

William D. Haglund, Melissa Connor, and Douglas D. Scott

## The Archaeology of Contemporary Mass Graves

### ABSTRACT

The excavation of mass graves provides information and documentation for both human rights work and for forensic medico-legal investigations. Medico-legal documentation for the United Nations International Criminal Tribunal for the former Yugoslavia and the International Criminal Tribunal for Rwanda is a major reason for recent excavation of large mass graves in these countries. The mass grave excavations have been among the largest since World War II. The investigative teams incorporated professional archaeologists sensitized to medico-legal realities, to the realm of decomposed fleshed remains, and who exhibited flexibility in adapting techniques to the forensic context. This paper examines the forensic context of these excavations, the techniques the team developed, and presents a case study from Rwanda.

### Introduction

The use of archaeological techniques for forensic investigations has been advocated by enlightened forensic investigators for the past two decades (Bass and Birkby 1978; Brooks and Brooks 1978; Snow 1982; Morse et al. 1983; Skinner and Lazenby 1983; Sigler-Eisenberg 1985; Krogman and İşcan 1986; Hunter et al 1996; Dirkmatt and Adovasio 1997; Hoshower 1998; Webster 1998), although frequently under the rubric of forensic anthropology. Increasingly, however, archaeologists and not just archaeological techniques are used in forensic work.

A recent example of the use of forensic archaeology involves excavations carried out by experts provided by the Physicians for Human Rights (PHR), under the auspices of the International Criminal Tribunals for Rwanda and the former Yugoslavia (1996). In 1996, over 1,200 bodies in Rwanda, Croatia, and the Republika Srpska area of Bosnia and Herzegovina were exhumed for these Tribunals. This paper discusses the Kibuye, Rwanda case in some detail. Other papers in this volume (Stover and Ryan;

Connor and Scott) briefly mention cases in the former Yugoslavia.

These excavations were performed to investigate mass graves resulting from alleged human rights abuses. The objectives were: (1) to collect narrative and physical evidence that assists in establishing the accountability of those responsible and bringing them to justice; (2) to assemble information instrumental in identifying the victims in order that the remains might be returned to surviving relatives; (3) to create a record that will stand up to historical revisionists; and (4) to expose such atrocities to world opinion and provide an international standard that will deter such atrocities in the future. The cumulative effect of such investigations is to give voice to the victims, imparting their stories from the grave.

There is no commonly accepted definition of what constitutes a mass grave. One definition suggests a mass grave contains at least a half dozen individuals (Skinner 1987). Another interpretation of a mass grave is proposed by the United Nations Rapporteur as locations where three or more victims of extra-judicial, summary or arbitrary executions were buried, not having died in combat or armed confrontations (United Nations 1991). This definition serves the legal needs of the Tribunal, however, it confounds what a mass grave is with the dynamics which brought it about.

Undoubtedly, some mass graves are the result of events other than summary or arbitrary executions and might include natural disasters resulting in mass casualties. The term grave has always been a functional term denoting the burial of once-living beings. Mass, of course, means a large quantity or aggregate, usually of considerable size. The term "mass grave" should probably be left as a relative term and specific graves described by an estimate of the minimum number of individuals it contains. For instance, the grave used as an example in this article is a mass grave containing a minimum of 500 people.

In addition to the estimate of the number of bodies in a grave, mass graves are defined by

their internal configuration, the major attribute of which is whether the bodies are adjacent or separate. A mass grave of 50 people, where the people are laid in a trench not touching each other, is vastly different from a mass grave where the bodies press against each other. The mass grave where the bodies are not adjacent is similar to a series of individual graves in the manner in which the bodies decay. In a mass grave where the bodies are adjacent, the mass creates its own microenvironment affecting preservation. While the bodies at the edge of the grave begin to skeletonize, the bodies at the core of the grave preserve and can remain fleshed for years after deposition. These two types of mass graves represent opposite ends of a continuum and most mass graves are somewhere in between.

#### Investigations of Recent Mass Graves: Historical Overview

The exhumation of mass graves to provide evidence for war crimes goes back at least to World War II. One of the most detailed and comprehensive exhumations from areas of Nazi German-occupied Europe, was conducted to investigate the deaths of over 11,000 Polish prisoners of war (Fitzgibbon 1971). After the Nazi German invasion of Russia in 1941, rumors circulated widely that the Soviet forces had systematically executed the Polish officer corps in the Katyn Forest. Anticipating accusations of Nazi government culpability for the deaths, the Germans carried out a meticulously documented program of exhumation and study of over 4,000 remains. The Nazi German investigation concluded that the deceased were killed execution-style by members of the occupying Soviet forces. Through recent reevaluations of documentary and physical evidence it has become clear that the Soviets were responsible for the mass execution of the Polish officers (Zawondy 1962; Fitzgibbon 1971; Lauck 1989; Taylor 1992:467; Paul 1996). Harrington (1997) reports that recent excavations recovered 6,400 additional bodies and over 10,000 artifacts from the Katyn Forest supporting the culpability of Stalin's regime in the deaths.

