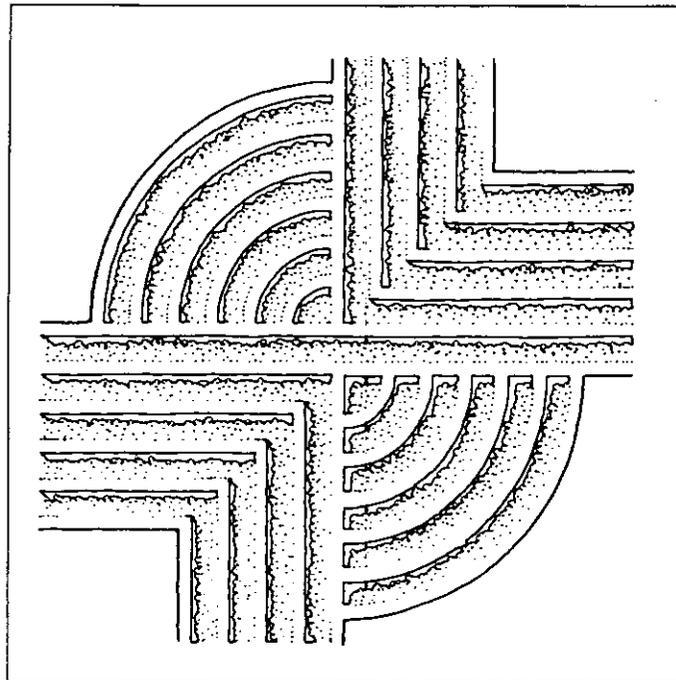


FORENSIC ARCHAEOLOGICAL
EXAMINATION OF A DISPUTED
SURVEY MONUMENT



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FORENSIC ARCHAEOLOGICAL EXAMINATION OF A DISPUTED SURVEY MONUMENT

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INTRODUCTION

This study involves the forensic archaeological examination of a disputed survey monument situated on the south side of Jonesville Road about 0.9 mile from the intersection of Jonesville Road and Spanish Wells Road on Hilton Head Island in Beaufort County, South Carolina (Figure 1). *Forensic archaeology* is the application of standard archaeological principles and techniques to the search and recovery of a scene or to the examination of a specific location which maximizes the documentation of all physical evidence in contextual relationships to the depositional environment.

Chicora Foundation was contacted several months ago by Robert V. Mathison, Jr., Esq. of the firm of Mathison & Mathison on Hilton Head Island and advice was sought on the possibility that forensic archaeological techniques might be useful on evaluating the age and authenticity of a survey monument involved in an on-going boundary dispute. In particular, the issue concerned whether the monument in question, found relatively recently by one of the parties but not recovered by two previous survey parties, was in its original location. Failing to determine that, the issue concerned whether any statement could be made on whether the monument had been in its current location for at least the past two years.

Chicora Foundation agreed to perform the forensic archaeological study, but the first anticipated date of September 8 was cancelled because of inclement weather. A second date of September 18 was cancelled for scheduling conflicts. The study was eventually conducted on Wednesday, September 25, 1996. Involved in the work were Dr. Michael Trinkley and Ms. Debi Hacker. The work was conducted between about 8:30 am and 12:30 pm, during which time the weather was clear and mild. A number of on-site observers were present for portions of this study, including Robert V. Mathison, Esq. and Mr. John Crago.

The disputed monument is situated about 15 feet south of Jonesville Road (Figure 2), a dirt road which roughly parallels Old House Creek about 200 feet to the south (although the marsh is only about 50 feet to the south) and Jarvis Creek about 4000 feet to the north. North of the study tract is a northwest-southeast running dirt road which is shown on the 1972 aerial photographs of the area (stereo pairs 45013-172-56/57) but which is not shown on the 1965 aerials (stereo pairs CDU-1GG-294/295; see Figure 3). Therefore, this dirt road or easement was constructed sometime after November 1965 and before early 1972. There are a series of aerial photographs covering the six year gap, so it might be possible to more closely identify the date of the easement's construction. This, however, is

