One chance only: advocating the use of archaeology in search, location and recovery at disaster scenes

Soren Blau argues for the inclusion of forensic archaeologists in emergency situations

Abstract

The public has traditionally perceived the discipline of archaeology as being concerned with ancient ruins, treasure hunting and Egyptian mummies. While archaeology may have suffered from a perception problem, there is no doubt that the discipline plays a valuable role in providing evidence about both recent and distant past cultures. In the last decade archaeology has extended its utility into forensic, human rights, and mass disaster scene investigations. Archaeology has proven itself to be an effective investigative tool both nationally (particularly in North America and the UK) and internationally (in the investigation of war crimes in, for example, Bosnia and Croatia). To date however, there has been limited use of archaeological techniques in these areas in Australia. As with archaeology, the key issues in the investigation of disaster scenes are response and recovery. This paper examines the ways in which archaeologists can potentially contribute to an effective disaster scene response in Australia. The paper highlights the need for the formation of a professional body of forensic archaeologists who can be called upon to work with emergency services. Efforts to establish such a group are outlined.

Introduction

It is obvious that crime and disaster scene investigators are well experienced and equipped to undertake the necessary recording of such scenes. The aim of this paper is to discuss the relatively new discipline of forensic archaeology and illustrate how the forensic archaeologist may potentially augment the collection and recovery of evidence. Enhancing collection and recovery procedures complements the Australian concept of disaster management which calls for a comprehensive approach, embracing prevention, preparedness, response and recovery (Anon 1996: 11).

Archaeology has been defined as the study of the past from its material remains. The discipline of archaeology has been overwhelmed by a perceptual problem, often being associated with ancient ruins, the exploits of Indiana Jones or Lara Croft, treasure hunting, tomb raiding and Egyptian mummies. Despite these popular (mis)conceptions, archaeology is a professional occupation for which you require a university degree and develop a suite of specialised skills. The professional archaeologist has research skills, is competent in survey, excavation, recording techniques and report writing, and often offers a specialist analysis such as that of human remains.

It is perhaps ironic that the excavation (or pillaging) of monuments to the dead in antiquity was the basis for the development of the discipline of archaeology. Today, archaeology is being employed to investigate death in the relatively new, yet rapidly expanding discipline of forensic archaeology. Forensic archaeology (distinct from forensic anthropology) (Skinner et al., 2003: 82–83) is defined as the application of archaeological field techniques within a legal context, and is concerned with the understanding, recognition, control and interpretation of space, site history, site formation and the context and attributes of (usually) buried features and evidence (artefacts) within a defined area (Connor and Scott 2001: 5; Hunter 1994: 758; Skinner 1987: 272).

Archaeology has been of interest to disaster and crime scene investigators because forensic science, crime scene investigation and archaeology have similar aims and objectives: that is, to reconstruct previous human actions by searching for, recovering and preserving physical remains, whether they be objects, corpses or residues. Although the time periods may be different, the philosophy and procedures are much the same (Dirkmaat and Adovasio 1997: 40).

History of forensic archaeology

Forensic archaeology developed in the United States of America (USA) under the wing of forensic anthropology, where the utility of human skeletal remains for personal identification was recognised as early as the 19th century (Davis 1992; Ubelaker 2000: 41). It was not until the early 1970's that anthropologists advocated the need for contextual information that could be provided by archaeologists about where and how the remains were recovered in order to aid personal identification (Morse et al., 1976; Skinner and Lazenby 1983; Haglund 2001). The need for controlled excavation by trained professionals became obvious as a result of the increasing number of cases involving buried remains that did not get to court due to poor recovery through excavation of evidence by unskilled personnel (Hunter 1999: 210; Morse et al., 1984: 53). While forensic anthropology has a well-established history and has become increasingly popularised as a result of the media (Black 2000: 491; Crist 2001: 38), forensic archaeology has only relatively recently emerged as a distinct discipline (cf. Hunter 2002: xxv) with increasing options for professional training in North America and Britain.

