REDUNDANCY, AVOIDANCE, AND IDEOLOGY IN PREHISTORIC SOUTHERN CALIFORNIA

DON LAYLANDER
ASM AFFILIATES, CARLSBAD, CALIFORNIA

Ethnographic evidence from aboriginal southern California points to a widespread pattern of avoiding the objects and places that were associated with a recently deceased person. Archaeological evidence of redundancy indicates that avoiding the reuse of still-functional artifacts, features, and locations also occurred prehistorically, although the restrictions against reuse that were observed were evidently neither absolute nor necessarily permanent. The distribution of thermal features, such as agave roasting pits, provides one case in point. Taboos against reuse appear to have been at least mildly dysfunctional when they are considered from a narrow economic perspective, but they may have provided ideological support for incipient economic individualism as against communal sharing. Evidence in the archaeological record for redundancy and avoidance is therefore a potentially valuable indicator for the timing and circumstances of important adaptive cultural changes.

Many aspects of California's prehistoric archaeological record can be interpreted in straightforward terms as adaptations to economic needs and opportunities. However, the role of social and ideological factors in prehistoric behavior cannot be dismissed, and such non-economic factors may themselves shed considerable light on changing adaptive strategies. Evidence concerning prehistoric ownership of property and taboos limiting its reuse provides a case in point.

ETHNOGRAPHIC TESTIMONY CONCERNING AVOIDANCE

The ethnographic record for the Diegueño groups (Ipai, Kumeyaay, and Tipai) and their closest linguistic kin, the Cocopa, contains many references to practices that imply the functionally premature destruction or at least temporary abandonment of artifacts, features, and locations. The record also attests to the ownership of some tools, structures, and resource areas by individuals or by entities, such as families or *šimuł*s (patrilineal clans), that were more restricted than whole communities.

Ethnographic accounts attest to the burning of personal possessions of the deceased in the cremation fire or during a subsequent mourning ceremony (Drucker 1937:29, 36-37, 1941:147; DuBois 1905:621; Gifford 1931:20, 57, 1933:294; Heye 1919:15-17; Hohenthal 2001:259-260; Kelly 1949:153-154, 1977:87, 89; Waterman 1910:278-279, 306). The house in which the deceased had lived was destroyed (Drucker 1937:37, 1941:147; DuBois 1905:621, 1908:170; Gifford 1931:20, 1933:294; Heye 1919:17-18; Hohenthal 2001:257-258, 260; Kelly 1949:153, 1977:87). Among the Cocopa, agricultural lands and crops belonging to the dead were abandoned, and even the deceased individual's footprints had to be obliterated (Drucker 1941:133; Gifford 1933:295; Kelly 1949:153-154). Taboos prohibited the speaking of a dead person's name (Davis 1919:24; Drucker 1937:37, 1941:141; Gifford 1931:56, 1933:294; Hohenthal 2001:259; Kelly 1949:154, 1977:87).

These restrictions on reuse were not always absolute. Some property rights could be inherited. At mourning ceremonies, some objects associated with the deceased might be given away rather than being destroyed, as long as the recipient was a non-relative (Hohenthal 2001:259; Kelly 1949:153). As a generalization, it was reported that "there is no prohibition against using the property of a dead person so long as he is unknown, or not a relative" (Hohenthal 2001:82).

Property ownership rights might be vested in an ethnic group as a whole, in a community or a *šimuł* (if, indeed, those latter two units were not identical; see Laylander 1991), in a family, or in an individual.

Ownership at the family and individual levels is minimally attested in the ethnographic record. Some nonutilitarian items were identified as individually owned, such as shaman's paraphernalia, sweathouses, and eagles' nests or the eagles themselves that were used in ceremonies (Drucker 1937:13, 1941:133, 198; Spier 1923:307; but cf. Drucker 1937:29). Individual ownership of land, gathering rights, hunting areas, and wild products was generally denied by ethnographic informants. However, two exceptions were rights to agave gathering areas reported among the Ipai and to mesquite groves among the Cocopa (Drucker 1937:29, 1941:133; Hedges 1986:13; Spier 1923:306-307). Individual ownership of houses, clothing, tools, and other artifacts seems to have been taken for granted by the ethnographers and is perhaps implicit in the practices of their destruction at the time of their owner's death.

In the cases of thermal features, such as agave roasting pits, or of milling features and tools, discussed below, the local ethnographic record does not specifically identify ownership or taboos restricting their reuse. However, neither does it rule out such ownership, which would have been consistent with other cultural patterns that were explicitly identified. For the nearby Quechan, it was noted that the mortar (probably wooden) belonging to a recently deceased leader "was now bad" and had to be thrown into the river (Heintzelman 2008:98).

REDUNDANCY AND AVOIDANCE IN THE ARCHAEOLOGICAL RECORD

Archaeologists recognize the importance of accounting for the archaeological site formation processes that move material cultural residues from their original systemic contexts into their ultimate archaeological contexts. Such movement is recognized as occurring as a result of excessive wear, accidental breakage, accidental loss, and site abandonment. Some attention has been focused upon evidence of reuse, which either delays or temporarily reverses that movement (e.g., Schiffer 1976, 1987). Less consideration has been given to ideologically motivated avoidance of reuse, which may accelerate the transition from a systemic to an archaeological context, ahead of the limits to normal use-life that would be imposed by the decreasing efficiency or accidental loss of the item.

