CORRAL CANYON AND LATE PREHISTORIC EXCHANGE IN INLAND SAN DIEGO COUNTY, CALIFORNIA

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ABSTRACT

Reconstructing Late Prehistoric exchange patterns in San Diego County will be a complex task, requiring prehistorians to disentangle the movements of resource materials, finished products, and people. Lithic, ceramic, faunal, and floral archaeological remains offer various possibilities. Of these, the evidence from lithic tools and wastes is most readily usable at present. An analysis of archaeological material from the Corral Canyon Prehistoric Archaeological District (Cleveland National Forest), in conjunction with data from other areas of inland San Diego County, suggests that western Kumeyaay-Diegueño individuals and groups moved relatively freely between the Pacific Coast and the crest of the peninsular mountain ranges, unhindered by kin-group territoriality. It is suggested that the primary material for flaked lithic artifacts, volcanic or metavolcanic rock, was directly procured in areas outside of the range of daily foraging based at Corral Canyon. On the other hand, formal exchange, rather than individual transhumant procurement, is suggested for obsidian, the exchange of which may have played an important role in inter-group relations during the fall acorn harvest in the upper mountains.

THE PROBLEM

The movement of resources and goods prehistorically, like most forms of cultural behavior, is not directly observable in the archaeological record. However, a considerable amount can be inferred on this topic, thanks to increasing sophistication in identifying and sourcing exotic materials, in reconstructing manufacturing sequences, and in inferring artifact functions.

This paper considers some aspects of the movement of goods and resources in inland San Diego County during the Late Prehistoric period (roughly the last 1,000 years before European contact). This topic is conveniently and conventionally labelled "exchange", although it is worth noting that only fairly refined analysis can distinguish archaeologically between true exchange (i.e., trade, gift-giving, etc.) and the direct access to and movement of resource materials by the materials' ultimate consumers.

Questions about the nature of exchange in Late Prehistoric southern San Diego County are intimately related to questions concerning the social organization and settlement system of the ethnographically-known Kumeyaay-Diegueño. Two extreme models may be extrapolated from the various interpretations which have been offered. One model would see the Kumeyaay-Diegueño as cultivators of native plant crops, living in permanent village settlements within several dozen compact, well-defined, exclusive territories, each with strong local leaders but also under a weaker umbrella of "national" territoriality and leadership (cf. Shipek 1982, 1986). The contrary model would view the Kumeyaay-Diegueño as highly mobile hunter-gatherers, organized rather loosely on the basis of kinship (cf. Spier 1923). The ethnographic evidence relating to these models has been reviewed and evaluated elsewhere (Laylander 1986a, 1987).

CORRAL CANYON

Evidence discussed here comes from a recently completed study of the Corral Canyon Prehistoric Archaeological District, a portion of the Cleveland National Forest in south-central San Diego County, California (Laylander and Christenson 1987). Corral Canyon has been designated as an off-highway vehicle (OHV) area for more than a decade. To mitigate adverse impacts from additional recreational development of the area, a limited archaeological data recovery program was carried out under the supervision of Forest Archaeologist Dorothy Hall in 1986 and 1987.

Corral Canyon is located in the mountains physiographic province of San Diego County (Figure 1). San Diego Bay and the Pacific coastline lie about 55 kilometers (35 miles) to the west, while the steep eastern escarpment of the peninsular ranges and the edge of the Colorado Desert are 45 kilometers (30 miles) to the east. Corral Canyon Creek is a minor tributary of the Cottonwood Creek-Tijuana River drainage system. The OHV area is located between 960 and 1270 meters (3150-4170 feet) above sea level, in an area of steep to rolling hills and fairly narrow valleys. Average annual rainfall is between 40 and 50 centimeters (15-20 inches). Mixed Chaparral is the predominant vegetation at present and evidently was so prehistorically as well, but Oak Woodland, Riparian Woodland, and Grassland communities line the larger drainages, where most of the archaeological sites are located.

More than three dozen prehistoric archaeological sites, large and small, have been recorded within or adjacent to the 1800-acre Corral Canyon OHV Area. Surface collections, shovel test excavations, and unit excavations have been carried out at a few of the sites, in response to OHV Area

