

**Survey, Remote Sensing, and Testing  
at  
Scarlett's Mound, 9CH1350, Ossabaw  
Island, Georgia**

*LAMAR Institute Publication Series*

*Report Number 188*

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**The LAMAR Institute  
2014**

## Table of Contents

Introduction.....	1
Previous Research.....	2
Survey and Testing Methods .....	4
Remote Sensing Methodology.....	4
Subsurface Survey Methodology.....	6
Testing Methodology.....	7
Fieldwork Results .....	9
Walkovers .....	9
GPR Survey .....	9
Survey Units.....	19
Test Unit.....	22
Summary.....	24
References Cited.....	25

## List of Figures

Figure 1. Location of Scarlett's Mound, North End, Ossabaw Island. Mound location indicated by yellow circle.....	1
Figure 2. Overlay of 1910 "Nautical Chart of Ossabaw Sound" Over Google Map.....	2
Figure 3. Scarlett's Mound (9CH1350). Facing southeast.....	3
Figure 4. 3D Rendering of Scarlett's Mound With Exaggerated Vertical Scale. Facing northeast. Contour points are shown as red dots.....	3
Figure 5. Grid Map For 9CH1350 Survey and Testing.....	7
Figure 6. GPR and Survey/Testing Grids, Scarlett's Mound.....	8
Figure 7. Plain Sand /Grit Podal Support. Found approximately 35 meters west of Scarlett's Mound.....	9
Figure 8. Radargram 7 in Block A, Western Slope of Scarlett's Mound.....	10
Figure 9. Radargram 19 in Block A, Summit Scarlett's Mound (Looter's hole evidence extends from 8.5-12.5 m along this radargram).....	10
Figure 10. Radargram 52 in Block A, Scarlett's Mound.....	11
Figure 11. Radargram 68 in Block A, Scarlett's Mound.....	11
Figure 12. Plan of GPR Block A at 134-150 cm Below Ground Surface. The approximate outline of Scarlett's Mound shown in blue.....	19

Figure 13. Isometric 3-D View of GPR Block A.....	20
Figure 14. Another Isometric 3-D View of GPR Block A. ....	20
Figure 15. Feature 3 East Profile, 490N510E. Left scale = 1 m, right scale = 30 cm. ....	21
Figure 16. North (left) and South (right) Profiles of 515.75N 509.5E. ....	23

## **Acknowledgements**

Several individuals and organizations contributed to this project. Daniel Battle, Research Associate for the LAMAR Institute, got the ball rolling by discovering the site. The Department of Natural Resources (particularly State Archaeologist Brian Tucker and Division Director and Deputy State Historic Preservation Officer David Crass) and the Ossabaw Foundation provided critical support for this research. Field and lab work was completed by students enrolled in the UTC archaeological field school: Mark Babin, Sara Bean, Mellissa Darroch, William Miller, Jason Rogers, Ben Seay, Alaina Winters, and supervisors Annie Bullard, Meredith Gilligan, and Randall Smith. LAMAR Institute Research Associate P.T. Ashlock, II assisted in the field effort. Andy Carroll was our indispensable GIS consultant, and on two occasions Lindsey Cochran volunteered for pre-field school work at 9CH1350. We also appreciate the suggestions made by Dr. Charles Pearson concerning the function of Scarlett's Mound.

## Introduction

From May 16 to May 30, 2013, a University of Tennessee at Chattanooga (UTC) field school conducted archaeological survey and testing at Scarlett's Mound on Ossabaw Island, Georgia. The survey incorporated Ground Penetrating Radar (GPR) by the LAMAR Institute, under the direction of Dan Elliott. The research was sponsored by the Georgia Department of Natural Resources (DNR) and the Ossabaw Foundation. This project was narrowly focused on defining the structure, function, and date of the modest earthen mound. As will become clear below, the first goal was met, while the others remain elusive.

Scarlett's Mound is situated on the north end of Ossabaw Island (Figure 1) in secondary growth maritime forest vegetation; during the last half of the 19<sup>th</sup> century, much of this same area would have been cleared, as shown in Figure 2. The site was discovered by Elliott and Daniel Battle in 2006, and they eventually submitted the Georgia site file documentation for 9CH1350 and brought the site to the attention of the UTC researchers. Accompanied by the authors, several UTC archaeologists inspected the site on March 13, 2013.



Figure 1. Location of Scarlett's Mound, North End, Ossabaw Island. Mound location indicated by yellow circle.

Scarlett's Mound is a low sand mound measuring about 20 meters north-south by 19 meters east-west and approximately 1.10 meters high (Figures 3 and 4). Nearly circular and dome shaped, it bears the hallmarks of a prehistoric burial mound that most likely dates to the Woodland period. Also characteristic of coastal prehistoric mounds is an apparent looter's pit in the mound summit.



Figure 2. Overlay of 1910 "Nautical Chart of Ossabaw Sound" Over Google Map.

### Previous Research

Although C.B. Moore visited the Island in the 1890s, he probably did *not* investigate Scarlett's Mound - at least there is no indication in his publications or field notes that he even knew of its existence. However, Moore definitely identified several other burial mounds on Ossabaw (Larson 1998:175-222), and he ended up excavating six mounds at Middle Place and three at "Bluff Field," approximately 2.5 miles northeast of





Figure 3. Scarlett's Mound (9CH1350). Facing southeast.

