

Prehistoric trails in the Colorado Desert: a review of archaeological research

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Abstract

Archaeologists in southern California have attempted to identify and interpret the physical remains of the prehistoric travel routes that extended within and beyond the Colorado Desert. A review of some of the approaches that have been used, the problems that have been encountered, and the results that have been obtained may be of interest to those who are dealing with similar landscape features on the Baja California peninsula, including those associated with the prospective UNESCO Cultural Route of El Camino Real de las Californias.

Introduction

Intra- and interregional routes of travel have unquestionably played important roles in the prehistory and history of the Californias. They have enabled the movement of people, raw materials, and manufactured products, as well as ideas, in ways that have helped to shape the regions' cultures. Some prehistoric trails were also intimately involved with warfare and with ritual practices.

Several types of evidence for such travel have been adduced. For the early historic period, researchers' key resource has been the written documentation of the routes of overland exploration that were pioneered by such figures as Oñate, Kino, Guillén, Konščak, Linck, Rivera, Portolá, Garcés, Anza, Fages, Velásquez, and Arrillaga. Established routes between the Spanish missions, presidios, and maritime supply points, notably El Camino Real de las Californias, have been similarly addressed, as have features in the Colorado Desert such as the Southern Emigrant Trail and the Bradshaw Trail. Ethnographic testimony has spoken to native peoples' interregional visits and their sharing of resources and products. More rarely, it has described specific travel itineraries, although those were often the routes supposedly followed by legendary or mythic figures. With archaeological evidence from substantial sites located both within and outside of the region, patterns of travel have been inferred from the presence of exotic items, such as nonlocal lithic types (particularly obsidian from the Coso, Obsidian Butte, and Tinajas sources [Panich et al. 2017]), marine shell and bone at inland sites, and geographically diagnostic ceramic types of buff ware and brown ware.

The present discussion focuses on the *in situ* physical clues to travel within this region: the physical traces of the paths themselves, plus the artifacts, features, sites, and settings that are closely associated with them. These features have received considerable archaeological attention since the pioneering work of Malcolm J. Rogers in the 1920s (Apple 2013; Waters 1982a). Trails are moderately common among the recorded features in the Colorado Desert. For instance, in a study of site records for the 1,074-km² McCain Valley-Jacumba-Ocotillo area adjacent to the U.S.-Mexico border, 2,318 prehistoric sites were identified. Of these, 72 (3.1%) were recorded as trail

sites, and 147 (6.3%) were sites having “trail” as one of their attributes (Laylander et al. 2014, 2015; Noah 2012; Schaefer and Laylander 2014). The aim in this discussion is not to present a summary of the numerous inventories of prehistoric Colorado Desert trails, but instead to call attention to some of the ways in which these regional studies may suggest more widely applicable archaeological strategies and insights.

Recognizing prehistoric trails

The two initial tasks for field investigators of prehistoric trails are to identify the presence of trails as physical features and to distinguish prehistoric human trails from animal trails and historic or modern trails. The first task has usually relied on observations on the ground. Sometimes these have been aided by observation and/or photography from airplanes or helicopters. The use of drones will likely be added to this toolkit in the near future. The availability of high-resolution satellite imagery, such as Google Earth, has increased the potential for using remote sensing to inventory trails in difficult-to-access areas or where trail patterns are more recognizable when they are viewed from above and at a distance. The accuracy with which the locations of routes are being recorded has been enhanced by improved topographic mapping and, above all, by the use of global positioning systems (GPS).

After the discovery of physical trails, the next problem is to differentiate prehistoric human paths from similar natural or historic-period features. As summarized by Ian Scharlotta, Jerry Schaefer, and Nick Doose (2015:40), “Becker and Altschul (2008:426-432) make the case that some of the best-known prehistoric trail studies in California may have included animal trails in the mapped trail systems.” Distinguishing trails’ origins has generally required close on-the-ground observations of the trails’ characteristics and their associated artifacts and features, as well as their apparent destinations.

