

*When the Construction of Meaning  
Preceded the Meaning of Construction:  
From Footpaths to Monumental  
Entrances in Ancient Costa Rica*

**PAYSON SHEETS**

in human societies, the control of energy constitutes the most fundamental and universally recognized measure of political power. The most basic way in which power can be symbolically reinforced is through the conspicuous consumption of energy. Monumental architecture, as a highly visible and enduring form of such consumption, plays an important role in shaping the political and economic behaviour of human beings. This explains why, as systems based on inequality evolved, monumental architecture loomed so large in the archaeological record.

— Bruce Trigger, “Monumental Architecture:  
A Thermodynamic Explanation of Symbolic Behavior”<sup>1</sup>

The Arenal Research Project in northwestern Costa Rica has documented human occupation and human movement in the landscape over the past ten thousand years (Sheets and McKee 1994). Apparently, human movement across the landscape in times of low population density, such as the PaleoIndian, Archaic, and early sedentary periods, was oriented to specific tasks at particular times. That movement was therefore sufficiently randomized to have left no permanent record that we have detected.

However, a different form of movement began around 500 BC in the

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*Epigraph.* 1990:128.

Arenal area, as people began burying their dead in cemeteries separated from their villages. Simultaneously they began following precise paths that connected villages with cemeteries, and cemeteries with the resources used in them for construction and for feasting. The “proper” cemetery-associated movement was single file along the same path used by parental and earlier generations, resulting in compaction and erosion of the path itself.

These paths were the product of this structured pattern of movement, and we have never found any evidence of construction along any path. When people trod the same path on slopes over 10°, the channel formed by many footsteps began to erode. With time, concomitant erosion on either side of the path deepened it dramatically. Generation after generation of path use resulted in entrenchment of the paths 1, 2, 3, or more meters below the surrounding ground surface, and in one case over 7 m deep. Thus the sustained use of a straight path entering a cemetery had the unanticipated consequence of causing a sunken entryway.

I contend that this incidental entrenchment of paths created a culturally meaningful landscape of movement. The ritual standard presumably developed that the preferred way to enter a cemetery was along a sunken narrow straight path, and then when people entered the special place it opened up in front of them. It might have emulated the birthing process, or emergence into the otherworld.

The formation and use of these sunken entryways in the Arenal area date from 500 BC to AD 1300. After AD 500, and especially after AD 1000, a series of more complex societies developed further east. Along with inherited inequality came the “mentality of monumentality” and chiefs chose to impress their commoners and visitors with large constructed entryways into their special places. I suggest that the monumental entryways of the later chiefdoms had their origins in the earlier inadvertent sunken entryways to cemeteries of simpler societies.

What became a cultural standard with no construction effort in simpler times, as people constructed the meaning of special places and how to enter them, apparently was “writ large” into a constructed monumentality in later times. The unanticipated results of repeated activities eventually became impressive indeed. And what a wise choice by a chief seeking monumentality, to seize on a long-valued concept of sunken entry, to legitimize their centralized authority by exploiting a value embedded in antiquity. The regularly repeated movements embedded meaning in the landscape that

was later co-opted by leaders in need of monumentality to control behaviors of construction, maintenance, and use.

## THE ARENAL RESEARCH PROJECT

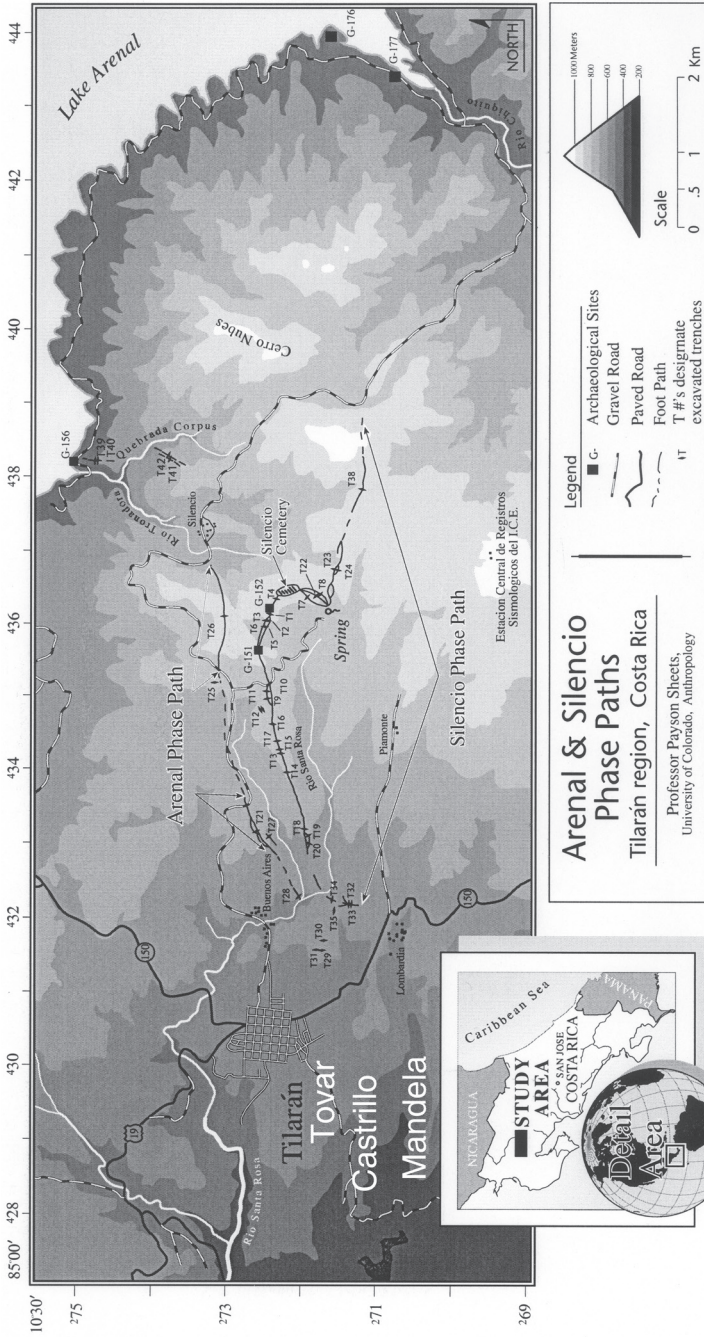
The Arenal Research Project has been operating in northwestern Costa Rica since the early 1980s (summarized in Sheets and McKee 1994). Funding from the National Science Foundation, National Geographic, and the University of Colorado has supported research. NASA has provided abundant remotely sensed imagery from aircraft and satellite platforms, in both analog and digital formats (McKee, Sever, and Sheets 1994) (Figure 8.1).