Distinguishing prehistoric patterns of avoidance is important in two respects. First, if the possible effects of avoidance are not taken into account, the archaeological record may be misinterpreted. Significant errors may occur, for instance, in the estimates that are made of the relative or absolute sizes of regional human populations, the relative importance of particular activity sets, or the characteristics of settlement systems. Second, archaeological evidence for avoidance may be able to offer insights into some aspects of prehistoric ideology and socioeconomic organization that are otherwise nearly invisible.

Avoidance is recognizable archaeologically through patterns of redundancy in artifacts, features, and sites. Recognizing redundancy in the archaeological record requires the exclusion of alternative explanations for the proliferation of similar remains. Those alternative explanations may include simultaneous use, accidental loss or unavailability, functional exhaustion, and utilitarian considerations that made reuse less efficient or otherwise undesirable. Conclusive archaeological proof of redundancy, beyond all possible challenges, is usually not possible, and it is not claimed for the cases that are discussed here. However, if the balance of the evidence favors a conclusion of redundancy, its provisional acceptance may be appropriate, and it may be important for interpreting regional prehistory.

AN ARCHAEOLOGICAL CASE IN POINT: THERMAL FEATURES

Thermal features offer a useful test case for the possible presence of redundancy in features within the archaeological record. Two sets of thermal features are offered here as representing apparent redundancy: the features that have generally been interpreted as agave roasting pits in the Jacumba area on the eastern slope of the Peninsular Ranges in southeastern San Diego County, and the fire-affected sandstone features in the Superstition Hills area within the low Colorado Desert of southwestern Imperial County (Figure 1).

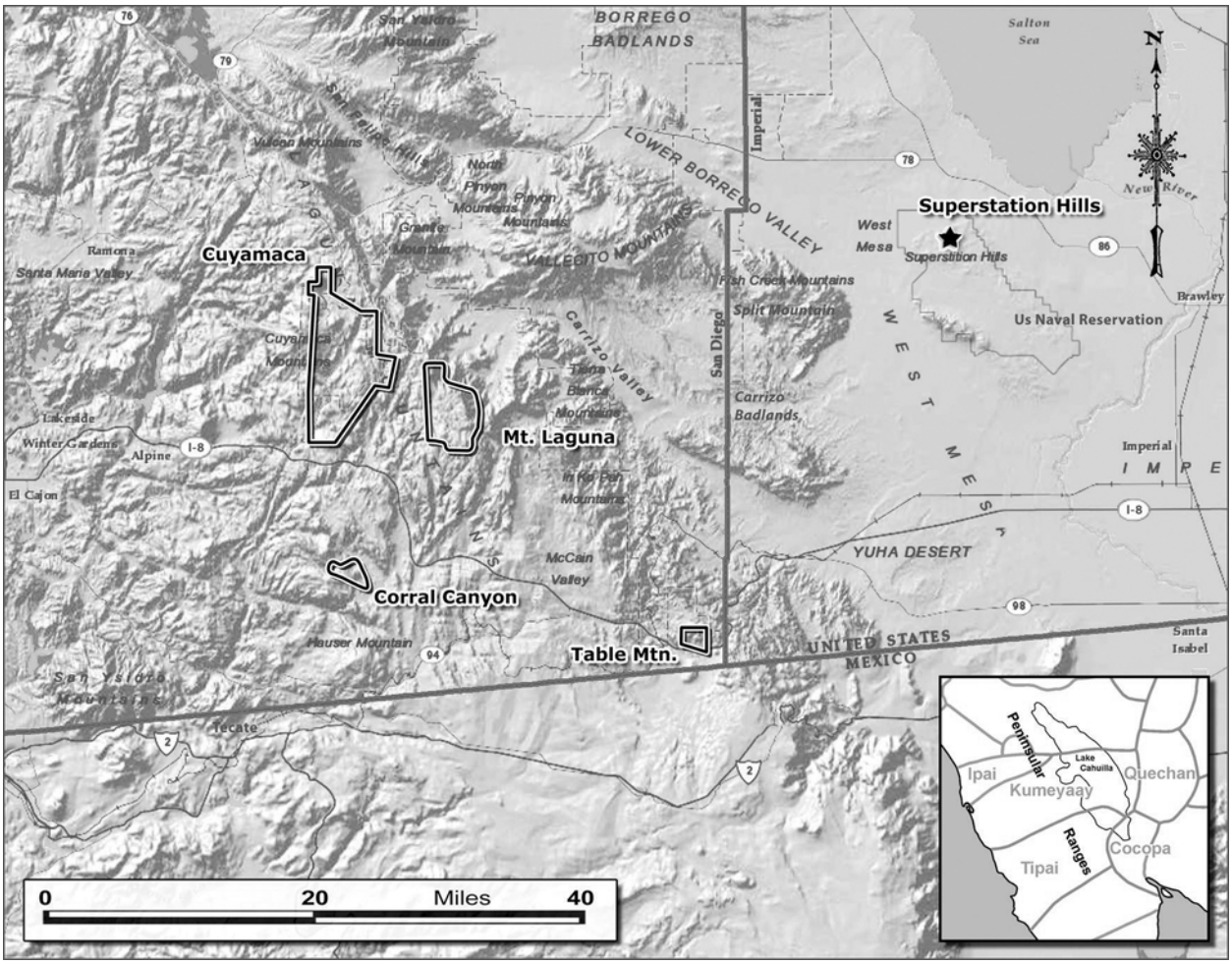

Figure 1. Map showing the locations of the areas discussed in the text.

