Archaeology and Forensic Science: The Need for an Interdisciplinary Approach in Pakistan

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Abstract

Forensic Science and archaeology have a very close relationship. Forensic Archaeology is the application of archaeological research and techniques in Forensic Science to solve the medico-legal issues. Unlike Pakistan, archaeology is considered as an integral part of Forensic Science in the developed countries. Therefore, this is very necessary for Pakistani archaeologists to make a collaboration of Forensic Science with archaeology within Pakistan by collaborating with the forensic science agencies/departments for the bright future of archaeology. In this paper the researchers have focused on the relation of archaeology and forensic science, the multidisciplinary methodology of Forensic Archaeology and the present status and future directions of such multidisciplinary approach in Pakistan.

Forensic Science is used to predict not the future but the past (Lee 1998: 280). In modern definition forensic science is the application of scientific knowledge to legal problems (Fisher et al. 2009: 3). In other words, Forensic Science is the scientific method of gathering and examining information about the past. The word forensic comes from the Latin *forensis*, meaning "of or before the forum." Forensic science applies scientific principles, techniques, and methods to the investigation of crime. Other related definitions of forensic may include the use of science to aid in the resolution of legal matters and a scientific analysis for the purpose of judicial resolve. Recently the term forensic is used to describe many scientific investigations and some these investigations are of historical importance. For example, a forensic scientist may work on the discovery of the composition of ancient pottery or the identification of ancient human remains (Collins 2007: 1-3).

In the past, the primary tools in Forensic Science were observation and interpretation of physical evidence. In the second half of the nineteenth century for the first time science

was applied to the forensic investigation (Erckert 1997: 1). Forensic Science is a multidisciplinary science closely related to other sciences like biology, chemistry, anthropology and archaeology etc. It is interesting to compare forensic science and archaeology because of the close relationship (Drewett 1999: 2).

In the case of archaeology, scientific archaeology (also known as processual archaeology) is a theoretical movement rooted in the 1960s–1970s. Scientific archaeology represented a radical break from the then-dominant culture, the historical and antiquarian approaches to archaeology and resulted into Archaeology as a science (oxfordbibliographies.com). With the application of science archaeology has made a place in the sciences.

Archaeology also predicts the past, like Forensic Archaeology. Most archaeologists define archaeology as the study of the past through material remains. Archaeology has its own methodology and theory applicable to the remains of past peoples, societies and cultures (Drewett 1999: 2). Like Forensic Science, Archaeology is also a multidisciplinary science and has a close relationship with other sciences e.g biology, chemistry and forensic science.

Analytical knowledge is important both for archaeology and Forensic Science. The analytical knowledge of forensic investigators and archaeologists has a close relationship. Both fields of research emerged during the nineteenth century. Both disciplines were concerned with the proper identification of materials studied during investigation. Work of archaeologists and the work of forensic investigators are very similar. Both attempt to understand the nature, sequence, and fundamental reasons for certain events in the past. Their final goals may differ, but their philosophy is very identical. Both disciplines use and present evidence in order to prove their cases (Dupras et al. 2006: 103).

There are some basic principles of archaeology that can be applied to forensic science. These principals include provenience, context, features, stratigraphy, superposition and taphonomy etc. (Dupras et al. 2006: 105).

An archaeological excavation and a crime scene are similar in many ways. Both field investigates a past event. Both fields preserves past event by documenting, gathering,

preserving, and interpreting physical evidence. Techniques are used to excavate archaeological burials with careful measurements and documentation. The exact location of all items *in situ* provide the basis for recreating the crime scene (Haglund et al. 2002: 96).

Due to the great similarities between archaeology and Forensic Science, archaeological methods can be applied to Forensic Science. The mutual relation of Archaeology and Forensic Science results into a new field called, Forensic Archaeology.

Forensic archeology is the application of archeological methods to forensic science. Forensic archeologists perform the controlled recovery of human remains and other evidence at forensic scenes (Nawarocki 1996: 1). In other words, forensic archaeology is the application of archaeological theory and methods to crime scene excavation and recovery of physical evidence/forensic evidence. It can also be defined as data collection activities carried out during the field recovery (Dupras et al. 2006: 3).

Forensic archaeology involves applying archaeological methods/techniques to the crime scene. Careful archaeological techniques can help in recreating the past scene (Dupras et al. 2006: 3). Following are some skills or knowledge associated with forensic archaeologists (Dupras et al. 2006: 4).