Among the potentially relevant physical attributes of trails are their widths, depths, gradients, and post-use changes. Several investigators have made note of the widths of the region’s prehistoric trails. Francis J. Johnston and Patricia H. Johnston (1957:23) reported native foot trails in Riverside County as being 6-12 in. (15-30 cm) wide. According to Jay von Werlhof (1984:33, cited in Bryne 2011:2), aboriginal trails averaged 35 cm in width. Daniel F. McCarthy (1993:70) reported such trails as averaging 30 cm in width. Andrew R. Pignuolo, Jackson Underwood, and James H. Cleland (1997:91, cited in Bryne 2011:3) found that trails average 35 cm in width but that they range from 20 to 50 cm. Stephen Bryne (2011:4) reported trail widths as ranging between 30 and 50 cm. Aboriginal foot trails are believed to be wider than game trails (Bryne 2011:4). In California more generally, James T. Davis (1961:6) noted that “many trails were originally so narrow they served merely as footpaths for humans, and horses could not negotiate them in brush country.” On the other hand, cattle paths have been reported to be typically 30 cm wide (Becker and Altschul 2008:433), similar to prehistoric human trails.

The depths worn by trails presumably reflect several factors, including the character of the natural substrate, the weights that were moved along them, and the number of times travelers passed over them. Johnston and Johnston (1957:23) reported the average depth for portions of the Chuckwalla Valley Trail as 1 in. (2.5 cm), but they also noted that some trails were “up to one-half inch [1.25 cm] deep.” Presumably the greater weight of pack animals and the repeated use of main historic-period travel arteries such as El Camino Real would have tended to produce greater depths than either natural animal trails or prehistoric pedestrian trails.

In uneven terrain, a trail’s gradient may be a key diagnostic of its origin. The paths of

domesticated animals and many types of game animals (but presumably not including bighorn sheep) tend to follow topographic contours more closely than do human foot trails; walkers accept the ascent or descent of steeper slopes as a tradeoff for traveling across shorter distances. Riding and pack animals as well as some wheeled vehicles (but not including off-road vehicles or dirt bikes) also tend to require more gradual slopes than human foot traffic.

Whether found in Liberia, Korea, Mexico, or the United States, trails ... tend to follow the most direct route between two points, rather than the path of least resistance, without contouring or “switchbacking” up the slope.... This directness of route and apparent disregard for topography is critically important to the field archaeologist, who has the vexing task of distinguishing animal from human trails [Becker and Altschul 2008:429].

The available data indicate that energy expenditure for burros and cattle increases in a curvilinear fashion in relation to slope, with ever-larger amounts of energy required to climb steeper grades, whereas the data on humans show an initial substantial loss in energy efficiency for climbing gentle slopes and an increase in energy efficiency, relative to gentle slopes, for climbing grades roughly between 15 and 25 percent. If reliable, these data help to explain why traditional human trails from around the world are observed to ascend steep slopes rather than contour around them, and conversely, why animal trails reportedly follow contours, avoiding steep slopes whenever possible [Becker and Altschul 2008:435].

Trail-associated artifacts and features

The presence of prehistoric artifacts and features in close association with trails has been a standard method for distinguishing prehistoric trails from natural or historic paths, as well as for identifying travel routes across surfaces that have not preserved the imprints of the trails themselves. Such associations have also been important for shedding light on the trails’ ages, the ethnic identities of their users, and the functions that were served by the routes.

The “pot drop,” typically an isolated concentration of sherds from a single ceramic vessel, is a common feature in the Colorado Desert. In the McCain Valley-Jacumba-Ocotillo study mentioned above, 93 (4.0%) of the recorded sites were classified as “pot drops” (Schaefer and Laylander 2014:342). In another area, according to Schaefer (2018:481),

Pot drops and sherd scatters are the predominant site type adjoining the Interstate 8 corridor across the Algodones dunes and East Mesa, the so-called “Buttercup Pass” [in southeastern Imperial County]. This suggests a travel route between the Colorado River and the Salton Trough that appears to have been in use for over 1,000 years. Habitation sites with a diversity of artifact types are noticeably absent or infrequent.

