H47 Sealed for Your Protection, Part I: The Effects of an Unknown Corrosive Agent on Human Bone

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Upon reading this poster, the participant will learn that human bone can be completely destroyed by exposure to corrosive agents such as muriatic acid.

The impact on the forensic community will be to raise the level of awareness regarding the detrimental effects of common household corro- sives on human bone and teeth.

After attending this presentation, attendees will be aware of the potential corrosive effects of common household chemicals on human skeletal remains. Characteristics of the chemical and methods to determine the type used will be presented.

On July 7, 2001 a woman and her two children left home in Phoenix, Arizona to visit relatives in the Midwest. They never arrived. On August 21, 2001, the woman's husband was arrested based on blood and circumstantial evidence found at the residence. On April 1, 2002 he was convicted of three counts of first degree murder and given the death penalty.

For the next three years, a variety of tips poured into the Maricopa County Sheriff's Office regarding the location of the remains of the woman and her children. The lead author participated in several excursions to the house and surrounding desert areas to search for remains. Every skeleton recovered was thought to be the missing woman. At one point, the lead and third author were called to a county north of Phoenix to participate in the excavation of a mine where an informant claimed that the husband had said he dropped the body and covered them with tons of dirt and rock.

On October 19, 2005 a crew crating palo verde trees in order to relocate them discovered two fifty gallon drums submerged in the rocky soil. The first drum was badly damaged by the backhoe and the contents thrown to one side. When the second drum was uncovered, the backhoe caught the edge of the lid and flipped it off to reveal the contents. A woman's foot was sticking up out of the drum. When the workers went back to the first drum, they discovered that the material was human tissue. A third drum was discovered two weeks later after an extensive search. Sheriff's detectives assumed that the adult victim was the missing woman and that the other two drums contained her children. The lead, second, and third authors partici- pated in all of the search and recovery phases for each of the drums.

The autopsy and subsequent anthropological and dental examinations of the bodies revealed that they represented portions of the missing victims. Age-at-death for the children was determined by radiographic and gross examination of the epiphyseal plates. The adult female received a standard anthropological examination and was subsequently circumstantially iden- tified by dental radiographs. The original antemortem radiographs were flipped and therefore could not be used to establish positive identification.

The remains of the adult female exhibited both perimortem traumata and postmortem damage. They were fairly complete however the tissue and bone appeared to be corroded, as if by some form of acid. There was damage to the facial skeleton, the arms and the legs of the victim. The female child was represented solely by portions of the pelvic girdle and proximal femora. She too exhibited the effects of some sort of corrosive substance, particu- larly on the shafts of the femora. The male child was represented by six fragments of bone. They were also from the pelvis and femora, but had the appearance of tree bark.

In each of the areas where the drums were located, items of evidence supported the use of some type of corrosive material. There were numerous white plastic protective seals with "Sealed for your Protection" written across them; nine were recovered around the male child's drum alone. In addition, the adult victim's drum had breached into the soil and a large amount of greenish, yellow stained earth was located around the bottom of her drum. This material had a ph of 3.34 (acidic) with mostly chloride ions, which could be consistent with hydrochloric or muriatic acid.

This poster presents the various aspects of this case including the search and recovery, the age-at-death determinations and the investigation of the corrosive material used to "dissolve" the remains. Ongoing research in the lab regarding the effects of different acidic materials on bone, teeth, hair, skin, tissue and muscle will be presented at a subsequent American Academy of Forensic Sciences meeting.

Taphonomy, Acid Etching, Skeletal Remains

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