H91 Aquatic Taphonomy in a Lacustrine Environment: A Case Study From Southeastern Tennessee

Jonathan D. Bethard, MA, The University of Tennessee, Department of Anthropology, 250 South Stadium Hall, Knoxville, Tennessee 37996; and Murray K. Marks, PhD*, University of Tennessee, Graduate School of Medicine, 1924 Alcoa Highway, Knoxville, TN 37920-6999*

After attending this presentation, attendees will learn about characteristic taphonomic changes brought about after long-term submersion in a lacustrine environment.

This presentation will impact the forensic community by describing a rare taphonomic context and adding to a growing body of literature on the subject of aquatic taphonomy.

In addition to standard components of the biological profile, forensic anthropologists are often called to analyze taphonomic changes of ossified tissue from many types of environments. Though recent developments in forensic taphonomy have described numerous possible alterations to human remains, several types of taphonomic modification are poorly documented by forensic practitioners. For example, few studies have reported findings of skeletal remains recovered from vessels submerged in aquatic environments. The case study presented here describes the condition of one set of skeletal remains recovered from an automobile submerged for over half a century in a lacustrine setting.

On February 22, 1956, a young adult female disappeared from Bradley County, Tennessee. Family and friends had no communication with her after this date and she was subsequently declared dead in 1975. Numerous scenarios surrounding the disappearance were discussed by members of her family and local community; however, none of these hypotheses offered any physical proof as to the missing woman's whereabouts. The case remained unsolved for over fifty years and received little attention until local law enforcement recently dedicated a substantial portion of time to retracing her last known activities.

After the case was reopened, interest soon turned to an alleged car trip taken by the missing woman that February morning. Investigators traced the alleged route along the rural state highway and noticed the roadway's proximity to a 1,900 acre lake. A diving team was assembled to search the lake bottom and subsequently found a vehicle that matched the description of the missing woman's 1951 Chevrolet BelAire approximately 45 feet below the lake surface. Upon searching the interior of the automobile, divers located and recovered numerous skeletal elements and remnants of clothing. All items were then transported to the Forensic Anthropology Laboratory at the Regional Forensic Center in Knoxville, Tennessee for analysis.

After a thorough drying period of several days, available skeletal elements were inventoried and it became clear that the remains of a single individual had been recovered from inside the automobile. The difficult scene prohibited a total recovery, as numerous portions of both the cranial and post-cranial skeleton were missing. It also became apparent that the lacustrine environment had a remarkable taphonomic effect on the skeleton, as numerous elements presented heavy taphonomic alterations.

Taphonomic changes to the skeleton were pronounced. Most notably, portions of the skeleton comprised primarily of trabecular bone were heavily abraded and eroded. In addition, commonly damaged elements such as the scapulae and ribs were heavily fragmented and poorly represented. With the exception of the radii and ulnae, all long bone epiphyses were highly eroded or absent altogether. Of the six recovered vertebrae, none had complete bodies and all but one was represented exclusively by the neural arch. Pubes and ischia were absent while ilia presented a highly weathered appearance akin to long-term sun exposure.

Though hindered by recovery and taphonomy, standard osteometric methods were used to develop the biological profile of the decedent. Sex was estimated from portions of the *os coxae* and metric analyses of the right radius and ulna. These data, along with an overall gracile appearance, led to a female sex diagnosis. Age-at-death was estimated from available portions of the auricular surface. Though portions of the retroauricular area were not present, the absence of billowing and presence of striae produced an age-at-death estimate of 25-34 years. Stature was calculated using the maximum length of the right radius and ulna. Ancestry was not definitively determined as the craniofacial skeleton and cranial base were entirely absent. Though no positive means of identification were possible from the available skeletal elements, available osteological data indicated the missing woman could not be excluded as a possible match. Given that the remains of a young adult female were recovered from the same type of automobile the missing woman drove, and was located in close proximity to a route she was known to travel,, it is argued that a presumptive identification is possible at this time.

Aquatic Taphonomy, Lacustrine Environment, Forensic Anthropology

 ** Presenting Author*