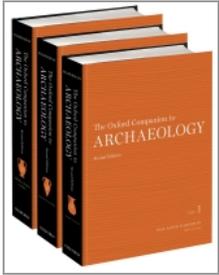


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DISASTER ARCHAEOLOGY

Disaster archaeology involves applying scientific skills in field archaeology following mass-fatality disasters to record and recover physical evidence, including human remains, as a means of assisting with the victim-identification and repatriation process and also in determining what happened at the disaster scene. Disaster archaeologists work under the oversight of the controlling authorities at the scene and according to the medical and legal standards of contemporary forensic science. Their results are combined with those of forensic anthropologists, odontologists, pathologists, DNA specialists, radiologists, and other specialists as part of a team effort directed toward accurate victim identification. In some cases, the evidence assembled will become part of a court proceeding to fix blame or compensate victims.

Archaeological interest in mass-fatality disasters is at least as old as the excavations at Pompeii and Herculaneum in 1732. Underwater archaeologists who study shipwrecks like the *Vasa* in Stockholm and submerged communities like Port Royal, Jamaica, routinely encounter such scenes, often containing human remains. Historic battlefields, such as the Little Bighorn (1876) in Montana, present archaeologists with similar opportunities for research. Disaster archaeology, while it is a relatively new concept, relies on skills developed through established academically or research-oriented efforts, but differs in its immediacy and applied nature. It is a form of forensic problem-solving directed at the needs of victims' families and their community as they try to recover from the disaster.

Assumptions apply to disaster archaeology that affect both its conduct and results:

- All data and physical evidence from a disaster scene must be handled in an unbroken chain of custody (a.k.a. "chain of evidence") that effectively anticipates potential challenges later on in court or in the medical examiner's office. Any break in the record of custody can raise the possibility in the minds of a judge or jury that the evidence was tainted. This requirement imposes strict standards on the handling of such data as digital imagery, DNA collection, site plans, and other records.
- Publication or public announcements of results are strictly limited by medical-legal considerations. For example, specific results of any investigation must be withheld from publication until cases arising from the disaster are resolved in court. The post-disaster identification and enumeration of victims is subject to similar constraints.

- All disaster-recovery activities in the United States, including archaeology, are governed by a national Incident Command System (ICS), which was initially developed by the U.S. National Forest Service following major wildfires in 1996. This is a comprehensive organizational plan that must be understood and followed by all emergency responders, which means that comprehensive training is required. Other nations have comparable emergency disaster plans.
- Disaster archaeology is part of the post-disaster response that follows the first response by firefighters, police, federal agencies, and others. It is a component of the recovery process, which, until recently, was under-emphasized in emergency disaster planning and training. Depending on the nature of the disaster, the recovery can take longer than the first response and can require everything from ongoing medical assistance for survivors to assessing and mitigating property damage (including damage to cultural properties).
- The first priority in any disaster archaeology field operation is the health and safety of the fieldworkers. Protocols govern such things as protective clothing in contaminated environments, behavior in hazardous situations such as unstable wreckage, and activities close to bulldozers, front-end loaders, and other heavy machinery. Special training is required, as is the presence of safety, medical, and security teams during any field operation. Fieldworkers, however, are expected to watch over each other and be pro-active about any hazards they encounter.
- The stakes are high whenever physical evidence is presented in court, since people's lives, fortunes, and reputations are involved. Special standards regarding qualifications and training can apply that go beyond the normal expectations of academic or professional archaeology. Serious efforts are currently under way to develop and improve such standards, as exemplified by members of the Inforce Foundation in Bournemouth, England.

Disaster archaeology is closely allied with forensic anthropology and other forensic sciences. Archaeologists doing this kind of work should have a good background in human skeletal biology and be prepared to call for additional expertise as needed. For matters of victim identification, matching procedures followed by the federal Disaster Mortuary Operations Recovery Team (DMORT) need to be understood and followed. These procedures involve detailed ante-mortem data collection following a disaster through family assistance centers where victims' families, survivors, and others are systematically interviewed. Meanwhile, task-groups in the morgue unit prepare a postmortem file for each victim using anthropology, DNA, dental, radiology, pathology, fingerprints, and any other relevant information (including clothing, personal effects, and other situational details that may be obtained through archaeology). The ante- and postmortem files are then compared in detail, both through a computer-generated program, such as WIN-ID used by DMORT, and by inspection. The process of inspection requires careful cross-checking before a positive match for identification can be confirmed.

