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A bimonthly journal of reports and activities of mutual interest to the individuals and organizations within the framework of the Institute of Archeology and Anthropology at the University of South Carolina and for the information of friends and associates of the Institute.

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PRELIMINARY REPORT
HULL CONSTRUCTION FEATURES OF THE
BROWN'S FERRY VESSEL

by

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Prepared by the
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INTRODUCTION

During the summer of 1976, divers raised the remains of a small merchant vessel from the Black River in South Carolina (Fig. 1). Laden with 25 tons of bricks, its hull was nearly half intact. Artifacts were dated to about 1740, making this the oldest preserved vessel in this country.

In September, 1977, at the invitation of Alan B. Albright, Underwater Archeologist for the Institute of Archeology and Anthropology at the University of South Carolina and Director of the Brown's Ferry Project, I visited the hull's storage site to conduct a preliminary study. Although Mr. Albright has been kept informed of developments during the course of our work, this report will formally document the initial results of that study. It will also serve as a guide for future reconstruction work. The information must remain preliminary in form, since some parts of the hull were not accessible, others were better left undisturbed until some manner of conservation has been performed, while still other details can only be dealt with following a preliminary study.

Figure 1: Raising the Brown's Ferry Vessel from the Black River (Photo by Gordon Brown).
The Storage Site

The wreck was stored along the perimeter of Fort Jackson, near Columbia, South Carolina, and was protected from human molestation. However, it was not protected from the elements, although continuous water sprays from perforated hoses and lawn sprinklers did seem to keep the timbers wet. This storage site was a temporary one as the hull has since been lowered into a storage pool to await conservation. The sprays made detailed inspection difficult and precise measurements virtually impossible. It was necessary to interrupt the water supply to perform certain duties, but such interruptions were limited to a few minutes each. Pools of water within the hull did not improve conditions.

Figure 2 illustrates the storage site. The hull was largely intact to the turn of the bilge. This section was still supported by the structure with which it was raised and transported, consisting of iron support beams, lifting cables, and cargo slings. The support structure and hull bottom rested on eight-inch sleepers. Detached hull members were stored nearby and were also under water sprays.

Figure 2: The storage site, showing the intact hull in its cradle (Photo by Alan Albright).
Hull recording, although limited by factors mentioned previously, had to be complete enough to provide a basic set of drawings to supply information needed by the conservator and the reconstructer, and to establish a fundamental catalog should further wood deterioration occur. A table of offsets was made to describe the intact lower hull shape, although the offsets included the distortion caused by the suspender slings. Because the lower side of the hull bottom was totally inaccessible and the clutter above made lateral measurements impossible in some areas, standard methods of taking off hull lines could not be utilized. Instead, an arbitrary reference line was established about two feet above the centerline of the keelson. Inside hull curvature was determined by noting the distance and elevation of planking seams from selected points along the keelson at approximately two-foot intervals. The relationship between these points and the reference line was then determined for each offset. Since the vessel was obviously built to the English system of mensuration, all data were recorded in feet and inches.

A set of hull lines could not yet be drawn from the resulting offsets because of existing distortion and insufficient hull area was examined. Additional offsets were taken from the standing outer frame faces on the port side. Several detached starboard frames were temporarily mounted in their original locations and measured, while a dozen detached frames from both sides were drawn full size on paper. Planking widths were recorded at 2 foot intervals, frame spacing and sizes were noted, and existing hull distortion was determined where possible. Keelson, stem, fastenings, and auxiliary members were dimensioned and located. Tool marks, distinctive structural procedures, and repairs were all recorded. Selected detached planks and a wale were measured and tabulated.

Not all the hull was accessible for inspection, nor was it deemed advisable to handle all the detached hull members. In some cases the bottom of the hull was too close to the concrete slab for measurement or scrutiny; even mirrors proved unsuccessful because of the water dripping through the bottom seams. Only selected detached planking and frames, those deemed necessary to a complete hull analysis, were studied in any detail. While it was tempting to record all these pieces, time and funding did not permit us to perform a task which will be duplicated in even greater detail prior to conservation. In addition, these old timbers had already been subjected to more than their fair share of handling; to further risk them by additional shifting and exposure to the hot sun without water was unnecessary at this stage. It was decided to learn as much as possible from the existing information and to then perform any additional recording under controlled conditions and the supervision of a conservator.
Three days were spent at the storage site, tabulating and studying hull details. This information was then taken to Institute of Nautical Archaeology headquarters at Texas A&M Research Center, where research, drafting, and modelmaking facilities simplified the preliminary reconstruction. Offsets and other data were converted into lines drawings. Unfair lines and erroneous offsets were "averaged out" to produce a set of harmonious lines. The lines were then transferred to a mould loft from which the reconstruction model was built. Using the remaining recorded data in constructing the model (planking shapes, fastening angles, frame shapes, etc.), errors in the original lines draft were soon recognized and corrected. All reconstruction work was done in 1:10 scale.
The hull was flat-bottomed and lacked a keel; its bottom structure was formed by three large planks. Only the center plank extended the full length of the hull and was laid first in the manner of a keel. A plank of equal thickness was edge-joined on either side of it with treenails of approximately 3/4 inch diameter. Figure 3 shows a pair of these treenails joining the starboard and center planks near the stern. Several more were reported seen when the hull was hoisted from the Black River, although these were the only two discovered during our survey. After the hull can be drained of its pools of water and sand scraped from the seams, a fastening pattern should become apparent. No other type of fastening was discovered, nor was any necessary because the planks were well secured to each other after the floors were installed.

Figure 3: Two small treenails joining the edges of bottom planks (Photo by Alan Albright).
The three bottom planks were without butts and varied in thickness from 2 3/4 to 4 inches in thickness, with the greater dimension being more predominant amidships and the thinner cross-section occurring near the bow. Part of this variation in thickness may have been due to uneven trimming during construction, but the lower surfaces of these strakes appeared worn near the bow, as if from beaching.

The bottom planks were probably roughly shaped to their port and starboard curvatures at this time, although they could not have been finished until after the first side strakes were added.

The Stem

Perhaps the most interesting construction on the entire hull was that of the stem. It consisted essentially of three pieces: inner, main, and false posts. Figures 4 and 5 show the manner in which the three members were attached to the center bottom plank and each other. The main (outer) post contained the planking rabbet. Its maximum thickness was 4 1/4 inches at the rabbet, tapering to 2 1/2 inches where it joined the false post. Its maximum width was 23 1/2 inches where it joined the center plank; the center plank was only 2 1/2 inches thick here.

Approximately 4 1/2 feet of the main post survived. Its upper end was quite eroded and the entire stem assembly was twisted to starboard. Three holes, 5/16 inch in diameter, transpierced the main stempost near its rot line. Eighteen inches lower, another abandoned hole of similar size and one which was pegged were found. Two additional clusters of three pegged holes each were located at similar spacings and orientations along the rabbet. Although the pegs closing seven of these holes have been worn smaller at their exposed ends from erosion, there is no doubt that they closed holes of similar size to the three empty ones at the top of the stem. No definite explanation for these holes and pegs has been determined to date. The fact that each cluster was situated just forward of the upper edge of the planks entering the rabbet may be a clue, however.

The false stem served the dual function of strengthening and protecting the main post. It was moulded 5 inches at the heel and sided 2 1/2 inches where it joined the main post. The false post diminished in thickness forward at the same rate as the main post.

Two bolts and at least two nails secured the false stempost to its neighbor. As in the model, the nails probably secured the false post until the bolts were installed. These nails had 3/8 inch square shanks of undetermined length. Bolts (Fig. 5) had 1 1/2 inch diameter shanks and heads 1 3/4 inches in diameter and 5/8 inch deep. Slots with a length of 1 inch and slightly less than 1/4 inch width were cut near the end of the shank. Keys were twice as long as the diameter of bolt, and were tapered to enter, but not pass through, the bolt slot. Washers, 2 inches in diameter and a 1/4 inch thick, cushioned the bolt head and
Figure 4: The surviving portion of the stem (Photo by Alan Albright).

Figure 5: Stem details (Redrawn from an original by Darby Erd).
keys. Bolts, keys, and washers were made of iron. The bolts were driven through the holes of the stem pieces, the inner washers slipped over the protruding shafts, keys driven tightly into their slots, and the narrow ends of the keys twisted to prevent their removal.

Similar bolts can be seen in the Underwater Exploration section of the History and Technology Building at Smithsonian Institution; on the Padre Island wreck at Austin, Texas (Olds 1976); and in their earliest recorded hull usage at Bodrum Museum in Turkey, where rubber castings were made from the concretions of a 7th century Byzantine wreck (Bass 1971).

Two of these slotted bolts and two iron drift bolts held the three stem pieces together within the preserved area. Iron traces and a depression suggest the possibility of a third slotted bolt at the upper extremity of the main post.

**Inner Stempost**

The most curious of the three stem pieces was the inner post. (It can hardly be called a stem knee.) Its grain direction indicated it was selected from the juncture of a tree trunk and branch or root, although the grain did not perfectly parallel the bottom and stem directions. In addition to the four bolts previously noted, at least four nails held it to the main post. It was attached to the bottom planks with 11 unwedged treenails of 1 1/8 inch diameter. At its widest part along the bottom, the inner post was sided 19 1/4 inches; it was sided 6 3/4 inches at the rot line. At its upper preserved end, it was moulded 3 inches; at its juncture with the bottom plank, 4 inches; along the bottom, 5 inches forward decreasing to 4 inches at the keelson. Although it widened as it went aft, the inner post by no means filled the space between the side planking in the bow. It was, however, carefully fitted along the stem so that it served as a nailer for the ends of the bow planking.

Covered with the marks of the axes and adzes which shaped it, the inner stempost had split at its angle long before it was excavated. Additional spikes and nails shown in Figure 5 fastened frames and a step to be described later.

The inclination to starboard taken by the stem during dispersion on the riverbed can be seen in Figure 1. Caused by the weight of the heavy structure above, this distortion created breakage only at the angle of the inner post.
Stempost

All of the upright portions of the sternpost and the aftermost end of the central bottom plank had broken away and disappeared. However, the surviving bottom part of the inner post, together with remaining frames and planking nearby, provided enough evidence to establish at least a partial understanding of the nature of the stern structure. It was similar to the lower end of the inner stempost, 5 inches thick at its broken (after) end and 3 1/2 inches thick at its forward edge. It was attached to the bottom with 7 unwedged treenails. As in the stem, this inner member did not fit against the side planking as it went forward, being only 13 3/4 inches across its widest part. The surviving length (34 1/3 inches) was the distance to the upright arm of this post, which broke away and permitted the surviving portion to erode slightly more.