As the term may suggest, pot drops have often been interpreted as evidence of accidental losses of ceramic vessels by prehistoric travelers along trails. However, it has also been argued that the distributions of such finds sometimes indicate intentional ritual practices rather than mere accidents (Apple 2005:106; Schaefer 2010).

In addition to attesting to prehistoric trails’ presence and their ages, the characteristics of pot drops associated with trails may help to identify the trail’s users and their direction of travel.

For instance, in Chuckwalla Valley, an important east-west corridor between prehistoric Lake Cahuilla and the Colorado River in what was ethnohistorically considered to have been primarily Cahuilla territory (Heizer 1978:ix), the types of buff ware sherds associated with trails may help to determine whether the paths were being used primarily by Cahuilla who were attempting to reach the Colorado River or by River Yumans (such as the Halchidhoma and Mohave) who were travelling to the shoreline of Lake Cahuilla (Laylander and Schaefer 2011). Similarly, the ratios of brown ware and buff ware in the western Colorado Desert may help to distinguish between eastward travel by western Kumeyaay and Cahuilla from the Peninsular Ranges and movements by their desert kin in the opposite direction; however, the picture is complicated by the apparent local production of some brown ware in the desert as well as in the mountains (Hildebrand et al. 2002).

Trailside shrines represent another set of features that are associated with many prehistoric trails in the Colorado Desert. Cairns are perhaps the most common type of trailside shrine. The McCain Valley-Jacumba-Ocotillo study reported 77 sites (3.3%) as containing cairns, although not all of those sites are associated with trails. Trailside cairns may have served to mark routes, to assert territorial ownership, to collect supernatural offerings, or, as in the case of the controversial “Yuha Man” site, to contain human burials (Childers 1974; Wilke 1978).

Rogers found 19 shrines along the Chuckwalla Trail

within a few feet of the trail and on either side of it with no regularity as to spacing.

They vary considerably in size but not much as to contents, being composed of local rock, dirt, potsherds, stone and shell artifacts, bone tools, and burnt food bones, in descending proportions in the order named [Rogers 1933:3, quoted in Apple 2013:92].

Rogers recorded and excavated a particularly elaborate cluster of six trailside shrine features at site SDM-C-1, located near the Colorado River in eastern Imperial County (Waters 1982b). These features included both cairns and pits, and they contained pottery, lithics, bone, and shell.

Other types of shrines or features have also been reported. Some rock art panels and geoglyphs associated with trails may represent either trailside features or trail destinations (Rogers 1966:49). In the southern Mojave Desert near Needles, Stephen Horne and Ruth Musser-Lopez (2015) noted numerous boulder petroglyphs that were associated with the Eagle Pass Trail and that were apparently oriented for viewing by travelers moving along that trail. Cleland (2005:132) noted the existence of “clear associations in many areas between trails and geoglyphs ... in some instances the two merge together.” The presence on trails of small scatters of quartz, sometimes thought to possess supernatural powers, has also been mentioned as another repeatedly occurring feature (Apple 2005:107; Johnston and Johnston 1957:25).

Destination sites and travel camps

The locations to which trails lead provide clues to the trails’ origins, ages, and functions. There are some basic commonalities that have been shared by most human and nonhuman trail users in the Colorado Desert. Wild and domesticated animals, prehistoric people, Spanish journeyers, and later historic-period travelers all needed potable water, and its sources in this arid region are far from being ubiquitous. However, there was variability in the ability of the different classes of trail users to cover given distances in a given time, to endure dry spells, and to carry water with them. This variability may be reflected in differences in the willingness of trail users to

choose routes that bypassed some potential water sources in the interest of greater directness to their destinations.

