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New Orleans District

RICE AGRICULTURE IN THE RIVER PARISHES: THE HISTORICAL ARCHEOLOGY OF THE VACHERIE SITE (16 SJ 40), ST. JAMES PARISH, LOUISIANA

September 1990

FINAL REPORT

R. Christopher Goodwin & Associates, Inc.
5824 Plauche Street
New Orleans, LA 70123

Submitted to:

U.S. Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

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were undertaken

In 1987, R. Christopher Goodwin & Associates, Inc. undertook archeological data recovery excavations at Site 16 SJ 40, St. James Parish, Louisiana. Based on 1984 archeological testing (Goodwin, Yakubik et al. 1985), the site possessed the quality of significance, as defined by the National Register of Historic Places criteria (36 CFR 60.4). The current historical and archeological investigations were conducted prior to planned revetment construction in the area by the U.S. Army Corps of Engineers, New Orleans District; these investigations formed the basis for a Determination of No Adverse Effect for the site. During site excavation, seven (possibly eight) rice irrigation features, primarily rice flumes (ca. 1850-1890), were recorded, along with a privy, wood refuse, and a granite slab. Historical research related the site to the local and statewide rice industry. Four research issues were considered during the study: rice agriculture in St. James Parish; the study of differences between large and small landholders in the reach; the intrasite arrangement of features; and, site formation and degradation. Through this study, previously unrecorded data about nineteenth century rice irrigation systems in the St. James Parish region were obtained through this study. Keywords: Archeology: Irrigation systems/agriculture: Mississippi River: Wetlands: Land use/history: Channels waterways/ditches; Stratigraphy/profiles. (MM)

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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

September 10, 1990

Planning Division
Environmental Analysis Branch

To The Reader:

The following report represents the final step in meeting the goals of 36CFR800, Protection of Historic Properties, for the Vacherie Site (16SJ40), St. James Parish, Louisiana. The site, a series of late nineteenth century flumes, was found eligible to the National Register of Historic Places in 1984 for its potential to yield scientific data regarding the agricultural and economic history of the lower Mississippi River region. The goals of this study were established in a Determination of No Adverse Effect prepared by the U.S. Army Corps of Engineers, New Orleans District, and accepted by the State Historic Preservation Officer on October 8, 1987, and the Advisory Council on Historic Preservation on January 6, 1988. All data recovery and construction at 16SJ40 are complete.

The resulting study is valuable from three perspectives. First, it presents the results of excavation and data analyses from the Vacherie Site. Second, it presents extensive historical data discussing nineteenth century rice agriculture along the lower Mississippi River, a subject not studied previously from an archeological perspective. Third, these data have been and will continue to be applied as a baseline when determining the scientific significance of similar sites or features found along the Mississippi River in Louisiana.

Carroll H. Kleinhans
Technical Representative

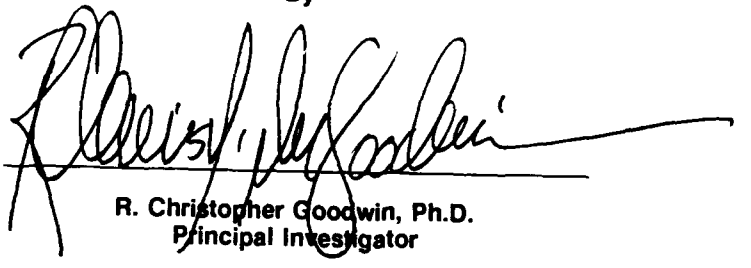
Howard R. Bush
Howard R. Bush
Authorized Representative
of the Contracting Officer

Robert A. Brisson Jr.
Robert H. Schroeder, Jr.
Chief, Planning Division

RICE AGRICULTURE IN THE RIVER PARISHES: THE HISTORICAL ARCHEOLOGY OF THE VACHERIE SITE (16 SJ 40), ST. JAMES PARISH, LOUISIANA

FINAL REPORT

By



R. Christopher Goodwin, Ph.D.
Principal Investigator

With

James M. Wojtala, Lawrence L. Hewitt, and George W. Shannon, Jr.

R. Christopher Goodwin & Associates, Inc.
5824 Plauche Street
New Orleans, LA 70123

September 1990

For

United States Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

Contract No. DACW29-86-D-0093, Delivery Order 04

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CHAPTER I

INTRODUCTION

This report, undertaken pursuant to Contract No. DACW29-86-D-0093, Delivery Order 04, presents the results of archeological data recovery at the Vacherie site (16 SJ 40), in St. James Parish, Louisiana. The work was funded by the United States Army Corps of Engineers, New Orleans District. The Vacherie project area (Figures 1 and 2) is located along the west (right descending) bank of the Mississippi River, between Ranges U-68 and U-10 of the Vacherie Revetment (River Miles 149.5 to 148.6). The site is a 665 m long, historic archeological site and consists of remains from Magnolia and Crescent Plantations at either end of the project area. Multiple small nineteenth century residences and businesses are scattered in between.

This site was located during intensive survey of the Mississippi River bankline in 1984 by R. Christopher Goodwin & Associates, Inc. The survey was undertaken for the United States Army Corps of Engineers, New Orleans District, prior to planned revetment construction along that reach of the river. The results of that study were reported in a document entitled: *Cultural Resources Survey of Five Revetment Items* (Goodwin, Yakubik et al. 1985). Pedestrian survey of the entire project area at 20 m transect intervals, artifact collection, preliminary recordation of features, and profiling of the cut bank to study soil deposition and cultural stratigraphy, were undertaken during 1984.

Prior to field work in 1984, archival research pertaining to the project area was conducted. Historically, 16 SJ 40 was found to comprise a number of small landholdings between Magnolia Plantation at the upriver end of the project area, and Crescent Plantation at the downriver end. These properties initially were occupied in the mid eighteenth century. They continued to be occupied through the Antebellum Period (when sugar was produced) and through the Reconstruction Period (when rice was produced) until the abandonment of the riverfront property when the levee was set back ca. 1917. During the 1984 survey, eight cypress board rice irrigation flumes, and four plank-lined privies were found along the exposed beach at 16 SJ 40. Exposures of sealed cultural deposits (as much as 20 cm thick and 80 cm below the surface) were located intermittently along the bank profile. No early artifacts were found in situ; however, a few ceramic sherds dating from the late eighteenth century were found among redeposited artifacts along the beach. Most artifactual materials dated between the mid and late nineteenth century. One privy yielded artifacts dating between 1846 and 1857. Because of the presence of intact archeological features, and particularly of nineteenth century rice irrigation flumes (a feature type not recorded previously along the Mississippi River in south Louisiana), Site 16 SJ 40 was identified as a significant cultural resource (Goodwin, Yakubik et al. 1985). This site then was determined eligible by the Louisiana State Historic Preservation Officer for listing on the National Register of Historic Places, because of its association with events contributing to broad patterns of history (36 CFR 60.4[a]), and because of its archeological research potential (36 CFR 60.4[d]). The significance of the site was determined to lie in its archeological and historical data (Appendix I).

The limits of the site were defined by bankline expression. The 1917 levee, built by the State of Louisiana, had to be set back in three segments to its current position by the Federal government between 1929 and 1947. These construction phases are responsible for the large borrow pits which are located landward of the abandoned 1917 levee. The river eroded the bankline back to the 1917 levee alignment, leaving a very narrow corridor of nineteenth century deposits between the river and the modern levee. The batture is heavily wooded. The site area sustained impact from both vertical deposition and natural erosion by the river, and from anthropogenic processes. Each high water event inundates the batture, burying the site beneath additional overbank deposits. The most vulnerable area of the batture, the bankline, is subject to scouring during high water, followed by caving as the soils dry out and slump during low water months. Additional erosion is caused when barges tie up to trees on the batture and are thrown into the bankline by wave action from river traffic. In a July 1987 inspection trip to the site, a Corps of Engineers archeologist noted that a backhoe trench, approximately 2 m deep, had been cut through the site perpendicular to the river by an unknown party, possibly the Lafourche Basin Levee District, to drain water from one of the borrow pits behind the site. In sum, the site is at continual risk of erosion from both man and nature

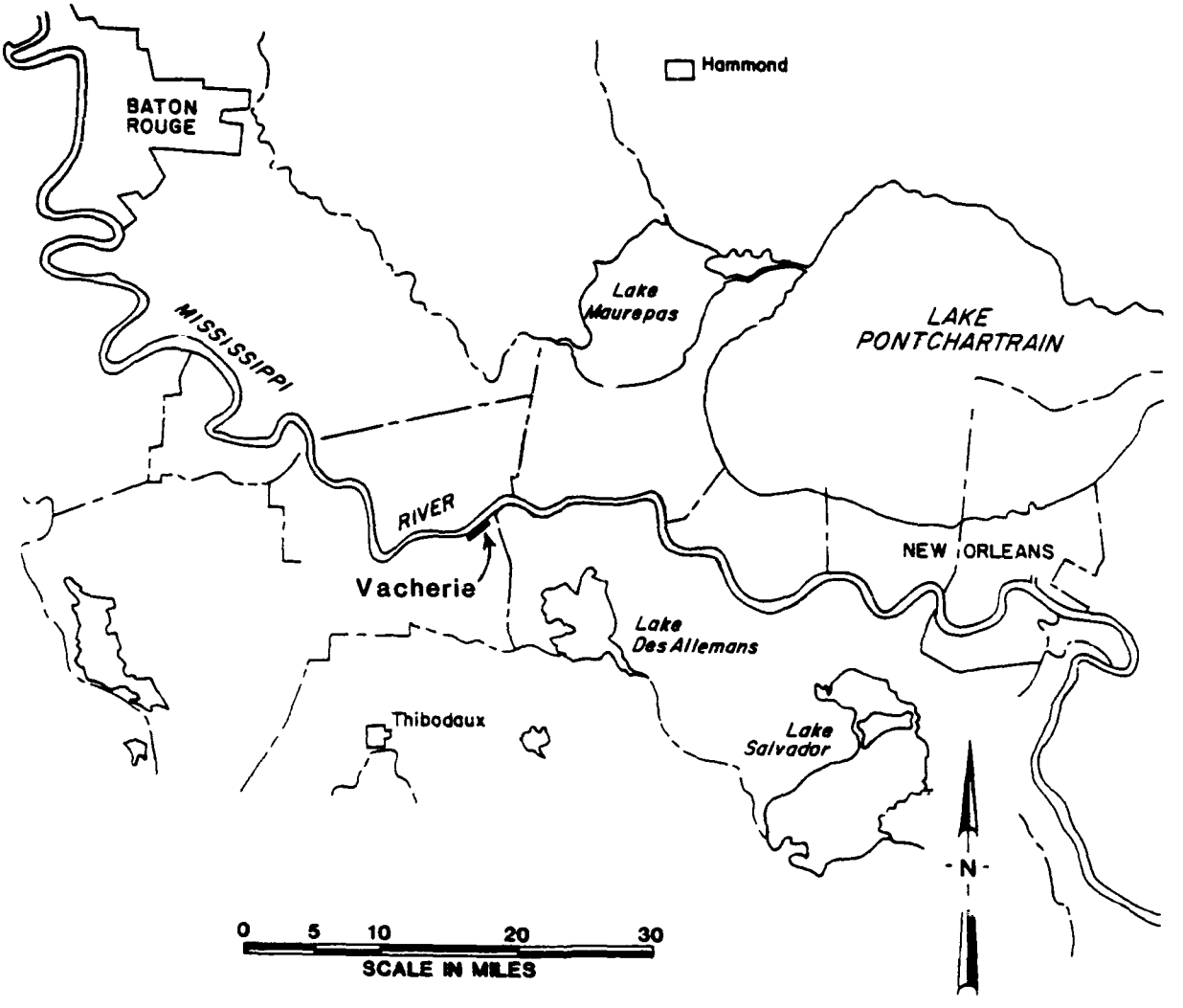


Figure 1. Map of the River Parish Region showing the location of Vacherie Data Recovery project (16 SJ 40), St. James Parish

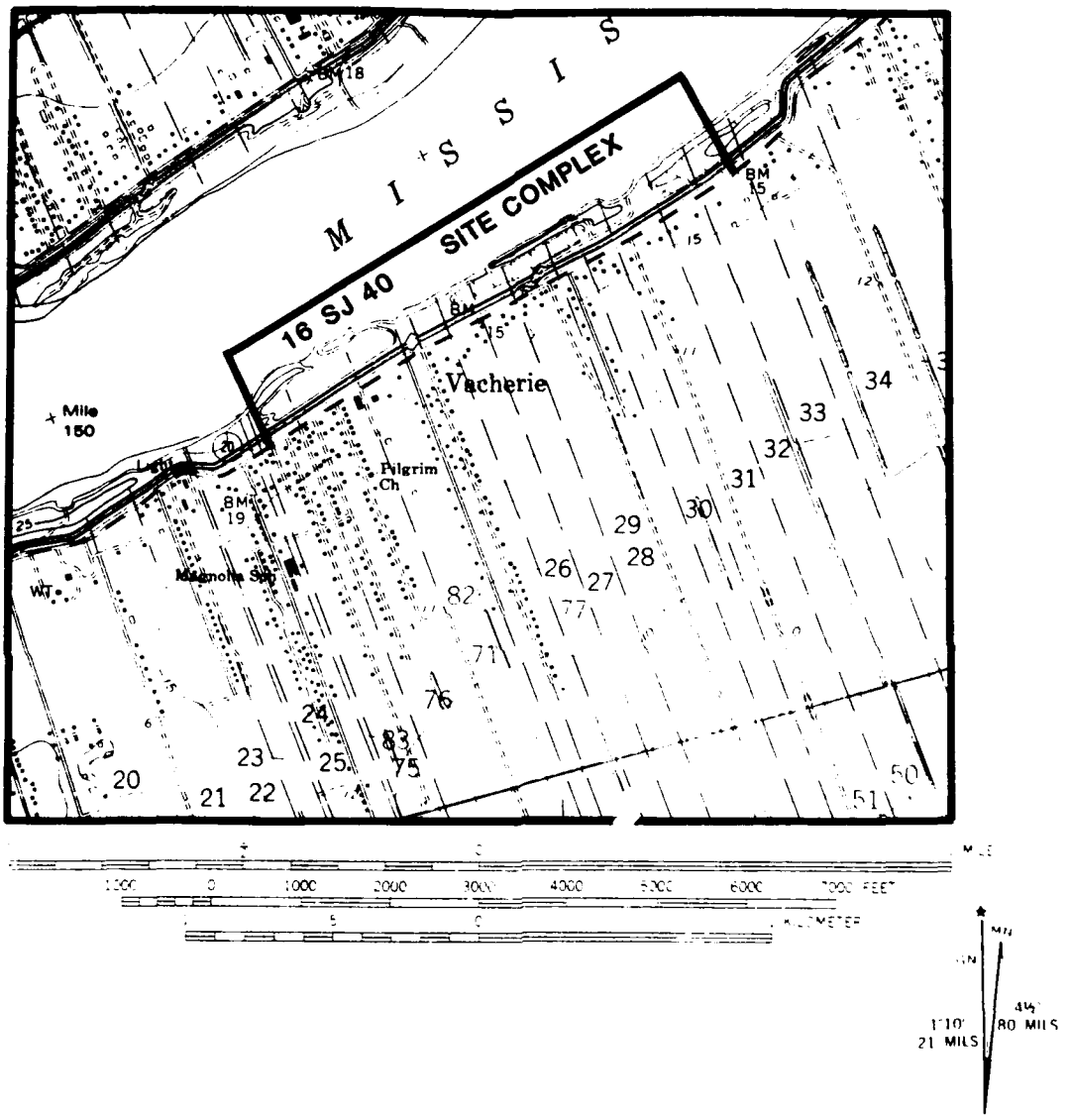


Figure 2. Excerpt from the 1962, photorevised 1980, Lutcher, LA 7.5' quadrangle map showing the limits of the 16 SJ 40 site

(Appendix I).

Because of the potential loss of 16 SJ 40 to revetment construction, the United States Army Corps of Engineers, New Orleans District, the Louisiana State Historic Preservation Officer, and the Advisory Council on Historic Preservation agreed that mitigation in the form of historic archeological data recovery would preserve the scientific value of the site. Since destructive forces, e.g., several forms of erosion, continually were modifying the site area, there was no other appropriate means of preservation at a cost less than data recovery which also would protect the integrity of the Mississippi River levee. Thus, archeological data recovery formed the basis for a Determination of No Adverse Effect (Appendix I).

Planned Revetment Construction

Upon completion of the excavation phase of this study, the United States Army Corps of Engineers, New Orleans District, constructed an articulated concrete mattress revetment across the entire length of the site. The Vacherie Revetment Item (River Miles M-150.3 to 144.3) is part of an on-going channel improvement program designed to halt erosion of the Mississippi River's bankline; to maintain levee stability; and to lessen land loss by maintaining the present channel of the river. Site 16 SJ 40 was located between two previously constructed revetment segments. The first segment was built in 1971. The portion affecting 16 SJ 40 is 1,440 m long. Construction required mechanical clearing of all vegetation from a strip parallel to the bankline no less than 100 ft wide. The bankline was graded to a standard slope, using bulldozers and a barge-mounted dragline. Grading removed as much as 100 lateral ft of the bank edge and 12 vertical ft from the upper bankline. All of the previously noted archeological and agricultural features at 16 SJ 40 were removed during grading. A continuous, articulated concrete mattress then was laid mechanically, from the low water line to a point several hundred feet into the river and along the channel floor. The top of the mattress was covered with riprap to prevent further erosion of the bankline (Appendix VI).

Research Issues

To assure preservation of the data for which the site was found significant, a program of excavation, recordation, data collection, and historical research was designed. Four issues or themes were identified to guide these investigations.

The first of these was the study of nineteenth century rice agriculture in St. James Parish. Archeological research focused on the definition, the construction, the use, and the variability of irrigation features. Both the economic and behavioral implications of rice agriculture were investigated. Archival research focused on the economic context of rice production in St. James Parish, in comparison with similar industries elsewhere within and outside of the region. In pursuit of these objectives, during archeological data recovery the flumes were fully recorded by their dimensions, manner of construction and installation, and by their stratigraphic relationships to their historic features. Perspective drawings and isometric plans of the features were made in the field by a professional illustrator; they are included in this report. Information was sought concerning how rice was grown, how field systems were operated, and how various irrigation and de-watering systems were installed and operated. The impact of flume construction on levee stability was reviewed. Rice flume features at 16 SJ 40 were compared and contrasted with each other and with available published, technical information.

The next two research themes identified pertained to the agricultural history of the project area. The first of these was the study of differences between large and small landholdings in the Vacherie reach. This issue was approached archeologically, archivally, and analytically through the study of artifact variability across the site. Archival research assisted in the determination of whether observed differences, especially in agricultural practices, represent temporal or socioeconomic variation between large and small landholdings. The study included analysis of the intrasite arrangement of features at 16 SJ 40. This included examination of the distribution of rice irrigation systems vis-a-vis landholdings, as well as map and stratigraphic reconstruction of former land use and levee positions. Finally, site formation and degradation processes of necessity were an archeological issue. This was approached through examination of microstratigraphy, and of levee and road building sequences. Deep backhoe trenches were excavated to provide profiles and to expose cultural deposits in cross-section. As a result of these efforts, this report presents what we believe to be the definitive study of rice agriculture in the river parish region.

CHAPTER II

ENVIRONMENTAL SETTING

Introduction

The study area is comprised of batture land, extending from the riverside toe of the existing levee to the river's edge. The batture is an artificial microzone of the natural levee, created by construction of artificial levees. The regional setting of this area is the deltaic plain of the Mississippi River, a low flat area, barely above sea level and dominated by fluvial processes. The deltaic plain is a highly dynamic area that is influenced by interactions between and among geologic, hydrologic, biological, climatological, and anthropogenic processes.

Riverine Processes

The deltaic plain of the Mississippi River can be divided into two parts--the upper and lower deltaic plains. The lower deltaic plain is that portion of the delta that encompasses river/marine interactions. It extends landward from the low tide mark to the limit of tidal influences (Coleman and Prior 1983:148). The lower deltaic plain usually contains numerous distributary channels with bifurcating and anastomosing patterns. The environments between these channels include actively migrating tidal channels, natural levees, interdistributary bays, bay fills, marshes, and swamps (Coleman and Prior 1983:148).

The Mississippi River contains itself by building natural levees on both banks. Levees generally are formed when the river floods. As the river level rises above its channel, the excess water is spilled onto the surrounding countryside where sediments then are deposited. This results in the formation of a low, wedge-shaped landform parallel to the river. The river sediments are carried in three ways. The heaviest particles (i.e., cobbles and boulders) are rolled along the bottom of the river channel; they are referred to as the bed load. Lighter particles, i.e., sand, silt, and clay, are carried by the current; they comprise the suspended load. Soluble materials, i.e., salts, evaporates, and other trace quantities, travel in solution. When the floodwaters top the channel of the river, the velocity of the current decreases as the water spreads out onto the surrounding area. The suspended load then settles. The bed load generally is contained in the channel and pushed to the mouth before settling. The load carried in solution precipitates when super saturation is reached. In this manner, the river builds its own natural levees. Levees are significant landforms in the Louisiana landscape; they are the highest ground in the delta region below Baton Rouge.

The distributary channels of the lower deltaic plain are natural flumes which carry water and sediment from the parent river system to the receiving basin. The size range of active channels varies from a few meters wide and one or two m deep, to one km wide and 30 m deep. The channels are usually stable, with little or no lateral migration. Abandonment of distributary channels is a complex process, and is often due to accidental factors, such as log jams or infilling due to hurricanes. Without influx of water and sediment, the channel infills with local sediments. Initially, the lower parts tend to fill with sands and silts, but in deltas with low tides and high suspended sediment loads, the fill does not include sand or coarse debris. Stagnation leads to infilling of the main channel with fine grained to poorly sorted sediments. The uppermost infilling may include organic debris (as large as logs), and clays with high water content (Coleman and Prior 1983:155).

The upper deltaic plain is older; it lies above the area of significant tidal/marine influences, and of salt water intrusion. As in the upriver alluvial valley, riverine rather than deltaic processes predominate (Coleman and Prior 1983:140). The present study area lies within this zone.

Cut banks are observed on the side of the river closest to the thalweg (the deepest part of the river channel) where the velocity and turbidity of the current often scour the bank and cause slumping to occur. The point bar is the side of the meander furthest from the thalweg, where the velocity and turbidity decrease. This feature is subject to active and gradual deposition. The surfaces of point bars often are grooved with

ridges and intervening swales where deposition builds up to push the meander into a U-shape. These features often are cut by new channels during floods and high water stages, when the principal current tends to straighten and the meander is cut off to sediments. These obsolete meanders become U-shaped lakes called cutoff lakes (inappropriately termed "oxbow lakes") (Newton 1987:38-40).

In the upper deltaic plain, deposits may be associated either with migratory channels (braided or meandering), or with lacustrine fills and floodplains. The floodplain may include backswamps, marshes, and fresh-water lakes. Overbank flooding during annual high water periods and associated crevasses are important aspects of land formation and modification (Coleman and Prior 1983:140).

Fresh-water swamps, or backswamps, form in the interstitial areas of distributaries, as well as in areas flanking the backslope portions of the natural levees. Fine silts and clays along with organic debris are the aggrading materials in this subenvironment. These low-lying areas retain standing water for at least a portion of the year, with most areas remaining inundated year-round. Beyond the fringes of the fresh-water swamps, areas of marsh develop. Marshes can be subdivided into fresh, brackish, and saline varieties. Each supports different floral and faunal communities. Marshes are characterized as areas of reeds and grasses that perennially retain standing water. The primary sediments consist of clays and large amounts of organic materials. The large volume of organic debris produced by a marsh environment results in thick layers of peat (Smith et al. 1986:25-26).

The Vacherie Revetment project area and Site 16 SJ 40 are located in the upper deltaic plain of the Mississippi River and within the modern meander belt that the river has occupied for approximately 4,800 years (Saucier 1974:22). The Mississippi River delta region has undergone dramatic changes since the advent of man-made protection levees. "The greatest... influence on the modern delta is the artificial confinement of the Mississippi River" (Bahr et al. 1983:104). Control of the Mississippi River by levees and revetments confined natural alteration, including deposition and erosion, to the batture. Prior to the completion of the modern levee system in the lower Mississippi River Valley (1928-1936), the large swamp basins on both sides of the river transported and accumulated a large percentage of the overbank discharge. Since then, and without the seasonal overflow by the Mississippi River, bankline cutting and aggrading has increased along the river.

The effects of annual overbank flooding along the Mississippi River varied with the development of the artificial levee system. Prior to the 1928-1936 completion of the modern levee system, levees generally were low, inadequately constructed, and improperly located. During the mid-nineteenth century, levees often were under 5 ft high, and the levee system contained many gaps. Extensive flooding occurred every few years, as crevasses formed, and as levee segments washed away. These foods destroyed or damaged numerous buildings and crops, and adversely impacted land-use along the Mississippi River. The construction of the modern levee system eliminated most flooding on the landside of the levees (Elliott 1932).

Since the late nineteenth century, revetment construction undertaken along the cutting banks of the Mississippi River impeded riverine cutting, and generally confined the river to its current course. These revetments limited bankline slumping, erosion, and riverine migration, protecting the modern levee system from riverine cutting (Elliott 1932). Both levee and revetment construction, and its effect on the archeological record, are discussed more fully elsewhere (Goodwin, Hinks et al. 1989).

Both levees and revetments limit lateral migration and riverine meandering within their confines. As a result, confined lateral migration occurs with more power, and the once balanced alternating sequences of deposition, subsidence, and rejuvenation gives way to the now dominant processes of erosion and subsidence. The increasing width of the Mississippi River in the lower delta region is evidence of this change.

The Vacherie site lies immediately below a slight bend in the river, where erosion is creating a cut bank. As noted above, cut banks are observed on the side of the river closest to the thalweg (the deepest part of the river channel), where the velocity and turbidity of the current often scour the bank and cause slumping to occur. Friedkin (1945) observed that some of the sediments carried downstream by bank erosion eventually accumulate at bends to form point bars and new batture land. Across the river from

Vacherie, a point bar is developing near Paulina. The point bar is the side of the meander furthest from the thalweg, where the velocity and turbidity decrease. This feature is subject to active and gradual deposition.

The artificial levees of the Mississippi River influence the stream course and the severity of riverine processes. Reciprocally, the dynamic action of the river influences the location, construction, and maintenance of the levee system. The 1918 levee at Vacherie currently is eroding actively along much of its length; in sections, it has been destroyed entirely.

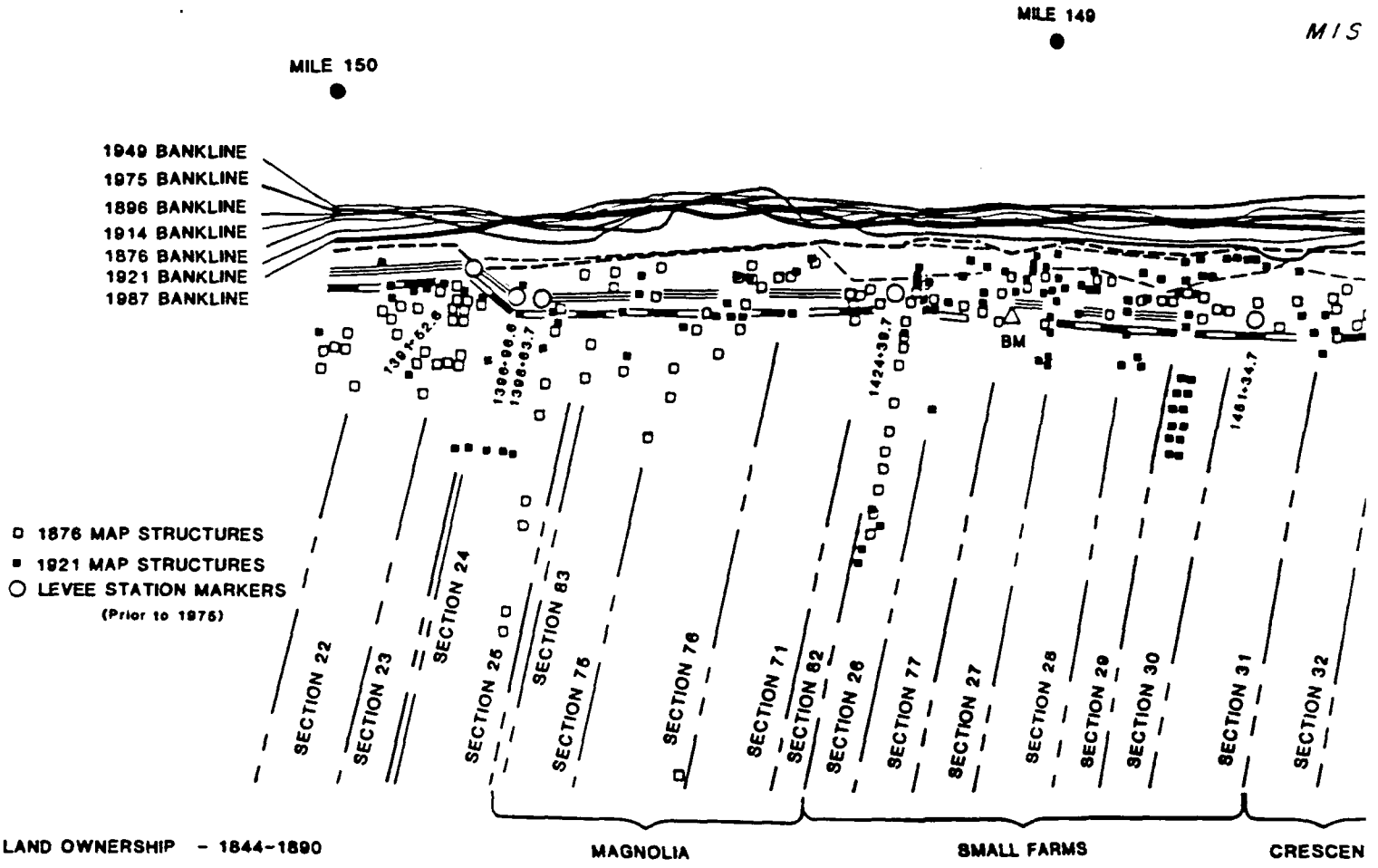
Destruction of Site 16 SJ 40

The Vacherie site (16 SJ 40), between River Miles 149.5 and 148.6, is located on a reach that is a short distance downriver from the cut bank at River Mile 150.0 on the right descending bank of the Mississippi River. The project area is situated between two revetments emplaced in 1971 and 1972; it has undergone various periods of erosion, relative stability, and deposition since 1876. Figure 3, a composite of 1876-1893 and 1921 Mississippi River Commission Charts 72, the Caving Bank survey (ca. 1940s-1970s) map, the Mississippi River Hydrographic Survey Chart (41), and the U.S.G.S. 7.5' Lutcher, LA quadrangle, were used to examine patterns of erosion, stability, and bankline aggradation. The batture remained relatively stable between 1876 and 1914. From 1914 to 1921, the batture eroded slightly, but enough to warrant first the strengthening of the older levee shown on the 1876 MRC chart, and then a levee set back (Figure 3). The levee of 1921 was set back from the older levee recorded in 1876 by about 55 m. Between 1921 and 1949, the bankline attained relative stability between River Miles 149.5 and 149.0. From 149.0 to 148.6, however, the bankline lost as much as 55 m (i.e., at River Mile 148.8). This erosion continued from 1949 through 1975, when erosion along the entire length of the project area caused up to 30 m of batture (i.e., at River Mile 149.0) to be washed away. By 1975, the levee of 1876, which had been strengthened prior to 1921, was inundated at River Mile 148.7. The present levee is situated between 10 m (Levee Station 1424+39.7) and 100 m (Levee Station 1451+34.7) landward from the levee set back of 1921. Between 1975 and 1984, a general trend of lateral accretion occurred, with 60 m of batture aggrading at Haas Landing (River Miles 149.5-149.4), and with as much as 100 m of aggradation at River Mile 149.0. The only exceptions to this trend were at either side of Haas landing, where erosion of about 20 m occurred.

Between 1984 and 1987, the river again eroded the Vacherie site area. In fact, vertical and lateral erosion were responsible for the loss of several features situated upriver from Haas Landing. Between September 5 and 15, 1984, Feature 109 along with 40 m of the batture were lost to the river. Since that time, vertical erosion of approximately 5 m at River Mile 149.5 destroyed Features 110 and 112, which originally were recorded in 1984 (Goodwin, Yakubik et al. 1985). The vertical erosion occurred in two ways. First, although transgression of the river water over the batture during high water stages usually causes sedimentary deposition, regression of the river water to lower water stages erodes the batture. If the regressional phase is slow, erosion (due to wave action, currents, etc.) is more extensive; both sediments deposited during the transgression and underlying strata may be washed away. However, if the regression is swift, much of the sediment deposited on the batture will remain in place. Second, during the regressional phase, slumping may occur. This happens when previously inundated bluffs and terraces become saturated; subsequent lowering of the water level leaves them heavily laden with water. The water weight carried in the interstitial spaces between sand, silt, and clay particles causes slumping when the water recedes too rapidly. Slumping also may occur by undercutting of the bank. Slumping along the bluffs and terraces often gives them a sharp and nearly vertical face. In addition, slumping may occur for other reasons. Human activities serve to heighten erosion on the batture (e.g., the 2 m deep backhoe trench placed perpendicular to the bankline and through the site, and barge mooring to the batture, that allows barges to be rammed into the bankline by wave action). Variation in bankline topography along the batture at 16 SJ 40 is shown in 11 surface contours in Appendix II of this report.

Soils at Site 16 SJ 40

The Vacherie site is located entirely within the batture. Loamy and clayey soils characterize the batture and the adjacent natural levee deposits. Convent soils and silty alluvial land are characteristic of the


MILE 150
MILE 149
MIS
1949 BANKLINE
1975 BANKLINE
1896 BANKLINE
1914 BANKLINE
1876 BANKLINE
1921 BANKLINE
1987 BANKLINE
BM
1394+62.6
1398+86.6
1398+83.7
1424+38.7
1481+34.7
1876 MAP STRUCTURES
1921 MAP STRUCTURES
LEVEE STATION MARKERS
(Prior to 1976)
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SECTION 77
SECTION 27
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SECTION 31
SECTION 32
LAND OWNERSHIP - 1844-1890
MAGNOLIA
SMALL FARMS
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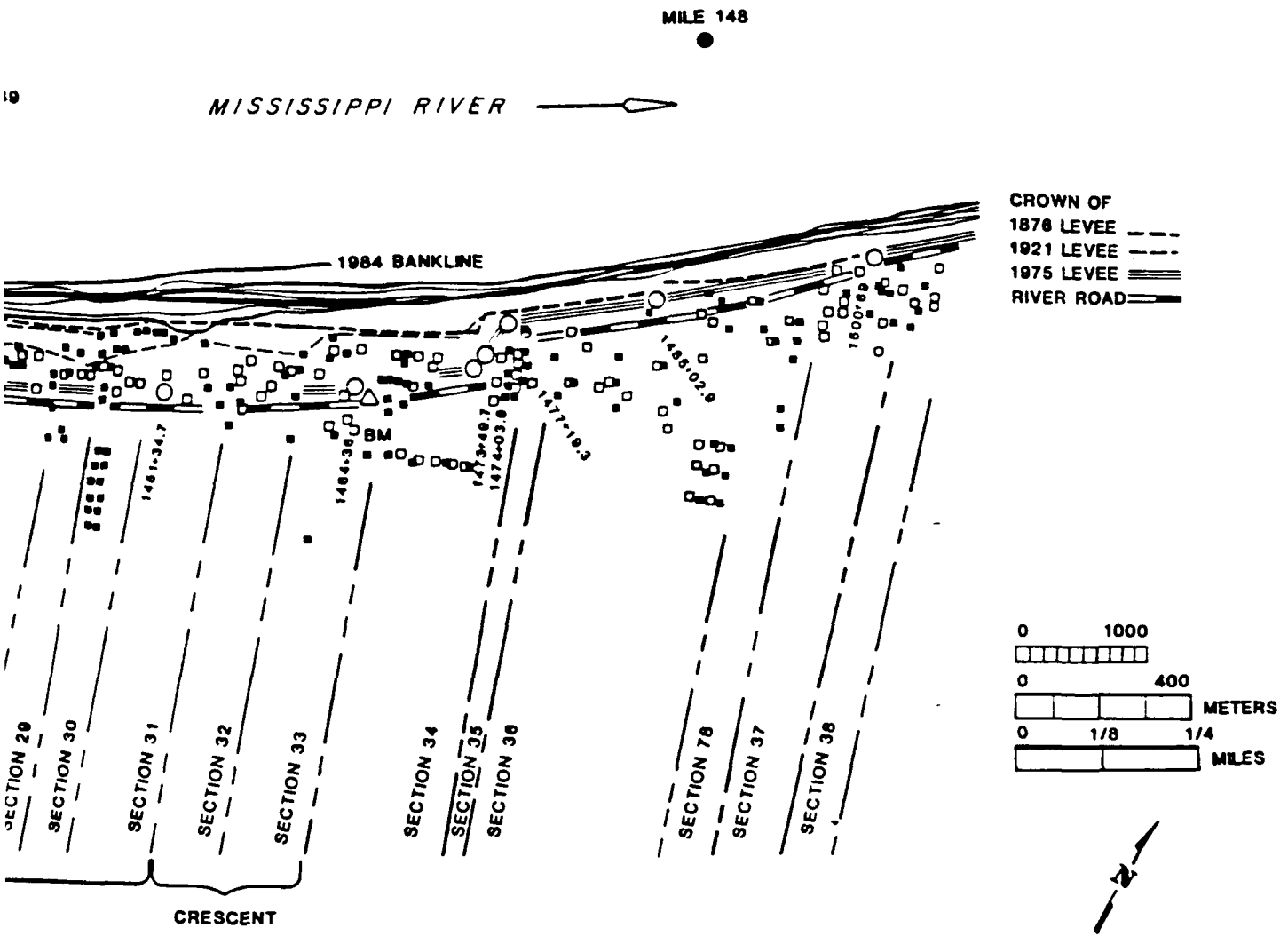
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MISSISSIPPI RIVER
1984 BANKLINE
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1878 LEVEE
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batture. These soils are frequently flooded; in times of flood, they are subject to scouring and deposition. Silty and sandy sediments mark the natural levee deposits of the river. Surface deposits consist of dark grayish-brown silt loam or silty clay loam. The subsoil is a stratified, grayish-brown silt loam and silty clay loam, faintly mottled with yellowish-brown and gray (United States Department of Agriculture, Soil Conservation Service [USDA, SCS] 1973:13).

CHAPTER III

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Field Investigations at 16 SJ 40

The Vacherie Site (16 SJ 40) was discovered by R. Christopher Goodwin & Associates, Inc. during cultural resources survey of five Mississippi River revetment items for the United States Army Corps of Engineers (Goodwin, Yakubik et al. 1985). During the 1984 field season, stratified cultural remains were exposed and visible in the river cut bank (Figure 4). Along this 665 m long area, gravel and oyster shell lenses representative of relict levee roads were noted, as were concentrations of domestic habitation refuse dating from the early through late nineteenth century. Aside from the pedestrian survey, surface collection, bluff profile, and feature recordation were carried out at the site. The results of those investigations are described below; for more detailed information on the 1984 investigations, the reader is referred to Goodwin, Yakubik et al. (1985).

Pedestrian Survey/Surface Collection

During 1984, a five-man crew conducted pedestrian transect survey and surface collection at Vacherie using 20 m quadrat control blocks. During the course of survey, the locations of stratified cultural remains exposed in profiles along the irregular river terrace were noted. Similarly, a number of archeological features were observed, mapped, and recorded during the archeological reconnaissance. Most of the artifacts collected from the Vacherie project area during the 1984 field season originated from the erosionary face of the river terrace, and were encountered on the clay beach. Some artifacts also were found on top of the terrace. A list of archeological features located during the 1984 field season is contained in Table 1.

In a number of locales, artifacts were present in concentrations on the beach surface, below the cut bank. In other portions of the survey area, no artifacts were recovered. The extreme downriver segment of the study area lacked visible cultural remains; the lowermost quadrat where artifacts were collected was quadrat N260-280, E480-500 (Figure 4). The uppermost collection locus that produced artifacts was quadrat N1140-1160, E520-540 (Figure 4). Above N1160 (Figure 4), no cultural refuse or artifacts were collected. However, several wooden irrigation features were recorded in this upriver portion of the study area.

Four cypress plank features, identified as privies, also were observed and recorded at the Vacherie site. These were located at N808, E492; N848, E492; N905, E490.5; and, N1207, E521.5 (Figure 4; Table 1). The lower three privies were located adjacent to or on the edge of the aforementioned gravel road. The uppermost plank privy was located at Haas Landing. The possible plank privy at N905, E490.5, designated Feature 108, was actively eroding from the river cut bank; artifacts were exposed both in profile and along the river beach below the cut bank. Artifacts from the immediate vicinity of features were collected and recorded using feature designations and proveniences. The collection from Feature 108, the eroding plank privy, consisted primarily of nineteenth century glass and ceramic sherds. The ceramic sherds produced a mean ceramic date of 1846.9.