Two iron bolts or spikes angling through the after extremity of the inner post fastened either a very short deadwood or the main post to this piece. Accessibility to the bottom of the hull may provide more information. It was the permeation of iron from these fasteners which saved the stern extremity.

Although the inner sternpost appeared similar to the inner stempost along its preserved length, it was sided 5 1/2 inches less at either end. Thus the lower part of the stern was narrower than the stem. Projecting the runs of lower side planking on the draught and model produced the same conclusion. Projecting the line of the upper hull from existing compound stern frames produced results similar to the shape of the bow sides, negating the possibility of a transom stern. In fact, there was no evidence for a stern knee or the deadwoods generally associated with that type of construction. We have tentatively reconstructed the stern as shown on the lines drawing; much more will be determined about this area during restoration of the hull.

Frames

Twenty floors were spaced on approximately 2 foot centers between the inner stem and sternposts. Their extent of hull coverage can be seen in Figure 6. Although their dimensions varied, they were moulded 4 inches and sided 5 inches on the average. Each floor was fastened through the bottom planks at 6 to 8 inch intervals with 1 1/8 inch treenails, which were unwedged at their upper ends and were staggered along the floors to reduce the likelihood of splitting. Each of these floors had a watercourse cut into it along the hull centerline to permit free passage of bilge water. Timber was selected for grain to follow the shape of the floors, although the shipwright experienced difficulty in finding such grain curvature among the u-shaped floors in the ends of the hull. No metallic fastenings were used to secure these floors, nor were there any fastenings present in the floor tops to suggest the installation of permanent ceiling.
Figure 6: The intact portion of the hull (Drawing by Darby Erd).

Figure 7: Floor of Frame #2 (Photo by Alan Albright).
At least 4 more floors were situated in the ends of the hull, 2 on top of the horizontal portion of inner stempost and 2 atop the inner sternpost. These sharply angled members may have been inserted only after the planking was completed, since they were nailed through the posts and into, but not through, the bottom plank. A single rectangular nail, 1/2 by 3/8 inches in cross-section, secured the forwardmost floor into the hull bottom while 2 such nails secured the floor directly aft of it. Similar fastening patterns were found in the stern.

Floors 1 through 20 had port and starboard futtocks set adjacent to their after faces. It is difficult to determine whether our shipwright took his frame shapes from a mould loft or simply laid down all the floors and added futtocks "by eye and by batten." We can be certain that the midship frame was completely erected before side planking was begun, since the first side strakes butt on futtock 13. On the other hand, futtocks as crooked as those on frame 14 would seem too difficult to work from a mould loft. We suspect, therefore, that the midship frame and probably every third frame afore and abaft it were erected first. Battens were then probably faired across their faces from the ends of the ship and the intermediate frames added. Frames in the ends of the hull were canted and unattached at the bottom, so that they could not have been installed before much of the planking was completed.

The midship futtocks nearly abut in the center of the hull, while in the ends of the ship futtocks barely step on the bottom planks. Figures 7 and 8 illustrate a typical floor and futtock. The heel of the futtock was treenailed through the bottom plank and was also laterally treenailed through its floor (see also Fig. 9). While the heels of the futtocks were fastened to the bottom planks with at least one treenail and often 3 or 4, only a few in the fore and after sections of hull were laterally fastened.

Intermediate frames and second futtocks beyond the floor arms added hull coverage where needed. Little can be determined concerning the framing in the stern, but nail holes in the bow describe that structure. Bow frames were canted forward of frame 20, but it would appear that their heels were attached only to planking. There was no evidence for breast hooks or other bow timbers.

Inner edges of frames were chamfered slightly to prevent splitting. Their outer faces occasionally had flats adzed into them to better seat the planking. Occasional traces of bark were found on some frames.

Planking

The hull was hard-chined along its ends and had a soft deadrise amidships. The centers of this transition occurred near frame 8 aft and at frame 17 forward. Thus the lowest side strake was vertical at the posts and nearly horizontal amidships, creating a complex seam.
Figure 8: Starboard futtock of Frame #8 (Photo by Alan Albright).

Figure 9: Floor and chine details (Photo by Alan Albright).
with the bottom planks. We had difficulty duplicating this seam on the model, but the shipwright did a masterful job on the prototype. In the bow and stern, the first side strake was set on top on the bottom plank, but as its attitude became more horizontal an angle was cut in both the strake edge and the upper edge of the bottom plank. The bevel cut into the bottom plank can be seen in Figure 9, where the chine angle is about 40° above the horizontal.

The lower side strakes butted on port and starboard futtocks of frame 13. They were both nailed and treenailed to floors and futtocks in an irregular pattern. For the most part, one treenail and one or 2 nails per strake per frame were used. Treenails usually had a diameter of 1 1/8 inches and were mostly unwedged. Where wedges were employed, they were 1/2 inch square and driven in the center of the treenail. Nails were of square, 1/4 inch iron. The lower strakes were in no way fastened to the bottom planks.

Side strakes averaged 1 inch in thickness, usually being somewhat thinner in the ends and often reaching 1 1/4 inches amidships. Their widths were well distributed and varied considerably, but they averaged about 9 1/2 inches. Butts were always placed on main futtocks, never on floors or intermediate frames. Planking was heavily nailed, but not treenailed, into the posts.

The curvature of the ends of the hull was rather severe above the fifth side strake, and considerable force was required to bend even these thin strakes into the rabbet. The shipwright made his job easier by slicing the inside surfaces of his planking (Fig. 10). We were at first surprised at this discovery and wondered whether the cuts weakened these planks. When the process was applied to our model, however, we found that much of the strength remained while the task of bending the strakes into the rabbet was greatly simplified. Not just any notch will do, of course; the secret is to make a very thin cut which is angled away from the direction of the bend.

Planking seams were well caulked throughout, although samples of caulking have yet to be removed and analyzed. Small square and rectangular wooden patches were found along some seams, especially near the butts. They seemed to have been used to repair split strake edges, a condition which may have been created during the removal of old caulking. A layer of pitch or resin coated the inside of the outer planking; outer planking surfaces also show traces of some sort of resin at widely scattered locations. These conditions were most noticeable on the upper strakes.

Our knowledge of the planking above the fifth side strake is still rather limited. Since some of this planking had to be cut away to facilitate excavation, it was difficult under prevailing conditions to determine exactly where a few planks butted and even where some of the shorter pieces belonged. Once conservation is completed, frames can be secured and the planking fitted to them with ease. We believe there were at least 8 side planks and a wale. Final determination can only be made by fitting them to the hull, as some of the planking which was
Figure 10: End of plank cut on inside face for bending into rabbet (Photo by Alan Albright).

Figure 11: A sample of planking strakes. Surviving wale fragments in center of photo (Photo by Alan Albright).
already detached on the bottom has two eroded ends and will have to be fitted to the nails of similarly detached frames (Fig. 11). Planking was in relatively good condition, however, and no problem is anticipated in accomplishing a precise and convenient restoration.

The Wale

Two long, rounded timbers found just outside the flattened upper starboard side by excavators were originally thought to be parts of a caprail. They are more probably pieces of a wale, whose irregular grain pattern caused them to split in such a long diagonal fashion. From vertically driven spikes and an apparent overlap of the 2 pieces, we determined the original width of this wale to be between 7 and 8 inches. It was preserved to its original thickness of 3 1/2 inches. The surviving length of the two pieces, when joined, was 18 feet, 4 inches. One end had eroded to a mere 1-inch cross-section.

When properly fitted and laid along a straight edge, these pieces assumed a curvature nearly synonymous with that of the reconstructed sheer from midships aft. Two large vertical spikes and one horizontal bolt, the latter nearly as large as the stem bolts, were concreted into the wood. Numerous nails and treenails attached the timber to frames. Pitch still adhered to the surface, curious rubbing patterns scar two areas, and marks made by the shipwright's tools abound.

The protruding vertical spikes, perhaps used to secure chainplates or a caprail, would seem to suggest that this was the uppermost strake. The horizontal bolt may have secured a fitting or it may have gone through a frame and shelf clamp. Clearly, this timber warrants closer inspection when it has been cleaned and dried and can be scrutinized for longer periods of time.

Internal Scantlings

The keelson was cut from a single piece of cypress 36 feet, 6 1/2 inches long. Probably to provide more room in the hold, its depth was only 4 inches; it was sided 12 inches amidships, 10 inches in the bow, and 8 inches at its after end. Treenails fastened the keelson through floors and bottom planks. Two iron nails may have held it in place until treenails could be inserted. In most cases, 2 treenails per floor were employed and none of the treenails were wedged. The keelson was not attached to the stern construction in any way. Its after end terminated in suspension between 2 floors. Even in the bow, the single treenail driven through its starboard corner into the inner stempost provided little connecting strength.
The upper edges of the keelson were sharply chamfered to prevent their split by movement of cargo.

This timber served functions other than that of a keelson. It contained steps for both main and foremost. The main step was cut 12 by 4 inches, while the forestep (Fig. 12) was 5 3/4 by 3 1/8 inches. Both steps pierced the keelson. Surprisingly little wear was evident around either step.

The keelson also served as a chopping block, presumably for the cook. Hundreds of random axe or hatchet marks marred its top surface between the two mast steps. Small charred areas, as if made by ash from the galley stove, were scattered among the chop marks. Perhaps the cook cut his kindling on this solid and convenient timber. If a galley stove located in the bow were made of brick, its presence might have gone undetected, especially if it collapsed among the cargo.

A small auxiliary step (Fig. 12), cut from a plank 11 inches broad and 1 1/2 inches thick, was located just forward of the keelson and was nailed into the inner post with two iron nails. Floor 21 served as the fourth side of this step, perhaps supporting a bit. Its proximity to the stem and the height of floor 21 do not support the theory that it was the bowsprit step.

Fragments of ceiling planking were found among the cargo, but the ceiling must have been loosely laid atop the frames. There were no fastenings on the inner frame faces to indicate the attachment of any inside members with the exception of the keelson and possibly a clamp. The evidence for a clamp directly opposite or slightly below the wale was suggested by the existence of clusters of nails at the upper ends of several of the longer frames. Since these nails were located at the rot line, and the condition of both frames and nails was extremely poor, it was impossible to determine what they might have attached. However, their size and frequency seemed more appropriate for attaching a longitudinal plank than hanging knees. On the model, we have installed a shelf clamp for the purpose of supporting mast partner and deck beams. It was based on the information available to us, but should not be construed as totally factual in either size or location.

