

Just as the orientation of magnetic particles in an ancient lava flow may become fixed, in **archaeomagnetic dating** magnetic orientation can become "fossilized" in cultural features. For example, the magnetic particles in sediments that have infilled a canal may become lined up with the earth's magnetic field at the time of their deposition (Eighmy and Howard 1991). Similarly, the magnetic particles in clay making up the bricks of a kiln, like so many natural compass needles, may point to the location of magnetic north at the time they were heated. Careful study of dated sites with features exhibiting evidence of past magnetic orientation has provided data necessary for the production of a "master map" showing the location of magnetic north as it changed through time (Eighmy and Sternberg 1990). Figure 2.22 shows the deduced location of magnetic north based on archaeomagnetism between A.D. 600 and 1975. When the orientation of the earth's magnetic field has been preserved in features found at an archaeological site dating to sometime in that period, a more precise estimate of the site's age can be deduced based on the dated location of magnetic north along this curve during the site's occupation.



FIGURE 2.22 Master map of the location of magnetic north from the period A.D. 600 to 1975 as determined at archaeological sites in the American Southwest (SWCVS95). (Courtesy of Jeffrey Eighmy)

THE ETHICS OF ARCHAEOLOGICAL RESEARCH

Rather obviously I am a contemporary person, a product of the modern world, born in the middle of the twentieth century to an American family firmly ensconced in the middle class. I can add to this the fact that I am of European descent; my father's side of the family hails from Austria and my mother's from Poland, Germany, and Russia. Finally, I am university educated and trained as an archaeologist.

My personal identity and family bio are relevant here for the following reason: The vast majority of the archaeological fieldwork I have conducted during the course of my career has been at sites representing the villages, hunting camps, and quarries of Native Americans, people with whom I have no particular historical connection. This raises the following interesting ethical question: Since I am not ethnically Native American, what gives me the right to excavate the places where their ancestors lived?

This is not merely an issue of political correctness. For much of our discipline's history, archaeologists practiced what can best be described as archaeological colonialism. Europeans and Americans of European descent traveled the world looking for fabulous archaeological treasures, dug them up, and brought them home to sell or display in museums or, in some cases, just their own homes. The native peoples of places like Egypt, Peru, or China were rarely asked permission by

Archaeomagnetism: Orientation of the earth's magnetic field can become fixed in relatively recent cultural deposits like the sediments in a canal or the clay in bricks lining a kiln. The date of a site can be determined where that orientation points to a location of magnetic north already fixed in space and time along a master curve.

foreign archaeologists to excavate in their countries, nor were they asked permission to remove the material evidences of their histories for display elsewhere. In some cases there were no local laws regulating archaeology and no real national institutions to oversee the archaeological activities of locals, much less foreigners. At best, archaeologists struck deals with local leaders or politicians and, like their natural resources, the archaeological heritage of many nations was plundered.

In most parts of the world today, governments have enacted laws that serve to protect their archaeological heritage by regulating the excavation of archaeological sites and controlling the disposition of artifacts recovered during those excavations. Most of these laws and regulations at least partially ensure that archaeological material remains the property of the government (or local university or museum) and is curated in the country of origin, though it may be loaned out for temporary analysis, exhibitions, or tours. In fact, in the last few years, I have been able to see artifacts and human body impressions from Pompeii (this chapter), the fossil Lucy (Chapter 3; and I have the *I Love Lucy* T-shirt to prove it), and the treasures of Egyptian pharaoh Tut Ankh Amen (Chapter 10), all during their national tours when they were on exhibit at the Discovery Center in Times Square, New York City.

In contrast, outside of Indian reservations, Native Americans in the United States are not able to control or regulate the vast majority of the archaeology conducted at the sites left behind by their ancestors, and most of that archaeology is conducted by people like me: non-Indians. It's easy to empathize with the discomfort some Native Americans feel about archaeology (Travis 2010); imagine a group of Native American scholars excavating the archaeological remains left behind by the U.S. cavalry during the Battle of the Little Bighorn (Custer's Last Stand) or the site left by the Pilgrims at Plimoth Plantation. It sounds fine to me, but I bet it might make a lot of people uncomfortable.

Indians do possess some control over one category of their cultural heritage: the burials of their ancestors. As a result of a U.S. law titled the Native American Graves Protection and Repatriation Act (NAGPRA), modern Indians are the legal stewards of burials that can be shown to contain the remains of their ancestors (<http://www.nps.gov/nagpra/PUBLIC/INDEX.HTM>).

NAGPRA is important, but far from perfect. A significant problem arises with ancient burials when it simply isn't possible to prove a direct historical connection between a living group and the ancient remains. It is simply impossible, for example, to prove that the 9,000-year-old bones found in San Diego, California, in 1976 are the remains of direct ancestors of the local Kumeyaay tribes who have claimed them in court (Gibbons 2011a). Scientists want to study the bones; the Kumeyaay want to rebury them. Problems arise as well when the very procedures that might help verify a direct connection between a specific group and an excavated skeleton (for example, a DNA study of the bones) are objectionable to the Native Americans who are claiming ownership. It can get particularly dicey when multiple claimants assert ownership, as is the case with Kennewick Man, where not just different Native American tribes claim a connection, but so does a group of Pacific Islanders, as well as a group of people of Norse descent (Thomas 2000; Chapter 7). Needless to say, that case is a mess.