During and after World War II, the British Army Medical Corps was assigned to identify missing allied personnel in Europe. They com-

pleted numerous mass grave exhumations, and Mant (1950, 1957:6-78) reported in detail on grave context and body decomposition. The largest mass grave he described held 40 bodies, and the total number of remains he reports in his study from several graves is 150. In Asia, graves outside of Nanking, China were opened for the Nanking War Crimes Trials (Chang 1997:171), but there appear to be no currently available detailed reports.

In the last two decades, the Japanese have conducted exhumations in the Pacific Theater to recover war dead, usually without benefit of forensic or archaeological assistance. An exception is the 1986 excavation of a mass grave discovered on Saipan containing the remains of eight Japanese Imperial Army and Navy personnel (Russell and Flemming 1991). The archaeological excavation assisted in identifying the branch of service and manner of armament, and locating identity tags that aided in personal identification. The artifacts associated with the bodies provided evidence that Japanese soldiers were still well-uniformed and accoutered with regulation equipment, arms, and ammunition at the end of World War II. This precisely controlled archaeological excavation clearly demonstrates that there was much to be learned by applying stringent excavation techniques in addition to body recovery. Geophysical surveys to locate mass graves from World War II on Saipan were also conducted (Doolittle and Kaschko 1990).

Starting in the mid-1980s, work on mass graves expanded. Excavations took place in Argentina to investigate the fate of the "disappeared," the thousands of people killed or missing during Argentina's period of military rule from 1976 to 1983. A group of forensic experts assembled by the AAAS Committee on Scientific Freedom and Responsibility began training Argentine students in the basics of forensic investigation (Snow et al. 1984; Stover 1985; Stover and Ryan this volume). During the 1980s and early 1990s, students, including archaeologists, were also trained in Chile and Guatemala to conduct similar human rights-oriented excavations. These programs have been immensely successful in investigating human rights abuses throughout Latin America. Members of the Argentine, Guatemalan, and Chilean forensic teams also participated in the

excavations described here for Rwanda and the former Yugoslavia and their experience was integrated into the methodology used.

Numerous other exhumations of mass graves have taken place for human rights investigations in Brazil, Ethiopia, Iraq, Afghanistan, and elsewhere. These exhumations use archaeological techniques to varying degrees, although it is common not to include professional archaeologists on teams when exhuming a grave. Increasingly, however, the goal is the use of controlled excavation techniques to exhume human remains and record the context of those remains. The Kibuye Catholic Church excavations provide a case example of how archaeologists fit into interdisciplinary team formed to document an episode of genocide in the east African country of Rwanda (Figure 1).

#### Case Example: Kibuye Catholic Church and the Home St. Jean, Rwanda

Following the 6 April 1994, airplane crash in which President Juvenal Habyarimana of Rwanda was killed, the country erupted into violence and within six months an estimated half a million people were killed. Throughout the country, people flocked to gathering places such as churches, and football stadiums for sanctuaries. An alleged 4,000-6,000 people gathered at the Kibuye Catholic Church and the adjacent Home St. Jean (Figure 2), which included a school, workshops, and a small hostel (Crowther and Finlay 1994:432; Hodd 1994:515). On or about 17 April 1994, gendarmes, communal police, and armed civilians surrounded the area. Those gathered in the Church and Complex were attacked with grenades, guns, cudgels, machetes, and a variety of other weapons. Survivors of the attack were searched for and killed throughout the following days. Burial of many remains took place in a minimum of four mass graves within days following the massacre. Witnesses to the burial identified a location behind the church, later designated as Grave 1, as the location where remains from the church and the surrounding area were placed. The remains of numerous individuals were unburied and left scattered to skeletonize on the surface.

At the request of the United Nations International Criminal Tribunal for Rwanda, Physicians for Human Rights conducted an initial assess-

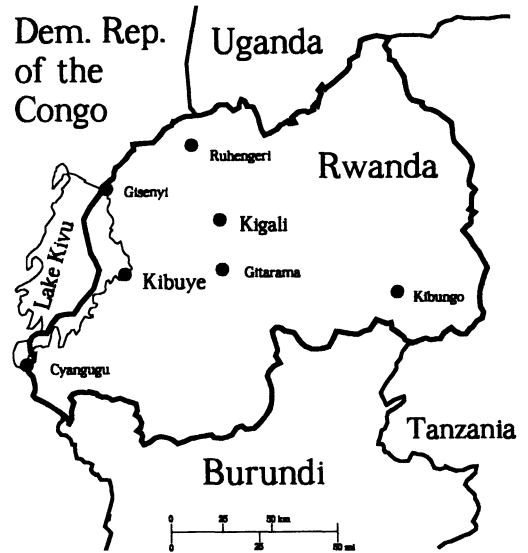


FIGURE 1. The case example; the mass grave at Kibuye, is located in eastern Rwanda on the shore of Lake Kivu.