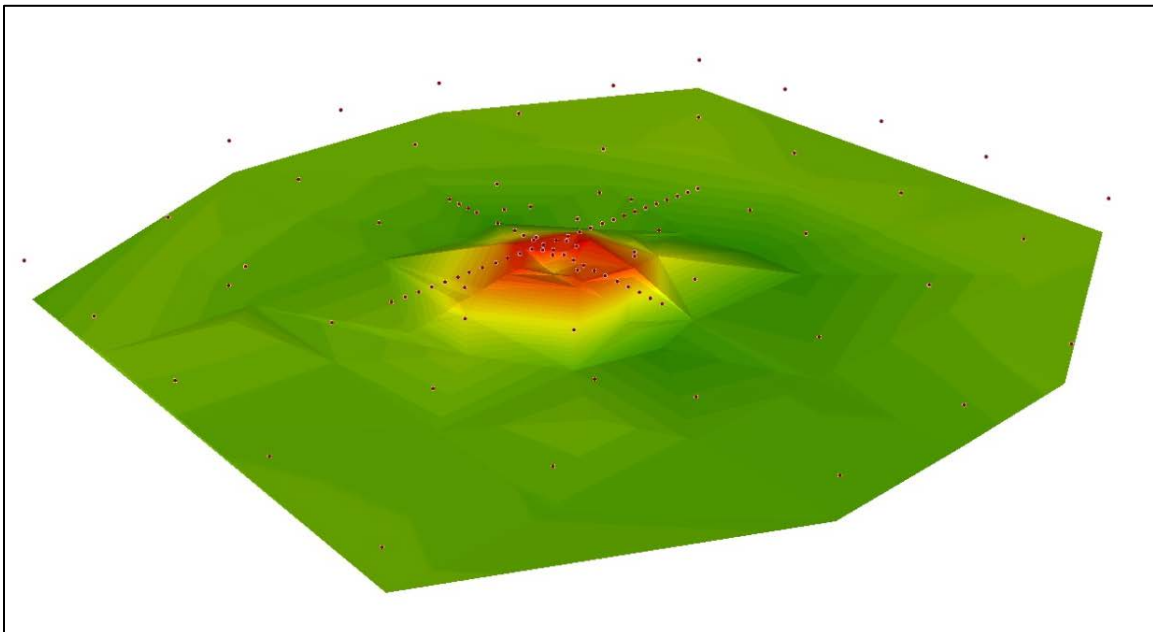


Figure 4. 3D Rendering of Scarlett's Mound With Exaggerated Vertical Scale. Facing northeast. Contour points are shown as red dots.

Middle Place.<sup>1</sup> Moore meticulously scouted out, planned, and obtained landowner permission prior to each of his offensives on the prehistoric southeastern sites that caught his attention, and he obviously made it his business to know where mounds could be found on Ossabaw. Since Moore seems to have been unaware of Scarlett's Mound, this may indicate it did not exist in 1895-1897, when he conducted his coastal fieldwork. While admittedly speculative, this omission on Moore's part constitutes the first line of evidence that the mound may have a relatively modern date of origin. However, current long-term residents on Ossabaw were unaware of the mound's existence prior to the Elliott discovery, so perhaps Moore simply missed it.

More recently, reports on extensive surveys of prehistoric resources by Chester DePratter (1974) and especially Charles Pearson (1975, 1977, 2001) fail to make any mention of Scarlett's Mound. While recognizing that supporting an argument with negative evidence is fraught with peril, the presence of this mound on the ground but absent in the professional archaeological literature likewise suggests that it may be a recent addition to the island's landscape.

### **Survey and Testing Methods**

A combined survey and testing approach was used at 9CH1350, with the survey portion consisting of three phases: tight-interval (four meter) walkovers of the mound and surrounding area (carried out in March and again in May, 2013); GPR survey (discussed more fully below), supervised by Dan Elliott, just prior to the field school field survey; and excavation of 28 half meter survey pits at 10-meter intervals at using ¼" mesh screens.

Remote Sensing Methodology. Ground Penetrating Radar, or GPR, is an important remote sensing tool used by archaeologists. The technology is particularly effective in mapping historic cemeteries. The technology uses high frequency electromagnetic waves (microwaves) to acquire subsurface data. The device uses a transmitter antenna and closely spaced receiver antenna to detect changes in electromagnetic properties beneath them. The antennas are suspended just above the ground surface and the antennas are shielded to eliminate interference from sources other than directly beneath the device. The transmitting antenna emits a series of electromagnetic waves, which are distorted by differences in soil conductivity, dielectric permittivity, and magnetic permeability. The receiving antenna records the reflected waves for a specified length of time (in nanoseconds, or ns). The approximate depth of an object can be estimated with GPR, by adjusting for electromagnetic propagation conditions.

The GPR sample block in this study area was composed of a series of parallel transects, or traverses, which yielded a two-dimensional cross-section or profile of the

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<sup>1</sup> According to Larson (1998:47), this site was located in a field that overlooked Cabbage Garden Creek, a tributary of the Bradley River.



radar data. These samples are termed radargrams. This two-dimensional image is constructed from a sequence of thousands of individual radar traces. A succession of radar traces bouncing off a large buried object will produce a hyperbola, when viewed graphically in profile. Multiple large objects that are in close proximity may produce multiple, overlapping hyperbolas, which are more difficult to interpret. For example, an isolated historic grave may produce a clear signal, represented by a well-defined hyperbola. A cluster of graves, however, may produce a more garbled signal that is less apparent.