Human living sites, often associated with water and lush vegetation, may have constituted important destinations. Prehistoric destination sites, beyond offering the limited resources that were directly available on-site, were likely to be situated at central locations within catchments or at ecotones that offered favorable opportunities for hunting, gathering, and/or quarrying. Historic-period trails may have bypassed native settlements, particularly after the native population had dwindled or disappeared.

In addition to destination sites (villages, temporary camps, quarries, resource extraction/processing areas, ritual sites, etc.), a potentially important site category that has infrequently been explicitly addressed archaeologically is the prehistoric travel camp (Laylander and Schaefer 2011; Laylander et al. 2014). Travel camps include sites that were occupied overnight or during the heat of the day but without their occupants significantly exploiting catchment resources (other than water). They might be distinguishable archaeologically from destination sites in the Colorado Desert by the absence at travel camps of residues from nonlocal catchment resources and the presence of residues of resources that were derived from more distant locations, such as cultigens or fish from the Colorado River area, lacustrine resources from Lake Cahuilla, marine resources from the Gulf of California, or acorns and piñon nuts from the Peninsular Ranges.

So-called “sleeping circles” are the large clearings in the desert pavement, sometimes 6-8 ft. (1.8-2.4 m) in diameter (Johnston and Johnston 1957:24). They are abundant in the Colorado Desert; in one 3-mi.-square area in eastern San Diego County, Rogers (1939:7) reported that he counted 500 such features. Sleeping circles may possibly be examples of travel camps, although several alternative interpretations of these enigmatic features have also been proposed (cf. Laylander 2015).

The ages of the trails

Determining the ages of the trails’ creation and use is valuable both for differentiating prehistoric from historic routes and for interpreting the cultural clues and significance that the features represent. Dating trail segments has been addressed in a number of different ways. Chronologically diagnostic artifacts, including some classes of lithic items (such as projectile points and obsidian suitable for hydration measurement), may be associated with the trails. In the Colorado Desert, proposed ceramic buff ware sherd types have been particularly important for dating trails, and the analysis has worked in both directions: in addition to dating the trails based on the sherds, the relative dating for the ceramic types themselves has been inferred from their associations with particular trails, in what has been termed “horizontal trail stratigraphy” (Waters 1982c:276). An unusual chronological suggestion by Rogers (1966:51) is that pre-Yuman trail cairns could be recognized by the large quantity of lithics that had cumulatively been added to them: “Some of these shrines are so large that their beginnings must have predated the Yuman period, providing each traveler deposited but a single stone which was the historic practice of the Yumans.” Another form of chronological evidence has come from the association of trails with dateable travel camps, destination sites, or larger regional destinations, such as the intermittently present shoreline of Lake Cahuilla.

Some types of physical evidence may be helpful in dating trails, either in absolute or in relative terms. The degree of weathering or patination on the rocks that were displaced or exposed by the trail may offer clues, although cation-ratio dating, varnish microlamination dating, and other

such methods have not gone unchallenged. Luminescence dating on rocks that were overturned or buried during the use of the trail may be a possibility. The geological age of the landforms that the trails cross provides at least a vague *terminus post quem* age for the preserved trails. Relative ages among trail segments may be distinguishable by different degrees of erosion and gullying, which would have obscured some earlier trail segments or rendered them unsuitable for continued use. McCarthy (1993:83) suggested that “environmental factors such as erosion, climatic changes, or faulting” were responsible for the rerouting of trail segments.

The construction of trails or their creation through use

Among southern California archaeologists, there has been no consensus as to whether most prehistoric trails were produced primarily or exclusively by the repeated impacts of human feet, without any purposeful construction on the part of their users, or whether systematic efforts were made to clear rocks from the paths. According to McCarthy (1993:70), “Trails in the McCoy Spring region [in Chuckwalla Valley] are unbordered ... and appear to be formed solely as a result of foot traffic over the same path. Nowhere is there evidence of deliberate construction.” However, in the same general region, Johnston and Johnston (1957:23) reported that “a specific feature noted wherever enough stones were prevalent was a trail rim or ridge of stones on each side of the trail.”

