A Jane Doe Gets a Backstory

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By James Gorman *November 12, 2012*

http://www.nytimes.com/2012/11/13/science/isotope-analysis-provides-clues-in-a-florida-cold-case.html?_r=0

As cold cases go, this one was frozen. Forty-one years ago a young woman's badly decomposed body was found floating under a highway overpass at the southern end of Lake Panasoffkee, in south-central Florida, about an hour and a half northeast of Tampa.

There was no clue to her identity, but one clear sign of her fate. "A man's belt was wrapped around her neck," said Darren Norris, an investigator with the Sumter County Sheriff's office who is now in charge of the case. (The original lead investigator was William O. Farmer, who is now sheriff.)

She was pulled from the water on Feb. 19, 1971, and detectives spent thousands of hours in a futile effort to determine who she was and who might have killed her. She was buried as Jane Doe.

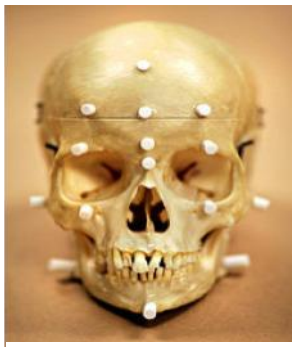
But such cases are not easy to let go. A young woman's life and body had been thrown away. Detectives could not help but think of the family somewhere who had lost a daughter. In 1986, the body was exhumed, for further investigation, which again led nowhere. What the detectives had to go on, based on forensic science at the time, was frustratingly sketchy: She was 17 to 24 years old, might have had children, and seemed to be white or Native American. It wasn't enough, and as it turns out it was only partly correct.

Early this year, Detective Norris brought the skeleton of the victim, who early on became known as Little Miss Lake Panasoffkee, to Erin Kimmerle, a forensic anthropologist who directs the Tampa Bay Cold Case Project at the University of South Florida.

Dr. Kimmerle reconstructed the woman's face and clothing, took shavings of her tooth enamel and bones, and recruited George Kamenov, a geochemist at the University of Florida in Gainesville, to analyze chemical traces in those shavings of lead, carbon and other elements that can give a surprisingly detailed history of diet and environment.

This kind of study, called isotope analysis, is part of the tool kit of geologists, archaeologists and paleontologists, but has only recently been used in criminal cases.

Last week Dr. Kamenov reported at a meeting of the Geological Society of America in Charlotte, N.C., on his work with Dr. Kimmerle and Detective Norris. His conclusions were startling.



Researchers believe the victim was probably from Europe.

The young woman was not Native American, he told the society. The best evidence suggested that she grew up in Greece and came to the United States less than a year before she was killed. (Tarpon Springs, north of Tampa, has a large Greek-American population.)

The research, said Detective Norris, "turned the case upside down." Based on the findings, he provided information for an article that was published Oct. 11 in The National Herald, an international Greek-language newspaper. It was accompanied by the new reconstructed image of the victim and her clothing.

The case is still not closed. The woman's identity has not been determined, and Detective Norris acknowledges that it is still a long shot.
But he is confident that he is on the right track. "The best lead that has ever come in this case came because of the science," he said — science that has changed remarkably in the decades since the body was found.

Among the changes are better databases for skull measurements used to determine ancestry; 3-D identification software for processing measurements and aiding in producing reconstructions of a face; and isotope analysis. A forensic investigation can now involve scientists from an array of fields, including anthropology and chemistry.

“We’re all working together,” said Ann H. Ross, who developed the software program “3D ID” and is professor of anthropology at North Carolina State University. “That’s where it has changed dramatically.”

Isotope analysis is one of the newest tools. “It’s in its infancy now” in criminal cases, Dr. Ross said.

One of the first times it was used in a criminal investigation was in the gruesome case of the torso of a young boy, who came to be called Adam, found in 2001 in the Thames River in England. Traces of strontium and other elements that accumulate in bones and other tissues led to Nigeria, and eventually to an area near Benin City. He was eventually identified, but no one has been charged with his murder.

The reason such an analysis can be done is that elements come in different versions, called isotopes, that vary by mass. Rocks and soil in different geographic locations have characteristic percentages of these isotopes, a kind of signature. Geologists have been documenting these signatures for years, creating geographic databases. Now, with mass spectrometers, a scientist can read the signature of an element like strontium from a small sample of rock, bone, hair or other material and match it to a location. In Adam’s case the strontium signature matched pre-Cambrian rock in Nigeria.

Dr. Kimmerle, the Florida anthropologist, was working on human rights cases in Benin City, Nigeria, when she talked to the police chief about Adam. “That’s what inspired me,” she said. She now collects sample isotopes for all her cases.

And that’s why she recruited Dr. Kamenov, a geochemist, to whom she sent tooth enamel and bone shavings from the remains of the murder victim.

Lead in the victim’s tooth enamel was what led Dr. Kamenov to his first discovery — that she grew up in Europe. In the 1950s, both Europe and America used leaded gasoline, and so lead ended up in the air, the dirt, the food and the teeth of growing children. But the lead came from different sources, with different signatures.

European gasoline had lead from Australia, Dr. Kamenov said. “The whole of Europe was contaminated with this Australian lead,” he said. The young woman’s tooth enamel showed she had grown up in Europe.

But where in Europe? For that, Dr. Kamenov looked at another element, oxygen, also incorporated in growing teeth. People living near the sea have more of the heavier oxygen isotopes: when seawater evaporates, the heavier molecules (hydrogen and oxygen) fall closer to the coastline. The victim’s tooth enamel showed heavier oxygen, which suggested she was from the southern Europe.

He also looked more closely at databases showing fine variations of lead isotope signatures in teeth and narrowed down her probable geographic origin to Greece, probably south of Athens. But, he cautioned in an e-mail that this is just “the most likely scenario based on all the data.” He put the probability at 60-70 percent that she was from Greece, but said there could be other locations in the region with a similar lead signature. A final piece of evidence came from carbon in her hair. Corn and wheat have different carbon signatures and Europeans have a more wheat-based diet than do Americans.

In looking at samples from the growing root of the hair and the old tip, Dr. Kamenov found a change: “The last hair that grew showed heavier carbon isotopes.” The woman had moved to a corn-based diet during the time her hair was growing, less than a year. She was a recent arrival in the United States.
And that discovery has given Detective Norris a slim edge in pursuing a very old, very cold case. People who knew the victim may well be dead now, so such a case is very hard to pursue. (Anyone with information may call the sheriff’s office at (888) 231-2168.) But, Detective Norris said, “the advantage is modern science comes along.”

He has another purpose in publicizing the case, he says: the hope that knowledge of new forensic techniques will spread to other investigators.

“This science exists,” he said. “You can use it. It’s a great tool.”