The GPR signals that are captured by the receiving antenna are recorded as an array of numerals, which can be converted to gray scale (or color) pixel values. The radargrams are essentially a vertical map of the radar reflection off objects and other soil anomalies. It is not an actual map of the objects. The radargram is produced in real time and is viewable on a computer monitor, mounted on the GPR cart.

GPR has been successfully used for archaeological and forensic anthropological applications to locate relatively shallow features, although the technique also can probe deeply into the ground. The machine is adjusted for optimal search by the use of different frequency range antennas. Higher frequency antennas are more useful at shallow depths, which is most often the case in archaeology. Also, the longer the receiving antenna is set to receive GPR signals (measured in nanoseconds, or ns), the deeper the search. The effectiveness of GPR in various environments on the North American continent is widely variable and depends on soil conductivity, metallic content, and other pedo-chemical factors. Generally, Georgia's coastal soils have moderately good properties for its application.

GPR signals cannot penetrate large metal objects and the signals are also significantly affected by the presence of salt water. Although radar does not penetrate metal objects, it does generate a distinctive signal that is usually recognizable, particularly for larger metal objects, such as a cast iron cannon or man-hole cover. The signal beneath these objects is often canceled, which results in a pattern of horizontal lines on the radargram. For smaller objects, such as a scatter of nails, the signal may ricochet from the objects and produce a confusing signal. Rebar-reinforced concrete, as another example, generates an unmistakable radar pattern of rippled lines on the radargram.

Using the same RAMAC X3M GPR system as that used in the present study, Elliott has conducted several GPR studies of numerous 18<sup>th</sup> and 19<sup>th</sup> century archaeological sites in coastal Georgia. The first study was at the New Ebenezer town site in Effingham County, Georgia. The results of the GPR work at New Ebenezer were quite exciting and included the delineation of a large portion of a British redoubt palisade ditch and the discovery of several dozen previously unidentified human graves (both within and beyond the known limits of the Jerusalem Lutheran Church cemetery). The LAMAR Institute's GPR surveys at aboriginal mounds include a study at Woodbine Plantation

cemetery and mound in Camden County; a Late Archaic shell ring on St. Catherines Island in Liberty County, and several small mounds at the Genesis Point development in Bryan County, Georgia. The same equipment has been used successfully for GPR surveys on seven of Georgia's barrier islands, including Cumberland, Jekyll, Ossabaw, Sapelo, St. Catherines, St. Simons, and Tybee islands (Elliott 2003a-c, 2004, 2005, 2006a-d, 2007, 2008a-b, 2009a-b, 2010; Elliott and Burns 2007).

The equipment used for this study consisted of a RAMAC/X3M Integrated Radar Control Unit, mounted on a wheeled-cart and linked to a RAMAC XV11 Monitor (Firmware, Version 3.2.36). A 500 megahertz (MHz) shielded antenna was used for the data gathering. MALÅ GeoScience's *Ground Vision* (Version 1.4.5) software was used to acquire and record the radar data (MALÅ GeoScience USA 2006a). The radar information was displayed as a series of radargrams. Output from the survey was first viewed using *GroundVision*. This provided immediate feedback about the suitability of GPR survey in the area and the effective operation of the equipment.

The time window that was selected allowed data gathering to focus on the upper 1.5 meters of soil, which was the zone most likely to yield archaeological deposits. Additional filters were used to refine the radar information during post-processing. These include adjustments to the gain. These alterations to the data are reversible, however, and do not affect the original data that were collected.

The GPR data from Scarlett's Mound was processed with *GPR-Slice* (Version 7.0). Dean Goodman's *GPR-Slice* program is recognized as the world leader in GPR imaging and it has proven quite effective in mapping historic cemeteries (Goodman 2006, 2013). Mapping in 3D entailed merging the data from the series of radargrams for each block. Once this was accomplished, horizontal slices of the data were examined for important anomalies and patterns of anomalies, which were likely of cultural relevance. These data were displayed as aerial plan maps of the sample areas at varying depths below ground surface. These horizontal views, or time-slices, display the radar information at a set time depth in nanoseconds (ns). Time-depth can be roughly equated to depth below ground.

Subsurface Survey Methodology. The subsurface survey was aligned to a 10-meter-interval grid oriented to magnetic north, as indicated in Figure 5. The units that comprised this modified systematic sample were usually excavated to sterile, normally to a depth of 50 cm. The grid was established using a Topcon total station equipped with a data collector. The survey data were downloaded into an Excel file and exported into ArcGIS 10.2 to produce the Figures 5 and 6 maps. The grid was georeferenced using coordinates provided by Elliott, generated by a Trimble GeoExplorer 2008 Series xh handheld GPS device. A stake south and west of the mound was arbitrarily designated as 500N500E, which served as the primary horizontal datum at the site. A 500N505E stake was the southwest point of the GPR grid shown in Figure 6.



Figure 5. Grid Map For 9CH1350 Survey and Testing.

Testing Methodology. The earthwork was tested through the excavation of a 2 x 1 meter unit that was placed near the mound center so that it would intersect part of the suspected looter's pit. The northeast corner of this test unit was located at 514.50N509.50E on the UTC grid. It was dug in six arbitrary 20-cm levels to 1.20 below the top of the mound, using screens with ¼" mesh. To enhance vertical control, the total station was used to make vertical measurements below a datum established on a nearby tree. Readings below datum on the four corners and center of the test unit were made to establish the excavation depths for each level.



Figure 6. GPR and Survey/Testing Grids, Scarlett's Mound.