Certainly the most surprising, and most important, research result is the realization that we can detect ancient footpaths in the remote sensing imagery, and we can confirm them by excavations and careful attention to stratigraphy (Sheets and Sever 1991). Most linear anomalies can be identified as recent or modern features, such as roads, fencelines, property boundaries, or trails, by inspection of the imagery and by verification on the ground. However, many have proved on excavation to be ancient paths eroded and entrenched by centuries of use. Our ability to evaluate these features is enhanced by the presence of a thick tephra deposit produced by one of the greatest of the precolumbian eruptions at about AD 1450, providing a useful separator between ancient and historic features.

### Early Occupations and Task-oriented Movement in the Landscape

We have not detected any preserved footpaths from our earliest time spans, from PaleoIndian through Archaic and the early sedentary (Tronadora phase) occupations. That covers the majority of time that we have documented people living in the area, from approximately 10,000 to 500 BC. **My assumption is that task-oriented travel predominated, wherein people perceiving a need to obtain a food or other resource, visit kin, or conduct a ritual generally would travel least-cost routes on an individual task basis, sufficiently randomizing foot travel across their countryside so that entrenched paths did not develop.** In fact, it is indeed fortunate that every footprint of people moving across the landscape does not preserve, or there would be very few of us able to live in a thoroughly trampled world.

Tronadora phase (ca. 2000–500 BC) villages were small, probably less than 100 people, in round houses with (presumably) thatch roofs. The



**8.1** Map of the Arenal-Tilarán area, with the Arenal and Silencio phase paths and the sites they connect. The earlier Arenal path leads from the G-156 village on the lakeshore, uphill over the pass, and down westward to the complex of cemeteries in the Castrillo-Mandela area. The later Silencio paths lead south from the Silencio cemetery to the spring, and then east. Their terminus likely is a village or villages, and two likely candidates are in that direction along the lakeshore. The path leading westward from the cemetery passes two repositories of construction stone and continues to the Tovar source of that stone. The path likely continued to a village or villages.

ceramics were highly sophisticated, and were accompanied by basic and efficient chipped and ground stone tool assemblages. Manos and metates probably were used for grinding maize and other seeds, and both macrofossils and pollen indicate that some gardening of domesticates was done. However, the bulk of the diet probably derived from wild species of trees, bushes, vines, and other plants, along with hunting and fishing.

Burials were secondary, in small rectangular pits just outside the driplines of house roofs and often accompanied by ceramic vessels. We have closely examined all analog and digital remote sensing imagery in and around these villages, and found no linear anomalies that could be ancient footpaths. In terms of social organization, all material indicators consistently point toward egalitarian societies throughout the thousands of years from PaleoIndian through Tronadora times.

### **The Arenal Phase and the Emergence of Ritually Directed Movement**

The population density during all precolumbian phases of occupation of the Arenal area remained quite low by Mesoamerican, Andean, and even by overall Costa Rican standards. It probably never exceeded a few people per square kilometer. However, the Arenal phase (500 BC to AD 600) had the largest settlements and the highest regional population density of any phase in our research area. Villages were composed of houses similar in size and construction to the earlier phase, but many more of them, with more ceramics and heavy tools such as manos and metates.

In terms of social organization, societies during all phases of occupation prior to the Arenal phase were egalitarian, based on the uniformity of housing, artifacts, and grave goods in the Tronadora phase as well as evident uniformity in the two earlier phases. Housing and household artifacts do not show any differentiation during the Arenal phase, supporting the interpretation that egalitarian societies continued. However, some Arenal phase burials show differentiation that could reflect status differences, but it also could derive from gender or age differences and the society thus have remained egalitarian.

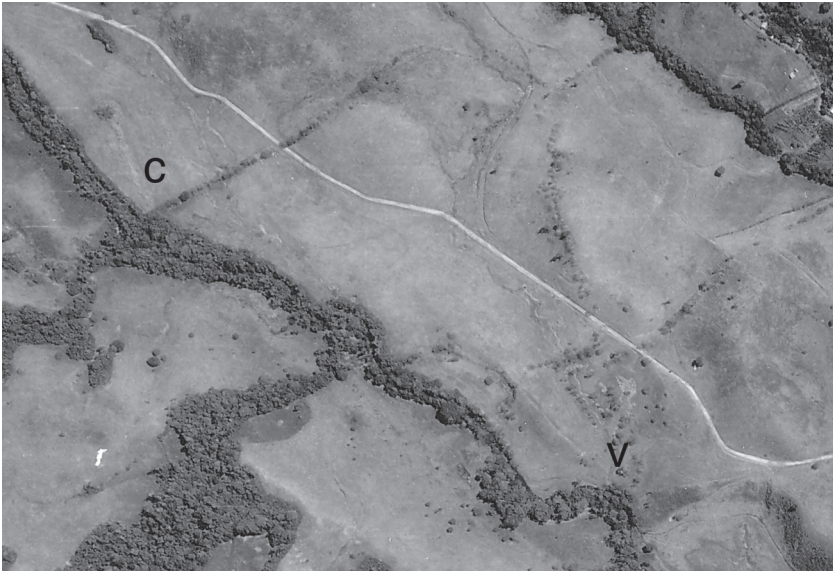
In a dramatic variance from earlier periods, Arenal Phase burials were placed in cemeteries separated from the villages, in some cases by only a few hundred meters, but usually many kilometers distant. A good example of an Arenal phase cemetery is the Bolivar site, located on a hill 150 m south-east of the associated village (Hoopes and Chenault 1994). Although we

detected no remains of a path at Bolivar, the cemetery itself is instructive as to burial procedures and post-interment rituals (Hoopes and Chenault 1994). Burials close to the ridge top received considerable post-interment attention. The primary burials were placed in pits dug about a meter below the ground surface, and occasionally accompanied with grave goods (stone axes). The pits were filled in with dirt and then outlined with elongated stones on the surface, and then rounded river stones were harshly smashed onto the entire surface, creating a low mound of rock. That was followed by extensive feasting and smashing of hundreds of complete pottery vessels and dozens of decorated metates and other artifacts in post-funerary rituals throughout the cemetery.