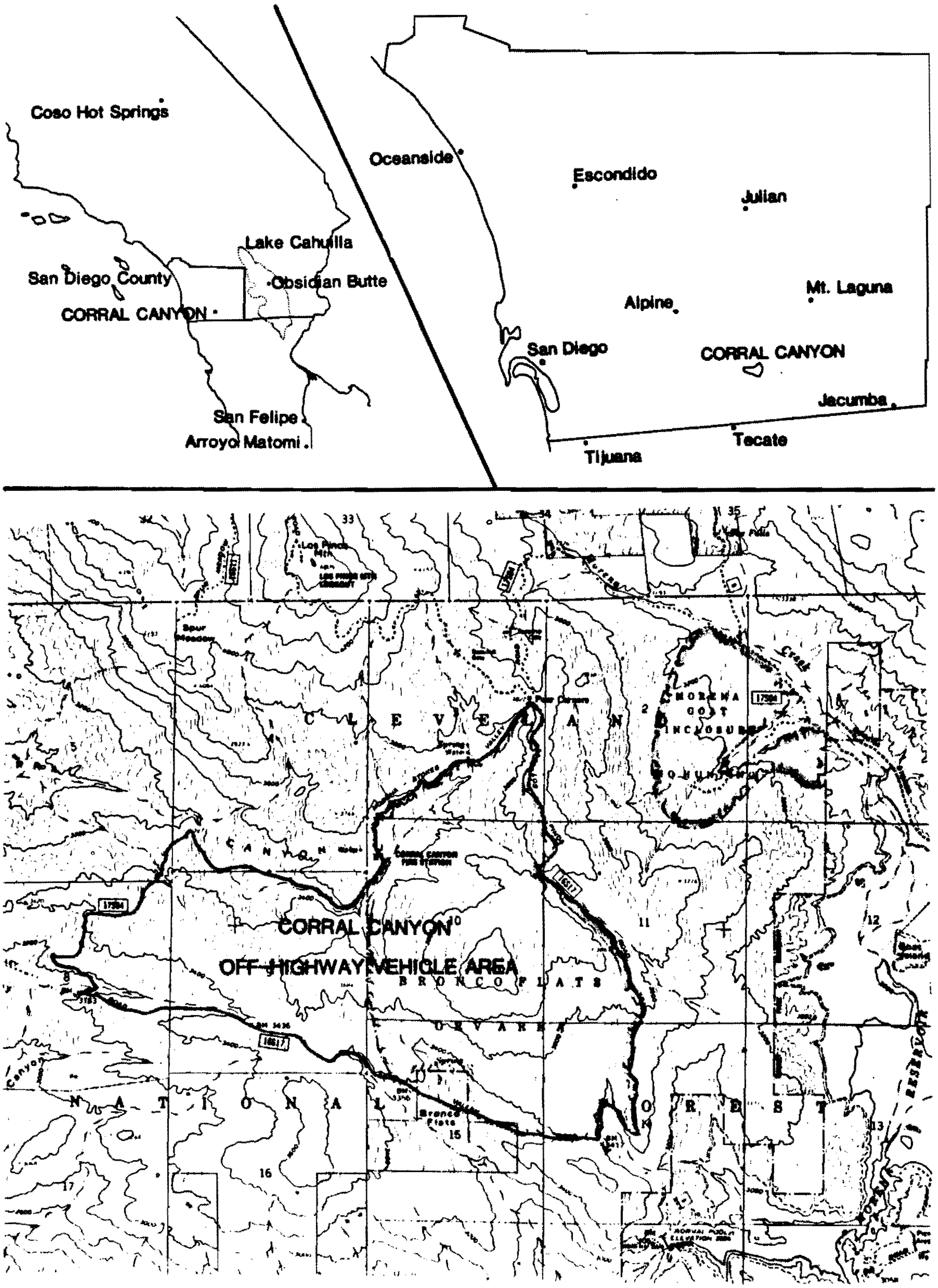

FIGURE 1. Location of Corral Canyon Prehistoric Archaeological District.

management needs. The majority of the cultural resources in Corral Canyon occur in association with ceramics, suggesting a Late Prehistoric date. However, earlier components are present as well, evidenced by several Elko Series projectile points, a possible Gypsum Series point, and a marked scarcity or absence of ceramics in the lower portions of some deposits. All deposits show substantial mixing by rodents, complicating but not entirely invalidating a discussion focused specifically on the Late Prehistoric component.

EVIDENCE OF EXCHANGE

Prehistoric exchange is evidenced at Corral Canyon by the presence of exotic materials. Items of interest in this regard include marine shell, other faunal and floral remains, pottery, obsidian, cryptocrystalline silica, and volcanic and metavolcanic rocks.

Marine Shell

Marine shell is an exotic material at the Corral Canyon sites. With the Pacific Coast located about 55 kilometers (35 miles) to the west and the Gulf of California more than 200 kilometers (125 miles) to the southeast, the source areas for shellfish were well outside of the potential range for daily foraging based on Corral Canyon. The quantity of marine shell recovered in prehistoric contexts at Corral Canyon was extremely small, weighing just over 5 grams in aggregate. Archaeological deposits containing substantial amounts of marine shell have occasionally been encountered between 20 and 30 kilometers (15-20 miles) from the Pacific Coast in the foothills province of San Diego County (e.g., Christenson 1981:72-73; Quintero 1987:136), but small quantities like those at Corral Canyon are the rule farther inland (e.g., Hagstrum and Hildebrand n.d.:18; May 1975:92; Phillips and Carrico 1986:122; True 1970:14; Waugh 1986: 466). Unfortunately, the Corral Canyon shell was too fragmentary for the identification either of its source area or of its function (e.g., food refuse, tools, ornaments, manufacturing debris).