Archaeology has proven itself to be an effective forensic sciences tool both domestically and internationally in North America, Britain and other parts of Europe. Archaeologists have assisted in the investigation of local domestic murder cases (Hunter et al., 1996; Sauer et al., 2003; Spenneman and Frank 1995) and multiple fatalities resulting from natural disasters such as floods, forest fires, and earthquakes (Sledik and Rodriguez 2002), and human induced events such as transportation accidents (Rhine 1998: 236-237), building fires (Sweeney 2003), or terrorist incidents (Gould 2002).

Since the mid-1980s archaeologists have also been employed to investigate genocide and human rights abuses (e.g., Connor and Scott 2001: 1-6; Doretti and Snow 2003; Morse et al., 1976; Schmitt 2002; Skinner 1987; Skinner et al., 2003; Wright 1995). Over the past 15 years the United Nations (UN) and human rights organisations such as the Physicians for Human Rights (PHR) have recruited archaeologists to exhume individual and mass graves associated with investigations of political killings, war crimes and genocide in over a dozen countries worldwide (Stover and Ryan 2001: 7). These include Argentina, Bolivia, Brazil, Colombia, East Timor, El Salvador, Ethiopia, Guatemala, Haiti, Iraqi Kurdistan, French Polynesia, Peru, Rwanda, the Republic of South Africa, the Solomon Islands and the former Yugoslavia (Connor and Scott 2001: 11).

While archaeologists are increasingly becoming part of the crime/disaster scene investigation team in North America and Britain, their potential to enhance investigations has not yet been fully recognised in Australia. A number of professionals with expertise in biological anthropology (many of whom have archaeological skills) have assisted police in forensic-related work involving identification of human remains in Australia or its near neighbours (Blau 2004). Apart from sporadic cases (McDonald and Ross 1990), little use has been made of archaeologists in the investigation of forensic or disaster scenes in Australia.

In an attempt to improve this practice, the author co-ordinated the Australian-Forensic Archaeology Recovery (Aus-FAR) Foundation Workshop in August 2003 at the University of Adelaide. This workshop brought together professional archaeologists and representatives from emergency and forensic services to discuss the ways in which forensic archaeologists can contribute to the search, location and recovery of human remains and other evidence from disaster and crime scenes in Australia. A total of 26 people attended the workshop over the two days. The first day consisted of a series of formal presentations, followed by an informal discussion group on the second day. Apart from Tasmania, Queensland and the ACT, all States and Territories were represented. The following disciplines and agencies were represented at the meeting:

Profession/Agency	Number	Paper presented
Archaeologist (some with anthropological expertise)	16	Yes x 3
Anthropologist	2	Yes
Soil scientist	1	No
Fire Service	1	Yes
South Australia Police (Physical evidence)	3	Yes
Australian Federal Police (Physical evidence)	2	No
Emergency Management Australia	1	Yes
Total	26	7

The workshop created a forum, which for the first time in Australia, allowed different yet overlapping disciplines dealing with forensic excavations to come together to augment their practice. The workshop resulted in a decision to develop a formalised database of names of professional archaeologists, which has been circulated to some forensic and emergency services. This register provides emergency and forensic services with a list of qualified professional archaeologists, who, in the event of an emergency, can be called upon for their expertise. The aim is to expand the database and make it available to as many emergency and forensic services in Australia as possible.

What can the archaeologist offer?

Archaeologists are able to contribute to three (overlapping) areas of an investigation: search and location, recovery and excavation and, consequently, identification.

Search and location

The search for, and location of evidence (buried or otherwise) is often aided by remote prospection. The basic techniques employed are:

- field craft which lies at the core of the archaeologists experience and training (Briggs and Wood 1988: 268);
- understanding of geology, landscape and environment; and
- identification of buried sites from topographical, vegetational and shadow anomalies for which innovative search pattern systems have been devised for forensic work (Hunter 1994: 763; Hunter 2002: xxx).