If you've been paying attention, you've noticed that I have cleverly avoided addressing the ethical conundrum I posed at the beginning of this section

concerning my own fieldwork. Unfortunately, I don't have any easy answers or even any not-so-easy answers to the question raised by archaeologist and professor Bettina Arnold in the title of one of her courses: "Who owns the past?" Is it all of the people of the country in which the remains are found? Is it just the tribe or even just the family of the descendants? Do such questions even apply to the fossils of ancient hominins discussed in Chapters 3 through 5 of this book?

As vexing as this issue can be, the good news is that in some places native people are embracing archaeology as a tool for illuminating their own histories. For example, the Navajo tribe has its own archaeology department (Two-Bears 2006); their motto is "Learning from the past to build our future" (<http://www.greenguide.nau.edu/NNAD.html>). In Connecticut, the resurgent Pequot tribe has its own team of archaeologists (most of whom are not Indians) who conduct research both on the reservation and off the reservation at sites important in Pequot history. For example, Kevin McBride, the director of archaeology for the Pequot (hired by, but not a member of, the tribe and not a Native American), is currently conducting archaeological and historical research at sites related to the Pequot War of 1637 (Urbanus 2015). Though there may never be an answer to the question "Who owns the past?" that satisfies everyone, archaeologists today realize that we have a special ethical obligation to the people whose histories we study.

COPING WITH CRAP: PSEUDOSCIENCE IN ARCHAEOLOGY

This brief discussion of the application of the scientific method in archaeology and paleoanthropology isn't all that different from one that you might find in any other introductory science textbook. Things do get a bit weirder here, however, for the following reason. To a far greater degree than is true for sciences like chemistry, physics, or biology, we find that archaeology and paleoanthropology generate a host of speculations accompanied by an attendant plethora of cable television series and "documentaries" focused on those speculations. The producers of those shows claim that they reveal a "hidden history" of the human species, one intentionally hidden by the science establishment. In fact, those producers don't "reveal" any such history. They just make it up.

Here's the bottom line: If you were hoping that in this book you might find support for claims that human history can be best explained by the intervention of ancient extraterrestrial aliens in antiquity, you are going to be sorely disappointed. If you thought that, just maybe, you would find here the revelation of proof for the existence of biblical giants or "Nephilim," well, that's not going to happen. If you figured that you'd encounter data here that might explain the evolutionary significance of Sasquatch, oh well.

Now the reason you won't be seeing any of that stuff here is assuredly not the result of my being part of a vast conspiracy of scientists sworn to secrecy on these and other out-there claims. We don't meet on alternate Thursdays in an underground government bunker as part of our evil strategy to keep you in the dark. Honest! Why in the world would we hide that stuff if it were true? It makes no sense. As a scientist and textbook author, I am confined and committed to

MESSAGES FROM THE PAST



evidence, not fantasy. You see, we actually know quite a bit about what happened in antiquity based on actual evidence, not hallucination. We know when the first hominins evolved and we know how the earliest tools were made by those ancestors (Chapters 3 and 4). We know many of the details concerning the evolution of the first modern humans and the development of the human intellect (Chapters 5 and 6). We have a pretty good idea about how our species spread across the face of the globe—and it didn't involve ancient spaceships (Chapter 7). We have a firm sequence for the development of agriculture (Chapter 8) and cities; and yes, we have some very good explanations for how the pyramids and other ancient monuments were built (Chapters 9–14). Human beings built them, and without the assistance of angels, aliens, or Atlanteans. We know these things because archaeologists and paleoanthropologists have conducted research, collected data, replicated ancient technologies, and written for publications where other colleagues challenge our assertions and conclusions before those articles ever get published.

Let me make this perfectly clear: In not a single instance has any evidence been found that supports claims of an extraterrestrial Peace Corps schooling our ancestors in agriculture, metallurgy, or pyramid construction. There is no archaeological or historical evidence for technologically advanced lost continents or twenty-foot-tall fallen angels walking around on Earth, having sex with human women, and constructing burial mounds in Ohio. For real (Feder 2014)! Does that mean that there are no mysteries, controversies, or uncertainties in science? Of course not. In each subsequent chapter in this book, you will find a section titled “Issues and Debates,” which focuses explicitly on mysteries, controversies, and uncertainties about which archaeologists and paleoanthropologists, in fact, debate. Ultimately, I think, and I hope you will agree, the amazing story of human antiquity as revealed by science is far more interesting and certainly more meaningful than the speculations and outright falsehoods promulgated by the purveyors of pseudoscientific nonsense.

SUMMARY

Archaeologists and paleoanthropologists apply a broad array of techniques in their investigation of the human past. This chapter has briefly surveyed some of the more important procedures for recovering and analyzing the data on which the rest of the book is based. How sites are formed, how they are preserved, and how they are discovered are key questions for archaeologists and paleoanthropologists. Once found, data can be analyzed to determine the age of the sites, how tools were made and used, the subsistence base of the people, and aspects of their social and even religious lives. Past peoples can also be investigated directly through analysis of their physical remains, which determines the age, sex, health status, and geographic origin of ancient individuals. The evolutionary relationship between a prehistoric person and modern human beings can therefore be determined. Using the general procedures outlined in this chapter and many other very specific analytical techniques mentioned throughout this book, archaeologists and paleoanthropologists can reveal the chronicle of the human past. We begin that chronicle in Chapter 3.

Web links for this chapter can be found at www.oup.com/us/feder