Other Faunal and Floral Remains

Other faunal remains and floral remains contribute little to the picture of Late Prehistoric exchange and the movement of materials. No substantial floral remains were recovered from regular unit excavations or column flotation samples. Bone was recovered, but the species represented are not diagnostic of specific environments within the context of complex mosaics and broad faunal ranges in interior San Diego County. No fish bone was found; such remains are occasionally found in extremely small amounts in inland sites, suggesting a very minor use of this resource in the interior. No mountain sheep bone was found; such remains occur in significant quantities in desert-margin sites (Wilke <u>et al</u>. 1986; Christenson 1987), and their absence at Corral Canyon and most other western interior sites might be an argument, albeit a weak one, against extensive involvement of eastern groups or individuals in the western region.

<u>Ceramics</u>

Pottery is potentially an important indicator of exchange. Typologies for Southern California pottery which contain apparent implications concerning the regions in which types were made as well as the dating of their manufacture have been proposed (e.g., May 1978; Rogers 1936, 1945; Van Camp 1979; Waters 1982a, 1982b, 1982c). However, such studies have yet to be put on a firm empirical footing or to be implemented for routine application (cf. Laylander 1983, 1987). At its broadest, a contrast can be made between Lower Colorado Buff Ware, of presumed origin in the Colorado Desert, and Tizon Brown Ware, probably produced primarily locally, in the mountains and foothills. At Corral Canyon, only 1.3% of recovered sherds were classifiable as Lower Colorado Buff Ware. This suggests only weak links to the east.

<u>Obsidian</u>

Lithic materials appear to offer the best evidence available at present to examine exchange and other factors in the movement of resources prehistorically. Among lithic materials, obsidian is the exotic lithic resource which is most amenable to such analysis. Both identification of the obsidian sources represented in the Corral Canyon materials and consideration of the proportion of obsidian relative to other lithic materials are of interest in interpreting the exchange system.

Obsidian is relatively scarce in the Corral Canyon collections, representing less than 1% of both the flaked lithic tools and the lithic wastes. Fifty obsidian tools and items of lithic waste were recovered by means of surface collections and excavations at the Corral Canyon sites. Of these items, 30 were submitted to Dr. Richard Hughes at Sonoma State University for trace-element characterization through x-ray fluorescence. Twenty-five of the 30 specimens are identified as coming from Obsidian Butte. Three specimens have been sourced to Coso Hot Springs, and the final two specimens (from two different Corral Canyon sites) come from a single, as-yet-unidentified source.

The predominance of Obsidian Butte obsidian at Corral Canyon comes as no surprise. Located at the southern end of the present Salton Sea in Imperial County, Obsidian Butte is about 100 kilometers (60 miles) east-northeast of Corral Canyon, less than half the distance of any other presently-known obsidian source. Obsidian Butte and Corral Canyon also fall within the historic-period boundaries of the same linguistic group, the Kumeyaay-Diegueño. Obsidian Butte obsidian consistently accounts for the majority of sourced obsidian specimens in the Late Prehistoric sites of San Diego County, although it is scarce or absent in earlier components. Many uncertainties are associated with the chronology of prehistoric use of this material, which would not have been available during periods when freshwater Lake Cahuilla filled the Salton Basin. Important clues relating to the use of this resource may emerge from ongoing but still inconclusive research into the geological age of the obsidian outcrops at Obsidian Butte (cf. Friedman and Obradovich 1981), the chronology of the stands of Lake Cahuilla (Waters 1983), and the hydration rate for obsidian from this source. Figure 2 illustrates the frequency of various hydration readings for Obsidian Butte obsidian from assorted San Diego County archaeological sites, six previously-proposed chronometric conversions for those hydration readings, and the readings from Corral Canyon. According to five of the six chronometric conversions, all of the Corral Canyon readings fall within the Late Prehistoric period, and even the sixth, anomalous conversion assigns the majority of specimens to the Late Prehistoric period.

Coso Hot Springs is a distant second in frequency as a source for the obsidian at Corral Canyon. This source holds a similar position in general in San Diego County archaeological deposits, although trace-element studies have indicated that Coso was the primary source of obsidian used in this region prior to the Late Prehistoric period. Coso obsidian probably also continued to reach San Diego County during Late Prehistoric times. This would have been particularly likely when the presence of Lake Cahuilla made the Obsidian Butte source inaccessible, but it is not unlikely that some Coso obsidian reached the region at the same time that Obsidian Butte material was being received. As in the case of Obsidian Butte, interpretation of the system which circulated Coso obsidian is hindered by the unsettled state of hydration-rate studies for this source. Figure 3 shows Coso hydration readings from assorted San Diego sites, 15 previously-proposed chronometric conversions, and the three Corral Canyon readings. Only five of the conversions would assign any of the Corral Canyon readings to the last millennium, and three of the five would include only one reading within that period. Evidently, the exchange system which circulated Coso obsidian during the Late Prehistoric period had little or no role as far south as Corral Canyon.