The investigation of the so-called Moors Murders provides a good example of the way in which archaeological techniques enhanced the search and location of evidence. In the early 1960s Ian Brady and Myra Hindley abused, tortured and ultimately murdered at least five children in the Manchester area of northern London. Despite extensive searching and digging by police on Saddleworth Moor, only three of the five victims were recovered in 1965. It was not until the re-investigation of the murders between 1986-1988 that archaeological methods were employed (Hunter 1994: 758) resulting in the recovery of another victim.

Recovery and excavation

The use of archaeological techniques in the recovery and excavation phase of an investigation ensures that maximum evidence (with limited contamination) is recovered from a scene. All evidence (fragmentary or otherwise) and their association with other evidence are recovered and recorded. This includes recording important environmental data that is later used in the analysis of the remains or by entomologists, botanists, and other specialists. The archaeologist provides the ability to disclose and record spatio-temporal relationships within a site and relocate the site and features within the site for future investigation. Such approaches have enormous significance for the reconstruction of peri and post-mortem events and ultimately to the identification of the victim(s) (Dirkmaat 2002). It should be stressed that the process of excavation is essentially controlled destruction and is therefore an unrepeatable experience. If excavation at a scene or site is to be undertaken trained archaeologists should be present.

'Clean up' efforts following disasters can sometimes hamper identification processes

A good example of the utility of the archaeologist at a disaster or crime scene is the investigation of the site of the World Trade Centre in New York, following the act of terrorism on September 11th 2001. Archaeologists were not included as part of the initial investigation process and consequently bodies and body parts were scooped up resulting in huge commingling. Once archaeologists were permitted to work (which was not until March 2002 well after the substantial "cleanup" efforts), they contributed through their recognition and recording using a GPS of highly fragmentary skeletal remains well beyond the boundaries of "ground zero" (Gould 2002: 11). This recognition not only provided evidence as to the extent of the devastation, but also contributed evidence important to the final victim identification.

Similarly, the involvement of an archaeologist in the examination of a fire scene can significantly enhance the investigation (Dirkmaat and Adovasio 1997: 48). Much information can be garnered from the in-situ identification of charred and modified human remains including:

- the location and orientation of the body during the fire;
- an accurate and efficient identification and collection of fragmentary cremated human (and animal) skeletal elements;
- field identification and documentation of observed pre-cremation trauma; and
- evidence of the fire intensity or duration from effects on bones.

Archaeologists were able to contribute to victim identification after the World Trade Centre disaster in 2001

Post-mortem damage that may occur as part of the recovery process (and complicate the determination of peri vs. post-mortem damage) is avoided using archaeological techniques (ibid). This is particularly important when interpreting (or proving) factors such as:

- Coercion: through the employment of meticulous excavation it is possible to recover evidence such as in-situ ligatures indicating that the hands were tied behind the victim's back. Without archaeological recovery, ligatures may be lost or slip. A loose rope, out of context, cannot necessarily be considered a ligature.
- Violence: for example, high velocity gunshot wounds often result in extreme bone fragmentation. Without recovery of all bone fragments, reconstruction of the wound defect would be impossible (ibid).
- Mode of approach to the scene: meticulous excavation can reveal, for example, tyre tracks which can be linked to the vehicle used to deposit the body/ies.
- Mode of digging the grave: archaeological techniques can determine where, for example, the perpetrator stood, when disposing of the body/ies.

Employment of basic archaeological principles of stratigraphy (the study of the layers of the earth known as strata) in the recovery process also provides the ability to assess the relative timing of events, that is, the *terminus ante quem:* time before which an event must have occurred and the *terminus post quem:* time after which an event must have occurred. For example, during the resurfacing of a road a skeleton was uncovered. The grave was cut into an existing ditch dug for a drain system. Using archaeological principles and knowledge about the dates of the digging of the ditch for the drain (1958) and the construction of the road (1962), it was possible to narrow down the search for missing persons to dates between 1958 and 1962 (P. Cheetham pers. comm 2002).

Archaeologists are also familiar with scientific techniques that are useful in determining the timing of events. A good example is the work of the Australian forensic archaeologist Emeritus Richard Wright (see also Hunter 1994: 762). In 1990 Professor Wright archaeologically investigated WWII mass graves in the Ukraine on behalf of the Australian Government's prosecution of war criminals (Wright 1995). He was able to radiocarbon date surviving human hair to test if it showed effects of the hydrogen bomb. Combined with evidence from bullet cases with the year of manufacture imprinted on them, Wright was able to demonstrate that the event was prior to 1952 but after 1941.