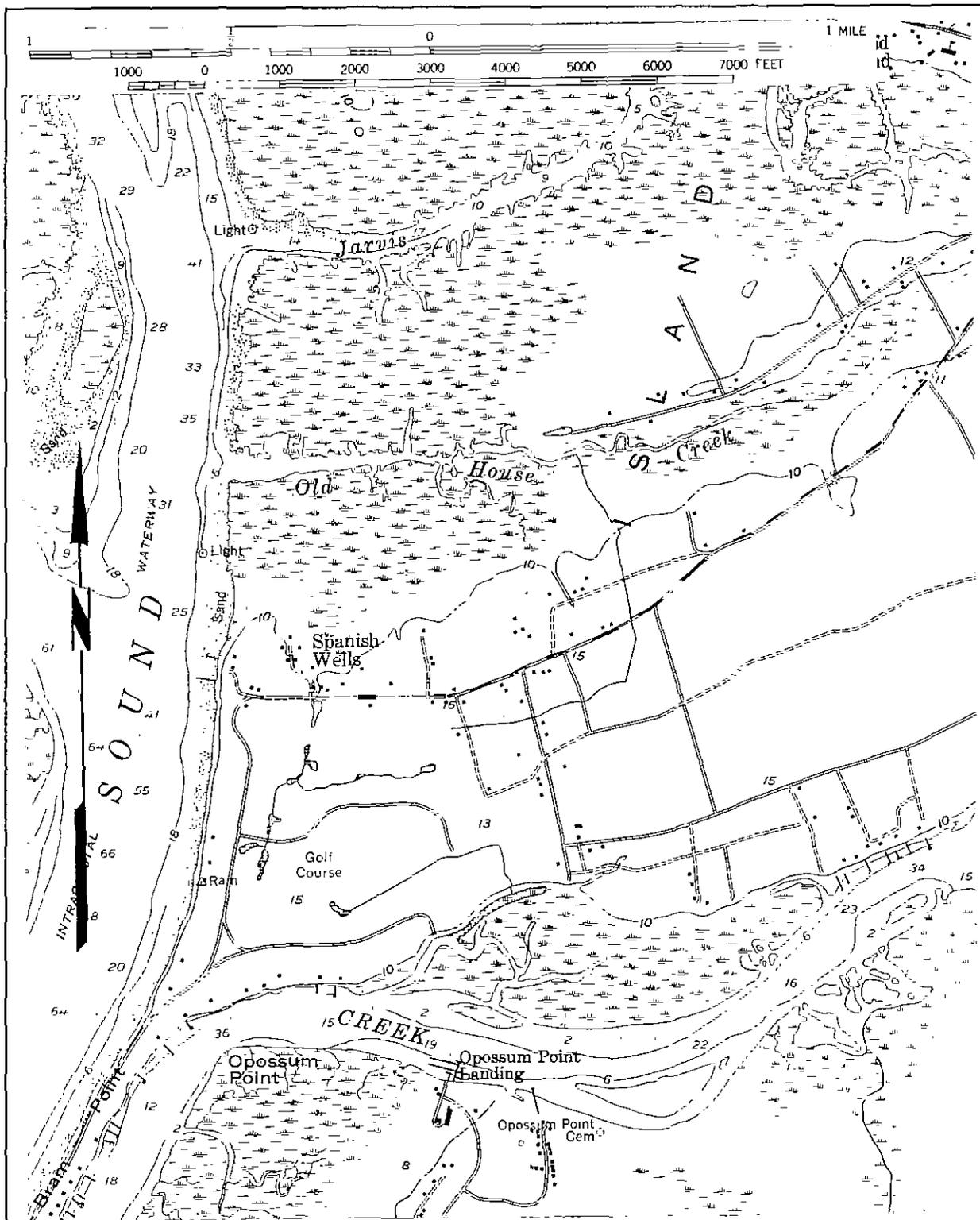


Figure 1. Portion of the 7.5' USGS Bluffton topographic map showing the project area.