The third, unidentified source of obsidian for Corral Canyon obviously poses even greater uncertainties for exchange analysis. Material apparently derived from this same source has previously been reported from several other San Diego County sites (e.g., Dominici and Corum 1985; Laylander 1986b; Corum 1986; Corum and White 1986). Hughes, in interpreting his x-ray fluorescence analysis of the Corral Canyon specimens, has specifically ruled out any identification of the items from the unidentified source with material from Arroyo Matomí in northeastern Baja

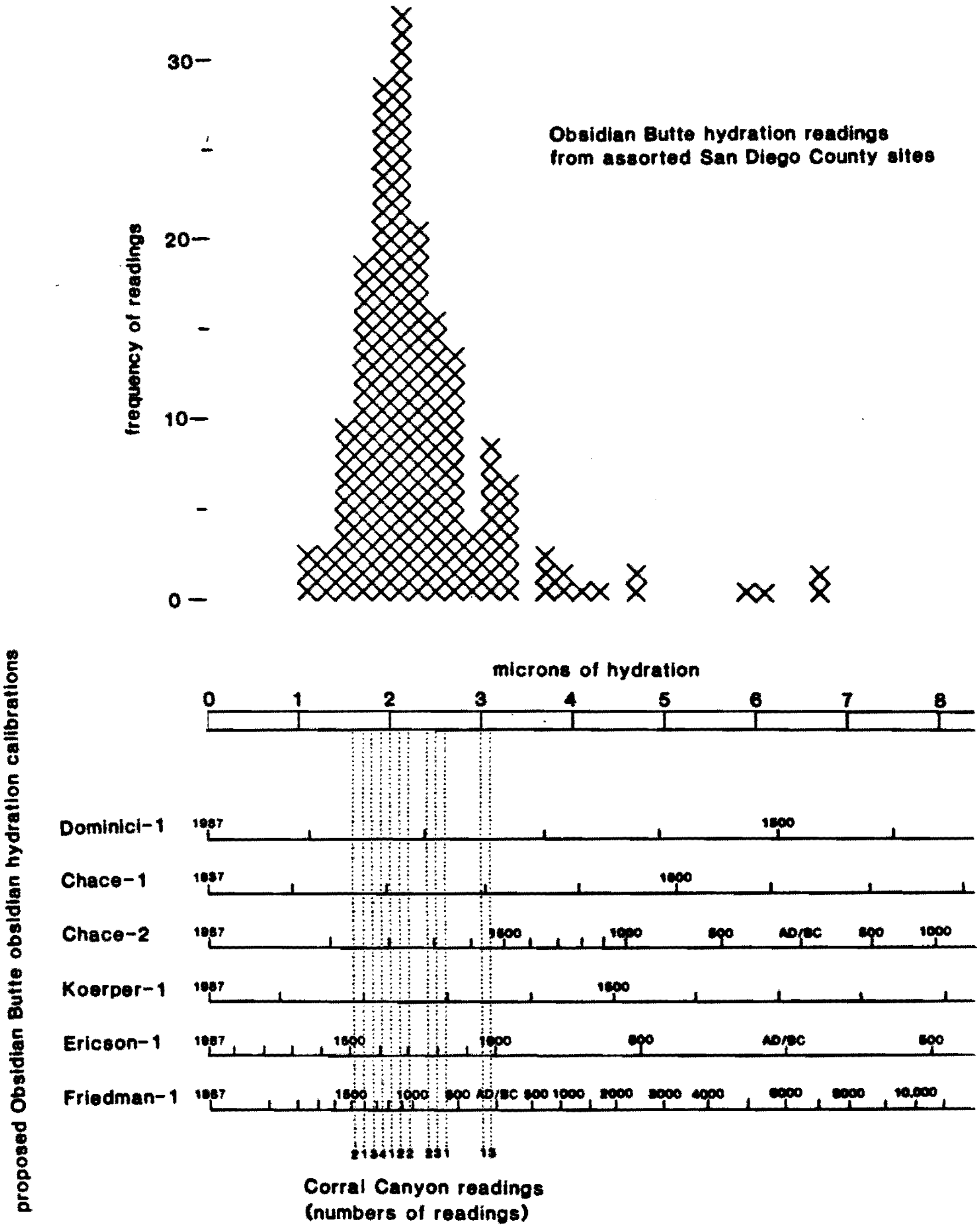

FIGURE 2. Obsidian Butte hydration readings from Corral Canyon and assorted other San Diego County archaeological sites, with proposed calibrations (Cardenas 1986; Chace 1980; Corum 1986; Corum and White 1986; Dominici 1984; Ericson 1977; Friedman and Obradovich 1981; Koerper et al. 1986; Kyle 1987; Laylander 1986c; Laylander and Christenson 1987; O'Neil 1984; Phillips and Carrico 1986; Robbins-Wade 1986; Waugh 1986; Winterrowd and Cardenas 1987).