The remains of a lodge knee were found. Its curvature could only match that of the bow forward of frame 22. The presence of this knee might suggest the existence of a bow deck. We would expect the presence of a deck at bow and stern, but there was absolutely nothing among the remains to support or deny the existence of a deck throughout the length of the hull.
Figure 12: Details of small auxiliary step (Photo by Alan Albright).
ANALYSIS--THE LINES

Those not accustomed to preliminary reconstruction drawings may wonder at some of our variations from standard line drafts. The rabbet is not indicated because we have not fixed its precise angle and width in some parts of the hull. Since this drawing served also as a mould loft for the model, the sternpost, sheer, and upper bow have been reconstructed (Fig. 13). The evidence for these areas is largely secondary. No deck is indicated, again due to a paucity of information, and the rig is similarly treated. A dashed line above the sheer line suggests the possible existence of weather boards or additional planking above the wale. The crossed diagonals were used for fairing the model's frames and to study the peculiar bulge in the surviving hull. Stations are not spaced equidistantly; they are situated at the points of measurement for the table of offsets derived at the site, and are mostly located about two inches forward of the individual floors. Frame 13 served as the midship frame.

Although an attempt was made to interpolate the twisted portions of the hull, the preliminary lines undoubtedly contain a certain amount of distortion and are subject to some revision when the final plan is drawn. Part of this distortion may have been inherent, but most of it was due to the hull's sojourn on the riverbed and the excavation process. The greatest errors can be expected in the extreme ends of the hull and in the upper sides of the quarters. None of these errors are so great, however, that the preliminary lines do not represent a true picture of the shape of this vessel. The corrections can be easily made when fastenings and planking edges are aligned during physical reconstruction.

It has been suggested that this hull is similar to that of the gundalow PHILADELPHIA displayed in Smithsonian Institution. Nothing could be farther from the truth, the only major similarity being that each had a flat bottom. The PHILADELPHIA is hard-chined throughout, is separately framed on bottom and sides, and is of extremely simple design and build. Conditions at Lake Champlain demanded a craft. The cargo vessel at Brown's Ferry, on the other hand, was both simple and complex in design and construction. Its form was not quickly decided to meet an emergency, but evolved slowly and thoughtfully in a competitive atmosphere.

The Brown's Ferry vessel was flat-bottomed and keelless, apparently for the purpose of reducing draft. Our designer desired to keep his hold volume as great as possible, maintaining rather full sides as far fore and aft of midships as was feasible. The result was a complex framing plan for so small and simply appointed craft, employing softly rounded hull sections amidships, compound shapes in the quarters, and pointed bow and stern.
Figure 13: A reconstruction of the sternpost, sheer and upper bow
(Drawing by Darby Erd).
Thus, the hull was shallow enough to operate in shoal waters but full enough in the hold to accommodate a sizeable cargo. Even the keelson was laid flatwise to increase hold volume. The drawing indicates a hull with a little over three feet of hold depth, and less than three feet of draft when carrying 25 long tons of cargo. Although our calculations are only approximate, such displacement would give the vessel only about a foot of freeboard—plenty for river travel but a bit slight if this merchantman were to skirt the coast to Charleston. There is a possibility that another side strake existed below the wale, since the wale was detached from the hull, and its exact relationship to other side strakes has not been established. Erection of weatherboards above the indicated sheer line is also a possibility.
Our reconstruction models are built solely to solve problems. When we are finished with them, they are discarded or turned over to nautical archaeology students at Texas A&M University for classroom study. Made from a cheap grade of pine to a 1:10 scale, they are highly detailed in investigative areas but are never sanded, varnished, or subjected to any other processes not used in the prototype. Nor are they completed beyond the scope of our investigation, so that such models never become museum pieces.

In this case, however, Mr. Albright requested that we complete the now-abandoned model so that his fellow South Carolinians could better understand the vessel and its appointments. He also suggested that it be rigged for further comprehension. The resulting model incorporates our ideas of the appearance of the Brown's Ferry vessel when it sank, although there is little evidence to support some of the areas we were required to include. The model is illustrated in Figures 14, 15, and 16. It shows a low, shallow draft hull—a sailing barge, really—of a type possibly intended for both river and coastal sailing. It is complete even to the axe marks atop the keelson and the crooked frames shown in the wreck plan. Some explanation should be given here for the more hypothetical areas of construction. The upper part of the stem was merely projected from existing areas, while the greater part of the sternpost was based on the pattern of construction noted elsewhere in the hull. Since well preserved frames were found as far aft as frame 2, and the projection of lines from these frames resulted in a stern that was almost certainly pointed, we made our model a double-ender.

The steep sheer in bow and stern was based on the pattern of planking lower in the hull. The shipwright made no attempt to narrow his planking at the posts in order to develop a flat sheer. If the planking pattern found in the first five side strakes was maintained, the suggested sheer would have resulted. The high ends would have been well suited for coastal sailing.

Not a hint for the size or shape of the rudder could be found, so that we have installed one which is purely conjectural. Leeboards have often been suggested and may have been a convenient addition, especially if the rig was that of a fore-and-after, but we considered such an installation to be too presumptuous.

Decks were installed at bow and stern, while only walkways covered the hold along the sides and across the main partner beams. It seems unlikely that so shallow a hold would be completely decked over, and equally unlikely that a shoal draft hull would have a deep hold. A single shelf clamp, along with a few knees, support what deck beams were necessary. Weather boards, removable amidships for loading, offered additional freeboard for coastal travel. A small galley stove, made of brick and situated under the foredeck, supported culinary efforts.
Figure 14: The completed model. Rigging, rudder, and topside details are conjectural (Photo by Gordon Brown).

Figure 15: Stern view, port side (Photo by Gordon Brown).
Figure 16: Bow view, port side (Photo by Gordon Brown).
The single block found with the wreck helped little in defining the rig of this vessel. The two mast steps in the keelson have prompted many to declare that this was certainly a cat schooner. Such suggestions might be based more on nostalgia than supporting evidence. The rig could have taken any number of two-masted forms, with or without bowsprit and leeboards. She could well have been square-rigged, using the main exclusively when sailing off the wind (Baker 1962). Or she could have sported square tops and fore-and-aft lower courses. If completely fore-and-aft rigged, a number of variations would have been possible in this period. There is not yet sufficient evidence to establish precisely how she was rigged.

The rig on the model, although totally hypothetical, was based on our limited research of period coastal trading in the South and upon the working of the vessel as we envision it. To begin with, designer, builder, owner, and skipper might well have been one person. Such was frequently the case with American coastal and river craft, the crew often consisting of family members. Teredo damage indicated the vessel must have wandered beyond the confines of the Black River; she may have been one of many coastal vessels supplying ports such as Charleston with building materials, farm products, and cargoes to be forwarded to deepwater ships. As such, her crew could be small and her speed relatively unimportant. We see her as a vessel which may have occasionally run her flat bottom on a bank to load where docks did not exist; to float downstream with the current and upstream with the tide, using the poles and oars we saw to keep off the banks or provide propulsion when wind and tide failed; and finally, to beat along the coast to Charleston, or an other port within her reach, as safely and conveniently as possible.

To meet all these conditions we gave her a sprit rig. Such a rig will not satisfy many, to be sure, but at least it is one which could be easily handled by a very small crew (perhaps only two or three in this case) and would satisfy the requirements for sailing along the coast as well as among fickle river winds.
What is the value of such a small, unimpressive little freighter? In my opinion, it is the most important single nautical discovery in the United States to date. In the first place, it establishes primary evidence for American shipbuilding nearly fifty years earlier than previous discoveries. More importantly, this was a merchant hull, built without the anxiety, bureaucracy, and inefficiency often associated with vessels of war. As such, it defines everyday technology in a competitive atmosphere. Additionally, this was a local type—important to any maritime scholar—representing a period and area in which far too little maritime information has been forthcoming.

The southern colonies had farmland, timber, deep rivers, and seaports. Certainly, South Carolina and neighboring states must have been heavily involved in shipbuilding and waterborne commerce. In some respects, these ventures must have been as impressive as the well-documented maritime ventures of New England and the Chesapeake. Hopefully, the Brown's Ferry vessel will signal the beginning of more fruitful research into those Southern maritime activities.
SUGGESTIONS

There remains the question of "where do we go from here" The most pressing problem is that of conservation. The hull remains continue to suffer some deterioration, even though they are soaking in fresh water. There is little advice I feel qualified to advance concerning the method of conservation, merely that it be done as quickly as possible.

Once conservation is completed, reconstruction of the hull should be a relatively easy matter. Physical reconstruction of the hull will take four to six weeks, depending upon the type of supporting structure and accommodations provided. The hull can be displayed on a variety of stanchions and blocks, a method similar to that used for the PHILADELPHIA being the most practical and probably the most economical. The hull can be fastened with either stainless steel rods and pins or with treated wooden pegs; either type of fastening can be inserted so as to be largely invisible.

Cosmetization will require another week to ten days, but can be handled by inexperienced help under the supervision of the conservator. I do not foresee the materials and equipment needed for assembling and cosmetizing the hull to cost more than a few hundred dollars, provided tools such as electric drills, C-clamps, and hand tools can be borrowed for the job. These estimates are based on the assumption that the ship will suffer little or no further damage.

The hull is in such fine condition that conservation, not reconstruction, poses the major obstacle in time and expense. Perhaps a publicity campaign, making more people aware of the historical value of this vessel, would help with funding, and public relations. The technical aspects of preservation can only be solved by a conservator.

One can make all manner of suggestions for displaying the hull and its artifacts, but such suggestions would be premature here. The model complementing this report should eventually be replaced, however, with one of museum quality.

One thing is certain--the Brown's Ferry vessel is far too important a piece of Americana to be neglected. Its secrets of early American technology should be shared by all. I suggest that continuing efforts be made to insure prompt and efficient preservation and display.

It has been called to my attention that interest is being generated concerning the construction of a replica of this vessel. I suggest that a replica NOT be built solely on the information from this report. Only three days were spent at the site in order to gather information presented here. The study was aimed toward developing a basic understanding of the hull construction and answering certain questions concerning reconstruction procedure. While the report has accomplished
this goal, it is not complete enough to establish the many details necessary to construct a full-scale replica. Similarly, the preliminary lines drawing should be expanded and a construction plan developed for such an undertaking.

This information could be acquired, of course, but only with more detailed investigation of the remains. For instance, it does not seem proper to construct a replica without knowing exactly how many strakes of planking made up the sides, whether shelf clamps existed, etc. To answer such questions, it would be necessary to study certain parts of the hull much more thoroughly than we were able to do at Fort Jackson. I doubt the intact portion of hull would have to be disturbed, as we already have documented that fairly well; but it would require a careful examination of all the loose remains, which we were reluctant to scrutinize for fear of their drying out.