Stratigraphic Profiles

Stratified cultural remains were found to extend from N290-N955 (Figure 4). This latter grid coordinate coincided with a bay-like erosionary area. In an attempt to obtain stratigraphic control, as well as to discern evidence of site formation and destruction processes, three profiles were cleaned and mapped along the river cut bank. The venues of these stratigraphic profiles were selected based upon a set of criteria that included presence of the 1917 gravel road, which provided a known *terminus ante quem* for deeper deposits. In addition, these profiles were placed at substantial increments, in order to provide representative coverage across the project area (Figure 4). Stratigraphic Profile 1 (Figure 5) was cleaned and drawn at N338.5-340, E489.60, near the downriver end of the stratified remains which began at N290

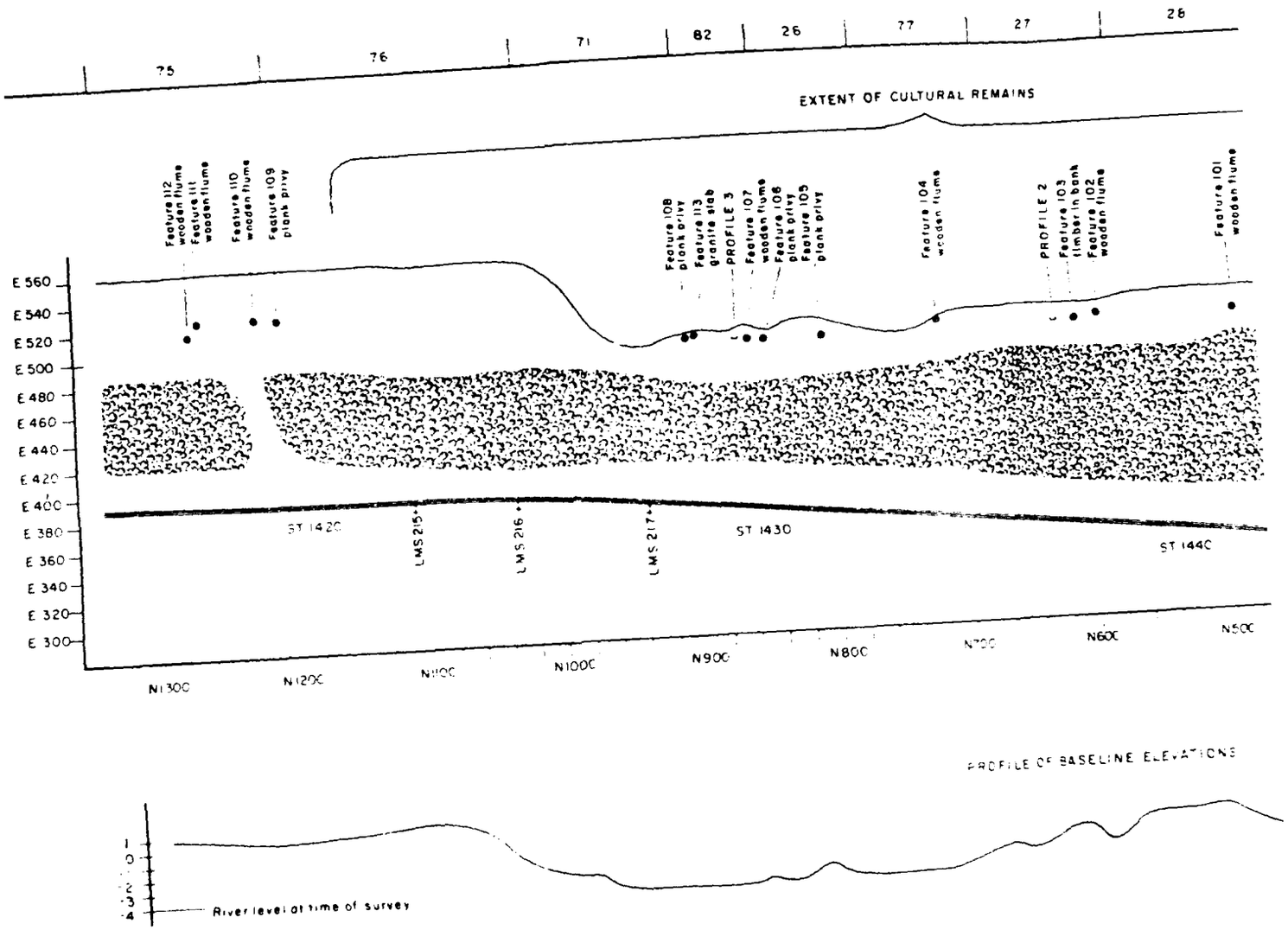


Figure 4. Site plan of 16 SJ 40 in 1984 (Goodwin, Yakubik et al. 1985:91)

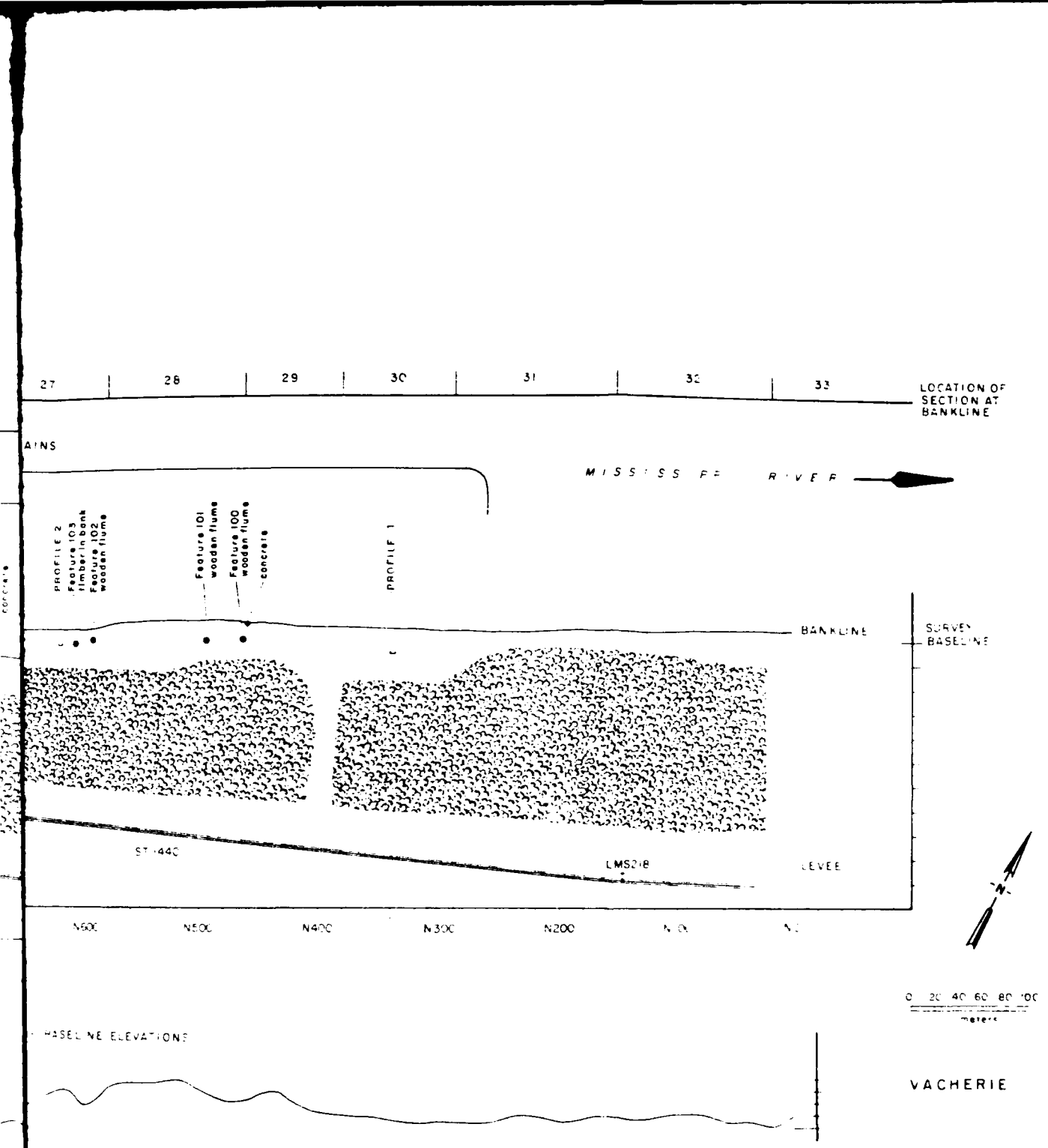
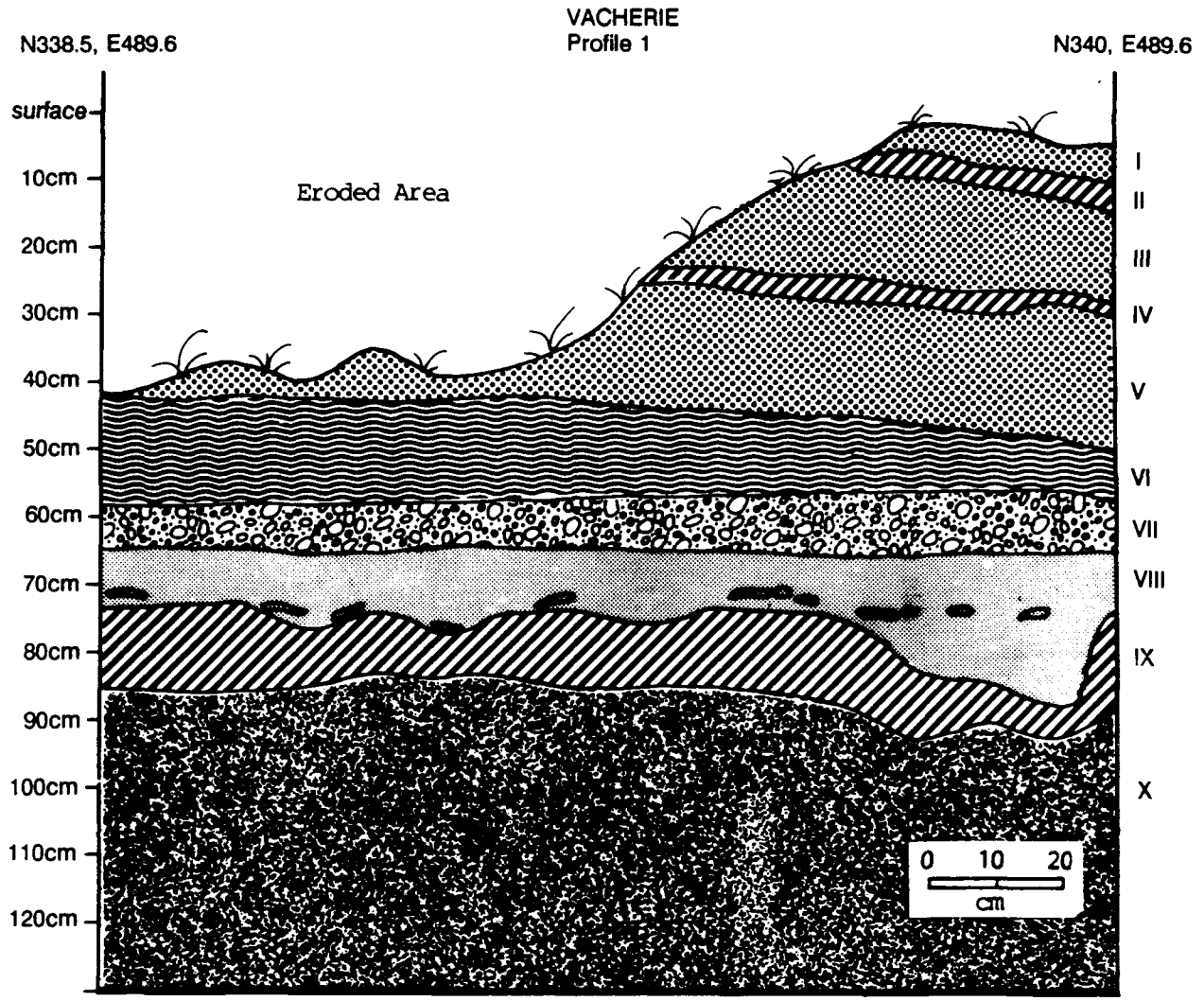

27
28
29
30
31
32
33
LOCATION OF SECTION AT BANKLINE
MISSISSIPPI RIVER
PROFILE 2
Feature 103 timber in bank
Feature 102 wooden flume
Feature 101 wooden flume
Feature 100 wooden flume
concrete
PROFILE 1
BANKLINE
SURVEY BASELINE
ST-440
LMS218
LEVEE
N600
N500
N400
N300
N200
N
0 20 40 60 80 100
meters
BASELINE ELEVATIONS
VACHERIE

Table 1

ARCHEOLOGICAL FEATURES ENCOUNTERED AT VACHERIE (16 SJ 40) DURING THE 1984 FIELD SEASON (Goodwin, Yakubik et al. 1985)

Feature No.	Provenience Feature	Description
100	N461 E499	Cypress flume with 18" diameter metal pipe inside.
101	N498 E500	Cypress flume on shell beach.
102	N596.5 E500	Cypress flume exposed on river at bank.
103	N608 E497.5	Cypress timber eroding out of bank, 30 cm below surface; runs parallel to bank.
104	N719 E493	Cypress flume in mid-bank 1.5 m below surface; has top cover board intact.
105	N808 E492	Plank privy; vertical cypress planks on top of bank.
106	N848 E492	Plank privy; vertical cypress planks on top of bank.
107	N860 E492	Cypress flume extending from cut bank.
108	N905 E490.5	Cave-in at plank privy with vertical cypress planks along sides; dense concentration of artifacts eroding out of bank.
109	N1207 E521.5	Plank privy on bank at high area in upriver section (Haas Landing).
110	N1222 E522	Cypress flume eroding out of top of bank at high area in upriver section (Haas Landing).
111	N1266 E524	Cypress flume with cover; looks more modern than others; 110 cm. wide.
112	N1272	Cypress flume with cover; near and analogous to Feature 111; 1 m wide.
113	N899 E494.5	Granite slab on beach immediately downriver from Feature 108; slab is 130 cm long, 50 cm wide, and 8.5 cm thick. Long axis parallels river.



KEY

I:	10YR	3/1	very dark gray silty clay
II:	10YR	5/3	brown silt loam
III:	10YR	3/1	very dark gray silty clay
IV:	10YR	5/3	brown silt loam
V:	10YR	3/1	very dark gray silty clay
VI:			24 Substrata; alternating layers of very dark gray (10YR 3/1) silty clay and brown (10YR 5/3) silt loam
VII:			Old gravel road; chert gravel interspersed with coal and cultural remains
VIII:	10YR	3/1	dense, very dark gray clay containing oyster shells and artifacts
IX:	10YR	5/3	brown silt loam; sterile
X:	10YR	3/1	very dark gray clay with dark yellowish brown (10YR 4/4) mottling; sterile

Figure 5. Stratigraphic Profile 1 at Vacherie (Goodwin, Yakubik et al. 1985:79)

(Figure 4). The base of the terrace profile was 170 cm below the surface of the relict levee. Superficial sedimentary deposits were characterized by sandy strata overlain by clay strata. Several cycles of sand, silt, and clay layers may be present within natural levee deposits, each cycle representing an individual flood. Evidence of numerous recent flood events were seen in Stratigraphic Profile 1 at Vacherie (Figure 5). In the upper 45 cm of the profile (Strata I through V), three layers of very dark gray silty clay (10YR 3/1) interbedded with two layers of brown silt loam (10YR 5/3) were present. Stratum VI (40 to 52 cm below surface) consisted of 24 sub-strata. The sub-strata consisted of alternating layers of the same soil types described for Strata I through V. Stratum VII was the old gravel road previously discussed. It was found at 52 to 60 cm below surface, and it contained a very compact chert gravel interspersed with coal and artifactual remains, such as nails. A two cm thick charcoal lens covered the gravel road in places. Stratum VIII, at 60 to 75 cm below surface, comprised a dense, compacted, very dark gray clay (10YR 3/1), interspersed with oyster shells. A large, heavily corroded iron bolt also was found in this stratum. Stratum IX, at 70 to 80 cm below surface, was sterile brown silt loam (10YR 5/3) comparable in structure and origin to the soils described for Strata II, IV, and VI. Stratum X, at 80 to 170 cm below surface, comprised a very dark gray clay (10YR 3/1) with yellowish brown mottling (10YR 4/4). This basal stratum was sterile (Figure 5).

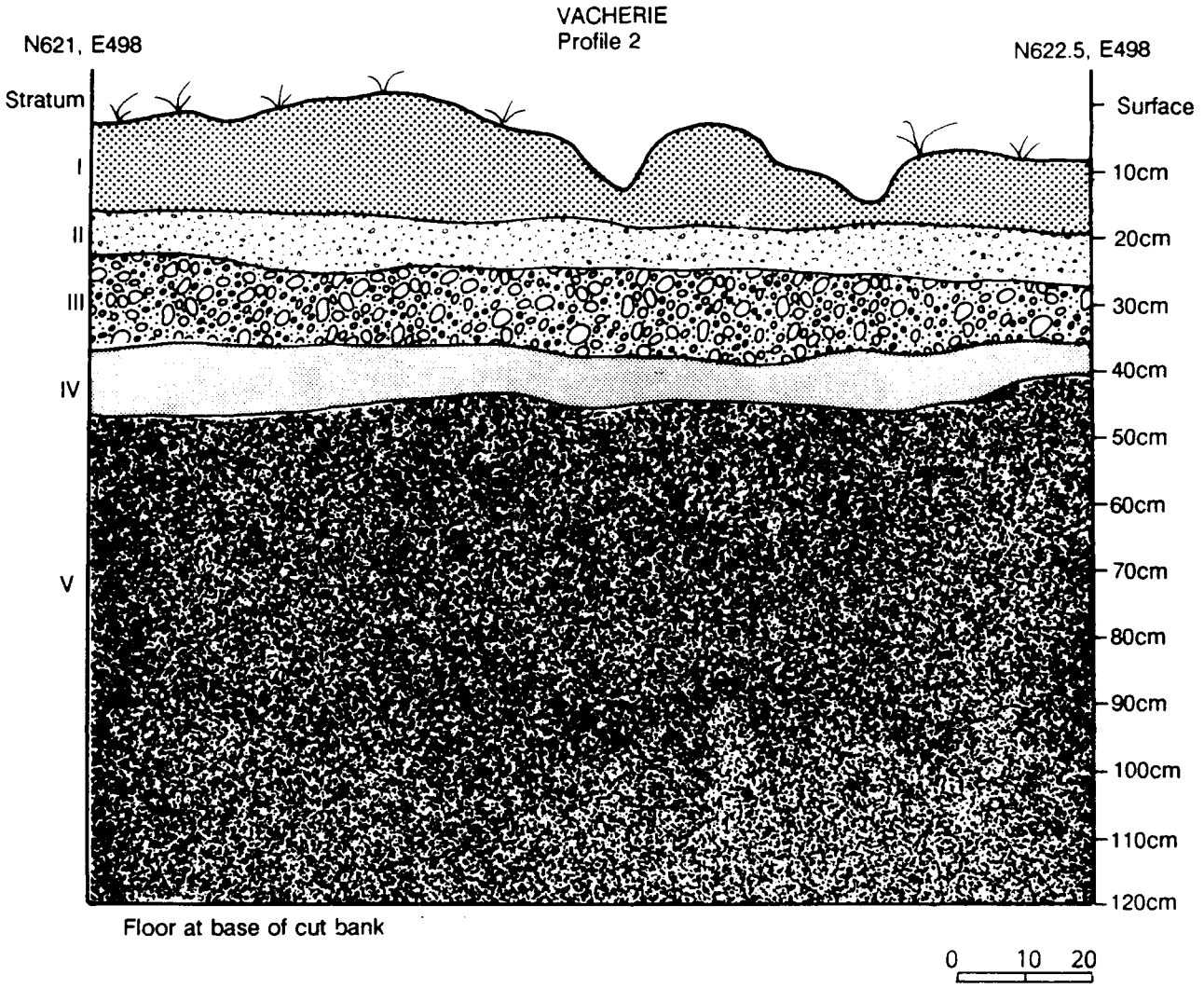
Stratigraphic Profile 2 was located at N621-622.5, E498, near the center of the stratified remains exposed in the cut bank. It did not exhibit the extent of recent overbank deposits that were present in Profile 1. However, the gravel road and associated artifacts were present (Figure 6). Stratum I was a brown (10YR 4/3) silty clay that extended to 18 cm below ground surface. Stratum II was the gravel road, at 15 to 25 cm below surface. Stratum III, at 25 to 37 cm below surface, was a dark grayish brown (10YR 4/2) dense clay interspersed with oyster shells. Brick fragments were present in this stratum, as were three corroded cut nails. Stratum III also contained a fragment of a metal key and another iron fragment. Stratum IV, at 37 to 45 cm below surface, consisted of sterile dark yellowish brown (10YR 4/4) silty clay. Stratum V, at 45 to 117 cm below surface, was a very dark grayish brown (10YR 3/2) clay with dark yellowish brown (10YR 4/4) mottling.

Stratigraphic Profile 3 was located at N867-868.5, E491, near the upriver extent of the stratified remains (Figure 7). The upper 50 cm of this profile (Strata I and II) was eroded away at the downriver end by runoff. Stratum I, at 45 cm below surface, consisted of a dark brown (10YR 3/3) silty clay. Stratum II, observed at 40 to 50 cm below surface, constituted the old gravel road. Stratum III, at 45 to 55 cm below surface, was a dense, very dark gray (10YR 3/1) clay underlying the gravel road. While the corresponding clay deposits in Profiles 1 and 2 contained oyster shells, these shells were not present in Stratum III of this profile. This stratum was only 2 cm thick at the downriver end of the profile, and it increased in thickness to 20 cm at the upriver end. Stratum IV, at 55 to 70 cm below surface, was a sterile brown (10YR 5/3) clayey silt loam. This stratum was 25 cm thick at the downriver end of the profile, and it tapered to 5 cm thick at the upriver end. Stratum V, at 70 to 115 cm below surface, was the sterile basal river clay. Again, the matrix was a very dark grayish brown (10YR 3/2) clay with dark yellowish brown (10YR 4/4) mottling. Below 115 cm, a talus slope overlies the beach, which was 265 cm below ground surface.

Flumes

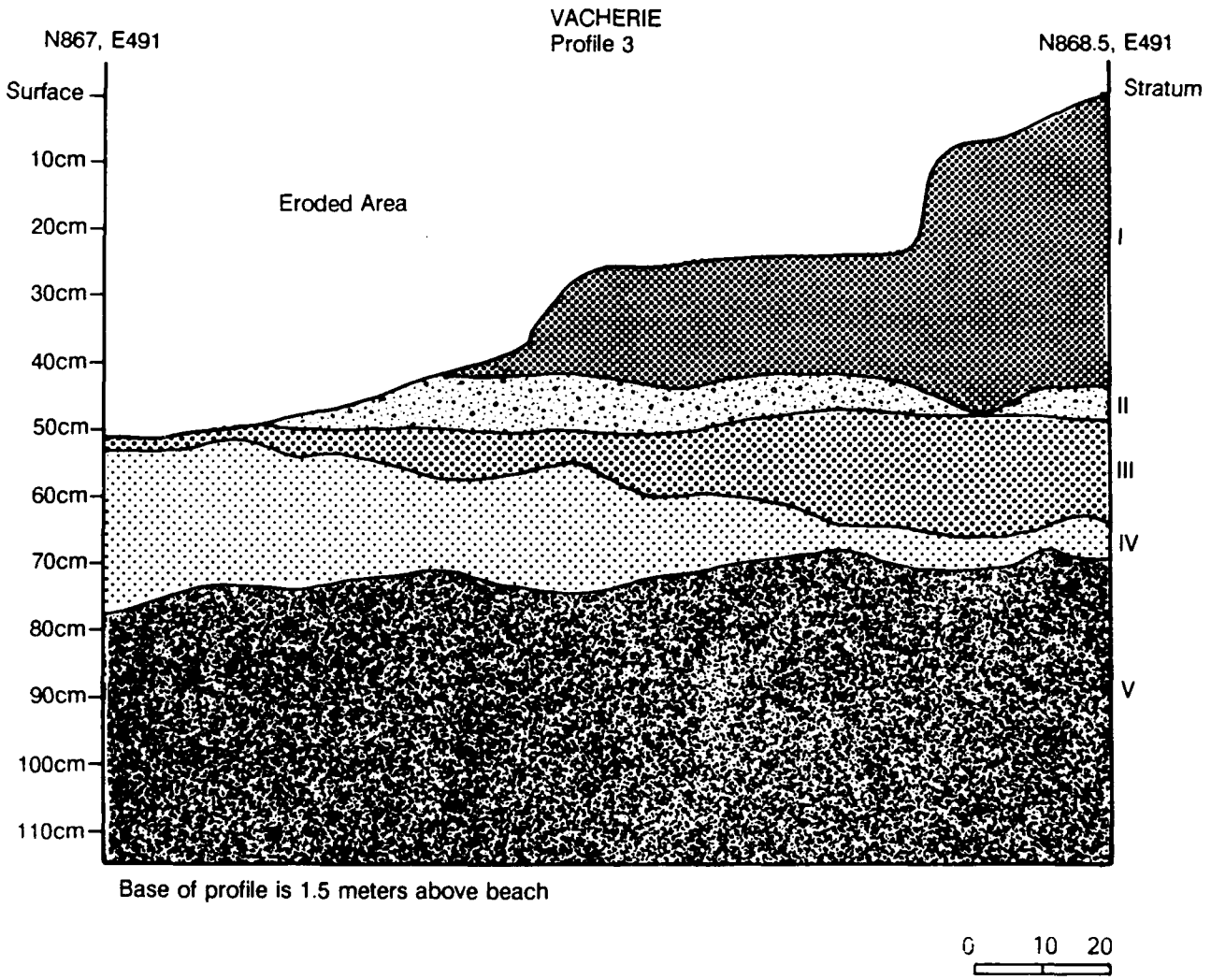
A series of rectangular cypress rice irrigation flumes constituted the most striking archeological features observed at the Vacherie site. Informant interview data indicated that these flumes were constructed by 1888. They carried river water into agricultural fields during high water months. Rice planting took place from middle March to early April, and the fields were flooded several times until the "lay by flow" was let into the fields in early summer. Flumes equipped with sluice gates enabled the planter to control irrigation of his fields.

During 1984, R. Christopher Goodwin & Associates, Inc. (Goodwin, Yakubik et al. 1985) identified these rice flumes and a large number of in situ features, including stratified historic remains dating from the antebellum period until 1917. The remains of wooden irrigation flumes at Vacherie provide tangible archeological evidence of rice agriculture. As will be seen, the adoption of rice agriculture by the residents of St. James Parish represented a distinctive adaptation to a changing socio-economic milieu that was a



I: 10YR 4/3 brown silty clay
II: Old gravel road; chert gravel interspersed with coal and cultural remains
III: 10YR 4/2 dense dark grayish brown clay interspersed with oyster shells, brick fragments, and metal artifacts
IV: 10YR 4/4 dark yellowish brown silty clay; sterile
V: 10YR 3/2 very dark grayisn brown clay with dark yellowish brown (10YR 4/4) mottling; sterile

Figure 6. Stratigraphic Profile 2 at Vacherie (Goodwin, Yakubik et al. 1985:82)



I:	10YR	3/3	dark brown silty clay
II:			Old gravel road; chert gravel interspersed with coal and artifacts
III:	10YR	3/1	very dark gray clay
IV:	10YR	5/3	brown clayey silt loam; sterile
V:	10YR	3/2	very dark grayish brown clay with dark yellowish brown (10YR 4/4) mottling; sterile

Figure 7. Stratigraphic Profile 3 at Vacherie (Goodwin, Yakubik et al. 1985:84)

direct outgrowth of a singular and significant event in our national history. Archeological investigations at 16 SJ 40 in 1984 (Goodwin, Yakubik et al. 1985) showed that this site possessed the quality of significance as defined by the National Register of Historic Places criteria; data recovery was recommended at the site.

CHAPTER IV

HISTORICAL OVERVIEW

Introduction

This chapter provides an historical context for the 16 SJ 40 vicinity. The economic history of St. James Parish is described, from the arrival of the French to the present; a separate section detailing the tenure and land use history of the project area follows this general discussion. A narrative approach was selected, since data pertaining to the early periods are limited. For the antebellum and subsequent periods, additional sources were available that enabled a more detailed analysis of land use and settlement patterns within the project area.

The earliest, most detailed, and most comprehensive sources pertaining to the project area are the original land claims filed following the annexation of the area by the United States in 1803. The original claims describe the extent of properties, and they are accompanied by accurate maps. These maps correlate directly with present-day maps. These claims provide the data necessary to determine settlement patterns at the beginning of the nineteenth century. Beginning in 1844, sugar and rice production figures are available. However, subsistence farms were not inventoried, nor was rice production for home consumption. Despite these shortcomings, the sugar and rice reports paint a fairly accurate picture of agricultural land use within the project area.

Norman's chart, compiled in 1858, served as a third source for the antebellum period. This chart, or map, depicts contemporary land holdings. Although it does not correlate precisely with the original land claim maps or with later maps of the region, when it is used in conjunction with the claim maps and the sugar and rice reports, changes in the size of land holdings can be distinguished. The Civil War seriously disrupted the economy of the region. With the exception of the sugar reports for the 1861-1862 crop, no distinctive data are available for this period.

The postbellum period provides a more definitive data base on land use and settlement patterns. Sugar and rice reports resumed with the 1868-1869 crop, and the late nineteenth and early twentieth century Mississippi River Commission charts provide specific locations of structures and settlements.

The Colonial Period

The Louisiana territory first was claimed for France in 1682 by Rene Robert Cavalier, Sieur de LaSalle. The initial French colonial period lasted until 1763. During this period, the territory was divided into nine districts, each with a judge and a *Commandant* to provide civil and military authority. The French government made large land grants, or concessions, to members of nobility, in an attempt to attract private investment and commitment in the territory.

The earliest grant within the present-day boundaries of St. James Parish was made in the early eighteenth century to the Duc de Charost and his son, the Marquis d'Anceny. The concession was located near the modern towns of Gramercy and Mt. Airy. Two hundred settlers occupied the concession in 1720, under the supervision of the Sieur d'Epinet, but they were forced to abandon it two years later, when fire destroyed their supplies (Bourgeois 1957:6).

Few settlers arrived in St. James Parish over the next forty years, possibly because the local Indian tribes, the Houma and Chitimacha, were hostile. Some isolated plantations were established in the area by German settlers relocating from existing settlements downriver on the "cote des Allemands" (the German coast) (Bourgeois 1957:67-68). The heirs of Mathias Frederic, one of these early immigrants, filed a claim with the United States government in 1812 indicating that six arpents near the present-day town of Vacherie had been under cultivation since 1756 (Lowrie and Franklin 1834:266). A separate claim by the same heirs pertained to a twenty arpent concession granted to Andrew Neau in 1755 (Lowrie and Franklin 1834:385).

Jacques Cantrelle established "Cabahonnecer," a plantation on the west bank of the river opposite present-day Convent, prior to 1763, although he did not live there until after 1769 (Voorhies 1973:201, 441); the name is a phonetic spelling of the Choctaw word for "Mallard's Roost."

Acadian Settlement In St. James Parish

In 1756, Salvador, Jean, and Louis Mouton arrived from Canada and settled on the west bank near Vacherie. Nine years later, in 1765, another 650 Acadians arrived; the first 200 came by way of Ste. Domingue (Haiti) (Rushton 1979:319). These were refugees from the British acquisition of Canada as a result of the Seven Years' War. Writing in 1770, Philip Pittman discussed the reasons for their arrival in Louisiana:

> These are the remainder of the families which were sent by General Lawrence from Nova Scotia to our southern provinces; where by their industry, they did and might have continued to live very happy, but that they could not publicly enjoy the Roman Catholic religion, to which they are greatly bigoted. They took the earliest opportunity, after the peace, of transporting themselves to St. Domingo where the climate disagreed with them so much, that they in a few months lost near half their numbers; the remainder, few only excepted, were in the latter end of the year 1763, removed to New Orleans, at the expense of the King of France (Pittman 1973:60-61).

In 1766, another group of Acadians moved directly from Nova Scotia to Louisiana. These 216 immigrants settled in St. James and Ascension Parishes; the St. James settlement became known as "la premiere cote des Acadiens" (the first Acadian coast), while the Ascension Parish settlement was called "la deuxieme cote des Acadiens" (the second Acadian coast) (Arsenault 1966:202). By 1770, the first Acadian coast extended approximately 16 mi along both banks of the river, centered on a point on the east bank opposite College Point. The area became known as "Cabahonnecer," after Jacques Cantrelle's plantation, and the name later was applied to both Acadian coasts (Marchand 1931:20).

The new settlement grew rapidly. The 1766 "Census of Cabaanoce" [sic] listed 266 white inhabitants, including 98 males over the age of 15, who owned among them 16 slaves, 95 hogs, and 97 guns. There were only a few large parcels of fallow land; Jacques Cantrelle and his son-in-law, Louis Judice, were among the owners, as were Landry, Bigeou dit Violette, Ducros, and Populus. Most holdings were small, with three to six arpents front. The "List of Acadians at Cabahonnocee" [sic], compiled in 1769, showed that the population had grown to 501 white inhabitants, including 163 men of an age to bear arms, and 36 slaves. They now owned 1,867 hogs, 512 cattle, 50 horses, and 16 sheep. The size of the holdings remained small, with fewer than six arpents river frontage. An Acadian cattle ranch or stock farm was called a *vacherie*; this term gives the present area its name (Bourgeois 1957).

The Spanish Period

Although Spanish rule brought political changes, it did little to alter the economic and demographic patterns established during the French colonial period. The culture was still predominantly French. The Mississippi River remained the focus of settlement. Small grants to military officers and bureaucrats led to the development of a mix of large and small plantations along the river (Taylor 1976:21-29). The territory's economy still was based on agriculture, forest products, and commerce; however, the nature of the crops changed, as did patterns of trade.

During the French colonial period, Louisiana's primary cash crop was indigo. By the 1790s, the Louisiana product could no longer compete in European markets with cheaper indigo grown in India. Insects and inclement weather caused major crop losses, the crop itself depleted the soil, and an increase in the price of slaves raised capital investment in labor past the breakeven point. In addition, the byproducts of the process polluted the streams from Pointe Coupee to the Yazoo River and were thought to attract

disease-bearing insects (Holmes 1967:346-348).

Louisiana planters were presented with a viable alternative to indigo cultivation during the 1790s, when Etienne de Bore and the Haitian planter Morin developed processes for granulating sugar from cane in commercial quantities. The introduction of the cotton gin during the same period made cotton-growing commercially feasible. As a result of these inventions, monocrop agriculture based on sugar cane and cotton became profitable in a way that indigo cultivation had never been; indigo disappeared as a major cash crop of Louisiana by 1800 (Holmes 1967; Le Gardeur 1980).

St. James Parish followed this pattern, although the best land for cotton-raising was located further north. In describing the area during the early nineteenth century, Berguin-Duvallon wrote:

> Above this begins the parish of Cabahanose, or the first Acadian settlement, extending eight leagues to the river. Adjoining it and still ascending is the second Acadian settlement, or parish of the Fourche, which extends about six leagues.... Except on the point just below the Iberville (Bayou Manchac), the country from New Orleans is settled the whole way along the river and presents a scene of uninterrupted plantations in sight of each other, whose fronts are all cleared to the Mississippi, and occupy on that river from five to twenty-five acres with a depth of forty; so that a plantation of five acres in front contains two hundred. A few sugar plantations are formed in the parish of Cabahanose, but the remainder is devoted to cotton and provisions, and the whole is an excellent soil incapable of being exhausted. The plantations are but one deep on the island of New Orleans, and on the opposite side of the river as far as the mouth of the Iberville, which is thirty-five leagues above New Orleans (Davis 1806:167-168, [sic throughout]).

An arpent of land yielded approximately 400 pounds of cotton annually; this was worth approximately $100.00 at the time. A single planter or skilled slave could cultivate three arpents of land planted with cotton (Robertson 1911:156); estimates of the amount a single slave could pick in a day vary widely. Cultivation of cotton is discussed in detail by Goodwin, Yakubik et al. (1984), and by Goodwin, Gendel et al. (1983b).

The Antebellum Period

Like the French, the Spanish were unable to derive a profit from the Louisiana colony. Thus, Spain ceded Louisiana back to France in 1800 by the Treaty of San Ildefonso. Three years later, France sold the territory to the United States for $15,000,000.00. Louisiana officially became a territory of the United States on December 17, 1803.

In 1804, the United States territorial governor, William C.C. Claiborne, arrived in Louisiana, and a territorial legislature was established. In 1805, the legislature divided the territory into twelve counties; the two Acadian coasts were combined into the county of Acadia. The county system was a failure because the predominantly French and Catholic populace considered the parish to be the primary social and political division. On May 31, 1807, the legislature once again divided the territory, this time into nineteen parishes, and Acadia county became the parishes of St. James and Ascension.

The American settlers who arrived after the transfer of the Louisiana Territory were attracted by the potential for profit in the infant sugar industry. Increasing numbers of small farms were bought up and consolidated into large plantations. The focus of agriculture along the Mississippi between New Orleans and Baton Rouge shifted from cotton to sugar cultivation for reasons discussed by Berguin-Duvallon:

> The sugar cane may be cultivated between the river Iberville and New Orleans, on both sides of the Mississippi, and as far back as the swamps.... Above the Iberville the cane

> would be affected by the cold, and its produce would, therefore, be uncertain. Within these limits, the best planters admit that one quarter of the cultivated lands of any considerable plantation may be planted in cane, one quarter left in pasture, and the remaining half employed for provisions, etc., and a reserve for a change of crops. One Parisian arpent of one hundred and eighty feet square, may be expected to produce, on an average, twelve hundred weight of sugar, and fifty gallons of rum (Davis 1806:168, 169; [sic throughout]).

The initial capital investment for a sugar plantation was considerably higher than that required for cotton agriculture, largely because of the higher cost of sugar production machinery. As a result, while cotton could be grown by slaveless yeoman farmers as well as plantation-owners (Taylor 1976:65), sugar agriculture was impractical for farmers with small holdings and with little liquid capital. Despite the expense, sugar cultivation was more attractive than cotton agriculture for those who could afford the investment because of a nine per cent rate of return, as opposed to the seven percent return derived from growing cotton (Taylor 1976:67). Detailed discussions of cane cultivation, sugar processing, and plantation organization and layout are presented in Goodwin, Hinks et al. (1989); Goodwin, Yakubik et al. (1984); Goodwin, Gendel et al. (1983a, 1983b); and, in Goodwin, Yakubik et al. (1985).

A primary concern of the new territorial administration was legal ratification of land claims. Local land owners were required to register formal claims, based either on French or Spanish grants, concessions, patents, or orders of survey, or on a record of proof of habitation and cultivation for ten years prior to 1803. Federally-sponsored surveys and plat maps, along with registered land claims, established parish boundaries and local ownership. Unclaimed areas were designated public land and were made available for purchase. Land claims provide the best available record of land use prior to the advent of sugar and rice production figures in the 1840s.

The Civil War

The Civil War devastated Louisiana's plantations. Planters all along the Mississippi had difficulty obtaining supplies and marketing their crops. The situation was particularly difficult for sugar planters, since sugar plantations were rarely self-sufficient in food; the collapse of the river transportation system meant that the price of necessities went up and that sugar could not be shipped and sold to pay for them. Federal troops blockaded the Gulf Coast before the end of 1861, and Admiral David Farragut forced his way past Forts Jackson and St. Philip in early 1862. New Orleans surrendered to Farragut's squadron on April 25, 1862; at the beginning of May, the city was occupied by Federal troops under Major General Benjamin F. ("The Beast") Butler.

The Union army ascended the Mississippi after the fall of New Orleans. The Union attack on the river parishes was described by the historian Alcee Fortier, grandson of the prominent St. James planter, Valcour Aime. He wrote:

> After the fall of New Orleans, the Federal gunboats ascended the river, and being attacked by Confederate batteries on the banks, bombarded the plantations as they passed. This was natural where they had batteries, but, too often, houses were bombarded in front of which stood no batteries. How well do I remember the flight of our whole family to the river front to seek the protection of the levee, whenever a gunboat was coming. There we stood behind the levee, my sisters and myself, our school mistress and our nurses, while our father stood on the levee to look at the Federal gunboats and at the shells, which generally passed over our heads, but which, occasionally were buried in the levee and covered us with dust.... How dramatic all this was: the huge iron clad Essex passing in triumph the river batteries, her shells whizzing like huge meteors over our heads, and we were helpless against the invaders! (Fortier 1894:221-222).

Many St. James Parish males of military age enlisted in the 18th Louisiana Infantry Regiment, which was known as Le Dix-Huitieme (The Eighteenth) because of the high percentage of soldiers with French ancestry. After the battle of Shiloh, in April, 1862, the regiment was commanded by a native of St. James Parish, Leopol[illegible] L. Armant. Armant was killed during the Battle of Mansfield, two years later. At the time of his death, he was engaged to Ana Fortier, grand-daughter of his neighbor, Valcour Aime (Bourgeois 1957:60).

The Confiscation Act, passed by Congress in July 1862, required Confederates to swear allegiance to the Union within sixty days, or have their property confiscated (White 1970:46). The confiscated properties were controlled by the Treasury Department; some were used by the Freedmen's Bureau to establish farming cooperatives for freed slaves and were not restored to their former owners until 1866 (White 1970:53).

Louisiana was readmitted to the Union in July 1868. This marked the official end of military rule, but the state remained under the jurisdiction of General Philip Sheridan's Fifth Military District until 1877. Until that date, Federal troops occupied New Orleans and other major Louisiana cities, and Sheridan appointed the governor and lieutenant-governor.

The Postbellum Period

The economy of St. James Parish during Reconstruction was hamstrung by the collapse of the slave labor system and the lack of available capital for rebuilding. Sugar farming had become virtually impossible after the occupation of New Orleans. Marketing was difficult, prices were low, and credit was unavailable. Slaves ran away or were freed by Union troops, who also confiscated stock and supplies. Some planters switched to subsistence farming, while others gave up completely and rented their lands (Begnaud 1980:38-39; Goodwin and Yakubik 1982). After the war, these problems continued and grew, and many planters lost their plantations. Sugar production during most of the latter part of the nineteenth century did not approach the high reached just before the war in 1861. The causes were: "Changes in labor systems, bad politics and government, and fear that the (sugar) tariff would be abolished or greatly modified..." (A. Bouchereau 1890:53a).

The postwar labor shortage was critical. The Thirteenth Amendment freed all people formerly held as slaves and destroyed the South's large scale labor system. Non-slave labor initially proved inadequate for sugar farming. The planters complained that day or contract labor was not cost-effective and provided too few field hands; they considered the former slaves to be lazy, evil, and a political threat. L. Bouchereau advocated the extensive use of German and Chinese laborers on sugar plantations, since he considered them to be reliable, manageable workers (L. Bouchereau 1871:xix).

Beginning in the 1870s, Italian immigrants provided another source of labor. Social, political, and economic troubles in southern Italy and Sicily caused many Italians to travel the established trade routes to New Orleans in search of better conditions. Many found employment on the sugar plantations (Scarpaci 1972:32-44). It was said of the Italian laborer:

> ...assigned a task, he toils at it without need of watching and urging on the part of an overseer; and though he has not the physical strength of the Negro, his close application makes ample amends for this deficiency. Centuries of experience in a worn out country have made him one of the most careful and economic of farmers. The necessity of cultivating the same little plot of ground year after year has taught him how to obtain the largest possible yield from his limited acreage. As intensive farmers, the Southern Italian and Sicilian are easily among the best in the world... (Scarpaci 1972:38).

Many Italians, including laborers from outside Louisiana, would migrate to the sugar parishes for the *Zuccarata*, or grinding season, when more labor was needed to cut cane and make sugar; wages from the

grinding season and escape from winter fuel bills made it profitable for Italians to travel from Northern cities for the *Zuccarata* (Scarpaci 1972:97, 109). Others settled permanently in the sugar parishes as wage laborers or tenant farmers.

The beginnings of a tenancy system in Louisiana appeared in Terrebonne Parish in 1870. Under the "Share System," the planter supplied land, implements, and seeds, while tenants provided labor and their own support. Profits were split three ways, with one-third each going to the planter, to the tenant, and to overhead. However, tenant farming and sharecropping were not particularly well-suited to the peculiar demands of sugar monocrop cultivation.

The sugar industry remained stagnant throughout the 1870s. Lack of capital prevented planters from rebuilding installations that had been destroyed during the war. In addition, labor expenses now constituted wages paid on a continuous basis, rather than occasional capital investment in slaves. Lack of available capital led L. Bouchereau (1874) to propose that agricultural and industrial aspects of sugar production be separated. "Let the sugar factories be established in different neighborhoods and let the producers of the can sell it to the factory" (L. Bouchereau 1874:xii-xiii).

This "Central Factory System," under which a centralized mill served the needs of many planters, rather than each planter operating his own mill, was far more efficient and helped alleviate labor difficulties, since the greatest wage and labor expenditures were incurred during the actual manufacture of sugar, rather than with the cultivation of cane. It allowed planters who lacked the capital to rebuild their sugar houses to resume production and made sugar cultivation viable for small planters who previously were unable to afford their own production equipment.

Rice Production

The level of rice production increased in St. James Parish following the Civil War, largely due to the lack of capital for sugar production. L. Bouchereau wrote:

> Many of the old sugar plantations are planted in rice for want of the necessary means to rebuild or repair sugar houses, etc., while others are only partially cultivated owing to the encroachment of water from crevasses, and many are completely abandoned on account of overflow (L. Bouchereau 1877:XX).

The production of rice was a logical step for planters to take during the post-war period. The water from unmaintained levees, which ruined cane crops, was necessary for rice agriculture, and the capital investment required for rice cultivation was small. The history and development of rice agriculture in Louisiana is discussed in detail in the following chapter.

Twentieth Century Development

During the first two decades of the twentieth century, agriculture remained the primary economic focus of St. James Parish. Sugar was cultivated on the higher grounds situated close to the Mississippi River, and rice was grown on the wet back lands. Cultivated fields extended from the river for a distance of three to six miles (Fortier 1914:415). In addition to major cash crops, vegetables and Perique tobacco were grown on small farms. The lumber industry also flourished sufficiently to support a local sawmill.

The 1920s saw a decline in the lumber industry. Drought dried the swamps in 1924, and a hurricane in 1926 destroyed significant quantities of lumber and blocked lumber canals with fallen trees. The 1927 flood further disrupted lumber transportation. By the early 1930s, Louisiana's supply of virgin cypress was depleted. Lumber mills across the state began to close, coincident with the advent of the Great Depression.

By the 1950s, only 69,503 acres of land were cultivated in St. James Parish, of which 20,000 were dedicated to cane agriculture. Most cane fields were on the west bank of the river. In the low-lying areas, rice cultivation remained important. Truck farming of vegetables began to assume a more important role in local agriculture; Perique tobacco was still grown in small quantities. From the 1940s on, cattle were raised in increasing numbers, with fallow rice and cane fields being used as pasture. In the 1950s, most farms in St. James Parish were operated by their owners, with tenant farmers working the remaining lands (St. James Parish Development Board 1954). The largest single industry in the parish in the 1950s was the refinement of cane sugar. Plants for milling and drying rice also operated within the parish, as did a Spanish moss gin, an ice factory, and a cement works.

Rice no longer is cultivated in St. James Parish, but agriculture remains an important part of the parish economy. Soybean cultivation has increased, and crawfish farming is a new and growing industry. Cane, tobacco, corn, hay, oats, fruits, vegetables, and livestock are still important products.

The petrochemical industry has assumed increased importance to the St. James Parish economy since the 1940s and 1950s. Both oil and natural gas are produced; despite the present statewide recession, oil refining is still a major industry.

Land Tenure Within The Project Area

During the nineteenth century, the Vacherie Site (16 SJ 40) was comprised primarily of two plantation landholdings. Magnolia Plantation was located at the upriver portion of the project area in Township 12S, Range 17E, Sections 25, 83, 75, 76, 71, and 82. Crescent Plantation was located at the lower end of the project area in Sections 32, 33 and 34. Several smaller tracts of land divided the two plantations. These holdings remained small farms throughout their histories. Sugar and rice production between 1844 and 1917 for Magnolia and Crescent Plantations, and for the small farms located between them, are shown in Tables 2 through 5.

Magnolia Plantation

The Frederic family comprised the original claimants of what became Magnolia Plantation. In their federal land claims, the early history of this portion of the project area was recounted, beginning with a 1755 concession to Andre Neau. The property granted consisted of a certain tract of land measuring twenty arpents front on the Mississippi River by forty arpents in depth. It originally was granted by Governor Louis de Kerlerec to Andre Neau, and later transferred to M. Delery. Delery proved unable to support the road and levee along his frontage, and the French crown reannexed 12 arpents front. The remaining eight arpents front by 40 arpents deep passed, through a series of sales to Mathias Frederic. Frederic also acquired six arpents and 13 toises granted to Juan Mouton in 1773 by Governor Luis de Unzaga. In 1783, Frederic obtained a regular order of survey from Governor Esteban Miro, thus securing the title to his 14 arpents and 13 toises frontage. In 1807, this parcel of land was claimed by Pierre Frederic for himself, Francois Frederic, Antoine Frederic, Noel Guisclair (husband of Charlotte Frederic), and for the infant heirs of Mathias Frederic, who was deceased by that time (Lowrie and Franklin 1834:266, 268, 285). This property is the earliest documented settled land in St. James Parish.