ment of Grave 1. The purpose was to confirm the presence of human remains and their condition in September 1995. Under the direction of the senior author, two trenches were hand-excavated at right angles to each other across the grave. Trenching was halted when human remains were found, the exposed remains were documented as to location, covered with plastic, and the trenches refilled. In addition, a very preliminary analysis of condition of human remains found on the ground surface around the church was conducted. The surface remains most vulnerable to disturbance were documented and wrapped in plastic. A pit was dug in the soil and the remains placed inside for storage. A rough sketch map was made that included the church, grave, trenches, and surface remains.

A three-phase project was planned for the investigation. In the first phase (two weeks) a team of archaeologists would document the site, create a small-scale topographic map of the site area and photographically document evidence in the buildings. Logistical considerations not normally included in archaeological projects included ensuring that no mines or unexploded ordnance were on site. The second phase consisted of the recovery and analysis of the skeletal remains scattered on the surface. For this a team of physical anthropologists would be brought in

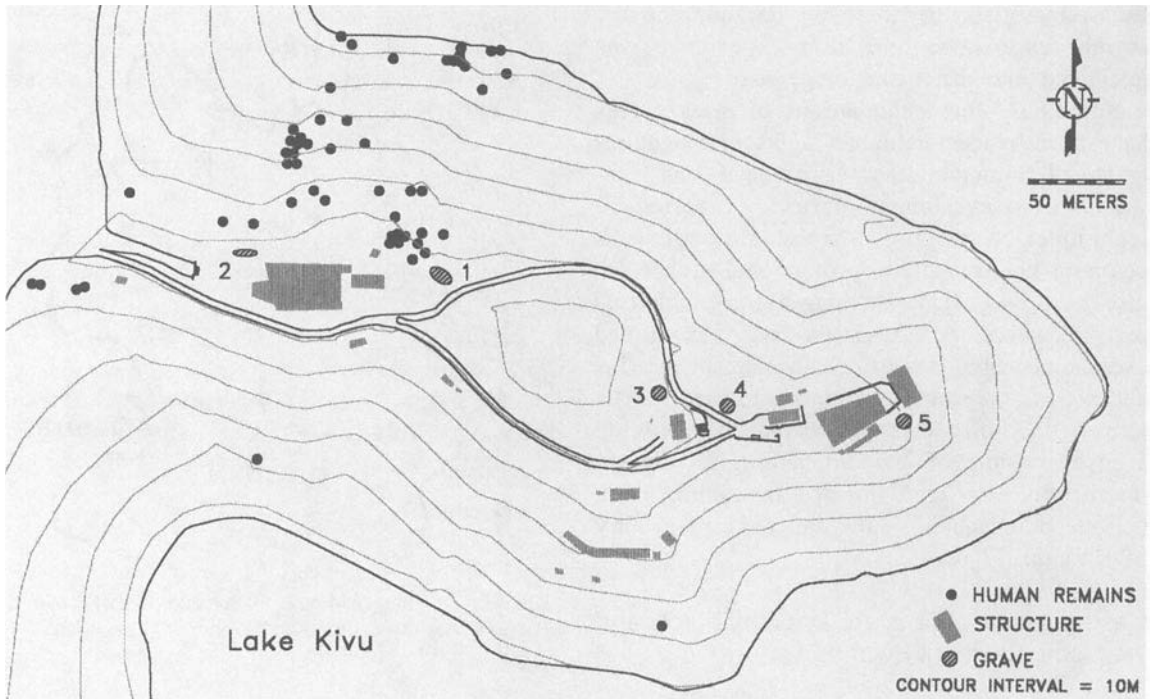


FIGURE 2. The Kibuye Catholic Church and the home St. Jean consist of a complex of buildings on a peninsula extending into Lake Kivu. Human remains were buried in a minimum of five graves on the peninsula, as well as scattered on the surface.

to assist the archaeologists in recovery and a laboratory would be set up for the analysis. This phase was allocated two to three weeks. The third phase would continue up to the end of February 1996 when the rainy season was anticipated and security would no longer be available. This phase would include excavation of Grave 1 and examination of the bodies by forensic pathologists. Witness estimates suggested from 4,000 to 6,000 people were killed on the Kibuye church properties.

