 conform to the general distribution of these types).

Class IVa: Compound, drawn, monochrome or bichrome, globular, oblate spheroid to short tube or ring, hot-tumbled, with a cylindrical perforation, and otherwise unmodified. In all likelihood the monochrome beads placed in this category do not represent true Class IVa beads, but were instead transformed into compound beads for the simple reason that the initial gathering of molten glass on the pontil was considered insufficient for the production of a full length cane, and it was therefore reintroduced into the same furnace to acquire more mass. Similarities between such monochrome compound beads and their simple monochrome Class IIa counterparts are noted where appropriate in the following discussions. Types IVa1 through IVa7, as well as Types WIa'1 and WIb'1 generally correspond to a bead known as the "Cornaline d'Allepo" noted

by Sorensen and Leroy (1968:44). The meaning of this term differs from one author to another, so some discussion is warranted. Unless Types IVa1-IVa7 are held lengthwise against a light, they appear uniformly dark-centered, with an opaque red outside. Considering that color variations between batches were also common, I strongly suspect that these beads represent a continuum rather than distinct types with temporal significance attached to their color variation. Sorensen and Leroy note that these types (which are generally green-centered) are an earlier form of the Cornaline d'Allepo beads, with the white-centered types (Types WIa'1 and WIb'1) turning up later, perhaps about 1840 to 1850. Meighan is in agreement with this suggestion, but notes that no firm dates can be assigned to either group. Woolfenden (1970:53) cites an 1847 order dor Cordelina beads by Thomas O. Larkin, the American Consul in Monterey, as their date of introduction into California; however their distribution seems to span a much longer period based upon their recovery in many earlier deposits (Meighan 1979).

IVa1- Opaque redwood red outside, opaque black center, short tube, 5.3 mm diameter, 5.0 mm long, 1.8 mm bore (one example). Meighan Type: no correlates exist.

*Other Occurrences: see Type IVa5/6/7 below.

IVa2/3- Opaque redwood red outside, transparent light gray center, round to oblate spheroid or short tube, 3.0-5.8 mm diameter, 2.0-5.2 mm long, 0.8-1.8 mm bore (47 examples). Meighan Type: no correlates exist.

*Other Occurrences:see Type IVa5/6/7 below.

IVa5/6/7- Opaque redwood red outside, transparent apple green to

teal green center, oblate spheroid to short tube or ring, 3.3-7.3 mm diameter, 1.9-6.7 mm long, 1.2-2.6 mm bore (3,093 examples). Meighan Types 103, 104, 105, 106, and 107 (these denote size differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C6a), Mokelumne Hill and Jenny Lind in Calaveras County, 04-Cal-83, Howells Point in Colusa County, Contra Costa County, Kelsey in Eldorado County, Vermilion Valley in Fresno County, 04-Fre-30, 04-Hum-112, 04-Hum-169, *Oudjiu* in Kern County, 04-Ker-37, 04-Ker-74, 04-Lak-203, Prestons Point and Dillons Beach in Marin County, 04-Mrn-201, 04-Mrn-260 (Meighan 1979), 04-Mrn-402 dated to 1833-1884 (Dietz 1976:133, Type 17), 04-Men-120, 04-Mnt-18 (Carmel Mission), 04-Nap-15, 05-Nap-59, 04-Nev-1, 04-Sac-1, 04-Sac-6, 04-Sac-33 (*Kadema*), 04-Sac-56, 04-Sac-86, 04-Sac-126, 04-Sac-127, the Del Paso Mound in Sacramento County, 04-SJo-26, 04-SJo-82, 04-SJo-105, La Purisima Mission and Goleta Site 1 in Santa Barbara County, 04-SBa-60, Santa Catalina Island, 04-Sha-47, 04-Sha-207, 04-Sha-220, 04-Sol-9, Fort Ross in Sonoma County, the Spaulding Ranch in Tuolumne County, 04-Ven-11 (*Muwu*) (Meighan 1979), 04-Ven-87 (Ventura Mission) dated to post-1769 (Gibson 1976:122, Type C6a), Knights Landing and Winters Site 3 in Yolo County, 04-Yol-3, 04-Yol-13, near Lovelock Cave in Nevada State, Fort Spokane, Fort Vancouver in Washington State (Meighan 1979, who notes that the smaller sizes tend to predominate in earlier contexts beginning as early as the 1770s, while beads with a diameter of over 6.0 mm tend to represent later Hudson's Bay Company distribution concentrated almost exclusively in northern California and the San Joaquin Valley).