Table Mountain Agave Roasting Pits

Isolated thermal features, without associated evidence of habitation, are a very common element of the archaeological landscapes on the eastern slope of southern California's Peninsular Ranges (e.g., Bastian 1977; Castetter et al. 1938; Cheever and Gallegos 1988; Christenson 1981; May 1980, 1987; Shackley 1983, 1984; Wallace and Taylor 1958). The features are recognizable by charcoal stains, typically on the order of 2-5 m in diameter, usually with an associated scatter of fire-affected rocks. Most or all of these features have been interpreted by their recorders as roasting pits used to cook agave. They are found in areas where agave plants now grow naturally, and they tend to occur apart from habitation sites, and often apart from any other evidence of prehistoric activity. However, direct evidence for their specific function, such as macrobotanical remains or protein residues, has usually been lacking. Several ethnographic accounts describe agave exploitation by the Ipai, Kumeyaay, and Tipai as well as the neighboring Cahuilla (Bean and Saubel 1972; Castetter et al. 1938; Chase 1919; Cuero 1968; Drucker 1937, 1941; Gifford 1931; Hedges 1986; Hicks 1963; Hohenthal 2001; Lee 1937).

A limited study of thermal features was carried out cooperatively by the San Diego County Archaeological Society and the USDI Bureau of Land Management at the Table Mountain Archaeological District, near Jacumba in southeastern San Diego County (Laylander 1992). The study included surface

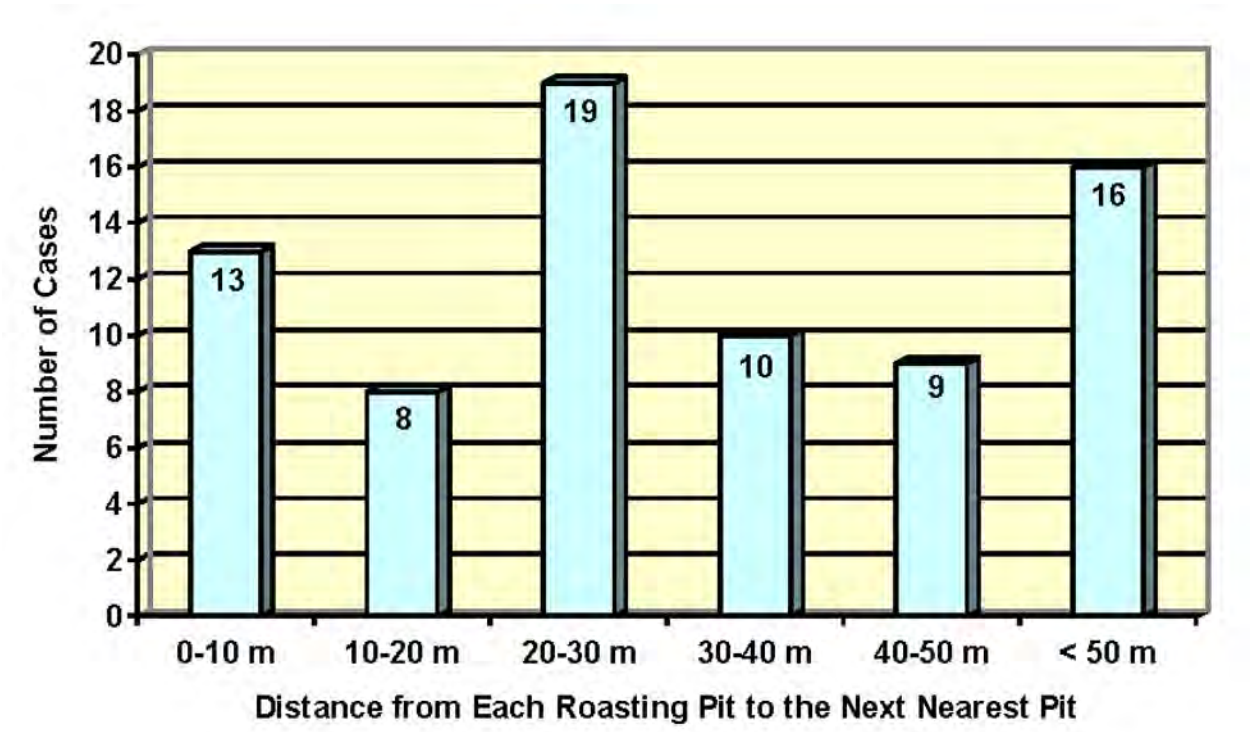

Figure 2. Distances between agave roasting pits at Table Mountain.

observations of 75 thermal features. The study was able to document the distribution and some of the characteristics of the features.

