Fingerprints in the Sand

Federal agents use dirty evidence against archaeological thieves

By RICHARD MONASTERSKY

The moon rises heavy over New Mexico's high desert, casting its rays on scattered juniper trees, pinyon pines and a crime in progress. Two men have just plundered the remnants of an ancient dwelling in the Gila National Forest and are loading up sacks with prehistoric pots and bead jewelry. As their truck swings homeward, they think about the handsome price these relics will fetch from dealers who sell fine antiquities.

That theft in New Mexico last year is but one case in a little-heralded crime wave sweeping the United States. Although the federal government and many states prohibit the unauthorized removal of artifacts from public lands, "pot hunters" illegally raid thousands of archaeological sites each year, ranging from prehistoric burial grounds in Washington state to the graves of Civil War soldiers in Virginia.

"While we tend to think of [archaeological] looting as a phenomenon that occurs outside the United States, the scale of looting inside this country is massive," says James Adovasio, an archaeologist at Mercyhurst College in Erie, Pa., who has investigated several such crimes.

Over the past two decades, the pace of pot hunting has grown steadily, reflecting a burgeoning antiquities market hungry for pretty legacies of the past. Archaeologists and law enforcement agents have responded by stepping up their own efforts. But it's often difficult to put the guilty behind bars, because savvy thieves can claim they collected artifacts legally on private property.

In the last three years, scientists have developed their own "dirty" tactics to circumvent that defense. Using X-rays and electron microscopes, they analyze soil particles recovered from stolen antiquities in an effort to prove the items were illegally removed from protected sites. So far, the high-tech soil tests have contributed to convictions in only a handful of cases. But those who investigate archaeological crimes believe the technique holds great potential in the battle against artifact thieves.

"Soils are probably *the* most important weapon in our arsenal against these people right now, because it's pretty hard to dig in an archaeological site without taking soil away too," says Martin McAllister, an archaeologist and consultant who trains investigators to handle artifact crimes.

The New Mexico case illustrates how a criminal investigation can benefit from some snooping in the soil. The pillaged site once housed members of the Mimbres culture, who lived in the region around 1100 A.D. The looters not only carted off artifacts but also disturbed a Mimbres grave and left human bones strewn about the ancient dwelling, says Linda Kelley, a U.S. Forest Service archaeologist involved in the investigation.

As often happens, authorities did not learn of the crime until long after the thieves had fled. But with the help of informants, federal agents tracked down a pair of suspects and searched the house where they lived. The agents found several bits of evidence there, including a bag of pottery fragments and some reconstructed pots as well as dirt-covered coveralls and excavation tools. The suspects claimed they had collected the artifacts from private property with permission from the landowner.

Because police had not caught the suspects in the act of robbing the Mimbres site, archaeologists had to find circumstantial evidence that would convince a jury the seized material came from national forestland. Focusing on the dirt encrusting the tools, clothing and pottery found in the suspects' home, Kelley called in a team of soil sleuths who had pioneered a technique for analyzing sediments in cases of archaeological theft.

Adovasio, working with geologist Gary A. Cooke of the R.J. Lee Group, Inc., in Monroeville, Penn., and sedimentologist Jack Donahue from the University of Pittsburgh examined the recovered dirt and two other soil samples: one collected at the Gila site and another from the private property where the suspects claimed to have found the artifacts. Using a computer-controlled scanning electron microscope, the researchers drew up a list of the minerals and elements in each sample.

Donahue says such analyses provide a distinctive profile of the soil samples. "This is essentially a fingerprint, but you're fingerprinting sediment rather than a person," he explains.

The forensic tests struck pay dirt, revealing that the soil on the seized pottery and tools matched the sediment from the national forest rather than the sediment from the privately owned site.

Kelley found other clues implicating the purported thieves. During excavations at the Gila site she collected more than 8,000 pottery shards left behind by the looters. In scrutinizing the fragments, she found one that matched a pot shard recovered from the suspects' home. The clay bits fit together like adjoining pieces of a jigsaw puzzle.

Such a match might seem irrefutable, but this type of evidence hasn't always ensured convictions in the past. For that reason, Kelley says the additional evidence from the soil analysis will prove important when the case goes to trial. "We need this scientific analysis to get rid

U.S. Forest Service

Stolen goods: Soil analysis indicated that this Anasazi basket and associated textiles were illegally removed from a site in the Manti-La Sal National Forest in southeastern Utah. Artifacts date to around 1220 A.D.

of the kinds of doubt that an attorney could raise," she says.