Artifacts from both the survey and testing were initially processed in the “Jim Bitler Memorial Laboratory” trailer provided by the Ossabaw Foundation. Formal analysis and temporary curation of the artifacts occurred at the UTC Institute of Archaeology Laboratory. The artifacts and excavation records will be sent to the Antonio Waring Laboratory of Archaeology at the University of West Georgia for permanent curation.



## Fieldwork Results

Walkovers. Despite the fact that the mound vicinity exhibited extensive rooting by feral pigs, neither of the two walkovers produced significant surface artifacts. With the mound as a starting point, only a few small fragments of scattered shell were noted within the c. 50-meter diameter area that was covered on both occasions. Historic materials included a single green bottle glass shard and the bottom of a gray salt glazed crock. Both of these artifacts may have originated in the nearby modern dump to the southeast of the site. A single plain sand/grit podal support, probably a Deptford pot fragment, was collected about 35 meters west of the mound (Figure 7).



**Figure 7. Plain Sand /Grit Podal Support. Found approximately 35 meters west of Scarlett's Mound.**

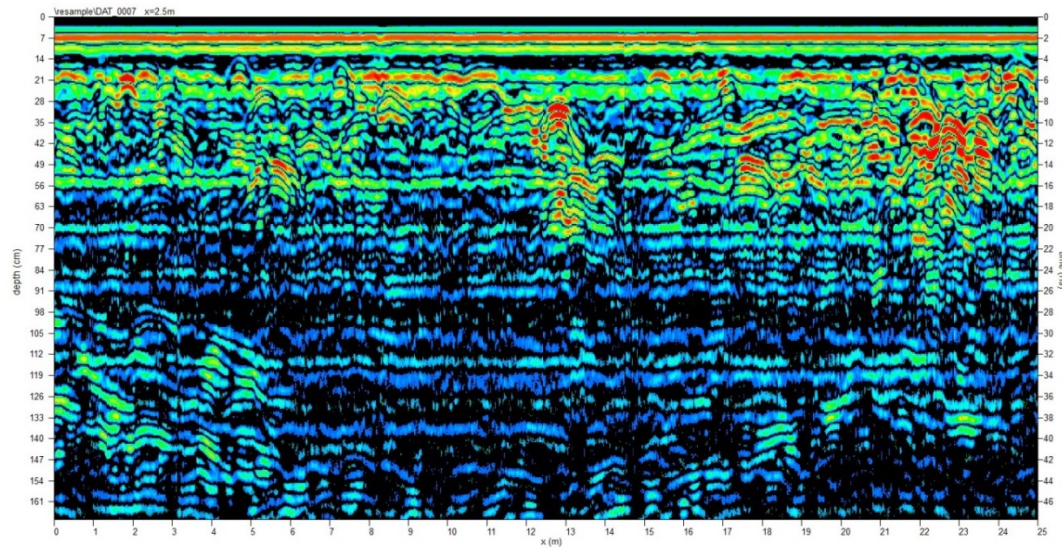
No other prehistoric artifacts (or even shell fragments) were found nearby. A modern utility trench, running roughly east-west, was noted about 40 meters to the north of the mound. Containing upright PVC pipes at various intervals, this feature may be associated with water quality monitoring.

GPR Survey. GPR Block A was a large sample that consisted of 1,171.9 m of subsurface radar data collected along 71 radargrams. The block examined an area measuring 24.5 meters east-west by 25 meters north-south. The GPR grid was oriented on a bearing of 330 degrees. The grid arrangement of these radargrams in Block A is shown in Figure 6. This GPR sample completely encompassed the earthen mound feature. Archaeologists located the geographic location in UTM coordinates at GPR grid point 0,0 using a Trimble GeoXH GPS receiver. Other GPS points were collected at other corner points on the GPR grid block. GPS points also were taken for the observed base of the mound perimeter and the apparent looter hole in the mound's summit.

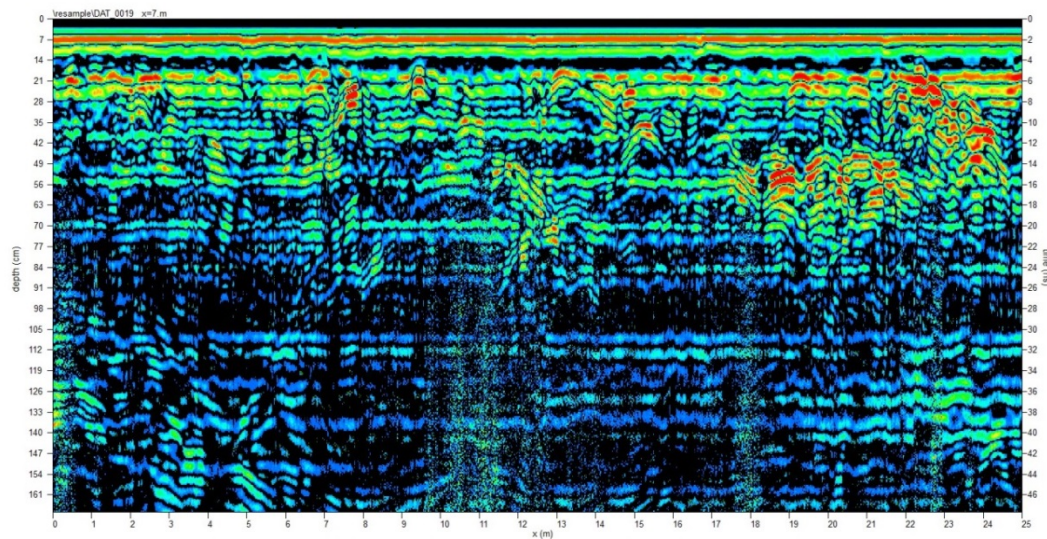
The LAMAR Institute GPR survey of Scarlett's Mound examined a total of 1,171.9 meters of subsurface radar information, which was collected along 71 radargrams. The survey was completed in one day without any major problems. Figures 8 through 11 show examples of radargrams collected within GPR Block A at Scarlett's