A key variable concerned the density of thermal features within this region. Such features number in the thousands in eastern San Diego County. The Table Mountain district encompasses an area of about 15 km^2. The features are almost entirely confined within about half of the district, where agave is prevalent. The tally for recorded thermal features within the district exceeded 200, and there is reason to believe that this count was incomplete. At any rate, an average density of 30 to 40 features per km^2 within the agave-growing areas of the district is probably a conservative estimate. Sample surveys reported by Andrew Christenson (1981) suggest that thermal features may occur in even greater densities in some areas farther north within the Peninsular Ranges.

One of the documented variables in the 1992 field study was the distance from each thermal feature to the next nearest feature, recorded in 10-m interval classes (Figure 2). The median and modal distances between features in this sample were 20-30 m. Seventeen percent of the features were located less than 10 m from their nearest neighbors, and 79 percent were separated by less than 50 m. (The nonrandom sample of 75 features was probably somewhat biased toward relatively dense concentrations of features, but that does not appear to invalidate the general point that the features are frequently very closely spaced.)

What can account for the high densities of roasting pits? First, the idea that all of the pits were ever put into use simultaneously to cook locally harvested agave is implausible. A single roasting pit could have cooked perhaps 10 to 40 agave crowns. Each pit would have required a significant amount of firewood. The densities of harvestable agave and available firewood have not been quantified at Table Mountain, but to judge by an intuitive impression based on modern conditions, only a small fraction of the pits could ever have been in use simultaneously on the basis of the locally available resources.

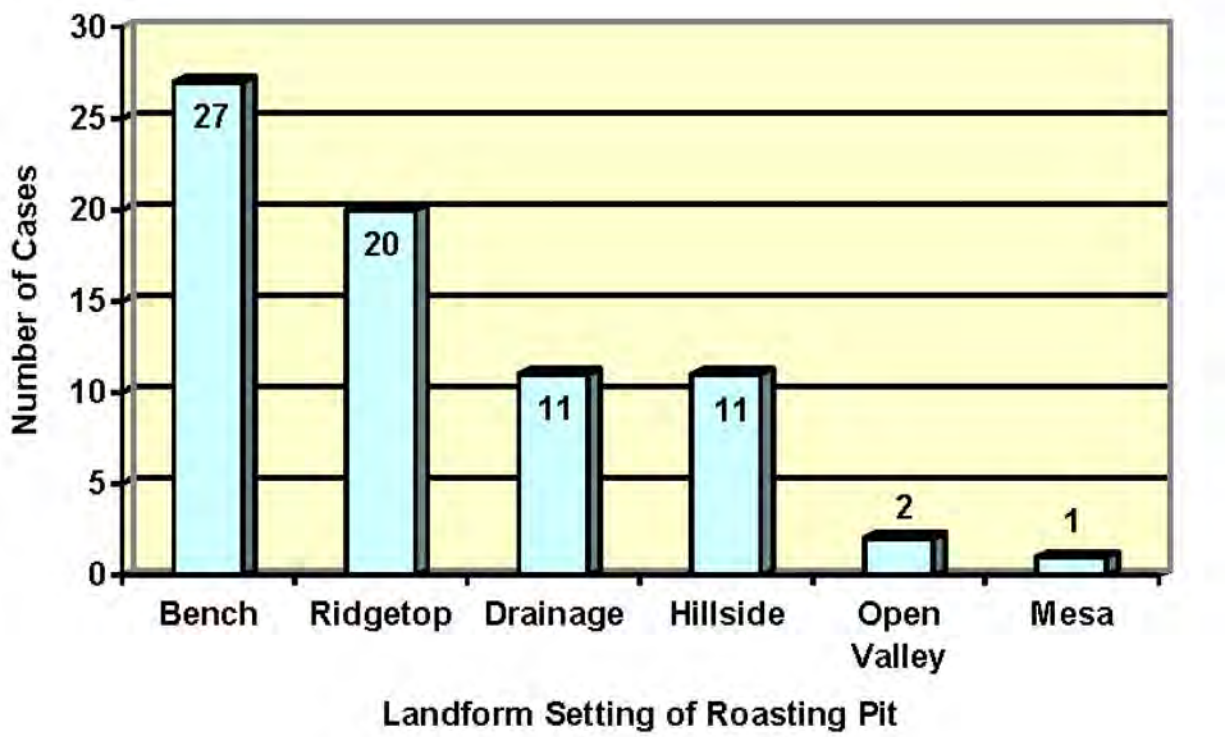

Figure 3. Landforms at Table Mountain agave roasting pits.

Second, the idea that the agave crowns and firewood were carried considerable distances in order to take advantage of "ideal" roasting pit locations is also implausible. It is true that some degree of selectivity in pit locations can be discerned archaeologically (Figure 3). Topographic benches, with relatively deep, sandy soil that would have been relatively easily excavated, were evidently favored. But pit locations were not narrowly stereotyped, and there are many locations at Table Mountain that appear to have been potentially suitable for such use but that lack roasting pits. Agave and firewood undoubtedly were carried to suitable pit locations, but it is not likely that they were carried for distances on the order of hundreds of meters.