- Ground search methods (environmental changes associated with burials)
- Survey techniques (compass, theodolite, total station)
- Geophysical search methods (GPR, electromagnetic survey, metal detector)
- Site formation analysis and description
- Mapping techniques
- Spatial controls (establishing datum points, GPS, establishing grids)

- Excavation techniques
- Basic identification of human and nonhuman skeletal anatomy
- Artifact collection, documentation and preservation
- Site recording (casting of features, digital and still photography, documentation)
- Field sample collection (soil, botanical, entomological)
- Collection and preservation of skeletal remains and associated evidence

Methodology and Interdisciplinary Approach

Forensic Science and Archaeology both are sciences, therefore scientific method is applicable in both fields. The scientific method begins with *observations*. Scientists try to organize observations. When the scientists find a relationship among the observations they suggest a *hypothesis.* The hypothesis tentatively explains what is being observed. A plan is made to test the hypothesis. Then the plan is carried out and further observations are made. If the new observations oppose the original hypothesis, a new hypothesis is suggested and tested. If the new observations confirm the original hypothesis, the scientists often choose another plan to confirm the hypothesis (Collins 2007: 5). Scientific method is valid both for Forensic Science and Archaeology and it make it easy to draw an interdisciplinary methodology to the close relation of these two sciences.

The forensic scientists do not directly solve crimes but rather they follow a systematic methodology. They simply analyze the physical evidence[1]. Physical evidence includes all objects collected at a crime scene and can be analyzed in a crime laboratory. This evidence is typically collected by police officers or specially trained crime scene investigators.

Similarly like forensic scientists, archaeologists do not directly make conclusions but rather they follow a systematic methodology. In case of archaeology the physical evidence can be termed as *Hard Evidence* (Pollard et al. 2007). Archaeologists collect *Hard Evidence* and then analyze it in the archaeological lab.

By mutually combining the methodology of both Forensic Science and Archaeology, interdisciplinary methodology can be created named as "the Methodology of Forensic Archaeology". The methodology includes archaeological methods for the collection and analysis of the physical evidences that can be used to make a final conclusion.

Sub-disciplines of Archaeology can be used for the analysis of the collected forensic evidences. For example, zooarchaeology can be applied for the analysis of forensic evidence like human bones.

Pakistan and Forensic Archaeology: The Present Condition and the Future

[1] Physical evidence consists of tangible articles such as hairs, fibers, hidden fingerprints, and biological material for scientific testing.

Directions

The first forensic laboratory was established in Lahore in 1930. By 1947 the laboratory was working as a training center and dealing with the examination of forensic evidence (Ahmad 1961:133). Today there are a few well equipped forensic laboratories in Pakistan.

As compared to forensic science, archaeology is not a developed field in Pakistan. Even in the recent time Pakistani archaeologists are using traditional methods in the archaeological investigations. The lack of interdisciplinary approaches and collaborations between the departments of Forensic Science and Archaeology are the great reasons for the lack of Forensic Archaeology in Pakistan. There is limited education of archaeology for Forensic practitioners and vise versa. There is no single course of Forensic Archaeology offered in any university of Pakistan. There are no opportunities for Pakistani archaeologists to be trained in forensic science. The current condition of Pakistan Archaeology illustrates that the importance of Forensic Archaeology has not yet been realized. Foreign archaeological missions in Pakistan do not tag Forensic Archaeology in the universities of Pakistan.

The collaboration of Forensic Science and Archaeology in Pakistan can result into a very important scientific field that will help in the investigation of crimes and terrorism. Most of the crimes remain untraced due to the lack of proper research and technical expertise in the forensic science. In most cases dead bodies are buried in the ground by the murderers in order to hide their crime. Therefore, especially in Pakistan, archaeological methods are needed to recover each and everything from the crime scene, with modern archaeological methods.

Table 1. Table showing the crime reported from 2003-2012 (Source: Bureau of Police Research & Development Ministry of Interior)

Offences	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
All Reported	400680	440578	453264	537866	538048	592503	616227	652383	673750	646900
Murder	934	971	963	1004	1055	1205	1249	1320	1386	1384

As previously mentioned, that there is no university in Pakistan that offers a single course of Forensic Archaeology. We are interested in the future to make collaboration between the departments/institutes of archaeology and forensic science departments/agencies in Pakistan.