Mound. Grid north is to the right in these views. Figure 8 shows Radargram 7, which is located on the western lower slope of the mound. Radargram 19 (Figure 9) is located on



**Figure 8. Radargram 7 in Block A, Western Slope of Scarlett's Mound.**



**Figure 9. Radargram 19 in Block A, Summit Scarlett's Mound (Looter's hole evidence extends from 8.5-12.5 m along this radargram).**

the summit of the mound and crosses the suspected looter's excavation hole from 8.5 to 12.5 m from its southern end. Radargram 52 (Figure 10) is located on the eastern upper slope of the mound. Figure 11 shows Radargram 68, which is located on the foot of the mound on its eastern side.



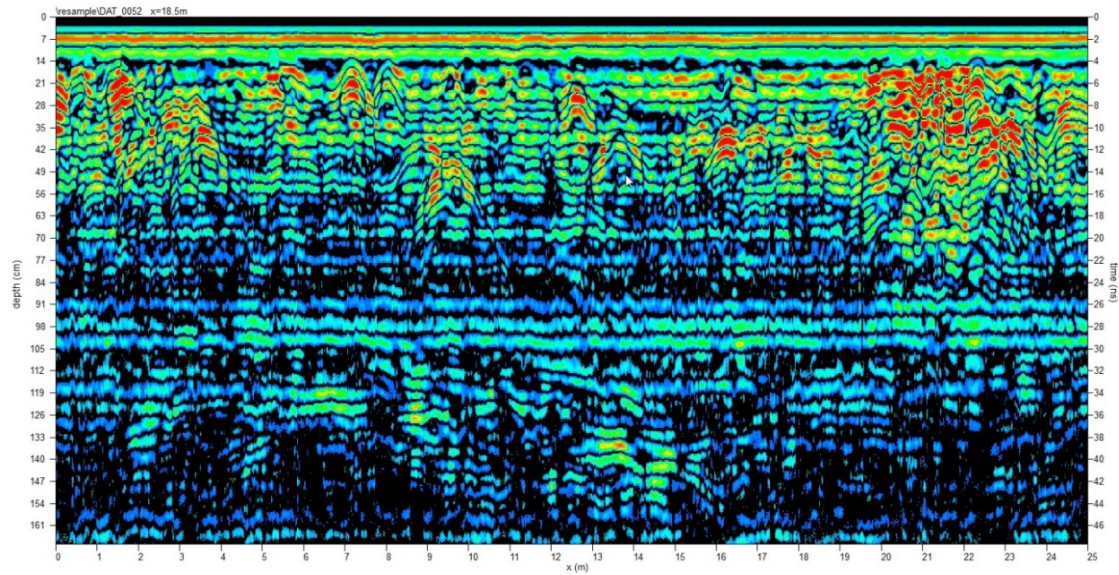


Figure 10. Radargram 52 in Block A, Scarlett's Mound.