Only 10 m down the gentle slope was a different kind of cemetery, covered with much more fragmentary and eroded sherds and a few broken ground stone artifacts. We concluded that these artifacts were scavenged from a midden and redeposited over the burials, a "poor person's" imitation of the more elaborate cemetery nearby. If these differences are not reflective of variation in gender, age-grade, or other similar factors, they could be indicative of the beginnings of social inequality. The lack of skeletal preservation in all Arenal phase cemeteries is due to high soil acidity and mean precipitation of about 3000 mm per year. Unfortunately, that means no gender or age studies of the deceased can be performed.

Paths dating to the Arenal phase have been recorded elsewhere in our Arenal research area. The shortest known path (Figure 8.2) is only 250 m long, and its positioning helped us understand how important entrenched paths were to ancient people in this area. It is between a cemetery (G-184) and a village (G-180) that are 1.1 km apart (McKee, Sever, and Sheets 1994:144–46). The easiest transit between the village and cemetery is on the flat floodplain of the Rio Piedra, along an almost straight line. However, the path runs up and over the hill, increasing the distance of travel slightly and the effort significantly. In addition to movement, this entrenched path also structures associated views in interesting ways. Traveling from the cemetery, one would be in the entrenched path up and down the hill, but as one reached the bottom of the hill and the entrenched path disappears, the village would open up to view.

Wherever we suspect we have detected an ancient path in the imagery or on the ground, we excavate it to determine its age and nature. On the north side of the hill the path had eroded down to about 1.5 m below the



**8.2** Aerial photograph of the Rio Piedra area, just west of Lake Arenal. The Rio Piedra flows from the upper left corner down to the lower right, under the gallery forest. The “V” denotes the Rio Piedra village, and the incised path is visible on the hill immediately to the northwest. That path points directly toward the cemetery “C”. The easier route between village and cemetery would be to pass on either side of the hill. Horizontal distance of aerial photograph is 1.6 km.

surrounding ground surface, while other parts of the trench on both sides of the hill had eroded to an estimated 2 m below the surrounding ground surfaces. Such an entrenched path would only have formed under particular conditions, one being movement restricted to that specific route.

Cultural/ritual prescription of travel along precisely the same path, year after year, from village to cemetery and back, would have generated the signature we see for this and other Arenal Phase paths. The first effect of sustained walking was linear compression, and inclinations greater than  $5^\circ$ , and especially over  $10^\circ$ , provided sufficient slope for moving water to erode the path itself. The actual “walked surface” is consistently only about 0.5 m wide, and that can only be formed by single-file use. Because the tephra layers and the juvenile soils on them are so unconsolidated in the Arenal area, their angle of repose under these conditions is a slope on either side of the path of approximately  $30^\circ$  from horizontal. Thus, as the path surface

erodes downward, it takes a broad V shape of surrounding surface down with it. Thus the prescription on path use in sloping areas resulted in the inadvertent entrenchment, which I believe became a cultural standard of the proper way to traverse between special places.

Although none of the paths of the Arenal phase were themselves constructed, associated constructed features do exist. On the hilltop above Rio Piedra two low stone platforms flanking the path were built of subrounded river cobbles, presumably carried from the river nearby. It is possible that people with special ceremonial roles stood on the platforms as processions passed single file between them. These features may be pregnant with importance, as they may be the forerunners to elements of monumentality in later chiefdoms (see below). The smashed ceramic vessels found on top of, and between, the stones are reminiscent of ritual pottery-breaking in Arenal phase cemeteries on both sides of the divide.

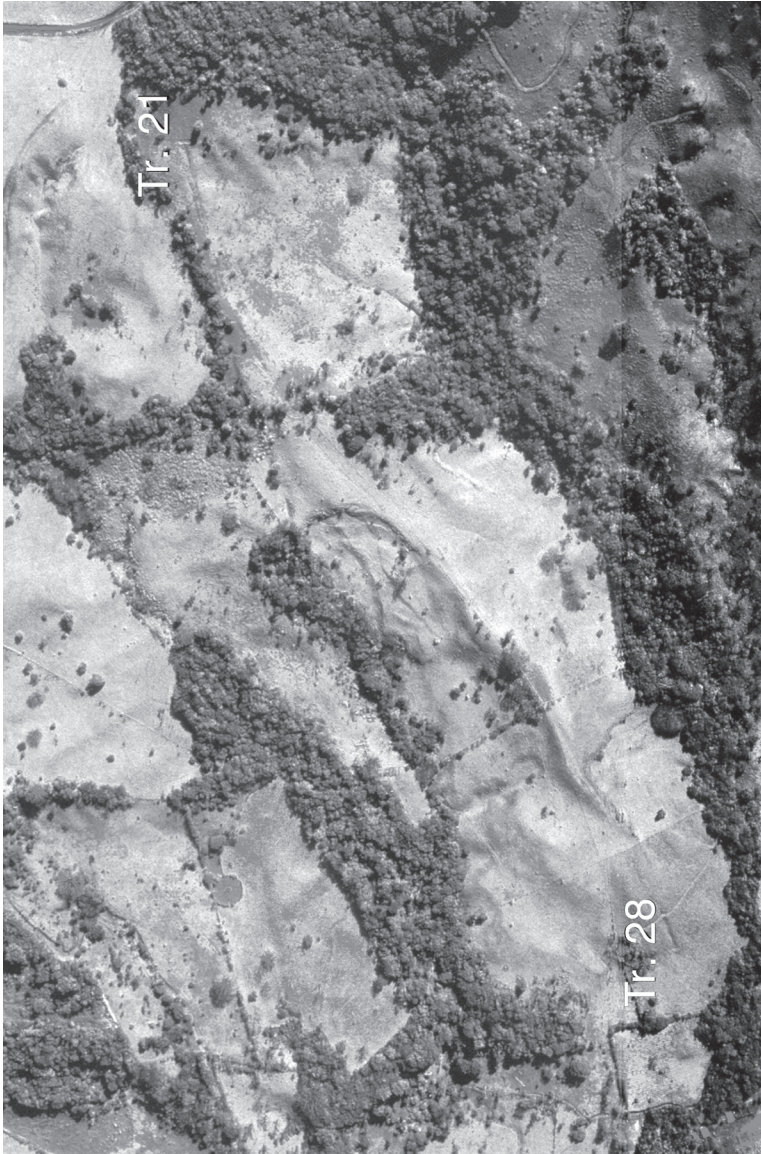
The longest Arenal phase path discovered to date is over 10 km long, leading south from village site G-156 on the south shore of Lake Arenal, and dated by ceramics, stratigraphic associations of the soil on the volcanic ash unit when path use began, and the ash unit that fell after the path was abandoned (Hoopes 1994) (see Figure 8.1). The path runs across the grain of the land with little regard for terrain, ultimately bending westward, crossing the mountain range that divides the Caribbean from the Pacific drainage. The path has been traced and confirmed to where it crossed the Rio Santa Rosa 1 km east of Tilaran, at the left side of Figure 8.3, and 6.4 km from the village (straight line distance). That segment of the path was confirmed by excavating Trenches 21 and 28. What appears to be a section of the same path, but farther west, was recently discovered at the juncture of the *fincas* (ranches) of Callan Vargas and Hilma Jenkins, 8.8 km from the village in a straight line.