Third, it might be suggested that pits are found in clusters because agave was brought simultaneously to central locations where, perhaps, the processors could socialize while the agave was being roasted. One Tipai consultant from La Huerta in northern Baja California reported that agave was cooked "communally" (Drucker 1941:96). On the other hand, Melicent Lee's (1937:13) ethnographically based story for children reported that the Kumeyaay were not supposed to construct agave roasting pits where the pits could be seen by anyone else while they were in use. An Ipai at Santa Ysabel reported that agave areas were owned by individual families and that if outsiders entered the areas to collect agave, the food would taste bitter (Hedges 1986:13). The usual absence of any substantial archaeological remains in association with the pits and the high overall density of pits throughout extended areas at Table Mountain and elsewhere in the region make an explanation for pit clustering in terms of communalism or sociability implausible.

Available archaeological evidence concerning the chronology of agave roasting in this region is fairly limited (but see, for example, Bastian 1977; Shackley 1984; Williams 2014). There may have been a florescence of the activity during the late prehistoric period. In any event, radiocarbon evidence is inherently too imprecise a tool to establish that multiple roasting pits were used simultaneously, rather than, for instance, in succession over a span of several years or decades. In any case, whether the pits in an area represent the remains from decades, centuries, or millennia of use is essentially beside the point for the present discussion,

if it is accepted that the older features were available for reuse but that choices was made to create new, redundant features instead.

The available archaeological evidence is also fragmentary concerning the extent to which individual features may have been reused. Pioneering archaeologist Malcolm J. Rogers evidently thought that considerable reuse had occurred in some areas of eastern San Diego County (Castetter et al. 1938:45). M. Steven Shackley (1984) suggested that some pits had been reused, while others had not. Careful archaeological excavation of a representative sample of roasting pits might be able to assess the extent of pit reuse, although such an analysis would probably be difficult and has not yet been undertaken. A subjective impression is that there is evidence of some pit reuse, but not a great deal of it, at least in the Table Mountain area.

Were there practical disadvantages to creating a new roasting pit, rather than reusing an old one? Without more data from replicative experiments, it is difficult to be completely certain. Recent efforts to roast agave in the traditional manner (e.g., Rhodes 2012) seem generally to be classifiable as "replicative experiences" rather than "replicative experiments," in that they have lacked the careful control and documentation of variables that the latter would entail. Impressionistically, although the soils at the Table Mountain pits tend to be sandy, the effort involved in digging a pit without the use of a metal shovel would not have been trivial. Working in soil that had already been loosened by previous digging would have saved energy. Moreover, most of the designs for roasting pits that have been reported ethnographically or archaeologically involved the use of rock linings or layers (Shackley 1984:133). Suitable rocks are not particularly scarce in the vicinity of most of the Table Mountain roasting pits, but collecting them and bringing them to the pit site would nonetheless have involved an appreciable amount of work. Using the previously collected rocks in or around an existing pit would have saved that effort. Some roasting pit designs included rock floors, rock walls, or both, and those would not have been disrupted by the subsequent removal of the cooked agave from the pit. For such pits, reuse would have entirely saved the labor of constructing anew the rock floors or walls.

Were there practical drawbacks to reusing old pits? In the eastern Mojave Desert, it has been suggested that limestone rocks lost their favorable thermal properties after being used once in a roasting pit (Krosen and Schneider 1991). In that region, the pits themselves were reported to have been repeatedly reused, but new rocks were continually brought in. However, it seems unlikely that the granitic, metamorphic, and volcanic rocks that are prevalent at Table Mountain and elsewhere in the Peninsular Ranges would have required any such replacement. Another possible drawback to reusing a pit might arise from some form of infestation after use, perhaps by insects or other pests, which might damage a subsequent batch of agave. This is a possibility, although there does not seem to be any evidence for it, and it seems unlikely. Controlled replicative experiments could help to provide an answer.

If it is true that there was a tendency to avoid reusing previous roasting pits and that the tendency was at least mildly dysfunctional in terms of the labor required for the immediate task at hand, then this is an aspect of culture in which practical decisions were being made on an ideological basis rather than on a narrowly utilitarian one. There is no direct ethnographic testimony on the point. However, Lee's claim that a taboo existed against using a pit within the viewshed of other individuals suggests that the Kumeyaay recognized an ideological dimension to pit placement. Ethnographic accounts from adjacent regions also report apparently nonfunctional or dysfunctional taboos relating to agave processing. For example, among the Apaches, Pimans, and Arizona Yumans, sexual abstinence for a period prior to agave processing was mandated (Castetter et al. 1938:29-30, 40-41). Some of the same groups also had rules concerning the season of birth of a person who could properly light the fire in an agave roasting pit (Castetter et al. 1938:40-41).

Superstition Hills Thermal Features

Another set of thermal features that are interpretable as roasting pits or hearths, located in the Superstition Hills area west of prehistoric Lake Cahuilla in southwestern Imperial County, provide a case

Figure 4. Examples of sandstone thermal features in the Superstition Hills area (Schaefer et al. 2012).

similar to the higher-elevation agave roasting pits (Schaefer et al. 2012, 2014). The features are attested by clusters of fire-affected sandstone rocks derived from the Brawley formation (Figure 4). Sometimes charcoal or associated artifacts are present, and some of the features occur within habitation sites, but more frequently they are found in isolation and without other cultural associations.

