

## CASE REPORT

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# A Clandestine Burial in Costa Rica: Prospection and Excavation

**ABSTRACT:** This case report describes the search for a clandestine grave in Costa Rica for which the police sought the assistance of an archaeologist. An anonymous informant suggested that the victim had been kidnapped and murdered, placed in a shallow grave in the woods, then covered with lime and cement. A search of the area to detect conventional signs of burial (e.g., slumping, different plant growth) resulted in excavation of unrelated features of past disturbance. Different aspects of the grave including the deposition of cement powder over the body prevented its initial discovery. Improvisation of conventional archaeological excavation methods and use of police familiar with archaeological excavation resulted in the location of the grave and exhumation of the victim without loss of important contextual evidence that supported testimony on the cause of death. The taphonomic effects of high-lying ground water and lime in the tropical burial environment are briefly discussed. Recommendations such as the construction of a temporary sump to lower the ground water level in the grave during excavation are made to assist in similar investigations in the future.

**KEYWORDS:** forensic science, forensic archaeology, grave detection, grave excavation, Costa Rica

### Background

On Wednesday, November 17th, 2004, agents from the *Organismo de Investigaciones Judiciales* (Judicial Investigation Body) of Costa Rica contacted the National Museum of Costa Rica seeking assistance with the search for human remains reported to have been buried in a clandestine grave.

According to an anonymous caller, the remains were buried about 15 m into the woods from a road in an area of coffee plantations, not far from the capital city, San José. On the journey to the suspected site, investigators explained that they believed the burial was of a kidnap victim from about two and a half years prior who, according to the anonymous caller, had had his throat cut and was placed in a freshly dug grave, covered with lime, and then cement.

Prior to excavation, the logistics of the operation were planned and input taken from investigative team members including several *zapadores*, northern border police who were trained in detection of land mines (left over from the civil war in Nicaragua). These police had previously worked excavating with the National Museum of Costa Rica on cases of robbed archaeological sites—a different sort of forensic archaeology that has not been discussed in the literature.

Costa Rica has historically been an exception to the state-led violence, inter-group conflict, human rights violations, and forced disappearances seen in other countries in the region during the 1970s and 1980s. The overall crime rate is lower in Costa Rica than many more developed countries including the United States, although the intentional homicide rates reported in 2001 and 2002 were slightly higher (6.64 and 6.44 per 100,000) than those of the U.S. (5.62 and 5.62) (1).

The experience of this author with buried body cases in Europe and North America has shown that in many forensic cases there is a preoccupation with only recovering the remains of the presumed

victim, missing or destroying contextual and associated evidence related to the death and burial. Despite the Costa Rican authorities having only used archaeological expertise on a few occasions, they emphasized from the beginning that the archaeologist would lead the search and excavation in consultation with the crime-scene manager. The use of police familiar with archaeological excavation also greatly assisted the investigation. The pathologist was invited to participate in the exhumation once the body had been exposed and recorded. Despite the complicated nature of the grave, which necessitated improvised excavation methods, and unfriendly weather, important contextual evidence was recovered that supported witness testimony.

### Methodology

#### *Definition of Search Area*

The area of investigation was premontane humid forest (a geographic denomination) at c. 800 m above sea level. It was delimited according to natural and artificial boundaries: a deep gorge and river; a paved, secondary road; and steep, heavily forested inclines. Based on these boundaries, investigators defined the search area as c. 70 m by 40 m. Slightly beyond 25 m from the road, there was a natural upward slope. This was difficult to climb under normal circumstances and it was concluded that it would have been very unlikely for the alleged offender(s) to take the victim upslope for burial (2,3). The site was heavily forested with some ferns, thick roots at or near surface level as well as large rocks; these essentially eliminated the possibility of using geophysical prospection methods such as ground penetrating radar or earth resistivity. Also, the heavy tree cover meant that aerial photographs, if they existed, would be of no assistance as the ground surface would not be visible.

#### *Preliminary Search*

Initial inspection of the area delimited 10 places of interest designated by the archaeologists with flags for further investigation.

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Criteria for areas of interest included topographical depressions, areas with distinct vegetation, places free of larger trees (i.e., those that would be older than two and a half years), large roots, and immovable rocks and boulders. A thin metal probe (4) was also used cautiously to detect areas of lesser subsurface compaction, which could indicate that it had been disturbed, perhaps by digging. The area was surveyed and mapped electronically with a total station (a theodolite with an electronic distance measuring device), prior to any intrusive search and excavation. At the same time as the mapping, a foot search was conducted across the area.