Between 1812 and 1827, Sosthene and Zenon Roman bought the tracts of land that were to become Magnolia Plantation. The upper portion, which consisted of eight arpents and 14 toises front by 40 arpents in depth, was bought from Mrs. Louis Patin, the widow of Jacques Roman, on May 2, 1812 (COB 5, Folio 385, St. James Parish). The Romans subsequently purchased a total of ten arpents front from the heirs and successors of Mathias Frederic. An additional four arpents front were purchased from Antoine Frederic on March 18, 1814 (COB 4, Folio 525, St. James Parish), bringing the Romans' holdings in the area to a total of 12 arpents and 14 toises front. Two more arpents front were purchased from Mathias and Jean Baptiste Frederic in 1815 (COB 4, Folio 963, St. James Parish). Finally, four arpents at the downriver end of the present project area were acquired at the succession sale of Marie Frederic, widow of Francois Frederic, on May 14, 1827 (COB 10, Folio 89, St. James Parish). On January 26, 1831, Sosthene Roman bought the

Table 2

SUGAR AND RICE PRODUCTION AT CRESCENT PLANTATION, 1844-1916
(After Champomier 1844-1860; A. Bouchereau and L. Bouchereau 1871-1916)

Year	Owner Manager	Sugar (Hogsheads)	Rice (Barrels)
1844	Evariste Champagne	52	
1845-1846	Evariste Champagne	32	
1849-1850	Est. of Evariste Champagne	15	
1850-1851	Evariste Champagne	2	
1851-1852	Evariste Champagne	15	
1852-1853	Theodule Trepagnier	---	
1853-1854	Edmond Trepagnier	6	
1854-1855	Edmond Trepagnier	82	
1855-1856	Edmond Trepagnier	65	
1856-1857	Edmond Trepagnier	---	
1857-1858	Edmond Trepagnier	---	
1858-1859	Edmond Trepagnier	75	
1859-1860	Edmond Trepagnier (24) A. Trosclair (12)	36	
1871-1872	A. Miltenberger & Company	157	
1872-1873	A. Miltenberger & Company	181	
1873-1874	A. Miltenberger & Company	83	
1874-1875	Emile Legendre	104	215
1875-1876	Emile Legendre	80	340
1876-1877	Emile Legendre	172	1460
1877-1878	Emile Legendre	90	600
1878-1879	Emile Legendre	145	775
1879-1880	Emile Legendre	185	168
1880-1881	Emile Legendre	190	652

Year	Owner Manager	Sugar (Hogsheads)	Rice (Barrels)
1881-1882	Emile Legendre	76	435
1882-1883	Emile Legendre	---	5755
1883-1884	Est. Emile Legendre	---	3500
1884-1885	"Sundry Planters"	---	1605
1885-1886	Emile Legendre	---	1650
1886-1887	Emile Legendre	---	1100
1887-1888	Louis Himel	---	4000
1888-1889	Louis Himel	---	3850
1889-1890	Louis Himel	---	
1890-1891	Louis Himel	---	
1891-1892	Louis Himel	---	
1886-1897	Louis Himel	No Yield	
1897-1898	Louis Himel	703,500 lbs.	
1898-1899	Louis Himel	758,520 lbs.	
1899-1900	Louis Himel	422,476 lbs.	
1900-1901	Louis Himel	705,385 lbs.	
1902-1903	Louis Himel		
1904-1905	Louis Himel	567,290 lbs.	
1905-1906	Louis Himel	497,000 lbs.	
1906-1907	Louis Himel		
1907-1908	Louis Himel	400,000 lbs.	
1911-1912	Louis Himel		
1912-1913	Joseph Waguespack P & M Company	No Yield	
1913-1914	Joseph Waguespack P & M Company	275,282 lbs.	
1914-1915	Joseph Waguespack P & M Company	550,000 lbs.	
1915-1916	Joseph Waguespack P & M Company	---	

Table 3

SUGAR AND RICE PRODUCTION OF FARMS BETWEEN MAGNOLIA AND CRESCENT PLANTATIONS, 1844-1890
(After Champomier 1844-1862; A. Bouchereau and L. Bouchereau 1869-1890)

Year	Owner/Manager	Sugar (Hogsheads)	Rice (Barrels)
1844	L. Simon & Co.	84	
	J. S. Armant	380	
1845-1846	Simon Bros.	100	
	J. S. Armant	340	
1849-1850	Simon Bros.	89	
	Gen. J. S. Armant	365	
1850-1851	Simon Bros. & Others	55	
	Gen. J. S. Armant	312	
	J. Waguespack & Sons & Others	62	
1851-1852	Simon Bros.	88	
	J. S. Armant	338	
	J. Waguespack et al.	70	
1852-1853	Simon Bros. & Others	175	
	J. S. Armant	350	
	J. Waguespack & Sons & Others	82	
1853-1854	Simon Bros. et al.	160	
	J. S. Armant	616	
	J. Waguespack & Sons	118	
1854-1855	Simon Bros. et al. (75 hhds. burnt)	75	
	J. S. Armant	466	
	J. Waguespack & Sons	141	
1855-1856	Simon Bros. et al.	49	
	J. S. Armant	286	
	J. Waguespack et al.	92	
1856-1857	Simon Bros. et al.	6	
	J. S. Armant	210	
	J. Waguespack et al.	15	
1857-1858	Simon Bros. et al.	54	
	J. S. Armant	250	
	J. Waguespack	101	
1858-1859	Simon Bros. et al.	65	
	J. S. Armant	235	
	J. Waguespack et al.	130	

Year	Owner/Manager	Sugar (Hogsheads)	Rice (Barrels)
1859-1860	Leufroy Simon	60	
	Est. J. S. Armant	195	
	J. Waguespack & Sons	72	
1860-1861	Leufron Simon	46	
	Est. J. S. Armant	275	
	J. Waguespack & Sons	56	
1861-1862	L. Simon	120	
	Est. J. S. Armant	520	
	J. Waguespack & Sons	237	
1868-1869	J. V. Armant & Others		
	H. Oubre		
	Simon Bros.		
	Total	---	**1285**
	Est. J. S. Armant	160	
1869-1870	J. V. Armant & Others		
	H. Oubre & Others		
	Simon Bros. & Others		
	Total	—	**1325**
	Est. J. S. Armant	13	
	Jos. Waguespack & Sons	65	
1870-1871	Simon Bros.	No Yield	
	Est. J. S. Armant	200	
1871-1872	Simon Bros.	18	
	Silver Luguet	6	
	Telesford Waguespack	6	
1872-1873	Simon Bros.	29	
	Silver Luquet	4	
	Telesford Waguespack	9	
1873-1874	Simon Bros.	20	
	Silver Luquet	4	
1874-1875	Dominque, Bouy & Co.	---	
	Simon Bros.	36	
1875-1876	John V. Armant		
	James Hubbell		
	M. Frederic		
	Dominique, Bouy & Co.		
	Simon Bros. & Others		
	Total	—	**738**

Year	Owner/Manager	Sugar (Hogsheads)	Rice (Barrels)
1876-1877	John V. Armant James Hubbell M. Frederic Dominique, Bouy & Co. Simon Bros. & Others F. Oubre Silver Luquet		
	Total	—	**1670**
1877-1878	John V. Armant James Hubbell M. Frederic Dominique, Bouy & Co. Joseph Durbe Simon Bros. & Others F. Oubre Silver Luquet		
	Total	—	**730**
1878-1879	John V. Armant M. Frederic Dominique Bouy & Co. Joseph Oubre O. Waguespack T. Kilbert Widow Michel Simon Dr. P. C. Tircuit Dr. O. Gaudet P. C. Simon T. Oubre Widow F. Simon S. Luquet		
	Total	—	**901**
1879-1880	J. V. Armant M. Frederic J. Oubre Dr. P. C. Tircuit Dr. O. Gaudet P. C. Simon T. Oubre Widow F. Simon S. Luquet		
	Total	—	**152, and 1 No Yield**

Year	Owner/Manager	Sugar (Hogsheads)	Rice (Barrels)
1880-1881	J. V. Armant M. Frederic J. Oubre Widow F. Simon		
	Total		**279**
1881-1882	J. Oubre	4	
	Simon Bros.		95
1882-1883	None Listed		
1883-1884	None Listed		
1884-1885	A. Jasmin J. Oubre Widow T. Waguespack J. Luquette		
	Total		**2664**
1885-1886	A. Jasmin J. Oubre D. Bouy O. Gaudet		
	Total		**2690**
1886-1887	A. Jasmin J. Oubre D Bouy O. Gaudet		
	Total		**3657**
1887-1888	Dr. O. Gaudet	660	
1888-1889	J. Oubre Widow T. Waguespack Alcide Kilbert Dr. Oscar Gaudet Widow Froizin Simon T. Oubre's Tenants S. Louquete (*sic*) T. Davis et als.		
	Total		**4196**

Table 4

SUGAR PRODUCTION AT MAGNOLIA PLANTATION, 1844-1862
(After Champomier 1844-1862)

Year	Owner/Manager	Hogsheads Sugar
1844	Sosthene Roman	570
1845-1846	Sosthene Roman	427
1949-1850	Sosthene Roman	397
1850-1851	Sosthene Roman	168
1851-1852	Sosthene Roman	418
1852-1853	Sosthene Roman	341
1853-1854	Sosthene Roman	577
1854-1855	Sosthene Roman	474
1855-1856	Sosthene Roman	180
1856-1857	Sosthene Roman	188
1857-1858	Denny, Cox & Hyronemous (*sic*)	220
1858-1859	J. H. Riggins & Co.	267
1859-1860	J. H. Riggins & Co.	361
1860-1861	Est. J. H. Riggins	278
1861-1862	Est. J. H. Riggins	900

Table 5

RICE PRODUCTION AT MAGNOLIA PLANTATION, 1868-1889
(After A. Bouchereau and L. Bouchereau 1868-1889)

Year	Owner Manager	Barrels Produced
1868-1869	P. Maspero & Company	1500
1869-1870	P. Maspero & Company	1400
1870-1871	P. Maspero & Company	---
1871-1872	Mrs. S. Roman	---
1872-1873	Citizen's Bank	No Yield
1873-1874	Victor Armant	560
1874-1875	Legendre & Poche'	1930
1875-1876	Legendre & Poche'	514
1876-1877	Legendre & Poche'	1260
1877-1878	Legendre & Poche'	780
1878-1879	Lange & Legendre	1714
1879-1880	Lange & Legendre	127
1880-1881	Lange & Legendre	865
1881-1882	Elphege Poche'	---
1882-1883	P. Monconduit & Co.	3630 Milled at Magnolia
	A. A. Jacob & Shares	3740 *Milled at Magnolia*
1883-1884	P. Monconduit & Co.	2000 Milled at Magnolia
	A. A. Jacob & Shares	4000 Milled at Magnolia
1884-1885	P. Monconduit & Co.	777
	H. Haas & Co.	555
1885-1886	P. Monconduit & Co.	1210
	Schexnyder & Co.	1320
	Mrs. Alex. Jacob & Co.	1100
	H. Haas, et als	1210

Year	Owner Manager	Barrels Produced
1886-1887	P. Monconduit & Co.	612
	H. Haas, et als	1100
1887-1888	P. Monconduit & Co.	660
	H. Hass	550
1888-1889	Joseph Poirier	550
	Widow Celestine Poche	550
	A. Monconduit & Co.	660
	H. Haas and Tenants	1870

1 Barrel = 200 Pounds

interest of Zenon for the above lands, as well as for other properties that they had owned jointly (COB 32, Folio 182, St. James Parish).

Magnolia Plantation was operated throughout the Roman tenure as a sugar plantation. By 1851, a steam-powered sugar mill was in operation (Champomier 1851). In 1857, Sosthene Roman sold the plantation to a partnership consisting of Jacob Denny, William Hieronymous, and Webb Ross for $270,532.39 (Theodore Guyol, May 20, 1857, NONA). The plantation measured 18 arpents and 23 toises front, bounded above by the property of Duparc and below by that of Valery Armant. The sale included all buildings and improvements, engines and machinery, livestock, carts, wagons, farming utensils, and 120 slaves. In addition, 1,148 shares of stock in the Citizen's Bank of Louisiana were conveyed at that time. The partnership held the plantation property for eight years (Figure 8), although it was operated by J. H. Riggins & Company (Champomier 1859). During this period, sugar continued to be the staple crop of the plantation. A record 900 hogsheads were produced during the 1861-62 season (L. Bouchereau 1869).

On November 15, 1865, a writ of seizure and sale was issued for the property (COB 40, Folio 38, St. James Parish), which was adjudicated to "the widow and a portion of the heirs of the late Sosthene Roman and Mrs. Marie Louise Roman wife of Euphemon S. Roman, one of the heirs of said Sosthene Roman." The consideration was $120,000.00, which was significantly less than the 1857 price. This reduction undoubtedly was due to the loss of the value of the slaves, following the Emancipation Proclamation.

Apparently, the Romans had financial difficulties during the reconstruction period. Several years later, their Magnolia properties featured heavily in a suit involving the Roman heirs; the partnership that had owned and lost the plantation previously; and the Citizen's Bank of Louisiana. The latter had acquired the plantation on May 4, 1872, at a public sale resulting from the case of "Citizen's Bank of Louisiana versus J. Denny, William T. Hieronymous, Webb Ross, and widow and heirs of S. Roman as actual possessors" (#440, 4th Judicial District Court, St. James Parish). The Magnolia property fronting the river subsequently was sold on December 9, 1881, to Elphege Poche. At the time of the sale by the Citizen's Bank, the property still consisted of 18 arpents and 23 toises front, by 80 arpents in depth (COB 49, Folio 157, St. James Parish). All buildings, sugar house, fences, and appurtenances were conveyed at the time of that sale. The bank let the land in question for cultivation during this period, since the sale to Poche was subject to a lease expiring on December 31, 1882. Between 1873 and 1881, the property produced rice exclusively (A. Bouchereau and L. Bouchereau 1873-1881).

Following this series of transactions, the property was subdivided and sold in nine parcels. Poche sold two and one-fourth arpents of the land to Alexander A. Jacob on February 6, 1882 (COB 49, Folio 202, St. James Parish). Poche sold smaller tracts to Eugenie Chenet, Messrs. Esteval, Octave and Maurice Joseph Schexnaydre, Calisse Borne, Celestine Bossier, and Vincent Dickerson (Conveyance records, St. James Parish). Philogene Monconduit, Anatole Monconduit, and Raymond Monconduit bought the largest tracts (six arpents) and divided it evenly. P. Monconduit [or A. Monconduit] & Company operated this property during the 1880s (A. Bouchereau 1883-1889). Poche also sold a three arpent parcel to Hans Haas, listed as a resident of New Orleans, on January 3, 1883 (COB 48, Folio 275; Cob 50, Folio 98, St. James Parish). The 1876 Mississippi River Commission Chart, which was drafted in 1894, labels this tract "Haasburg Plantation." The chart shows Magnolia Plantation immediately upriver from Haasburg (Figure 9). No rice production figures are available after 1889, and no sugar production was reported between 1892 and 1917 (A. Bouchereau 1890-1917). Haas's son, O. L. Haas (personal communication 1984), stated that his father built the last of the numerous rice flumes in the area during 1888 at Haasburg Plantation. Hans Haas relinquished control of this property, however, when served a notice of seizure on May 13, 1895 (COB 53, Folio 502, St. James Parish). The land was sold at a public sale in the suit entitled "George Haas vs. Hans Haas" (#1843, 4th Judicial District Court, St. James Parish). In June 1895, Paul M. Lambremont, Jr., purchased the property at auction for $2,350.00. The sale included all buildings and improvements, twelve mules, one three-mule cart, two four-mule carts, two one-mule plows, eight two-mule plows, three four-mule plows, one six-mule plow, one stubble digger, one cultivator, one revolving harrow, one thresher, one engine boiler and pump, one siphon, gearings, harnesses and "all other movables thereon and thereunto belonging" (COB 53, Folio 502, St. James Parish). Two days later, Lambremont sold one arpent of the property to George Haas (COB 53, Folio 507, St. James Parish). A 1/2 arpent parcel of this property, bounded above

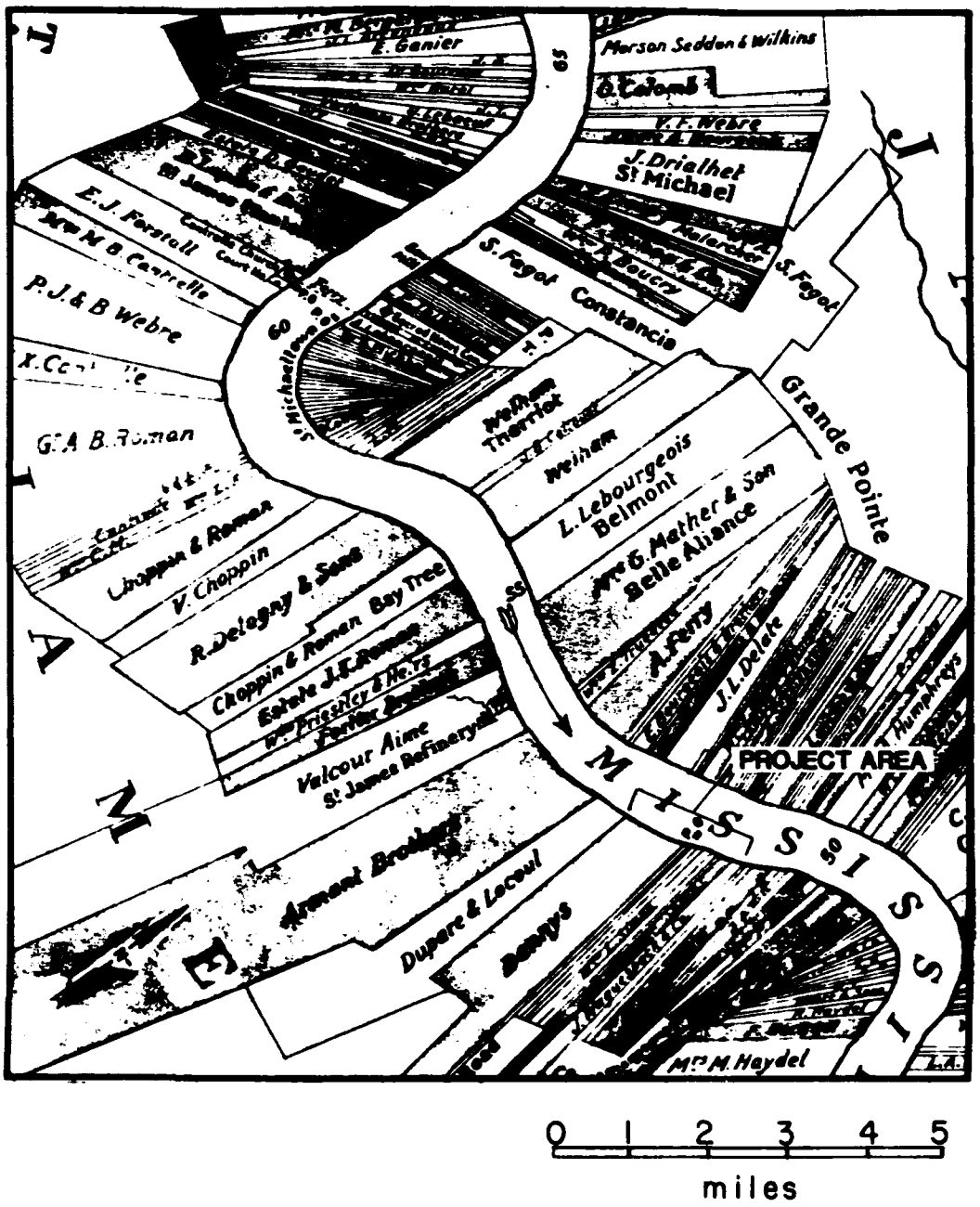


Figure 8. Excerpt from Norman's 1858 "Plantations on the Mississippi River from Natchez to New Orleans," showing the Vacherie project area

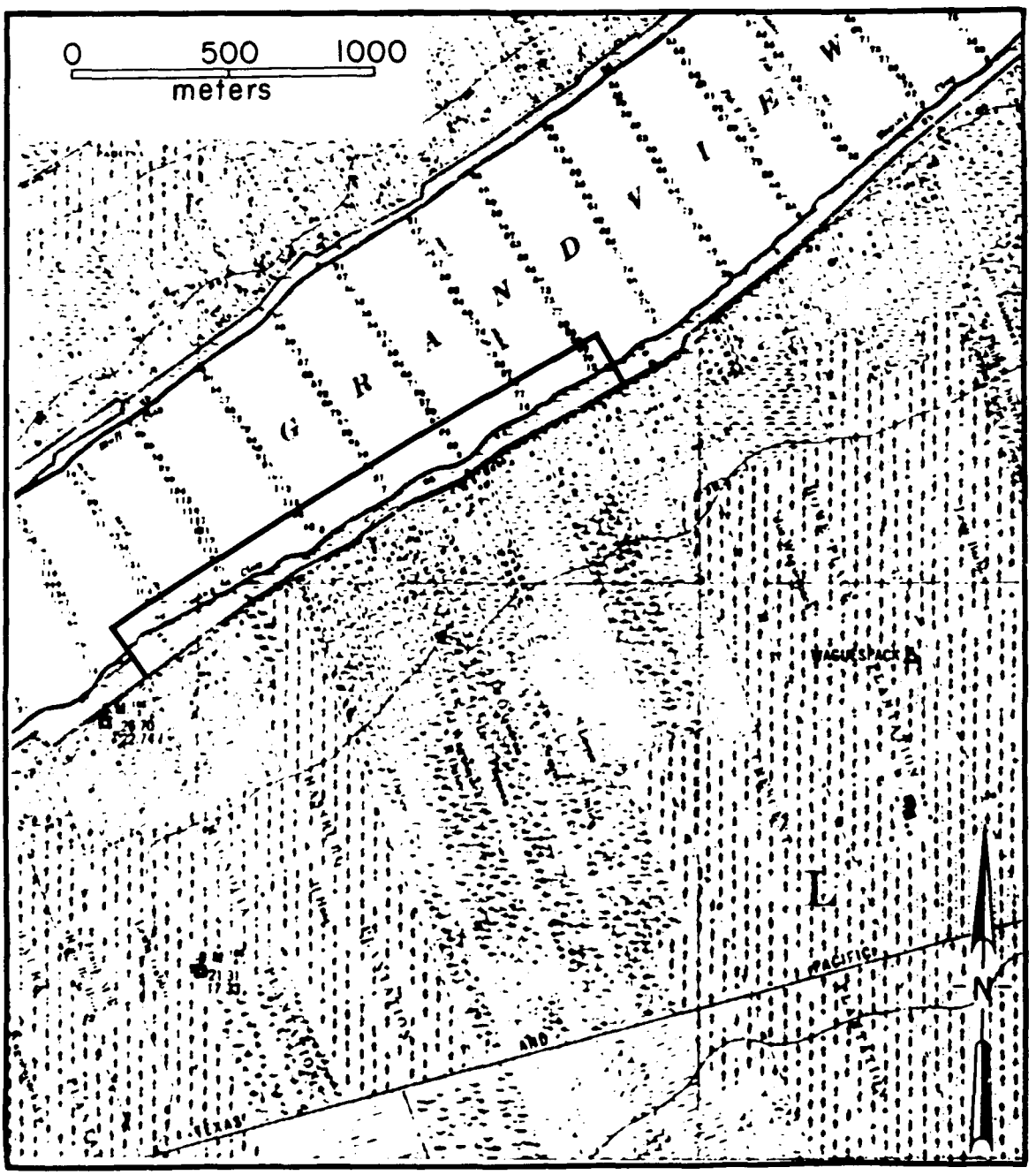


Figure 9. Excerpt from the 1876 Mississippi River Commission Map, showing the Vacherie project area

by Caliste Borne and below by Celestine Bossier, was still held by Elphege Poche at the time of his death. This portion of Poche's succession was adjudicated by Sheriff H. E. Bourgeois to Simon Ernest on December 28, 1883 (COB 50, Folio 440, St. James Parish).

By 1915, Magnolia Plantation was subdivided into many smaller lots. Hans Haas and George Haas owned the only sizable tracts, four and one quarter arpents in parts of Sections 76 and 71, and two arpents in parts of Sections 71 and 82, respectively (Payne 1915:T12S R17E).

The 1954 Tobin survey showed even further subdivision of Magnolia Plantation. Land owners included Lawrence Roussel, Veronica Schexnayder, Eugene Roussel, the Bazile Zenon Estate, the M. Jacques Estate, John Perkins, Anatole Monconduit, Marcellin Alexis, Marcel Alexis, the Eliza Jones Estate, Mrs. Lydia Haas, George Haas, and numerous others. The Haas family still ranked as largest landholder in the Magnolia Plantation area at that time (Tobin 1954:T12S R17E).

Magnolia Plantation no longer exists as a working plantation. Sugar cane is grown to the east at Crescent/Home Place Plantations and in the fields to the west, but the remaining portions of Magnolia Plantation's fields appear to be idle. The bulk of the area is now a part of the town of Vacherie and is primarily residential. Many small houses are located along narrow streets or lanes which seem to follow the old 80 arpent property lines; there are very few cross streets.

Crescent Plantation

As noted previously, the lower end of the project area comprised Crescent Plantation. This holding expanded to a seven and one-half arpents river front property late in the nineteenth century. The original claimant was Louis Falgout (Lowrie and Franklin 1834:269). By 1815, Eugene Champagne owned the property (COB 4, Folio 955, St. James Parish). The Champagne family owned the plantation for nearly 40 years. On May 15, 1852, a two-arpent-front property was sold by Adam Evariste Champagne and Mrs. Adele Champagne Dufresne to Theodule Trepagnier (COB 30, Folio 277, St. James Parish). He retained the property through 1858 (Figure 8).

Ownership of the property is unclear during the 1860s. L. Bouchereau's reports indicate that Crescent Plantation was absorbed by the J.S. Armant Estate during that decade. In 1871, A. Miltenberger & Co. was listed as the owner/manager of Crescent. At that time, the plantation contained a brick sugar house with a shingled roof. Utilizing the steam, kettle, and open pan method of granulation, the plantation produced 157 hogsheads of sugar (Bouchereau 1871). On February 2, 1874, Emile Legendre, the husband of Anais Armant, one of the heirs of John S. Armant, leased the plantation from A. Miltenberger & Co. for one year. The rent charged was $5,000.00. This fee included the use of the buildings, sugar house, mules, carts, plows, and implements of husbandry. Legendre also was allowed the free use of the coal, corn and wood on the plantation. In addition to the rental fee, Legendre was required to leave on the plantation enough good cane to plant about 100 arpents of cane in 1875 (COB 40, Folio 313, St. James Parish). The property yielded 104 hogsheads of sugar, and 215 barrels of rice in the 1874-75 season (L. Bouchereau 1875).

Emile Legendre continued to lease the plantation until 1877. After 1874, however, the lessor of record was the Citizen's Bank of Louisiana (COB 40, Folio 558, St. James Parish). Legendre bought the property from the bank in 1877. The consideration for the sale was $28,000.00 (Edgar Grima, February 10, 1877, NONA). The sale included the buildings, sugar mill, mules, cattle, stock, carts, ploughs and farming tools on the property. Shortly thereafter, Louis Hymel gained possession of the land. Figure 10 shows Crescent Plantation in 1894, during the period of Hymel's ownership. In 1894, 15 structures were present on the plantation. No report of crop production was recorded until the 1897-1898 season, when 703,500 pounds of sugar were produced. The sugar mill had been modernized. The brick and shingle-roofed structure housed a steam train, vacuum, and centrifugals (A. Bouchereau 1898). Between 1912 and 1917, the Joseph Waguespack Planting and Manufacturing Company, Limited, owned and operated Crescent Plantation (A. Bouchereau 1907-1917). In addition, a 1915 survey listed J. Waguespack P. & M. Co. as owner of a 13 1/8 arpent frontage along the Mississippi River in Sections 32, 33, 34 and 35 of T12S R17E

RIVER RICE ON THE MISSISSIPPI
1884-1896

Modified from MAP OF THE LOWER MISSISSIPPI RIVER FROM MOUTH OF THE OHIO RIVER TO THE HEAD OF THE PASSES (Mississippi River Commission. 1884 & 1900. 1895-96 & 1916)

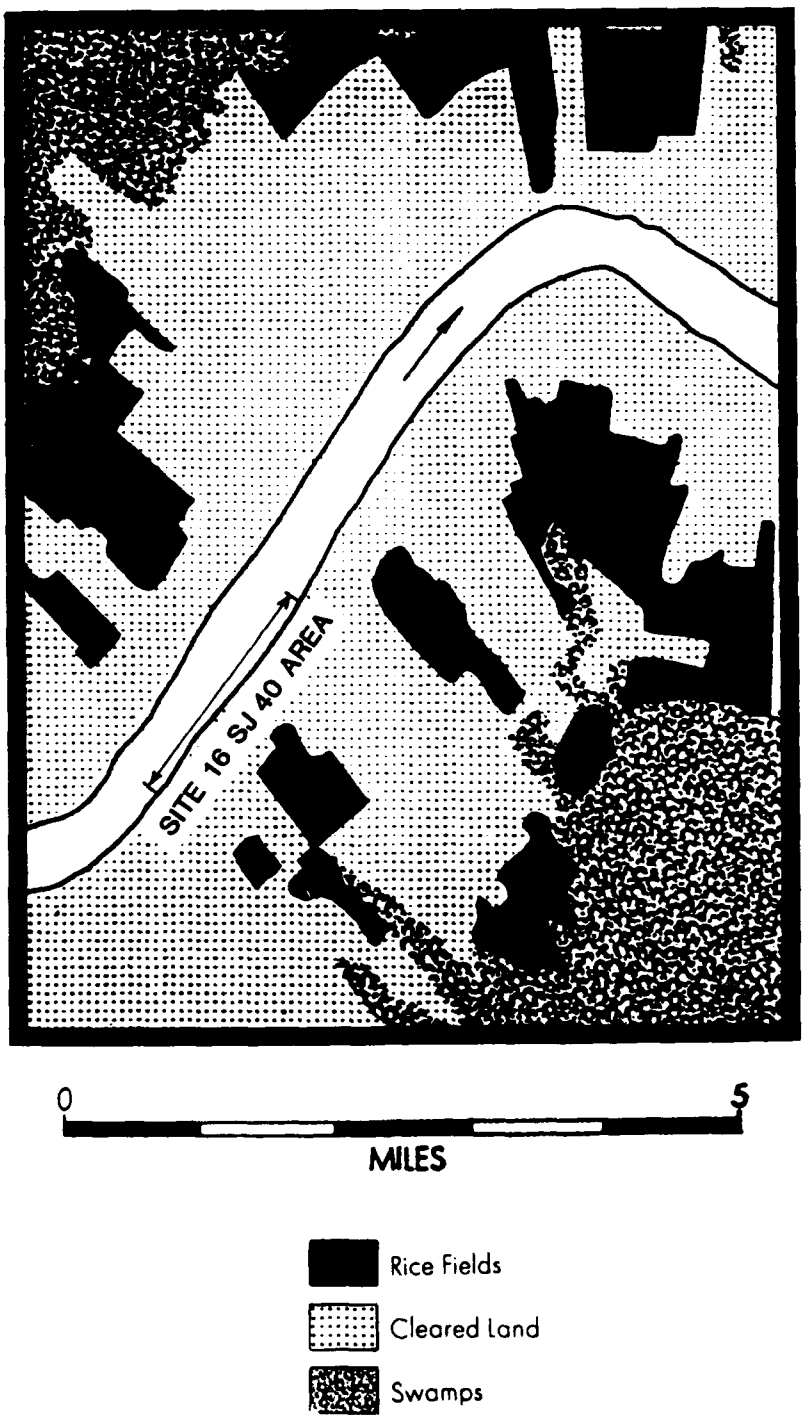


Figure 10. River rice on the Mississippi, 1884-1896

(Payne 1915:T12S R17E).

The 1954 Tobin survey lists Leroi Waguespack et al. as the owner of Crescent Plantation. The adjacent plantation, Home Place, was owned by the Joseph Waguespack Estate et al. (Tobin 1954:T12S R17E). Home Place Plantation lies east of the project area. The Waguespack family presently operates it as a sugar cane plantation in combination with Crescent Plantation (Mrs. Waguespack, personal communication 1990).

The 1989 St. James Parish Tax Rolls list Crescent Plantation as 1,028 acres of agricultural and marsh lands bounded by V. Hymel & Son and by Home Place Plantation, and valued at "19180" [$191,800.00]; the owners named are Joseph A. Waguespack et al. of Vacherie, Louisiana (St. James Parish Tax Rolls 1989:Ward 6:Assessment No. 116513). Both Crescent and Home Place Plantations currently are for sale, and the two old Crescent Plantation family homes located along La. Hwy. 20 (River Road) are in the process of being torn down. The present owners are living in a former elementary school -- the first built in St. James Parish -- on the Crescent Plantation grounds (Mrs. Waguespack, personal communication 1990).

Small Farms

Ownership of the intervening farm areas, in Sections 26-32 and 77, was confirmed ca. 1812 in the form of small tracts of three or less arpents front each. From upriver to downriver, the claimants were the heirs of Mathias Frederic, George Autin, Etienne Toup, Pierre Frederic, Christopher Trosler (Trosclair?), Gabriel Rodrigues, and Jean Rom (Appendix III).

During the antebellum years, annual sugar reports noted that a few farmers in this intervening area engaged in sugar cultivation. In 1857, a number of residences and commercial establishments were present in this portion of the project area. These included: Armand & Sons' Store; the farmstead of Valery Armand (Armant); the Vacherie Landing Wood Yard; the residence of Henry Frederic, listed as a corn producer; Louis Emma's Store; Thelesfort Waguespack (also listed as Waigespack), who grew corn; residences of the Widows Michel Simon and Lefroid Simon, both listed as growing sugar; Amede Arcenaud (Arcenaux), a merchant; and, Drosin Luquet, Jr., John S. Armant, Joseph Waigespack [sic], Norbert Zeringue, and Widow Drosin Luquet, all of whom produced sugar (Henry and Gerodias 1857).

After the Civil War, a hiatus in economic activity in the area persisted for approximately 10 years. During this period, little sugar was grown. Rice cultivation began during 1875, and after this date a rapid growth in the number of rice farmers in the area continued until ca. 1890. Producers in 1879 included John V. Armant, M. Frederic, Dominique Boury & Company, Joseph Oubre, O. Waguespack, Theodule Kilbert, Widow Michel Simon, Dr. P.C. Tircuit, Dr. O. Gaudet, P.C. Simon, T. Oubre, Widow F. Simon, and Sylvere Luquet. Dr. O. Gaudet had the only listed sugar mill; it was constructed of wood and housed a steam and kettle operation. In 1889, the farmers included H. Haas and tenants, Joseph Oubre, Widow Tele. Waguespack, Alcide Kilbert, Dr. Oscar Gaudet, Widow Froizin Simon, T. Oubre's tenants, Sylvere Louquet, and Theodule Davis. Not a single sugar house was listed for any of these holdings. A. Bouchereau and L. Bouchreau (1869-1890) dropped the rice producers from the report beginning in 1890, but undoubtedly that crop continued to be harvested in the area.

Figure 10 illustrates the project area in 1894. Landholders at that time included J. and R. Oubre; J. Waguespack; Dr. O. Gaudet; F. Simon; T. Oubre; and, S. Luquet. At that time, few fields appeared to be cultivated. However, numerous small buildings indicative of extensive residential development were present.

Julius Hubble was listed as owner of a 3 arpent tract in Sections 26 and 77 on a 1915 survey; all other owners held very small or narrow lots at that time. This survey gave no indication of land usage then (Payne 1915:T12S R17E).

The 1954 Tobin survey showed numerous land owners in this area. Among these owners were George Haas, Rose McGowan Simon, the Julius Hubbel Estate, Gilbert Oubre, Suzanne Hymel, the

Hermogene Oubre Estate, Wilfred Waguespack, Adam Waguespack, Alcide Kliebert, Roselus Kliebert, the Maurice Goudet Estate, Henry Simon, Sylver Luquette, Renaud Lequette, Mrs. Edward Oubre, Edwin Oubre, the Mrs. Numa Luquette Estate, the Willie Hymel Estate, and the Valsin Hymel Estate.

This "Small Farms" area now lies on the eastern fringe of the present-day community of Vacherie. The residential building pattern resembles that of Magnolia Plantation. Some fields can be seen beyond the houses, but none seem to be in cultivation.

Summary

It is clear from the archival record that the Vacherie area produced substantial and fairly consistent amounts of rice during the late nineteenth century. The archeological record of rice cultivation is observable in a series of cypress flumes visible along the batture at low water. According to O. L. Haas (personal communication 1984), the majority of the flumes were constructed prior to 1888. The number and regular spacing of the flumes within the project area suggest that one flume may have serviced each of the farms. Although the design of these flumes was determined largely by function, technology, and available materials, both their distribution across the Vacherie Site and their morphological similarity indicate at minimum the large scale adoption of a specific agricultural technology, i.e., river-rice production. The construction of irrigation systems as a community effort would have been particularly efficient for small-scale farmers, particularly in the postbellum period when labor was in short supply. In addition, a number of tenant properties were present, as indicated in the 1889 and 1890 sugar and rice reports (A. Bouchereau 1889-1890). Thus, intensive rice cultivation during the late nineteenth century in the Vacherie area appears to represent an adaptation to the postbellum environment that cross cuts economic strata, and that served small and large farmers alike. On the larger plantations, it is almost certain that more than one flume was required. The spacing of these corresponded with the more substantial irrigation ditches running perpendicular to the river.

Between 1875 and 1890, rice surpassed sugar as the major cash crop of the area. Crescent Plantation, which produced both rice and sugar until 1882, was the one notable exception. Between 1887 and 1890, the areas above and below the Vacherie Site again were producing sugar (Wojtala et al. 1990; Shannon et al. 1990); the parcels at Vacherie continued to cultivate rice exclusively. After 1896, Crescent Plantation, with Louis Hymel as planter, was the only property in the project area that reported any sugar production.

St. James Parish was sparsely settled until the Spanish colonial period. The early Acadian immigrants established small farms and concentrated on subsistence agriculture. The American acquisition of the Louisiana territory and the subsequent growth of the sugar industry led to the consolidation of these small holdings into large plantations dedicated to monocrop agriculture; the Vacherie Site lies largely within the boundaries of two such plantations. The Civil War and the economic depression which followed led to a decline in the importance of sugar cane as a staple crop; to the development of the postbellum rice industry; to an increase in the importance of small farms; and, to accelerated economic diversification.

CHAPTER V

THE RICE INDUSTRY OF LOUISIANA

Rice Cultivation in North America

Although rice represents a major food crop in Louisiana, few authors provide a comprehensive study of rice production with the state. Linscombe (1904), Williamson (1940), Bagent (1987), Shutts (1951), and Chaffey (1969) contribute useful information with an agricultural focus. However, Lee's (1960) study remains the most comprehensive study to date, as it provides a historical and cultural framework for the development of the rice industry in Louisiana. The following discussion relies, in part, on Lee's dissertation.

It is impossible to determine exactly when rice cultivation was first successfully introduced into the western hemisphere. The first attempt to grow rice in the English colonies of North America occurred in Virginia, when Sir William Berkeley attempted to grow the grain in 1647. His efforts proved unsuccessful. The first attempts at rice cultivation in South Carolina possibly occurred about 1650. Traditional accounts, however, claim that rice cultivation in South Carolina did not begin until 1694. It was during that year, supposedly, that a vessel sailing from Madagascar was blown off course in a storm and arrived at Charleston. The captain of the vessel gave a resident of the town, Landgrave Thomas, a bag of rice. Several years later, a second bag of rice arrived in the colony, sent by a Mr. Du Bois, treasurer of the East India Company. It is thought that these two separate events resulted in the cultivation of two types of rice in colonial South Carolina: Carolina Gold and Carolina White. The seed that arrived from Madagascar in 1694 produced the strain of rice known as Gold. It was so named because the hull was deep-orange in color. It was a medium long-grain type which was superior to the strain that was grown previously in the colony (Lee 1960:75-76).

This interesting tale notwithstanding, it is certain that rice was cultivated in the colony before 1694. By 1670, immigrants from Barbados settled in South Carolina (Dethloff 1988). They facilitated the development of the plantation system, which incorporated slavery. In Barbados, they raised sugar and rice; in South Carolina they cultivated rice. The same primitive methods were practiced in South Carolina as in the West Indies: shifting, slash and burn land clearing, and swamp rice cultivation without the benefit of a controlled system of irrigation. A pamphlet published in 1666 mentions the growing of rice. A petition which the settlers of South Carolina circulated in 1691 requested that they be allowed to pay their rents in kind: "...this we are the most confident of because we are encouraged wth. several new rich commodities as Silk, Rice & Indigo, wth. are naturally produced here" (Simkins and Roland 1972:32; Lee 1960:75, 204). By 1700, rice demonstrated its compatibility with the swamps of South Carolina. Rice cultivation expanded rapidly in South Carolina and spread into Georgia and North Carolina. Commercial production of rice in the Carolina region may be divided into two phases: inland-swamp and tidal-water swamp rice. The former dominated until 1776, although the latter was introduced in 1758 (Simkins and Roland 1972:32, 57; Lee 1960:204). The principal concern of southern farmers was which cash crop their land would best support. However, rice and sugar were exceptions. The cultivation of these crops required specific locations that generally were unsuited to the production of other food staples. These requirements restrained rice planters to low-lying areas near tidewater, which provided an easy method of irrigation (Hilliard 1972:36). Shortly after 1700, rice planters were making 40 per cent on their investments. The cultivation and sale of rice formed the basis for a small but wealthy aristocracy that stretched along the coast.

Early rice planters managed to flood their fields by damming streams above inland swamps. After 1758, rice producers turned to tidal-flowing. Levees, ditches, and sluices enabled the farmers to flood their fields three times a year by making use of fresh-water tides. About this time, drills and harrows were substituted for hand labor. Sticks and windfans were replaced by water-powered threshing machines (Simkins and Roland 1972:57).

The development of a commercial rice industry during the colonial period altered the coastal landscape. Slave labor using axes and hoes, and receiving little assistance from animal power or wheeled vehicles, shaped the countryside. Swamps were cleared and drained. The necessary ditches, levees, and

reservoirs were constructed in irregular fashion. Wealthy rice planters constructed large homes. These palatial mansions were elevated on pilings to prevent inundation. Nearby were slave quarters. These one and two-room cabins were constructed closer to the rice fields (Lee 1960:86).

A change in irrigation techniques occurred after the American Revolution. Rice cultivation extended into tidal swamps. The dense forest that covered the previously uncultivated area as far inland as the tidewater flowed was cropped. Levees shut out the tides, and swamps were drained. These same levees were used to regulate the flooding of the rice fields according to the wishes of the planter. Some of the levees meandered along the natural course of streams. Less substantial, straight levees divided the fields. Canals ran parallel to the levees. Numerous pipes and water gates of various sizes allowed the water to pass through the levees into the canals. These same apparatuses enabled the water to flow from the canals into the ditches (Simkins and Roland 1972:114; Lee 1960:87).

The newly developed areas of rice cultivation brought with them an expansion of the plantation system. This new generation of rice planters constructed their mansions on the higher elevations along the rivers. Levees often surrounded these homes to prevent inundation. Oak trees were planted to provide shade. These planters also relied on slave labor. The slaves lived in houses that were built near the master's residence. They were constructed in rows, and the rows were divided by streets. The slaves' quarters usually were constructed of wood, with two houses joined together into a double pen house. The common wall included a chimney in the center that was used by residents of both sides. Each side usually consisted of a living room and two sleeping rooms. Log or brick piers elevated these quarters (Lee 1960:87).

The use of slave labor posed a problem for the rice planters. What were they to do with their laborers during those periods of the year when they were not needed in the rice fields? The answer was indigo, the growing of which did not conflict with the labor demands of rice. Taken together, these two crops required so many unpleasant tasks that probably only slaves could have been induced to perform them. Non-slave laborers were repulsed by the fermentation and pressing of indigo. Rice and indigo, along with tobacco, provided the basis for the Tidewater aristocratic life.

One consequence of these demands upon labor was the absence of non-slave owners in the malaria-infested swamps. Even the planters and their families moved into town or upland into the piney woods during the sickly seasons. The overseer's whip maintained discipline in the rice country, probably more so than anywhere else in the South. The slaves who cultivated rice had one advantage over those who labored on tobacco or cotton plantations. The task system, as opposed to gang labor, prevailed on the rice plantations. Each slave was assigned a specific task to accomplish every day. Once they completed that task, the slaves were free to rest (Simkins and Roland 1972:61-62).

Plows pulled by draft animals were introduced in the tidal swamp fields after the American Revolution. A sickle was used to harvest rice throughout the inland-swamp and tidal-swamp periods. After it was cut, the rice was placed on the stubble for one or two days to dry. Once it dried, it was tied in bundles and stood upright in stacks. Occasionally, these small stacks were combined to form larger ones, 12 to 16 ft in diameter, which provided additional protection for the crop until it was threshed. It remained in this position until the grain was moved to the threshing grounds. Slaves carried the bundles on top of their heads. Flats and two-wheeled carts eventually enabled fewer slaves to handle larger stacks.

Flails and animal treading threshed the grain until the 1830s, when a threshing machine was introduced. In 1839, a thresher developed in New York, was tested on a rice plantation along the Santee River in South Carolina. An apparatus similar to that which drove the cotton gin also drove the machinery of the thresher. The results were less than satisfactory, but this prototype was further developed until a successful model was constructed (Lee 1960:85, 204).

Milling during the period of inland-swamp rice cultivation was done by mortar and pestle and hand- and horse-powered mills. Hand- and horse-powered mills were the principal means of milling until early in the nineteenth century. In 1780, a man named Lucas constructed a mill driven by tidal action. This water-powered machinery operated cast-iron mortars in ironclad pestles. Each pestle held five bushels of

rough rice. Lucas continued to experiment with rice mills. In 1801, he successfully demonstrated the first steam-powered rice mill. Lucas' technology soon was incorporated in mills in England and, later, in the commercial rice areas of Asia. A rice huller, developed in the second decade of the nineteenth century, also stimulated cultivation of that crop (Williamson 1940:43; Lee 1960:85).

Rice and sugar producing areas imported a larger percentage of their food than any of the other major agricultural regions. Importation was facilitated by water transportation. Areas of rice and sugar cultivation comprised a higher percentage of plantation-size landholdings; a correspondingly higher proportion of slaves comprised their population. Undoubtedly, other foodstuffs were produced on rice plantations. Their immense acreage usually encompassed some better-drained interfluvial land (Hilliard 1972:36).

The people along the coast of Georgia and the Carolinas consumed substantial quantities of rice. Rice quickly became a staple in the diet of both blacks and whites in those counties with extremely high production and correspondingly low costs. Travelers in the region before the Civil War noted that rice, coupled with corn bread, had replaced wheat bread as the principal grain in the diet. One plantation visitor recorded: "I always eat from this dish of rice at breakfast because I know it to be very wholesome. People generally eat it with fresh butter, and many mix with it also a soft-boiled egg" (Hilliard 1972:50, 169). Another favorite was a breakfast roll made with rice flour. The inferior grades and the cracked rice, those grains broken during the milling process, provided a cheap source of food for the slaves in lieu of corn.