Phase 1 began in December 1995 when three archaeologists arrived to further document the site. They began by walking transects parallel to the contours around the entire site area, placing flagging tape at all human remains and potential evidence found on the surface. In many areas, the vegetation was dense and visibility low. A topographic map was completed that included the lakeshore, the buildings, the roads, all exposed human remains, and the known and potential grave areas (Figure 3). The site area, inside and outside of the buildings, the exposed human remains, and grave areas were systematically photographed.

In early January 1996, six forensic physical anthropologists joined the archaeologists. The exposed surface skeletons, as well as those in the storage grave, were recovered and analyzed. Recovery of the surface skeletons involved removing the vegetation around each skeletal assemblage until the extent of the scatter could be determined. After the remains were exposed, each individual set of remains was assigned a case number, plotted onto the site map, and photographed. The forensic anthropologists inventoried the remains. The skeletal elements were then collected, placed either in labeled paper bags or in a labeled body bag, and brought back to the church area where a laboratory area was set up and a detailed analysis conducted.

Fifty-three discrete skeletal assemblages were located and collected. Their composition ranged from complete individuals to isolated bones; most assemblages consisted of incomplete individuals. Dispersion was attributed one or more of several factors: (1) consumption and scattering by scavenging animals; (2) scattering and burial through agricultural activity; (3) disturbance by local foot traffic; (4) down-slope movement

assisted by gravity and rain water, and (5) incomplete collection and reburial by local residents. In most cases, the assemblages were in relative anatomical order with minimal scattering. Analysis included a skeletal inventory, inventory of artifacts found with the remains, age, sex, and race estimates, and an inventory of trauma seen on the remains. If the anthropologist could suggest a probable cause of death it was noted, to be ratified later by the pathologist.

Potential grave locations, other than the known Grave 1, were tested. Grave 2 was pinpointed by local people working on the excavations who told archaeologists that a roll of wire in a tree represented a memorial over a grave. Shovel-dug test trenches below the tree revealed the presence of several individuals. As the goal of the test was to determine the presence of additional mass graves, the trenches were photographed, mapped and backfilled when the presence of multiple individuals was confirmed. A second location was also tested, by a combination of hand trenching and a backhoe. No remains were found and testing ended when the backhoe hit a water pipe below which the ground was undisturbed. A probe was used in a third location that was also marked as a mass grave by the local population. The probe revealed an odor consistent with deteriorating remains. An additional unmarked area was probed when the priest told the team leader

that a mass grave existed there. Again, the probe carried an odor consistent with decaying remains. A third area was probed where a series of human remains appeared to be eroding from the ground. No smell, or change in soil consistency, was encountered.

Phase 3, the excavation of Grave 1, began with the erection of a morgue on site. This ensured there would be no transportation of the remains, and thus no related security or logistical concerns. However, fresh water and electricity had to be established on site, an x-ray machine brought in, large quantities of equipment, and housing found for the pathologists, autopsy, and x-ray technicians. The church and surrounding area were converted to examination areas, and an inflatable tent set up for the autopsies (Figure 3). Twenty-four-hour security for the church, grave, and areas of examination were provided by a contingent of UN troops. A generous perimeter of concertina wire was established to close off the area. A log was maintained to record visitors to the site.

In mid-January the test trench of Grave 1 was opened. The remains exposed in the September assessment mission were relocated. The investigators believed those remains exposed in the test trenches accurately demonstrated the depth, as well as the horizontal extent of the grave. As excavations continued, the remains in the test trench were found to be bodies and partial remains redeposited in a berm to the northeast