According to von Werlhof (1988:58):

Some minor construction work had to be done on at least a few stretches of most trails. Such tasks included moving cobbles and boulders to the sides of the trails where they crossed rough terrain.... An extreme case was at Indian Pass [in eastern Imperial County] where boulders had to be cleared for as much as a quarter mile [400 m] at the time, and another along the Mohave War Trail south of Black Mountain [in southeastern Imperial County] where several miles of malpais boulders were set aside to form an unobstructed path.

Cleland and Rebecca McCorkle Apple (2003:289) also argued for trail construction rather than mere creation through use. Cleland (2004:47) wrote that “many trails were intentionally created and are not simply a result of repeated use.” According to Bryne (2011:4), “the surfaces of the trails [in southeastern Imperial County] have been cleared of rocks and small pebbles,” which seems to imply intentional construction, although casual kicking or scuffing might perhaps have produced similar results.

Historic-period trails may differ in this respect. For some portions of El Camino Real de las Californias, substantial amounts of labor were invested in trail construction and maintenance (Crosby 1977; Venegas 1979(4):633-635). However, many of the later historic-period trails were likely to have been created or maintained in a more casual manner.

Trail redundancy

Looking at the archaeological record in general, the proliferation of functionally equivalent prehistoric artifacts, features, and sites has raised important interpretive questions. In some cases, the apparent redundancy may be attributable to functional exhaustion or to changes in specific needs. However, it has been argued that redundancy often occurred without any evident utilitarian motive, in response to ideological mandates requiring that people avoid reusing things associated with deceased persons (Laylander 2014).

Some cases of multiple parallel trails may be examples of this ideologically driven redundancy. Colorado Desert archaeologists have reported what seems to have been a multiplication of prehistoric trail segments beyond any functional needs. For instance, as noted by Jackson Underwood (2004:239), “travel routes on the desert floor and alluvial slopes typically consist of a number of braided trail alternatives, not just one trail. These converge in areas like passes and springs, then spread out again where they are not constrained by the natural landscape.” Similarly, Apple (2005:107) observed, “The term trail is often used to describe major trail systems across the desert, but in reality, the singular trail across the countryside is rare. Generally, there were trail networks of alternative routes connecting important places.”

Johnston and Johnston (1957:23) noted that aboriginal trail systems almost invariably include multiple parallel trail segments in areas where the landforms and vegetation made such redundancy practicable. McCarthy, studying the same area, initially dissented from the Johnstons’ view, arguing that “as trails diverge from canyons or natural passes, it seems apparent that these trails lead to particular areas, each having its own destination” (McCarthy 1982:C-5). However, he subsequently modified this view somewhat:

Along two of the trails [in the McCoy Spring area] ..., a peculiar type of feature described as a “passing lane” or short, parallel trail loop has been noted. These passing lanes consist of the trail splitting and running parallel to the other segment (usually for less than 100 m) before they join again to form a single trail.... The distance separating adjacent “passing lanes” is less than several meters in one instance and several hundred meters in another [McCarthy 1993:137-138].

More specifically addressing the motivation for trail proliferation, Rogers (1966:51) reported:

It has been quite often found that where San Dieguito peoples, and later on, Yumans, were traveling in the same direction, the latter made a new parallel trail some feet away from the more ancient trail rather than walk in a trail of the dead. The two will converge into one where they pass through a narrow defile, but will immediately diverge on the other side.

A particularly compelling case of trail avoidance is provided by what have been termed “spirit breaks.” According to Rogers (1966:51), “a few instances have been found of a Yuman trail crossing a San Dieguito trail at right angles, or nearly so, where the Yumans had arranged lines of boulders across the more ancient trails, as if to stop the spirits of the dead from walking the trail.”