The tremendous consumption of this local commodity is an excellent example of how food availability influences culinary traditions; traditional rice dishes remain popular in the Georgia-Carolina region, even though rice no longer is grown in the area. Outside the region, however, rice formed a lesser part of the average diet before the Civil War (Hilliard 1972:50-51, 159, 169).

Rice production was substantial before the Civil War. It was one of the South's leading cash crops. The best grades of rice were produced for sale throughout much of the United States, the West Indies, and Europe (Dethloff 1988). They would bring a higher price than an equal amount of corn. Commercial production, however, basically was restricted to a few counties along the South Atlantic Coast. In 1849, South Carolina produced over 50 per cent of the total rice crop in the United States. South Carolina's production, when added to that of North Carolina and of Georgia, amounted to 90 per cent of the rice produced in the United States that year (Hilliard 1972:169; Lee 1960:85).

South Carolina, Georgia, and North Carolina represent the oldest rice growing area of the United States. This region led the nation in rice production until the 1850s, when rice cultivation declined. Rice planters in this region never fully recovered following the Civil War (Lee 1960:86). Several factors brought about this decline in rice production along the Atlantic coast: untimely storms and freshets, declining prices, and loss of labor. Any chance of a recovery was destroyed in the late nineteenth century by the introduction of rice cultivation in southwestern Louisiana in conjunction with the use of modern machinery and irrigation systems. The new machinery could not be used in the tidal swamps along the Atlantic coast, which for decades had been the best lands for rice cultivation. Land values dropped accordingly. By 1880, South Carolina production dropped to 52 million pounds. In 1895, only 27 million pounds were harvested. The passing of another fifteen years saw the virtual extinction of rice cultivation in that state (Simkins and Roland 1972:332; Lee 1960:86). Today, giant oaks are the most visible remains of many of the rice plantations that operated before the Civil War. A closer investigation of these sites reveals ruins of plantation buildings, miles of levees and ditches, mill ponds, remnants of water gates, and debris associated with those who lived on the plantation.

Numerous farmers and planters farther inland, however, grew rice on a small scale. An acre or two of rice planted near a small stream, which provided the irrigation, provided the owners with a valuable food supply. This production has received little attention by historians and other scholars of the antebellum South. The remnants of numerous "rice patches" still dot the southern landscape (Hilliard 1972:169, 274fn25; Lee 1960:87).

Early Rice Production in Louisiana

Historic rice production in southeastern Louisiana utilized three basic cultivation techniques. The earliest widespread method of cultivation was termed Providence rice. Rainfall supplied most of the water necessary for flooding the fields. Overflowing rivers and bayous sometimes supplemented the rainfall. Consequently, the time and depth of flooding were beyond the farmer's control. The term is used in this report to distinguish rice cultivation with no controlled water supply. Providence rice was grown extensively in the state prior to the mid-nineteenth century; by 1839, Providence rice production in Louisiana ranked third in the nation behind South Carolina and Georgia. Upland rice, a second cultivation technique, was very similar to Providence rice. It was grown on higher ground than Providence rice, and relied totally on rainfall for irrigation. The third type, river rice, was grown along waterways such as the Mississippi River; water from the river was siphoned or pumped into rice fields. This provided farmers with a controlled, reliable irrigation system for rice (De Bow 1846; Lee 1960; Dethloff 1988). These rice cultivation techniques are discussed more fully later.

The first report of rice in connection with Louisiana occurred in 1710. Diron d'Artaguette wrote the Count de Pontchartrain that he was trying to secure rice seeds for the Indians, because he thought rice would flourish in the region. Two years later D'Artaguette despaired about his inability to secure the seeds. He added, "The Indians grow their Indian corn on fields that are inundated by the overflowing waters; these are the only places that are productive. I think that rice will grow well there" (Davis 1965:72; Lee 1960:89, 92, 98, 115, 117).

The failure of the French settlers to begin cultivating rice during this period is due primarily to the fact that they disliked farming. Commissary General Hubert reported in 1716:

> The colonists of the present time will never be satisfied with the infallible resource, accustomed as they are to the trade with the Indians the easy profit from which supports them, giving them what they need day by day like the Indians who find their happiness in an idle and lazy life, who have no taste except for an animal life (Lee 1960:92, 94).

The first rice cultivation in French Louisiana apparently occurred at Dauphin Island (near present-day Mobile, Alabama), in 1716. No record regarding the success of this attempt has been found. In 1718, the Western Company instructed the captain of a vessel engaged in the slave trade with Guinea to secure four hogsheads of rice seed and a few slaves who knew how to cultivate rice. It is possible that the captain returned to Louisiana with the seeds and slaves requested in 1719. A resident of Louisiana from 1718-1734, Le Page du Pratz wrote: "The rice which is cultivated in that country was brought from Carolina. It succeeds surprisingly well, and experience has there proved, contrary to the common notion, that it does not want to have its foot always in the water" (Lee 1960:94, 95). A fourth possibility is that rice already was growing in the swamps of the region. Surviving records of the DeSoto expedition claim that rice grew naturally in marshy spots. The Indians gathered the ripened grain when they encountered it by shaking it into their canoes (Williamson 1940:2).

Of the four possible sources for the first rice seeds secured by the French settlers in present-day Louisiana, i.e., Dauphin Island, Guinea, Carolina, or the local swamps, Dauphin Island is the most likely choice. It is possible that French farmers along Bayou St. John cultivated rice brought from Dauphin Island in 1718, and that their success prompted the India Company to request additional rice seed and slaves knowledgeable about rice cultivation.

Botanical evidence supports the theory that the first rice seed to arrive in Louisiana came from the West Indies, via Dauphin Island. It also eliminates Carolina as a possibility. "Creole" was the common variety of Providence rice in Louisiana. It also was known as "Bull" rice because of its fat kernel: it has a fat grain of short or medium length. The long-grain Carolina Gold seed was not widely used in Louisiana until river rice began replacing Providence rice in 1850. The surviving evidence regarding the difficulty that the colony had in securing rice seed reduces the likelihood that the grain grew naturally in the region.

Rice seed arrived in present-day Louisiana between 1716 and 1720. Considerable quantities of rice were harvested by the German settlers in the area in 1720. In 1719, two villages composed of German settlers were established about 30 mi upriver from New Orleans on the west bank. Indeed, rice already was competing with corn as the principal staple grain in the colony. In 1720, the India Company announced that rice could be purchased from growers in Louisiana. In September, 1721, a hurricane flooded the German settlements. The 1724 census reported that the high water destroyed over 1,000,000 pounds of rice just before it could be harvested. Although this figure seems unrealistic, the Germans undoubtedly cultivated rice. They probably secured their seed from French farmers along Bayou St. John or in the West Indies, where they had stopped during their voyage to Louisiana (Williamson 1940:11; Lee 1960:95-96; Davis 1965:72).

After working their fields, the Germans had to grind corn or rice before they could eat their evening meal. They used a *pilon*, hand mill, or pounding trough. Initially, the Germans lacked domesticated animals, so there was no beef, pork, or poultry to supplement their bland diet of rice, corn, and beans. The combination of these three items varied with the season. The industrious Germans, however, soon ate better than other settlers in Louisiana. They cleared the land more rapidly then the French. Not only did they expand their gardens and grain fields, but they apparently were the first to plant orchards in the colony. Both the quantity and variety of food on their table increased (Davis 1965:88).

Providence rice was a success in Louisiana. Warm temperatures and an abundance of rainfall were well-distributed between April and September, the growing season. The dark-brown clayey soils on the reverse slopes of natural levees, coupled with the relatively flat terrain, favored the semi-aquatic character of rice. Rice was also most successful on lands that were not well-suited for the growing of sugar. Although, Europeans favored wheat, wheat could not be grown successfully along the Gulf coast because of the climate. Rice was preferable to maize as a substitute for wheat. In a letter to the King dated May 12, 1733, Bienville wrote:

> the quality of the soil and the climate are perfectly adapted to rice. It grows here very abundantly and without much work. Three-fourths of the inhabitants live on it and have forgotten wheat bread. This last grain has not been successful at all in the lower part of the colony. The fogs that are caused by the forests and the lakes of these quarters make it rust as soon as it is in the head (Lee 1960:96-97; Wall et al. 1984:78).

Boiled rice soon became the standard substitute for bread. Again, rice's popularity was enhanced because of the relatively small amount of labor required to cultivate it.

By 1725, Providence rice was grown throughout the colony, from just north of New Orleans to Natchez. It then moved down Bayou Lafourche and, by passing the Atchafalaya swamp, into the Teche country. By 1744, the colony harvested so much rice that it was one of the few exports. The principal market for Louisiana-grown rice was the French West Indies. Rice reached the prairies of southwestern Louisiana about 1760. Before 1800, its cultivation spread southward along the Mississippi to a point below English Turn (Williamson 1940:13; Lee 1960:98, 115). De Bow pointedly reported the status of the rice industry in Louisiana in his journal in January, 1850:

> In regard to agricultural societies, I am sorry to confess our extreme backwardness.... Large quantities of rice are produced in Louisiana, though of a character inferior to that of Carolina. The culture and machinery used by us is of the most primitive kind. The grain is bad and it is said will not stand a sea voyage. Below New Orleans, 40 to 50 mi, a large number of these rice plantations may be found. The crop is understood to be even more profitable than sugar. We can little doubt that rice will one day become an important staple of Louisiana, for which we have abundant soil, but then we shall have to borrow from the experience of our Carolina friends (Williamson 1940:30-33).

The cultivation of Providence rice by French colonists transformed the landscape along the Mississippi River and the bayous. The settlers cleared the swamps along bayous and small crevasses. Additional land was cleared after the construction of artificial levees along the Mississippi River. Drainage canals were dug an arpent (approximately 192 ft) apart. They ran perpendicular from the natural-levee crest to the backswamp (Lee 1960:116).

French culture accompanied the settlers. The pattern of settlement was the standard French colonial linear pattern along navigable waterways. Houses were erected close to and facing both the waterway and the road parallel to it. Residences were spaced according to land holdings. Originally, the distances were determined by the original land grants. Over the years, because of the French system of inheritance, these estates were divided. Property divisions usually were followed by the construction of new residences (Lee 1960:119).

Early in the eighteenth century, the settlers began to erect artificial levees. At Bienville's urging, as early as 1719 levees were constructed to protect the agricultural lands near New Orleans. The greater the threat of flooding, the higher the levees. It soon was mandated by law that each property owner construct and maintain levees. During the early French period, levees were at least 2 ft high and 6 ft wide.

Waterways provided the only means of travel at this time. Consequently, each property owner was obligated to place a post in the bank fronting his property (Williamson 1940:10; Lee 1960:119, 122). The post had to be either green oak or cypress and at least 12 ft long. Eight ft of the post had to be below the ground. The top of the post had to be at least 4 ft in circumference. These posts were required for the convenience of vessels needing to land. A 1732 proclamation required the construction and maintenance of a wagon road 48 ft wide. The road was to be on the landward side of the artificial levee. Each property owner was obligated to maintain this road. By the end of the French period, this road ran from 18 mi below New Orleans to a point 32 mi upriver from the city. The Spanish increased the minimum levee height requirement to 6 ft. The levees either were widened correspondingly at the base or reinforced by a wooden revetment (Lee 1960:122).

Artificial levee construction proved to be the cornerstone of a constantly expanding rice industry. Rice was particularly suited for freshly cleared areas. These were usually wet lowlands that would not support upland crops. After rice had been cultivated on a site for several years, that site usually showed an improvement in drainage. This tendency brought the constant clearing of fresh lands for rice cultivation. Newly cleared areas tended to be free of weeds (Williamson 1940:11; Lee 1960:116-17).

By 1728, five colonies were located within a 30 mi stretch upriver from New Orleans. Their inhabitants were required to construct earthen levees. Each planter was responsible for constructing a levee the length of his river frontage at his own expense. These levees were completed by 1735, but the unusually high crest of the river that year proved that they were of insufficient size. The Mississippi River broke through the earthen barrier in numerous places (Kerr 1920:4).

Pierre Francois de Rigaud Cavagnal, the Marquis de Vaudreuil, arrived in New Orleans on May 10, 1743 as the newly appointed governor. He made numerous improvements in the colony during his tenure. Some of these improvements, including expansion of the levee system, resulted in an increased rice yield during his administration. He issued an ordinance shortly after his arrival that stipulated that all property owners along the river had to have their levees completed by January 1, 1744, or forfeit their lands to the crown. Apparently, the levees in general were not extended during the next 20 years, when the settlers devoted their energies to cultivation of the already protected acreage. One account, however, claims that when the Spanish arrived in 1764, levees lined both banks of the Mississippi from below New Orleans to 50 mi upriver.

Although Louisiana produced a surplus of rice when Spain acquired the colony, it still was not self-sufficient in overall foodstuffs (Davis 1965:133). Louisiana's exports, in order of importance at that time were: indigo, deerskins, lumber, naval stores, rice, peas and beans, and tallow. The value of the exports totaled approximately $250,000.00. Exports brought in $600,000.00 in 1770, and more with the passing of each year (Davis 1965:136).

When Louisiana was acquired by the United States in 1803, there was continuous settlement between Baton Rouge and New Orleans except on the point just below Iberville Parish. By 1828, the levees extended along both banks from New Orleans almost to Red River Landing. Levees were only absent along those stretches of the river where bluffs made them unnecessary (Kerr 1920:5-6).

Differences of terrain divided Providence rice into three principal types: row rice, which includes upland rice; swamp rice; and, *marais* rice. Row rice derived its name from its method of planting. The term apparently originated among the rice farmers along the Mississippi River and its distributaries, where rice was planted in rows instead of being broadcast. Row rice appears to have been the first method of cultivation used in Louisiana. Le Page du Pratz described row rice cultivation in French Louisiana: "...rice is sown in a soil well labored, either by the plough or hoe, and in winter, that it may be sowed before the time of the inundation. It is sown in furrows of the breadth of a hoe" (Lee 1960:98-99). Before the annual flood, the seeds were sown in a previously prepared field.

In some areas, the levee system enabled farmers to make openings in the levees to flood the rice fields during periods of high water. When it became necessary to drain the fields, the water was removed by drainage canals, which emptied into the backswamp. If the terrain favored it, the water was returned to the river (Williamson 1940:11).

Row rice was grown on the outer edge of the natural levee, where the wet clay soils prohibited the growing of sugar or maize. The high water mark of the annual flood formed a boundary between row rice and upper-levee fields. The fields were prepared during the winter and spring, periods of low water. First, the farmer had to clear the forest. Before he felled the trees, they were killed by girdling. After the trees were removed, the dry soil was plowed or broken up with a hoe. If a hoe was used to make the furrows, the rows were separated by a space roughly equal to the width of the hoe. If the field was prepared with a plow, the distance between the center of the furrows was approximately 2.5 ft. Seeds either were dibbled in or broadcast in the furrows. A hoe or wooden harrow then was used to cover the seed.

Row rice fields were limited by the amount of labor available. Most fields consisted of between one and two acres. Weeds usually forced the family to relocate the rice field after one or two years. Post-and-rail fences were used to keep out animals. When the green fields turned golden in August, the rice was ripening, and birds preyed on the crop. To secure their harvest, people, especially children and the elderly, positioned themselves atop bird-watching stands to assist the scarecrows.

Row rice was ready for harvesting in September; by that time, the water level in the swamp dropped. Harvesting occurred on the first clear day after the rice head turned yellow and the weight of the ripened grains bent the plant. The farmer cut the rice with a sickle and let it drop on the stubble. It was left to dry for one day. Rice straw was used to tie the dry rice into bundles or shocks. The farmer moved the bundles to higher ground to protect his crop from rising water. Transportation was provided by two-wheeled carts or by human backs. Palmetto leaves or thatch possibly was used as a protective covering against rain. The rice remained in the stack until it was threshed (Lee 1960:99, 101, 106, 109, 122-123).

Upland rice was grown on flat hill lands and on areas of natural levees that would not be flooded during the growing season. It was planted in rows. One difference between upland rice and row rice was the absence of flooding in the case of the former. An equally significant difference to the farmer was that upland rice required considerably more labor. Experiments conducted between 1932 and 1934 indicated that upland rice could equal both the yield and quality of wet rice farming (Lee 1960:101, 103, 117).

Le Page du Pratz wrote of upland rice cultivation in colonial Louisiana: "It has been sown in the flat country without being flooded, and the grain that [was] reaped was full grown, and of a very delicate taste" (Lee 1960:101). As Chan Lee, in his study of Louisiana rice agriculture observed, the possibility that upland rice cultivation may have developed from row rice farming. Upland rice was cultivated in the Tensas Basin before the Civil War. The local residents called it "dry rice," because they did not irrigate it and often planted it in dry soil. Dry rice farming continued after the Civil War, particularly among the newly freed slaves. Upland rice for home consumption still was being cultivated in Louisiana in 1950. Another variation of upland rice farming involved planting the rice between rows of maize. This practice remained common

along Bayou Teche and Bayou Black until the early twentieth century (Lee 1960:101-103).

Although swamp rice is the most primitive method of rice cultivation, it was not the first procedure adopted in Louisiana. Swamp rice farming consists merely of broadcasting germinated seeds in inundated swamps. The seeds were not covered and the only additional labor required, besides harvesting, was occasional weeding. Because of the lack of labor required, swamp rice farming was common in the early twentieth century, and it still is practiced today. Swamp rice farming apparently came to Louisiana by accident. A severe hurricane hit the colony on September 11, 1723. The resulting destruction caused the colonists to worry about having adequate food during the months ahead. The settlers were delighted when they discovered an unexpected source of food: the hurricane winds broadcast rice, which had taken root. Legend has it that the crop proved to be abundant. This good fortune would help to explain the popularity of swamp rice farming in Louisiana. Bienville wrote, probably in 1725:

> This last year when the water from the river maintained on the land a very long time people took the risk of planting the rice in the water itself. No sooner had the water run off than it grew with such vigor that most of those who thus ran a risk with it will have made an abundant crop (Lee 1960:101, 103, 105).

Swamp rice fields were located at the edge of fresh-water marshes or swamps. Predominant areas of swamp rice cultivation were one- to two-acre fields, located in small depressions. The soil usually consisted of extremely fine clay rich with humus. The clay soil, nicknamed "buckshot," is impermeable. This ability to retain water made the soil a favorite with rice farmers. As with row rice, removing the trees was the first step. The harvesting procedure with swamp rice was identical to row rice, with the exception of sometimes having to allow a second day for drying. Salinity was the dominating factor. The discharge of the Mississippi River and its distributaries determined the level of salinity. Following the construction of a dam in 1901-1902 to restrict water entering Bayou Lafourche from the Mississippi River, swamp rice cultivation decreased. The ever-increasing salinity of the water prohibited rice farming in the swamps and marshes (Lee 1960:105).

A sub-type of swamp rice farming occurred on the slopes of newly developed crevasses in the swamp. These areas were covered with grass, thereby eliminating the additional labor of removing the trees. Unlike row rice and other swamp rice fields, crevasse-slope rice fields usually were encircled by levees. Rain supplied the water necessary for flooding the field. The only additional irrigation apparently consisted of a portable flume which allowed water to enter from the crevasse canal or swamp. Crevasse-slope fields were planted both in rows and by broadcasting. This subtype of swamp rice probably represents a transitional type of cultivation between swamp and row rice. It seems certain that it was the earliest example of controlled irrigation, a transition in itself (Lee 1960:106).

Marais in southwestern Louisiana are naturally occurring depressions, 40 to 50 yd in diameter and 1 to 2 ft deep. A claypan lies beneath them. Rainfall turns the *marais* into ponds. Thousands of *marais* dot the prairie region of Louisiana, particularly along the Vermilion River. Early French settlers treasured the *marais*. They broadcast pre-germinated rice seed into them; no preparation of the pond was required. They harvested more than a fair yield, considering the lack of labor required. Occasionally, the farmers constructed concentric levees in the *marais* to retain water. They also built fences to keep out cattle. *Marais* rice was harvested in the same manner as the other types of "Providence" rice (Lee 1960:106-108).

The term "Providence" rice originated with the cultivation of the *marais*. Abundant rainfall during the growing season resulted in a bountiful harvest. Although primitive *marais* rice cultivation is technically nearly the same as swamp rice, the latter preceded the former in Louisiana by nearly half a century. The settlement of the prairies followed that of the Mississippi River and Bayou Lafourche areas by 40 to 50 years (Lee 1960:105-106, 108-109, 116).

Farmers used hoes, plows, and harrows to prepare Providence rice fields for planting. All swamp rice fields, except for those along slopes of crevasses in swamps, were tilled with a hoe. Neither the

standard upland plow nor the mold-board plow was practical for working the wet, heavy soils in the swamps. Trunks of the previously girdled trees would have proved a hindrance to any type of plow. With a moldboard plow, a farmer easily could work the comparatively coarse soils on the new crevasse slopes. Row rice fields generally were plowed the same as one would prepare a field for corn or any row crop, and the same equipment was used. Although some farmers broke up the topsoil with a hoe or plow, most farmers planted *marais* rice with no prior preparation of the field (Lee 1960:108-109).

Threshing of Providence rice was a family affair, done on an as needed basis. The simplest threshing procedure was beating the dried rice with ordinary sticks. Some individuals began by beating a bundle of rice against an object such as a barrel. After most of the grain was removed, the bundle was beaten with sticks to extract the remaining grains. When the breeze was sufficient, Indian basket-trays made of cane were used for winnowing the rice. This procedure allowed the chaff to be blown away. More sophisticated methods included true flails and animal treading (Lee 1960:109).

After threshing, the rice was milled. This is the process of removing the outer hull of the rice kernel. Part of the inner hull then is removed by polishing. Most rice is eaten in the whole grain form, as opposed to other grains which usually are converted to flour (Lee 1960:110).

A wooden rotary pit-mill also was used for removing the husk. This machine consisted of two pieces of wood, each about 2 ft in diameter. A series of channels diverged from the center along the surface of the wood. The rotary action of the upper board against the lower successfully removed the outer husk, but the inner husk had to be removed with a mortar and pestle. The pit-mill was introduced in Louisiana in the 1740s. It undoubtedly originated from one of the English colonies, probably South Carolina. The pit-mill gained popularity along the Mississippi River below Baton Rouge and in the bayou region, but it was not used by the colonists in the prairie region (Davis 1965:72; Lee 1960:109-10, 113).

Milling was the most demanding aspect of rice production. It was tiresome and tedious, and, like threshing, it was done on an as needed basis. Legend has it that the French colonists who grew rice on the prairies only milled rice on Saturday afternoons. This effort provided enough of the staple for Sunday dinner, but *marais* rice cultivation did not provide a family with enough rice for everyday consumption (Lee 1960:110).

The principal tools used in milling rice were the mortar and pestle. Made of wood and adopted from the Indians, these items were common where Providence rice was grown. Milling the rice by this means was a task almost universally reserved for the women. Sometimes two or three people labored at the task, alternating strokes with individual pestles (Lee 1960:110-113).

Providence rice fields usually were limited to one or two acres. The cultivated area was irregular in shape. Although long since abandoned and covered by woods, they are still recognizable today. They are usually covered with tall canegrass and surrounded by trees. Portions of the wooden fence that once surrounded may remain. Abandoned flumes also might be discovered in levees associated with crevasse-slope cultivation. The development of prairie rice cultivation, coupled with its use of machinery, caused the *marais* to be abandoned by rice farmers. Many *marais* fields now serve as water holes for cattle, while others have been obliterated by farm machinery (Lee 1960:110, 117).

During the early colonial period, rice, along with maize, was the principal food of slaves and the poorer classes of Louisiana society. Before the end of the colonial period, maize probably became the principal item in the slave's diet. Rice became the principal source of food for urban dwellers (Williamson 1940:11).

Growth of the River Rice Industry Between 1850 and 1885

Farmers along the Mississippi River and its distributary bayous coined the term "river rice" about 1900. The term distinguished their method of cultivation from that used in the prairies of southwestern Louisiana. The principal difference between the two methods was the manner of irrigation. Growers of

river rice secured their water for irrigation from the Mississippi River or from the bayous. River rice fields were flooded by irrigation ditches which received water from cuts in the levee or from flumes.

It is impossible to determine the specific time when river rice was introduced. Descriptions of rice cultivation tend to place the date at about 1850. In 1833, Timothy Flint described Louisiana as having a vast expanse of land suitable for the production of upland rice. He added, however, that rice only was produced in small amounts for home consumption. More importantly, he failed to mention any sort of irrigation system. Possibly the first mention of river rice production in Louisiana occurred in an article by Wilkinson, written for De Bow's review. Wilkinson claimed that around 1855, several Louisiana planters imported rice seed from South Carolina. They were seeking a crop to substitute for sugar cane. An unfavorable tariff made that crop less profitable. "Carolina Gold" and "Carolina White" quickly replaced "Creole" rice and were the principal varieties grown in Louisiana until about 1890. Even with a tremendous influx of new rice planters during the 1850s, many of whom were former sugar cane growers in Plaquemines Parish, most rice cultivation remained small scale. No single planter had more than 200 acres in rice, and many had less than 50 (Lee 1960:124-25, 128).

In 1849, Louisiana farmers produced 4,425,349 pounds of rice, and ranked fourth among the states. Louisiana remained in fourth place in 1859, producing 6,331,257 pounds. In 1869, Louisiana farmers produced 15,854,012 pounds of rice, and moved ahead of North Carolina to rank third among the states; of this, St. James Parish contributed 934,915 pounds. St. James ranked fourth in rice production, behind Plaquemines, St. Charles, and Lafourche Parishes. Louisiana continued to trail South Carolina and Georgia in 1879, producing 23,188,311 pounds. Ten years later, however, the tables were turned. Louisiana's 75,645,433 pounds represented 58.83 per cent of the nation's total production. Louisiana was number one. Within the state, St. James Parish still ranked fourth, behind Acadia, Plaquemines, and Calcasieu (Porter and Wright 1895:71, 98-99; Kennedy 1864:67; Walker 1872:701, 743; Walker and Seaton 1883:250; Ginn 1940:581-82).

River rice was the principal method of cultivation between 1850 and 1885. It was widespread along the Mississippi and its distributary bayous south of Natchez, Mississippi. With few exceptions, before 1885 the fields could be flooded only when the waterway being tapped rose to a sufficient height to permit controlled divergence. Consequently, the farmer had no control over the time of flooding. In 1885, a crude steam-powered device which enabled farmers to lift water from rivers and streams was invented in the prairie region of Louisiana. The machine soon was adopted along the Mississippi River and the bayous. This discovery was of such importance that it altered the cultivation of river rice.

River rice was more of a commercial product than Providence rice, which generally was grown for home consumption. Consequently, river rice was grown on a larger scale. River rice fields usually were located on the lower back slopes of the Mississippi River natural levee. The farmers grew sugar cane, cotton, and vegetables on the upper slopes, because these crops were unsuited for the heavier soils which composed the lower slopes (Lee 1960:124-25).

J. D. B. De Bow, of New Orleans, helped promote rice production in Louisiana during the 1850s. In 1853, he published *The Industrial Resources, Etc., of the Southern and Western States...*, which contained a 38 page article on rice cultivation. The following year, in his *Review*, De Bow presented a comparison of sugar and rice production and costs for an individual laborer. De Bow concluded that a rice farmer would net $270.00 per acre each year, compared with only $245.50 for the sugar producer. By 1856, De Bow reported that rice was cultivated in every parish in Louisiana (De Bow 1854:538; 1856:290).

The Civil War drained the capital necessary to finance sugar cultivation. The war also brought an end to the slave-based labor system created by the wealthy sugar planter class. Not until 1885-1890 would sugar production reach its prewar level of production. As discussed earlier, the river rice industry continued to boom after the Civil War ended in 1865. During the decade following the war, former sugar planters and farmers of limited means turned to the cultivation of rice. This may be attributed to the fact that the growing of rice required considerable less capital and less labor than the cultivation of sugar cane (Taylor 1974:351; Lee 1960:128).

River Rice Cultivation

River rice fields had to be prepared before the river neared its crest. Work in the fields usually began in February. New irrigation ditches had to be dug or previously existing ones cleaned out. The topography determined the configuration of the ditches. The typical river rice cultivator had a farm with a approximately four-arpent frontage on the Mississippi. A flume-ditch ran from the river to the backswamp. It was at least 4 ft wide, and usually between 4 to 5 ft deep.

The flume-ditches could be connected to the river in several ways. The two simplest ways were a cut in the levee or a flume. Use of a flume, however, involved the additional difficulty of keeping it watertight. This problem resulted because the flume dried out following the irrigation season. There was at least one cross ditch, the number being determined by the topography. The cross ditch ran at a right angle to the flume-ditch(es). Larger fields were divided by cross-levees. These cross-levees were laid out to correspond with the natural-levee slope. They were started with a plow and completed with shovel or hoe. Drainage ditches excavated when the arpent system was prevalent were blocked with cross-levees constructed of either plank gates or earthen dams. If the flume-ditches were a considerable distance apart, check- or length-levees were constructed (Shutts 1951:28; Lee 1960:128, 130).

Wilkinson also reported that in Plaquemines Parish cross-ditches were constructed every half-acre. These ditches were about 2 ft wide. A high bank behind them enabled them to hold an additional foot or more of water. Another ditch ran across the back of the rice field and parallel to the river. Its levee was higher than the field levee on the down-slope side. A floodgate allowed for the passage of water through the back-levee. Together they enclosed the field. This system was almost identical to the tidal-swamp method of irrigation practiced in South Carolina. Only the use of a rising river as opposed to the tidal range of a river distinguished the two. Because so many aspects of rice cultivation in South Carolina were found in Louisiana, some diffusion from that direction can be assumed. The Louisianians merely made the necessary modifications to suit the locale.

After the necessary earthwork was completed, one of two methods was adopted to ready the fields for sowing. These two methods were known as "wet" and "dry." The former technique was only appropriate for the heavy clay and acidic soils along the slope of the lower levee. The latter worked better on the upper portion of the levee slope. There, the soil was dry and sandy in comparison.

If the farmer used the wet technique, he usually plowed in April. The field may or may not have been inundated. Although it would seem hard to plow after the field was covered in water, actually the heavy clay soils were easier to plow when wet. Even so, the procedure required a special wheeled model of a wooden moldboard plow. This plow required two drivers to direct the six oxen needed to pull it. A third individual steered the plow. This plow had several names: lowland, French sock, or creole. The lowland model had two wheels on the front, which made it especially successful in the rice fields downriver from New Orleans. In that area, the soils were extremely heavy. The wheeled version of the lowland plow was identical to one commonly used in northern Europe after the eleventh century. It probably was brought to Louisiana while the region belonged to France. Areas of northern France also consisted of heavy lowland soils. There is no evidence that the lowland plow was used above New Orleans, despite the fact that it was still in use as late as 1950 by at least one tenant farmer. He only gave it up because of the intrusion of salt-water from the Gulf (Lee 1960:130, 132, 134). Shovels and hoes also were used to prepare the fields. Pre-germinated seeds were then cast on the flooded fields. Once the rice was sown, the fields were drained. They were not inundated again until the plants gained a height of 6 in.

If the farmer used the dry method, he plowed the land during the fall and winter. He used the same moldboard plow he used to prepare his field of corn. A team of mules or one or two oxen pulled the plow. In addition, a hoe or shovel possibly was used. The field also was harrowed before being flooded. The seed either was broadcast or placed in a drilled hole and covered with a harrow. The latter method was similar to the process used for planting oats or wheat. The planting occurred between late March and early April. Sowing the seed at this time enabled the plants to reach a height of approximately 3 in before the river crested, at which time the field was inundated. The flooding not only provided the necessary moisture for the rice plants, but it also curtailed the growth of weeds.

Hand weeding also was prevalent. Flooding was not extensively used in Louisiana to retard weeds until late in the period of river rice cultivation. Water was not available on demand until 1885. During the early 1940s, farmers eliminated weeds by deep flooding with only the heads of the plants remaining above water. This procedure was known as "point flow." During the height of river rice production, the water was kept, whenever possible, at a depth of about six inches in the fields until harvest time. The water was drained off at or just before the harvesting of the rice (Lee 1960:132, 134).

Weeds constituted one of the principal factors in retarding the commercial production of rice; they reduced both the quality and quantity of a grower's crop. Excessive weed growth usually occurred if the river failed to rise sufficiently at the proper time, or if rain did not fall in the right amount at the right time during the growing season. An adequate water supply was especially important during the sowing and early growing period. The low crest of the river and bayous was blamed for the poor crops of 1871 and 1872. A planter in Plaquemines Parish suggested "a small water wheel" (Lee 1960:134, 136) as one means of overcoming a low crest of the river. The wheel would be between 6 and 8 ft in diameter. A pair of horses or mules would propel it. This wheel might have been similar to a "Persian wheel," which was introduced in Louisiana to aid in the removal of water from sugar cane fields. These fields occasionally flooded when rising water breached a levee. Horses powered these wheels as late as 1880. Despite their extensive use for draining fields, they never became popular devices for flooding rice fields.

Steam engines were used in the irrigation of rice before the Civil War. An observer in 1856 noted that the steam engines used on sugar plantations were capable of flooding rice fields by lifting water from the Mississippi River. A farmer along Bayou Teche recalled that his father planted rice in 1862 at Reserve, Louisiana. He rented a steam pump from a sugar planter. This pump was equipped with an engine that had a hardwood piston, and as a consequence the engine had to be stopped every four or five hours to allow the piston to cool. Until water-lifting devices became commonplace, the use of pumps was confined to acreage near sugar houses (De Bow 1851:510-511; Lee 1960:136).

In August, the fields of rice turned a golden yellow as the time to harvest neared. As with Providence rice, farmers often had to protect their ripened grain from birds. An individual posted on a bird-watching stand in the field often scared birds away by cracking a whip. Before the end of the month, the rice farmer was using a sickle to cut between one-half and three-quarters of an acre per day. The condition of the fields, particularly the moisture level, determined the amount of rice cut each day. For one or two days, cut rice was laid on the stubble to dry.

The next step was to tie the rice in bundles. Either rice straw or latania strips were used for ties. The cutters then piled the bundles in several small stacks, or shocks, in convenient locations throughout the fields. This process was carried out without the benefit of center poles. After the entire crop was cut and piled, the farmer used a two-wheeled cart to haul the bundles to grain yards located near the house. The grain was transported in the same order in which it had been cut. Eventually, the small stacks scattered about the field were consolidated into large stacks. Each of the latter were placed on wooden blocks, which raised the grain about three ft above ground level. Although center poles were not used, the stacks were pointed and topped with latania; each contained about twenty barrels of clean rice (Lee 1960:136-137).

Flailing and animal treading remained the primary methods of threshing in Louisiana throughout the antebellum period. Wilkinson gave the following description of animal treading:

> ...eight or ten tackeys, or small horses, are tied one to another to a post; the rice is placed on the ground about three feet deep, the heads up, and the animals are made to trot around, occasionally shaking up the rice. In this way, about 20 barrels per day are usually trodden out (Lee 1960:137, 140).

After the Civil War, it appears that South Carolina rice planters migrated to Louisiana, bringing with them sophisticated rice-threshing machines. In the twentieth century, rice farmers in St. John the Baptist Parish recalled that threshing machines from Wisconsin were imported to the region. This machine had a

spiked cylinder and "concave," which was turned by a steam engine. It lacked the self-feeder and straw blower incorporated on a later model. The early Wisconsin model was simpler than that from South Carolina; it probably was introduced in Louisiana in the 1870s. The first documented use of a Wisconsin threshing machine in Louisiana was in the region below New Orleans about 1885 (Lee 1960:137-140).

During the antebellum period, the river rice farmers used a wooden mortar and pestle or wooden rotary pit-mill to hull the rice. The wooden rotary pit-mill also was used to polish the grain. If a farmer was fortunate enough to have both pieces of equipment and the labor to operate both simultaneously, about 1,500 lbs. could be hulled and polished daily. Prior to the end of the Civil War, this crude milling process undoubtedly remained the most common. Although some horse- or steam-powered mills possibly were used, rice farmers harbored a prejudice against those cleaning processes. A small steam-powered mill was operated in Plaquemines Parish about 1840 (Lee 1960:137, 140).

Following the Civil War, the population in the region grew, and rice cultivation became more commercial (Figure 10). In some areas, the transition did not occur until the twentieth century; but it is possible that the financial cost of constructing a steam-powered mill was responsible for the delays in modernization. One individual recalled that when he was a boy in St. John the Baptist Parish during the late nineteenth century, a horse-powered, wooden, mortar-and-pestle mill was used. This particular mill had several wooden pestles. The mortars consisted of indentions cut in a cypress log. Animals powered the mill, which was similar to a horse-powered mill invented by Veitch in South Carolina in 1768. One anthropologist concluded: "It is very possible that horse-powered rice mills came from South Carolina, the source to which the river rice methods in Louisiana owe so much" (Lee 1960:140-41). Most of the horse-powered mills were located in Lafourche, St. Charles, Plaquemines, and St. John the Baptist Parishes. Although prevalent in the late 1860s, horse-powered mills rapidly were replaced by steam-powered mills (Figure 11). By 1885, horse-powered mills virtually were extinct. Because of their relatively brief period of use in Louisiana, their contribution to the rice industry in Louisiana was minimal.

Shortly after the end of the Civil War, a steam-powered rice mill was introduced into Louisiana from South Carolina. This mill was small in scale, and operated on the mortar-and-pestle principle. Besides replacing horses with steam-power, the only change in the new mode of operation was the use of larger, iron-covered mortars and pestles. Substantial steam-powered rice mills were constructed in New Orleans around 1870; at least five were operating in the city by 1877. As more were constructed along the Mississippi River and Bayou Lafourche, farmers gradually abandoned the smaller steam-powered mills. In 1885, at the end of the river rice period, approximately two-thirds of these large mills were located in New Orleans. This pattern of distribution apparently confirms that prior to the 1870s, rice was milled near its place of harvest. By 1885, however, most of the rice grown in Louisiana was milled by the large-scale commercial mills in New Orleans (Taylor 1974:357; Lee 1960:141, 144).

Land-Use Patterns

The modernization of milling equipment and increased commercialization of the rice industry in Louisiana brought about changes in the cultivation of the grain. Irregularly configured small fields were not suitable for large-scale production. Two new patterns of fields developed. A commercial rice producer either had to clear swamp lands or modify existing sugar-cane fields.

Plaquemines Parish was the most active region with regard to the clearing of swamp land. Ditches, constructed perpendicular to the natural levee of the Mississippi River, could be used both to drain the acreage and to irrigate it. The primary ditches usually ran from the crest of the natural levee of the Mississippi to a lake or small bayou, which in turn opened into the Gulf of Mexico. These flume-ditches immensely improved drainage. Cross-ditches ran at right angles to the flume-ditches. The resulting checkerboard pattern was slightly denser than similar patterns associated with sugar-cane fields. The wider and denser rice ditches allowed better irrigation than ditches associated with sugar-cane cultivation. Rice fields also contained cross-levees which enabled the fields to contain flood waters. In 1960, the modifications made to convert sugar-cane acreage to rice fields could still be observed. Anthropologist Chan Lee concluded:

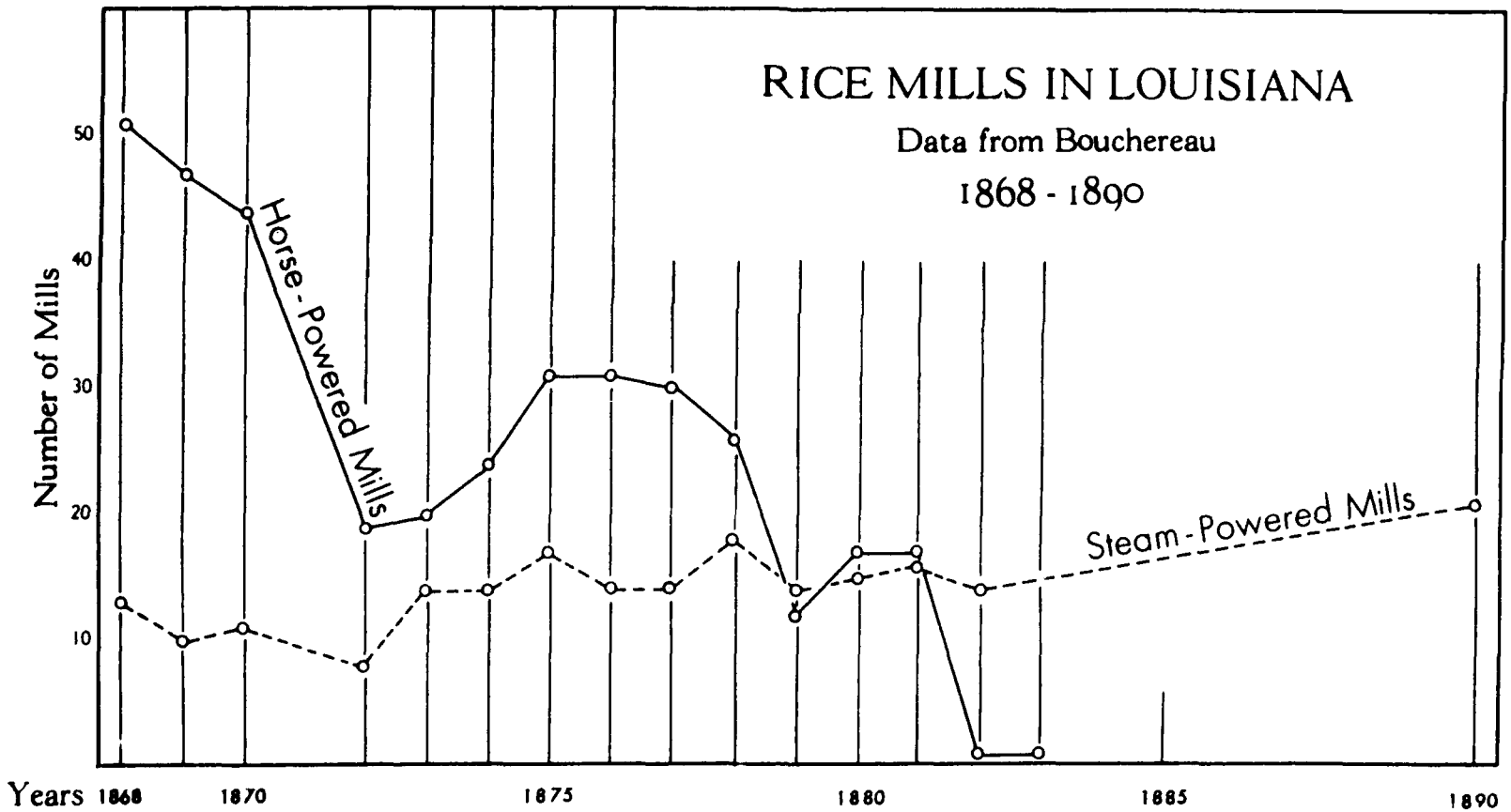


Figure 11. Number of horse-powered versus steam-powered rice mills in Louisiana, 1869-1890 (Lee 1960:Figure 48).

> River rice was primarily a development of French Louisiana, just as was Providence rice. There the traditional French Louisiana rural landscape continued as either the simple farmstead or as the larger clustered plantation combining former individual holdings. Thus the rural landscapes associated with river rice can be divided into two types: the individual small farm, and the plantation (Lee 1960:144, 146).

In Louisiana during the antebellum period, rice farmers generally operated on a small scale. Less than 200 acres, on the average, were planted in rice. Many rice farmers cultivated no more than 50 acres. Consequently, the basic farmstead, rather than the elaborate plantation, constituted the surroundings of the rice producer. Typical rice farms consisted of a creole-style dwelling, which fronted the river, one or two outbuildings, and perhaps a small area fenced for livestock. The residence and outbuildings usually were fenced; the fields were not. The fields extended from the residence toward the backswamp. Along the Mississippi River. The fields of an individual rice farmer ran perpendicular to the river in narrow strips. In the study area, the typical depth was 40 arpents; the frontage could be less than 3 arpents (Appendix III).

The plantation river rice landscape did not develop until after the Civil War. The destruction wrought by that conflict left the sugar planters of Louisiana in a state of chaos. Their cheap source of labor disappeared with emancipation. Many of the sugar houses were destroyed by Union forces during the war. Lacking the capital to rebuild their mills and hire laborers, many of them rapidly converted all or part of their acreage to the cultivation of rice (Lee 1960:146, 148; Chaffey 1969:3).

As described above, this required little change of the landscape. Although the functions of outbuildings changed, their outward appearance generally did not. Barns once used to shelter animals now had their floors used for threshing rice. Small farm and plantation landscapes could be distinguished by the residence of the owner or manager, the "big house," and the rectangular cluster of cabins that once housed slaves. The location and composition of the slave cabins represents the primary distinguishable difference between these plantations.

Levees helped farmers convert their acreage from sugar-cane to rice cultivation. The earliest settlers constructed levees along the Mississippi River. In 1812, the east levee stretched for 155 mi, from Pass Manchac to Pointe a la Hache; the west levee ran for 185 mi, from Plaquemines Parish to Pointe Coupee. By the end of the antebellum period, there were 2,184 mi of levee along the Mississippi. The average height was nine ft, with a base between 50 to 75 ft in width.

The expansion of the river rice industry corresponded with an increased need for water to inundate the fields. However, the likelihood of devastating floods also increased. Cuts in the levee once provided the water needed for rice cultivation. The threat of serious flooding, however, resulted in the gradual abolishment of levee-cuts, and the use of the sluice-gates after 1870. Following the end of Reconstruction in 1877, Louisiana had a string of governors who deeply were concerned about flooding and later were termed "levee governors" (Tompkins 1901:334; Lee 1960:148; Kerr 1920:7-15).

The Rice Industry in Louisiana Between 1885 and 1950

Mechanization of the Rice Industry

The rice industry in Louisiana began a major transition about 1885. A new era dawned when rice cultivation was introduced to the prairies that year. Rice was of major importance to the area by 1887. By 1889, Louisiana led the U.S. in rice production. The following year saw the state produce nearly 76,000,000 lb of the grain, as compared with just over 6,000,000 lb harvested in 1860. In 1900, over half the rice produced in the United States was harvested in Louisiana. Within five years, the production in Louisiana exceeded that of the entire United States in 1860. Because of decreasing rice production costs in the prairies, the center of rice production gradually shifted from the Mississippi River to the prairies. New methods of cultivation were developed in the prairies, and some of these were adopted by growers along the river. As a consequence, two conflicting methods of rice farming existed along the river after 1885.