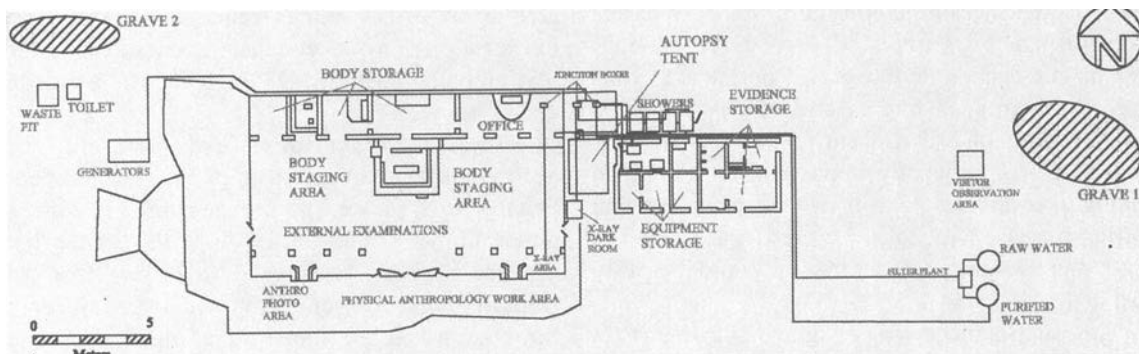


FIGURE 3. The excavation/ examination flow for the excavation of Grave 1. The remains were taken from the grave and moved to a staging area in the church. Autopsies were conducted in an inflatable tent between the church and a second building. Water was pumped from Lake Kivu, purified on site, and pumped to showers, a clothes washer, and hoses as needed. Generators were brought in and provided electricity. Selected remains were given full autopsies, clothing and evidence were taken to the evidence storage area, logged, cleaned, and stabilized. Autopsied remains were radiographed, rebagged, and placed in the body storage area. The majority of remains were given external examinations, evidence and unusual clothing were removed to the evidence storage area, and the body taken to the body storage area.

of the grave. A bulldozer had created this berm when filling the grave. In the berm, partial bodies, isolated skeletal elements, and clothing were redeposited in the fill above the main grave (Figure 4). The commingling and partial articulation of individual skeletons required analysis for sex and chronological age of skeletal material in order to determine the minimum number of individuals present. Partially fleshed remains were intermingled with the skeletal remains such that they could not be exhumed before the skeletal remains above. This created a dilemma, for while the upper layer of skeletal material was slowly uncovered, exposed fleshed remains were drying out. This led to the need to remove the commingled skeletal remains in order to exhume the fleshed individuals while they were still in a condition to be autopsied.

As excavation of the berm area continued, other excavators attempted to locate the south and east edges of the grave. These were significantly below the original remains in the test trenches and required the removal of a large amount of overburden. As the excavations continued, the condition of individual remains ranged from isolated and disarticulated skeletal elements to full to partially skeletonized remains, to intact, saponified bodies (Figure 5).

Initially, case numbers were assigned as each body was exposed. This facilitated photographs throughout the process and allowed the case number to be written on the bags placed over the hands and feet, or containing other disassociated elements. However, numbering remains at this point became confusing. Not only partial remains and disarticulated parts were encountered, but deeper in the grave there were overlapping layers of bodies and those that were intertwined. Until the entire body was excavated, it was frequently impossible to tell which limbs were associated with which crania or with other limbs. We soon learned not to assign case numbers until the remains could be fully defined.

The case number was assigned from a master list that included a brief description of the remains, associated evidence, and possible commingling. Remains were frequently too commingled to be easily separated in the field. When this occurred, the remains were bagged



FIGURE 4. Photograph to north of the northern end of Grave 1. Typical condition of remains at the outer edges of the grave where they are skeletonized and co-mingled.

together, case number(s) assigned, and a notation to this effect made in the master log. Photographs were taken at the discretion of the archaeologist, based on the condition of the remains and how much of the body was in its original position when it was ready for removal. Crania locations were placed on the site map.

Once the grave was emptied of human remains, two methods were used to ensure that the bottom of the grave was reached. First, the bottom of the grave was trenched 40-80 cm below the last remains with two perpendicular trenches. No further remains were located. Second, a metal detector was used along the bottom of the grave in an attempt to locate metal fixtures on clothing that might be associated with further human remains. Postmortem examinations were conducted on all of the minimum number of 493 individuals, based on crania recovered.

After the excavations were complete, the autopsy and examination phases continued. During this phase, an archaeologist acted as photographer. The archaeologist's master list of case numbers was used to ensure that all remains were either autopsied or examined. Information on the locations of the bodies and body parts were used to assist in correlating partial remains. While the autopsies continued, the archaeologists drafted the maps, their portion of the report, and completed photograph and evidence databases.

## Guidelines for Excavation of Recent Mass Graves

There is no court-accepted protocol or standard for the excavation of a mass grave. The absence of an archaeological excavation standard protocol results in a wide variety of methods and techniques applied to forensic excavations. While flexibility in excavation techniques is necessary (Hoshower 1998), so are basic excavation protocols.

Undoubtedly, archaeological procedures need to be flexible and will change on a site by site basis (Hoshower 1998). However, basic guidelines to excavations, such those described by the United Nations (1991), are useful. They are in fact necessary in medico-legal proceedings to ensure that the evidence produced will be accepted in the relevant court. The procedures described above and the process outlined below, meet or exceed the mass grave documentation procedures set forth by the United Nations (United Nations 1991). In addition, they meet the standards for the United States Rules of Evidence so that the documentation can be introduced into a U.S. court of law.

Prior to excavations, the archaeologist needs a clear understanding of his or her role and responsibilities within the forensic team as addressed in other papers in this volume (Crist; Haglund; Stover and Ryan). The archaeologist probably will be working for the criminal investigators on the case. The archaeologist will need to discuss the collection of evidence, the taking and use of photographs, and who will be allowed into the excavations. The person who will testify in court must take the responsibility for all that goes on within the excavations.