Even though conservation is not close at hand, the following suggestions might prove to be a feasible solution to the problem.

1. Build a long, shallow tank, large enough to hold the planks and frames in question and shallow enough to study them while they are submersed. It could be a temporary affair, such as a plastic-lined wooden trough. These members could then be raised individually, carefully examined without risk of drying, and then returned to the pond.

2. Since the time and expense has already been invested, the pre-conservation drawings might well be done at this time. Thus the data needed for the replica and also for permanent excavation records could be combined in one operation, provided damage or distortion of timbers does not follow. Since most of the detached material is large, the work should progress rapidly.

3. With sufficient information from step 1, a construction plan and set of specifications could be drawn up from which a replica could be more accurately built.

Prior to conservation, we can only accomplish the necessary study of hull timbers by keeping them completely wet and sheltered. I am sure there are other solutions, but the above method is one way to proceed. The important fact to remember is that this first report is not, nor was it intended to be, informative enough to enable the construction of so elaborate and expensive a replica.
APPENDIX A

PRINCIPAL DIMENSIONS AND SCANTLINGS

Length
between perpendiculairs (sheer) 50 feet, 5 inches
along the centerline of the kingplank 45 feet, 9 1/4 inches

Breadth
extreme 14 feet
moulded 13 feet, 5 inches

Height
bottom of kingplank to sheer amidships 3 feet, 10 1/4 inches
to sheer at bow rabbet 6 feet, 6 3/4 inches
to sheer at stern rabbet 7 feet, 5 1/4 inches

Depth
in hold (est.) 3 feet, 1 1/2 inches

Draft
afore and abaft 2 feet, 10 inches

Burthen - c. 30 tons

Bottom planks
of yellow pine 4 inches thick

Frames
of oak, floors sided ±5 inches,±5 inches,
moulded ±4 inches
futtocks sided ±4 inches
moulded at the head ±4 inches
moulded at the heel ±2 1/2 inches

Posts
of oak - dimensioned as in text

Planking
of pine 1 inch thick

Wale
of cypress 3 inches thick
±7 inches broad

Keelson
of cypress, moulded 4 inches
sided 12 inches amidships,
10 inches in the bow,
8 inches in the stern
REFERENCES

BAKER, W. A.

BASS, G. F.

OLDS, D. L.
INTRODUCTION

Two miles south of Red Springs in Robeson County, North Carolina, is an Indian burial mound. Over the years, this particular mound has received the attention of many individuals and groups, ranging from the pothunter and the curious to amateur, student, and professional archeologist. Unfortunately, documentation of the site's history has not kept pace with its public popularity.

The purposes of this report are threefold: to bring together available information on the site; to describe the features, burials, and material culture; and to establish a temporal position for the Buie Mound.

LOCATION AND DESCRIPTION

The Buie Mound (Fig. 1) is in the northern part of Robeson County, two miles south and slightly west of Red Springs, North Carolina. The site, on land owned by Joe Todd Buie, is in the woods near the small airfield landing strip at the junction of state roads 710 and 72. The mound is situated on the north side of Richland Swamp, a major tributary of the Lumber River, approximately 15 miles above the junction of these two streams (U.S. Department of the Interior 1974).

Robeson County is within the Atlantic Coastal Plain physiographic region. The section of the county in which the Buie Mound is located is on the Coharie geomorphic surface, where elevation is between 170 and 200 feet (U.S. Department of Agriculture 1978: 64). Most of Robeson County, except for this extreme northern part, is on the Sunderland geomorphic surface, where the elevation is 100 to 170 feet (U.S. Department of Agriculture 1978: 64).

The soils belong to the Black Creek formation, dating from the Late or Upper Cretaceous period (Stuckey 1958). Typically, the Black Creek formation consisted of thinly bedded and crossbedded sands and clays that were evidently laid down by shallow sea water. The clays were generally dark brown to black; the sands were fine to medium grained and gray or light yellow in color (Stuckey 1965: 159-161).

A soil sample from the mound was identified as Wagram loamy sand (Thompson n.d.; U.S. Department of Agriculture 1978). In a representative profile, the surface layer (0-8") was dark grayish-brown loamy sand; the
Figure 1: Locator map of the Buie Mound.
subsurface layer (8-28") was light yellowish-brown loamy sand. The subsoil (28-78") consisted of yellowish-brown sandy loam and sandy clay loam mottled in shades of red, brown, gray and yellow (U.S. Department of Agriculture 1978: 30).

The climate is mild, with an average daily minimum temperature of 34°F in December to an average daily maximum temperature of 90°F in July. On a yearly basis, average temperatures range from 51°F to 74°F. Precipitation totals an average 45.6 inches per year, and the growing season, from late March to early November, consists of about 225 days (U.S. Department of Agriculture 1978: 64-65).

Situated as it is beside a swamp, the mound is bracketed between two distinct habitats. The Wagram soil on the high ground north of the mound is rated as good for the growth of grain and seed crops, domestic grasses and legumes, wild herbaceous plants, hardwood trees, and coniferous plants. This provides a favorable environment for openland and woodland wildlife (U.S. Department of Agriculture 1978: 40-41). South of the mound, the lower land of the swamp consists primarily of Johnston type soil (U.S. Department of Agriculture 1978: Sheet 17). It is poor for the categories listed above, but is good for wetland plants, shallow water areas, and wetland life (U.S. Department of Agriculture 1978: 40-41).

All of Robeson County was originally covered by forests, with a large variety of needle leaf and broadleaf trees (U.S. Department of Agriculture 1978: 36). The mound and its environs are presently wooded, and an examination of the vegetation was made by Mr. Tom Jones during the month of May (Appendix I).

The following trees and shrubs were identified: American holly, bitternut hickory, black gum, black oak, dogwood, dwarf or winged sumac, inkberry or bitter gallberry, large or sweet gallberry, loblolly pine, long-leaf pine, mockernut hickory, paper mulberry, pecan, persimmon, pin oak, post oak, red maple, sassafras, short-leaf pine, southern red oak, sweet bay, sweet gum, sweet pepperbush, swamp chestnut oak, tag elder, tulip tree, water oak, and white oak.

Other plants observed were bitter-weed, blackberry, bladderwort, bracken fern, bur-reed, butterfly weed, cat-briar, cat-tail, cinnamon fern, dodder, duckweed, dwarf blueberry, dwarf dandelion, elderberry, elephant's-foot, evening primrose, fetter-bush, goat's rhue, goldenrod, hawkweed, heart leaf, high bush blueberry, lizard's tail, mistletoe, muscadine grape, netted chain fern, New Jersey tea, panicum, partridge pea, pickerelweed, pipsissewa, poison ivy, pokeweed, poor-mans pepper, possum haw, prickly pear, privet, rabbit tobacco, St. John's wort, sedge, sow-thistle, stagger-bush, stinging nettle, styrrax, titi, varigated milkweed, watermeal, white cap moss.

The principal wildlife species associated with this type of wooded swamp environment are gray squirrel, cottontail rabbit, raccoon, deer, mink, musk-rat, otter, beaver, fox, wood duck, black duck, mallard, and ring-necked duck (U.S. Army Corps of Engineers 1972: 20), while opossum,
mourning dove, quail, turtles, and fish (U.S. Department of Agriculture 1978: 42) probably are present also.

HISTORY

The abundance of good soil and the availability of water make this section of Robeson County ideal for farming. Early settlers arrived about 1730, and grew wheat, corn, rice, potatoes, and cane. In the late 1880's after the invention of the cotton gin, the major crop was cotton; by the 1930's, this changed to tobacco (U.S. Department of Agriculture 1978: 64).

While this site may have been known in the 1880's, it was not the mound examined by Hamilton McMillan in 1882, as suggested by Keel (1970: 17). Mr. McMillan investigated a mound two miles east of Red Springs, and reported an "entire absence of skulls and teeth" (Holmes 1883: 24). Neither the location nor the description applies to the Buie Mound.

A Red Springs resident who was familiar with the site said that the mound had been dug for 100 years. He reported finding bones, charcoal, colonial pipestems, and a polished celt there some 50 years ago, but did not remember seeing any projectile points or shell objects (McConaughey, personal communication).

On May 15, 1971, approximately 50 members of the North Carolina Archaeological Society held a "dig" at the Buie Mound in connection with the society's spring meeting. Under the direction of Dr. David A. McLean of St. Andrews Presbyterian College and Dr. J. Ned Woodall of Wake Forest University, teams of archeological society members partially excavated eight five-foot squares.

In 1971, when visited by the North Carolina Archaeological Society, the mound was oval in outline, the axis lying slightly northeast-southwest. Earlier diggers had removed dirt from the center of the mound and had thrown it to the sides. This excavated dirt formed an oval ridge weathered down to approximately one and one-half to two feet high and from five to ten feet across. Including the surrounding ridge of fill dirt, the mound measured 45 feet in length (east-west) and 30 feet in width (north-south). The central portion of the mound was about a foot below the ridge of spoil dirt, although deeper pits appeared in places (Fig. 2).

Since 1971, several college classes have worked at this site. Mr. Bennie Keel did field work with the St. Andrews Presbyterian College archeology class in the fall of 1971 (Keel 1970: 17-22). Mr. Jeffery Gordon and students from Pembroke State University worked at the site during the summer and fall of 1971, the spring and summer of 1972, and the spring of 1973. The number of Pembroke students varied from 3 to 14 per day, with an average of six students being present each working day. Dr. David McLean carried out further excavations during the 1973 fall semester and the 1974 spring and fall semesters with archeology classes.
from St. Andrews and Pembroke State University. Each of these classes numbered from 25 to 35 students. The areas excavated since 1971 are shown in Figure 3.

Figure 2: Center of the Buie Mound looking northeast. The ridge of fill dirt is visible in the background. (Photo taken in 1971 at the beginning of the North Carolina Archeological Society dig.)

The last fieldwork at the Buie Mound was carried out in the fall of 1974. The excavated squares were partially filled at that time. Complaints by a local Indian group (Anon. 1975) were a factor in the decision not to continue work at the site.

Notes from the 1971 N.C. Archeological Society meeting and reports of the work done by the St. Andrews and Pembroke archeology classes are on file at the Indian Museum of the Carolinas in Laurinburg, where the cultural materials described in this report are available for study (Keel 1970).