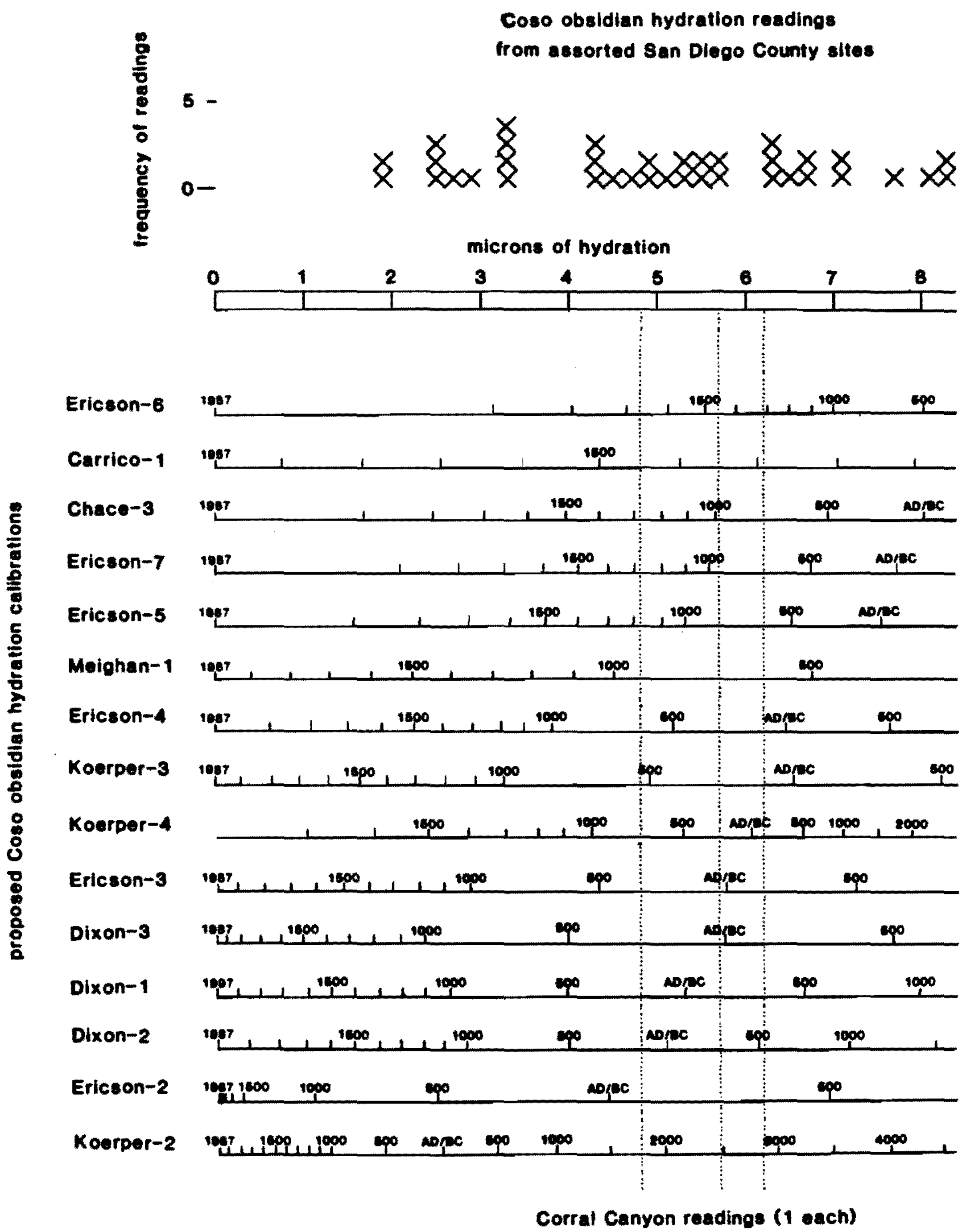

FIGURE 3. Coso Hot Springs hydration readings from Corral Canyon and assorted other San Diego County archaeological sites, with proposed calibrations (Cardenas 1986; Carrico <u>et al</u>. 1984; Chace 1974; Corum 1986; Corum and White 1986; Keith A. Dixon, personal communication 1987; Dominici 1984; Ericson 1977; Kyle 1987; Laylander 1986b, 1986c; Laylander and Christenson 1987; Meighan 1983; Robbins-Wade 1986; Waugh 1986).

California. However, the trace element characterization appears to bear some resemblance to a San Diego County archaeological specimen assigned by Paul Bouey to a San Felipe obsidian source in the same portion of Baja California (Winterrowd and Cardenas 1987; cf. Bouey 1984). Whether this obsidian at Corral Canyon reflects Late Prehistoric or earlier activity is undetermined.

Beyond the simple presence of obsidian from various sources in the Corral Canyon deposits, the relative quantities of obsidian may offer insights into the nature of the system which brought it there. Previous studies which have discussed or touched upon this quantitative approach to San Diego County obsidian have been made by Ericson (1977), Shackley (1981), Dominici (1984), and Hughes and True (1985). In general, an east-to-west dropoff in the frequency of obsidian within San Diego County sites has been observed, but so have various irregularities in this pattern.

