

FUNDAMENTALS OF FORENSIC ANTHROPOLOGY

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**FUNDAMENTALS
OF FORENSIC
ANTHROPOLOGY**

Foundations of Human Biology

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The Growth of Humanity, by *Barry Bogin*

Fundamentals of Forensic Anthropology, by *Linda L. Klepinger*

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Figure 10.6 <i>a</i>	John Moore
Figure 10.6 <i>b</i>	Eldon Quick

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The great American tennis champion Althea Gibson (1927–2003) remarked that “No matter what accomplishments you make, somebody helps you.” Somebodies, actually.

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SERIES INTRODUCTION

The core focus of physical anthropology as a discipline is the biology of human beings in a cultural context. The subfield of forensic anthropology adapts this focus to the special job of identifying unknown remains and seeking and interpreting any evidence relating to the death that the remains may hold. We believe that Linda Klepinger's book will become the classic text in this subfield. *Fundamentals of Forensic Anthropology* embodies a genuine scientific passion for the subject matter, communicated not only through the author's unique critical and evaluative approach to the tools and techniques used in forensic investigations but also through her craft and artistry as a writer.

Forensic anthropologists need to know a great deal about human osteology, skeletal biology, dental anthropology, taphonomy, archeology, genomics, and scientific inquiry in general. Fortunately for us, Klepinger knows all this and more. Best of all, she has the rare gift of being able to take others along with her for an eye-popping ride without demanding that they be similarly knowledgeable. In a prose style both engaging and straightforward, she unveils the history, limitations, accuracies, imprecisions, and future of forensic anthropology. Her book will lead its readers to ask all manner of related questions regarding the science behind forensic techniques, because it will teach them not how to do forensic science but how to think about doing it. This, we believe, is the essence of a classic text.

In this book, professional forensic anthropologists will find guides to help them in estimating from unknown remains an individual's probable age, sex, race and stature. Novices will learn to understand—and question—the

science behind such estimates. And everybody who reads this book will discover how much they care about this field, and how important it is that it be done with both authority and honesty. This reflects the field's social significance as well as its intrinsic scientific interest; but most of all, it reflects Klepinger's consummate skill in telling the story of her discipline.

Forensics should be an objective scientific inquiry, not a body of opinion in service to a particular employer. Throughout her career, Linda Klepinger has pursued this ideal with wit, charm, and a tenacious and courageous devotion to the scientific method. Her impatience with less conscientious practitioners is expressed in her comment that the false certainty they profess to offer is perhaps "... best left to those who wear a pointy hat with stars on it." After reading *Fundamentals of Forensic Anthropology*, you will understand why the author quotes Voltaire's aphorism: "Doubt is not a pleasant condition, but certainty is an absurd one."

In editing *Foundations of Human Biology*, we seek to offer students the works of physical anthropology's leading practitioners and its best authors. We are grateful to Linda Klepinger for contributing a work that captures the enthusiasm of crime-scene investigations and channels that enthusiasm into a critical concern for the scientific basis of the investigators' knowledge. Her integration of empirical inquiry, social insight, scientific integrity, and narrative skill exemplifies and carries forward the best traditions of anthropological science.

Kaye Brown
Matt Cartmill

Durham, North Carolina
March 27, 2006

PART I

BACKGROUND SETTING FOR FORENSIC ANTHROPOLOGY

1

INTRODUCTION

There does not exist a category of science to which one can give the name applied science. There are science and the applications of science, bound together as the fruit of the tree which bears it.

—Louis Pasteur

OVERVIEW OF THE FIELD

Pasteur's observation on science appears particularly appropriate to forensic anthropology. The American Board of Forensic Anthropology offers the following definition:

Forensic anthropology is the application of the science of physical anthropology to the legal process. The identification of skeletal, badly decomposed, or otherwise unidentified human remains is important for both legal and humanitarian reasons. Forensic anthropologists apply standard scientific techniques developed in physical anthropology to identify human remains, and to assist in the detection of crime. Forensic anthropologists frequently work in conjunction with forensic pathologists, odontologists, and homicide investigators to identify a decedent, discover evidence of foul play, and/or the postmortem interval. In addition to assisting in locating and recovering suspicious remains, forensic anthropologists work to suggest the age, sex, ancestry, stature, and unique features of a decedent from the skeleton.