Some growers adopted new methods developed on the prairies, while others resisted change. Because of this transfer of knowledge, it is necessary to understand prairie rice cultivation in order to understand rice cultivation along the river after 1885. Only the early development and techniques of prairie rice culture need to be detailed to allow for comparison with river rice procedures (Wall 1984:231; Simkins and Roland 1972:332; Davis 1965:296; Chaffey 1969:3; Lee 1960:125, 151).

Prior to 1880, the prairie region of Louisiana was occupied predominately by Acadians settled along streams, where they raised cattle. A few grew cotton. For subsistence, however, they engaged in farming. Nearly every family grew Providence rice, which they planted in the *marais*, or seasonal ponds.

The Southern Pacific Railroad crossed the prairies in 1882. With relatively inexpensive transportation available to the region, new settlers moved to the area and agricultural production expanded. Many of the newcomers were experienced wheat farmers from the Midwest. They were attracted by the warm winters and the vast grasslands. They believed that they could successfully convert the area into a corn-cattle region like their former homeland (Davis 1965:297; Lee 1960:151-152). In failing to achieve their goals, they learned how to cultivate rice from the Acadians. Believing they could succeed where others had failed, the Midwesterners plowed and seeded the grassland with rice. They soon learned that the annual rainfall was not suited to rice cultivation. They also learned that considerable weeding was required if the rice fields were not flooded.

The lack of water for rice production on the prairies was overcome by David Abbott. A native of Michigan, Abbott moved to Acadia Parish near Crowley. In 1888, Abbott lifted water from a bayou with something that has been described as "an endless chain of buckets" (Lee 1960:152). This "pump" was powered by a 3.5 horsepower engine. The engine was geared to the rotating cylinder of a threshing machine with the chain, which actually had an arrangement of wooden flanges attached at right angles to the chain. The machine proved so successful that it was imitated within a year. By 1895, some farmers used centrifugal pumps (Davis 1965:297; Lee 1960:152).

The introduction of water-lifting devices in the 1880s marked the turning point in river rice cultivation. A variety of machines were constructed to lift water in order to accommodate various river stages and the terrain of a specific area. These can be divided into three general types: Mississippi, Lafourche, and Teche (Lee 1960:161-62, 164, 169).

These early pumps were crude, inefficient, and small. One with a capacity of 25,000 GPM was deemed substantial. There were two types, vertical box and horizontal. The former generally was constructed of wood, and it had a lower lift capacity. The latter was made of cast iron, and it had an average lift of approximately 25 ft. The machine itself usually was located in the center of the lift, or "head." The intake pipes usually ran to a short canal, which led to a stream. Steam provided the power for these pumps, the most convenient prime mover being a slow speed Corliss steam engine. The difference between pump and engine speed was adjusted by a belt drive. More modern engines constantly were introduced during the early twentieth century; the most common was a cross compound condensing steam engine capable of 150 RPM. Diesel engines were introduced in the 1920s. Larger, more efficient centrifugal pumps were introduced from Europe prior to 1910 (Shutts 1951:28-30).

Rice farmers along the Mississippi developed a technique that combined artificial water-lifting devices with natural flooding. When the river was high enough to provide the needed water, the liquid, now termed "free-water," simply was allowed to flow into a flume-ditch. This source supplied approximately half of the water needed for rice cultivation, especially during April and May. During periods of low water, a steam-powered pump lifted the water from the Mississippi into borrow pits, which were formed when earth was removed for construction of levees. The pumping station was located on the river side of the reservoir. From there, the water was siphoned into a main irrigation ditch (Figure 12).

Artificial control of Bayou Lafourche since the early twentieth century prevented this system from being used there. At that time, the bayou was cut off from the Mississippi resulting in an immediate drop in rice production along the bayou. Because rice farmers along Bayou Teche were bounded by both a natural and an artificial levee, they were required to lift the water to greater heights, prohibiting the use of

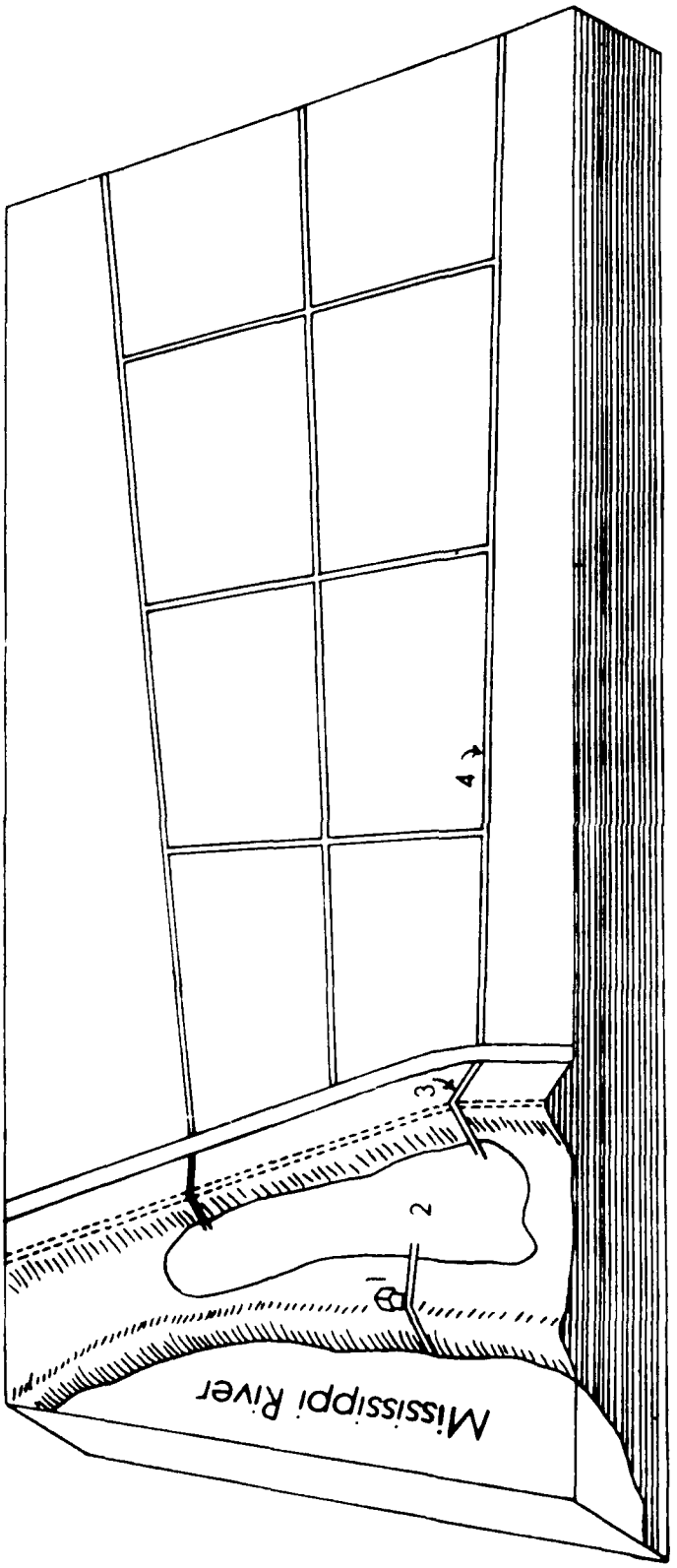


Figure 12 A schematic diagram of Mississippi-type irrigation (after Lee 1960)

a reservoir (Lee 1960:169, 173, 178).

The irrigation system of the river rice fields remained unchanged. The flow of water from the main ditch into the cross-ditches was controlled by wooden sluice-dams. These were made by driving cypress planks into the ground. The volume of water was regulated by removing or adding planks at the dam(s).

Water-lifting devices enabled the grower to control the time and volume of irrigation. This advantage allowed for deep flooding whenever desired. This deep flooding became known as "point flow" because only the heads of the plants remained above water. More consistent deep flooding virtually eliminated weeding. Previously, even a seasoned laborer in the rice fields could weed only between one-fourth and one-third of an acre per day. Any necessary weeding was done by hand until after World War II, when the weed-killing chemical "2,4-d" was introduced. Those rice farmers opposed to the use of chemicals continued to rely on deep flooding, hand weeding, and crop rotation to eliminate undesired plants (Lee 1960:134, 169, 173, 178).

Near Jennings, Louisiana, in 1893, C. L. Shaw and A. D. McFarland introduced canal dredging as a means of providing water for rice irrigation. The Abbott family followed suit the following year; their canal measured 3.5 mi long and 20 ft wide. Additional canals were excavated in the late 1890s, including the Farmers' Canal and the Louisiana Canal, both of which drew water from the Calcasieu River above Lake Charles (Davis 1965:297; Lee 1960:152; Shutts 1951:26).

Initially, the bayous, supplemented by a few canals, provided an adequate supply of water for the rice fields. An increase in the amount of rice-producing acreage, however, coupled with subnormal rainfall, brought about the need for additional water. Jean Costex, of Mermentau, drilled the first well in southwestern Louisiana for the purpose of irrigating rice fields in 1895. Prior to 1901, only a few farmers followed his example, but the extremely dry weather that year demonstrated the need for a more reliable water source. Hundreds of wells were drilled by the end of 1903. The reliance upon wells continued to increase in certain areas because of the encroachment of salt water from the Gulf of Mexico into the bayous (Davis 1965:297; Lee 1960:152-53).

Fields in the prairies were divided according to the range-and-township system, except where the Acadians settled along the bayous. Their holdings were divided by frontages based on the arpent method. Chan Lee described the prairie rice fields:

> Abandoned Pleistocene river channels provided perfect gradients for irrigation canals. Checkerboard field-levees like those used on the river were employed to keep a uniform depth of irrigation water. As early as 1895 the contour-levee method was developed, where the levee followed closely the contours of the land with the aid of a transit survey. For the first time levees were made with plow and pushers throwing four or six furrows together. These levees, then inches high at the most, allowed field machines to cross them. The contour-levee system helped to save time in plowing because it was not necessary to turn around as much as in checkerboard-levee fields. The prairie field pattern naturally lacked the drainage ditches running at right angles to the natural levee found in the river areas (Lee 1960:153).

The Midwesterners rapidly adapted the equipment they were familiar with, such as gang-plows, disks, harrows, and seeders, to rice cultivation. Although the Acadians used oxen, Creole ponies, and mules for draft animals, these were never popular with the Midwesterners. These animals soon were replaced by "rice mules." These mules were larger than the mules used in Louisiana's cotton fields. The unusual rice implements mentioned above were accompanied by nothing short of a mechanical revolution in the rice industry between 1884 and 1896. A mechanized twine binder appeared as early as 1884, but this piece of equipment soon was replaced by a slightly modified wheat-threshing machine. The other pieces of equipment, including the irrigation pumps, are described below (Simkins and Roland 1972:332; Davis 1965:297; Lee 1960:153). In 1904, the editors of the *Louisiana Rice Book* described the impact of

machinery on the rice industry:

> *It has made it possible for a few men from the Northwest to capture the rice industry.* It has enabled one man with a machine and four mules to do the work of thirty to forty men in harvest, which lasts three months of the year. The 3,000 twine binding harvesters in use represent for three months an unseen population of 100,000 men who never strike, ask for no holidays, never hunger, thirst or get tired. It gives to one man the productive capacity of thirty. A good machine is the laboring man's best friend (Linscombe 1904:54).

Seaman A. Knapp

Many of the Midwesterners moved to Louisiana at the urging of Seaman A. Knapp, a man who contributed immensely to agricultural development in the South. Best remembered for his activities with cotton, Knapp also was responsible for the rapid expansion of Louisiana's rice industry that began in the late 1880s.

Born on December 6, 1833, at Schroon Lake, a village in the Adirondacks, Seaman was the youngest of eight children. After attending the Crown Point Center, close to the Canadian border, and spending two years at the Troy Conference Academy, a Methodist school at Poultney, Vermont, Seaman graduated from Union College, Schenectady, New York, in 1856. A crippling knee injury, sustained while teaching his female students the fine art of baseball, brought urgings from his physicians in 1865 that he seek a change of climate, "preferably in the wide open spaces of the Iowa prairies" (Williamson 1940:64-66).

He tried his hand at sheep farming in Benton County, Iowa. By 1869, however, he established himself locally as an educator, and he accepted an invitation to serve as superintendent of the Iowa College for the Blind. Although he held that post for six years, he retained his farm, which became his own private experimental station. His leg completely healed by 1875, when he resigned as superintendent. He moved to Cedar Rapids, where he edited an agricultural paper for the purpose of sharing his discoveries. He advocated crop diversification and the breeding of fine stock. In 1879, he became professor of agriculture at the Iowa State College of Agriculture (Williamson 1940:67-69).

In 1885, Knapp was serving as professor of agriculture at the Iowa Agricultural College. He considered the South an ideal place to conduct agricultural experiments, and late that year an opportunity to relocate arrived. A land speculator and promoter extraordinaire, Jabez Bunting Watkins, contacted Knapp. A Kansan who was defeated by a swarm of grasshoppers, Watkins represented a British syndicate of land and timber companies, known collectively as the North American Land and Timber Company. His only interest in southwestern Louisiana at this time was the commission he could make on the sale of upwards of one million acres. In order for him to succeed, he had to demonstrate that the prairies of southwestern Louisiana could be farmed profitably. What Watkins needed to ensure success was a prominent agriculturalist to champion his cause (Shutts 1951:25; Wall 1984:231; Williamson 1940:71-72). Watkins learned from a relative that Knapp possessed the ability to combine scientific and practical agriculture successfully. Watkins invited Knapp to make a report on the agricultural possibilities of southwestern Louisiana, and to share in the potential profits. Knapp accepted. History was about to be made.

Most of the immigrants that Knapp drew to southwestern Louisiana came from the upper Mississippi Valley. They were people who knew him personally or by reputation, but who knew nothing about southern agriculture. The syndicate sponsored railroad excursions for those interested in relocating (Wall 1984:231; Williamson 1940:72). Ads such as the following appeared in newspapers around the country:

> There are many reasons that can be given why a farmer should locate in Southwest Louisiana. In the first place, a complete crop failure is almost unknown, since a drought, the greatest of all the disasters to the Western farmer, practically never occurs. There are

> no long winters here during which the farmer has to sit with folded hands and kill time till spring rolls around again, but on the other hand the climate is so mild that he can work outdoors almost constantly. And not the least of the reasons is the greater opportunity for profitable investments. All of those advantages combine to make Southwest Louisiana the most desirable home for the man looking for a new location (*Crowley Signal*, May 1898).

Knapp, too, had to adjust to a new environment. He soon learned that for most Louisianians, agriculture was more than a business--it was a way of life (Wall 1984:231; Williamson 1940:72).

Watkins was determined to derive the most from land sales. An immense exhibit at the Chicago World's Fair in 1893 detailed each stage of the rice industry. Sample packages of the product were given to all who desired one. That same year, Watkins had a rice exhibit constructed in a railroad car, which traveled about the country until 1897 (Ginn 1940:570) Knapp, however, was something of a philosopher; he was not motivated strictly by monetary gain. Years later, Congressman A. F. Lever, of South Carolina, described Knapp:

> If Knapp came to Louisiana to enrich himself, he was not long in finding that he was to enrich mankind. For him Louisiana was Nature's laboratory, in which he began to compound those fundamental methods and philosophies and the common-sense way of applying them, that have immortalized his name. It was here that he learned, as he himself said, 'the philosophy and power of demonstration (Williamson 1940:73).

Knapp taught the immigrants the fundamental values of their new land, although his teachings were hampered by the natives, who persuaded many of the immigrants that the most profitable use for the land was for grazing inferior cattle. After his ordeal ended, Knapp often summarized how he succeeded by saying, "In desperation we then resorted to demonstration" (Williamson 1940:73). He subsidized personally selected farmers, placed them in strategic locations on the syndicate's holdings, and obligated them to follow his instructions on farming to the letter. The initial area of cultivation consisted of 4,000 acres of marsh on the east bank of Calcasieu Lake, about 30 mi south of Lake Charles. This area already was cleared, and 4 ft levees divided the fields. Small canals crossed the area, running east and west. The levees held water from Calcasieu Lake to a depth of 6 in in the field. The first crop was unsuccessful because of salt water intrusion from the Gulf. The area of cultivation was relocated to higher terrain. Within three years they demonstrated that farming in southwestern Louisiana could be profitable. With a sure thing, Knapp had no trouble attracting farm families from the Midwest and East. Thousands of farmers relocated to the prairies stretching from Lafayette to Lake Charles. The towns of Vinton and Iowa, in Calcasieu Parish, were settled by newcomers from the prairies of Iowa (Shutts 1951:25-26; Wall 1984:231; Williamson 1940:73, 73n).

Based upon the soil in southwestern Louisiana, Knapp concluded that rice would be the cash crop best suited to the region. Knowledge was needed, if this venture were to prove successful. Knapp turned to an old friend, Secretary of Agriculture James Wilson. Wilson twice sent Knapp to China, Japan, and India to find a commercially suitable rice for cultivation in southwestern Louisiana. The shift from "Providence" rice to a crop produced by controlled irrigation led to the success of one or two of the Asian varieties brought back by Knapp (Wall 1984:231; Williamson 1940:74). Although best remembered in southwestern Louisiana for his accomplishments in the rice industry, Knapp went on to achieve greater fame. He largely was responsible for the initial success in combating and containing, though not destroying, the boll weevil. He died in Washington, April 1, 1911, at the age of seventy-seven.

Rice Experiment Station and Extension Service

The rice industry in Louisiana received aid throughout the last 100 years as a result of the Morrill Act of 1862, which provided for land-grant colleges specializing in the fields of agriculture and mechanics. Ironically, southerners opposed a similar bill introduced in 1859. In October 1877, the Louisiana State

University and Agricultural and Mechanical College opened. Its programs stimulated agricultural development.

Additional support for rice agriculture arrived with the passage of the Hatch Act in 1887. Enacted by the United States Congress chiefly at the urging of Seaman Knapp, the Hatch Act resulted in the first federal appropriations for the states to be used to establish agricultural experimental stations. A portion of these funds paid for investigations in rice cultivation at the State Experiment Station at Louisiana State University before the turn of the century (Williamson 1940:46, 50-53, 52n, 59, 70, 87, 98).

An experiment station devoted strictly to rice was established at Crowley in 1909. Eleven acres provided the laboratory for research and experimentation. The scientific efforts were divided into three categories: (1) study of rice varieties to obtain data on seasonal growth, yield and quality; (2) experiments in methods of seed bed preparation, seeding, fertilization and rotation; and, (3) weather observations to record the conditions under which the experiments were taking place and to determine the effect of weather upon the rice crop.

These efforts led to some startling discoveries. It is more cost effective to drill the seed to a depth of 1 in at the rate of 80 lbs per acre than to broadcast the seed in a greater density. Also, commercial fertilization is virtually ineffective; instead, rice should be rotated with other crops, especially soy beans. The station provided selected varieties of seed to farmers under a plan known as "restricted rice distribution" (Williamson 1940:222-23).

The Extension Service provided an additional source of knowledge for rice farmers. It began in Louisiana on July 1, 1917, in St. James Parish. By 1923, the extension director demonstrated that yields per acre for corn, oats, and rice increased by slightly more than 11 per cent. The Extension Service, which devolved from the Smith-Lever Act of 1914, demonstrated its value (Williamson 1940:139-140, 145, 318).

Depression of the River Rice Industry

The increased production of rice only could be sustained if the market price proved profitable. To help elevate the market price, a campaign to popularize rice and thereby increase demand was needed. This objective was undertaken by the Rice Association of America, which was organized at Crowley in December 1901 (Davis 1965:297).

The census report of 1850, which was based on the 1849 crop, demonstrates that rice was produced in nearly every parish. This distribution, particularly in the prairie parishes in the southwestern portion of the state, indicates that Providence made up a considerable portion of the crop. Twelve per cent of the crop came from the hill parishes. According to the census records, this level of production was the largest achieved in the hill country. The bulk of rice cultivation primarily was associated with areas of French settlement. The parishes south of the Red River along the Mississippi River and the bayous contributed approximately 87 per cent of the harvest.

The relative importance of river rice declined abruptly after the 1880s. In 1879, more than 93 per cent of the rice produced in Louisiana was grown in the river region. Ten years later, that area's production dropped to 68 per cent. In 1899, it fell to only 27 per cent. Chan Lee contended in 1960 that this abrupt decline was due to the development of the prairie rice industry (Lee 1960:155). His detailed argument is persuasive. The reason for presenting it in its entirety follows this passage:

> Natural factors may have been effective in the shifting of the rice area from river to prairies, but cultural factors played the more important part. The main differences of natural conditions as between river and prairie are configuration of the land, water resources, and soils. In the prairies the flatness of land, as compared to narrowly restricted natural-levee slopes along the river, gives advantages for large-scale mechanized farming. Also, it requires fewer field levees to hold uniform depths of water than on natural-levee slopes; the

river section needs generally three to four times more field levees than in the prairies. In the prairie section, about 65 per cent of the total requirement of irrigation water comes from bayous, and the balance from wells. In the river section most irrigation water is supplied by the active Mississippi and its abandoned channels, except for a small amount in the Tensas Basin. The nature of stream irrigation is also quite different as between river and prairies. In the prairies, irrigation water is obtained by lifting devices and transported for long distances through canals. In the river section, however, irrigation water is lifted only when the river stage is low, and there are no long irrigation canals, since all fields are located along streams. The cost of irrigation water per unit on the river is less than in the prairies. However, total expense of irrigation water per unit area is not much different because the river section needs more irrigation water than do the prairies. Lack of impermeable subsoil on the natural-levee slopes necessitates about three times more water for irrigation than on prairie soils. Natural factors involved in producing rice must be evaluated in terms of the level of technology and value system of the human group undertaking it. Without a lifting device to make available stream and ground water, water resources in the prairies would be of no value. As mentioned previously, the (marais) was the only suitable place for rice culture on the same prairies about 60 years ago, or before the coming of the Midwestern farmer. Development of rice cultivation, thus, is connected closely with the technical level of culture; Providence rice almost without irrigation; river rice with natural flooding; river rice with controlled irrigation through lifting devices; and finally, open prairie land irrigated with water lifted from bayous and ground-water sources. Level of technology alone fails, however, to explain the shift of emphasis from river to prairies. An effective lifting device for stream water was known and used somewhat by rice farmers along the Mississippi long before the coming of Midwestern farmers to the prairies. As mentioned before, a horse-powered water wheel and a steam pump for lifting water from the Mississippi River were recommended as early as 1854. Though they were not widely accepted, water-wheels and steam pumps were used for irrigation purposes around the 1860s in St. John the Baptist Parish. The use of a steam pump in the Teche country preceded such usage in the prairies; one is reported for Franklin, Iberia Parish, for 1885. Rice farmers along the Mississippi and associated bayous could have used water-lifting devices and improved machinery more widely before 1885. However, the wide use of lifting devices for rice irrigation and the employment of improved machinery were accepted primarily as a result of the stimulus of prairie rice methods. Rice has never been the dominant commercial crop along the Mississippi nor has it been on the distributary bayous. On the Mississippi rice could not meet the competition of sugar cane and cotton. Rice was considered primarily as a subsistence crop or a temporary substitute for sugar cane in the river section. Lack of adoption of modern machinery in rice culture along the river is therefore not related to a general lower level of technology. Nearby sugar planters used steam pumps for a long time while rice farmers continued old hand methods without controlled irrigation. Possibly the basic ideas of Providence rice and natural flooding prevented even sugar-cane planters from adopting new ways of rice culture for a long period. Non-traditional attitudes of Midwestern prairie farmers with respect to rice, as well as the technological potential of the times, were therefore responsible for the development of new modes of cultivation (Lee 1960:155, 158-60).

Lee's comparison is accurate, however, he ignored the fundamental aspect of commercial agriculture. If a commercial grower has the necessary capital, he will cultivate whatever crop his land is suited for that offers the greatest return on his investment. In the river region, that crop was sugar. With few exceptions, when the capital required to rebuild after the Civil War became available, planters along the Mississippi reconverted their fields from rice to sugar cultivation. Admittedly, the latter stages of the sugar industry's recovery occurred simultaneously with the virtual explosion of prairie rice production (Shannon et al. 1990). Sugar, however, would have replaced rice as the principal commercial crop along the Mississippi regardless of prairie rice agriculture development.

Production during World War I brought an increase in the acreage cultivated by rice farmers. By 1920, rice cleaning and polishing became the fifth leading industry in Louisiana, behind petroleum refining, lumbering, sugar refining, and paper manufacturing. The port of New Orleans handled one-half of the rice exported from the United States that year. Rice made a substantial contribution to the growth of the Port of New Orleans. River rice cultivation remained extensive along the river until the 1920s. The depression which occurred late in that decade seriously curtailed rice production. Rice production during the 1930s approximated that of the early 1860s. Cattle grazed over much of the former rice acreage. The Agricultural Adjustment Act of 1933 attempted to curtail production of several commodities, including rice, to drive up the market price. Benefit payments were paid by the government to compensate the growers. Historian Charles P. Roland concluded, "Southern farmers entered into the reduction contracts enthusiastically and received much material benefit from their operation; in a series of referendums, they approved their continuation" (Simkins and Roland 1972:427-428, 483-484, 578; Davis 1965:299, 303, 351; Williamson 1940:119-120; Lee 1960:161).

World War II brought an end to the depression, but the river rice industry recovered slowly. Labor methods suitable for the land along the river could not compete with the highly mechanized prairie rice operations, and farm equipment was in short supply. The 1944 crop netted just over $90 million. Following World War II, river rice production began a gradual recovery. Over 33,000,000 bushels were harvested in Louisiana in 1954. The leading producers were Jefferson Davis, Acadia, Calcasieu, Evangeline, and Vermilion parishes. By 1960, the level of production approximated that of the early twentieth century. The 1969 harvest totalled just over $340 million. Although prairie rice farmers migrated to the river region during World War II, this recovery was due to an increased demand overseas which drove up the price of rice. Louisiana exported rice to Latin America and elsewhere because the former exporting countries in Asia no longer could meet the demand. By using machinery and organizational skills, a single worker in Louisiana could produce 60 times as much rice as a laborer in Asia (Simkins and Roland 1972:427-428, 483-484, 578; Davis 1965:299, 303, 351; Williamson 1940:119-120; Lee 1960:161).

After 1885, fields continued to be prepared at the beginning of the year in the same manner as previously described. Seeds usually were planted in February, prior to the annual spring rise in the river. "Carolina Gold" and "Carolina White" were replaced by the Central American variety "Honduras" about 1890. Shortly thereafter, the United States Department of Agriculture introduced the "Kiushu" variety from Japan. This strain produced greater yields. A new variety, the "Blue Rose," was introduced in 1911. The superior "Blue Rose" strain was developed by Sol Wright, a former Indiana wheat farmer known as the "Burbank of the rice industry." Wright went on to develop several other varieties. The 1936 *United States Agricultural Year Book* reported that "roughly 73 per cent of the rice produced in the United States in 1934 consisted of varieties developed by the late S. L. Wright" (Davis 1965:297; Simkins and Roland 1972:332; Lee 1960:128). The introduction of these early and late varieties of rice expanded the time of harvest (Lee 1960; Davis 1965).

The checkerboard field pattern dominated the acreage along the lower Mississippi (Figure 12). There was a limited amount of contour field-levee cultivation along the river; this procedure never became popular along the river, probably because of the existing arpent system of drainage canals. When it did occur about 1920, it apparently was the result of actual migration of farmers from the prairie. During the 1930s, contour field-levee cultivation was introduced successfully along Bayou Teche; it never spread to the original river rice growers.

No substantial changes were made in the field pattern along the Mississippi since the days of French colonization. On diversified farms, the front land generally is planted in sugar cane and the backslope in rice. Pump sheds were built along the Mississippi; borrow pits served as reservoirs (Figure 12). Initially, boxed flumes or pipes were inserted under or through artificial levees. A siphon replaced these after 1890 (Lee 1960:185, 187), when a law was enacted prohibiting any type of boxed flume or pipe to penetrate the levees (Ascension Police Jury Minutes, September 1890):

> Act No. 144. To regulate the manner of placing pipes through the public levees of the State for purposes of irrigation or otherwise; to impose a license upon all pipes through such

> levees, and to provide for the collection of the same; to require the removal by Police Juries of all existing rice-flumes, dahls and other conduits, and to enforce the payment of the cost thereof; to prohibit the cutting of the public levees of the State for any purpose not provided for by this Act (repairs) and to punish any person offending against this Act (Kerr 1920:183).

Failure to comply with this brought forth a second one in 1892:

> Act No. 5. To prohibit placing rice flumes, dahls, pipes, or other foreign substances in the public levees of the State for the purpose of irrigation or otherwise; to require the removal by police juries, by January 1, 1893, of all existing rice flumes, dahls, pipes or other conduits, and to provide a penalty for violation of this Act (Kerr 1920:184).

Abandoned rice pipes and flumes along the Mississippi in the study area are obvious markers of the ineffectiveness of this act as well.

Both the dry and wet methods of seeding, described previously, were used after 1885. Sowing by airplane on either dry or flooded fields began in the prairie about 1950. The majority of river rice growers, however, continued to use endgate seeders. Implements used to prepare the fields did not change until the beginning of World War I, when tractors began to replace mules. This increase in pulling power led to the replacement of moldboard plows and creole plows by gang-plows and, in the 1950s, by disc plows. Iron harrows also replaced those constructed of wood.

Harvesting and Milling

Prior to World War II, and except when labor was in short supply during World War I, laborers used sickles to harvest rice along the river. Self-binders, which are used on the prairies, never were adopted along the river. Farmers along the river argued that rice cut in the fields and allowed to dry for one or two days can be threshed within days of the harvest, however, rice that is immediately bound into bundles after cutting has no time to dry on the stubble. The additional drying time needed caused a substantial delay between harvesting and threshing. In addition, the fields along the river tend to be more saturated at harvest time than those of the prairies, making it more difficult to operate the self-binders. A farm-labor shortage that began during World War II continued after the war because of rapid industrialization in the region. This factor, coupled with a new generation of rice growers who were willing to use machinery, finally brought about the adoption of the combine. It should be noted that a combine suitable for harvesting rice was first used in southwestern Louisiana in the early 1890s (Lee 1960:178, 180; Davis 1965:297).

A thresher was introduced during the 1870s. It gradually replaced animal and flail threshing. A new model was introduced about 1916. It included a self-feeder and chaff-blower. This machine remained in use until the adoption of the combine, which harvested and threshed at the same time (Lee 1960:180-81). The combine thus eliminated a common site on rice farms: stacks of rice in the field.

A new machine, known as shelling or hulling stones, polished the rice. This mechanism, actually an Engellery polisher, which was introduced in 1891, initially consisted of a pair of stones (a bed stone and upper stone or "runner") which later were replaced by artificial stones, generally made of cement. The threshed rice dropped through an opening in the upper stone. The revolution of this stone over the bed stone removed the hull from the grain. As previously described, rice milling, unlike other grains, avoids breaking the grain. This is accomplished by using stones that have a smooth milling surface and maintaining a gap between the upper and lower stones. Brown rice, however, continued to be polished by the traditional method of mortar and pestle until the huller was introduced (Ginn 1940:572; Davis 1965:297; Lee 1960:181).

Along the Mississippi River during the last quarter of the nineteenth century, a "plantation huller" was adopted for household use. Derived from a coffee huller and still in use today, it consists of a horizontal, tapering grooved cylinder. A ribbed shaft revolves within the cylinder. The hull is separated from the grain by the kernels rubbing against each other, against the rough iron walls of the cylinder, and against the ribbed surface of the core. The grain is then screened and fanned, before passing through the huller a second time. A small steam or diesel engine powers this machine. It also is used for polishing the grain. A larger huller, the Engellery, developed in 1891, was introduced in the commercial mills at the beginning of the twentieth century. Similar to the "plantation huller" described above, the name in this case is misleading. It actually is used to polish the grain after the hull is removed by the stone mill (Davis 1965:297; Lee 1960:181, 185).

Land-Use Patterns

Despite the fact that most rice plantations now are used for other purposes, structures remain that indicate their existence. An abandoned barn often housed a "plantation huller." Before World War I, every plantation had a landing on the river where large steamers could tie up. These vessels were the primary conveyors of rice to the commercial mills in New Orleans. These landings were abandoned as more and more growers came to rely upon the railroad for transporting their harvest. This change in transportation often brought about a relocation of the threshing ground. If circumstances allowed it, the threshing area shifted from the levee slope to the railroad track. This pattern continued until the introduction of the combine. The larger growers undoubtedly had an elevator for loading the rice aboard railroad cars (Lee 1960:192, 194; Davis 1965:297).

The onset of mechanized cultivation brought about the gradual disappearance of farmers of less than 200 acres. Small-scale operators relying on manual labor could not successfully compete. By 1950, small-scale commercial rice producers virtually disappeared.

The Modern Rice Industry 1950 to Present

Rice provides more food for the world than any other crop grown today. It is grown in more than 60 countries, and on six continents. The 1967-1968 world crop, excluding Communist Asia, was estimated at nearly 180,000,000 metric tons of rough rice. This bountiful harvest was grown on a record 235,000,000 acres. The number one exporter of rice remains the United States, despite the fact that it only cultivates one per cent of the world's acreage devoted to rice production (Chaffey 1969:3).

Rice cultivation in the United States continued to spread following its success in southwestern Louisiana. Rice was introduced into the prairies of southeastern Texas about 1900, the prairies of eastern Arkansas in 1905, and, at least commercially, in California in 1912. The first rice crop grown in the upper Mississippi Valley occurred in 1923, near Elsberry, Missouri. During the 1950s, the number of acres of rice planted in Mississippi increased tenfold (Chaffey 1969:3; Jones and Jenkins 1938:2). Table 6 details the 1969 acreage allotments and the 1968 production for these five states.

The rice farmer follows the same general schedule today as he did one hundred years ago: preparation of fields, planting, fertilizing, weeding, irrigating, harvesting, drying, and storing. Improvements made in machinery aid in various phases of rice production, but beyond that the only substantial change in the procedure would be weeding and fertilization. Weeds no longer are removed by hand, but are controlled by chemicals. Chemicals readily available to the farmer today, such as nitrogen, phosphorus, and potash, also make more effective fertilization possible (Chaffey 1969:5-6, 8).

The typical grower is a rent farmer who cultivates over 200 acres. Most of the rental property includes residences and outbuildings which eliminates the need for new construction. Modern transportation developments permit the rental farmer to commute to his fields. Except for the combine, equipment often is left in the fields unprotected. An implement repair shop serves as the only structure on the farm. The implement yard's location depends upon the time of year. During the off season, it usually is located near

Table 6

ACREAGE AND PRODUCTION IN PRINCIPAL RICE PRODUCING STATES (JANUARY 1968; CAFFEY 1969:4)

State	1969 Acreage Allotments	1968 Production (Pounds)
Texas	552,013	2,746,200,000
Louisiana	620,890	2,648,100,000
Arkansas	521,566	2,488,200,000
California	391,828	2,332,800,000
Mississippi	61,009	288,100,000

the highway. When fields are being prepared, and at harvest time, it is located in one corner of the field. Because of the interspersal of river rice farmers of French descent and prairie rice farmers along the Mississippi, no single distinct kind of settlement assemblage exists for river rice farming (Lee 1960:192, 194, 197).

The rice industry appears to be on the verge of a significant breakthrough in production. Because of new seed varieties that mature earlier, and due to Louisiana's climate, it is possible to harvest a crop as late as the first week in September and still be able to harvest a second crop from the same field. At present, an abnormally mild fall coupled with a late first frost, such as occurred in 1985, is required. New varieties of seed currently being developed will require a shorter period of maturation, thereby greatly enhancing the chances of successfully harvesting a second crop. Rice farmers also are increasing their margin of profit by raising crawfish in conjunction with rice. Where the double cropped rice and crawfish system is utilized, the farmer usually sacrifices a portion of the rice yield because chemicals used to control rice insects reduce the crawfish population (Bagent et al. 1987:9; Linscombe n.d.:1).

A new process was added to the milling procedure: coating the grain with glucose and talc. After the rice is polished, it is screened. Following this step, if the rice is to be coated it is conveyed to a revolving cylinder, known as a trumble. The glucose and talc then are applied. The hulls, which are removed in the first phase of milling the grain, once were used as fuel for the mills, now they are burned as waste. Other by-products are derived, as well. These are indicated in Table 7.

Rice is classified as short, medium, or long grain. The two primary varieties of the medium grain cultivated by Louisiana farmers, based upon number of acres planted, are "Saturn" and "Nato". The three dominant long grain varieties grown in the state, based upon acreage, are "Belle Patra", "Bluebelle," and "Bluebonnet 50." Usually, the difference in the varieties within a classification is determined by time of maturation. "Belle Patra", for example, matures extremely early in the season, whereas "Bluebonnet 50" is a midseason variety. The other three fall in between. As of 1968, no late maturing varieties were grown in Louisiana. Although the classifications are determined by shape, the true difference is in the cooking. The long grain varieties are easier to cook; the grains are flakey and separate easily when served. The medium grain varieties retain more moisture after cooking; consequently, the grains remain somewhat sticky. Highly nutritious, in areas where it is popular, rice commonly is used in soups, salads, casseroles and desserts; with meat, chicken, egg and vegetable dishes; and in foreign dishes, such as chop suey (Chaffey 1969:14-17).

Summary

Agriculture dominated the economy of the study area since the arrival of the first Europeans. Subsistence farming gave way to commercial cultivation of rice during the colonial period. In the early nineteenth century, sugar became the dominant crop along the Mississippi River between Baton Rouge and New Orleans. Although this was true immediately above and below the project area, rice apparently maintained a near parity with sugar on the eve of the Civil War along this reach of the river.

Sugar planters recovered slowly from the devastation of the Civil War. Rice production expanded to become the dominant crop for the remainder of the nineteenth century. In the early twentieth century, sugar cultivation again rivaled rice cultivation. Following the onset of the Great Depression in 1929, cultivation of both crops declined.

One result of the extensive cultivation of rice in the project area was a significant decrease in the rate of land consolidation, as compared with a region dominated by sugar production. The center portion of the study area never was consolidated into a large plantation.

Following the end of World War II, rice production gradually disappeared in the project area. Several factors led to its decline. Rice producers in the area were unable to compete successfully with those in southwestern Louisiana, and sugar cane cultivation promised greater profits. Because rice was produced in the region for a longer period of time and required virtually no sophisticated equipment to

Table 7

AVERAGE YIELD OF MILLED RICE AND BY-PRODUCTS OBTAINED FROM THE MILLING OF 100 LBS. OF ROUGH RICE (CAFFEY 1969:15)

Head Rice	62.5 lbs.
Second Hand	5.1 lbs.
Screenings	1.8 lbs.
Brewers	1.0 lbs.
Bran	8.1 lbs.
Polish	1.5 lbs.
Hulls	19.1 lbs.
Inert Material	.9 lbs.
TOTAL	**100.0 lbs.**

cultivate, mechanization met with hostility from the old-timers along the river. Sugar producers more readily adopted new technology. These different attitudes contributed to the extinction of rice cultivation in the project area by the 1950s. Finally, the ability to earn a substantial wage in a petrochemical plant and graze cattle in fields formerly sown in rice probably dealt the final blow to an industry still suffering from the effects of the Great Depression.

As demonstrated in this chapter, rice cultivation along the lower Mississippi River can be divided into three chronological periods: "Providence" rice (pre-1850); river rice (1850-1885); and, river rice (post-1885). These periods are distinguishable by predominating methods of irrigation. Prior to 1850, most rice farmers relied upon precipitation and water taken from the Mississippi when the river neared crest stage. Between 1850 and 1885, rice farmers relied heavily on the Mississippi, as they expanded their production activities for commercial reasons.

This greater reliance on the Mississippi, coupled with an increasing likelihood of flooding, brought about several changes in irrigation methods during the early period of river rice agriculture. As indicated in Table 8, flumes were installed in levee cuts beginning in 1850. In 1870, the flumes were replaced or supplemented by sluice-gates. Pumps became more prevalent after 1885, and by 1890 flume construction was banned. Although required by law to remove flumes, many property owners failed to comply. Additional laws requiring the removal of flumes also failed to secure the removal of the flumes, as demonstrated by the remains located during this investigation.

After 1890, pumps were used to convey water over, rather than through, the levees. This enabled rice farmers to irrigate their fields whenever necessary, while at the same time reducing the risk of a crevasse. Table 8 demonstrates the increased mechanization in other aspects of rice cultivation and processing. Most rice plantations operating along the Mississippi River between 1850 and 1890 probably utilized flumes for irrigation. Additionally, each landowner probably utilized his own flume. Characteristics of rice plantations along the Mississippi River included a cut in the levee for the flume, a flume ditch at least 4 ft wide and 4 to 5 ft deep, at lease one cross ditch at a right angle to the flume ditch, and an abandoned barn along the river, which housed a plantation huller (Table 8).

Archival research presented in Chapter IV detailed the dominance of rice agriculture in the study area by the late 1860s. Undoubtedly, this economic trend represents an expansion of antebellum production levels. The substantial number of flumes excavated in the study area supports the historical findings. The materials used in the construction of the flumes, especially the use of machine cut square nails, date the flumes to the period of river rice cultivation between 1850 and 1885, which also correlates with the historical evidence. Applying the direct historical approach, Table 8 illustrates archeologically relevant expectations of the various components of the rice agricultural assemblages that existed during each of the three periods mentioned above. These expectations will be compared with the results of archeological excavation at 16 SJ 40.

Based on the known historic development of rice cultivation technology, several factors influence the probable locations of rice flumes along the Mississippi River. Rice flume construction is associated directly with historic land use land-side of the levee; these flumes will occur only in areas where river rice was cultivated. Prior knowledge of river rice agriculture within a survey reach will enhance the likelihood of locating and identifying these small, easily obscured wooden features. Between ca. 1850 and 1890, boxed flumes extended from the river bank into pit reservoirs, often borrow pits, or through the levee into rice canals. The post-1890 siphon flumes generally were situated on the riverbank. Their remains may be associated with pump house remains or iron pipes. Finally, especially within smaller landholdings, rice canals and associated rice flumes may occur more commonly along property boundaries. Archeological expectations of rice cultivation along the Mississippi River are discussed more fully elsewhere (Goodwin, Hinks et al. 1989).

In Chapter VII, the site is subdivided into three spatial units: for the purpose of relating archeological features to individual historic properties and for the purpose of comparing the assemblages of large landholdings with those of single family units from the same time period from an economic perspective. The three spatial units addressed are: Crescent Plantation located in Sections 33, 32, and 31

(Table 2); six small farms located in Sections 30, 29, 28, 27, 77, and 26 (Table 3); and, Magnolia Plantation located in Sections 82, 71, 76, 75, and 83 (Tables 4 and 5). These units are used to relate archeological features to individual historic properties and to compare the assemblages of large landholdings with those of contemporaneous single family units.

Table 8

CHARACTERISTIC COMPONENTS OF RICE CULTIVATION ASSEMBLAGES BY PERIOD ALONG THE MISSISSIPPI RIVER

Pre-1850	1850-1885	1885-Present
I. Cultivation Attributes		
Oxen, Creole Ponies, Mules	Oxen, Creole Ponies, Mules	"Rice" Mules; Tractors
Upland or Moldboard Plow	Wheeled, Wooden Moldboard Plow	Moldboard Plow; Gangplow; Disc Plow
Wooden Harrow Hand seeding	Wooden Harrow Hand Seeding	Iron Harrow seeders; Endgate Seeders; Airplane
Sickle Hand Binding	Sickle Hand Binding	Sickle; Combine Mechanized Twine Binder; Combine
Bird-Watching Stands	Bird-Watching Stands; Two-Wheeled Wooden Cart	
II. Processing Attributes		
Flailing/Animal Treading	Flailing/Animal Treading 3' Wooden Blocks	"Wisconsin" Threshing Machine
Threshing Sticks	Threshing Sticks; Threshing Machines	"Wisconsin" Threshing Machine
Wooden Mortar and Pestle	Wooden Mortar & Pestle; Iron-Covered Mortar and Pestle	Mortar & Pestle; Plantation Huller; Engellery Huller
Pre-1850	**1850-1885**	**1885-Present**
Wooden Rotary Pit-Mill	Wooden Rotary Pit-Mill (Few Horse- or Steam-Powered Mills)	Engellery Polisher

III. **Terrain and Irrigation Attributes**

Openings in Levee	Openings in Levee; Sluice-Gate and Flume; Horse-Powered "Persian Wheel" Pump; Steam Pump	Steam-Powered Pump (Both Vertical and Horizontal); Intake Pipes; Diesel Engines; Centrifugal Pumps
Drainage Canals with Cross-Ditches	Boxed Flumes/Pipes Flume Ditch with Cross-Ditches; Check- or Length-Levees; Cross Levees Plank Gates	Siphon Flume Ditch Cross-Ditches; Check- or Length-Levees; Cross-Levee Plank Gates
Irregularly Configured Fields	Irregularly Configured Fields; Larger, Uniform Field Pattern (Such as the Checker-Board Pattern)	Irregular and Checker-Board Field Patterns (Very Few Contour Levees)

CHAPTER VI

FIELD METHODS

Introduction

Field investigations during 1987 at 16 SJ 40 were designed to complete recordation of feature, size, depth, stratigraphy, cultural association, function, approximate date of use, and condition of each archeological components. Research objectives were archeological and historical documentation of (1) the postbellum development of rice agriculture on the Mississippi River, (2) differences between large and small farms along the river during the postbellum period, (3) spatial variation in the arrangement of facilities and features between large and small farms, and (4) historical archeological site formation and destruction on the batture of the Mississippi River. In the discussions that follow, the methodologies that were applied during data recovery at each feature or unit are reviewed, and the archeological results of field investigations are reported.