EXCAVATION PROCEDURE

There are numerous reasons for undertaking an archeological excavation. They may include salvage operations to conserve information from sites threatened with destruction; the reconstruction of a local site as a public service; or the solution of a fundamental historical problem (Heizer and Graham 1967: 29-30). In the absence of any expressed research design or theoretical base statement by those in charge of the various excavations, the author cannot say what weight was given to the above—
Figure 3: Groups excavating at the Buie Mound (1 inch = 10 feet).
or other--considerations prior to excavations at the Buie Mound. Perhaps the criteria recommended before undertaking an archeological excavation (Heizer and Graham 1967: 29-30) were not met. Nevertheless, this site is the source of substantial information. As witness to one segment of the state's prehistory, its evidence deserves to be recorded and evaluated.

A concrete marker was set in the ground southeast of the mound at the 1971 N.C. Archeological Society meeting, and this datum point was used in all subsequent excavations. Each excavation unit was a 5x5 foot square. Baulks, with a width of four to six inches, were left between squares. Some of these baulks were later reduced because of structural unsoundness or to free bones partly within the baulk area.

Most of the work reported here was done by students of archeology at St. Andrews Presbyterian College and Pembroke State University. For the archeology classes taught by Dr. David A. McLean in 1973 and 1974, three five-hour days of fieldwork were scheduled each semester. In the fall of 1973, seven teams were from St. Andrews and two from Pembroke. In the spring of 1974, there were six teams from St. Andrews and one from Pembroke. All six teams during the fall of 1974 were from St. Andrews.

A team consisted of four or five students, with one serving as recorder. Recorders were responsible for sketching and measuring the placement of all features, artifacts and other items within their team's excavation unit. The equipment of each team consisted of two shovels, a framed screen for sifting soil, and a tool kit including a bucket, root cutters, trowels, small brushes, folding rule, tape measure, line level and string. Because much of the area had been disturbed previously, shovels were used to remove upper layers of soil. As changes occurred in soil coloration, workers switched to trowels. When bones were encountered they were cleaned with brushes and strengthened with lacquer before removal from the ground. Soil was sifted through screens with a one quarter inch mesh.

**STRATIGRAPHY**

In 1971 when the North Carolina Archaeological Society visited the site, the "mound" was more concave than convex, except for the ring of soil thrown outwards from a central point (Fig. 2). Fifty years ago, according to a Red Springs resident, it was in fact a mound, some two and a half to three feet high and circular in form. Even at that time, however, it was already "trenched every which way" (McConaughey 1979).

It is not known whether the mound was originally natural or artificial. Reasons for lack of a profile or other corroborative material to settle this point are given below. That the site is a burial mound is beyond dispute, in view of the large quantities of human bone.

The changes in soil composition followed a definite sequence, although earlier disturbances had caused a great deal of mixture and variation in the depth of occurrence.

-36-
The first stratum consisted of three to nine inches of humus and dark soil. The second stratum was composed of light-colored sand, variously described in field notebooks as white, yellow, tan, or gray. Where measurements were obtained, stratum 2 was found to be from six to thirty inches below ground surface. There was a tendency for the yellow-brown sand of stratum 2 to become coarser in texture and shade into an orange color with increasing depth. This occurred at a depth between 13 and 30 inches, and was designated as stratum 3. However, in the southwest corner of the excavation (N100W145 and N105 W145) "loose yellow sand" continued to depths of 36 and 18 inches, respectively. The yellow sand of stratum 2 was mixed with red clay in squares N105W105 (16 to 35 inches) and N110W110 (18 to 22 inches). In N95W105, a sterile layer of red clay was found to extend from 23 to 29 inches below the ground surface.

An unsuccessful attempt was made to draw a profile of the excavation. This was not possible, because stratigraphic information in the field notes was fragmentary or nonexistent, and profiles were not recorded for the squares excavated. The incompleteness of stratigraphic information and the amount of previous disturbance make consideration of the various types of data according to their vertical distribution hazardous. However, measurements from the original ground surface are given where known, in case it is possible to perceive meaningful relationships between artifacts, features and burials in the horizontal dimension.

CONTENTS OF THE MOUND

Previous disturbance of the mound was apparent from the numerous potholes and from the presence of charcoal and small bone fragments both on the surface of the ground and throughout the excavated soil. While the majority of the bone was identified as human, animal bone was present also. Deer, squirrel, rabbit, turtle, and birds were represented (Applegate 1970).

Burials

N105W145 The top 8-10 inches of dark gray soil contained a mixture of small fragments of charcoal and bone, particularly in the northwest corner of the square. At a depth of 18 inches, a concentration of bone and charcoal was encountered in the southern portion of the square. More than half of the bone was charred, suggesting cremation. The bones were in very poor condition, but their placement indicated that the head orientation was toward the north. The charcoal-bone configuration extended approximately ten inches horizontally, and the soil below it was sterile (Fig. 4).

N110W120 A poorly preserved burial was overlaid by charred planks. The upper surfaces of the planks were charred and somewhat deteriorated, but the lower sides appeared to be split. The planks were uncovered 17 inches below the surface of the ground, and the bones were situated beneath them at a depth of 25 to 28 inches (Fig. 5). Long bones were
Figure 4: Burials and other features (1 inch = 10 feet).

B = Burial
F = Feature
* = Heavy bone concentrations
found in proximity to the jawbone and teeth, perhaps indicating flexed burial.

**N110W125** This square showed signs of disturbance, as teeth and bone fragments were found in the first six inches of dirt screened. The burial noted in N110W120 continued into this square, as long bones and fragments of cranium were found at depths of 25 to 28 inches. Bone fragments and charcoal were associated with a large, dark stain covering nearly the entire square at 34 inches below the surface of the ground. Multiple burials were proposed, from the quantity of bone recovered and by the presence of teeth, bone, and charred wood to a depth of 40 inches.

**N115W120** Bone fragments and charcoal appeared in the northern one-third of the square, beginning at a depth of nine inches and being widespread at a depth of 19 inches below the surface of the ground. Despite the large quantities of charcoal, less than three grams of the 322 grams of bone recovered were charred. In the northwest corner of the square, two pieces of charred wood were found at a depth of 21 inches, 17 inches from the north wall, and 18 inches from the west wall of the square. Because charred planks overlaid bones in square N110W120, it was thought these charred wood fragments might similarly indicate a burial. Bone fragments were too small and scattered, however, to show a definite burial.

**N115W130** A heavy concentration of bone was found in the central part of this square at a depth of 18 to 33 inches. Portions of rib, long bone, cranium and teeth were identified, but they were found in no apparent order. A modern aluminum trash can lid was uncovered at a depth of 20 inches below the surface of the ground. Although this lid was clearly intrusive, the shape of the disturbed area was not observed or recorded.

**N120W140** In the upper levels, bone fragments and charcoal were scattered throughout the square. At a depth of 25 inches, a soil discoloration in the center of the square indicated the top of a fire pit, containing charcoal and burned bone fragments. This pit was approximately 16 inches in diameter and 19 inches deep, with the sides expanding to a depth of 30 inches and then narrowing to a diameter of 6 by 18 inches at a depth of 41 inches. With increasing depth, burned bone and charcoal concentrations were observed to shift from the center of the square toward the northeast quadrant. One jawbone fragment appeared to be that of a child. The quantity of bone suggested a multiple burial, probably a cremation.

**N120W145** The mixture of charcoal and bone noted in N120W140 was also present in N120W145. While charcoal was mixed in the soil around the bones, only a few bones showed signs of charring. Portions of cranium in fair condition were located in the northeast corner at a depth of 20 to 24 inches. When the baulk between N120W145 and N120W140 was removed, long bones were found 24 to 27 inches below the ground surface. The large quantity of bone, and the lack of apparent order, because of its presence for 10 inches vertically may indicate bundle burial, perhaps of many people.

-39-
Figure 5: Profile of Burials and Features  ($\frac{1}{2}$-inch = 1 foot).
N125W125 The heaviest concentration of bone at the mound was noted in this square. Tiny fragments were first recorded at a depth of 8 inches and continued to a depth of 25 inches. The only pattern which emerged was a change in distribution areas at different depths. Between 8 and 11 inches below ground level, the bone was located in an oval area 4x3 feet in the central portion of the square, shifting to a 3x3 foot area in the southeast portion of the square between 11 and 16 inches. Another concentration of bone was found within a 3 foot area in the south central portion of the square at depths between 18 and 25 inches. Again, multiple burials appear likely from the wide distribution of teeth, cranium fragments and long bones, both horizontally and vertically.

N125W140 A concentration of bone was found in the southeast quadrant of the square at a depth of 14 inches below ground level. Pieces of charcoal were mixed with the bone, though most of the bones did not appear charred, and were in a fair state of preservation. Jawbone, teeth, and cranium fragments were located in the southeastern portion of the square to a depth of 31 inches, and in the southwest corner at depths from 31 to 36 inches. A large, non-human bone was noted in the northwest corner of the square at a depth of 25 inches. Beneath this was another concentration of bone at a depth of 31 inches, including long bones, cranium, and jawbone.

Field notes for squares N105W125, N105W130, N105W135, and N115W140 are missing or do not afford any explanation for the fairly large quantities of bone found there.

Other Features

Except for the burials and concentrations of bone and charcoal mentioned in the previous section, few features were noted (Fig. 5).

Feature #1-N105W105 Underlying a layer of charcoal and burned hickory nut shells (12-20") was a pit containing charcoal, charred hickory nut shells, pebbles, and small flakes of quartz and rhyolite. The outline of the pit was oval, approximately 9 by 14 inches. Beginning at 28 inches below the surface of the ground and continuing to 54 inches, the pit was 26 inches deep (Fig. 6).

Feature #2-N100W120 Gordon's field notes (Jan. 15, 1972) noted a possible post mold with a diameter of 5 1/2 inches and a semicircular "feature." Both appeared 18 1/2 inches below the ground surface. The semicircular "feature" measured 21 inches across and extended 12 inches from the east wall of the square.

Feature #3-N100W140 Gordon's field notes (June 24, 1971) report four post molds, originating at depths from 14 to 18 inches below the ground surface. Dimensions of the molds were 2x2 1/2", 2x2 3/4", 2x2", and 1 1/2x2". The distances between the first three marks were noted as 4" and 3 3/4" respectively. The notes state that "the three features seem to be in some circular position in relationship to each other" (Gordon 1971). A possible pit was reported from the same square, but the description is incomplete.
Keel mentions two features (N100W115 and N100W130) and a pit (N100W120) but says that Features 1 and 2 are backfilled pits, originating from the surface (Keel 1970: 19).

CULTURAL REMAINS

Ceramics

Of the ceramics found at the Buie Mound, pottery sherds will be discussed first and then tobacco pipes.