Figure 2. Project area from the north side of Jonesville Road, looking south-southwest.

FIGURE NOT AVAILABLE

Figure 3. Portion of the November 1, 1965 aerial photograph CDU-1GG-294 showing the project area. Note the absence of the easement road to the north.

the beyond the current scope.

The project area is lightly wooded in pine, oak, and palmetto, with a very light understory of scrub. The ground is covered in light humus about 0.1 to 0.2 foot in thickness consisting of pine straw, mulched organics, and a dense root mass. Soils in the area are classified as the Wando Series by Stuck (1980) and field observations of a loose, well-drained sandy soil are consistent with this classification.

PROCEDURES

Introduction

The goal of this work was to authenticate the disputed monument. While it would likely not be possible to determine to any reasonable certainty when the monument had been placed in the ground, or exactly how long it had been at its current location, we believed that it would be possible to determine whether it had been moved in the past one to two years. In other words, using forensic archaeological techniques it would be possible to determine whether or not a hole had been excavated in the recent past, allowing placement of the monument at its current location.

A monument which had been undisturbed for several years should exhibit certain signs.

- It should be solidly placed.
- Surrounding soil should be of an even compaction and texture.
- In the soils characterizing the project area the stain of the excavation surrounding the monument should be vague.

- There should be no evidence of recent dead humic material in the immediate area, excluding possible rodent or insect burrows.

- Roots and rootlets around the monument should evidence no cutting or damage.

- Roots should evidence contact with the monument.

In contrast, a monument which had been replaced, or moved, within the past several years might be expected to exhibit different signs.

- It might exhibit some wobble or allow some movement.

- Surrounding soil might exhibit uneven compaction.

- There would likely be a relatively clear stain showing the excavation for the monument.

- There would be a significant potential for dead organic material —

roots, leaves, twigs, perhaps even recent refuse such as gum wrappers or bottle caps — to be included in the backfill.

- Roots would likely evidence some damage from the excavation of the hole. Depending on the length of time since the excavation there might be evidence of rosin at the damaged section or evidence of new growth.

- There would be only minimal contact between the monument and roots.

Current Condition

Upon arrival at the monument, we found that it was situated between two trees. A pine (*Pinus* sp.) with a dbh of 16 inches (1.3 feet) was found 2.9 feet north of the monument. An oak (*Quercus* sp.) with a dbh of 6 inches (0.5 foot) was found 1.2 feet to the south (Figure 4).

The monument, measuring about 3 inches (0.25 foot) square was of concrete with gravel aggregate observed on one corner. An "X" had been drawn on the top of the monument when the concrete was wet, with the arms of the "X" oriented with the four corners of the monument. The "X" of the monument was oriented about 20° west of magnetic north.

We were informed that a nearby stake had been wedged by the monument to mark its location after it had been reported by one of the property owners.

Such a stake was nearby, on the ground, and consisted of an approximately 5 to 6 foot length of sapling cut to a point with a survey ribbon on the other end. Such stakes are commonly used by survey crews to flag cut lines.

The monument was clearly visible. Ground cover, including humus, had been removed. We observed that the humus (including root mass) to the west of the marker was 0.1 to 0.2 foot in depth below loose pine straw. There appeared to have been relatively little accumulation over the monument (Figure 5).

Documentation

The entire study of the monument, from our initial arrival to the backfilling, was video taped and is on file at Chicora Foundation. The camera was turned off only for the replacement of the video tape (a total of two tapes were used during this work) and once during transfer from one side of the monument to the other. Color photographs of special findings or general conditions were taken during this work. While many of the prints are included in this report, the negatives are on file at Chicora Foundation. Color bars and a mug board, along with scales where appropriate, were used for both the video and still photography.

In addition, notes on observations were taken as the work progressed and these, too, are on file. A series of root cuttings and other items were collected during the work as potential evidence. These were all bagged and labeled. Upon arrival in Columbia they were sealed and are stored under refrigeration. They will be maintained for 30 days and, if there is



Figure 4. Trees surrounding the survey monument.