(IVa20)- Resembles Types IIa13/14/15, and comprises a highly variable assemblage of glass beads characterized by two layers of opaque to semi-opaque white or off-white. Most frequently the outside layer has a gray to very light aqua blue tinge, while the center is usually a pure chalk white. When burnt, these beads often acquire a yellowish coloration. Their shape is generally a short tube or ring, ranging from 2.2-11.0 mm diameter, 1.0-8.3 mm long, and 0.7-4.0 mm bore (1,233 examples). See discussion of Type IIa13/14/15 above. Meighan

Types: see types listed for Type IIa13/14/15 above.

*Other Occurrences: Widely distributed throughout the colonization of California, with a potentially significant temporal distinction based on bead size as noted above.

(IVa21)- Opaque olive green outside, opaque white center, short tube, 4.9-5.2 mm diameter, 4.1-4.2 mm long, 1.5-1.7 mm bore (three examples). Meighan Type: no correlates exist.

*Other Occurrences: none known.

(IVa22)- Translucent gray outside, opaque white center, short tube, 4.8 mm diameter, 3.9 mm long, 0.9 mm bore (one example). Meighan Type: no correlates exist.

*Other Occurrences: none known.

(IVa23)- Opaque white outside, translucent light gray center, short tube, 4.8-7.1 mm diameter, 3.1-5.6 mm long, 1.6-3.2 mm bore (36 examples). Meighan Type: no correlates exist.

*Other Occurrences: none known.

(IVa24)- Opaque dark blue-green outside and center, round, 3.6 mm diameter, 2.5 mm long, 1.0 mm bore (one example). Meighan Type: no correlates exist.

*Other Occurrences: none known.

(IVa25)- Opaque emerald green outside and center, short tube, 3.1-3.4 mm diameter, 1.7-2.5 mm long, 1.0-1.4 mm bore (four examples). This bead is probably just a compound variant of Type IIa26/27 described above. Meighan Type 441.

*Other Occurrences: 04-SBa-60 dated to between 1790 and 1810 (Meighan 1979).

(IVa26)- Translucent deep royal purple outside and center, short

tube, 3.9 mm diameter, 3.2 mm long, 1.5 mm bore (one example). This bead is probably just a compound variant of Type IIa62 described above. Meighan Types 221, 223, and 326 (these denote size differences).

*Other Occurrences: see those described for Type IIa62 above.

(IVa27)- Transparent bright navy blue outside, opaque white center, round, approximately 6.5 mm diameter (one melted example). Meighan Type: no correlates exist.

*Other Occurrences: none known.

(IVa28)- Translucent robins egg blue outside and center, round, 3.1 mm diameter, 2.2 mm long, 0.9 mm bore (one example). This bead is probably just a compound variant of Type IIa40 described by Kidd and Kidd (1970), which is a simple drawn bead of the same color, size, and shape. Meighan Type 205?

*Possible Other Occurrences: Jenny Lind in Calaveras County, 04-Hum-112, 04-Men-120, 04-Sha-6, 04-Sha-8, 04-Sha-20, 04-Sha-22, 04-Sha-35, 04-Sha-47, 04-Sha-207, 04-Sis-169, 04-Sis-262 (Meighan 1979, who notes that these types occur in contexts dated exclusively to the period 1850-1880, and were probably traded heavily by the Hudson's Bay Company).

Class WIa: Simple, wire wound, monochrome, tubular, with a cylindrical perforation, and otherwise unmodified.

WIa1- Opaque very light gray (burnt?), 6.4 mm diameter, 3.7 mm long, 1.8 mm bore (one fragmentary example). Meighan Types 20 and 22 (these denote size differences).

*Other Occurrences: Chico in Butte County, Mokelumne Hill and Jenny Lind in Calaveras County, 04-Cal-83, Clear Lake Park in Lake County, north shore of Kern Lake, 04-Mad-12, 04-Men-120, 04-Nev-1, 04-Sac-6, 04-Sha-20, 04-Sha-22, 04-Sha-192, 04-Yol-13, and Knights Landing in Yolo County (Meighan 1979, who notes that these types date to between 1850-1870 in California and were

traded primarily by Americans).

Class WIb: Simple, wire wound, monochrome, round, cylindrical perforation, and otherwise unmodified.