The present study attempts to extend and refine this analysis in several respects. The number of sample sites or site-clusters used here -- 35 -- is considerably larger than in previous studies. Because obsidian seems to occur with substantially greater frequency in Late Prehistoric components in San Diego County sites than in earlier components, an effort has been made to include only sites which have been interpreted or are interpretable as primarily Late Prehistoric in age. The frequency figures used here include only lithic wastes (cores, flakes, and shatter), rather than utilized or shaped tools; obsidian generally makes up a larger proportion of the latter, but low absolute numbers make tool proportions less statistically reliable. Data from excavations and intensive surface collections are included. Only sites or site-clusters represented by lithic waste samples containing several hundred specimens are included, in order to reduce the problem of sampling error. It is worth keeping in mind, however, that the sample of sites and site-clusters is still small and that variability in field and laboratory techniques employed may have introduced significant biases.

The data on obsidian as a proportion of lithic wastes in Late Prehistoric San Diego County sites suggest an interesting pattern (Figure 4 and Appendix 1). Although a general east-to-west gradient in the frequency of obsidian is present, it is far from uniform. Most notable is an area with obsidian waste proportions of 10% or more, encompassing Mount Laguna, the Julian area, and the Valle de San José. From this area of high obsidian concentrations, the proportions decline not only to the west but also to the south and even to the east. Evidently something more than just the distance from the obsidian source must account for the pattern.

It may be helpful to return to the models introduced earlier concerning Kumeyaay-Diegueño social organization and settlement. According to the first model, which proposed

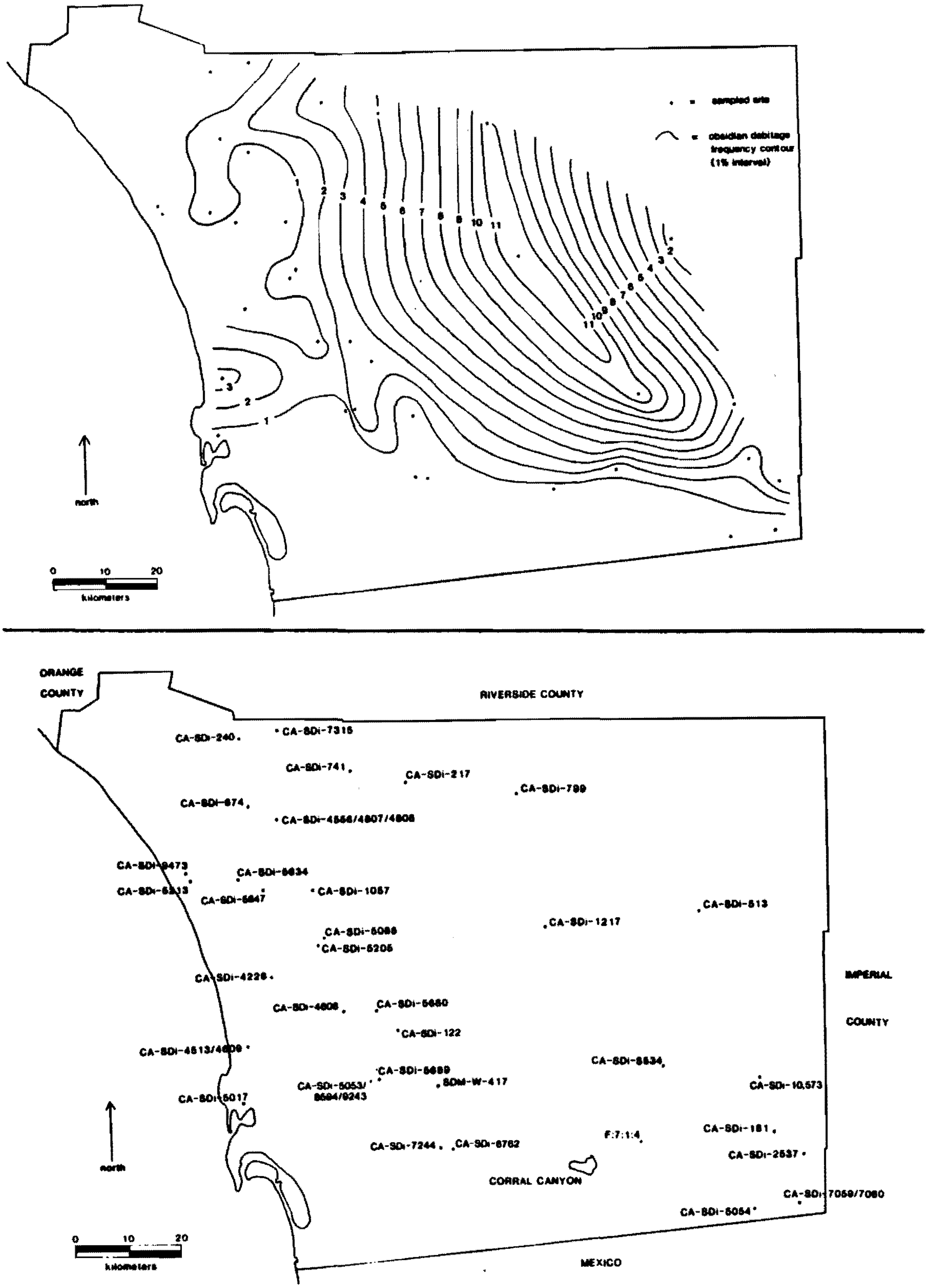

FIGURE 4. Percentage of obsidian in lithic wastes from assorted Late Prehistoric San Diego County archaeological sites (above) and locations of sample sites (below).