The roots of forensic anthropology are firmly planted in the twentieth-century academic research of physical (i.e. biological) anthropology, especially bioarchaeology. The quest for extracting the maximum information from skeletal remains of past peoples pushed the envelope of osteology beyond the parameters of study routinely addressed by physicians and anatomists. The knowledge, skills and experience that physical anthropologists focused on to derive biological, and even cultural, information from human skeletons in an archaeological context has proven directly applicable to medical–legal contexts. This is not to state that the research to application flow has been essentially one-way, for that is, indeed, not the case. The growth of research and practice in the forensic realm has created a back-flow of information to bioarchaeological and paleontological endeavors.

Reading the bones for clues to personal identification summed up most of the initial work by anthropologists, who were called upon pretty much on a sporadic, *ad hoc* basis. Increasingly they are called upon to help interpret skeletal evidence with an eye to cause and manner of death. “Simply put, the *cause of death* is any injury or disease that produces a physiological derangement in the body that results in the individual dying” (DiMaio and DiMaio, 1993, p. 3). Therefore, causes of death can be as diverse as gunshot wound, melanoma, or toxic shock. While determinations of causes of death are ultimately the call of pathologists, medical examiners, and coroners, when remains are skeletal, the opinion of the forensic anthropologist counts. However, anthropologists lacking soft tissue evidence must be especially cautious in their pronouncements. For instance, there is no absolute association between linear skull fractures and degree of brain injury, and the cause of death may or may not have any direct connection with a cranial fracture. The *manner of death* is the circumstance that gave rise to the cause of death. In contrast to the myriad possible causes of death, the manner of death has but five categories: natural causes, accident, homicide, suicide, and undetermined. For example, a gunshot wound to the head as a cause of death could result from accidental, homicidal, suicidal, or undetermined circumstances. The circumstances of death are part of the medical–legal investigation that is often amenable to anthropological probing—from assigning manner of death to evaluating the believability of a suspect’s account of events.

The *mechanism of death* is the physiological or chemical process, initiated by the cause of death, that leads to the failure of vital organs or organ systems. It is a description of how that bullet to the head or chest eventuated in death. This is not an area of primary concern to the anthropologist and should usually be left to medical personnel.

What is of concern to the anthropologist is maintaining the chain of evidence or chain of custody. The anthropologist must vouch for the security of any remains or other evidence left in his or her custody. The anthropologist

must guarantee that the evidence was not tampered with in any undocumented way. Often, but not always, there is a chain of custody form signed and dated in serial fashion by each custodian. In any event, anthropologists should record dates, times, and circumstances of the arrival and departure of evidence and where it was housed in the interim.

Mass disasters and recovery from mass graves present special challenges and obstacles that differ from more typical death investigations in that agencies and command structures, foreign settings, and bureaucracies must be dealt with. Each such instance has its own idiosyncrasies.

Finally, forensic anthropology is very much analogous to clinical practice, especially in regard to decision-making, as described by Dawes *et al.* (1989). We employ both “clinical” judgment, where the practitioner processes information in his or her head, and actuarial judgment, where interpretation is the product of an automatic routine or calculation based on empirically established formulations. The Dawes and co-workers study concluded that in medicine and psychology the actuarially based decisions were superior to the clinically based ones. Their conclusion is of interest to anthropology, but (and this is a very big but) the databases on which their actuarial procedures were based are very much larger than those characteristic of anthropology, and their formulations have been more intensively cross-validated. Discretionary decisions in forensic anthropology retain value and must even be applied to the formulae themselves. The era of autopilot has not yet arrived. Attention must be paid.

EDUCATION AND TRAINING

In the United States and Canada most, but not all, programs in physical anthropology are housed in departments of anthropology. Broad undergraduate training in the four fields of anthropology automatically introduces the student to a broad range of cultural practices and to principles of archaeology. Students should have courses in both field archaeology and in archaeological method and theory. Admission to the Physical Anthropology section of the American Academy of Forensic Sciences requires a masters degree in anthropology, which should reflect an emphasis on physical anthropology, and even more specifically on human osteology/skeletal biology. In practice very few university degrees specify such detail. A Ph.D. in physical anthropology with the same emphasis on some aspect of human osteology is one of the requirements for becoming eligible to sit for the American Board of Forensic Anthropology certifying examination. Galloway and Simmons (1997) present an in-depth look at education in forensic anthropology under changing circumstances.