During the 1984 survey of the Vacherie revetment project area, when 16 SJ 40 was discovered, a 20 m grid was placed across the entire length of the Vacherie project area. The baseline established during that survey (E500) ran parallel to the river, proximal to the river's edge. In the intervening years, however, the 1984 temporary datum was washed away by the river. Thus, during 1987 the first tasks undertaken at the site were reestablishment of grid control and the preparation of a site plan (Figure 13). Because the river destroyed part of the E500 baseline, it was not possible to reestablish the 1984 grid precisely. Therefore, the grid utilized during the 1987 data recovery was close, but not identical to the grid established three years earlier. Consequently, the grid coordinates listed for the features recorded in 1984 (Goodwin, Yakubik et al. 1985) do not duplicate those recorded during 1987. Table 9 lists archeological features recorded at the site in 1987. Seven of these features (100, 102, 104, 105, 106, 107, and 113) remained in situ since 1984. Eight additional features (114-120 and 122) were discovered in 1987; Feature 111 (Goodwin, Yakubik et al. 1985) was redesignated Feature 121 during the 1987 data recovery.

As discussed in Chapter II, the Vacherie site lies immediately below a slight bend in the river, where erosion is creating a cut bank. A point bar is developing on the opposite shore near Paulina, Louisiana. The 1918 levee is eroding along much of its length; sections of it were destroyed completely. The surface of the batture behind the old levee appears relatively stable; however, there is evidence of river scouring in the upriver portion of the site area. A man-made point known as Haas Landing is situated at the upriver end of the site, between Ranges U-47 and U-68. In 1984, the landing extended as much as 5 m above the natural batture, and it reached some 20 to 30 m farther into the river than the rest of the batture. On September 5, 1984, three cypress irrigation flumes and a plank privy (Features 109 through 112) were recorded along the erosionary face of Haas Landing. Ten days later, on September 15, 1984, over 40 m of Haas Landing fell into the river. Although Features 109 through 112 remained, their loss to massive erosional impacts was imminent. The continued cutting of the beach terrace between Ranges U-47 and U-68 represents the major difference in the site configuration documented in 1987. By 1987, Features 109, 110, and 112 were removed by the river, and four new features (115, 116, 117, 121, and 123) were identified between Ranges U-47 and U-68. Feature 121 subsequently was determined to be part a of Feature 111 that was not exposed in 1984.

The following discussion describes site mapping, surface collection, and subsurface testing modalities applied during field work at 16 SJ 40. Field investigations at the site began with the establishment of vertical (NGVD) and horizontal control. The site datum and major site features were tied-in to levee marker stations with an Infrared Electronic Distance Machine (EDM). A baseline consisting of a line of stakes set at 50 m increments across the entire length of the site was established parallel to the river, and proximal to the river's edge. From this baseline, major terrain features, such as the river bankline, old roads, levees, and borrows were surveyed and recorded. Emphasis was placed on the delineation of vertical relationships across the site area. The elevations on all site features and test excavation units were established. In addition, a series of beach and bankline cross-sections were recorded with the EDM. These elevational cross sections illustrate the contour of the surface from the top of the bank to the water's edge. These

Table 9

LIST OF ARCHEOLOGICAL FEATURES AT VACHERIE (16 SJ 40) IN 1987[1]

Feature No./ Section	Provenience	Feature Description
100/28	N452.5 E495.5	Cypress flume with 18" diameter metal pipe inside.
102/27	N587.5 E496.0	Cypress flume exposed on river at bank.
104/77	N711 E490.0	Cypress flume in mid-bank 1.5 m below surface; top board intact.
105/26	N785.2 E484.0	Large depression filled with hewn cypress timbers and willow bark.
106/26	N800.0 E490.5	Willow bark and hewn cypress.
107/26	N816.0 E487.0	Two vertical cypress boards in the bluff face.
113/71	N933.0 E488.0	Granite slab on beach. Slab is 134 cm long, 51 cm wide, and 10 cm thick. Long axis of the slab is perpendicular to the river.
114/28	N490.0 E496.0	A basin shaped depression with cypress board planking and post in association.
115/76	N1028.5 E488.0	Vertical cypress planks placed in the ground in a square pattern.
116/76	N1017.5 E487.0	Cypress flume on the ground surface.
117/71	N921.0 E485.0	Two cypress boards protruding from the face of an eroded depression oriented perpendicular to the water's edge.
118/30	N355.0 E488.0	A stack of cypress boards.
119/28	N511.0 E496.0	Two cypress boards protruding from the buff face.
120/77	N717.0 E485.0	Metal culvert eroding from bluff edge.
121/75	N1261 E497.5	Cypress flume (?).
122/30	N314 E475	Cypress plank privy filled with oyster shells and artifacts.

[1]Features 101, 103, 108, 109, 110, 111, and 112 were recorded in 1984 (Goodwin, Yakubik et al. 1985); those features were not present in 1987.

cross-sections facilitated the analysis of site formation and destruction processes along this stretch of the river.

Following the establishment of horizontal control, a controlled surface survey at the site was undertaken by a four man crew, using 50 m transect intervals. Collection procedures were augmented by the division of transects into 20 x 50 m collection quadrants. The results of the controlled surface survey are presented in Chapter VIII.

After the surface collection was completed, a program of test excavation was initiated to determine the stratigraphy of the site, and to ascertain relationships between features. Several techniques of subsurface investigation were employed in order to determine feature boundaries, and to determine the extent and nature of intact cultural deposits at each feature. Subsurface examinations included boring with Dutch augers, probing around surface features, excavation of the features, bankline and trench exposures with a backhoe, 1 x 1 m and 1 x 2 m test units, and the cleaning and recording of bankline profiles.

Five trenches and a number of stratigraphic exposures were excavated into the site with a backhoe. Backhoe trenches were excavated at the southern end of the site to search for and recover deeply buried deposits, and to establish the stratigraphy in that portion of the site area. Archeological monitoring of backhoe excavation was implemented to prevent the destruction or disturbance of archeological remains. The field crew conducted a thorough visual reconnaissance of the profile trenches and of backdirt, in order to identify artifacts and features. Scaled profile drawings of selected portions of the east wall of backhoe Trenches A, B, D, and E were prepared in the field. Backhoe Trench C could not be drawn, due to slumping and subsequent trench collapse. Detailed observations on the natural and cultural stratigraphy of these exposures are presented in Chapter VII.

In general, controlled archeological hand excavation was applied to uncover and enable recordation of features at 16 SJ 40. A 1 x 1 m test excavation unit was excavated at Feature 118. Test excavation units measuring 1 x 2 m were excavated at Features 104 and 121. Test excavation units measuring 2 x 2 m were excavated at Features 122 and 115. In addition, two 2 x 2 m units were excavated in the middle of the project area, where in situ deposits were visible just below the old levee road in profile along the cut bank. These shallow block excavations, in a balked network of two 2 x 2 m squares, were implemented in order to view and record those deposits in both vertical and horizontal aspects.

A series of four 3 m long stratigraphic profiles (Profiles 4, 5, and 6) were cleaned along the cut bank to record the stratigraphy of cultural deposits. Profiles 4, 6, and 8 were cleaned and mapped over Features 114, 102, and 105, respectively, in order to provide information on the construction and/or excavation history of these agricultural features.

Major effort was given to recordation of features. All features were recorded, photographed, mapped in horizontal and vertical profiles, and compared and contrasted in terms of their morphology. All features were excavated and recorded using standard archeological techniques, and tied into datum. Vertical control was accomplished by a series of datum planes derived from an absolute (NGVD) measurement in each unit. The profiles and floors of units were kept neat and level at all times. Information from each 10 cm level was recorded separately on each excavation level record form, for comparison with levels above and below. Floor plans were drawn at the base of each 10 cm level. Basal depths were recorded at the midpoint and each of the four corners of each unit. Floor plans included piece plots for individual artifacts, soil matrix descriptions, and the recordation of features. Root, insect, and animal disturbances were noted when present. In addition, each excavation unit profile was studied, and drawn to scale. Field specimens recovered during excavation were found either in situ, or during the hand sorting of unit fill. Artifacts recovered from a single excavation level or feature were bagged as a unit. Bags were marked with the site number, test excavation unit number, level number, subunit (feature) number, date, and the name of the excavator. A feature record form was kept for each feature encountered during excavation. Feature information included the feature number, its vertical and horizontal location within a particular excavation unit, feature dimensions, stratigraphic notes, photos, sketches, and associated objects. All major features, such as rice flumes, wharf supports, privies, and slab board structures, were assigned feature numbers. The results of archeological field work at 16 SJ 40, and each of the test units, features, and profiles studied

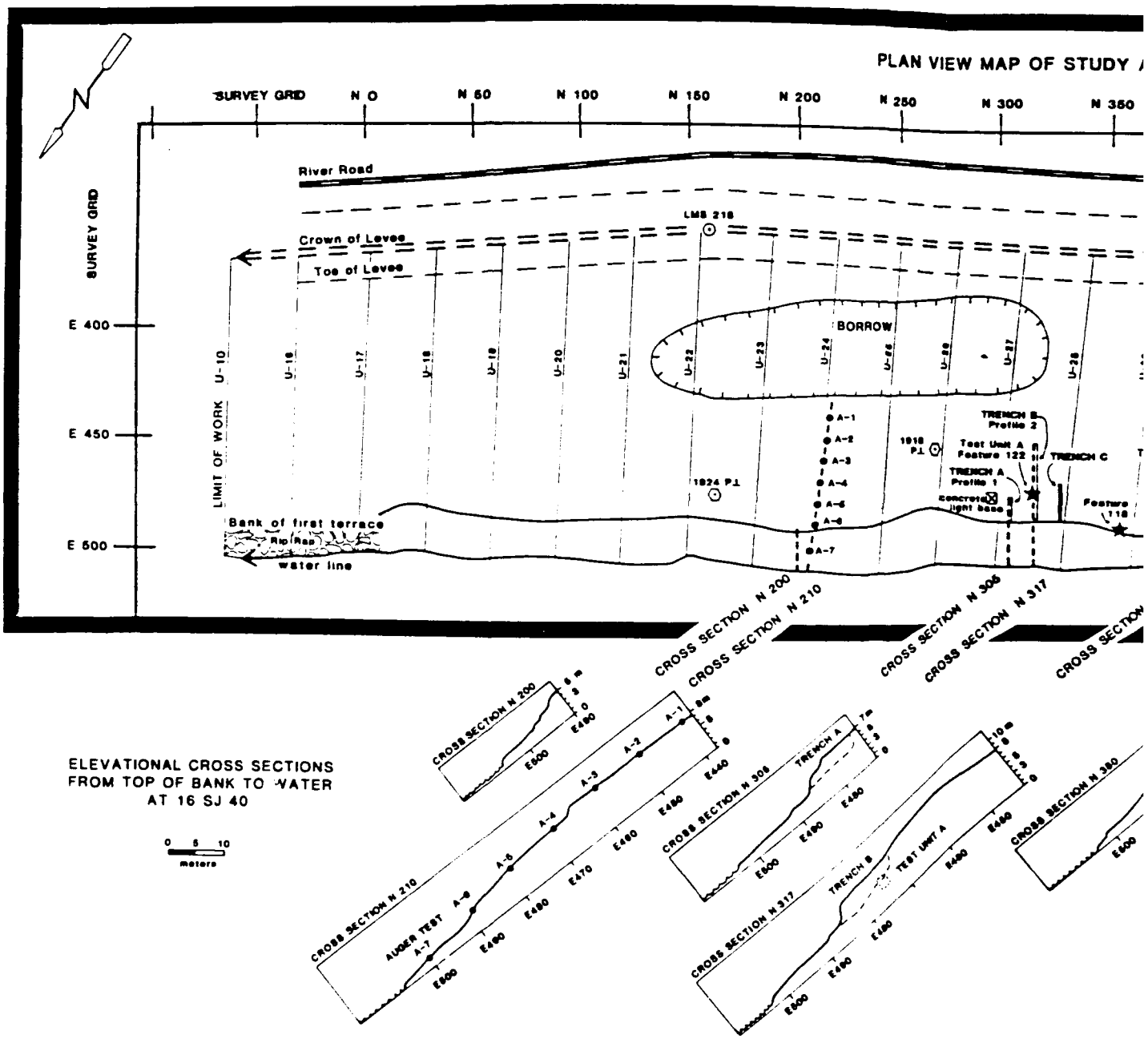
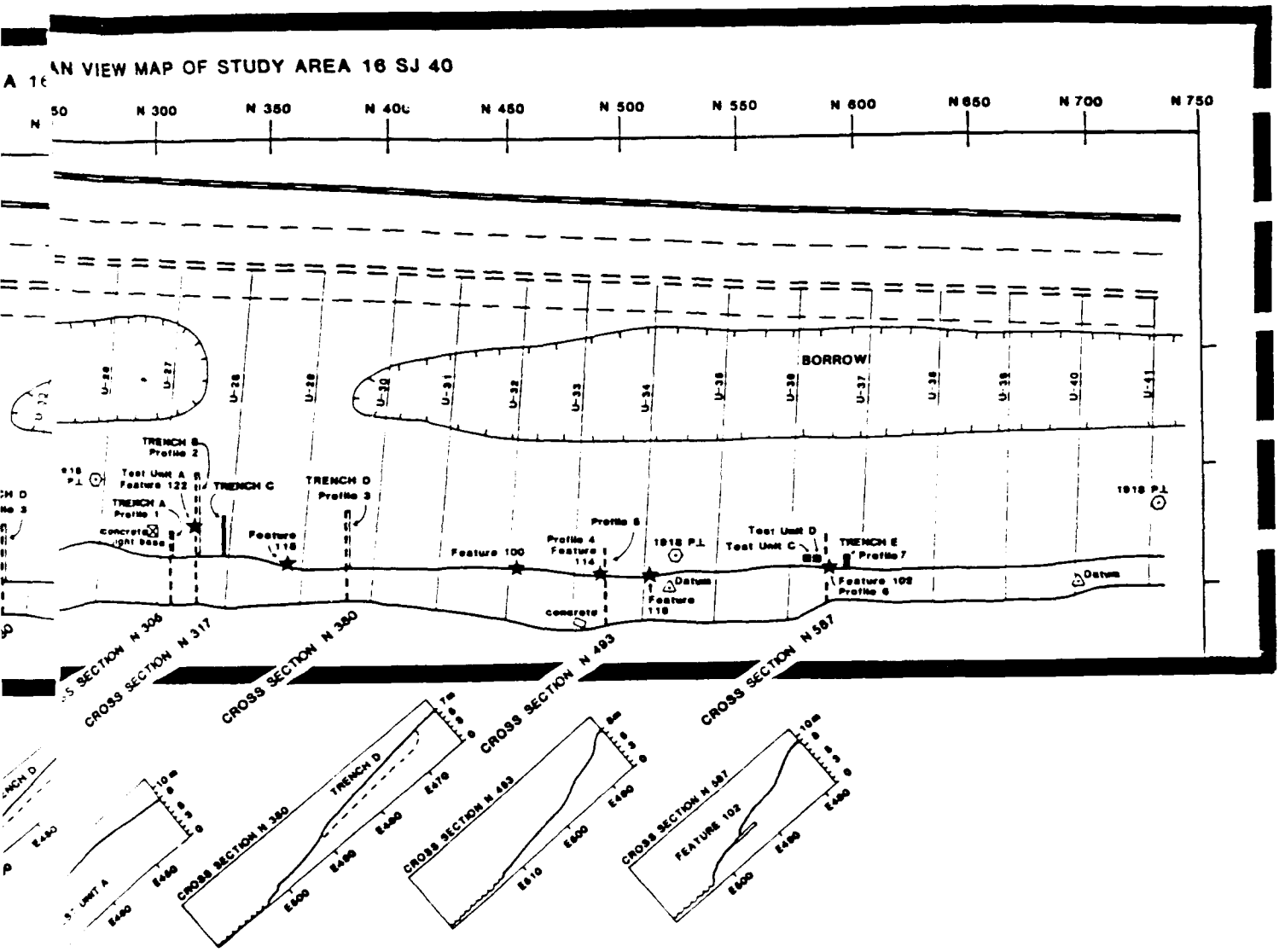


Figure 13. Site plan of 16 SJ 40 in 1987



MAP CONTINUES
(Overlap sections U-40 and U-41)

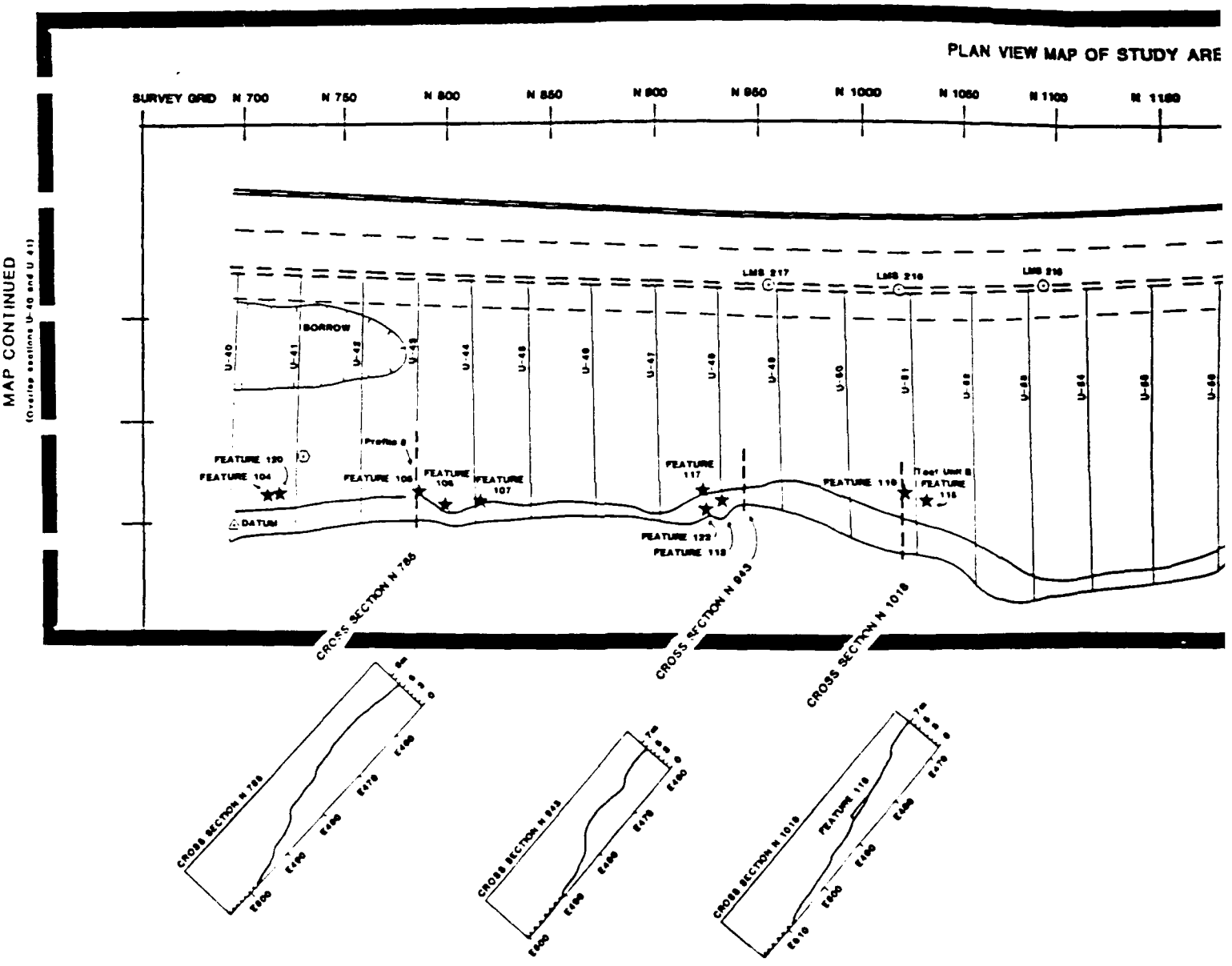
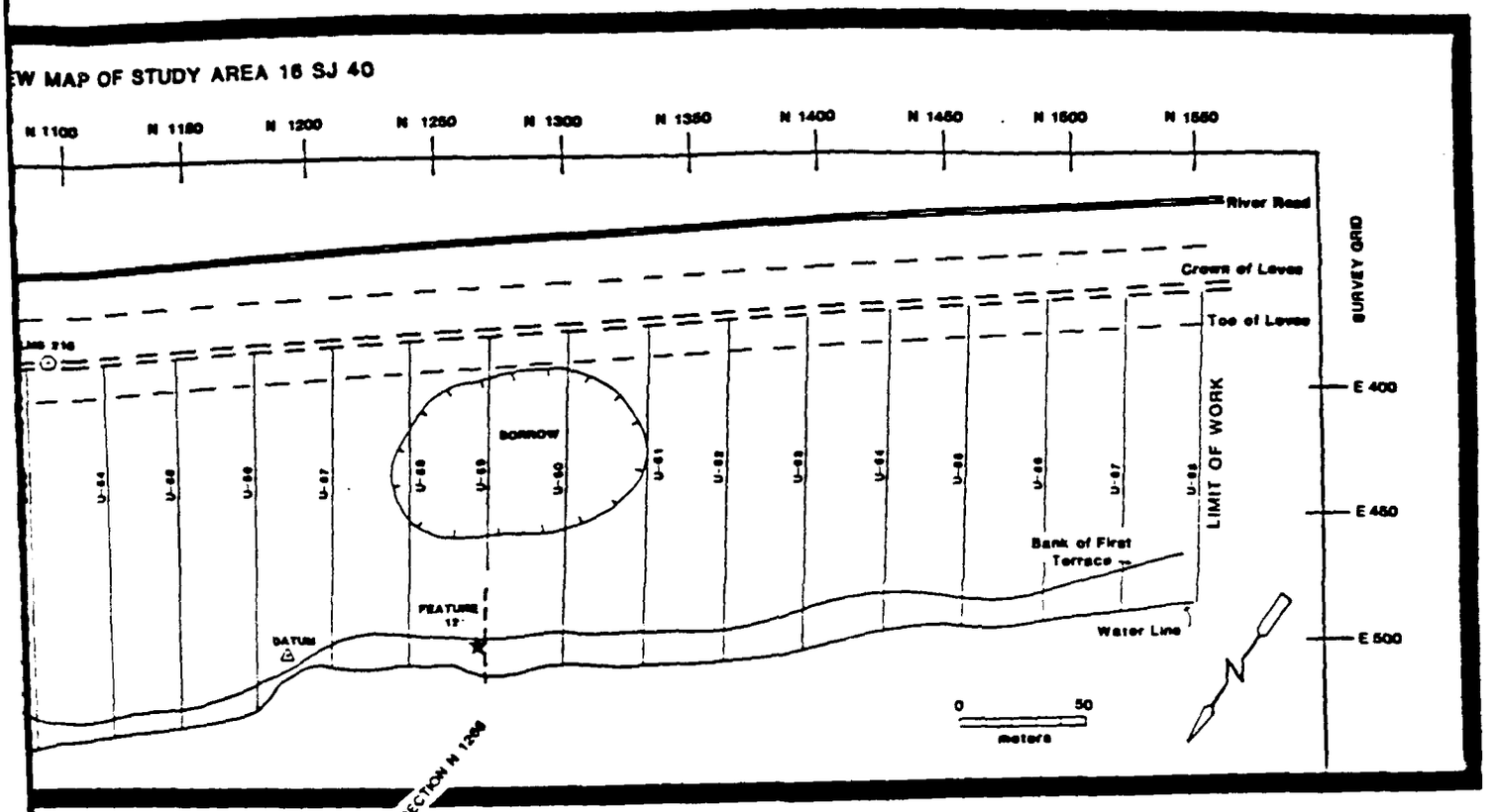
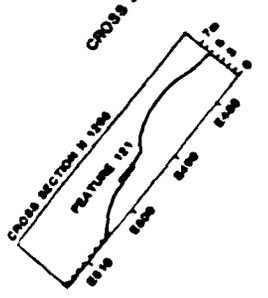


Figure 13. Site plan of 16 SJ 40 in 1987





ELEVATIONAL CROSS SECTIONS FROM TOP OF BANK TO WATER AT 16 SJ 40

there during 1987. are described in detail in Chapter VII. Archeological features and tests at the site are inventoried in Tables 9 and 10; the site plan prepared during the 1987 field season is shown in Figure 13.

Table 10

ARCHEOLOGICAL TESTS AT THE VACHERIE SITE (16 SJ 40)

I.	Profiles	Grid Coordinate	Section	Association
	1	N 305; E 485	30	Trench A
	2	N 316; E 484	30	Trench B
	3	N 380; E 475	29	Trench D
	4	N 490; E 499	28	Feature 114; Profile 5
	5	N 493; E 490	28	Profile 4
	6	N 589; E 492	27	Feature 102
	7	N 595; E 490	27	Trench E
	8	N 784; E 488	26	Feature 105
II.	Excavation Units			
	A	N 315; E 473	30	Feature 122; Trench B
	B	N1028; E 487	76	Feature 115
	C	N 580; E 488	27	Test Unit D
	D	N 583; E 488	27	Test Unit C
III.	Backhoe Trenches			
	A	N/S 305	30	Profile 1
	B	N/S 317	30	Profile 2; Excavation Unit A; Feature 122
	C	N/S 330	30	N/A
	D	N/S 380	29	Profile 3
	E	N/S 595	27	Profile 7
IV.	Auger Tests			
	1 through 7	N/S 210	31	From Waterline to Borrow Pit

CHAPTER VII

FIELD INVESTIGATIONS

This chapter presents the results of archeological field work conducted during the 1987 field season. This discussion begins with the downriver portion of the site within the vicinity of historic Crescent Plantation, and it continues with a presentation of features found on land that formerly comprised seven small farms, between Crescent and Magnolia Plantations. Finally, it describes features found within the former boundaries of Magnolia Plantation, at the upriver portion of the project area.

Crescent Plantation (Sections 33 to 31)

As discussed in Chapters IV and V, Crescent Plantation was a nineteenth century plantation located at the lower end of the 16 SJ 40 site in Township 12S, Range 17E, Sections 33, 32, and 31 (Figure 13). Crescent Plantation came into the possession of Eugene Champagne as early as 1815 (COB 4, Folio 955, St. James Parish). The Crescent Plantation holdings belonged to the Champagne family for nearly forty years. By 1871, A. Miltenberger & Co. was listed as the owner of Crescent. At that time, the plantation contained a brick sugar house with a shingled roof. In 1877, the plantation expanded from its original two arpents to seven and one-half arpents front.

Because no features were recorded at Crescent Plantation during 1984, archeological investigations within the area began with a controlled surface survey; artifacts were collected along the baseline from 50 m quadrats. Along the (E500) site baseline, no artifacts were found between N0-50. However, between N50-100, 60 Kitchen group, 4 Architecture group, 1 Furniture group, and 1 Activities group artifacts were found. A mean ceramic date of 1835 was calculated for this quadrat, using 34 identified sherds. Between N100-150, 11 Kitchen group and 3 Architecture group artifacts were found. A mean ceramic date of 1836 was calculated for this quadrat using 7 identified sherds. Between N150-200, 99 Kitchen group, 4 Architecture group, and 2 Activities group artifacts were found. A mean ceramic date of 1826 was calculated for this quadrat, using 39 identified sherds. Between N200-250, 8 Kitchen group artifacts were found. A mean ceramic date of 1841 was calculated for this quadrat using 4 identified sherds. And, between N250-300, 163 Kitchen group, 44 Architecture, and 1 Activities group artifacts were found. A mean ceramic date of 1840 was calculated for this quadrat using 35 identified sherds. The predominance of Kitchen group artifacts across this area suggests either that food-related activities occurred somewhere near this portion of the site, circa 1835, or that kitchen refuse was dumped there.

Throughout this area, traces of a gravel lens representative of a ca. 1917 relict levee road were present in profile. In addition to the artifacts present on the beach surface below the cut bank, several pieces of whiteware were collected from the base of the gravel lens. No wooden features as recorded elsewhere on the site were recorded within the area of Crescent Plantation.

Auger testing was conducted in this area, both to investigate site formation and degradation, and to search for any buried features. Seven Dutch auger tests were excavated (Figure 14). Of these, only two, Auger Test 5 and Auger Test 6, produced cultural remains from below the surface. In Auger Test 5, the 1917 gravel road was present at a depth of four to eight cm below surface. In Auger Test 6, a small lump of coal was found 18 cm below surface. However, no evidence either of intact midden or of features was found below the surface in this area. Thus, the downriver end of the site did not present the quantity of surficial cultural remains present in the middle and upriver end of the site.

Intervening Small Farms Located Between Crescent and Magnolia Plantations Circa 1812

Crescent Plantation, on the downriver side of the site, was held by Champagne, Trepagnier, Miltenberger & Co., and Legendre. Magnolia Plantation, on the upriver side of the site, was held variously by the Frederic and Roman families, the Denny partnership, the Citizen's Bank, and Elphege Poche. Lesser

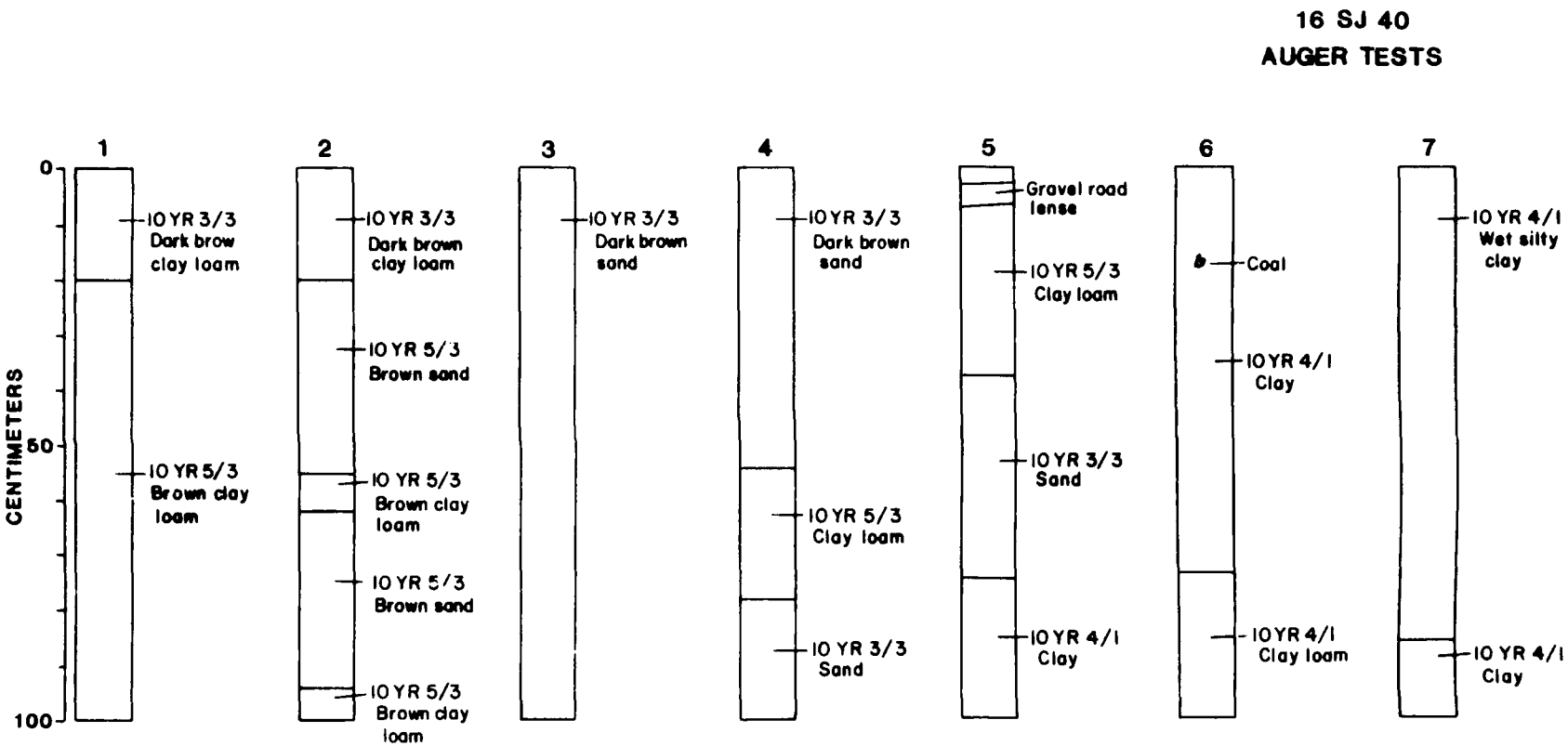


Figure 14. Stratigraphic profiles of seven Dutch auger tests at 16 SJ 40

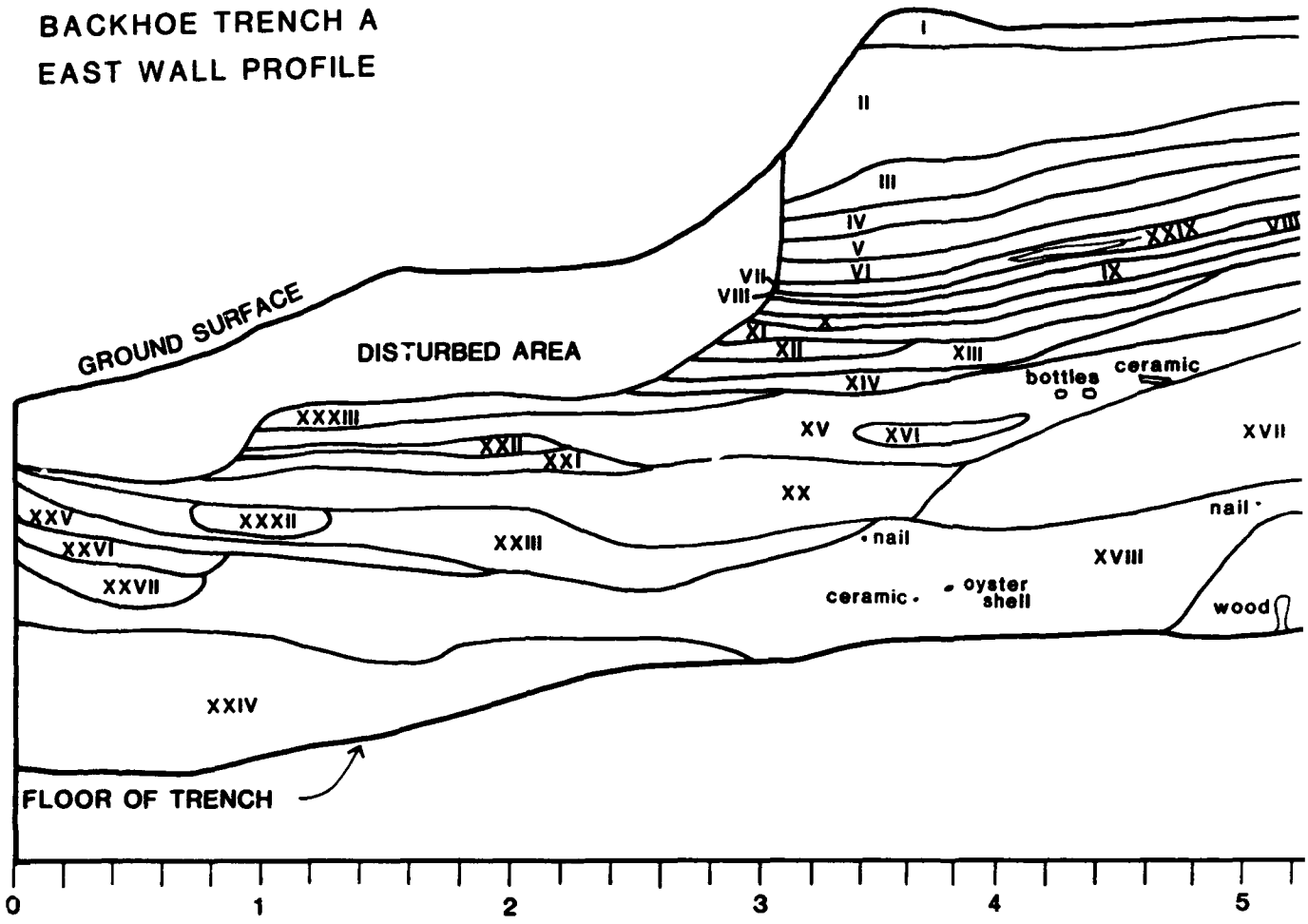
parcels were held by Hans and George Haas, and by Paul Lambremont. Numerous structures on the 1876 and 1921 Mississippi River Commission Charts were located within this area of the batture (Figure 3).

The intervening areas, in Sections 26-30 and 77, took the form of small tracts of three or less arpents front each. From downriver to upriver, the heirs of Jean Rom, Gabriel Rodrigues, Christophe Trosler (Trosclair?), Pierre Frederic, George Autin, and Mathias Frederic owned these tracts. In 1875, a number of residences and commercial establishments were located in this portion of the project area, including Armand & Sons' Store and the Vacherie Landing Wood Yard. A rapid growth in the number of rice farmers in the area continued until ca. 1890. Numerous small buildings indicative of extensive residential development were present, as indicated on Figure 3. The spacing of flumes within Sections 28, 27, and 77 suggests that one flume may have serviced each of the farms contained within these three sections. The morphological similarity of the flumes found in these three sections indicates the near wholesale postbellum adoption of rice agriculture, even by small-scale farmers. Intensive rice cultivation during the late nineteenth century in the Vacherie area probably represents an adaptation to the postbellum environment; various levels of the economic strata were involved in rice cultivation. The following discussion examines archeological features from the river rice period in the small farms between Crescent and Magnolia Plantations.

Small Farm (Section 30)

A close inspection of Figure 3 demonstrates that five structures were present in Section 30 in 1876, and that eleven structures were located within the batture portion of Section 30 during 1921. The remains of these structures, however, were not apparent on the surface of the batture during either the 1984 survey or the 1987 data recovery project. However, numerous surficial remains were found within this area of the site. A controlled surface collection from N300-350 produced abundant evidence of mid- to late nineteenth century occupation, including 120 Kitchen group, 7 Architecture group, and 1 Activities group artifacts. A mean ceramic date of 1842 was calculated for this quadrat, using 10 identified sherds. The abundance of Kitchen group artifacts across this 50 m area suggests either that food related activities occurred near this portion of the site, circa 1840, or that kitchen refuse was dumped there. In 1987, extensive backhoe trenching was performed in this area of the site to search for and recover evidence of deeply buried structures. Three backhoe trenches (Trenches A-C) were excavated perpendicular to the river.

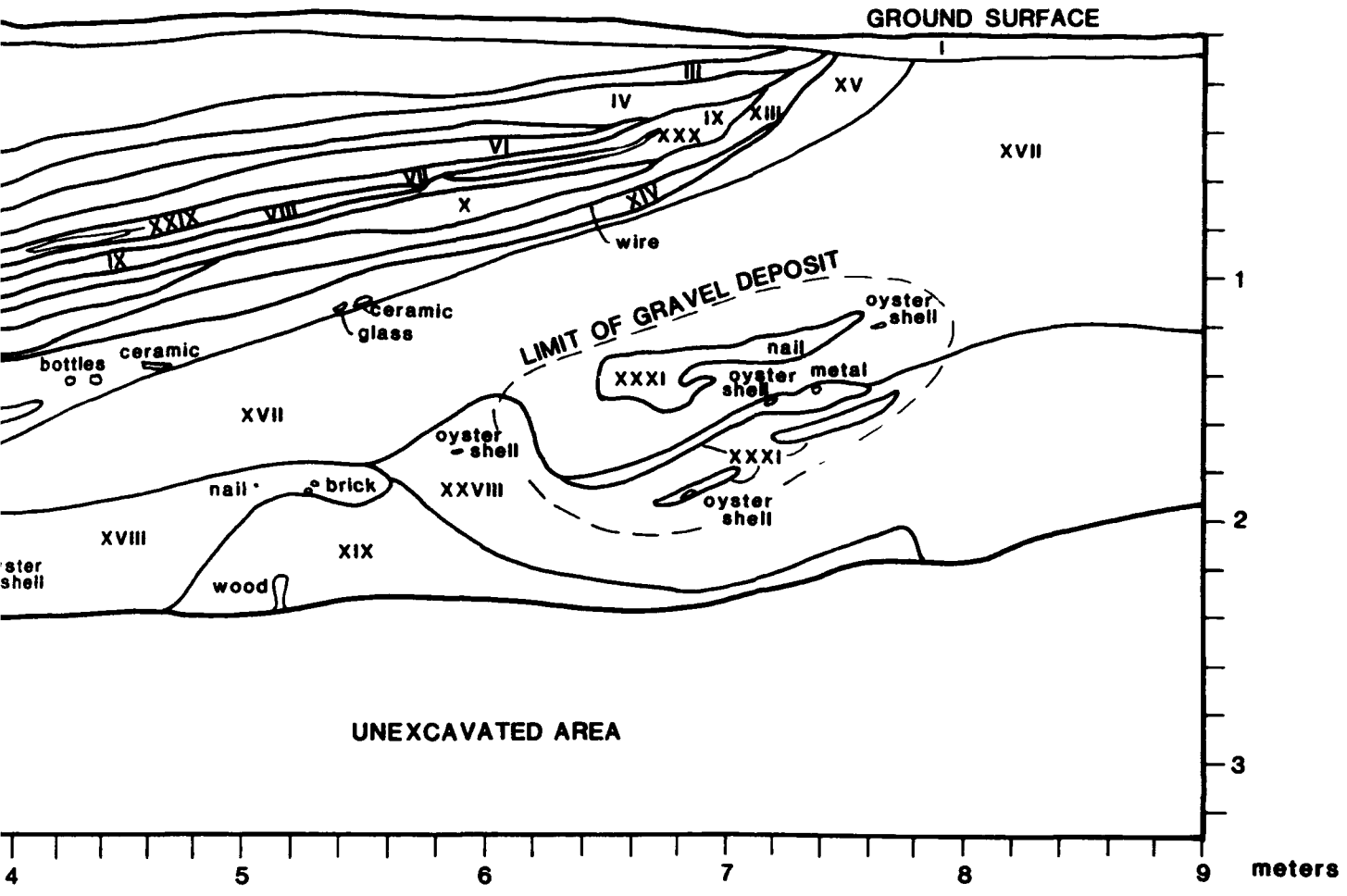
Backhoe Trench A. Backhoe Trench A measured 11 m long, 80 cm wide, and 2.30 m deep. Its long axis was oriented along an azimuth of 327 degrees. Profile 1 comprised a 9 m section of the east wall of Trench A that was cleaned and recorded (Figure 15). Stratum I consisted of a 5 cm thick deposit of *Rangia cuneata* shells. This shell deposit probably represents a road surface which overlies natural overbank deposits. The top half of the profile (Strata II-XIV, XXIX, and XXX) and a portion of the north half of the profile (Strata XX-XXIV) exhibited several cycles of sandy and silty layers, each cycle representing a recent overbank deposit. Stratum XXV was a remnant of the 1917-1921 gravel road mentioned earlier. It rested upon natural levee deposits (Stratum XVIII, Stratum XXVI, and Stratum XXVII). The presence of the 1917 gravel road provided a known *terminus ante quem* for deeper deposits. In addition, the difference between natural levee deposits and man-made levee deposits were evident in the shapes and slope of the strata above and below interface Stratum XV-the line of demarcation. Strata above this cultural lens (XV) exhibited the near horizontal bedding typical of periodic overbank deposition. The strata below have a pinched appearance caused by episodic dumping, and subsequent natural sorting and runoff. The core of the profile showed evidence of construction, indicating the presence of a large levee setback (Strata XV, XVII, XXVIII, and XXXI). These four strata represent fill episodes resulting from modification by man. The intermixture of cultural materials, oyster shell, and gravel within Stratum XVII and Stratum XXXI suggests reversed stratigraphy, bolstering the interpretation of these deposits as man-made. The characteristic mottling; the presence of mixed and randomly appearing cultural remains in these strata; the frequent and obvious nodular ferrous oxide inclusions; the lack of regularity (e.g., horizontally bedded deposits); and the presence of heavier sediments containing larger clay loads atop silts, in a stratigraphically reversed profile, all are characteristic of man-made deposits caused by levee construction. All of these depositional and construction events rest upon a basal natural levee deposit (Stratum XXIV) consisting of a 10YR 5/2 (grayish brown) blocky clay.