#### *Feature Identification and Excavation*

A test pit was dug in a seemingly undisturbed area to examine the natural soil horizons. These would be compared to any excavated areas which appeared to confirm past disturbance, as with the creation of a grave. Such test pits appear not to be commonly undertaken in forensic contexts. They have been proposed by Wright et al. (5) and performed by the author working conventional archaeology and also with teams on mass grave excavations in the former Yugoslavia.

Feature 1, a depressed area with vegetation that differed from that of the larger context and which when probed was less compact than the surrounding area, was deemed “most promising.” A 4 × 4 m quadrant string grid was laid across it. All soil excavated from each quadrant was sieved by the *zapadores* and any items deemed possibly relevant were collected and their provenience (i.e., the section and depth from which they came) noted.

Feature 2 was detected via the metal probe, where there was relatively little subsurface resistance. Excavation of the humic layer defined a small, oblong feature that was then excavated in horizontal, arbitrary stratigraphic layers of 10 cm each. Each layer was sieved and items recovered were recorded and retained.

When features 1 and 2 proved to be modern but unrelated disturbances (see Results), it was determined that a more effective method was required to identify all disturbances to the natural soil layers from which we could then prioritize features for excavation. Feature 3 was discovered via stripping with mattocks of the uppermost soil layer (about 10 cm depth and 15 cm width). Starting from a central point on the site, three lengths were stripped radiating outward in a spoke-like pattern across the site, keeping away from large boulders and trees. The objective of this method was merely to search for changes in the soil matrix that would indicate disturbances.

## **Results**

During the foot search, prior to excavation, an investigator found a long-handled, curved-tip shovel with a broken peak and with moss growing on it, lying on the forest floor in the center of the search area. It was collected as possible evidence.

The test pit dug into sterile soil revealed three natural layers that could be compared to the fill of features detected and excavated:

1. Uppermost, *c.* 5 cm of dark brown sandy silt humus;
2. Approximately 9 cm of natural, red, small-grain volcanic gravel;
3. A subsoil layer (the bottom of which was not reached, but extending at least 10 cm deep) of brown-gray silty clay with occasional sub-angular stones predominantly 5–10 cm in size.

#### *Feature 1*

Beneath the two uppermost naturally formed layers of soil, rusted nails, other pieces of oxidized metal, a rusting AA battery,

and small pieces of plastic were found mixed into the soil. It was believed that these artifacts were the result of relatively recent, temporary occupation of the site by seasonal coffee bean harvesters. It was not possible to determine how long it took the two natural layers to form above these finds and thus if this domestic garbage could have come before or after the alleged burial. The third natural layer of compact silty clay was reached through excavation and it appeared to be undisturbed. The compaction and appearance of the soil indicated that there had been no prior disturbance at this depth in this area.

#### *Feature 2*

Early excavation defined a small, oblong feature *c.* 75 × 40 cm. Removing only the fill from the feature revealed a large liquor bottle, small fragments of painted and nonpainted ceramics, and small pieces of rusted metal. Further excavation continued to the bottom of the feature, marked by large, compact stones and clay. The base was cleared of loose soil and a photograph taken to help document that the feature was not a grave. As with the first feature excavated, this was also likely a disposal area made and used by seasonal agricultural workers.

#### *Feature 3*

Within *c.* 5 min of beginning the surface stripping with mattocks, one of the *zapadores* cut across and identified an area of different soil colors and compaction. Cleaning the loose soil from the test trench area with a trowel revealed a distinct change, and within the area of looser soil, a small hole began to form into which soil was falling (i.e., caving in). Through this hole, using a tiny camera with a light, police showed what appeared to be a large, robust bone, suspected to be a human femur.

Shortly after the definition of feature 3 began, something very predictable happened: heavy rainfall. Costa Rica’s rainy season, which peaks in November, the month in which we were working, involves almost daily, intense afternoon rains. In the interest of maintaining the integrity of the grave, excavation stopped, a shelter was created and strategies for mitigating the effects of further rain were discussed. The geographical and topographical nature of the site (sloping hillside) in combination with the intensity of rain that fell each afternoon during this season led the investigators and archaeologists to agree that a trench dug to divert descending water from the grave area would probably not be effective.