Finding that segment led our survey into what must have been a special area of some two dozen Arenal phase cemeteries 1 to 2 km farther west, at the locus labeled “Mandela” on Figure 8.4. This supports our contention that entrenched paths connect villages and cemeteries. That entrenched footpaths began during the Arenal Phase, and not before or after, brings up two key questions, for which I can offer only possible answers.

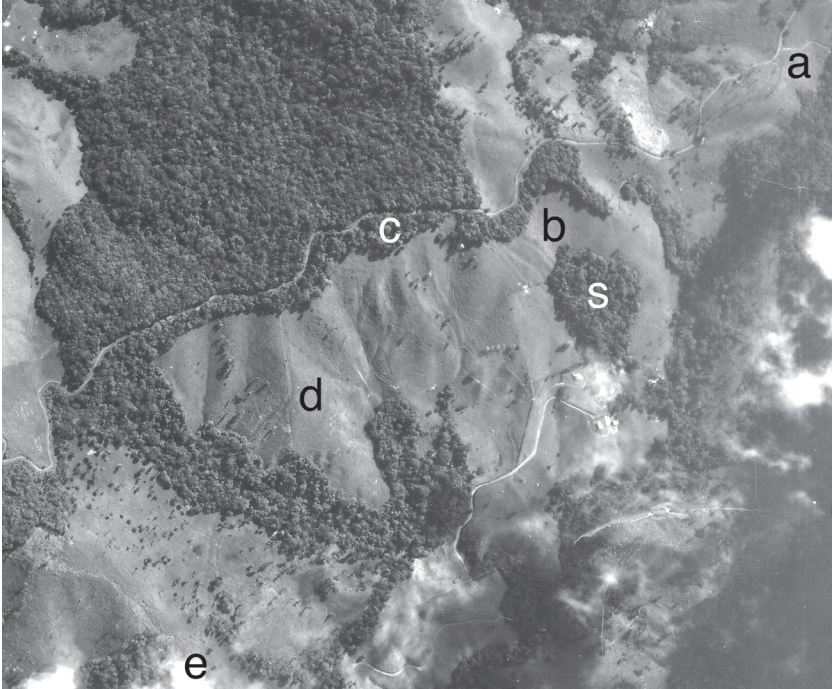
### Cemeteries Separated from Villages

Why separate village from cemetery? A potential answer is provided by ethnographic accounts from lower Central America. First we consider





**8.3** Black-and-white version of infrared aerial photograph showing rainforest (dark) and pastures (light), with earlier Arenal phase path confirmed by Trenches 21 and 28. The path is the single darker line at Trench 28 that runs uphill (northwest), and divides into two parallel paths at Trench 21. Horizontal distance is 1.5 km.



**8.4** Silencio phase paths radiating from the Silencio cemetery (“c”) atop the mountain, dividing the Pacific from the Caribbean drainages. Three paths (“b”) lead down to the spring (“s”), and then continue northeastward to “a” and presumably a village or villages. Another path heads south to “d” and bends around a stone repository, and then southwest to cross the small stream and climb the steep slope to “e”. This path leads to the source of construction stone at Tovar, just west of Tilaran, and probably on to a village or villages. Horizontal distance of aerial photograph is 2.3 km.

the present-day Cuna in Panama (Dillon 1984), the most traditional Native Americans in lower Central America. The Cuna bury their most prominent village members (civic leaders, heads of prominent households, shamans, curers) in cemeteries at or near ridge tops visible from the village but many kilometers away. When asked why the cemetery is so far away, the Cuna respond that the spirits of the dead are less bothered by the noise, smoke, and children of the busy village, and the living are happier with the spirits of the formerly powerful people buried at a distance. The body of a powerful person may have stopped functioning, but their spirit has not and it must be dealt with appropriately. As the Cuna travel

from village to cemetery and visit the graves of deceased ancestors for extended times, they consume food and drink, burn incense, and make offerings to the deceased.

The most traditional Native Americans in Costa Rica are the Bribri, described by Skinner (1920) and Bozzoli de Wille (1975). The Bribri believe that people leave a part of themselves in everything they touch, or in every place where they lived or to which they have traveled (Bozzoli de Wille 1975). Both ethnographers mention the Bribri concern for evil spirits at the time of death. After death, the soul-spirit of the deceased will revisit all those places, and to find those places the assistance of the living is essential (Bozzoli de Wille 1975). She describes (1975:95) an example of a cemetery on a hilltop 2 km from the village and the processions carrying the bones (presumably from the platform) to the cemetery. The spirit, following the bones and the procession, needs guidance. The women tie string along the path to help guide the spirit, which of course causes a path segment to follow a straight line. If similar practices existed in ancient times in the Arenal area, perhaps by tying vines, this could explain why so many of our path segments are so straight. Elaborate funerary rituals occurred from the time of death to the interment.