Figure 5. View showing monument and surrounding ground upon arrival.

no request that they be kept longer, will be discarded. Until that time Chicora Foundation has established a chain of evidence for these materials.

Metal Detector Survey

The first activity at the site was to sweep the general area using a metal detector. The device used was a Tesoro Bandito II™ with an 8-inch concentric coil (electromagnetic type operating at 10 KHz). The instrument has the capability to operate in either an all metal mode or discriminate mode (which eliminates ferrous metal response). The all metal mode is the industry standard VFL type which does not require motion of the search coil for proper operation. The discriminate mode is based on motion of the search coil, but allows control over the detector's response to ferrous metals.

This general sweep yielded a number of strong signals on the all metal mode to the east of the monument. While none were ground-truthed, it is likely given the proximity of the area to the road side that they represent bottle caps, pull tabs, and aluminum cans. More importantly, the monument itself yielded a very strong signal, which we presume to be indicative of a pipe or iron rebar core surrounded by concrete.

While the trees required that the sweep be more thorough (in order to move the detector head over the monument), it nevertheless provided an excellent signal.

Forensic Archaeological Excavations

In order to explore the situation,

common archaeological techniques were used. Excavation was by trowel, with the monument bisected along the line formed by the pine to the north and the oak to the south. The western half was removed first. Although no grid was used, the excavation encompassed an area about 2 feet north-south by about 1.5 foot east-west, allowing for adequate exposure.

The excavation proceeded with the removal of thin levels, typically about 0.05 foot in depth. Small roots were cut, after they were evaluated for their relationship with the monument. Excavation was terminated on the west side at a depth of about 1.5 foot below the top of the monument. Work then moved to the east side of the monument where identical field procedures were used. Excavation on this side was terminated at 1.0 foot below the top of the monument.

At the conclusion of the work the excavation was backfilled with clean white sand.

RESULTS AND CONCLUSIONS

Results

On the west side of the monument our excavations revealed a heavily oxidized metal can fragment 1.8 inches from the monument at an initial depth of 4 inches below the ground surface. While the fragments of the can cannot be tightly dated, the extent of the oxidation or "rusting" is consistent with materials ranging from the mid-nineteenth century through the early twentieth century. The ferrous compounds ("rust") had leached into the surrounding soil (Figure 6),

indicating that the can had been in place for a number of years. This can is of particular importance given its proximity to the monument and its undisturbed condition.

Also on the west side we identified a large pine tree root, originating at the pine tree to the north, twisting westward to avoid the monument. This root, in excess of 0.3 foot in diameter, came within an inch of the monument. The root evidenced no cuts or other damage (excluding the damage resulting from

t h e s e excavations). To the southwest and tightly abutting the monument was the dead root of a greenbrier (*Smilax* sp.) plant. This root, at a depth of 1.0 below the top of the monument, was so tightly situated against the monument that it was not possible to



Figure 6. Excavation on the west side of the monument, showing can fragment *in situ*. Note corrosion stain in the surrounding soil.



Figure 7. Roots adjacent to the monument on the west side.