Four types of surface finishes were found on the 614 sherds recovered: 79% were plain; 9% were fabric impressed; and less than 1% of the total were cord marked and check stamped, respectively (Table 1).
TABLE 1

POTTERY SHERDS CLASSIFIED BY SURFACE FINISH

<table>
<thead>
<tr>
<th>Surface finish</th>
<th>No. of sherds</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain</td>
<td>486</td>
<td>79.15</td>
</tr>
<tr>
<td>Fabric impressed</td>
<td>55</td>
<td>8.96</td>
</tr>
<tr>
<td>Cord marked</td>
<td>6</td>
<td>.98</td>
</tr>
<tr>
<td>Check stamped</td>
<td>4</td>
<td>.65</td>
</tr>
<tr>
<td>Corroded &amp; worn</td>
<td>63</td>
<td>10.26</td>
</tr>
</tbody>
</table>

After the sherds were separated by surface finish, paste composition was examined. This second sorting resulted in four categories on the basis of paste and surface finish. Using South's taxonomy (1977), the three previously described series or types are identified by name, the remaining type by its attributes (Table 2). These are discussed in order of frequency.

TABLE 2

SHERDS CLASSIFIED BY SERIES (TYPE) AND VARIETY

<table>
<thead>
<tr>
<th>Series (type)</th>
<th>Variety</th>
<th>No. of sherds</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand Tempered Burnished Hanover</td>
<td>Plain</td>
<td>486</td>
<td>79.15</td>
</tr>
<tr>
<td></td>
<td>Fabric impressed (55)</td>
<td>58</td>
<td>9.45</td>
</tr>
<tr>
<td></td>
<td>Cord marked (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deptford</td>
<td>Check stamped</td>
<td>4</td>
<td>.65</td>
</tr>
<tr>
<td>Cape Fear</td>
<td>Cord marked</td>
<td>3</td>
<td>.49</td>
</tr>
<tr>
<td>(Unidentified worn sherds)</td>
<td></td>
<td>63</td>
<td>10.26</td>
</tr>
</tbody>
</table>
The horizontal and vertical distributions of each type are shown in Table 3. The levels in Table 3 and Figures 9-12 are arbitrary horizontal segments.

TABLE 3
HORIZONTAL DISTRIBUTION OF CERAMIC TYPES

<table>
<thead>
<tr>
<th></th>
<th>Cape Fear</th>
<th>Deptford</th>
<th>Hanover</th>
<th>Sand Tempered Burnished Plain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 (1-6&quot;)</td>
<td>1(33.3%)</td>
<td>---</td>
<td>15(25.9%)</td>
<td>172(35.4%)</td>
</tr>
<tr>
<td>Level 2 (7-12&quot;)</td>
<td>2(66.6%)</td>
<td>2(50%)</td>
<td>20(34.5%)</td>
<td>81(16.7%)</td>
</tr>
<tr>
<td>Level 3 (13-18&quot;)</td>
<td>---</td>
<td>1(25%)</td>
<td>6(10.3%)</td>
<td>94(19.3%)</td>
</tr>
<tr>
<td>Level 4 (19-30&quot;)</td>
<td>---</td>
<td>1(25%)</td>
<td>11(19.0%)</td>
<td>46(9.5%)</td>
</tr>
<tr>
<td>Location unknown</td>
<td>---</td>
<td>---</td>
<td>6(10.3%)</td>
<td>93(19.1%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3</td>
<td>4</td>
<td>58</td>
<td>486</td>
</tr>
</tbody>
</table>

Sand Tempered Burnished Plain (Fig. 7) Over 79% of the sherds at the Buie Mound belong to this classification. In addition to the sand temper and burnishing as a surface finish, this type is uniformly characterized by a compact paste with a hardness of 2.5 to 3. Texture of the paste is generally clayey, sometimes gritty. Sherd thickness ranges from 5 to 10.5mm, with the average thickness around 7.5mm. Most sherds appear to be from large bowls, but one base is from a flat-bottomed vessel.

The greatest variation is in color, form, and decoration. Half of the sherds are yellow-brown to gray in color. Twenty sherds are incised with a series of three or four parallel lines and semicircles. Eight others are crudely incised with curved lines. Fingernail marking appears on eight other sherds. One hundred sixteen sherds (23.9%) are red in color, and represent at least two vessels, one of them a conical bowl with a pointed base. The larger bowl is decorated with a row of reed punctations below the rim. No rimsherds of the conical bowl were found. Reed punctations are also found on plain sherds which are brick-orange in color. Thirty-five percent of the Sand Tempered Burnished Plain sherds came from the top six inches of soil excavated.

Hanover (Fig. 8) This sherd tempered pottery type from the Carolina coast (South 1976: 16) is similar to a Georgia ceramic series known as Wilmington (Caldwell 1952: 316). At the Buie Mound, the Hanover series is represented by 55 fabric impressed sherds and 3 cord marked sherds.
Figure 8: Hanover fabric impressed. A, exterior. B, interior.
Figure 9: Distribution of Sand Tempered Burnished Plain sherds. (5 provenience unknown)
While all three Hanover cord-marked sherds came from square N130W140, the Hanover fabric impressed sherds were scattered in the western half of the excavation, with the heaviest concentration in the southwestern quadrant (Fig. 10). Table 3 shows the percentage of Hanover sherds is greatest in level 2, while the location for 10% of the sherds was not determined.

Deptford (Fig. 7) All four sherds of this sand tempered type were recovered in the southwest corner of the excavation, two in level 2 and two in level 3. Two varieties of markings appear on the surface: Deptford Linear Check stamped and Deptford Bold Check stamped (Williams 1968: 137-139).

Cape Fear (Fig. 7) Three sherds tempered with sand and crushed quartz particles were identified as Cape Fear cord marked (South 1976: 18). They came from widely separated excavation squares (Fig. 12), one sherd from level 1 and two sherds from level 2.

Pipes In addition to the sherds from pottery vessels, portions of two clay pipes were recovered. The end of a clay pipe stem from an elbow pipe (Coe, personal communication) was found in square N130W115 (Fig. 7). It is made of compact yellow-brown paste resembling that of the Sand Tempered Burnished Plain series. The paste may be untempered, as only a small amount of very fine sand is visible. This stem is from a flared-bowl elbow pipe similar to those of the Pee Dee phase in the Carolina Piedmont (Coe 1952b: Figure 165) and the Pisgah phase in the Appalachian Summit (Dickens 1976: Plate 46).

A second pipe fragment, made from similar paste, is a circular, funnel-shaped bowl with a flattened rim. Found in square N125W125, it is decorated with three incised lines parallel to the rim. A pipe bowl with a similar shape, although lacking incised lines, is illustrated in Holmes (1903: Plate CXXVb), and described as a Southern Appalachian pottery group pipe from a burial mound.

Stone

The stone artifacts consist of projectile points, drills, biface fragments, and other individual items. They are illustrated in Figure 13 and their distribution is shown in Figure 14.

The largest category of stone artifacts consisted of projectile points. The four triangular points all came from the first 6-inch level excavated. Two fit the description of Caraway Triangular points while the three smaller points have measurements corresponding to Clarksville small triangular points (Coe 1964: 49, 112). The smallest triangular point is of quartz, the others of rhyolite.

Two other projectile point types in the Carolina Piedmont sequence were present: a small Guilford point and a Stanly point (Coe 1964: 35, 43). A LeCroy Bifurcated Base point (Broyles 1971: 69) came from an undetermined location in square N100W110. Broken portions of five other projectile points include two distal tips, the mid-section from a thick, narrow blade, and two Morrow Mountain bases (Coe 1964: 37).
Figure 10: Distribution of Hanover fabric marked and cord marked sherds.
Figure 11: Distribution of Deptford sherds.
Figure 12: Distribution of Cape Fear cord marked sherds.
Figure 14: Distribution of projectile points (*) and stone tools (#).
* (A = triangular; B = Guilford; C = Morrow Mountain; D = Stanly; 
E = LeCroy)
# (F = drill; G = bifaces; H = quartz cobble; I = gorget blank; 
J = discoidal; K = pipe; L = lanceolate tool)
Thirty-five pieces of a distinctive gray rhyolite were found in square N120W145, all but eight pieces having a bifacially chipped edge. They appear to be broken sections of quarry blades (Coe 1964: 50), three of which were partially reconstructed by the author. Half a crystal quartz cobble was found in association with these bifaces.

One of the two rhyolite drills is lanceolate and the other has an expanded base (Coe 1964: Figure 43A). A steeply beveled, lanceolate tool with one pointed end may have been a scraper or graver. The quartzite discoidal stone (Keel 1976: 201) has a small pitted depression in each lateral surface. A tabular piece of slate (Fig. 13) appears to be one end of an unfinished expanded-center (Fundaburk 1957: Plate 6) or boatshaped (Keel 1976: 145, Plate 42B) gorget. One fragment of a greenish chlorite-schist (South, personal communication) pipe bowl is decorated with a single line incised below the rim.

Other lithic materials include 30 rock fragments or cores, 13 of which appear to be fire-cracked. Of the 558 chips and flakes recovered, 458 (82.1%) are of rhyolite; 82 (14.7%) of quartz; and 18 (3.2%) of other stone.

Shell

A small conch shell (Dickens 1976: Plate 55) was found on the surface of square N110W140. Wearing of the lower projections and abrasions on the side of the shell (Fig. 13) are indicative of human modification (South, personal communication). All other shell items are beads. The 19 small, spherical columella beads (Dickens 1976: 158-159) made from conch shell are soft and chalky in appearance. Their distribution at the mound is shown in Figure 15.

No artifacts were found in association with the three features (Figure 4) and there was a low correspondence between artifacts and burials. In four squares (N110W120, N110W125, N115W130, and N125W125) a total of 21 Sand Tempered Burnished Plain sherds came from the same levels as burials. The only other pottery type with a location from the same square and depth as a burial was one Hanover fabric-impressed sherd from square N120W145.

Several of the stone artifacts appeared to be associated with burials. These were the chlorite-schist pipe fragments (N115W130); the Guilford projectile point (N120W140); and the quarry blades and quartz cobble (N120W145). While four of the nineteen columella shell beads are from squares in which burials were found, three of the four beads came from the top six inches excavated, and the location of the fourth bead is unknown.
Figure 15: Distribution of columella shell beads.
DISCUSSION

Artifacts from the Buie Mound

Despite previous disturbances at this site—a characteristic shared with a majority of the other sand burial mounds described in the next section—the artifacts provided clues to the temporal period at which this site was occupied. It is doubtful if much reliance can be placed on stratigraphy at this site, so the following discussion is based largely on typology.

The earliest evidence of human presence is the LeCroy Bifurcated Base projectile point (Broyles 1971: 69) which belongs to the Early Archaic period in Alabama (DeJarnette et al. 1962: 60) and West Virginia (Broyles 1971: 69), where it is dated around 6300 B.C.