The following morning, after removing 10–15 cm of the uppermost soil from the area, the grave was defined as being *c.* 1 m in length. It was covered in cement, which was not uniformly laid across the grave. We surmised that cement powder had simply been spread across the top area of the grave; penetrating rainwater later caused it to harden unevenly. This resulted in the area where no cement had formed (i.e., the hole through which the human remains were originally seen at time of discovery of the grave), and other parts where the cement was between 5 and 10 cm thick. Mixed in with the cement were two bags: a light, white plastic bag as one might find at a grocery store and a larger woven plastic fiber sack.

In a typical excavation of a grave, the ideal method is to remove stratigraphic layers in the opposite order in which they were deposited (“last in = first out”), leaving the walls of the grave intact so as better to analyze and interpret the creation of the burial and all its contents. This method allows for the possible detection of tool marks or other trace evidence that would be destroyed if the walls were excavated to facilitate removal of the body (6). However, due

to the layer of possibly unstable cement, it was decided that one of the walls along the length of the grave should be removed so as to view the profile of the grave and the extent of the cement. This would allow for a more informed decision as to how best exhume the remains and examine the grave and its contents. Removal of the upper half of the wall revealed lime, with a third plastic bag mixed into it. The lime sloped inward towards the base of the grave, and removal of more of the wall could have affected the stability of the lime and its ability to support the cement. Therefore, excavation of the side wall ceased. The presence of cement and lime both confirmed the information given by the anonymous caller to the police.

Removal of soil from the edge and outside of one of the two ends of the grave was deemed necessary. Doing so in horizontal spits that were separated for sieving resulted in the discovery of blowfly pupae cases and hair at the lowest levels excavated. There was no lime at the end of the grave and a cranium was observed beneath the concrete. This led to the conclusion that the remains were human, that the body was probably lying on its right side and that the cement layer appeared to be quite superficial. For this reason, we began to remove the cement first, then the grave contents, all in the reverse order in which they had been originally placed.

Attempting to lift the cement layer showed that it broke freely into smaller pieces, which were then lifted without affecting the contents of the grave below. Beneath the cement, small pieces of lime were observed above the body whereas the walls of the grave were lined with lime. Within the grave were the skeletonized remains of an adult. The natural ground water level was slightly above the base of the grave. The water meant that the full contents of the grave could not be observed before removing some of the remains, which then allowed for water to be drained.

The maximum length of the grave measured 99 cm and the mid-point was 43 cm in width. The depth was difficult to assess due to the waterlogged base of the grave but was about 50 cm. The body and legs were partly flexed and the arms tightly flexed. The skull had dark cloth wrapped around it, indicative of a possible blindfold (Fig. 1). Slightly rusted handcuffs were locked at the wrists. Other artifacts included a dark colored shirt and white buttons. The buttons were not attached to the shirt and it was deduced that they must have been sewn onto the shirt with a natural fiber that deteriorated after burial, the shirt more likely consisting of a

more durable synthetic material or blend. A leather belt was around the pelvic bones and a fourth plastic bag, with strips of electrical tape on it was lying over the torso. The belt strongly suggested that the body had been wearing pants at the time of burial and, as with the button thread, they had subsequently degraded in the grave, almost certainly having been made of natural fibers. Two of the plastic bags had probably been used to carry lime, as they were below the concrete and one appeared to have been reinforced with the electrical tape, presumably to prevent it from breaking. No weapon was found.

At the bottom of the grave, at the level of the water table, was a large section of saponified flesh and skin, with pores still visible. The state of preservation was probably a result of the flesh having been in water (7). The lime may also have been a factor, although it must be remembered that only at the lowest level of the grave was soft tissue found, whereas lime was along both sides of the grave. Therefore the effect of lime or at least a specific type of lime, on the decomposition of soft tissue must be explored in consideration of all of the other variables at work in this environment.

**Discussion**

The complicated nature of the site (a very active biological environment with various modern events affecting the natural context), and of the grave (the uncertain relationship between the human remains, possible other artifacts, lime, and cement), necessitated unconventional excavation methods. Excavation of a test pit into sterile soil for comparison purposes and use of police familiar with archaeological excavation ensured a more controlled and efficient site investigation. Knowledge about the local area and the seasonal presence of coffee bean harvesters helped explain modern, nonforensic intrusions. All of these things saved search and excavation time that was critical given the heavy rainfall every afternoon during this time of year which complicates fieldwork.

Surface indicators such as depressions and anomalous vegetation, while generally good signs of previous ground disturbance, were in this case the result of other modern nonforensic activity. Neither of these things was present in the area of the grave because the cement above the burial prevented the ground surface from depressing following the decomposition of the body's soft tissues. The cement also prevented plants from taking root above the grave, resulting in the opposite of what might normally be expected when plants take advantage of greater aeration, moisture, and nutrients created by the decomposing body. The lack of vegetation here, however, was not unique to the area of the grave, as the heavy rainfall down the slope, acidic soil, and tree cover allowed only for limited, smaller vegetation (e.g., occasional ferns).