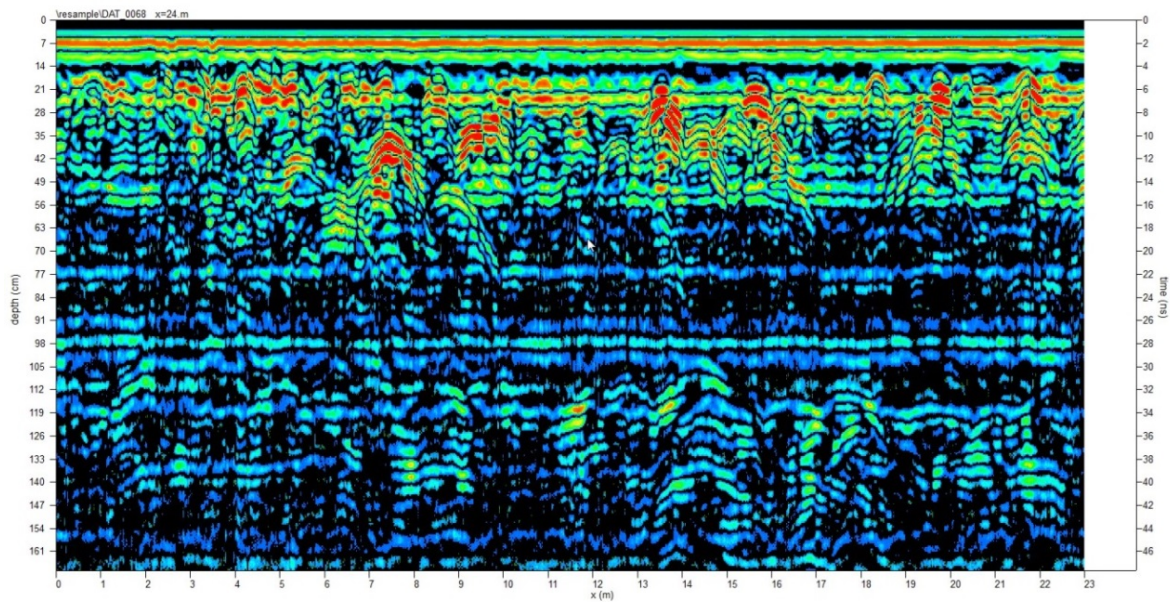
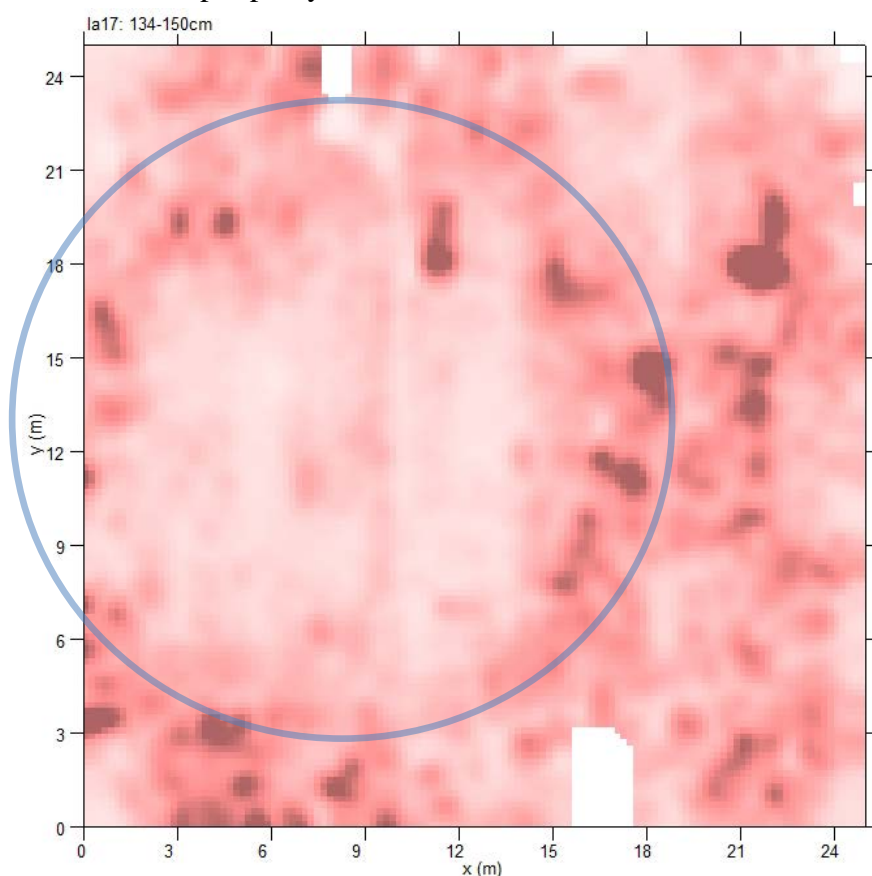


Figure 11. Radargram 68 in Block A, Scarlett's Mound.

None of these radargrams delineate distinctive profiles that are applicable in reconstructing the mound's origin. However, that itself is useful information: the absence of evidence of an episodic fill sequence suggests a single construction event occurred.

A series of time slice maps were generated that show the radar reflections at selected depths below ground in Block A. Figure 12 shows the block at approximately 134-150 cm below ground, which encompasses the basal portion of the mound. Nothing resembling a burial or other feature is present at that depth or higher. The patterning of radar reflections around the base is intriguing but inconclusive, and without excavations of the mound periphery, we hesitate to assume that those anomalies are unimportant.



**Figure 12. Plan of GPR Block A at 134-150 cm Below Ground Surface. The approximate outline of Scarlett's Mound shown in blue.**

Finally, the GPR data from the site also may be viewed in three dimensions. Figures 13 and 14 show two isometric views of the grid block. Strong radar anomalies appear as pink masses in these views.

Survey Units. Twenty eight survey units were dug and screened directly adjacent to or on the mound, as shown in Figure 5. Nearly half of the survey units were profoundly unproductive: three were completely sterile, while only charcoal (with an occasional charred nut) or a single shell fragment was recovered from nine others. This charcoal was probably produced by natural or controlled burns in the mound vicinity,