Why travel such a precisely prescribed route? James Snead (2002) provided important insights that could help answer this question in his study of ancestral Pueblo trails of northern New Mexico. He found that meaning as well as practical and economic factors were intrinsic to ancient paths in the Bandelier area. In a paradigm-changing insight into how differently Westerners and Native Americans can view a trail, Snead provides a quote from Waterman about the Yurok of California: "Trails are sentient, and must be traveled with urbanity. If you step out of a trail and in again, and fail to preserve decorum, the trail becomes resentful" (2002:756). Although the geographic and cultural distances between Arenal people and the Yurok are great, I believe the former might have considered their paths as sentient, or at least so special that people did not step out of the path.

Pertinent here is the concept of materialization (De Marrais, Castillo, and Earle 1996), also discussed by James Snead (Chapter 3, this volume). Materialization focuses on the relationship between material culture and ideology, within the framework of landscape. It relates the physical to the conceptual world. As generations of Arenal villagers processed single file along the same ritual pathways to their cemeteries, their perception of the

gradually entrenching paths changed, as did their perception of the landscape. The separation of village and cemetery appears suddenly in the archaeological record. Simultaneously, people determinedly maintained their precise paths linking village to cemetery, thus enforcing connections between the living and the deceased. As those paths entrenched during later centuries, a new value emerged, that of the ideal way to transit the landscape and enter a special place. Generations of processions of Arenal people along their paths constructed meaning.

It remains unclear why the shift to prescribed paths occurred during the Arenal phase, but the separation of cemetery and village space is clearly important. It is possible that the belief in the supernatural power of the spirits of the deceased had somehow blossomed around 500 BC, and therefore separation of village and cemetery was necessary, as well as prescribed passage between them. Single-file processions were involved, and a sense of place, as well as the tradition of going to the cemetery precisely as one's parents and grandparents did.

### **The Silencio Phase and Continuity in Ritually Directed Movement**

The tradition of separating village from cemetery, as well as the cultural prescription of following the same path between them, continued during the subsequent Silencio phase (AD 600–1300). The continued forming and using of entrenched paths is one of several indicators of continuity between two phases. Overall population declined, however, and villages were smaller (Sheets and McKee 1994). The principal change in funerary practice from Arenal to Silencio phases involves the shift from rounded river rocks to flat slabs of rock (called *laja*) used to make stone box tombs.

A good example is provided by the Silencio cemetery (G-150) perched atop the divide between Atlantic and Pacific drainages (Figure 8.4). Evidence in the cemetery of feasting and other ritual activities associated with the deceased and their spirits included great numbers of thermally fractured stones using in cooking, many cooking vessels, dispersed maize pollen possibly indicating corn grown in the cemetery, carbonized foodstuffs, and pine pollen (Sheets 1994). The cemetery was connected to a village (or villages) and to exploited resources by paths that headed downslope into both drainages, to the east and west.

The path headed westward from the Silencio cemetery has been traced for 3.7 km (straight-line distance) to near Tilaran where it disappears in rela-

tively flat-lying terrain that has had major agricultural disturbance (particularly sugar cane) and a lot of recent construction. However, the path heads straight toward the Cerro Tovar *laja* source, the principal source of stone slabs and headstones for the Silencio cemetery. The straight-line distance from the Tovar source to the cemetery is 7.3 km. Other confirmation that the path was intended to access the *laja* source is provided by the two *laja* repositories that lie along the path (G-151 and -152) on the west side of the cemetery.

Because the amount of trail use is proportional to the amount of erosion (holding slope constant), one can estimate relative amounts of foot traffic on portions of these Silencio phase paths. The volume of erosion of the path headed westward from the cemetery is about as great as the erosion of the path headed eastward. One function of the westward path was transporting stone for construction of tombs from the Tovar source southwest of Tilaran. However, the amount of erosion (i.e., foot traffic) on this path is considerably greater than that expected if it were used only for occasional access to the *laja* quarry. Therefore, I believe it is probable that a village connected to the Silencio cemetery lies to the west of the Tovar source.

Traffic on the eastward path can be divided into two segments: the section connecting the cemetery to the spring, and the continuation of it farther east (Figure 8.4). Well over twice the erosion, hence foot traffic, traversed the paths between cemetery and spring, than traversed the continuation eastward. People involved in funerary rituals frequently descended to the spring and returned, more often than they walked the distance from village to cemetery. It is virtually certain that a village, or villages, participating in cemetery rituals lies at the terminus of this eastward path. We have yet to confirm the path all the way to that terminus, despite years of trying.

### The Tilaran Phase

The Tilaran phase is the final precolumbian phase in the Arenal area, dating from AD 1300 to 1500. The population decline of the earlier phase continued and even accelerated, leaving scattered hamlets across the countryside and no evidence of cemeteries separated from villages. The settlement pattern is like that of the Tronadora phase, the earliest sedentary phase, but probably with even lower regional population.

We could find no evidence of Tilaran phase footpaths, despite the fact

that their higher stratigraphic position would have meant fewer sources of disturbance than the older footpaths. It is thus probable that ritually prescribed travel had been eliminated from the culture. There is other evidence for significant cultural discontinuity from the preceding tradition, as the local cultural traditions were replaced by a Central Highlands-Atlantic Watershed culture (Sheets 1994). An actual immigration and population replacement may have taken place.