permanent settlements and small community territories, it might be anticipated that obsidian frequency would decline monotonically with distance from the source, because the "cost" of the material would increase, either, in the case of a down-the-line exchange system, as the number of transactions involved increased or, in the case of direct procurement, as the number of community boundaries to be crossed and the unfamiliarity of the groups visited by the obsidian procurer increased. No such monotonic pattern seems to be suggested by the presently-available data.

The alternative model, which proposed a high degree of individual mobility and community flexibility, appears to fit the obsidian data better. To explain the observed pattern in obsidian frequency, it is suggested that predominantly western (coastal/foothill) and predominantly eastern (Colorado Desert) groups came together on occasion in intermediate locations and that the exchange of obsidian was one means for mediating social and economic interactions on those occasions. In the case of Mount Laguna and the Julian area, the conjunction of may have been occasioned by the fall harvest of culturally-preferred black oak (Quercus kelloggi) acorns, which are found in abundance in restricted areas at high elevations. In the case of the Valle de San José, ethnographic and ethnohistoric records suggest an unusual mixing of Luiseño, Cahuilla, and Kumeyaay-Diegueño as well as Cupeño settlements in this area; although the ecological cause of this mixing is not entirely clear, an adaptive consequence may have been heightened obsidian exchange to mediate inter-group relations.

It is to be noted that the obsidian wastes being discussed do not necessarily mirror tool use, but may instead refer to tool manufacture. Detailed data which would permit an evaluation of the stages in the lithic reduction sequence represented by the wastes at the various sampled sites are not presently available. It may be hypothesized that the high proportions of obsidian wastes in the intermediate areas reflect working of newly-acquired obsidian by western groups, who later left much smaller proportions of manufacturing or reworking wastes from the same obsidian in other habitation sites farther west.

Cryptocrystalline Silica

Tools and lithic wastes of cryptocrystalline silica similarly represent exotic remains in the Corral Canyon sites, and like obsidian, they constitute a very small portion of the remains -- 0.5% of all lithic wastes. These items apparently came from well outside of the probable daily foraging range based at Corral Canyon, perhaps coming from the northern coastal area of San Diego County or the Colorado Desert to the east; reliable source identifications have not as yet been made.

Volcanic and Metavolcanic Rocks

Assorted volcanic and metavolcanic rocks constitute most of the material recovered at Corral Canyon -- 75% of the lithic wastes, as against 23% quartz (a locally available material). These volcanics are of interest in the context of a discussion of exchange and material movement because field observations confirm that they were not available locally in Corral Canyon, either in outcrops or as creek cobbles.

Generalized geological maps suggest that the nearest sources for such rocks would have been the Black Mountain Metavolcanics, outcropping about 20 kilometers (13 miles) west of Corral Canyon (Strand 1962; Gastil et al. 1975). Somewhat similar low-grade metavolcanic rocks are also present as clasts within the Table Mountain Gravels, about 35 kilometers (20 miles) to the east (Minch and Abbott 1974:130). There are also unmetamorphosed Tertiary andesites and basalts in the eastern and western areas (Gastil et al. 1975).

To interpret the volcanic materials in the Corral Canyon sites, it is useful to look for indications of the ways those materials were processed and used. Shaping and use appear to have been notably casual. Of the volcanic items recovered, 94% are lithic wastes lacking any observed indications of shaping or use. Of the 350 tools recovered, 46% show use modification only, 41% are unifacially worked, and 11% are bifacially worked (primarily projectile points). The great majority of the utilized and unifacially worked items show only limited, apparently unpatterned, causal, and opportunistic modification. Despite evidence for multiple chronological components in several of the sites, there is also rarely any indication of reworking materials over extended periods of time as attested by differential patination on flake scars.

Analysis of the lithic wastes may indicate something of the way the exotic volcanic resources were processed. Three traits are hypothesized as having some value as statistical indicators of the stages in the lithic reduction sequence: the proportion of shatter as against true flakes; the size of the wastes; and the presence or absence of cortex. Evaluation of the characteristics of the Corral Canyon lithic wastes is hampered by the scarcity of reported, fully-comparable data in the region. However, a useful study is available for the Late Prehistoric site CA-SDi-9476 (Pio Pico), located about 30 kilometers (20 miles) west of Corral Canyon (Hector 1984). Notably, CA-SDi-9476 is within the area of outcrops of the Black Mountain Metavolcanics, the most probable source for most of Corral Canyon's volcanic material. The lithic waste typology employed at Corral Canyon is not entirely concordant with that used at CA-SDi-9476, but there is a usable amount of overlap between the two. For Corral Canyon, excavated lithic wastes of all rock types (but mostly volcanics) include 29% shatter, as compared to 32% at CA-SDi-9476. Large lithic wastes (greater than 3 centimeters in length) make up 3% of the Corral Canyon wastes but in excess of 7% at CA-SDi-9476.