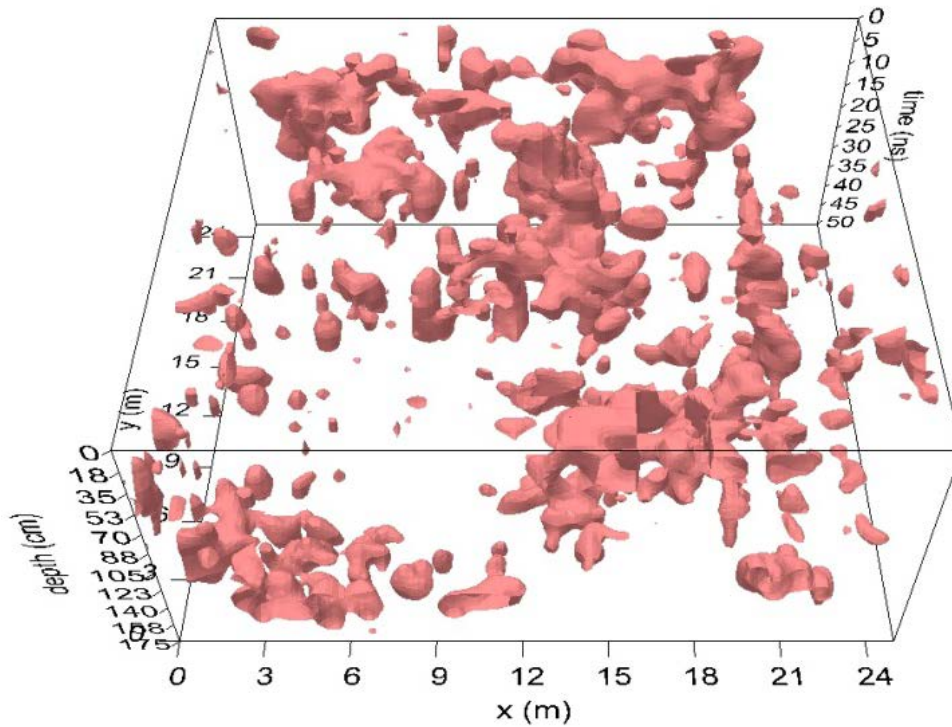


Figure 13. Isometric 3-D View of GPR Block A.

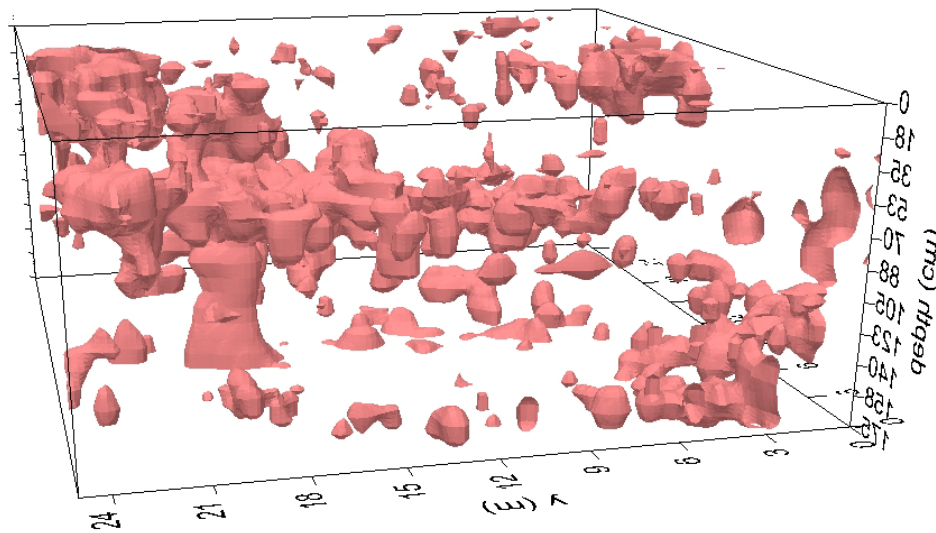


Figure 14. Another Isometric 3-D View of GPR Block A.

while the small shell fragments were derived from a clam (0.7 g) and a mussel shell (0.1 g); both are enthusiastically harvested by raccoons. Thus the materials recovered in these 12 units are likely naturally-produced ecofacts rather than human-made artifacts.

The most productive survey unit at 9CH1350 was located south of the mound at 490N 510E. A heavy concentration of oyster shell and sherds was encountered about 25 cmbs, and at 35 cmbs a possible trash pit was defined. Designated as Feature 3 (the first two features observed at the site were determined to be natural stains), this deposit contained a large amount of oyster shell and several Wilmington cord marked sherds to a depth of 82 cmbs. In all likelihood, however, the top of the feature was probably at 25 cmbs, as indicated in Figure 13. The unit was taken to 92 cmbs to observe the bottom of the feature in profile. Unfortunately, even with three profiles mapped, it has an amorphous appearance due to the diminutive size of the survey unit. Table 1 below presents the frequencies and weights of the artifacts recovered from the unit and feature.



**Figure 15. Feature 3 East Profile, 490N510E. Left scale = 1 m, right scale = 30 cm.**

The 19 prehistoric sherds were all identified as Wilmington Cord Marked. What is most surprising in this assemblage, of course, is the presence of tabby mortar, probably formed from the reduction of shell through burning. Most of this material was associated with Feature 3, and its presence indicates that the feature is historic in origin. However, the complete absence of any other historic artifacts is certainly puzzling. The shell was obviously brought to the mound area from elsewhere, and prehistoric artifacts (in particular sherds) may have been inadvertently included, but why shell-based mortar would be produced or at least deposited at this forlorn location, and the function of Feature 3, remain enigmas.



**Table 1. Artifact Totals, 490N 510E.**

Artifact Type	Feature 3		Survey Unit	
	Frequency	Weight (gms)	Frequency	Weight (gms)
Burnt bone	2	0.1	0	0
Whole oyster shell	14	343.9	11	250.7
Oyster shell	-	21609.0	-	3544.8
Clam shell	6	53.5	1	0.1
Mussel shell	20	3.4	1	2.8
Land snail shell	11	1.1	1	0.1
Charcoal	31	3.9	113	22.6
Ceramics, prehistoric	5	80.8	14	94.8
Tabby mortar	<u>66</u>	<u>45.2</u>	<u>4</u>	<u>0.7</u>
Total	151	22060.5	145	3916.6

Since this single survey unit accounted for over half of the total prehistoric ceramic assemblage derived at 9CH1350, chasing down Feature 3 immediately became a high priority for the UTC archaeologists. Accordingly, in order to bound the feature, four 30 cm<sup>2</sup> shovel tests were laid out at 5 m intervals in cardinal directions from 490N510E. While three of the units were sterile (not shown in Figures 5 or 6), several sherds and oyster shell fragments were recovered from the northern unit (495N510E), so it was expanded into a formal 50 x 50 cm survey unit, as indicated in Figure 5. When fully excavated to 50 cmbs, nine Wilmington Cord Marked sherds, 54.7 g of oyster shell and a clam shell weighing 1.1 g was recovered from the unit. No sign of any feature was seen, indicating that Feature 3 is of modest size.