The recorded features number in the thousands. Systematically surveyed sample areas have reported densities ranging from 28 features per km^2 in locations several km west of the Lake Cahuilla shoreline to 161 features per km^2 along the shoreline (Andrews and Schaefer 2011; Schaefer et al. 2012, 2014; Schultz et al. 2007). Simultaneous use of a substantial proportion of the features at any one time can evidently be ruled out by the sparse resources that were locally available away from the shoreline. The features are not typically in close proximity to the sandstone outcrops that provided the rocks, and the practical benefits of creating new features close to food resources or firewood would likely have been more than offset by the burden of carrying rocks any substantial distance to create the new features. As in the case of the Table Mountain thermal features, the overall density in the occurrence of thermal features in the Superstition Hills area seems likely to be too great to be explicable without invoking the principles of redundancy and avoidance.

ARCHAEOLOGICAL EVIDENCE: OTHER DATA SETS

The case of redundancy in thermal features is not an isolated example. Evidence suggestive of similar patterns is discernible in the distributions of other features, artifacts, and sites within the same region.

Bedrock milling elements constitute another set of apparently redundant features. The manufacture of a shaped bedrock mortar or basin in plutonic or metamorphic rock represented an appreciable amount of labor. Utilitarian considerations might have dictated that only enough of these features would have been created at any location to serve the simultaneous needs of the sites' occupants, with allowance for some functional differences among the different classes of features and possibly for "wearing out" of some features. Contrary to this expectation, scores of apparently redundant and still-functional milling features are commonly observed at archaeological sites in the Peninsular Ranges. For example, within the small area of the Corral Canyon Prehistoric Archaeological District, four habitation sites (CA-SDI-9446/9447, SDI-9449, SDI-9746, and SDI-9750) each contain from about 100 to more than 200 milling elements (Laylander and Christenson 1988). Even more conclusive evidence of redundancy is seen on some bedrock outcrops, where the milling features are so densely clustered that their simultaneous use would have been physically impossible (Figure 5).

Artifacts provide evidence of both reuse and redundancy. Reuse after very extended periods of curation or, more likely, after scavenging of still-functional but previously discarded tools is attested by the presence of multiple distinct hydration rinds on obsidian artifacts (e.g., McFarland 2000) and of different degrees of patination on adjacent flake scars of some other flaked lithic tools (e.g., O'Neil 1982). Avoidance is suggested by the proliferation of numerous whole or fragmentary manos that is found at many sites. Since breakage of manos during normal use seems likely to have been fairly rare, the frequent occurrence of fragmentary milling tools more likely represents either the consignment of still-functional tools into hearths where heat split them or else their intentional destruction for non-utilitarian reasons.

Site locations, too, provide clear evidence of reuse, but probably suggest avoidance as well. Reuse across extended periods of time is attested by divergent radiocarbon dates and by distinct cultural components within a site deposit. Avoidance might be suggested by the redundant clustering of multiple habitation sites ("villages" and "temporary camps").

In a highly idealized settlement pattern, an optimally located habitation site might command a 10-km daily foraging catchment (Binford 1982). In a hexagonal array, such catchments would each occupy an area of 260 km^2, for a density of 0.0019 habitation sites per km^2. The actually observed densities of substantial and at least broadly contemporaneous sites are often several orders of magnitude greater than that. For example, within the 7.3-km^2 study area at Corral Canyon, seven "large habitation sites," as well as eight "small habitation sites," were documented, for a density of 2.05 habitation sites per km^2. Similar clusters of habitation sites have been documented in Cuyamaca Rancho State Park (True 1970) and on Mount Laguna (Graham 1981). In regional studies based on previous site records for the Jacumba/McCain Valley and Ocotillo areas, on a much larger geographical scale but based on substantially incomplete inventory data, the 1,074-km^2 area included 438 habitation bases and temporary camps, for a mean density of 0.41 habitation sites per km^2 (Laylander 2014a, 2014b) (Figure 6).

A variety of possible explanations might be offered to account for the proliferation of habitation sites. The multiple locations might have been occupied to focus on different resources in the immediate proximity of the sites, or in response to changing seasonal circumstances. They might represent either an unusual spatial clustering of different contemporaneous communities or, in some cases, an unusually wide dispersion of family homesteads within a single community. Settlements may have been shifted periodically for sanitation reasons. However, another possibility worth considering is that habitation sites were often abandoned in favor of nearby alternative, functionally equivalent locations for a period of time following the death of a key community member.