Table 2. List of Forensic departments/agencies and facilities they offer

Forensic Departments/Agencies in Pakistan	Facilities
National Forensic Science Agency, Islamabad (NFSA) www.nfsa.gov.pk/news.html	• DNA analysis • Firearms and Toolmarks analysis • Fingerprints • Crime Scene Investigation
Center for Applied Molecular Biology (CAMB), Lahore (DNA) www.camb.edu.pk	• DNA Research
Punjab Forensic Science Agency pfsa.gop.pk/	Investigation Facilities • Crime and Death scene • DNA and Seriology • Forensic Photography • Firearm and Tool Marks • Latent Finger Prints • Pathology • Toxicology Training Facilities • Latent Finger Print Training • Medico-legal Death Investigation Training • DNA Evidence Consideration Training • Firearm and Tool mark Training • Forensic Toxicology and Narcotics Training

Table 3. The future possible collaborations of the forensic departments/agencies and departments of archaeology in Pakistan

Departments/Institutes of Archaeology in Different Universities of Pakistan, for Future Collaborations
• Taxila Institute of Asian Civilizations, Quaid-i-Azam University, Islamabad. • Department of Archaeology, University of Peshawar, Peshawar, Pakistan. • Department of Archaeology, Hazara University, Mansehra. • Department of Archaeology, University of the Punjab, Lahore.

Conclusion

Archaeology is an integral part of forensic science. Forensic scientists must understand archaeological principles, concepts, and techniques. However, they must also be well versed in all legal matters relevant to the occupation, like the criminal justice system, state and federal laws, and chain of custody. Most importantly, forensic scientists must have spotless criminal records and only exercise the highest ethical standards. Upon completing an analysis, forensic scientists must be able to present their findings in a court of law in a manner understandable to the general public. This requires an extensive understanding of archaeological techniques in addition to the ability to ideas clearly. Forensic scientists work neither for the defense nor for the prosecution do they simply serve as advocates of the truth under all circumstances.

In Pakistan, Forensic Archaeology will open new door in the development of archaeology and will replace the traditional archaeology into scientific archaeology. The establishment of Forensic Archaeology departments will replace the traditional methodology of archaeology into a modern and scientific methodology and it will open new chapters in the Archaeology of Pakistan.

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Figures

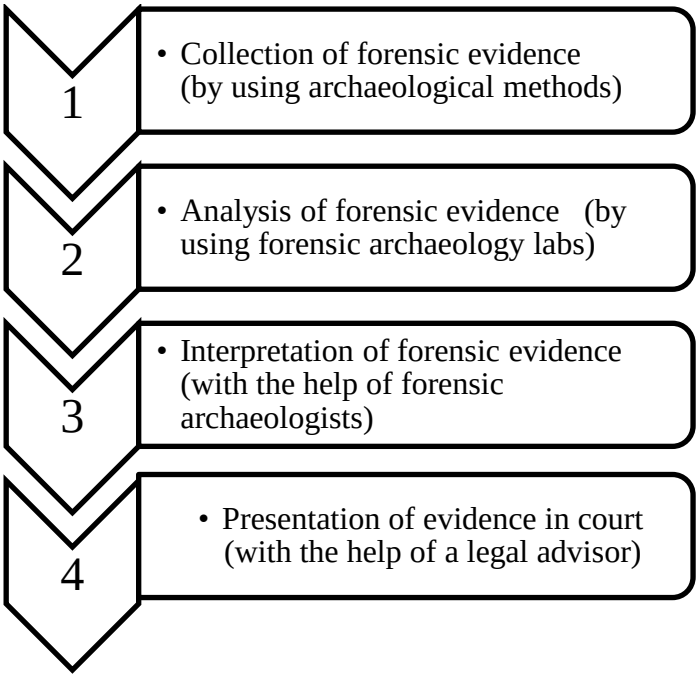

Figure 1. Methodology of Forensic Archaeology (Conceptualized by the Authors)