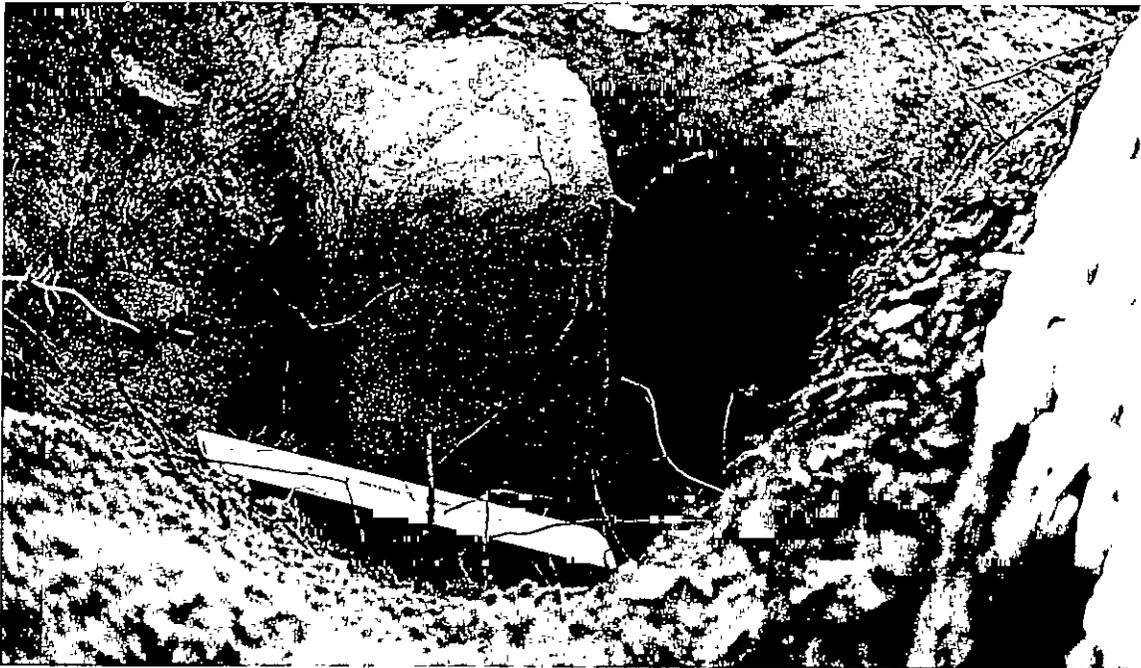


Figure 8. Root from small plant growing up the side of the monument, view to the west.

insert a trowel between the monument and the root.

Turning to the eastern side of the monument, our excavations first revealed a small root, about 0.10 inch in diameter, which had a pronounced bend around the monument. This root was cut out and is retained. Below this, at a depth of 0.65 foot, we encountered a moderately sized root tightly bending around the monument. Like the greenbrier root, this root would not allow a trowel blade to be inserted between it and the monument. Like the previously discussed pine root, this root showed no indication of previous damage.

Yet another root was found growing up along the side of the monument, tightly wedged in a crevice created by concrete squeezed between the form boards (Figure 8). This root measured about 0.1 inch in diameter and was green (i.e., live) when cut.

Throughout the excavation the soil (below the humic zone) was a fairly uniform brown color (Munsell® designation 10YR 5/3).¹ Only a very faint stain of the original excavation for the monument could be seen, characterized by soils with a yellowish brown color (Munsell® designation 10YR 5/6). In addition, the soils were of a uniform texture and seemingly even compaction (although no compaction tests were conducted). When the monument is examined the line separating the portion above the soil is grayish-white, while a slight brown (no color designation made)

¹ These readings were taken of slightly damp soil in subdued light.

ghosting of the soil is found below. This is consistent with its current placement.

Even once the excavations had gone to a depth of about 1.0 foot on the east and 1.5 feet on the west, the monument was still solidly set in the soil and would not move. This is consistent with solid compaction around the monument.

The excavations produced absolutely no foreign material (excepting the previously discussed can fragment). Nor was any evidence of humic material, leaves, twigs, or branches encountered in the excavations. Nor were any roots encountered in the excavation which had been cut, or which evidenced clearly new growth.

Conclusions

While it is not possible to determine from this work when the monument was put into place, the combined evidence is clear and compelling that the monument has been in its existing location for a number of years. The nature of the soils, the stability of the monument, the proximity of the can fragment, the presence of roots close to or on the monument, and the absence of recent foreign material in the excavation all indicate that it is most probable that the monument has not been altered or moved within the past five to 10 years.²

² One of the few studies using roots to estimate time lapse is that of Willey and Heilman (1987) entitled, "Estimating Time Since Death Using Plant Roots and Stems." If necessary, several of the roots in very close proximity to the monument could be examined for annual growth rings.

It is therefore our conclusion that the monument has not been tampered with since the dispute began approximately two years ago.

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