A perimeter should be established around the excavation area, and anyone not directly involved with the excavation required to remain outside, including crime scene personnel. All field notes will be court-admissible documents so there should be absolutely no comments outside those directly related to the excavation. Any notes taken should be very clear. They should omit any language that contains implications beyond the archaeologists' expertise. For instance, a skull may contain a circular defect, but the pathologist will determine whether the cause of that defect is a gunshot wound. Clothing may look brown or tan in the soil, but when

washed in the morgue may be another color so it is wise to omit references to clothing color in one's field notes.

Photograph and artifact logs are also evidence, admissible in court. Numbering should be a very straightforward system and any missing numbers need to be clearly explained in the field documentation. Missing numbers invites speculation about missing evidence. Misidentification of artifacts in the log allows speculation of incompetence.

All physical items—artifacts, rolls of film, etc.—should be carefully tracked. It is necessary to keep a chain of custody, meaning that the person is in charge of the material can testify as to where it was and who had access at all times. If skeletal remains or artifacts are taken from the site, they need to be kept in a secure area. When material is turned over to the investiga-



FIGURE 5. Cases 23 and 30, Grave 1, Kibuye Catholic Church. Typical condition of remains from the interior of grave. Note partially saponified tissue. Compare this to the skeletal remains in Figure 4 at the edge of the grave.

tors, it should be done formally and documented with a receipt. This can be done on a chain-of-custody form. This form can then be appended to any resulting report to show the material was turned over to the proper authorities.

### *Location of the Grave*

The most successful method of locating graves is through witness testimony. In direct contrast to most archaeological contexts, forensic investigators can frequently ask someone to pinpoint the location of the feature. If possible, the informant should be brought to the site and asked to mark the grave, or where the bodies were last seen. For a variety of reasons, the archaeologist probably will not be on site at the same time as the witness. They should ask that the area the witness indicates is physically marked with flagging, or other methods, as it is easy for an investigator to be several meters off when relaying the information. Given a general location for a gravesite, a trained archaeological eye can determine differences in vegetation, soil, and microtopography that indicate a ground disturbance. At this point, the use of a probe can frequently confirm the presence of remains (Owsley 1995).

Without information from a witness, or with deeply buried remains, forensic investigators have used a panoply of techniques to locate graves, with varying success. Bass and Birkby (1978) suggested using an ice pick or screwdriver to examine soil compaction. Owsley (1995) and Haglund (1998) emphasize the use of the probe. Methods emphasizing specialized technologies exist (side-scanning sonar, ground-penetrating radar, proton magnetometer, and electrical resistivity (Davenport et al. 1988; Killiam 1990; Bevan 1991; France et al. 1992; Davenport this volume). Aerial photography can also be successfully used to locate ground disturbances that may be graves. All disturbances located by these remote sensing devices require ground truthing to establish that the disturbance resulted from a grave and not from some other cultural or natural anomaly. The more complex of these methods require specialized equipment and the personnel trained in their use.

Once the potential grave is located, the surrounding area should be searched for additional evidence and the grave should be documented

with photographs and with a map (Gerberth 1983:86). At this stage a simple sketch map completed with paced or taped measurements is appropriate. The map should include a north arrow, scale, the grave location, relocatable features, notes on where the probes or other relevant techniques were used, vegetation, and topography.

### *Delineation of the Grave*

Large graves should be tested before excavation. This step may not be necessary in small graves. However, in a large grave, with tens or hundreds of bodies, it is necessary to determine the amount of overburden and the horizontal extent of the bodies before excavation begins. This allows the excavators to determine an appropriate excavation strategy, as well as logistical needs, and scope of the project.

Before any soil disturbance, the site needs to be thoroughly documented. This includes photographing the entire area and creating a map showing the surface contours of the area of the grave. The area should be searched for surface evidence and a metal detector used to examine the area for cartridge cases, bullets, and metal fixtures on clothing.

A common testing strategy is cross-trenching, or digging two perpendicular trenches, each about one-meter wide across the top of the grave until the remains are located. The trenches should minimally extend to the edges of the grave and to the depth of the top of the bodies. A skilled backhoe operator can remove soil from the trench area in increments as fine as 5-10 cm. A monitor who observes the soil being removed and stops the operator should any non-soil material be encountered is necessary. If testing occurs during an assessment mission, prior to the actual excavation, the bodies should be covered with plastic so they do not dry out and to protect them when the trench is refilled. The plastic also allows the excavators to later find the bodies quickly with less possibility of damage from the excavation.