Archaeological experience has shown that there can be pitfalls in the matching process, especially when misleading physical associations occur. A cell phone found inside a body bag with the victim may still be working but may not necessarily belong to the victim. It may have been borrowed, or it may have been scooped into the body bag by a first responder from the general deposit surrounding the body. A key chain with a bar-coded "loyalty tag" (such as one uses at supermarkets, pharmacies, etc.) must be physically connected to the victim before it can be used for identification, and even then caution is required. Items found physically attached to each other must be kept together, such as the contents of a wallet, especially if found inside a victim's pocket. Empirical skepticism and continuous testing of assumptions, which are hallmarks of good archaeological science, apply to the process of victim identification.

The physical context of the disaster scene must be recorded in a manner comparable to a crime scene but often on a larger scale. This may require advanced tools, such as the "total station" (for site mapping), GIS (for post-processing and analysis), and the use of remote-sensing techniques like magnetometry and magnetic resonance (for locating buried evidence). For submerged contexts, side-scan sonar and magnetometry can aid in locating and recording evidence when used by fieldworkers trained in underwater archaeology. Ongoing field training in such skills along with health and safety procedures and interaction with the authorities should take place regularly enough for proficiency in the event of a disaster. Otherwise, when a disaster occurs, it's too late.

Although police and other emergency responders sometimes are trained in basic archaeological methods, the development of archaeology as a disaster-response specialty arguably began when the wreck of a World War II B-24 bomber that crashed in highland New Guinea in 1944 was located in 1982. It became the subject of an organized archaeological and forensic recovery that ultimately evolved into the current Joint POW/MIA Accounting Command (JPAC) based at Hickam Air Force Base, Hawaii. Human remains from the wreck site were transferred to the Central Identification Laboratory, Hawaii (CILHI) where they were examined in detail by Dr. Tadao Furue, a physical anthropologist whose tenacity and drive for perfection led to the identification and repatriation of the remains of the fliers to their families. JPAC continues to send teams of forensic archaeologists and anthropologists to different, far-flung locations, mainly in the southwest Pacific and east Asia, to perform recoveries of the remains of U.S. service personnel reported missing in action in various conflicts. The example of Dr. Furue and the JPAC teams that followed set a standard that is being widely emulated.

The National Transportation Safety Board (NTSB) also deploys archaeologists and anthropologists for field recoveries, mainly at mass-fatality air crash scenes. This became especially important following two major airline crashes in 1995 and 1996 and the passage by Congress of the Aviation Disaster Family Assistance Act. Federally activated DMORT units performed similar services in New York following the 11 September 2001 attacks, and in Louisiana and Mississippi in 2005 after Hurricane Katrina. At a more local level, community-based groups like Forensic Archaeology Recovery (FAR) performed archaeological recoveries at the Station nightclub fire in Rhode Island in 2003.

In the arena of human-rights archaeology, mass graves containing victims of genocide have been excavated and recorded archaeologically and victims identified whenever possible, beginning with the pioneering work of Dr. Clyde Snow in 1984 to organize the Argentine Forensic Anthropology Team (EAAF) to unearth and identify remains of people who “disappeared” during the military junta of the 1970s. Major efforts of this kind were later performed in Rwanda and the former Yugoslavia (1996) by the Boston-based Physicians for Human Rights under the auspices of the United Nations, raising issues of how archaeological and forensic data should be presented at international tribunals. More recently, archaeologists and anthropologists have performed this kind of work through organizations like the British-based Inforce and the U.S. Army Corps of Engineers at mass graves of Kurdish victims in Iraq.

Disaster archaeology arose in direct response to major, mass-fatality events coupled with a growing awareness of humanitarian needs surrounding such events. Earlier concerns with criminal investigation and justice continue to be important, but new elements of victim identification and “closure” for victims’ families are now recognized and identified as goals for disaster archaeology. This kind of work is not for everyone, but it can be a rewarding experience for the archaeologists who do it.

[See also UNDERWATER ARCHAEOLOGY.]

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RICHARD A. GOULD

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