The anonymous call appeared to give accurate information regarding the cause of death stating that the victim's throat was cut. It is possible that the insect pupae cases discovered only in the area of the head were the result of eggs laid at the site of such a wound. It was also recognized, however, that blowflies typically lay their eggs at natural orifices such as the eyes, nose, and mouth as was noted during a decomposition experiment in the same general area of Costa Rica (8). These observations were documented by this author and reference made to Smith (9), although it was also asserted that an entomologist must be consulted with reference to this type of evidence. During the trial, however, it was noted that the cause of death had not been established and therefore the witness' allegation that the throat of the victim had been cut remains unproven (10).

As the base of the grave was slightly lower than the ground water level, it is believed that the water in the grave could have

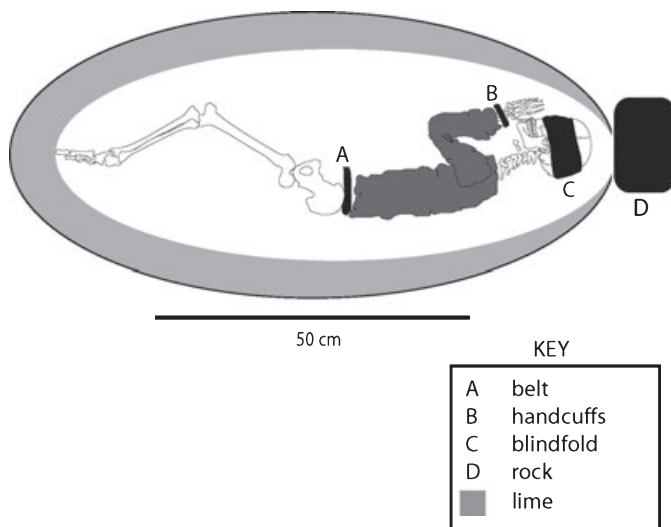


FIG. 1—Grave in plan view.

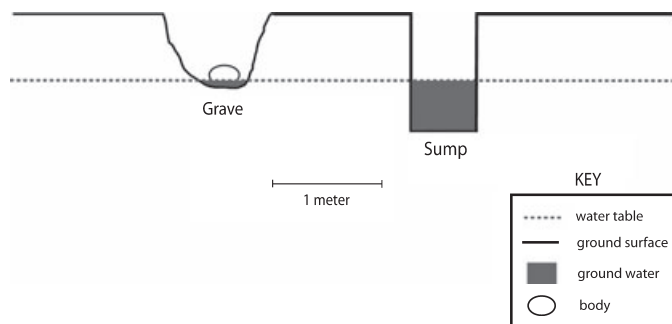


FIG. 2—Creation of a sump near the grave can facilitate excavation and exhumation. By removing water from the sump, the ground water level can be temporarily lowered, thus also lowering the water level in the grave.

been drained temporarily throughout excavation via a sump. The sump should have been within a meter and a half of the actual grave, not actually cutting into the grave. Removing water from the nearby sump (Fig. 2) during grave excavation would temporarily lower the water level in the grave and could be continually drained without disrupting the excavation/exhumation while also allowing a better view of the body and associated objects *in situ*, before removal. The author has used this technique in conventional archaeology in contexts where features (e.g., pits) extend below the ground water level as well as that of modern mass grave investigations. It is also a much less destructive and intrusive method than putting a water pump into a grave or attempting to continually remove water directly from the grave. This would also have enabled the grave cut to be examined more closely and is recommended for future, similar cases with waterlogged graves.

Although this case occurred in a very different context to that addressed by Hoshower (11), her primary message stands: flexibility in excavation approach is often more productive than adherence to a specific and rigid protocol. Traditional archaeological methods that address challenges similar to those faced in this case, however, are often practicable and known by those with site excavation experience. Due to the methods employed and constant documentation via photography, video, electronic mapping, and written notes and sketches, the burial context *and* contents could be interpreted to a satisfactory degree and important associations such as the empty pupae cases being recovered only towards the head, were established.

The identity of the victim was established via DNA analysis, and four suspects were tried for kidnapping and murder. Due to an

undetermined cause of death and other factors, only one suspect was found guilty of kidnapping and aggravated extortion and sentenced to 16 years in prison (10).

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