The Middle Archaic period (Willey 1966: 250) is represented by projectile points from three separate cultural phases. In the Carolina Piedmont, the Stanly occupation is estimated at 5000 B.C. (Coe 1964: 54). This is followed by the Morrow Mountain and Guilford phases, which span the time after 5000 B.C. to about 3000 B.C. (Willey 1966: 258-259).

The stone pipe bowl fragment was made from chlorite-schist, a material favored during Middle and Late Woodland times (Coe 1952a: 307-308) in Piedmont North Carolina.

Four of the six projectile points are small triangular points, characteristic of the Late Woodland and Historic periods (Willey 1966: 284). Interestingly, their small size suggests a closer relationship to the Roanoke-Clarksville-Hillsboro tradition of the northern Carolina Piedmont than to the Uwharrie-Dan River-Caraway tradition (Coe 1964: 49, 112) of the southern Piedmont.

The other stone artifacts are less precise time indicators than the projectile points. Discoidal stones, often classified as gaming stones (Keel 1976: 204), appear throughout the United States in contexts back to the Archaic period (Brennan 1975: 113). Elliptical or expanded-center stone gorgets have a wide distribution in both time and space (Coe 1964: 115). Brennan (1975: 161) notes that, beginning with Woodland times, gorgets were increasingly made of shell rather than stone. However, stone gorgets of the shape found at the Buie Mound have been reported in Woodland contexts from Western North Carolina (Keel 1976: 200), Alabama (Fundaburk 1957: Plate 6), West Virginia (McMichael 1963: Plate 25A), and Maryland (Wright 1973: Figure 12).

Conch (Busycon) shells are reported from Late Archaic levels in the mid-south and continue through Middle Woodland to Mississippian and Late Woodland times (Griffin 1967: 180, 190). Beads made from the columns of conch shells are found with burials of the Pee Dee phase in the Piedmont (Dickens 1976: 158) and the Pisgah and Qualla phases in western North Carolina (Keel 1976: 151-153).
Early ceramic series or types at the Buie Mound are represented by only a few sherds, which are probably accidental inclusions, and not indicative of the occupation period here. The Deptford series, with its distinctive check stamped surface finish, belongs to the Early Woodland period, approximately contemporaneous with Adena in the central Ohio Valley (Griffin and Sears 1950). Their presence suggests influence from the south and west, since check stamping did not even figure as a minor surface finish along the northeastern North Carolina coast (Haag 1958: 72), and less than 1% of the sherds from the survey of the southeastern North Carolina coast (South 1976: 47) were check stamped. To the north and west, check stamping appeared on only 4% of the Yadkin series sherds and on less than 2% of the Pee Dee sherds (Coe 1964: 32, 33) at the Doerschuk site in Montgomery County.

An approximate date of A.D. 950 has been proposed (South 1960: 54) for the sand tempered Cape Fear series, largely on the basis of its typological similarity to the Clement series from the Roanoke River basin. Of the three surface finishes reported for the Cape Fear series, only cord marked sherds are found at the Buie Mound. Haag (1958: 109-110) states that cord-marking as a surface treatment moved from a general northeastern direction toward the south and west, with the time depth decreasing toward the south; and that cord marking probably died out as an accepted surface finish before fabric impressing.

The sherd tempered Hanover series was apparently the first ware to reach the state's southeastern coastal area in any large amount (South 1960: 42). Radiocarbon dates of 180 B.C. and 150 B.C. are reported for Hanover fabric impressed sherds from Fort Johnson, South Carolina (South 1976: 41). Hanover series paste is similar to that of the Wilmington series (Caldwell 1952: 316) which closely follows the Deptford period in Georgia. Haag (1958: 69-70) reports clay-grit tempered sherds in his survey of the northeastern North Carolina coast, but does not propose a time horizon for this type of ceramic. A relationship may exist between the sherd tempered Hanover series and the somewhat later Yadkin series from the Carolina Piedmont, as Coe (1964: 32) notes that about 10% of the Yadkin fabric marked sherds contained particles of clay temper.

Unless the Buie Mound was used for burials at two distinct periods of time, the dates obtained for the Hanover series in South Carolina (South 1976: 41) seem too early for the sherd tempered ceramics here (Fig. 16). While some sherds are from large cooking pots (Fig. 6), the globular form of the smaller vessels come into use at a later time (Coe personal communication). In this burial mound context, it would appear that fabric impressing as a surface treatment and the use of sherd temper continued into Late Woodland times (Coe personal communication).

Plain surface finishes are present in fiber tempered and clay tempered Southeastern ceramics from the beginning (Brennan 1975: 205). For the southern North Carolina coastal area, it is estimated (South 1960: 55) that plain surface finishes became a dominant type approximately 1000 years ago, and probably continued into the period just prior to white contact. Burnishing as a manufacturing technique is also a late appearing trait, found on protohistoric and historic ceramics (Caldwell 1952: 318; Coe and Lewis 1952; South 1977).
a. Cape Fear Cord marked

b-g. Hanover Fabric marked

h-t. Sand tempered Burnished Plain

Figure 16: Rim profiles, full scale. (Note: Interiors left)
Traits noted on Buie Mound Sand Tempered Burnished Plain sherds seem to have their greatest affinity with ceramics of the Savannah and Irene (Lamar) periods in Georgia (Caldwell 1952: 318-320; Reid 1967: 83) and the Pee Dee series of Piedmont North Carolina (Reid 1967). Similarities to the first-mentioned ceramics include careful finishing of the interior (Caldwell 1952: 317), burnishing (Caldwell 1952: 318), vessel forms (Caldwell 1952: Figures 172-173), rows of reed punctations below the rim (Caldwell 1952: 319; Reid 1967: 68), and incising. The motif of parallel lines and circles (Fig. 5F, G) appears on Irene Incised (Williams 1968: Figure 31C) and Lamar Incised (Griffin 1952: Figure 175).

In the Carolina Piedmont, the cognate Pee Dee series is only rarely incised (Reid 1967: 69). Reed punctations are found on Pee Dee pottery, although at Town Creek these punctations evidently appeared only in combination with nodes (Reid 1967: 24). Two traits shared by the Pee Dee and Sand Tempered Burnished Plain sherds are lip notching and small vertical incisions (fingernail marking?) along the shoulder of the vessel (Reid 1967: 26). Lip notching is also found on ceramics of the Hillsboro (Coe 1952a:311) and Dan River (Coe and Lewis 1952) series. Sand Tempered Burnished Plain paste is most like that of Pee Dee and Caraway ceramics (Coe personal communication).

In view of the surface finish and decorative traits present at this site—burnishing, incising and reed punctation—the absence of complicated stamped pottery is unusual. This is particularly true since complicated stamped ceramics are found in the Savannah, Irene, and Pee Dee series, whose similarities to Sand Tempered Burnished Plain have just been considered.

Geographically, the Buie Mound is in an area subject to the influences of both the Northeastern Woodland and Southern Appalachian Mississippian cultural traditions (South 1972). Complicated stamped pottery is also absent from the nearby McLean Mound in Cumberland County (MacCord 1966: 32), which has an artifact inventory very similar to that from the Buie Mound.

As well as being located on the periphery of Southern Appalachian Mississippian culture, adoption of certain ceramic traits and rejection of another generally associated with them suggests cultural preferences and affiliations as well as strictly geographical considerations.

Except at the Town Creek ceremonial center in Montgomery County, an examination of several North Carolina Piedmont pottery series reveals a preference for plain rather than complicated stamped surface finishes. At Town Creek, 71% of the Pee Dee series sherds were complicated stamped (Reid 1967: 3). Approximately ten miles away at the Doerschuk site, complicated stamped sherds accounted for only 32.8% of the Pee Dee sherds, 64.3% being plain (Coe 1964: 33). The Caraway series at the same site was represented by 58.7% plain and 14.7% complicated stamped sherds (Coe 1964: 34). In the Dan River series, 22.7% of the sherds from the type site in Rockingham County were plain, and less than 1% were complicated stamped (Coe and Lewis 1952).
The Sand Burial Mound Complex

Burial mounds are found throughout the Eastern Woodland area, and are considered by some (Willey 1966: 267) as a characteristic of the Woodland tradition. In the Southeastern United States, this complex is common to the coastal regions (MacCord 1966: 45) and may represent a north to south cultural movement (South 1972).

Sand burial mounds are found on the coastal plains of North Carolina (Holmes 1883; Peabody 1910; MacCord 1966; South 1966); South Carolina (Moore 1898; Flannery 1943); Georgia (Moore 1898; Caldwell & McCann 1941; Caldwell n.d.); and Florida (Moore 1894; 1903). The boundaries of the sand burial mound region, especially to the west, have not been completely delineated. In the northeastern part of North Carolina, burial mounds are notably absent from the John H. Kerr Reservoir basin of the Roanoke River (Miller 1962: 22).

MacCord (1966: 36-39) lists the characteristics of 13 North Carolina coastal plain burial mounds. All of these mounds were circular in outline, low in height, situated on sandy ridges, and made of local sand. Two-thirds of the mounds had a diameter greater than 25 feet and half of them contained bundle burials and cremations. The Buie Mound corresponds to this group in physical structure, burial methods, and artifact types.

In South Carolina and Georgia, burial mounds of the Wilmington and Savannah I periods (Caldwell 1952: 317-318) are comparable in structure: circular, from one to four feet high, and 75 to 150 feet in diameter. The earliest small burial mounds on the coast were built during the Wilmington period (Caldwell 1952: 317). They usually contained a central burial pit or deposit of several cremated individuals, although other burials—flexed, bundle, or extended—might be found beyond the center. Infrequent grave offerings consisted of deposits of hematite or mica, a bone awl, a few shells, or a pottery vessel.

Savannah I burial mounds were similar to the preceding Wilmington mounds with a few new traits: intentionally broken and scattered pottery vessels were more frequent with burials than in Wilmington times. At some sites, the presence of almost completely undecorated pottery was noted as suggestive of a preferred mortuary type (Caldwell 1952: 317). Shell vessels were occasionally found with burials also. The subsequent Savannah II period showed a continuity of burial customs first used as early as the Wilmington period (Caldwell 1952: 318), with burial offerings relatively more abundant than before. Plain sherds were similar to the Savannah I plain, although some vessels were more highly burnished. The Savannah II period is distinguished by the appearance of two new pottery varieties: check stamped and complicated stamped.