KEY

I:	10YR	8/1	(white) *Rangia* shell road lens
II:	10YR	5/4	yellowish brown sand
III:	10YR	4/2	dark grayish brown oxidized clay
IV:	10YR	5/2	grayish brown sand
V:	10YR	4/2	dark grayish brown oxidized clay
VI:	10YR	5/2	grayish brown sand
VII:	10YR	4/2	dark grayish brown clay
VIII:	10YR	5/2	grayish brown sand
IX:	10YR	4/2	dark grayish brown clay
X:	10YR	5/2	grayish brown sand
XI:	10YR	5/2	grayish brown sand
XII:	10YR	4/2	dark grayish brown sand
XIII:	10YR	5/1	gray clay
XIV:	10YR	6	gray sand
XV:	10YR	4/1	dark gray clay
XVI:	10YR	4/2	dark grayish brown mottled clay
XVII:	10YR	5/2	grayish brown mottled clay
XVIII:	10YR	2/1	
XIX:	10YR	3/1	
XX:	10YR	5/3	
XXI:	10YR	5/3	
XXII:	10YR	5/3	
XXIII:	10YR	5/2	
XXIV:	10YR	5/2	
XXV:	10YR	5/3	
XXVI:	10YR	3/1	
XXVII:	10YR	3/1	
XXVIII:	10YR	5/2	
XXIX:	10YR	5/2	
XXX:	10YR	5/2	
XXXI:	10YR	5/3	
XXXII:	10YR	5/3	
XXXIII:	10YR	5/1	

Figure 15 Stratigraphic profile of the east wall of Trench A



KEY

XVIII:	10YR	2/1	black clay
XIX:	10YR	3/1	very dark gray clay
XX:	10YR	5/3	brown laminated clay
XXI:	10YR	5/3	brown laminated clay
XXII:	10YR	5/3	brown laminated clay
XXIII:	10YR	5/2	grayish brown clay
XXIV:	10YR	5/2	grayish brown clay
XXV:	10YR	5/3	brown sandy clay loam (gravel road)
XXVI:	10YR	3/1	very dark gray clay (oyster)
XXVII:	10YR	3/1	very dark gray sandy clay
XXVIII:	10YR	5/2	grayish brown clay
XXIX:	10YR	5/2	grayish brown sand
XXX:	10YR	5/2	grayish brown sand
XXXI:	10YR	5/3	brown sandy loam with gravel intermixed
XXXII:	10YR	5/3	brown sandy loam with gravel intermixed
XXXIII:	10YR	5/1	gray sandy clay

Backhoe Trench B. Backhoe Trench B measured 23.40 m long, 90 cm wide, and 2.30 m deep. Like Trench A, its long axis was oriented along an azimuth of 327 degrees. A deeply buried cultural deposit (Feature 122) and associated artifacts were encountered during the excavation of Trench B. Profile 2 in Trench B comprised a 5 m section of the east wall of Trench B that was cleaned and recorded at N316, E484. As shown in Figure 16, Stratum I through Stratum XIV consists of uniform overbank deposits. The east wall profile of Trench B illustrates the ca. 1917 gravel road (Stratum XVI). An earlier, distinct oyster shell levee road (Stratum XVII) also was present 10 to 15 cm below the 1917 levee road. Cultural material collected from the oyster road fill dates from the mid-nineteenth century. Both of these roads were constructed on top of natural levee deposits (Stratum XXI). In other portions of the site, these two roads are eroding; some sections are destroyed completely. The surface of the batture behind the old levee appears to be relatively stable, and there is no evidence of river scouring in most portions of the site.

The first 2 x 2 m test (Unit A) was excavated when a significant archeological feature (Feature 122) was encountered during the excavation of Trench B. The profile directly above Feature 122 collapsed before feature recordation could begin. The backhoe removed the overburden above the feature, expanding the trench so that Unit A could be excavated. The northeast stake served as the datum for Unit A; the horizontal coordinates for this unit were N314.51, E473.16, and the vertical coordinate established for the datum plane was 5.09 m NGVD. The unit was excavated in 10 cm levels, to a depth of 130 cm below datum (3.79 m NGVD). At 130 cm below datum, the unit was bisected and its western one-half, which contained Feature 122, was excavated as a 1 x 2 m unit to a depth of 205 cm below datum (3.04 m NGVD), where Feature 122 bottomed out. That was approximately 4 m below the top of the bank in this area.

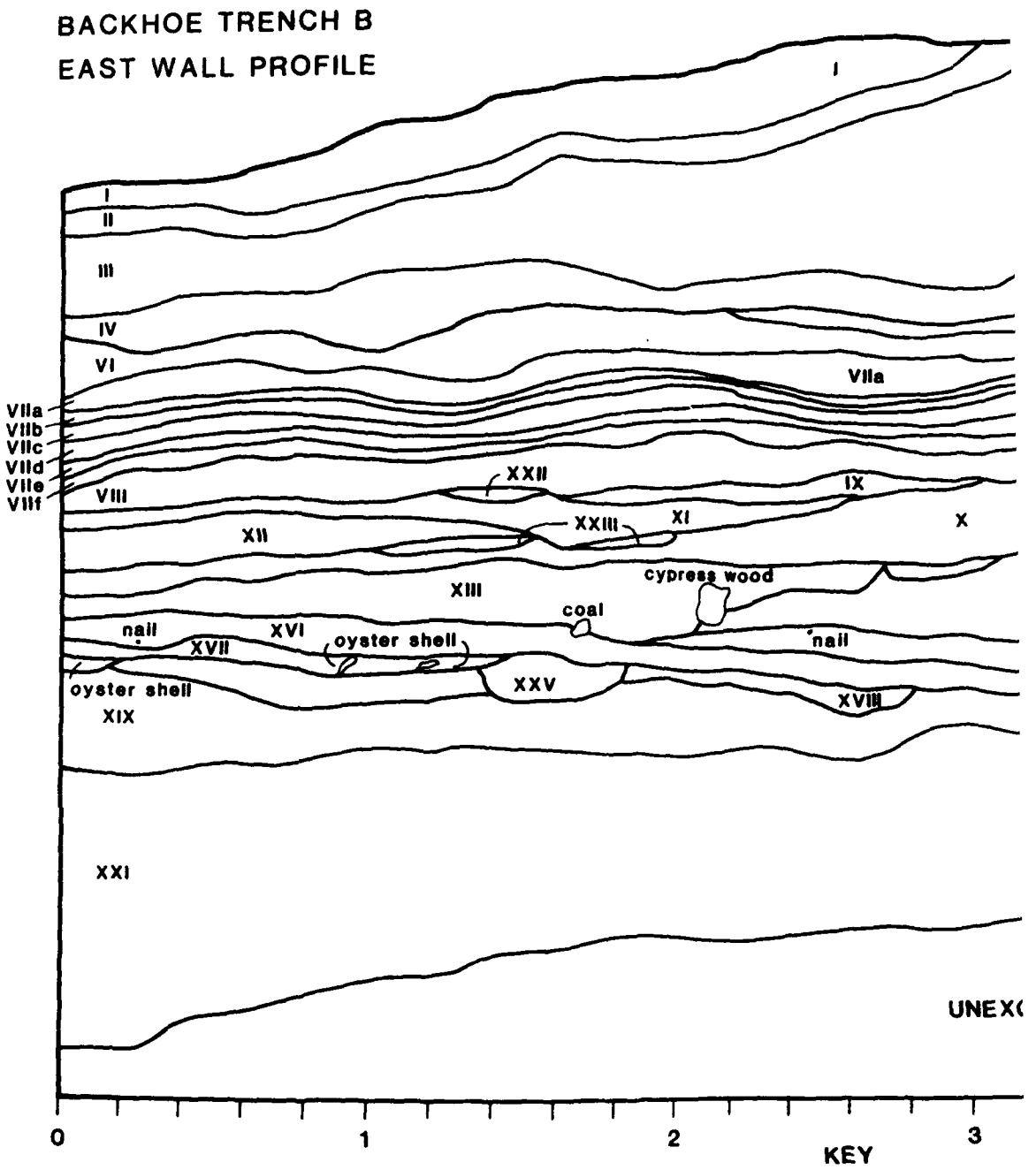
Feature 122 was a cypress lined plank privy filled with oyster shells and with a dense concentration of historic artifacts. The privy contained over 1 cu m of shell fill (Figure 17). The wooden planks were not visible in the upper levels of excavation; they became apparent after reaching depth of 1.13 cm below datum. Artifacts collected from the privy feature include glass fragments, historic bottles (whole and broken), historic ceramics, historic metal fragments, iron square cut nails, shoe heels, and a button. The shell fill disappeared at the top of Level 14, a dark gray (5Y 4/1) clay fill. The lenticular shape of the surface of Level 14 suggests that the privy may have been cleaned out at this level. The artifactual contents of this privy feature indicate that it was filled during the mid- to late nineteenth century (ca. 1840-1870). A detailed description of the types of historic artifacts recovered from Feature 122 is provided in Chapter VIII.

Backhoe Trench C. Backhoe Trench C comprised a 19.5 m long, 85 cm wide, and 3 m deep exploratory unit that was excavated to search for subsurface features. None were noted during monitoring of its excavation. Unfortunately, shortly after this trench was opened, and before its stratigraphy was recorded, the east wall of the trench collapsed, completely filling the trench. Further exploration within the area of Trench C was halted, for safety reasons.

Feature 118. Also in Section 30, Feature 118 consisted of a stack of short cypress boards resting upon two long cypress board runners; it was oriented perpendicular to the water's edge. Feature 118 was located at N355, E488, near the downriver end of the site. As shown in Figure 18, one large cypress block and 10 stacked boards were found eroding from the base of the cut bank. Several boards had square cut nails embedded in them. A 1 x 1 m test excavation unit was placed directly on top of Feature 118, to examine its nature and to expose its dimensions. The top of the feature (top of the large wood block) had an elevation of 3.63 m (NGVD), and the bottom of the feature had an elevation of 3.31 m (NGVD). The configuration and age of these cypress boards indicate that they represent raw material either for flume construction, or for repair.

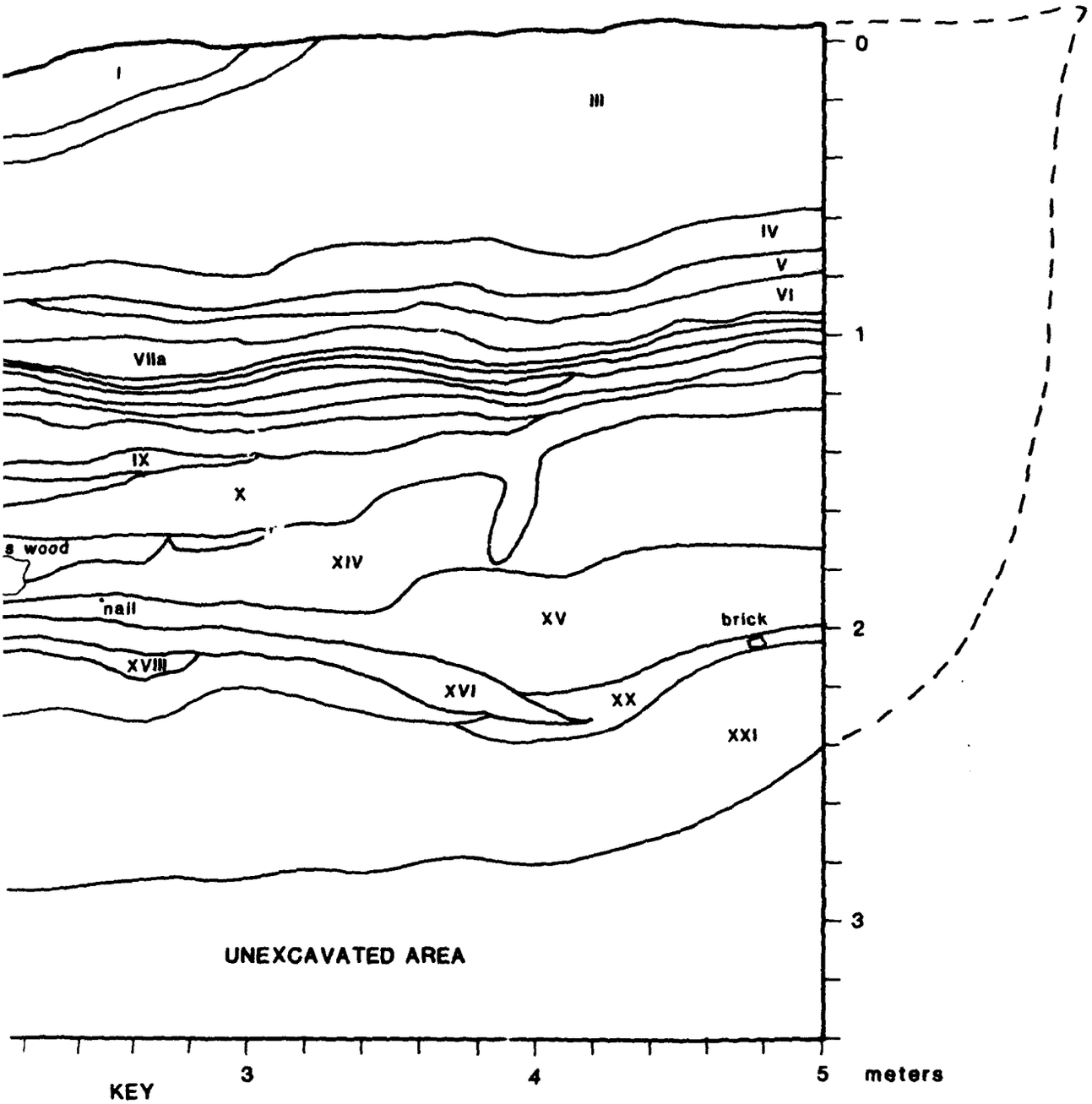
Small Farm (Section 29)

An examination of Figure 3 demonstrates that three structures present in 1876 and six structures present in 1921 formerly were located on the batture within Section 29. The controlled surface collection within Section 29, from N350 to N450, produced abundant evidence of mid to late nineteenth century occupation. Between N350-400, 142 Kitchen group, 11 Architecture group, and 1 Personal group artifacts were found. A mean ceramic date of 1841 was calculated for this quadrat, using eight identified sherds.



I:	10YR	5/4	yellowish brown sand	XI:	10YR		
II:	10YR	4/1	dark gray oxidized clay	XII:	10YR		
III:	10YR	5/4	yellowish brown sand	XIII:	10YR		
IV:	10YR	4/1	dark gray oxidized clay	XIV:	10YR		
V:	10YR	7/2	light gray sand	XV:	10YR		
VI:	10YR	4/1	dark gray laminated (banded) sand	XVI:	10YR		
VIIa:	10YR	4/1	dark gray clay	XVII:	10YR		
VIIb:	10YR	5/4	yellowish brown sand	XVIII:	10YR		
VIIc:	10YR	4/1	dark gray clay	XIX:	10YR		
VIId:	10YR	5/4	yellowish brown sand	XX:	5Y		
VIIe:	10YR	4/1	dark gray clay	XXI:	10YR		
VIIf:	10YR	5/4	yellowish brown sand	XXII:	10YR		
VIII:	10YR	4/1	dark gray oxidized clay	XXIII:	10YR		
IX:	10YR	4/2	dark grayish brown clay	XXIV:	5Y		
X:	10YR	4/1	dark gray clay	XXV:	10YR		

Figure 16. Stratigraphic profile of the east wall of Trench B



XI:	10YR	5/4	yellowish brown sand
XII:	10YR	4/1	dark gray oxidized clay
XIII:	10YR	5/3	brown laminated sand
XIV:	10YR	4/1	dark gray clay
XV:	10YR	4/2	dark grayish brown clay
XVI:	10YR	5/1	gray gravel road
XVII:	10YR	7/1	light gray puddled clay
XVIII:	10YR	7/2	light gray sandy clay
XIX:	10YR	5/4	yellowish brown sandy clay
XX:	5Y	3/1	very dark gray organic clay
XXI:	10YR	3/2	very dark grayish brown clay
XXII:	10YR	4/2	dark grayish brown clay
XXIII:	10YR	7/2	light gray clay
XXIV:	5Y	3/1	very dark gray clay
XXV:	10YR	6/1	ashes/charcoal area

ıded) sand

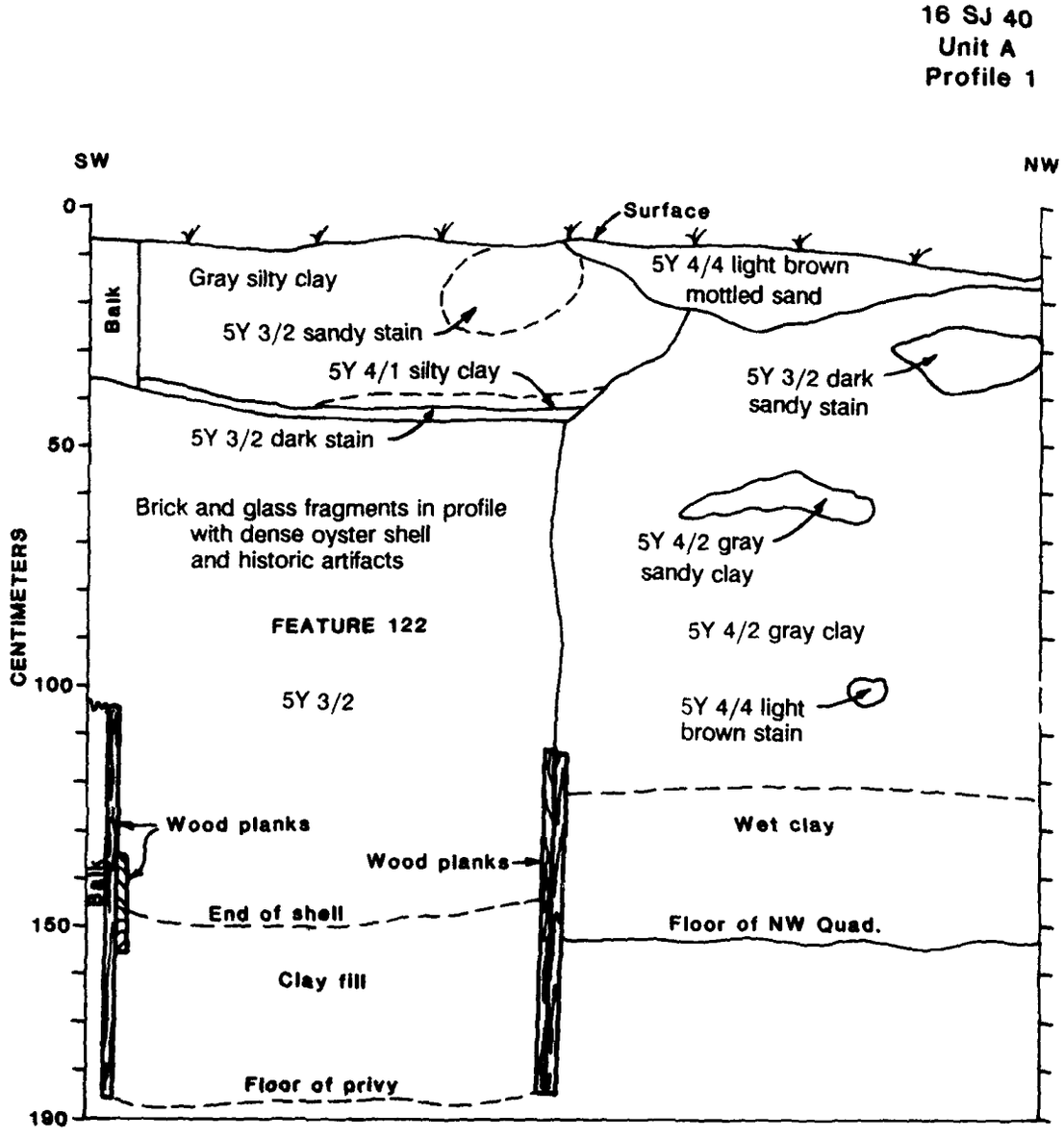
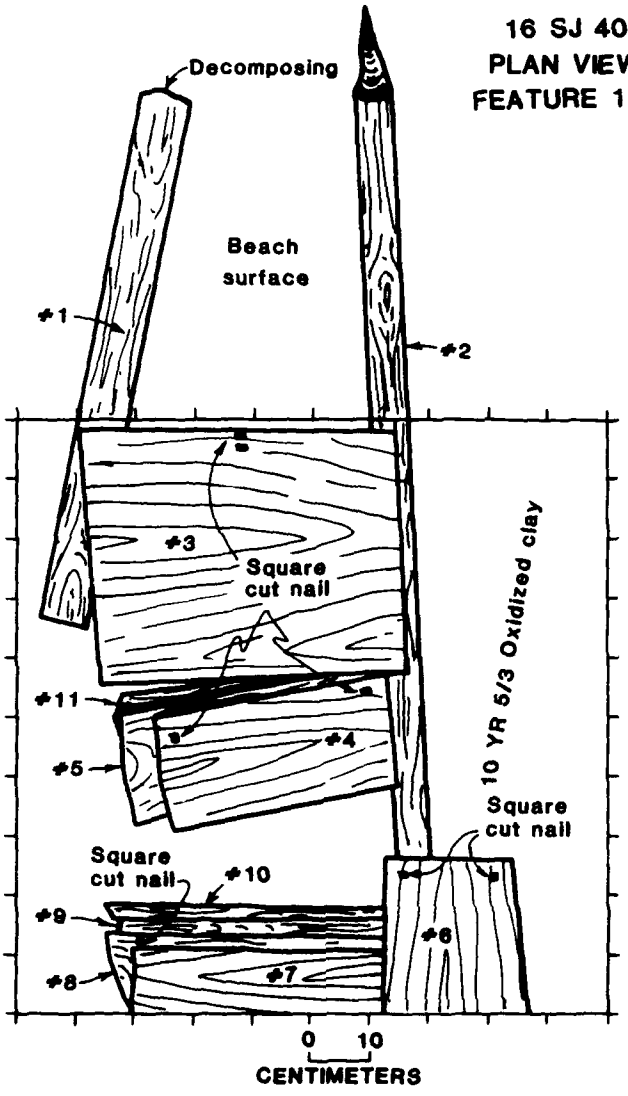


Figure 17. Stratigraphic profile of Test Unit A, showing Feature 122



Dimensions on cypress boards #1-11

	Length	Width	Depth
#1	78cm x	13cm x	6cm
	31"	5"	2.5"
#2	1.35m x	10cm x	4cm
	53"	4"	1.5"
#3	41cm x	53cm x	18cm
	16"	21"	8"
#4	20cm x	46cm x	4cm
	8"	18"	1.5"
#5	20cm x	46cm x	4cm
	8"	18"	1.5"
#6	26cm x	20cm x	5cm
	10"	8"	2"
#7	10cm x	46cm x	5cm
	4"	18"	2"
#8	13cm x	46cm x	5cm
	5"	18"	2"
#9	10cm x	46cm x	5cm
	5"	18"	2"
#10	15cm x	46cm x	5cm
	6"	18"	2"
#11	20cm x	46cm x	5cm
	8"	18"	1.5"

Figure 18. Plan view of Feature 118

Between N400-450, 107 Kitchen group, six Architectural group, one Furniture group, one Arms group, and two Activities group artifacts were collected. A mean ceramic date of 1835 was calculated from 16 identified sherds found within this quadrat. The overwhelming abundance of Kitchen group artifacts across this 100 m area suggests either that food-related activities occurred near this section of the site, circa 1838, or that domestic kitchen refuse was deposited there.

Backhoe Trench D. Backhoe Trench D was excavated to search for and recover deeply buried structural deposits within this section of the site. Backhoe Trench D measured 24 m long, 80 cm wide, and 1.75 m deep. It was oriented perpendicular to the water's edge. Trench D stretched from the riverside face of the bank landward to the borrow located behind the treeline. A 2 m portion of the east wall (Profile 3) was recorded in the mid section of Backhoe Trench D. A 2 m profile of the east wall (Figure 19), was cleaned and recorded in the mid-section of this trench.

Profile 3. Profile 3, the uppermost stratum, had a maximum width of 60 cm; it was a brown (10YR 5/3) sand with *Rangia* shells. This layer surmounted a dark gray (10YR 4/1) oxidized sandy clay extending from 60 cm to 1 m below surface. From approximately 1 m to 1.4 m, a very dark gray (10YR 3/1) sandy clay was present. This stratum was situated above a 10 cm stratum of black (10YR 2/1) sandy clay that contained no cultural remains. Below the black clay, a dark gray (10YR 4/1) clay extended to the bottom of the trench.

Stratum I in the profile was composed of a mixture of *Rangia cuneata* shells and brown (10YR 5/3) sand. This stratum represents the remains of a shell road. Evidence of this recent surface road also was found in the vicinity of Backhoe Trenches A and B, as described earlier. The four remaining strata within this profile exhibited the near horizontal bedding typical of periodic overbank deposition. No in situ artifactual deposits or structural features were noted throughout this 24 m long trench.

Small Farm (Section 28)

As Figure 3 indicates, three historic structures formerly were present in 1876, and eight structures were located on the batture in 1921, within Section 28. That section historically was a small farm. The controlled surface collection within Section 28, from N450-550, produced evidence of mid- to late nineteenth century occupation; between N450-500, 22 Kitchen group, 3 Architecture group, and 3 Activities group artifacts were found. Between N500-550, 25 Kitchen group and 3 Architecture group artifacts were collected. A mean ceramic date of 1841 was derived from a sample of 6 identified sherds. Three features (100, 114, and 119) were located in this area during 1987 investigations.

Feature 100. Feature 100 represents a cypress timber rice flume with a metal conduit. A single side board connected with bottom boards was exposed on the riverbank. Top boards and an upriver side board were lacking; these apparently were removed in order to facilitate the refitting of the flume with the metal conduit. This feature was both the largest and the most complex feature encountered during the data recovery project. In 1984, Feature 100 was observed eroding from the river cut bank. By 1987, over two thirds of the metal pipe and the associated cypress wood box flume were protruding from the cut bank.

The exposed portions of the flume were tied into the site grid prior to excavation. The downriver side board of the flume was located between grid coordinates N451.97, E493.65, and 452.20, E492.32. The top elevation of this board was 3.68 m NGVD where it entered the bluff, and 3.91 m NGVD at its riverside end. The metal pipe was located parallel to this alignment.

Initial excavation at the feature was conducted using a backhoe. An area approximately 8 m north/south by 5 m east/west was excavated to the top of cultural deposits. Care was taken not to disturb in situ structural remains during the removal of the overburden with heavy machinery. Figure 20 shows a plan view of Feature 100 exposed by backhoe. Excavation with shoveis and small hand tools followed. The hand excavation of Feature 100 lasted nearly three weeks, from September 21 until October 8, 1987. Excavations indicated that a wooden tank was positioned directly behind the flume (Figure 21). Two sides were identified by horizontal planks with vertical support struts. These retainer walls were buried deeper

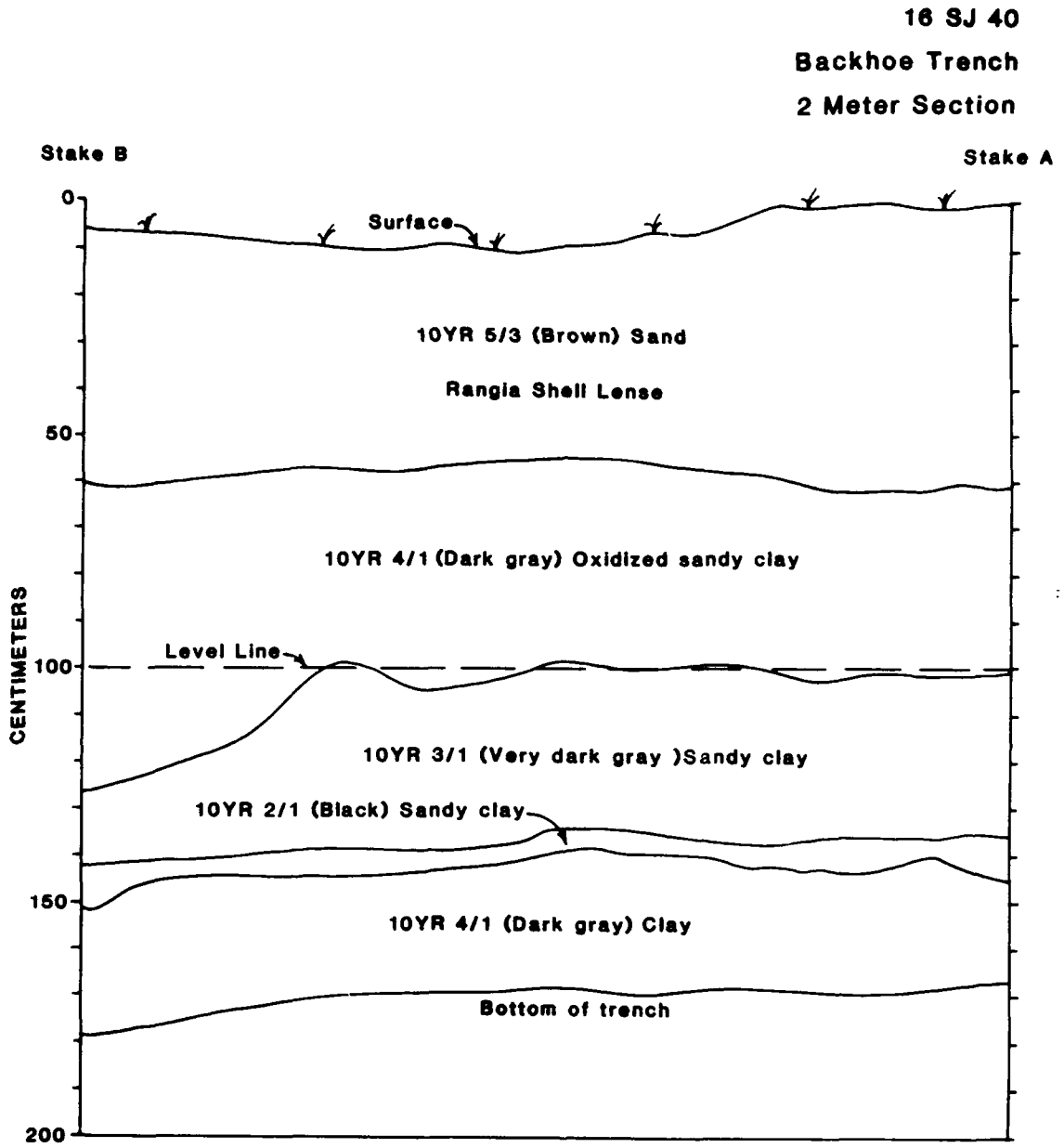


Figure 19. Stratigraphic profile of the east wall of Trench D

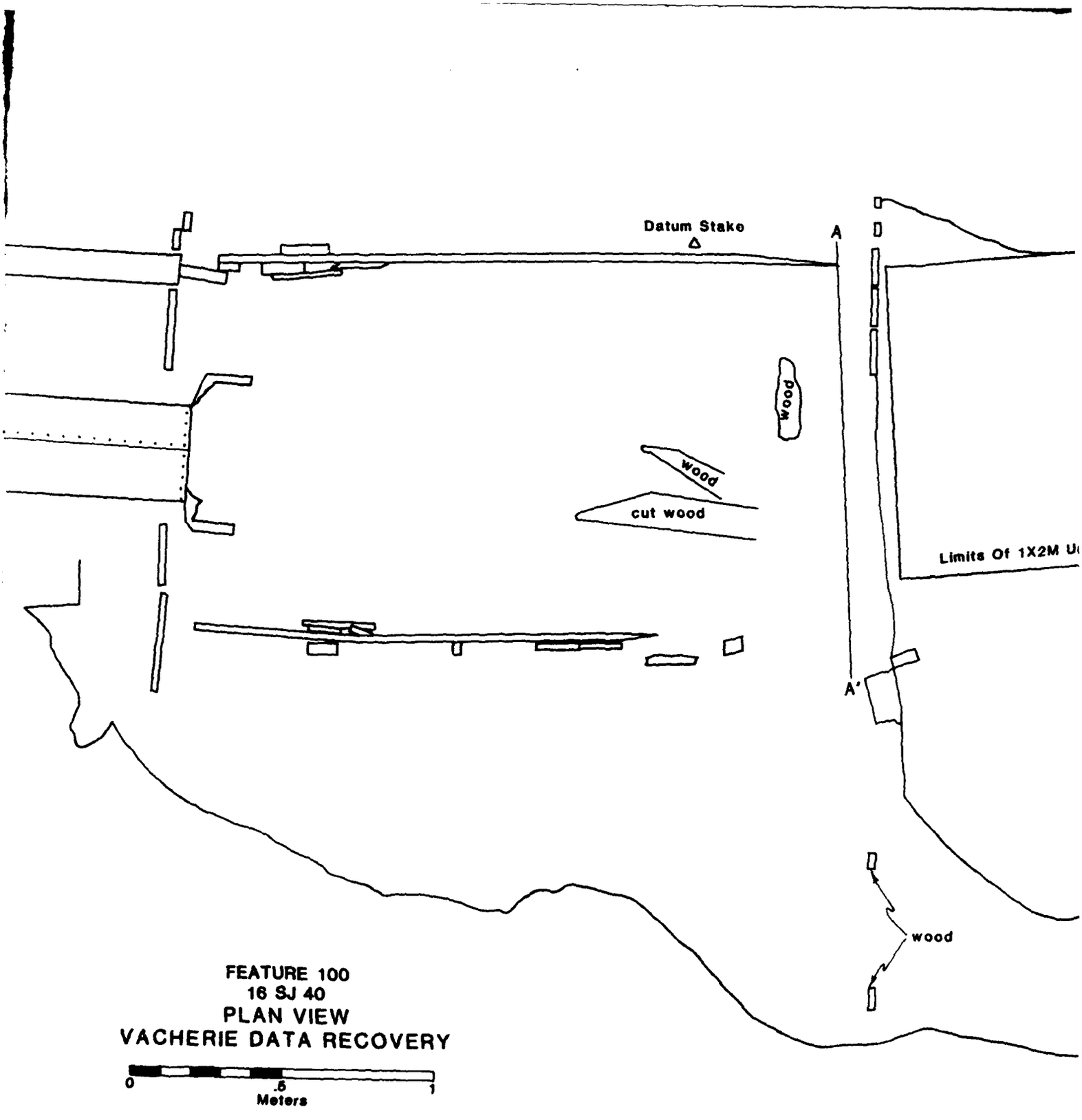
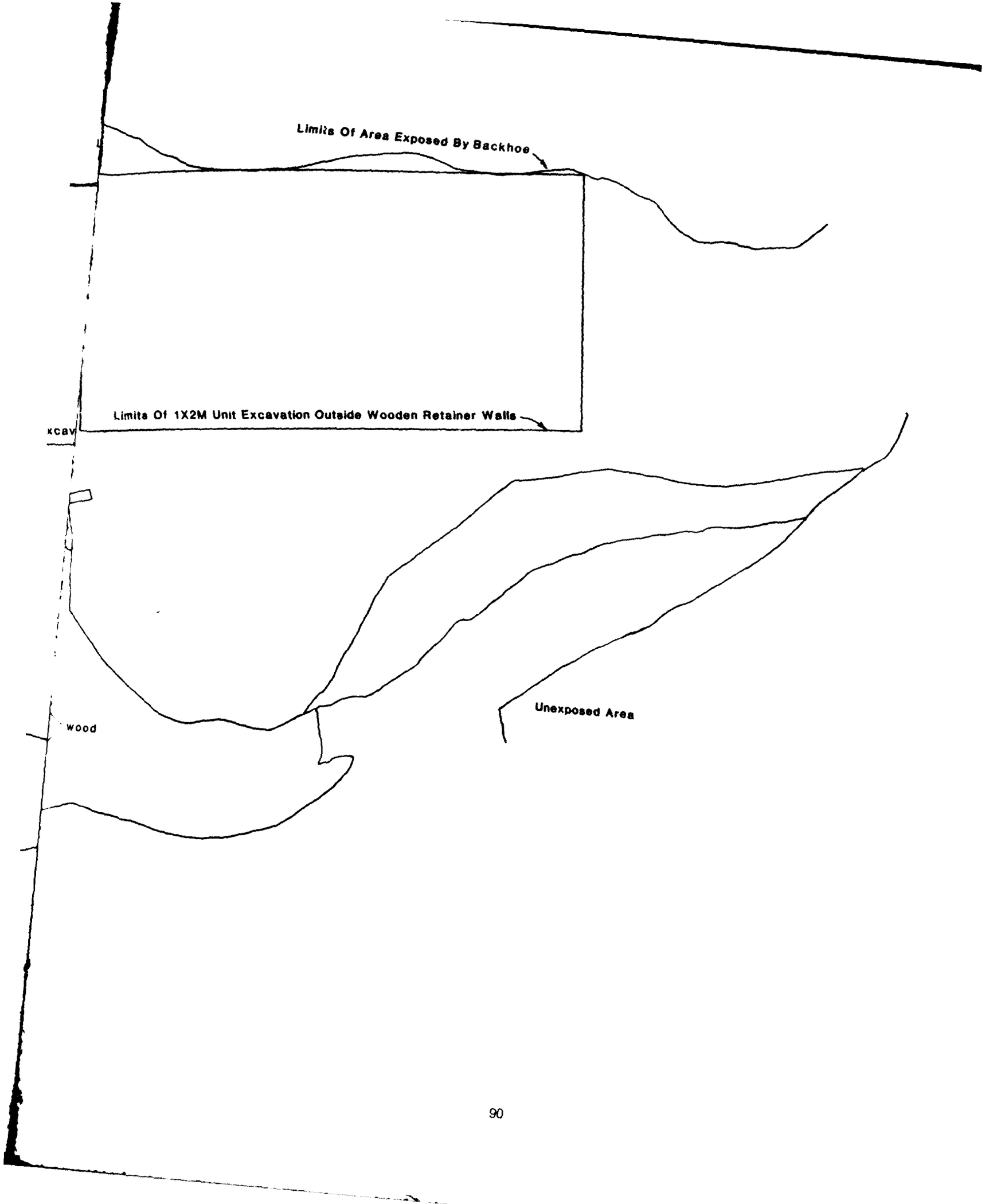


Figure 20. Plan view of Feature 100


Limits Of Area Exposed By Backhoe
Limits Of 1X2M Unit Excavation Outside Wooden Retainer Walls
xcav
wood
Unexposed Area

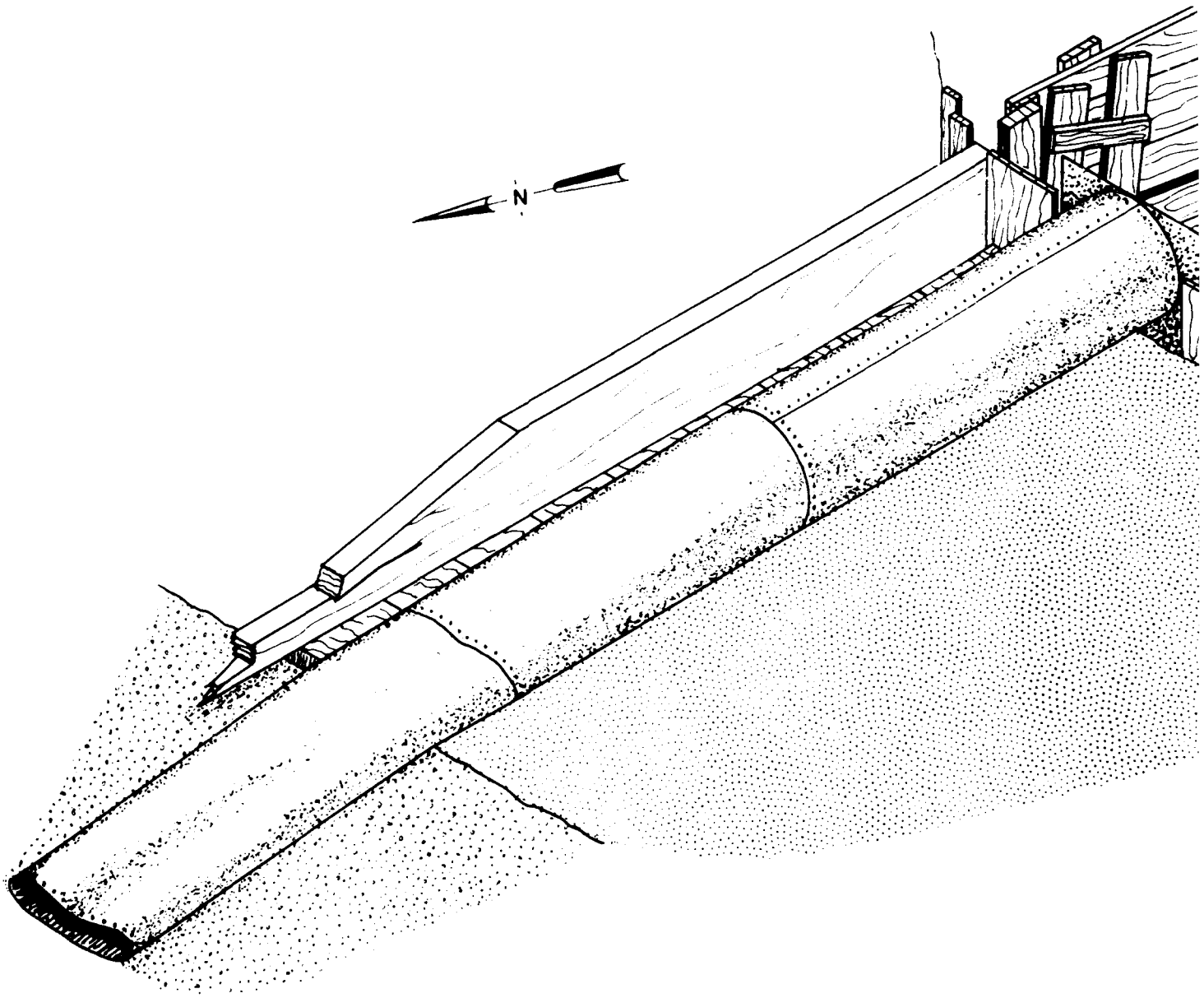
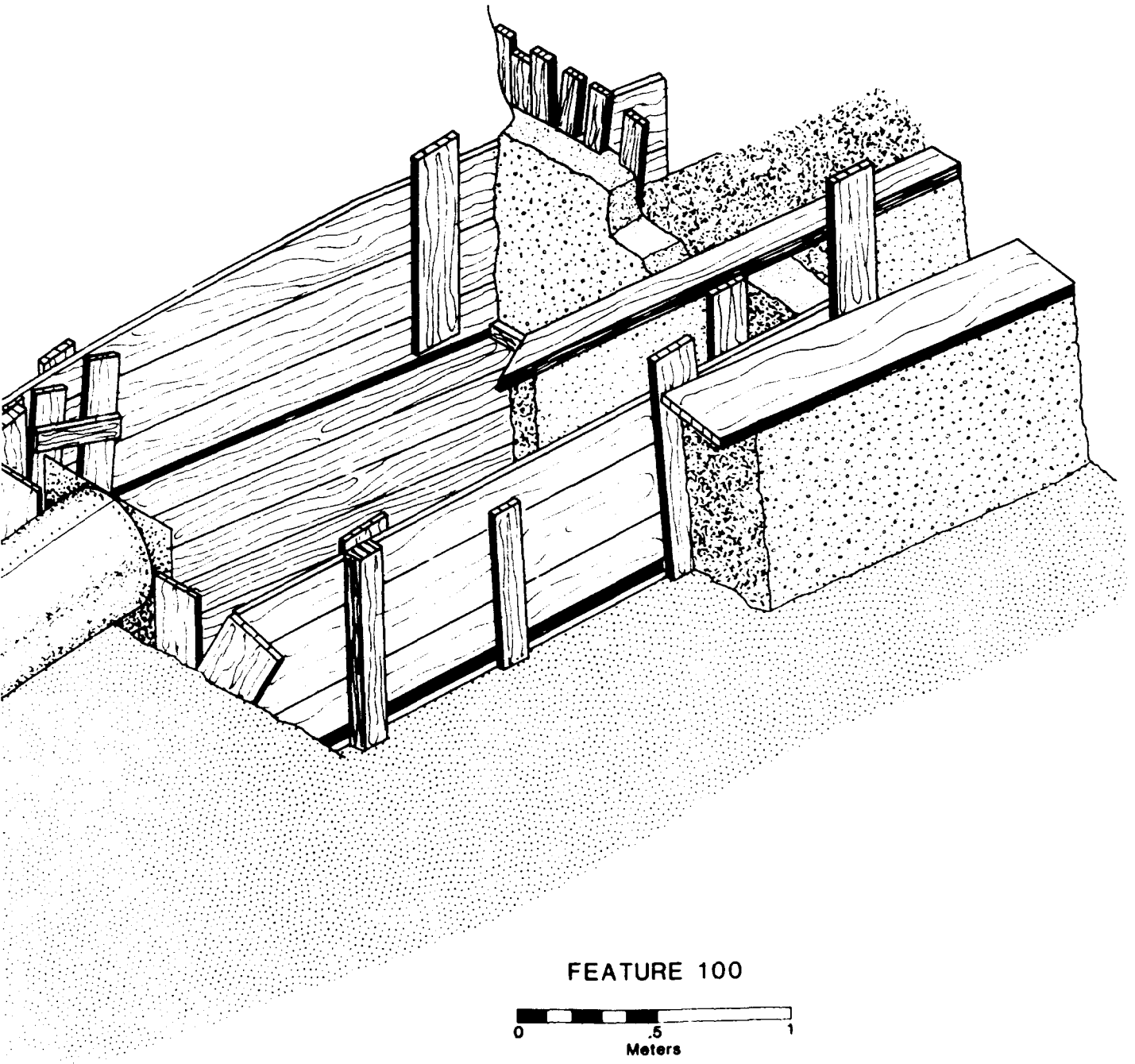


Figure 21. Perspective view of Feature 100 after excavation



FEATURE 100

0 .5 1
Meters

away from the river. A series of vertical wood slats were exposed at the top of the fill near the rear of the tank. A profile cross section was established approximately 15 cm inside of these slats; excavations proceeded to remove the soil inside the tank. A total of ten arbitrary levels were excavated within the tank. Plan maps and photographic records were completed for all eight levels. Soils in Levels 1 through 4 consisted of 10YR 3/2 very dark grayish brown silt. Artifacts and ecofacts included shells, brick, ceramics, metal, and wood. Level 5 consisted of 10YR 4/2 dark grayish brown silt and 10YR 3/1 very dark gray clay. These soils formed thin alternating bands within this level. Soils in Level 6 exhibited the same laminar bedding as the previous level. A 10YR 5/3 brown very fine sand predominated at the base of the level. Level 7 consisted of alternating layers of 10YR 3/1 very dark grayish brown silty clay with organic concentrations, and 10YR 5/2 grayish brown fine sands. It became apparent that the walls of the tank were slanting inward at this level. Wood was abundant within this level. The upper portion of a picket fence slat was exposed near the base of Level 7. A cypress wood cross member was exposed near the north side of the tank in Level 8; a wooden floor also was exposed at 84 cm below datum in this level. Soils consisted of 2.5Y 3/2 very dark grayish brown clay, 7.5YR 5/0 gray clay, and 10YR 4/2 dark grayish brown fine sand. Ceramics, wire, metal, wood, charcoal, coal, shell, and brick fragments were collected. About half of the wood floor of the tank was exposed at the base of Level 9. Soils in Levels 9 and 10 were consistent with those of the previous level. The wood floor extended across the excavation unit at the base of Level 10. Construction details were observed and recorded (Figures 22 and 23). The soil profile was mapped and photographed (Figures 23 and 24).