When Donahue, Adovasio and Cooke joined the New Mexico investigation, they already had a forensic success record of 2-0, having used soil analyses to provide hard evidence against suspected looters twice before.

The first of those cases involved a man named Earl Shumway, who discovered a spectacular cache of thirteenth-century Anasazi baskets in southeastern Utah, "the likes of which hadn't been collected in over 50 years," says Adovasio. Archaeologists suspected Shumway had looted the baskets from Manti-La Sal National Forest, but he claimed they came from private land.

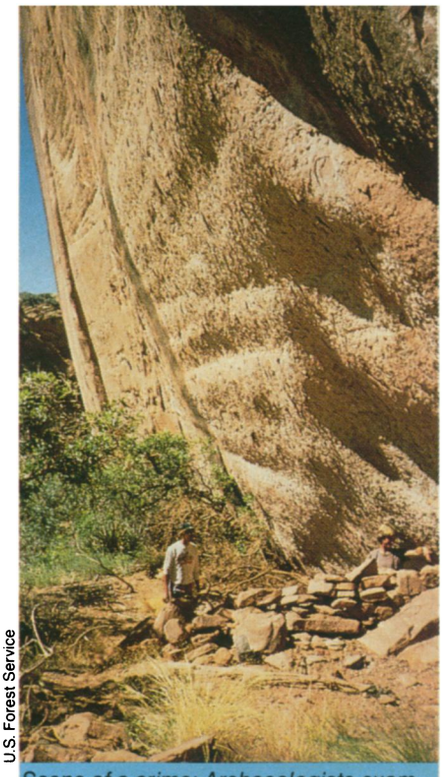
Although Shumway had cleaned the baskets, Donahue and colleagues managed to collect a small sample of dirt from under the stitching, which enabled them to demonstrate that the baskets had come from the national forest. Prosecutors used this analysis in their case against Shumway, who eventually confessed to the crime.

In the second incident, a man was convicted of stealing a 1,500-year-old mummified infant from a site known as Tin Cave in Arizona's Tonto National Forest. Authorities arrested him in 1988 after he tried to sell the infant's remains for $20,000 to an undercover agent. Through soil analysis, the researchers linked sediment from inside the cave with dirt found with the mummy. Because the man never denied having taken the mummy from the cave, the soil analysis wasn't crucial to his conviction, but the trial provided an important test of the technique's reliability.

In the Utah and Arizona investigations, the scientists analyzed soils using X-ray fluorescence and X-ray diffraction rather than the electron microscopy technique applied to the New Mexico soils. While the X-ray tests can provide an equally accurate portrait of the minerals and elements within soil, the computer-controlled scanning electron microscope technique is faster and easier, says Donahue, who described the three cases in Dallas this October at the annual meeting of the Geological Society of America.

Soil analysis has long played a role in investigations of artifact poaching, notes McAllister, a veteran in the field of archaeological criminology. But until the last five years, he says, authorities have used relatively simple techniques that lack the fingerprint-like accuracy of X-ray and electron microscope analyses.

Investigators have used the high-tech tests in only a few cases so far, primarily because news of the advances has yet to spread and the tests can cost up to $5,000 per case. But Donahue says many universities and research organizations have the necessary equipment to perform this type of analysis.



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Scene of a crime: Archaeologists examine an Anasazi structure plundered by looters. Scientific tests linked recovered artifacts to this and other sites on federal land.

"I think the soil tests will be used more commonly in the future," McAllister says, noting that it's very difficult to prove that purloined artifacts came from a protected area without such evidence. "Even if you find someone driving down a road through a national forest with a truckful of pots or other artifacts in their possession, you're not necessarily going to be able to prosecute them," he says.

Paradoxically, the new tests may lose some of their power against criminals as they gain popularity with investigators. That's because looters pay close attention to new legal tactics and adjust their methods to stay ahead of the law.

Several years ago, authorities started using an approach that capitalized on looters' disregard for the environment. Pot hunters often left cigarettes, beer cans and other garbage at the scene of the crime, and investigators collected the trash as evidence. But the looters soon caught on to that technique. "They're running a much cleaner operation now," says J. Scott Wood, an archaeologist at the Tonto forest who worked on the Tin Cave case.