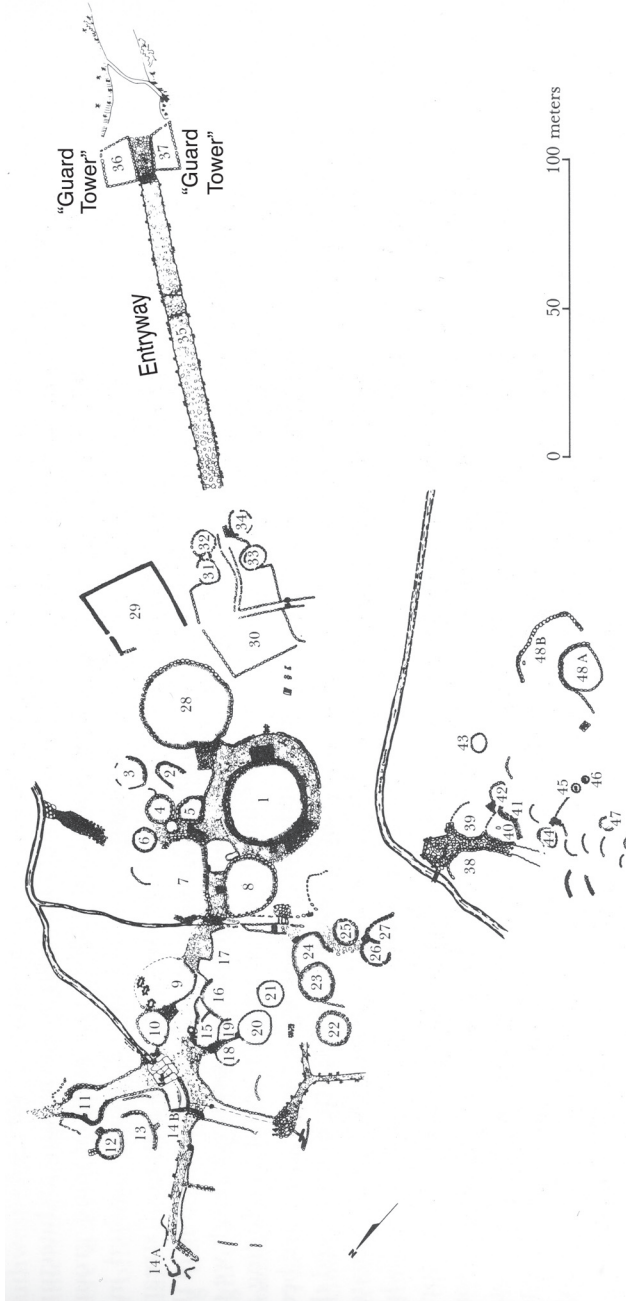
### AND THEN, THE MENTALITY OF MONUMENTALITY

By AD 1000 a series of larger sites emerged to the east of the Arenal area, in the Atlantic drainage of Costa Rica. I would characterize them as ranked societies or chiefdoms, with their central places distinguished by large, bilaterally symmetrical architecture that exhibits monumentality. The sites often have long roadways paved with cobbles called *calzadas* that lead into formal plazas ringed with barrier structures, large mounds, and occasionally aqueducts, pools, and bridges (Snarskis 1981:63). As Snarskis states, Guayabo de Turrialba is the largest and best known of these chiefly centers, which also include Las Mercedes, Anita Grande (a.k.a. Parasal), Fortuna, Cutris, Costa Rica Farm, and La Cabaña.

In all cases the entryway into the special place is constructed to be impressive. One approaches the Guayabo de Turrialba site via a 20-m-wide and straight *calzada* that passes between two imposing stone structures or “guard towers” (Figure 8.5) (Fonseca 1981:106). However, on either side of the “guard towers” I could find no natural or constructed feature that might hinder someone circumventing this entrance. The view down the *calzada* between the guard towers toward the center of the site is precisely oriented on the distant Turrialba volcano. I suspect the intended effect was to create the impression of monumentality and to display chiefly power to those walking the *calzada*, making a statement of authority and connectivity or rulership.

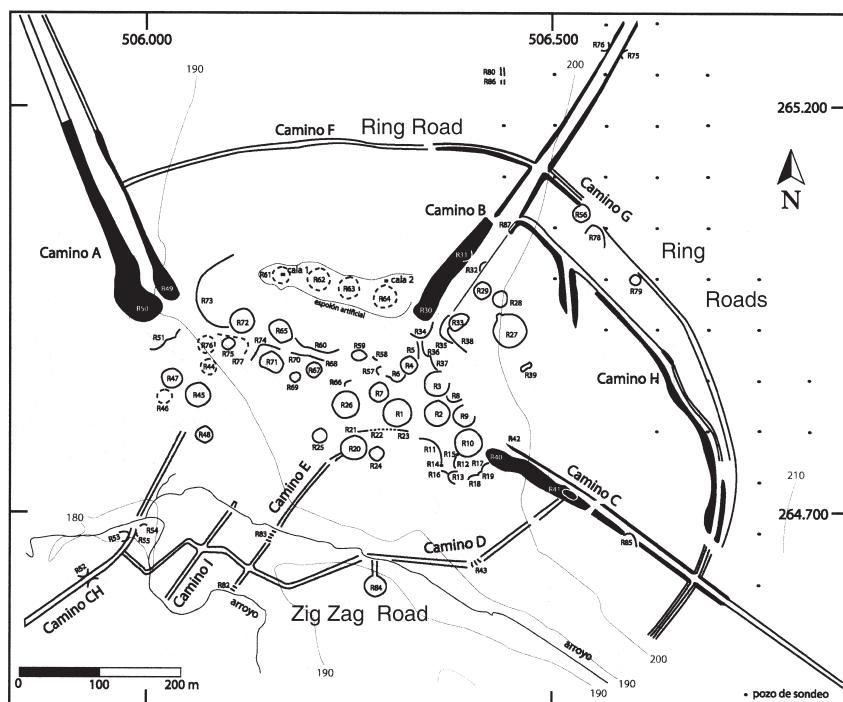
According to Mauricio Murillo (2002), a long stone-paved *calzada* has been traced and confirmed heading north-northeast out of Guayabo for over 4 km, linking it with other sites on the way and a site complex at its northern end (Figure 8.6). This feature cuts across tremendous topographic variability in order to maintain an almost straight line.