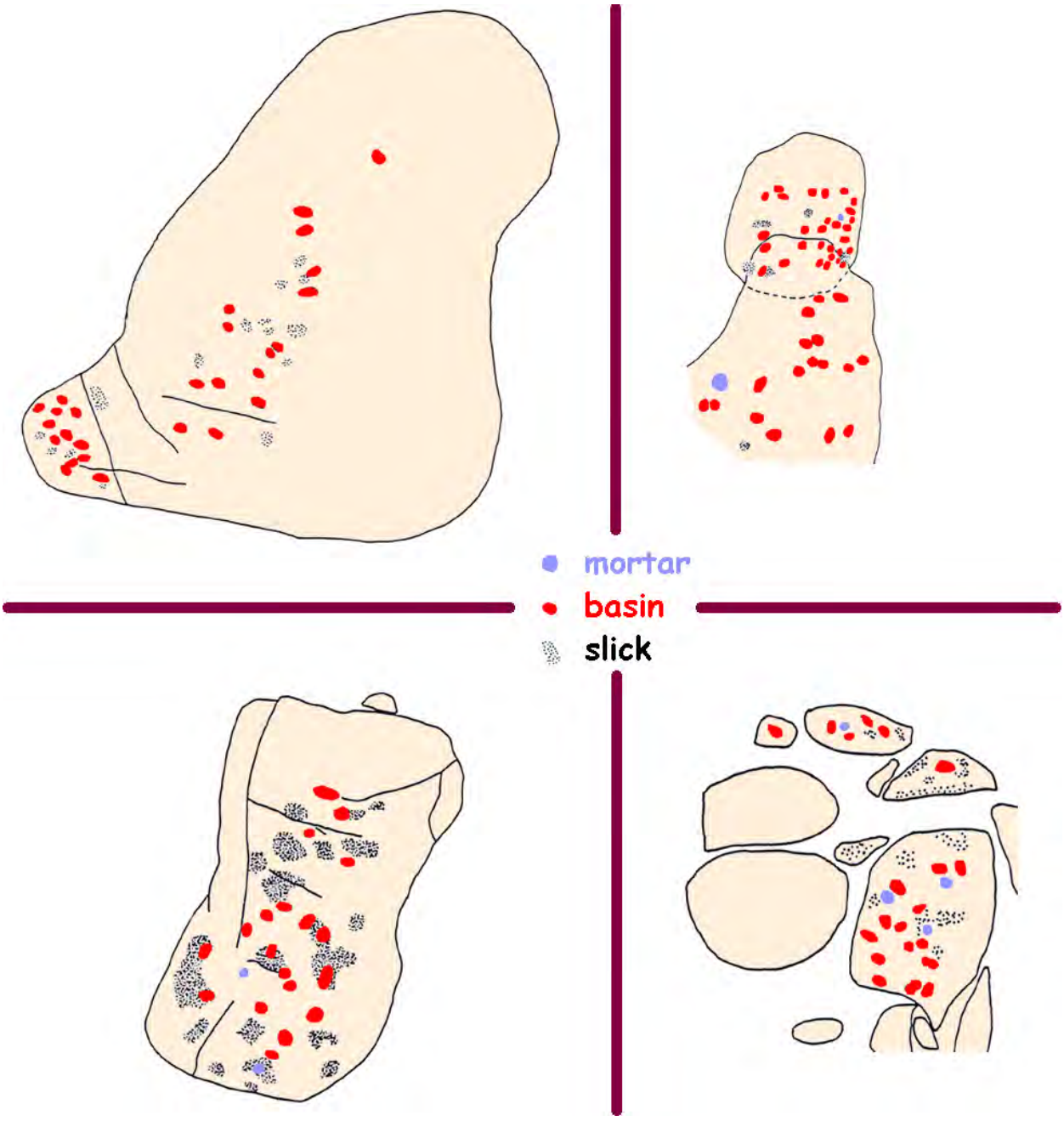

Figure 5. Examples of densely clustered bedrock milling features at Corral Canyon sites (Laylander and Christenson 1988).

INTERPRETING REDUNDANCY AND AVOIDANCE

In the ethnographic record, taboos relating to the possessions of the dead were rationalized primarily in terms of the dangers to the living that were represented by the deceased person, rather than in terms of any postmortem rights or needs of the deceased. From an emic perspective, this may be sufficient to explain the practices. However, investigators who are interested in etic explanations for why societies and cultures function in the ways they do will seek to understand such customs from a different perspective.