(A somewhat analogous pattern of avoiding a trail that was associated with a recently deceased individual was reported by Francisco de Ortega in 1636 among the Pericú in the Cape region of Baja California Sur [Mathes 1970:447-447].)

Landmarks and viewsheds

Notable natural features in the Colorado Desert landscape, such as Pilot Knob, Mt. Signal, and the major peaks and canyons of the Peninsular Ranges, likely served as landmarks that helped to guide prehistoric travelers to their destinations. As noted by Scharlotta, Schaefer, and Doose (2015:40), “Long-distance trails may line up with prominent features on the horizon, which may or may not be the ultimate destination.” In addition to offering practical assistance in traveling, landmarks that were observed from trailside locations may have been used in giving spiritual

instruction to students (Apple 2005:108).

Landmarks can be observed on the ground from existing trail segments, or their visual significance can be inferred from topographic maps. Additionally, programs such as Google Earth's Street View and Ground Level View make the views of landscapes easily accessible from the comfort of the researcher's proverbial armchair. Computer geographical information systems (GIS) have used digitized topographic data to model the viewsheds that are present from particular trail locations (Scharlotta et al. 2015:193). In addition to suggesting possible positive landmarks, viewshed analysis might be used to identify routes that were intended to avoid the viewsheds of some locations, such as settlements that belonged to potentially hostile communities.

Route optimization and prediction

A particularly interesting approach to trails studies in the southern California deserts is prehistoric trail route optimization. Some treatments of the subject have been merely impressionistic. McCarthy suggested that "the trails follow the path of least resistance to key resource areas" (McCarthy 1982:C-9) and that, "given the often rugged nature of the terrain, trails are usually the shortest and most convenient routes to walk from one point on the landscape to another" (McCarthy 1993:82). The availability of GIS has spurred the development of more mathematically rigorous least-cost models for trail routes. Scharlotta, Schaefer, and Doose (2015:78-80) discussed some of the issues involved in the development of such models.

More concretely, Apple and Anamay Melmed (Apple 2005; Melmed and Apple 2009) modeled possible trail routes in southeastern Imperial County on the basis of a GIS least-cost elevation model. They found some degree of correspondence between the trail routes that were predicted by their model and the traces of trails that they confirmed on the ground. However, the correspondence was far from perfect, working best where the distances covered were short and where topographic constraints were strongest. "Clearly, there are refinements needed in the model to more closely reflect human activity in a variety of terrains" (Apple 2005:109).

Conclusions: interpretive values in trails studies

Archaeological studies of the Colorado Desert's trail systems are helping to flesh out the understanding of the region's prehistory. Inventories of trails are becoming more extensive and more precise, in spite of the strong negative forces arising from the passage of time and from modern activity in erasing or obscuring the trails' traces. Investigations and analyses of trail systems are helping to elaborate the received pictures of regional patterns in resource use and ethnic interaction, as well as providing clues to prehistoric world-views as those were materialized in certain types of ritual behavior.

The experiences gained from trail studies carried out in the Colorado Desert region and in other regions may suggest opportunities for future trail studies in Baja California. As one example, studies of prehistoric trails, where those trails coincide with, diverge from, or run parallel to El Camino Real de las Californias, may shed light on the ways in which the route for El Camino Real was selected. Historic-period explorers and travelers often made use of the routes developed by prehistoric peoples (e.g., Davis 1961), but the popular cliché that game trails and Indian trails invariably underlie later routes, from explorers' paths to modern highways, is an exaggeration. In the case of El Camino Real, mission-period travelers often would have applied different criteria for their route choices, reflecting differences in long-range destinations, in daily rates of travel, in

needs for water and forage, in trail grades suitable for pack animals, and in security needs. The traces left by prehistoric and historic travelers may have also differed in important physical characteristics. Archaeological, historical, and ethnographic investigations of the Californias' trails may intersect in ways that will be productive for all three fields.

Acknowledgment

My thanks to Jerry Schaefer and Ian Scharlotta for some helpful suggestions.

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