Comparison With Other North Carolina Sand Burial Mounds

Sand burial mounds have been reported from a number of counties in the North Carolina coastal plain. Table 4 compares characteristics of several sand burial mounds for which information is available. This listing should not be regarded as complete, either as to mounds or counties.
The Buie Mound (Robeson County #1) is in the first column. Robeson County #2 is the mound east of Red Springs which Hamilton McMillan examined in 1882 (Holmes 1883). In Cumberland County, Mound #1 is the McLean mound northeast of Fayetteville, excavated from 1960-1962 (MacCord 1966). Cumberland County #2 is located near Hope Mills (Peabody 1910) and Mounds #3 and #4 are about ten miles south of Fayetteville (Holmes 1883).

The Cameroun Mound in Harnett County was studied by Charles MacCauley between 1920 and 1930 (MacCord 1966: 46-47); and Stanley South (1966: 59-61) described work at the McFayden Mound in Brunswick County. The four mounds in Duplin County (#1 southwest of Kenansville, #2 and #3 east of Hallsville, and #4 near Sarecta post office) were investigated by J. A. Holmes in the 1880's as were a mound west of Clinton in Sampson County and another south of Raleigh in Wake County (Holmes 1883).

Table 4 shows a higher degree of correlation between physical features of the mounds and types of burials found than to artifact types represented. The most complete reports are from work done in the last 15 years, suggesting that the blanks on Table 4 may be as much a function of reporting as the actual absence of the artifact or trait under consideration.

All mounds were circular in form, all but one was built on a sand ridge, and only three of the 14 were less than 25 feet in diameter. Multiple burials were found at 13 of the 14 mounds, but single burials at only 3 mounds. Types of burial reported from the mounds were: bundle burials, 7; cremations, 7; flexed burials, 6. Incomplete burials were reported from nine mounds.

Pottery was found at eight mounds. Comparison is difficult, as only two other site reports specifically mention the presence of plain and fabric marked sherds. Descriptions such as "monotonously and rudely decorated fragments" of pottery from the Hope Mills mound (Peabody 1910) in Cumberland County and "generally scratched and cross-scratched" sherds from Mound #1 in Duplin County (Holmes 1883) are less than satisfactory.

All of the sherds from the McFayden mound in Brunswick County (South 1966: 60) were of the Cape Fear Fabric impressed type. At the McLean mound (MacCord 1966: 32-33) all sherds were sand tempered; 84.5% of the sherds were fabric impressed, and only 15.5% were smooth ware. From the description, these fabric impressed sherds might belong either to the Cape Fear series (South 1976: 18) or the Tooled Interior (South 1976: 22) series. In a survey of the southeastern coast of the state (South 1976: 47), 36% of the Cape Fear series and 50% of the Tooled Interior series were fabric impressed. The temporal position of the Tooled Interior ware in the coastal sequence has not been established, but the estimated date of A.D. 950 for the Cape Fear sand tempered series (South 1960: 54) compares favorably with the radio-carbon date of A.D. 1000 obtained from the McLean Mound (McCord 1966: 44). Sherds from the McLean mound (MacCord 1966: Plate V) display similarities to Buie Mound ceramics in fabric impressed ware vessel forms and the use of punctate decoration on the smooth ware. The relative frequencies of
Table 4. Comparison of N.C. Burial Mound Cultural Traits and Artifacts.

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<tr>
<th>TRAIT &amp; ARTIFACT LIST</th>
<th>Robeson Co. #1</th>
<th>Belew Mound</th>
<th>Cumberland Co. #1 (McLean)</th>
<th>Cumberland Co. #2 (Rose Mill)</th>
<th>Cumberland Co. #3</th>
<th>Robeson Co. #2 (Mckean)</th>
<th>Harnett Co. (Cameron)</th>
<th>Sampson Co.</th>
<th>Duplin Co. #1</th>
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fabric impressed to plain sherds, however, would suggest an earlier occupation for the McLean mound than for the Buie Mound.

Small triangular projectile points, indicative of a Late Woodland to Historic period occupation (Willey 1966: 284-285) are reported from less than half (5) of the burial mounds listed in Table 4. With the exception of deer antler projectile points found at the McLean mound in Cumberland County (MacCord 1966: 27-28), the Buie mound was the only site with types of projectile points other than triangular. No other item in the stone tool inventory is found at more than three mounds, while the Buie Mound is the only one from which a discoidal stone is reported.

Tobacco pipes of stone were found at five sites, and clay pipes at four sites. There was considerable variation in form. The stone pipes from the Hope Mills were biconical (Peabody 1910). Seven of the ten stone pipes from the McLean mound (MacCord 1966: 21) were platform pipes or bent tube pipes with flattened stems. At the Cameroun mound (MacCord 1966: 46) a large platform pipe of steatite and fragments of a small platform pipe were found, as well as a 2½ inch trumpet-shaped pipe. This last specimen might resemble the funnel-shaped clay pipe found at the Buie Mound.

A majority of the pipes from the mounds listed in Table 4 were decorated with geometric designs. At the Buie Mound, the chlorite-schist pipe bowl has a single line incised below the rim. The funnel-shaped clay pipe is decorated with a series of three parallel lines incised horizontally below the rim of the pipe bowl, similar to the decoration on stone pipe #8 from the McLean mound (MacCord 1966: 26).

Shell beads were present at seven mounds: marginella beads at three; disk beads at two; and cylindrical beads at two. At two other mounds the shell beads were not identified as to type. Bone beads were present twice, and gorgets of stone or shell were found at three sand burial mounds.

SUMMARY AND CONCLUSION

The Buie Mound belongs to the complex of sand burial mounds found along the southeastern Atlantic coast, and corresponds to mounds in North Carolina, South Carolina, and Georgia, with regard to physical structure, burial methods, and artifact types.

Stone and ceramic artifacts reveal a long Indian occupation of the area, spanning approximately seven thousand years. This is shown by individual projectile points from the Early and Middle Archaic periods; a few pottery sherds characteristic of the Early and Middle Woodland periods; and projectile points and pottery from the Late Woodland period.

The Buie Mound is situated in a region described as the "Carolina Lowlands Area of Cultural Amalgamation" (South 1972), subject to influences both from the northeastern Woodland culture and the Southern Appalachian Mississippian culture. A mixture of traits is evident here. With a broad selection of ceramic traits to choose from, the predominant ceramic type
which emerged was Sand Tempered Burnished Plain, decorated with incising and reed punctation. Complicated stamped pottery was conspicuously absent. Fabric impressing continued to be used as a minority of surface finish, although its combination with sherd tempered paste raises some questions.

Based on the preponderance of Late Woodland artifacts and the absence of European items, a time contemporary with the Pee Dee and Lamar phases is postulated for the occupation of the Buie Mound. Only two other sand burial mounds in the area have been studied and reported on since 1950. Comparisons with them indicate the Buie Mound is later in time than either the McFayden (South 1966) or McLean (MacCord 1966) mounds.
APPENDIX

VEGETATION AT THE BUIE MOUND (Radford et al. 1964)

American holly
bitternut hickory
bitter-weed
blackberry
black gum

black oak
bladderwort
bracken fern
bur-reed
butterfly weed

cat-briar
cat-tail
cinnamon fern
dodder
dogwood
duckweed
dwarf blueberry
dwarf dandelion
dwarf or winged sumac
elderberry

elephant's-foot
evening primrose
fetter-bush
goat's rhue
goldenrod

hawkweed
heart leaf
high bush blueberry
inkberry or bitter gallberry
large or sweet gallberry

lizard's tail
loblolly pine
long-leaf pine
mistletoe
mockernut hickory

Illex opaca Aiton
Carya cordiformis (Wang.) K.
Helenium amarum (Raf.)
Rubus cuneifolius Pursh
Nyssa sylvatica Marshall
Quercus velutina Lam.
Ultricularia sp., L.
Pteridium aquilinum (L.) Kuhn
Sparganium americanum or Sparganium cholocarpum
Asclepias tuberosa L.
Smilax rotundifolia L. and
Smilax auriculata Walter
Typha latifolia L.
Osmunda cinnamomea L.
Cuscuta sp., L.
Cornus florida L.
Lemna sp., L.
Vaccinium sp., L.
Krigia dandelion (L.) Nuttall
Rhus copallina L.
Sambucus canadensis L.
Elephantopsis sp., L.
Oenothera sp., L.
Leucothoe racemosa (L.) Gray and
Lyonia lucida (Lam.) K.
Tephrosia virginiana (L.) Persoon
Solidago sp., L.
Hieracium sp., L.
Hexastylis arifolia (Michaux) Small
Vaccinium atrooccum (Gray) Porter
Ilex glabra (L.) Gray
Ilex coriacea (Pursh) Chapman
Saururaceae cernuus L.
Pinus taeda L.
Pinus palustris Miller
Phoradendron serotinum (Raf.) Johnston
Carya tomentosa (Poiret) Nuttall
muscadine grape
netted chain-fern
New Jersey tea
panicum
partridge pea
paper mulberry
pecan
persimmon
pickerelweed
pin oak
pipsissewa
poison ivy
pokeweed
poor-mans pepper
possum haw
post oak
prickly pear
privet
rabbit tobacco
red maple
St. John's wort
sassafras
sedge
short-leaf pine
southern red oak
sow-thistle
stagger-bush
stinging nettle
styrax
swamp chestnut oak
sweet bay
sweet gum
sweet pepperbush
tag alder
titi
tulip tree
variagted milkweed
water oak
watermeal
white cap moss
white oak

Vitis rotundifolia Michaux
Woodwardia aerolata (L.) Moore
Caenothus americanus L.
Panicum, sp., L.
Cassia fasciulata Michaux
Broussonetia papyrifera (L.) Vent.
Carya illinoensis (Wang.) K.
Diospyros virginiana L.
Pontederia cordata L.
Quercus palustris Muenchh
Chimaphila maculata (L.) Pursh
Rhus toxicodendron L.
and Rhus radicans L.
Phytolacca americana L.
Lepidium virginicum L.
Ilex decidua Walter
Quercus stellata Wang.
Opuntia compressa (Salisbury) Macbride
Ligustrum sp., L.
Gnaphalium obtusifolium L.
Acer rubrum L.
Hypericum sp., L.
Sassafras albidum (Nuttall) Nees
Cyperaceae sp.
Pinus echinata Miller
Quercus falcata Michaux
Sonchus asper (L.) Hill
Lyonia mariana (L.) Don
Cnidostylis
Styrax americana Lam.
Quercus michauxii Nuttall
Magnolia virginiana L.
Liquidambar styraciflua L.
Clethra sp., L.
Alnus serrulata (Aiton) Willd.
Cyrillaceae racemiflora L.
Liriodendron tulipifera L.
Asclepias amplexicaulis Smith
Quercus nigra L.
Wolffia sp., Horkel
Leacobrynum
Quercus alba L.
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