Investigators have also drawn evidence from distinctive footprints and tire tracks found near excavation sites. Looters have responded by buying boots with common soles and tires with unremarkable treads.

Most archaeological thieves are tightly "networked," readily passing on information about new forensic techniques. Already, many have begun fastidiously cleaning off their artifacts and tools, Wood says. As this trend continues, he says, "the success of soil techniques will depend on when we catch them. If we can get them before they clean their stuff off, then we have a chance."

Part of the problem, says Adovasio, is that the techniques work best when soil samples are large enough to allow several tests. "But if worse comes to worse, as was the case with the Shumway business, we can use extremely minuscule portions to do the job – thimble-size or smaller," he says.

Donahue recounts one instance in which the team scraped tiny bits of sediment from within the grooves in an arrowhead and found the sample sufficient for analysis. Thus, he says, "even if [the looters] clean it off very carefully, we still have a chance of finding material that can be analyzed."

Although experts lack detailed statistics showing the extent of archaeological looting in the United States, they say the problem has worsened in recent decades as antiquity prices have reached staggering levels. Most of the plundered material ends up gracing coffee tables of wealthy U.S. collectors, although an increasing proportion reaches Japan, Europe and Saudi Arabia, says McAllister.

"It's going on everywhere in the United States, anyplace you find an historic or prehistoric artifact that has collector interest. You'll find people stealing from public lands, tribal lands and even off private property without the permission of the owner," he says.

People outside the archaeological community may wonder whether this looting truly represents a serious problem. After all, the United States has thousands of archaeological sites, and museums have countless artifacts stored away in dusty basements.

Yet that reasoning belies the real impact of pot hunting. There are only a finite number of archaeological sites holding information about prehistoric life; no more will ever exist. The raiding of these sites wipes out our record of past peoples. When looters ransack a site, they not only remove artifacts but also rearrange critical archaeological clues, destroying the contextual information researchers need to understand a particular site, Kelley says.

That information cannot be recovered even if police locate the stolen goods. "A looted artifact has lost 95 percent of its value to tell us what was going on in the prehistoric or historic period," McAllister says.

K. Barkley/Union County Advocate, Morganfield, Ky.

Gaping holes and mounds of dirt scar the Slack Farm in western Kentucky, site of one of the most widely publicized incidents of archaeological looting. Pot hunters leased digging rights on this private farm in 1987 and then plundered Native American graves beneath the field, searching for stone pipes, shell ornaments, pots and other valuable artifacts. State authorities charged the men with violating a Kentucky law that protects human burial sites, but later dismissed the case.

He also raises a more subtle concern about the effects of looting. Thieves routinely target the most important archaeological sites, such as ancient villages, because these places are the most likely to contain valuable artifacts, McAllister says. "[Looters] are going to destroy our ability to understand what happened in the prehistoric period because we're losing a whole category of sites," he warns. Imagine, for instance, a future scholar trying to reconstruct U.S. history without access to the information stored in state capitals and Washington, D.C.

In the battle against archaeological crime, investigators continually seek new techniques for outwitting robbers, and they believe soil analysis can play an important role. But forensic tricks alone won't end the raids.

"Most professionals agree that law enforcement isn't the [long-term] solution. Public education is really what we're trying to do," Kelley says.

Archaeologists distinguish between two types of looters: the serious thieves and the "weekend hunters," who often see nothing wrong with their hobby. Through public awareness campaigns and education in schools, federal and state officials hope to reduce casual looting and raise an outcry against commercial raiders. Increased awareness might also translate into stronger anti-theft laws and help cut pure vandalism of archaeological remains, a growing problem in many parts of the nation.

This type of outreach program would represent a major shift for archaeological scholars in the United States. "One of the main problems we have with the public is what I call archaeological arrogance," McAllister says. "Archaeologists like to maintain the position that archaeology is for archaeologists only, that it's something the public has no right to have access to. This attitude plays right into the hands of the commercial looters."

Some states have already developed programs to involve lay people in excavations, and the idea seems to be catching on elsewhere. Perhaps such projects can channel the energy of artifact buffs, reducing the temptation to steal pieces of the past. □