Identification

The ultimate aim in both a disaster and crime scene investigation is the personal identification of the victim(s). The success of identifying an individual based on badly decomposed or skeletonised human remains depends largely on the completeness of the material. It is therefore fundamentally important that complete and accurate recovery of skeletal parts is undertaken and information about their associations with one another and other items recorded. Such recovery relies on an appreciation of the notion of the context of the evidence and controlled excavation employing archaeological techniques (Dirkmaat and Adovasio 1997: 39). Excavation is controlled destruction and is

an unrepeatable experience. It is therefore vital that any excavation is undertaken by professionals.

Summary

The ability of the archaeologist to enhance the investigation of a crime or disaster scene can, in summary, be attributed to professional experience. Because of the nature of the discipline of archaeology, professionals are trained to recognise and recover complex features from a wider variety of site types. Consequently, when approaching a crime or disaster scene, archaeologists are adept at appreciating the notion that there is no such thing as a typical scene: each situation is unique (Skinner and Sterenberg in press; Spennemann and Franke 1995). The ability to be flexible in the planning of site investigation impacts on choices about the size of the area excavated and the employment of appropriate equipment. These decisions have the potential to save time (and therefore money) and to ensure that maximum evidence is collected. While police investigators are competent to sketch, photograph and collect evidence on the ground surface, rarely do they employ the same techniques underground.

Further, most archaeologists will have excavated numerous human remains in their career, under different conditions and in different soil environments. The efficiency and effectiveness of a search may therefore be enhanced through the archaeologist's ability to make rapid in-the-field evaluations of any potentially significant bone (complete or fragmentary/ human or non-human), and to determine the forensic significance of human remains by establishing the type and association of artefacts and physical evidence (including human bones) to depositional environment (i.e. context).

Conclusion

Clearly, "the practice of archaeology is applicable beyond its traditional role" (Davis 1992: 152). It is hoped that this paper has shown the clear benefits law enforcement and emergency service agencies can gain from the use of forensic archaeology. While North America, Britain and parts of Europe actively include archaeologists in the investigation of crime and disaster scenes, and substantial literature on the benefits of such an inclusion exist (Briggs and Wood 1988; Dirkmaat and Adovasio 1997; Hunter 1994; Morse et al., 1984; Skinner and Lazenby 1983; Ubelaker 1989), Australia is yet to realise the potential of consolidating forensic archaeology as a discipline. Unlike Scotland which has a six-hour custody law that potentially impacts on the time taken to undertake an excavation (and therefore the employment of professional excavators—Hunter 2002: xxviii), Australia does not have these time constraints. The inclusion of a qualified and skilled professional archaeologist in the investigation of a crime/disaster

scene is therefore possible and has the potential to improve the accuracy in evidence collection, increase the probability of collecting all physical evidence, and prevent post-mortem damage to the evidence (including human remains) (Dirkmaat and Adovasio 1997: 57).

The forensic archaeologist must, however, participate in an investigation in a reliable, ethical and lawful manner, appreciating that the work of any specialist is complementary to that of another. Archaeologists have an obligation to understand and work within the protocols and methodologies of disaster and crime scene investigation (Hunter 1994: 759). Forensic archaeology is not therefore, simply the transferral of archaeological skills into the forensic arena (Cox 1998: 21–22). For this reason formal training for archaeologists interested in contributing to the forensic field is necessary. The development of forensic archaeology is therefore, a two-way exercise. Forensic and emergency service agencies need to be aware of the benefits archaeology can offer, and archaeologists need to understand the objectives and constraints which govern forensic and emergency practices (Hunter 1999: 211). Education and training are required so that mutual trust can be developed between the expert and the investigatory agencies. It is hoped that through the formation and future expansion of Aus-FAR, archaeologists will begin to be more readily included in forensic and emergency investigations.

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