WIb7- Transparent amber, 10.5 mm diameter, 9.2 mm long, 3.3 mm bore (one example). Meighan Types 318, 417, and 418 (these denote size differences).

*Other Occurrences: 04-Sha-46, 04-Sis-262, and 04-Yol-13 (Meighan 1979, who notes that these types probably represent the period from 1840 to 1860, due to their absence in the upper levels of these sites where other types of glass beads are associated with burials dating to the post-1860 period).

(WIb17)- Opaque apple green, 6.7 mm diameter, 7.7 mm long, 1.7 mm bore (one example). Meighan Type 404?

*Possible Other Occurrences: 04-Sha-47, and 04-Yol-13 (Meighan 1979).

(WIb18)- Opaque black, 6.5 mm diameter, 5.1 mm long, 2.6 mm bore (two examples). Meighan Types 82, 275, and 338 (these denote both size and shape differences).

*Other Occurrences: 04-Sac-126, 04-Sac-127, La Purisima Mission in Santa Barbara County, Santa Rosa Island campsite 4. 04-Sha-22, Fort Ross in Sonoma County (Meighan 1979, who notes that these types occur from about 1800 on in various contexts), and 04-Ven-87 (Ventura Mission) dating to between 1810 and 1839 (Gibson 1976: 123, Type W8a).

(WIb19)- Semi-translucent redwood red to ruby red, round to oblate spheroid, 9.1-9.8 mm diameter, 9.3-9.5 mm long, 1.6-1.9 mm bore (16 examples). Meighan Types 54, 55, and 56 (these represent size differences).

*Other Occurrences: 04-Ker-74 (Meighan 1979), 04-Mrn-402 dated to between 1833 and 1884 (Dietz 1976:136, Type 32), 04-Sac-86, La Purisima Mission in Santa Barbara County dated to between 1790 and 1820, Santa Cruz Island Site 138, Santa Rosa Island campsite 2 (Meighan 1979, who notes that these types do not appear diagnos-

of any one period of California history).

Class WIc: Simple, wire wound, monochrome, oblate spheroid, with a cylindrical perforation, and otherwise unmodified.

WIc1- Opaque white, 5.1 mm diameter, 3.5 mm long, 1.4 mm bore (one example). Meighan Types 24 and 47 (these denote size differences).

*Other Occurrences: Tejon Ranch and the north shore of Kern Lake in Kern County, Prestons Point in Marin County (Meighan 1979), Old Sacramento dated to ca.1852 (Motz and Schulz 1980:54, Type 26), 04-Sha-20, 04-Sha-46, 04-Sha-220, and 04-Yol-13 (Meighan 1979, who notes that this distribution is not diagnostic of any one period of California history).

Class WId: Simple, wire wound, monochrome, donut-shaped, with a short cylindrical perforation, and otherwise unmodified.

WId2- Transparent maple, 6.5 mm diameter, 3.7 mm long, 2.5 mm bore (one example). Meighan Type 371.

*Other Occurrences: Old Sacramento (?) dating to ca.1900 (Motz and Schulz 1980:56, Type 38?), and 04-Yol-13 (Meighan 1979).

* Class WIIc: Simple, mandrel wound, monochrome, facetted conical bead with a conical perforation and characteristically truncated biconical shape composed of six or seven facets on each end which form a marked equatorial ridge where they meet. The classification of these beads is tentative at this point, based primarily on the unique conical perforation. This method of perforation left a ground or drilled appearance on the inside of the bore, which had a very uniform conical shape. The facets on this bead were probably formed in a two part mold, with the seam following the equator of the bead. The sophistication of this technique is consistent with their relatively recent distribution, beginning no earlier than the mid 1840s in California. By that time glass

*This should probably be classified as an "M" series, rather than as WIIc series. RTE

bead manufacturing techniques had made significant progress over the earlier and more crudely formed molded and pressed glass beads. The distribution of these types suggest that they were probably distributed only during the American period (after 1848).

WIIc1- Opaque black, 7.9-12.3 mm diameter, 7.0-10.5 mm long, 1.0-1.2 mm (small end) to 2.1-3.9 mm (large end) conical bore (nine examples). Meighan Types 386, 397, and 398 (these represent size differences).

*Other Occurrences: 04-Yol-13 (Meighan 1979).