Fortuna and Cutris are the centers of chiefdoms located in a topographic



**8.5** Map of the chiefdom site Guayabo de Turrialba (after Fonseca 1981:105). The entryway on the left leads up a large stone-paved stairway, between two "guard towers" of stone, and along a long stone-paved walkway to the center of the site. The entryway aligns directly to Turrialba volcano to the west, past the principal Mound 1.

setting quite different from Guayabo, as they are beyond the steep rocky terrain of the volcanic slopes. Unlike Guayabo, they lacked easy access to large construction stone, as they are in a gently sloping alluvial environment of finer sediments. Instead, their impressive entryways are earthen constructions. Large labor gangs created these entryways by digging a few meters down into the fine river alluvium and piling the sediment up on both sides, creating a long sunken road with long straight berms on both sides. Recent research on Cutris shows that the site is earlier than expected (Vazquez, Guerrero, and Sanchez 2003). Other chiefdoms in Costa Rica have been dated to Period VI, between AD 1000 and 1500. Cutris reached its apex during Period V, between AD 500 and 1000. The 50-hectare site center is like the later chiefdoms, with some 86 identified features, largely platforms and



**8.6** Map of the Cutris chiefdom site, with the beginnings of the four roads radiating outward (denoted as Camino A, B, C, and CH). Roads A, B, and C are interconnected with ring roads. The mounds in the site center were used for public performances, residences, and burials. The zig zag road at the bottom connects roads C and CH.



mounds of which some have river stone in facings and stairs. Illicit excavators have found both gold ornaments and carved jade.

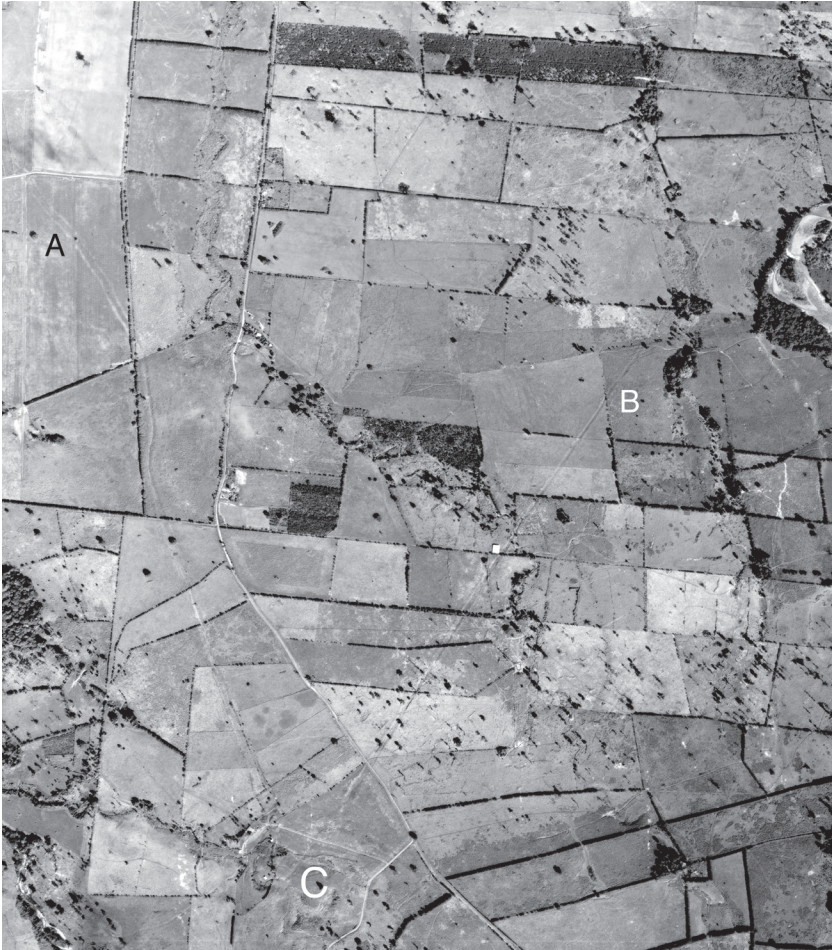
The monumental sunken roadways radiating from Cutris are impressive. Vazquez, Guerrero, and Sanchez (2003) have found that each terminates in a smaller village, from 6.7 to 9.4 km from Cutris. The roadways are of earthen construction, and are visible in aerial photography (Figure 8.7). The roadways average 6 m in width, and they broaden dramatically in the final kilometer approaching the site center. They broaden to 35 to 40 m in width, and are deeper than before, perhaps some 5 m below the surrounding ground surface.

The emotional impact of walking along such a sunken roadway is notable, and even today some are sufficiently deep to hide the surrounding countryside. One's attention is thus focused on the distant objective ahead. Anticipation builds as one walks in the progressively deeper and wider entryway, and then as one enters, the full site center is suddenly in view. If the modern visitor can have such an emotional reaction and be so removed from the ancient inhabitants by centuries, culture, language, and belief, one can only imagine the effect on the traveler who is fully informed and experiences the entrance process from within the relevant cultural context.

According to Juan Vicente Guerrero (personal communication 2003) small stone platforms were built along either side of the entryway close to the site center, atop the berms, every few hundred meters. Is it possible that the stone platforms beside the naturally eroded path atop the hill near Rio Piedra might have been an egalitarian forerunner to these stone platforms flanking the broad, deep entryway?

Two sets of ring roads connect three of the radial entryways at Cutris (Figures 8.6 and 8.7), and are 2–3 m wide (Vazquez, Guerrero, and Sanchez 2003) and about that deep. These secondary roads could have provided access to other major roads without entering the site center. Perhaps not all processional participants were allowed entry to the site center. Why the southern secondary road follows a zigzag route is totally unknown.

Broad entrenched entryways radiating some 4 km from a site make no sense as defensive features. I think the most likely functional explanation is in the ritual domain, as monumental processionways and materialized power (De Marrais, Castillo, and Earle 1996). These roadways can readily be interpreted as chiefly displays, demonstrating their control of energy through human labor to construct and maintain these huge systems that



**8.7** Aerial photograph of the Cutris chiefdom center at "C", and roads radiating outward at "A" and "B". Horizontal distance of aerial photograph is 2.5 km.

shape perception of space to advance political and social agendas. Chiefs could display their control of human activity through processions using the entryways, demonstrating their hierarchical power before their subjects and before visitors from other centers.