Items with cortex constitute 4% of the Corral Canyon lithic wastes and more than 13% of those at CA-SDi-9476. All three indicators point to a moderately greater preponderance of the later phases of the lithic reduction sequence at Corral Canyon as compared with CA-SDi-9476. These data suggest that what was being transported to Corral Canyon was not primarily raw quarrying chunks but lithic material on which initial testing and trimming had been completed. On the other hand, the movement was evidently not primarily of finished tools needing only occasional resharpening and reworking. It seems likely to reflect direct procurement rather than exchange.

In aggregate, the evidence of exotic volcanic and metavolcanic material at Corral Canyon point to extensive, casual exploitation of a resource well outside of the daily foraging range. Such material may have been brought to the Corral Canyon sites in the course of patterned seasonal transhumance or of extended foraging. This evidence suggests patterns of human movement and resource utilization more compatible with the model of loose, mobile social units than with the model of strict territoriality and permanent villages.

SUMMARY

The evidence of exotic materials at Corral Canyon -- marine shell, ceramics, obsidian, cryptocrystalline silica, and volcanic and metavolcanic rock -- documents the use of resources ultimately derived from a wide area. Obsidian, certain ceramics, and perhaps cryptocrystalline silica appear likely to have reached the area through true exchange mechanisms. Late fall aggregations of eastern and western based groups in the higher mountains may have played a key role in such exchanges. Volcanic and metavolcanic rock seems more probably to reflect direct procurement by its consumers during the course of extended foraging or seasonal transhumance.

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APPENDIX 1

OBSIDIAN AMONG LITHIC WASTES FROM LATE PREHISTORIC SAN DIEGO COUNTY ARCHAEOLOGICAL SITES

Site	Lithic Wastes (Count)	Percent Obsidian	References
CA-SDi-122	1,348	2.4	McCown 1964:34
CA-SDi-161	357	2.2	Shackley 1981:107
CA-SDi-217	7,393	5.0	Waugh 1986:155
CA-SDi-240	321	0.3	McCown 1964:71
CA-SDi-674	1,281	1.5	Rosen 1984:91
CA-SDi-741	10,150	3.7	Waugh 1986:207
CA-SDi-799	3,221	11.0	White et al. 1983:70
CA-SDi-813	2,607	1.5	Sampson 1984:15
CA-SDi-1057	3,116	0.4%	American Pacific Environmental Consultants 1980:145-146; Olmo 1981:118
CA-SDi-1217	1,670	11.9	Fritz et al. 1977:23
CA-SDi-2537	27,939	3.8	Wilke et al. 1986:164
CA-SDi-4226	3,287	0.0	Berryman 1977:20
CA-SDi-4606	3,852	0.6	McKee 1970:9-10; Heuett 1980:38-45, 63
CA-SDi-4609	10,852	3.2	Hector 1985:52; Hector and Wade 1986:20
CA-SDi-5017	12,915	0.9	Heuett 1979:64-65; Winterrowd and Cárdenas 1987:40
CA-SDi-5053/ 8594/9243	17,255	0.3	Corum 1986:80, 88, 149, 152; Corum and White 1986:66, 74
CA-SDi-5088	1,994	1.2	Chace 1977:41
CA-SDi-5054	484	0.2	Smith and Isham 1980:52
CA-SDi-5205	412	1.9	Chace 1978:40
CA-SDi-5213	6,358	0.1	Cárdenas and Robbins-Wade 1985:91
CA-SDi-5634	1,070	1.5	Berryman and Varner 1981:87
CA-SDi-5647	62,825	0.1	O'Neil 1982:24
CA-SDi-5669	83,494	2.6	Berryman 1981:358, 367, 795, 800
CA-SDi-5680	18.496	2.7	Dominici and Corum 1985:93
CA-SDi-7059/ 7060	14,863	0.0	Townsend 1986:88, 148
CA-SDi-7244	814	0.0	Isham et al. 1978:38
CA-SDi-7315	964	0.2	Corum 1980:33
CA-SDi-8534	484	10.7	Laylander 1986d
CA-SDi-8762	487	0.6	Smith 1981:40, 44

Site	Lithic Wastes (Count)	Percent Obsidian	References
CA-SDi-9473	561	0.2	Corum and White 1982:32
CA-SDi-10,573	-	5.	Shackley 1981:107
SDM-W-417	-	0.3	Shackley 1981:107
CA-SDi-4556/ 4807/4808	7,257	0.5	Cook 1978:64, 190
F:7:1:4	374	1.1	Minor 1975:38
Corral Canyon	7,212	0.7	Laylander and Christenson 1987