WIIc6- Translucent to opaque cinnamon, 5.3-6.4 mm diameter, 4.7-5.7 mm long, 0.5-0.9 mm (small end) to 1.4-2.3 mm (large end) conical bore (six examples). Meighan Type 139? (this type is of the same color, but much larger).

*Possible Other Occurrences: 04-Sac-1 (Meighan 1979).

WIIc11/12- Transparent ultramarine to bright navy blue, 5.0-8.8 mm diameter, 4.8-8.3 mm long, 0.6-0.9 mm (small end) to 2.1-2.9 mm (large end) conical bore (35 examples). Meighan Types 140, 141, 152, and 244 (these represent size differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:33, Type F1b), 04-Ker-74 dated to between 1850-1870, 04-Sha-47, 04-Sha-207, and 04-Yol-13 (Meighan 1979).

(WIIc14)- Transparent rose wine to ruby red, sometimes with an additional row of equatorial facets, 3.1-12.9 mm diameter, 2.0-11.5 mm long, 0.7-1.1 mm (small end) to 1.0- 3.0 mm (large end) conical bore (17 examples). Meighan Types 144, 393, 394, and 395 (these denote size differences).

*Other Occurrences: Kelsey in Eldorado County, 04-Mrn-201, 04-

Sac-1, 04-Sac-192 (Meighan 1979), Old Sacramento (Motz and Schulz 1980:55, Type 28), 04-Sis-169, and 04-Yol-13 (Meighan 1979).

Class WIIg: Simple, wire wound, monochrome, with a cylindrical bore, molded or marvered shape, and no further modifications.

(WIIg3)- Transparent ruby red, globular, with a molded or marvered single continuous helical ridge spiralling around the bead's axis somewhat like the thread of a screw. This shape was probably formed with the bead in a semi-plastic state using an open mold or corrugated marver board. 6.3 mm diameter, 6.0 mm long, 2.2 mm bore (one example). Meighan Type 410.

*Other Occurrences: 04-Ven-87 (Ventura Mission) dated to after 1850 (Gibson 1976:123, Type W6k), and 04-Yol-13 (Meighan 1979).

(Class WIa'): Compound, wire wound, bichrome, tubular, with a cylindrical perforation, and otherwise unmodified.

(WIa'1)- Opaque to semi-translucent redwood red outside, opaque white center (frequently yellowish or pinkish, possibly as a result of burning), 8.0-12.2 mm diameter, 14.3-19.0 mm long, 2.1-2.8 mm bore (130 examples). Aside from its shape, this bead is identical in color and method of manufacture to Type WIb'1. Because of this similarity, it is also grouped into the beads known as Cornaline d'Allepo, along with Types IVa1-IVa7 previously discussed. Sorensen and Leroy (1968:44) note that this is a rare type outside of Central California, and dates to the mid nineteenth century or possibly earlier. The similarity of these beads in size and shape to the extremely highly valued magnesite beads which were manufactured by the Pomo during the protohistoric period has been suggest-

ed. Meighan (1979) notes that beads of this type have been found in Pomo territory, but rejects the conclusion that they were attempts by white trappers and colonists to counterfeit magnesite beads. It may be significant nonetheless to note that the distribution of this glass bead type closely parallels the former extent of magnesite bead trade. Meighan Types 19, 186, and 286 (these represent both size differences and color differences. The color differences consist of either a yellowish or pinkish tinge which I attribute to the subjection of these beads to fire).

*Other Occurrences: Alameda County, Jackson in Amador County, Chico in Butte County, 04-Cal-83 dated to after 1856, Jenny Lind and Mokelumne Hill in Calaveras County (Meighan 1979), 04-Gle-10 (Woolfenden 1970:54, Plate VII, Number N), north shore of Kern Lake and the Tejon Ranch in Kern County, Clear Lake Park in Lake County, 04-Mad-12, 04-Men-120, 04-Men-187, 04-Men-248, 04-Nap-59, 04-Nev-1, 04-Sac-1, 04-Sac-6, 04-Sac-192 (Meighan 1979), Old Sacramento (Motz and Schulz 1980:55, Type 30), 04-Sha-20, 04-Sha-47, 04-Sis-262, Bodega Bay in Sonoma County, 04-Yol-13, Knights Landing in Yolo County, and Chiloquin in Oregon State (Meighan 1979, who notes that this bead type first appears ca.1850 and is diagnostic of the post-Gold Rush period. He also notes that this type is definitely not Hispanic, nor was it distributed by the Hudson's Bay Company).