The final product of the testing should include a map showing the site area, trenches, human remains, grave pit, and depth of the top layer of bodies. Products will also include a photographic record of the process, a photographic log, and an evidence log. From this informa-



tion, the investigators should be able to assess the logistical needs of grave excavation, as well as the condition of the bodies in the grave and what specialists will be necessary during the examination phase (pathologists, forensic anthropologists, radiologists, forensic odontologists).

### *Grave Excavation*

Before excavation begins, the investigators need to ensure that all of the documentation is complete as described before the testing phase. The present condition of the site area should be compared to the condition as mapped, photographed, and described when the site was located and/or tested. If there are differences, these need to be recorded and investigated.

Videotaping the grave every night and every morning helps document problems that occur during the night and conversely demonstrates that no changes occurred. In addition, a still photographic record should be kept of the progress of the excavation, along with a detailed photographic log.

If the site was tested, then the first step in the excavation is to relocate and empty the test trenches. If the site was not previously tested, then the first step is to cross-trench the grave as described above, to determine the location and depth of the bodies as well as the length and breadth of the grave.

The grave fill needs to be removed to a depth of about 30 cm over the bodies. This amount of protective covering over the bodies will allow people to walk on the grave without damaging the bodies underneath. The depth of the bodies in the test trenches can be used to gauge how close the bodies are to the surface and how much overburden is to be removed. As the overburden is removed, the grave outline should appear in the soil. Standard excavation procedure has archaeologists leaving all elements of a feature, such as a grave pit, intact until excavation is complete and it is documented. In other words, the top of a grave would be located and then the grave fill emptied before all the sides of the grave are disturbed (Hunter 1996:49-51; Haglund 1998). In the case of mass graves, however, the content of the grave is much more important than the feature outline and it is easier to remove the contents from the

side. In the case example presented, trenches were excavated around the outside of the grave, deeper than the recovery excavation. This ensured that the grave was delineated and that the edges were correctly discerned. These trenches also helped drainage within the excavation and allowed workers to stand in the trenches and work from the edges of the grave without standing on bodies.

The disadvantage of working from trenches at the side of the grave is that the outline of the grave pit will disappear as the excavation is completed and the trenches are dug. However, a competent surveyor can take locations on the grave boundary at well-defined points as the boundary disappears. Drawings of the profile of the grave may then be completed. This is still not as detailed a profile as emptying the grave would provide and tool marks on the side of the grave may be lost. The alternative however, is to have the crew work on top of bodies at all times.

When the team is ready to begin body removal, the ideal excavation is large enough that the entire grave is exposed and trenches are excavated around the sides so that the edges are well delimited. At this point, photographic documentation is again important as is plotting the edges of excavation and the edges of the grave.

### *Body Removal*

Preparing a body for removal requires all elements to be free so it can be easily lifted. Soil needs to be removed from on top and laterally between bodies, so that each is clearly delineated. Clothing helps protect bodies from trowel marks and other damage during excavation. Clothing is also useful as it can be very gently pulled tight and shaken to dislodge soil. Done gently, this is less damaging to the body and quicker than using a trowel. Clothing also serves to envelop and contain the remains. Although presence of clothing may be a boon to the excavator, it may also present complications to removal, for instance when loose or flowing garments are entangled with other remains in deeper recesses of the grave. If there is no clothing or with areas of exposed skin, great care must be taken not to damage the skin, especially around the face and hands. Soft materials, such

as bamboo tools and brushes, are useful for excavation. Soft adipose tissue, however, can be marked even by a sturdy whiskbroom, so care is the watchword in this type of excavation. It may be necessary to separately package head, facial, and pubic hair to include with the remains to avoid its loss during removal or transport.

Preparing a body for documentation and removal requires a good spatial sense. Where bodies are intertwined, it is necessary to manipulate them so that they will be exposed for removal. Fleshed remains, especially in the core of recent mass graves, are, for the most part, fairly limber. Care needs to be taken that parts do not become detached while being manipulated. This usually necessitates sliding an excavator's arm between bodies to the point where the end of the limb can be held and pushed gently back, freeing the limb from the mass. Often one is working by feel, not being able to directly observe the trapped extremity. The excavator needs to ensure that all the digits at the end of the limb are held in place as this occurs, or those digits will be left behind when the limb is moved. Removal of complete hands and feet with the individual not only insures the integrity of personal identifying information such as rings, antemortem fractures, or amputations, but also of trauma associated with circumstances surrounding death, such as defense wounds. When hands or feet are exposed, they should be placed inside a bag tied to the nearest long bones, to ensure that the digits or phalanges do not fall off as the body dries. A bag might also be placed over the head, as the cervical vertebra are frequently loose and may cause the cranium to become detached. This also ensures that hair and teeth are not lost during transport.