The relationship between these chiefly centers and the Arenal area is unclear. A population movement from Arenal eastward to these sites is possible, but there is no evidence of it. It is also possible that rulers in the more complex societies adopted the idea from the Arenal area. Perhaps more

likely is a widespread religious conversion of people in all these areas, resulting in establishing distant cemeteries and paths that entrenched through time. No earlier simple eroded paths have yet been found east of the Arenal area that would support this interpretation. A ruler initiating control of labor to construct, maintain, and use monumental entryways would be wise to exploit a valued cultural norm that had existed for centuries before, rather than inventing something entirely new.

## COMPARISON WITH OTHER PATHS OR ROAD NETWORKS

The pattern seen in Costa Rica of central places connected by calzadas with “ring roads” is also known in other areas of the tropical lowlands in South America. They also have some similarities with constructed roadways in ancient North America. These patterns reflect common expressions of monumentality and processions/pilgrimages.

Heckenberger et al. (2003) report on complex regional settlement patterns of native Amazonians in the Xingu area of Brazil from ca. AD 1200 to 1600. They found 19 major ancient settlements an average of 4 km apart, and they were linked with broad straight roads detectable in Landsat TM imagery. Some of the excavated ditches in and around the settlements were up to 2.5 km long and 5 m deep. The major roads were 10 to 50 m wide, with berms on each side, and often ran into plazas.

The pattern of a central place with radiating principal entrenched roads, with smaller concentric rings of ditches, is strikingly similar to Cutris. The rings could have functioned as roads linking the radiating primary roads, or some of them could have been part of ditch-and-palisade fortifications. The radiating roads must have served practical functions for communication and trade, but their width as they approach the site centers indicate more of a ritual/processional function. To some degree this widening could have practical aspects, as Ur (Chapter 9, this volume) found. However, I believe the degree of widening at Xingu and the Costa Rican chiefdoms is much greater than the rather small populations would warrant for purely practical purposes. Heckenberger et al. (2003) estimate residential populations in the larger centers as between 2500 and 5000 people, or regionally at 6 to 12.5 people per square kilometer.

Similar patterns can be seen in lowland Venezuelan sites associated with chiefdoms, which developed earlier than most of those in Costa Rica and

the Amazon (Spencer 1994:38). Calzadas came into use between AD 500 and 1000, linking several of these centers. The settlement pattern, density, radiating calzadas and ring roads, and central places are quite similar to Atlantic lowland Costa Rica. Large and small mounds and an oval “ring road” similar to Cutris, for instance, characterize the Gavan site. Three calzadas radiate toward other sites as well (Spencer 1994).

In Ohio the “Great Hopewell road” (Lepper 1995) has been traced for some 90 km as a straight entrenched roadway from the Newark earthworks south-southwest to the High Banks works in Chillicothe. The width of the roadway is impressive at about 60 m, a bit wider than the Cutris entryways. The earthworks at both ends are huge enclosures that are somewhat reminiscent of the plazas in the large Costa Rican sites. Although they are in a dramatically different arid landscape, the Chaco roadways in the U.S. Southwest (Lekson 1999; Sever and Wagner 1991) also share characteristics with the roadways at Cutris and other chiefdoms.

All of these constructed cases share roadways that become more formal and wider as they get closer to “downtown.” Similar characteristics include berms and a general tendency toward straightness despite topographic obstacles. They also share roadway entrances that are much wider than can be explained by economic needs. Although never historically connected, the commonalities of these types of roads imply similar patterns of materialization (De Marrais, Castillo, and Earle 1996) as sustained use embedded ideology into the landscape. The quote that begins this chapter on labor control and monumentality is pertinent here. Snead (2002; Chapter 3, this volume) develops the concept of a “gateway trail” among the ancestral Puebloans, which shares important features with many of these built entryways, but without the monumentality.

## SUMMARY AND CONCLUSIONS

As our research has documented, precolumbian populations of the Arenal area of Costa Rica are notable for social stability and continuity across more than 10,000 years. Residents avoided the population explosions of Mesoamerica and the Andes, and they avoided state level societies with their concomitant chronic warfare, environmental degradation, reliance on intensive cultivation of a carbohydrate staple crop, nutritional deficiencies, and other hallmarks of civilization.

Human movement across the landscape throughout 80% of the precolumbian occupation of the Arenal area was sufficiently randomized to leave no trace that we can detect by remote sensing, pedestrian survey, or excavation. That movement is here interpreted as task-specific and thus was not routinized in place for long periods of time. However, this pattern changed at about 500 BC, and for almost two millennia people separated their cemeteries from their villages. They traveled in single file between them on straight routes. Regular processional use of the path must have invested it with increasing meaning and sanctity.

Use of the same precise path resulted in linear compaction. Where the path traversed a slope, an unintended consequence was erosion. Although the actual path surface was never wider than a half meter, the downward-eroding path eroded its sides as well. Use sustained over a few centuries resulted in paths entrenched a few meters below the surrounding terrain. A person traveling an entrenched path loses sight of surrounding terrain, and vision is inevitably focused on the objective at the end of the path.

I suspect the deep meaning of the path became associated with travel through such a deep entrenchment, which opens up when one enters the special place at the terminus. That inadvertent consequence permanently engraved procession routes into the landscape, and into social memory. Such entrenched passageways became the “right” way to enter sites of sacred character.

I propose that in later centuries, when chiefdoms developed to the east of the Arenal area, and chiefs needed to exercise their authority by mobilizing labor to make large nonutilitarian features, they adopted the symbolism of entrenched entryways for their monumental architecture. Thus they built features such as the ca. 8-km-long entrenched earthen roads at Cutris, and later the long paved calzadas with monumental entryways into sites such as at Guayabo de Turrialba. Thus, the egalitarian societies developed the principles that were “writ large” when the mentality of monumentality developed among more complex societies. When leaders of nearby chiefdoms needed a “hook” to get commoners to engage in large work gangs to construct monumental features, they wisely chose sunken pathways that had a high cultural value recognized by all.

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