Test Unit. The single 2 x 1 m test unit dug at 514.50N509.50E (northeast corner) in the mound extended from 1.47 (surface) to 2.81 mbd. As seen in Table 2, a large number of fairly ambiguous faunal and floral remains – probable “ecofacts” consisting of minute fragments of bone, deer teeth, charcoal, oyster shell, and snail shell - but precious few definitive artifacts were recovered. The only artifacts that were of definite prehistoric origin were four small fragments of flint that weighed only 0.6 g. These are most likely debitage from tool manufacture or modification. The eight small rock fragments are obviously transported to the island, either in the prehistoric or historic periods. The only historic artifact recovered was a small (0.4 g) fragment of oxidized iron, function unknown. It was found in the lowest level excavated (2.68-2.81 cmbd) in the test unit. If it was not intrusive, then its provenience at the base of the mound indicates that the mound is not prehistoric, although when it was constructed in the historic period could not be established. Suffice it to say that the artifact assemblage associated with Scarlett’s Mound is strikingly dissimilar to the shell- and sherd-heavy prehistoric sites investigated elsewhere on Ossabaw Island by Moore and Pearson. In terms of the artifact assemblage, the almost complete absence of prehistoric materials argues against a prehistoric origin.

Similarly, stratigraphic data from the test unit did not contribute much in the way of interpretive clarity. As shown in Figure 13, the base of the mound contained a more or less

**Table 2. Scarlett's Mound Test Unit Artifact Totals (515.75N 509.5E)**

<u>Artifact Type</u>	<u>Frequency</u>	<u>Weight (grams)</u>
Bone	15	4.3
Deer Teeth	6	5.0
Charcoal	2480	368.7
Burned Wood	18	6.5
Oyster Shell	8	12.1
Land Snail Shell	14	0.3
Rock (Quartz, etc.)	8	3.3
Flint Debitage	4	0.6
UID Iron	<u>1</u>	<u>0.4</u>
Total	2,544	401.2

continuous dark stain that varied in thickness; except for the iron fragment, no artifacts were recovered from it. In the north profile (Figure 13, left) this stain rises from the west to the east, but, as seen in the south profile, the stain trends higher from east to west. What the latter orientation indicates is that the slope of the mound surface is not parallel with the subsurface stratigraphy. This would seem more consistent with modern earth moving equipment and techniques than with basket loads of prehistoric soil.



**Figure 16. North (left) and South (right) Profiles of 515.75N 509.5E.**

## Summary

Although Scarlett's Mound bears many of the hallmarks of a prehistoric mound, and even appears to have been looted, it apparently was not constructed in the prehistoric period. In essence, the application of GPR technology, archaeological survey, and archaeological testing failed to determine the function of the mound. Stratigraphic data and a distinct lacuna of artifacts that would be expected to accompany a prehistoric mound – not to mention the recovery of a small iron fragment at the base of the feature – indicates that the earthwork is modern in origin. Whatever its temporal affiliation, it represents the sum result of human labor, and it was created for a purpose. Unfortunately, the cumulative data generated at 9CH1350 does not provide much in the way of clues as to what that purpose might be.

While Feature 3 contains a significant quantity of Woodland period ceramics, it also contains tabby plaster, something that is not associated with the prehistoric past on the Georgia coast. Thus, it too appears to have a historic origin, but its limited size and isolation, its function, and its relationship (if any) to the adjacent modern mound are unknown and ultimately perplexing.

One explanation for the presence of the mound comes from Dr. Charles Pearson, who has carried out more research on Ossabaw than anyone else. Noting the dissimilarity between Scarlett's Mound and other prehistoric mounds present on the island in terms of associated artifacts, he suggests that the mound is relatively modern and may have been constructed as a platform for loading timber trucks (personal communication 2014). Such operations leave precious little in the way of associated historic artifacts. However, the circular outline of the feature seems to preclude its use as a loading ramp. The looter's pit, which was not very deep, was probably dug by a would-be relic collector who soon became frustrated with the absence of prehistoric artifacts and/or too fatigued to dig to the base of the mound, where burials and grave goods might be expected to occur.

Despite its modest size, another possible explanation is also predicated on a historic origin for the mound: that it was built as a refuge point during highwater storm surge for slaves, cattle, and others. This location is the highest elevation on the northwest part of Ossabaw Island - even higher than the tabbies and the main house area. At least six big storms, most of them deadly, hit the Georgia coast between 1804 and 1898. Scarlett's Mound may have been a last resort due to its elevation and proximity to the main house and slave tabbies. The enigmatic Feature 3, with its tabby plaster, could somehow be associated with the mound during the antebellum period.

If nothing else, Scarlett's Mound serves as a caveat about superficial similarities and accompanying assumptions. While its form seemingly resembles a "classic" prehistoric mound, the absence of associated shell and sherds simply does not conform to what has been found at other mounds identified on the island. It is only through the application of multiple, systematic surveying and testing methodologies that a probable modern origin of this feature could be established.

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