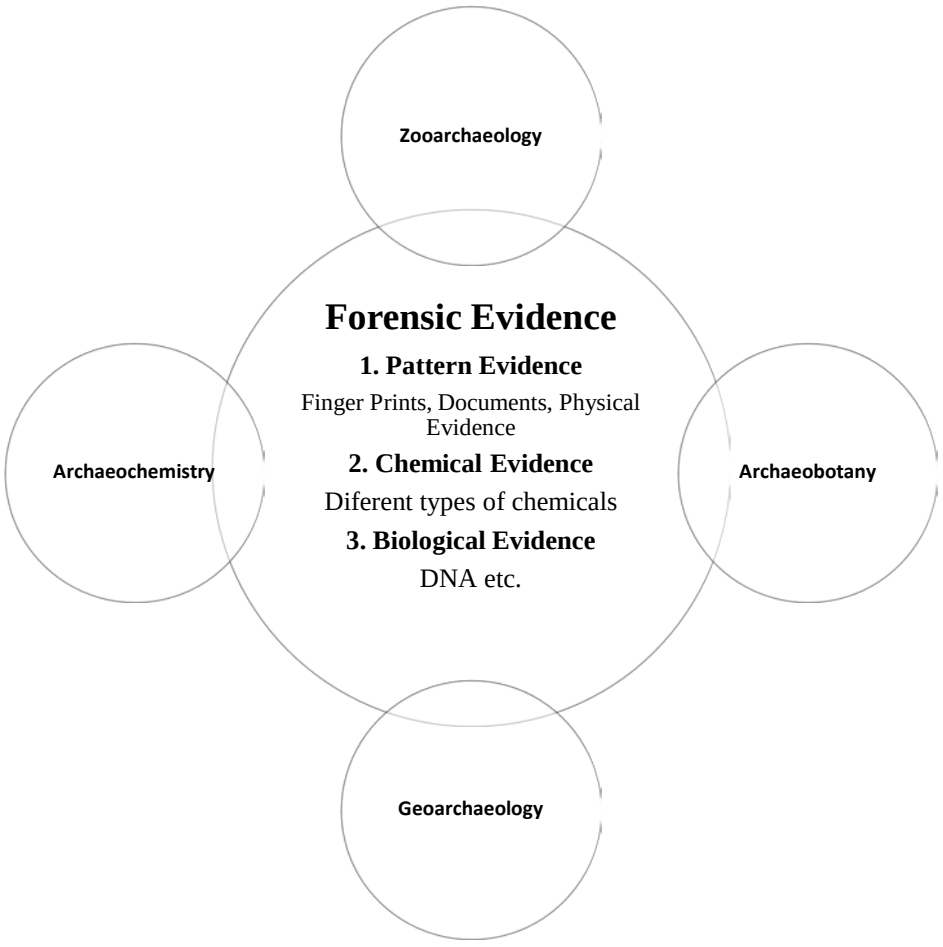

Figure 2. The Relation of Forensic Evidences with the Sub-disciplines of Archaeology (By the Authors)

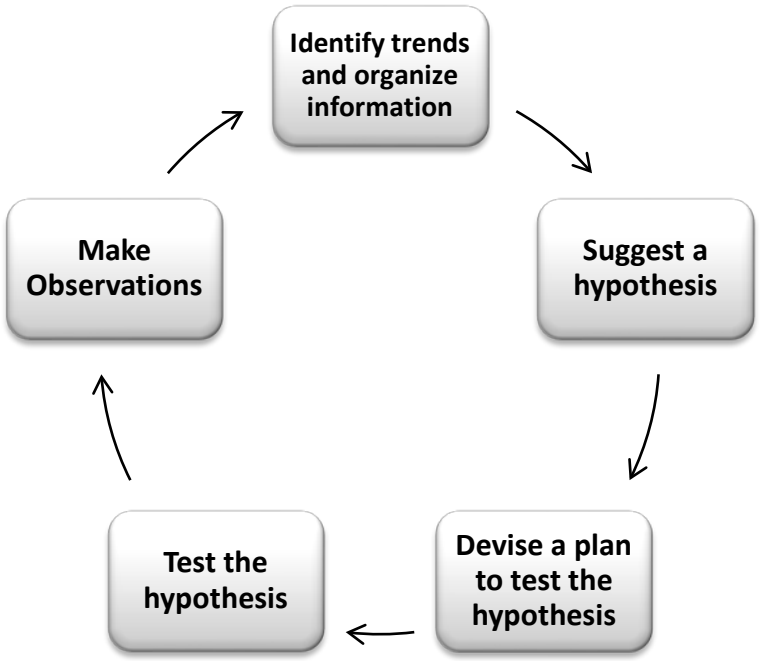

Figure 3. Scientific Method in Archaeology and Forensic Science (Diagram by the Authors).