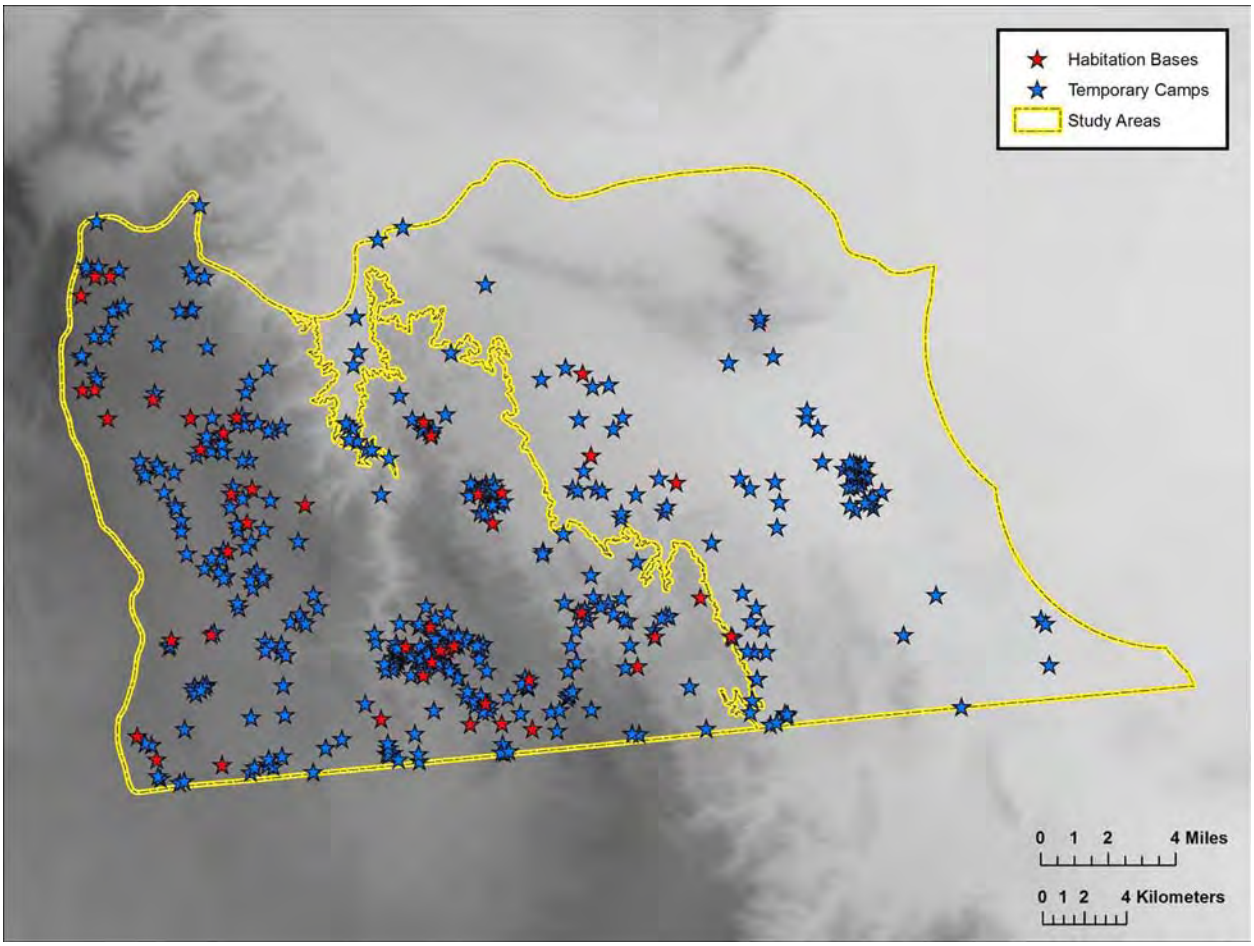

Figure 6. Habitation bases and temporary camps in the Jacumba/McCain Valley and Ocotillo regions (Laylander et al. 2014a, 2014b).

The structural anthropologist Claude Levi-Strauss (1963:89) suggested a distinction between foods being *good to eat* and being *good to think*. If functionally irrelevant or dysfunctional taboos such as avoiding the reuse of agave roasting pits were *good to think* within these cultures, an investigator who is operating within a basically materialist, adaptationist paradigm may legitimately ask *why* it was good to think in that particular way. At least three possible answers may be suggested here.

One possible explanation might invoke a cultural mechanism for curbing overexploitation of a resource. Agave is a nutritious and storable food resource. Harvesting an agave crown kills the plant just prior to its flowering. A subsistence strategy that permitted unrestricted exploitation of the resource might have tended to destroy agave stands over considerable areas within a few years, or at most within a few decades. Tempering such exploitation through disincentives or spacing mechanisms might have helped to make possible either a continuous but more limited and sustainable exploitation of the agave or else the restriction of agave to a role as an emergency famine food. A taboo on roasting pit reuse might have provided at least a mild disincentive against agave use, because of the extra labor that the taboo imposed. In some areas, where steep slopes offer only a small number of suitable pit locations, a temporary taboo on reuse might also have served as a spacing mechanism, although in this respect it evidently would have been fairly ineffective in the Table Mountain area, where suitable roasting sites are numerous.

A second possible ideological factor concerns prehistoric attitudes toward the dead. According to the ethnographic record for southern California, as discussed above, the predominant attitude toward deceased

persons was a fear of the danger that they represented to the living. For native people who were not in a position to discriminate precisely the operation of contagious diseases, biological and chemical contaminants, and other subtle environmental hazards, this was not an unreasonable way of thinking. The dead and the things and places that were associated with them sometimes did indeed – etically – represent dangers to the living. Ideology may have simplified, exaggerated, and enforced this practical proscription. Old agave roasting pits almost certainly represented no danger to the living, but it may have been *good to think* of them as doing so, if thinking in that way reinforced a useful general principle of avoidance, at a fairly small practical cost.

The most likely ideological explanation for the redundancy in roasting pits and other features, as well as sites and artifacts, concerns changes in prehistoric ideas about property. There is some archaeological and ethnographic basis for supposing that population density and the territorial circumscription of communities in southern California were increasing substantially during the late prehistoric period, and that, concomitantly, there was a trend toward ownership rather than general sharing of land, resources, and possessions. Economically motivated individual ownership of roasting pits is improbable. However, within a cultural system that may have been working to establish legitimacy for restrictive individual ownership of economically significant resources, an ideology sanctioning respect for ownership rights to roasting pits, as well as other kinds of features and artifacts, may have been a fairly minor practical inconvenience that was *good to think*, for the sake of reinforcing the more general principal of exclusive possession and limitations on community sharing.

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