The body is ready for removal when all parts are free and it can be easily lifted onto a stretcher. At this point, a case number is assigned and the documentation team begins photographing, mapping, and describing the body. An overall photograph showing the position of the body is taken, as well as any detail shots including tattoos, obvious trauma, or unusual clothing. The overall shot is accompanied with a north arrow, scale, and case number; detail shots include a scale and the case number. At a minimum, the horizontal and vertical position

of the cranium should be plotted, a point usually taken from the top of the cranium. Body outlines might also be plotted, depending on the detail of the map decided on by the team and the expertise of the surveyor.

In a medico-legal investigation a pathologist is the final authority in describing a body, its clothing, associated evidence, and manner and cause of death. Those involved in field recovery must only make brief and accurate descriptions. All notes, including those of the archaeologists, can be requested by the legal council in discovery, and any contradictions can be used by the opposing legal council to cast doubt on the expertise of the pathologist, the archaeologist, or both. In a worst case scenario, the entire forensic effort could be dismissed.

When the photographing, plotting, and documentation are complete, the body is ready for removal. The case number and date of removal are written on both ends of a body bag and on a sheet of paper placed in an external envelope on the body bag. The bag is unzipped, opened, and moved adjacent to the body. The arms are moved close to the body and placed on the chest, if the body is face up. The legs are moved together. Other loose portions of the body are also removed and placed in the body bag. One technique is to roll the body up on its side, and insert the body bag beneath the remains in the fashion of making a hospital bed with a patient in it. If lifting is required, one excavator is placed at the head, one in the middle of the body, and one at the legs. As these people lift, an additional person holds open the body bag and helps to slide it beneath the body. Once the body is inside, the bag is placed to the side while the team examine the soil underneath the body to ensure that no body parts or associated evidence are left behind. Then the bag is closed and removed to a storage area.

After all bodies are removed, the grave should be searched for additional material. The bottom of the grave should be scraped with trowels and any loose clothing bagged. Metal detecting of the bottom of the grave is desirable to locate metallic debris such as bullets or shrapnel, or other evidence that may have been associated with the deposition event.

## Evidence

Any material clearly associated with a single body is removed with the body in the body bag and logged under the case number of the body. However, throughout the excavations, there may be material not clearly associated with a single body. Their locations are best indicated on a base or excavation map and assigned a number by the surveyor that corresponds with the number placed on the map for the object. The object is then placed in a bag labeled with the site, date, number, and initials of the person who collected it. Any evidence associated with a particular set of remains (eyeglasses, wallets, other personal items) should be retained with those remains until the postmortem examination. To maintain a legal chain of custody all evidence should be entered into an evidence log and kept in a secured area until given to the investigators for further analysis.

## Summary

Mass graves are complex cultural features that require careful attention to detail in excavation and documentation if the data collected are to be admissible as evidence in a court of law or for personal identification in humanitarian situations. The excavation documents are legal documents. In the medico-legal context archaeologists must not interpret details of human behavior and process. The medico-legal process requires documented facts and defensible expert opinion. The outcome of a forensic and archaeological investigation will have real impact on the accused, survivors, family, and even world opinion.

The value of the procedures outlined here lies in that they are a standard accepted by two international courts. These procedures meet or exceed the mass grave documentation procedures set forth by the United Nations (United Nations 1991). In addition, they meet the standards for the United States Rules of Evidence, so that the documentation can be introduced into a U. S. court of law.

## ACKNOWLEDGEMENTS

Tens of people participated in these and other recent excavations, and it took the mental and physical contributions of all to make the work a success. We would like to thank the Physicians for Human Rights for including us in these projects. The United Nations Tribunals have recognized the importance of forensic documentation in support of their legal cases and made it logistically possible to complete the investigations. The Midwest Archeological Center, National Park Service, allowed authors Melissa Connor and Doug Scott time to participate, despite their numerous other duties. The United Nations military support insured safety of workers. Owen Beatty, Mark Skinner, and Marcella Sorg read, commented on, and improved earlier versions of this paper.

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WILLIAM D. HAGLUND

DIRECTOR, INTERNATIONAL FORENSIC PROGRAM  
PHYSICIANS FOR HUMAN RIGHTS  
C/O 20140 25TH AVE. N.W.  
SHORELINE, WA 98177

WEBSTER, ANN DEMUTH

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MELISSA CONNOR

FORENSIC ANTHROPOLOGY, INC.  
11101 SOUTH 98TH STREET  
LINCOLN, NE 68526

ZAWONDY, J. K.

- 1962 *Death in the Forest.* University of Notre Dame Press, Notre Dame, IN.

DOUGLAS D. SCOTT

MIDWEST ARCHEOLOGICAL CENTER  
NATIONAL PARK SERVICE  
FEDERAL BUILDING, ROOM 474  
100 CENTENNIAL MALL NORTH  
LINCOLN, NE 68508