(Class WIb'): Compound, wire wound, bichrome, round, with a cylindrical perforation, and otherwise unmodified.

(WIb'1)- Opaque to semi-transparent redwood red outside, opaque white center (frequently yellowish to pinkish- see the discussion above, under Type WIa'1), 3.4-8.0 mm diameter, 2.7-6.2 mm long, 0.6-1.8 mm bore (535 examples). Known as "white hearts," "under whites," "late Hudson's Bay," and simply as "California trade beads," this type is another form of the

Cornaline d'Allepo bead which also includes Types IVa1-IVa7 and Type WIa'1 above. Please refer to the discussions under those types. Meighan Types 98, 99, 100, 102, and 288 (these represent both size and color differences).

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:31, Type C6b), Chico in Butte County, 04-Cal-83 dating to after 1856, 04-Cal-88, Mokelumne Hill and Jenny Lind in Calaveras County, Kelsey in Eldorado County, 04-Fre-30, Vermilion Valley in Fresno County, 04-Hum-112, 04-Hum-169, 04-Ker-74 dating to between 1850-1870, north shore of Kern Lake, 04-Mad-12 (Meighan 1979), 04-Mrn-402 dated to between 1833-1884 (Dietz 1976:133-134, Type 18), 04-Men-120, 04-Men-187, Modoc County, 04-Nap-15, 04-Nap-59, 04-Nev-1, 04-Sac-1, 04-Sac-6, 04-Sac-85, the Del Paso Mound in Sacramento County (Meighan 1979), Old Sacramento (Motz and Schulz 1980:55, Type 29), 04-SJo-26, Santa Rosa Island Site 50, 04-Sha-18, 04-Sha-20, 04-Sha-22, 04-Sha-47, 04-Sis-159, 04-Sis-169, 04-Sis-262, 04-Sol-12, Fort Ross in Sonoma County, 04-Teh-1, 04-Teh-58, the Spaulding Ranch in Tuolumne County (Meighan 1979), 04-Ven-87 dating to after 1830 (Gibson 1976:123, Type C6b), 04-Yol-13, Winters Site 3 and Knights Landing in Yolo County, near Lovelock Cave in Nevada State, the Palus Site and Fort Vancouver in Washington State, Fort Spokane, and four sites in the state of Alaska (Meighan 1979, who notes that although this type is found at Fort Spokane sometime between 1810 and 1826, its distribution in California occurred primarily during the period from 1850 to 1900).

(Class BIa): Simple, blown, monochrome, twisted, spirally-grooved tipped ovoid with small parallel ridges covering the exterior surface of the bead which has an hollow center and is otherwise unmodified.

(BIa1)- Opaque aqua blue, 5.0 mm diameter, 9.9 mm long, with 0.7 mm perforations entering the hollow center of the bead from either end of the spindle (one example). Meighan Type 429.

*Other Occurrences: 04-Ala-1 (Mission San Jose)(Bone 1975:34, Type B1a), and 04-Lak-203 (Meighan 1979).

Fused Glass Bead Sequences

Glass beads were often recovered in fused segments which pre-

served the original order in which they had been strung. The patterns which were noted during this research are described below.

04-Cal-S-286: If2-If6-If2-If6-If2-If6
(7)If2
If2-(2)WIc18-WIIc1-(2)WIc18-(4)If2
If6-(2)If2
(9)If6
(2)IVa5/6/7-IVa20-(2)IVa5/6/7-IVa20
(30)alternating IVa5/6/7 and IVa20
(33)IVa20

04-Cal-S-328: (7)white beads

04-Cal-S-329: (2)white beads

04-Cal-S-331: red-white-red
white-(2)blue-white-blue

04-Tuo-S-304: (2)IVa20

04-Tuo-395: (5)IIa13/14/15
(2)IIa13/14/15-IVa5/6/7-IIa13/14/15-IVa5/6/7
(176±)alternating IIa13/14/15 and IVa5/6/7
IIa17-IIa24-IIa63
IVa5/6/7-IVa20-IVa5/6/7
IVa20-IVa5/6/7-IVa20
IVa20-WIb'1-IVa20-WIb'1
(67±)WIb'1

04-Tuo-S-433: (7)IVa20-WIb'1
(34)WIb'1
blue-white