Backhoe and hand excavations delineated the boundaries of Feature 100 on the west (upriver) side of the water retainer tank. Excavations outside the retainer tank were attempted initially to define both the horizontal and vertical extent of construction. This procedure indicated that the area pre-excavated for the placement of Feature 100 extended beyond the limits of exposure. Consequently, a 1 x 2 m portion of the fill immediately landside of the wood retainer tank was excavated. Three tombstone fragments were recovered there, along with wooden fence slats.

Prior to completing a final profile at the feature (Figures 23 and 24), the remaining balk between the controlled excavations was removed. The vertical wood slats exposed in the upper level of the feature did not extend beyond the top of the horizontal walls of the retainer tank. There was no rear wall on the retainer tank. After completion of profiles, photographs, and drawings, the feature was covered with plastic and backfilled.

Feature 100 was constructed of cypress board planks and cross timbers, and fastened with square cut nails. The cypress board trough, which was laid perpendicular to the water's edge, measured 3.5 m in length, and 70 cm in width. The metal conduit probably was added later. This 4.5 m long, 40 cm diameter metal pipe, was placed directly above the wooden trough. The wooden retainer tank was constructed of cypress boards held in place by vertical slats which were pointed and driven into the ground beneath the level of the wood bottom. The interior dimensions of this tank were 1.15 m x 1.12 m x .67 m. The tank remained open after its abandonment. Cultural remains were disposed haphazardly in this area as sediments, which appear to have accumulated seasonally, gradually filled the tank.

Two discrete building episodes were discovered as a result of field investigations. The first consisted of the construction of a simple wooden trough placed through the levee in a fashion similar to the construction shown in Figure 25. At a later date, possibly during the late nineteenth century, this flume was renovated, altered, and fitted with metal piping and a steam engine boiler pump. The vertical piping for the pump was appended to the landward end of the horizontal metal pipe and immediately above a wooden water retaining tank. This tank was built beneath the piping to cleanse and settle the water before it entered the pump. Two metal bands which served to hold the vertical pipe in place were attached to the landward end of the pipe, as shown in Figure 20. The holding tank served as a reservoir of clean water, which in turn would have been sucked up by the pump and thrown over the levee into a holding pond.

The artifactual contents recovered from inside and around the feature varied in both form and function. The objects encountered include picket fence slats, marble tombstone fragments, a hand painted porcelain doll head, square cut nails, a square metal shovel, shoe leather, and various historic bottle fragments and ceramic sherds. These artifacts are discussed in detail in Chapter VIII.

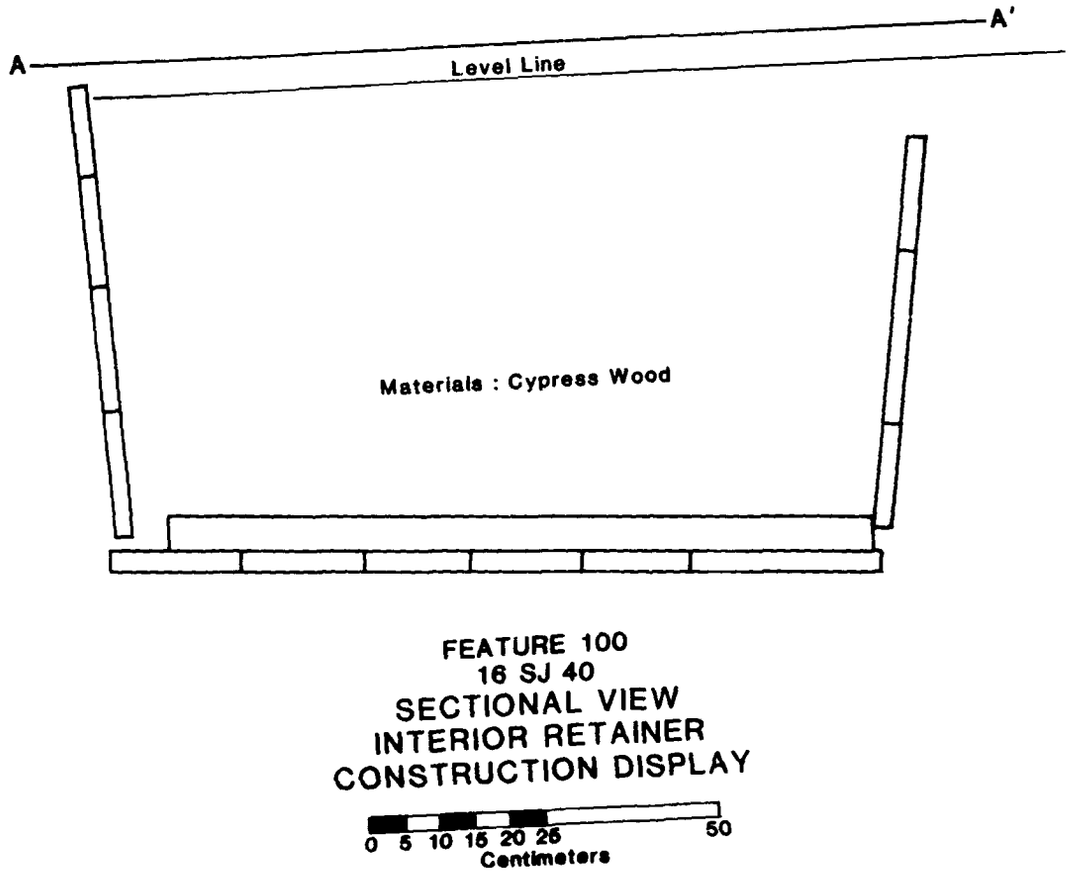
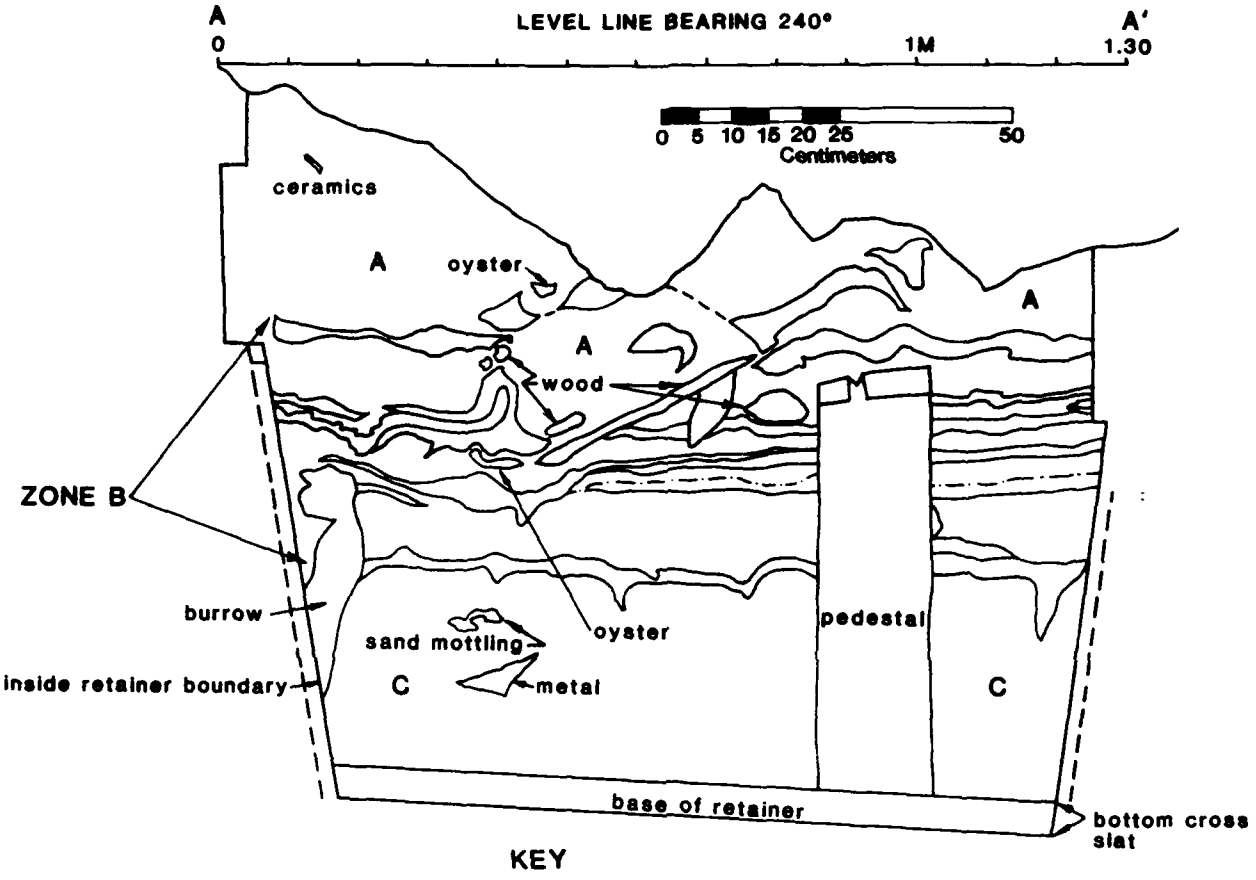


Figure 22. Sectional view of the interior retainer construction at Feature 100

FEATURE 100
16 SJ 40
PROFILE VIEW
INSIDE RETAINER WALL



A: 10YR 3/2 very dark grayish brown silt
B: 10YR 5/2 dark grayish brown silt with 10YR 5/2 grayish brown fine sand and 10YR 3/1 very dark gray clay bedding
C: 5Y 3/1 very dark gray clay mottled with 5Y 4/1 dark gray clay

Figure 23. Profile of Feature 100 inside retainer construction

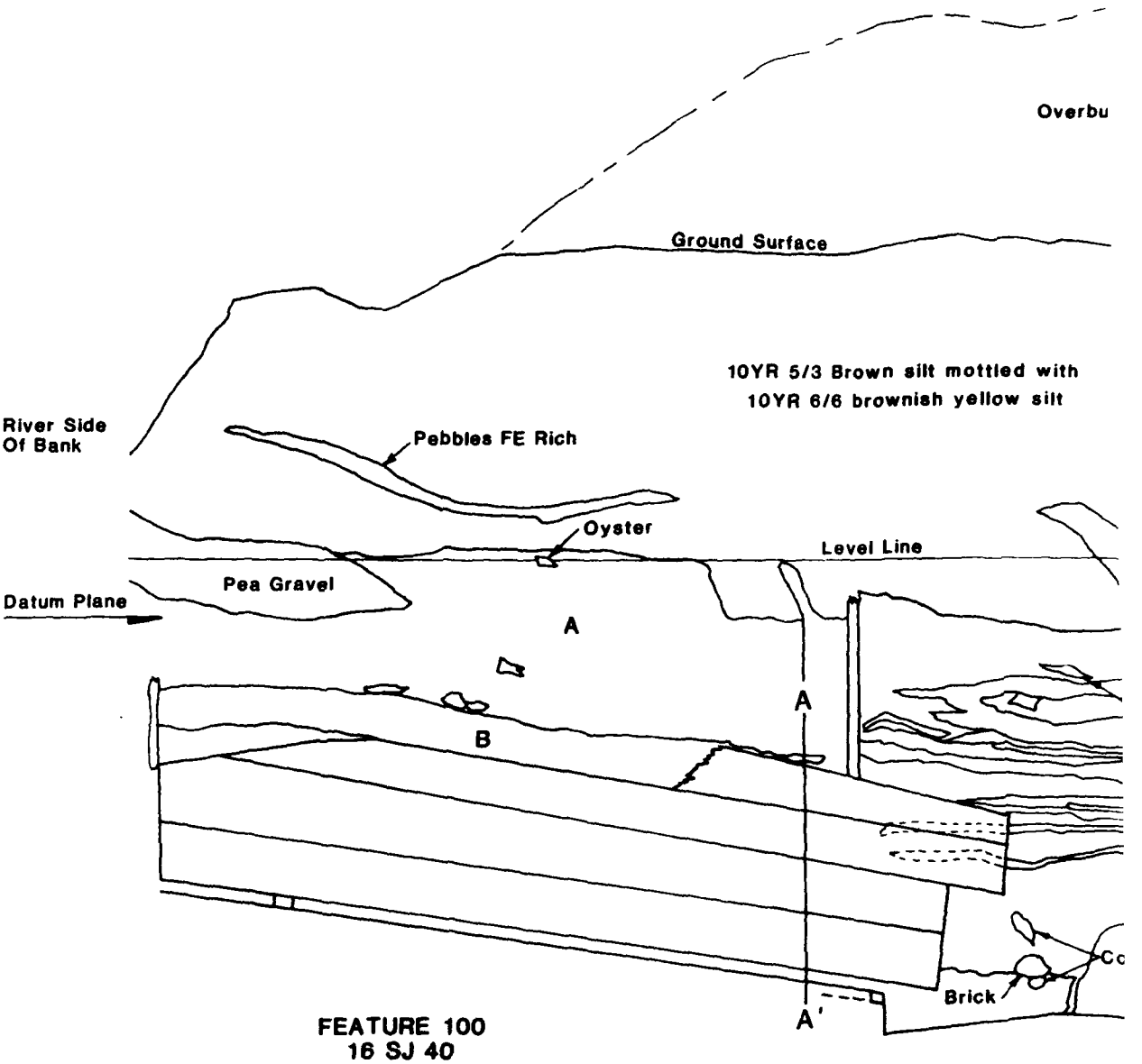
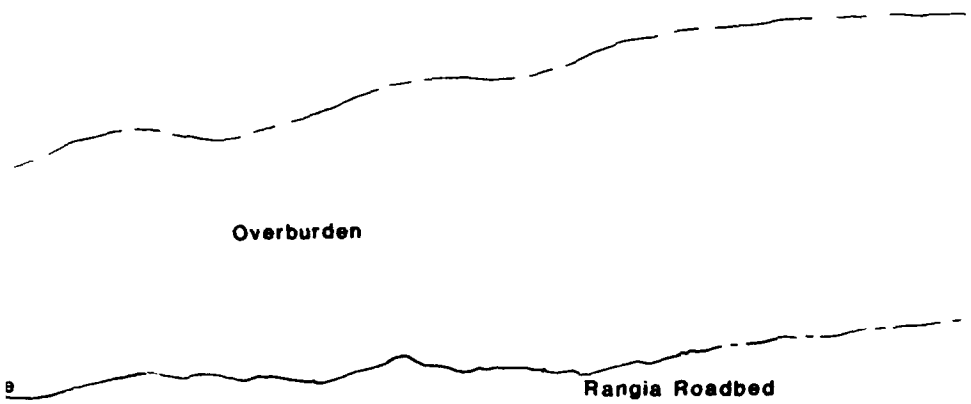
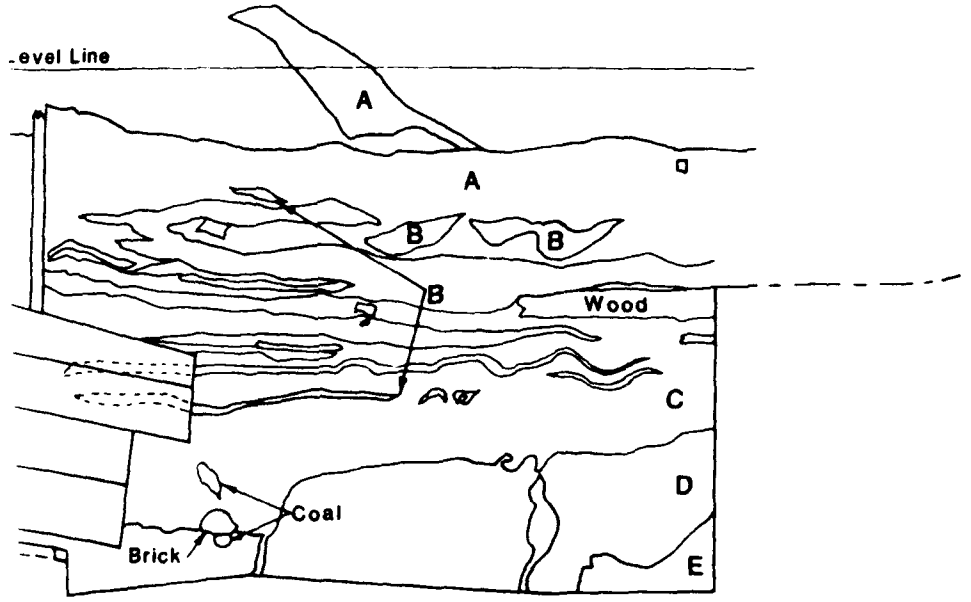


Figure 24. *Profile of the east wall of Feature 100*



Brown silt mottled with
/6 brownish yellow silt



KEY

very dark grayish brown silt
dark grayish brown silt with 10YR 5/2 grayish brown fine sand and 10YR 3 1 very dark gray clay bedding
very dark gray clay mottled with 5Y 4/1 dark gray clay
dark gray clay mottled with 5Y 5/2 olive gray clay
dark yellowish brown silt mottled with 10YR 5/1 gray clay

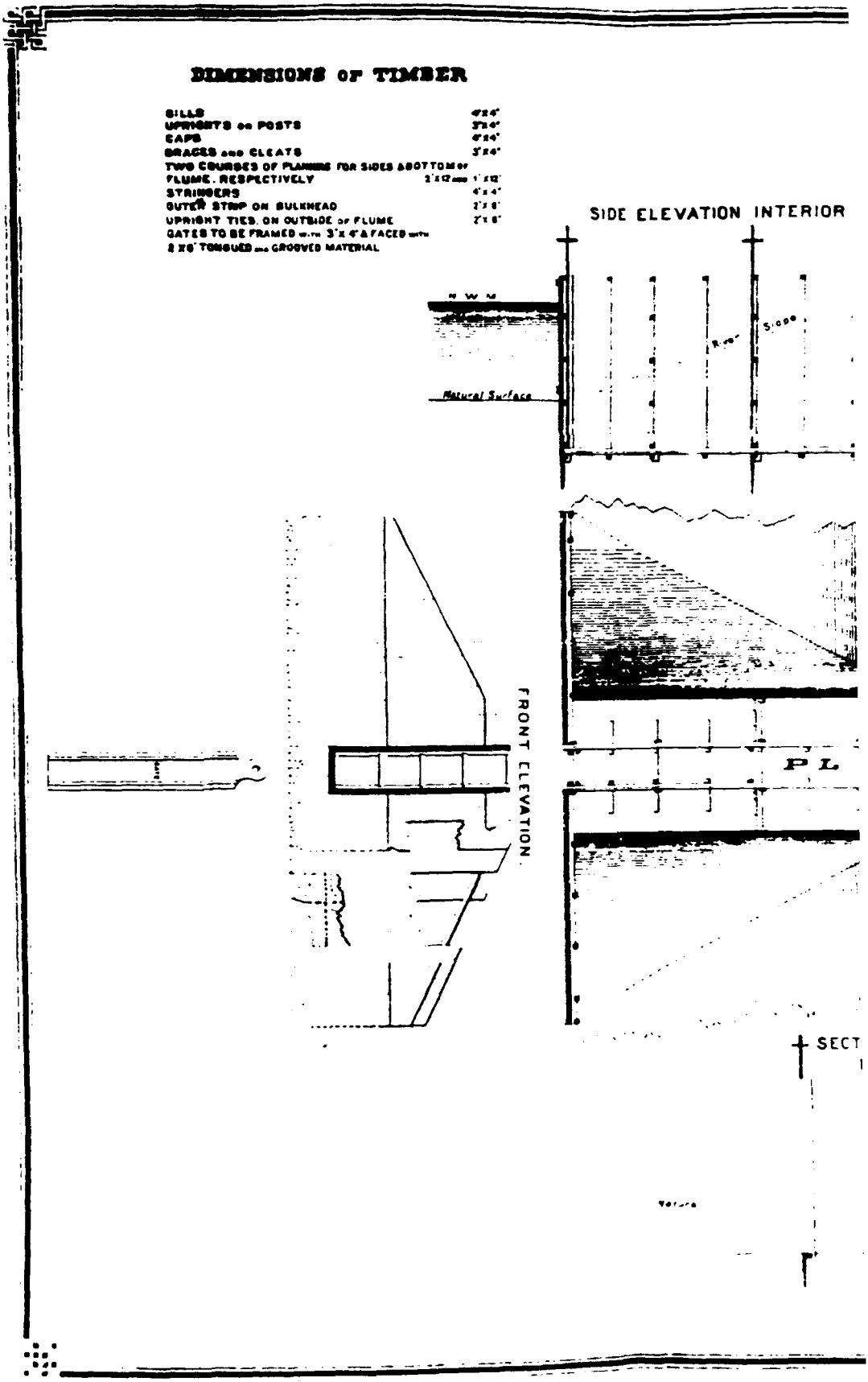


Figure 25. Plan view of rice flume, 1880

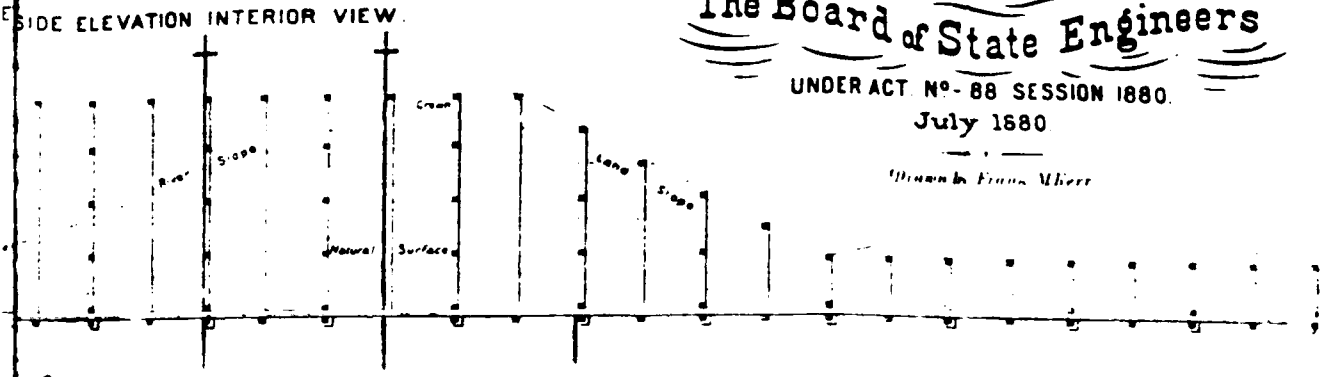
PLAN OF
RIO PLATA

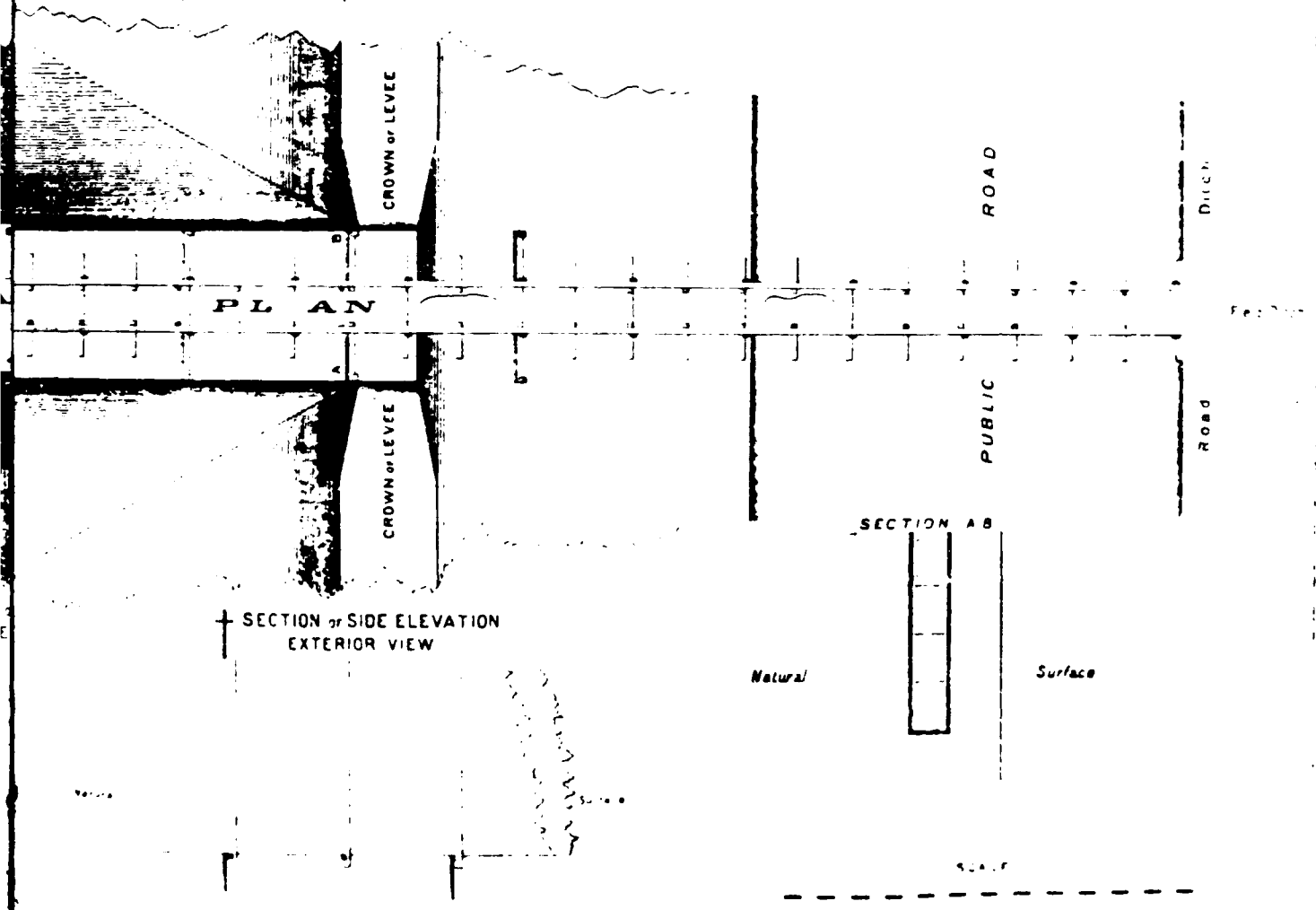
ADOPTED BY

The Board of State Engineers

UNDER ACT Nº 88 SESSION 1880.

July 1880





Profile 4. Profile 4, a 3 m bluff edge stratigraphic profile, was created to record and to examine the relationships between natural and cultural deposits within the downriver portion of the site. Furthermore, Profile 4 was cleaned and mapped at a rice flume feature, in order to provide information on the construction history of Feature 114. A profile was drawn of a vertical slice of the cut bank. Ten depositional strata were identified (Figure 26). Stratum I consisted of a 10YR 6/2 light brownish gray silt containing ferrous oxide inclusions. No artifacts were recovered from this stratum. Stratum II consisted of a 10YR 5/3 brown medium fine silt mottled with 10YR 5/6 yellowish brown silt inclusions. A large piece of oyster shell was found in Stratum II. Stratum III had the same texture as Stratum II; however, it was lighter in color. Strata IV, V, VI, VII, and X all contained artifacts. These five silty strata may represent ditches, viewed in cross-section. The bottom of the first ditch was observed at Stratum IX, a 10YR 4/3 brown silt mottled and striated with 10YR 5/1 gray silt and 10YR 5/6 yellowish brown silt. The artifacts found within these strata represent fill which either was washed or thrown into the ditches during two discrete depositional episodes.

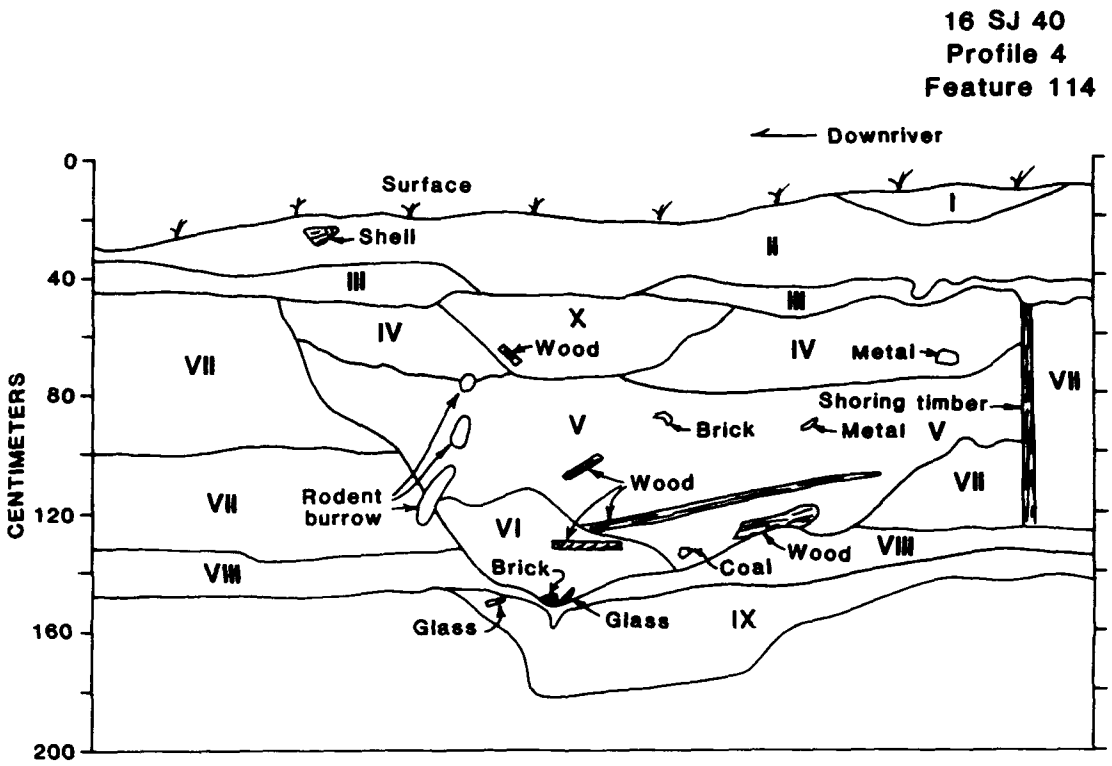
Feature 114. This feature was a water sorted deposit of cypress planks, metal scrap, coal, brick, and glass fragments, at N490, E495. Major effort was given to record Feature 114. It was excavated initially as a 1 x 2 m excavation unit; the feature then was cut back and cleaned using trowels. As Figure 26 illustrates, soils within Feature 114 consisted of 10YR 3/1 very dark gray clayey silt mottled with 2.5Y 4/0 dark gray clayey silt. Artifacts recovered from the feature fill include wood boards and shavings, brick fragments, oyster shells, metal, chains, coal, glass, and ceramic sherds. The artifacts were concentrated within the lower portions of the concave feature. The presence of a wooden post in the brown silt subsoil was noted. It appeared that a rectangular hole had been excavated prior to the placement of this post; gray silty clays differentiated its boundaries.

Ten depositional strata were identified in profile. Stratum I consisted of a 10YR 6/2 light brownish gray silt containing ferrous oxide inclusions. No artifacts were recovered from this stratum. Stratum II consisted of a 10YR 5/3 brown medium fine silt mottled with 10YR 5/6 yellowish brown silt inclusions. Oyster shells were present in Stratum II. Stratum III consisted of 10YR 6/2 light brownish gray silt mottled with 10YR 5/6 yellowish brown silt. Strata IV, V, VI and X were contained within the boundaries of the feature. Stratum IV consisted of 10YR 6/2 light brownish gray silt with artifacts. Soils in this zone showed alternating bands of sandy silts that probably were deposited by water. Stratum V consisted of 10YR 3/1 very dark gray clayey silt with artifacts. Stratum VI consisted of 2.5Y 4/0 dark gray clayey silt with artifacts. Stratum X consisted of 2.5Y 4/0 dark clayey silt with artifacts. These strata cut Strata VII, VIII and IX, which consisted of 10YR 5/3 brown silt, 10YR 5/1 gray silt mottled with 10YR 5/6 yellowish brown silt, and 10YR 4/3 brown silt mottled with 10YR 5/1 gray silt and 10YR 5/6 yellowish brown silt, respectively.

Feature 114 originated at 4.59 m NGVD, and terminated at 3.22 m NGVD. The profile of Feature 114 indicates that the feature is somewhat steeper at its downriver end. A wood shoring defined the upriver boundary of the feature. This timber originated under Stratum III, and it was driven into the soil to the base of Level 7. The soil deposits associated with Feature 114 indicate that this deep basin or trench was pre-excavated and shored. Water deposited sediments (possibly seasonal in nature) capped the feature; a portion of the feature then was re-excavated and subsequently filled.

The feature either represents an irrigation ditch or the residue of construction necessary for the emplacement of a now lost rice flume. The presence of Feature 101 in this vicinity in 1984 supports the latter hypothesis.

Profile 5. Profile 5 was a 3 m bluff profile located between grid coordinates N498.5, E497.0 at 4.68 m NGVD and N495.5, E497.0. A sheer surface was cleaned by trowel for mapping. A thin gravel lens capped the cut. An erosional surface cut through Stratum III within the downriver 1 m of the profile. Stratum II consisted of 2.5Y 4/2 dark grayish brown silt. Stratum III consisted of 10YR 6/2 light brownish gray silt. Stratum IV consisted of 10YR 5/3 brown silt mottled with 5YR 5/8 yellowish red silt. Stratum V consisted of 10YR 5/3 brown sandy silt. Stratum VI consisted of 10YR 5/2 grayish brown clayey silt. Stratum VII consisted of 10YR 5/3 brown silt. Stratum VIII consisted of 10YR 5/3 brown silt with sandy silt inclusions. Stratum IX consisted of 10YR 5/1 gray silt. And, Stratum X contained 10 YR 5/1 gray silt mottled with 10YR 5/3 brown sandy silt.



KEY

I:	10YR	6/2	light brownish gray silt mottled (<20%) with ferrous oxide inclusions
II:	10YR	5/3	brown medium fine silt mottled with 10YR 5/6 yellowish brown inclusions
III:	10YR	6/2	light brownish gray silt mottled with <20% 10YR 5/6 yellowish brown silt
IV:	10YR	6/2	light brownish gray silt mottled with 10YR 4/1 dark gray clayey silt
V:	10YR	3/1	very dark gray clayey silt mottled with 2.5Y 4/0 dark gray clayey silt
VI:	2.5Y	4/0	dark gray clayey silt mottled with 10YR 3/1 very dark gray silt
VII:	10YR	5/3	brown silt mottled with 10YR 5/6 yellowish brown silt
VIII:	10YR	5/1	gray silt mottled heavily with 2.5Y 5/1 gray silt and 10YR 5/6 yellowish brown silt
IX:	10YR	4/3	brown silt mottled with 10YR 5/1 gray silt and 10YR 5/6 yellowish brown silt
X:	2.5Y	4/0	dark gray clayey silt mottled with 10YR 3/1 very dark gray silt

Figure 26. Bankline stratigraphic profile showing Feature 114

No artifacts were recovered below Stratum III. Profile 5 exhibited a profile consistent with Convent soils in batture deposits. The strata were deposited horizontally, although some erosion was indicated between deposits. Silts and sandy silts predominated. Darker soils in the lower portions of the profile indicated an oxygen reduced environment.

Feature 119. Feature 119 comprised two articulated cypress boards protruding from the face of the cut bank at grid coordinates N511.08, E495.38. The lower board measured 37 cm x 16 cm x 2 cm. The upper board measured 34 cm x 17 cm x 2.5 cm. A vertical profile around the wood was cleaned in order to discern the boundaries of this feature. Soils associated with the wooden feature were 2.5Y 5/0 gray clayey silts. No artifacts other than the wood boards were present. The 1917 gravel roadbed was noted approximately 20 cm above the cypress boards. The function of Feature 119 was not determined. However, the character of the gravel roadbed in the area may elucidate the feature's function. Feature 119 possibly represents a pit in the road that was loosely re-filled and later subsided. Although clayey soils are subject to displacement when wet, they are quite firm when dry. Feature 119 possibly functioned as a culvert positioned underneath the 1917 roadbed; the adjacent dip in the roadbed may signify the culvert's collapse. Dark clayey soils like those associated with feature 119 normally are deposited in a water rich and oxygen deprived environment.

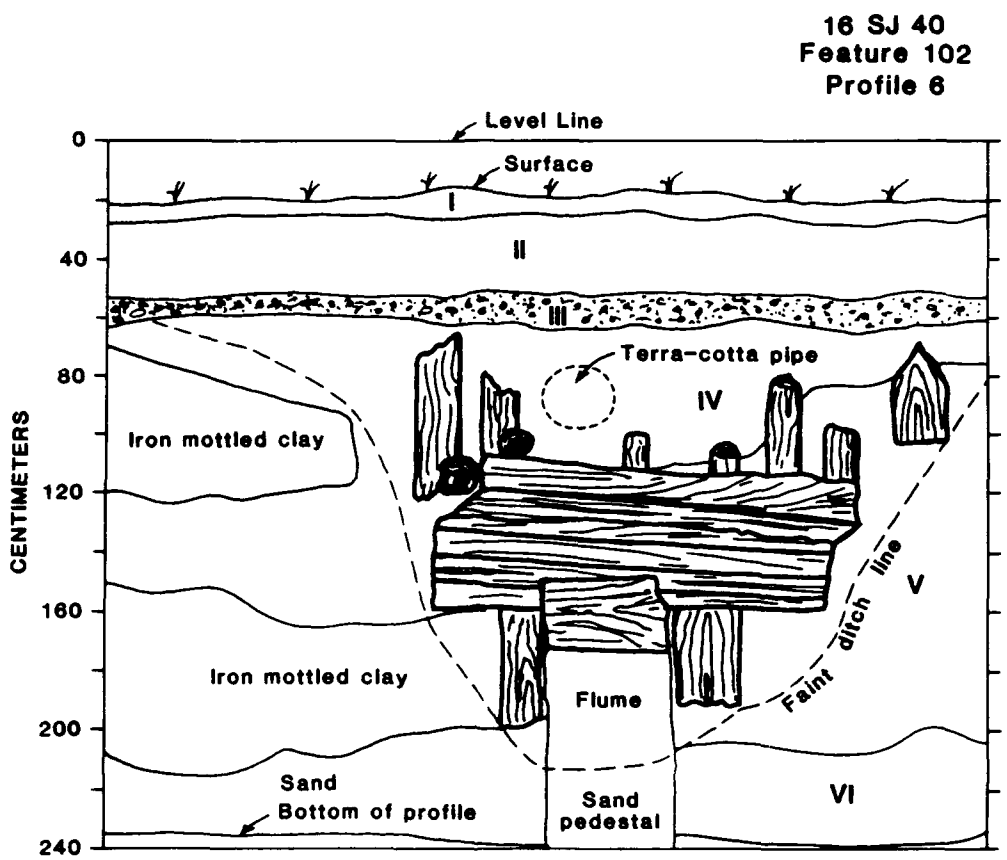
Small Farm (Section 27)

The controlled surface collection of the bank within the Vacherie site continued in Section 27. Historic domestic artifacts were abundant between N550-N650. Between coordinates N550 and N650, Kitchen group artifacts predominated. A mean ceramic date of 1847 was produced from ceramic sherds collected within this quadrat.

Test Unit C. This 2 x 2 m unit was located on top of the bluff. The southwest corner of the unit was located at grid coordinates N580.36, E488.25, at an elevation of 5.48 m NGVD. This unit was excavated in seven 10 cm levels to 4.76 m NGVD. Level 1 consisted of 2.5Y 6/4 yellowish brown silty clay mottled with 2.5Y 5/2 grayish brown silt soils. Artifacts collected included historic ceramic sherds and glass. Level 2 consisted of soils similar to those in Level 1. Ceramic sherds, glass, and brick fragments also were recovered from Level 2. A mean ceramic date of 1841 was obtained from ceramics within this level. Level 3 and Level 4 soils resembled those in previous levels. Level 5 consisted of 2.5Y 4/2 dark grayish brown silty clay mottled with 2.5Y 3/2 very dark grayish brown silt loam. Dark gray soils identified previously were dispersed across the entire floor of the unit, separated from other soils by some large rotting trees or tree roots. Artifacts within this level included coal, brick, metal, glass, and ceramic sherds. A mean ceramic date of 1853 was obtained for Level 5. Levels 6, 7, and 8 consisted of 2.5Y 4/2 dark grayish brown silty clay soils mottled with 2.5Y 4/4 silt. Profile maps and a photographic record were made of the south and east walls of Unit C. Both horizontal and vertical aspects of the unit indicated that most soils in this area of the site resulted from levee fill. The presence of large decomposing tree branches or trunks, and of amorphous soil zones, support this hypothesis.

Test Unit D. This 2 x 2 m unit test was located adjacent to Unit C; these units were separated by a 40 cm balk. The southwest corner of the unit, located at grid coordinates N582.72, E488.21, functioned as unit datum. Seven 10 cm levels were excavated to a final depth of 4.76 NGVD. Soils within Unit D resembled those previously described for Unit C. Artifacts were recovered from Levels 1 through 6. Ceramic artifacts from this unit produced a mean ceramic date of 1839. Profile maps and a photographic record were made of the south and east walls of unit D. The presence of decomposing trees, of amorphous soil zones, and of discontinuities in the ceramic seriation suggest that deposits in this area of the site represent levee fill.

Profile 6. Profile 6 was located between grid coordinates N589.19, E491.72, and N586.22, E491.98. Initial clearing of the bluff profile was carried out by backhoe. Once a sheer face was made, construction detail for Feature 102 was defined (Figure 27).



KEY

I:	10YR	5/3	clay (loose, brown)
II:	10YR	5/3	clay with coal fragments
III:	2.5Y	6/2	shell/pebbles and compact clay
IV:	2.5Y	5/2	clay with brick, shell, and coal fragments
V:	2.5Y	3/2	iron mottled clay
VI:	2.5Y	5/0	gray clayey sand

Pipe was removed before drawing was made. Upright plank is perpendicular to flume.

Figure 27. Bankline profile showing Feature 102

Feature 102. This was identified as a cypress wood rice flume during the 1984 field season. This feature was located at grid coordinates N587.29, E496.51. The top elevation of the flume was 3.82 m NGVD. Portions of the flume were covered with cypress boards attached to the sides with square cut nails. Bottom boards also were present. Above the flume at 4.51 m NGVD, a 65 cm long section of terra cotta pipe was found (Figure 28).

In an attempt to delineate construction detail of the feature, a 3 m section of the bluff was cleared. Excavations unearthed a series of wood planks above and along each side of the flume (Figure 27). A trench outline became discernable during differential drying of the soil matrix. The trench appeared to originate just beneath the 1917 gravel and shell roadbed. Metal chain and other historic artifacts were found in close proximity to the wooden boards. The cleaned profile was mapped and a photographic record was made.

In order to understand the construction of Feature 102 better, the bank was peeled back an additional 20 cm. These excavations were conducted by hand. This excavation slice showed that the wood planks were 2.5 cm (1 in) thick. These boards were removed in order to complete the second vertical profile cut. Two fill sequences were noted in this second profile. Soils in the upper limits of the trench fill were identified as 2.5Y 5/2 grayish brown fine sand mottled with 2.5Y 7/2 light gray sandy silt. Artifacts associated with the trench fill were collected. Glass artifacts collected produced a mean glass date of 1895. Ceramic sherds from the feature area produced a mean ceramic date of 1854. Dark gray (5Y 4/1) silt loam soils were located directly behind the flume opening. Oyster shell, wood, and glass fragments were present. This second profile cut indicated that the trench originated beneath the gravel roadbed in a 10YR 4/3 sandy silt. Artifacts within this zone appeared more broken and smaller in size, which may indicate secondary fill. Once the profile was completed, three auger tests were made within the dark gray sandy silt in attempts to define the horizontal aspect. Each auger test indicated that these ditch soils continued across the bank. The feature was covered with plastic and reburied after excavations were completed.

Excavations indicated that the construction of the rice flume began with the excavation of a trench to the river. After the flume was set, the trench was filled. Levee fill deposits were placed on top of this matrix during a later levee setback. Wood shoring was placed at the landside end of the flume after the trench was filled. This probably was done in an attempt to keep the loose fill from washing into the flume. Sediments were redeposited at the opening and inside the flume after it was abandoned.

Backhoe Trench E. Backhoe trenching in Section 27 was undertaken to search for deeply buried deposits and to determine the stratigraphy in that portion of the site. In this middle portion of the 16 SJ 40 site, in situ deposits were evident just below the old (1917) levee road in profile. These deposits consisted of historic ceramic sherds dating from the 1840s through the 1880s; these sherds were found in association with an oyster shell road lens, which possibly correlated with the levee appearing on the 1876 MRC map.

Backhoe Trench E, extended landward and perpendicular to the river from coordinates N594, E487. This trench was excavated about 2.0 m deep, 3.20 m in length, and 80 cm wide. A 3.2 m section of the east wall profile of Trench E was cleaned and recorded (Figure 29). It was designated Profile 7. Stratum I consisted of a brown (10YR 5/3) silt loam with inclusions of coal; it had been subjected to erosional forces. Directly beneath Stratum I, Stratum II was a light brownish gray (2.5Y 6/2) silt loam, also with inclusions of coal. Stratum III contained brick fragments, glass, and oyster shells. Cultural remains in this dark brown (10YR 4/3) sandy silt may derive from the road fill also found in Trenches A and B. Stratum III was associated with a wooden post with square cut nails. Stratum IV consisted of a grayish brown (2.5Y 5/2) layer of banded sands and silts. Stratum V contained a light gray (2.5Y 7/2) layer of silts that pinched out near the river and extended landward. Stratum VI was a grayish brown (2.5Y 5/2) layer of sands and silts containing oyster shells and brick fragments.

The abrupt terminus of Stratum III, and the riverside pinching out of Stratum V, exemplify cultural rather than natural deposition. The slightly convex layering of Strata III through VI suggests that this trench was located at the top of an historic levee. The oyster shell road, as well as the cut nails (1840s to 1870s) present, identify it as the levee structure that was present in 1876. The continuous flat layer of oyster shells supports the idea that a road once existed along this structure.

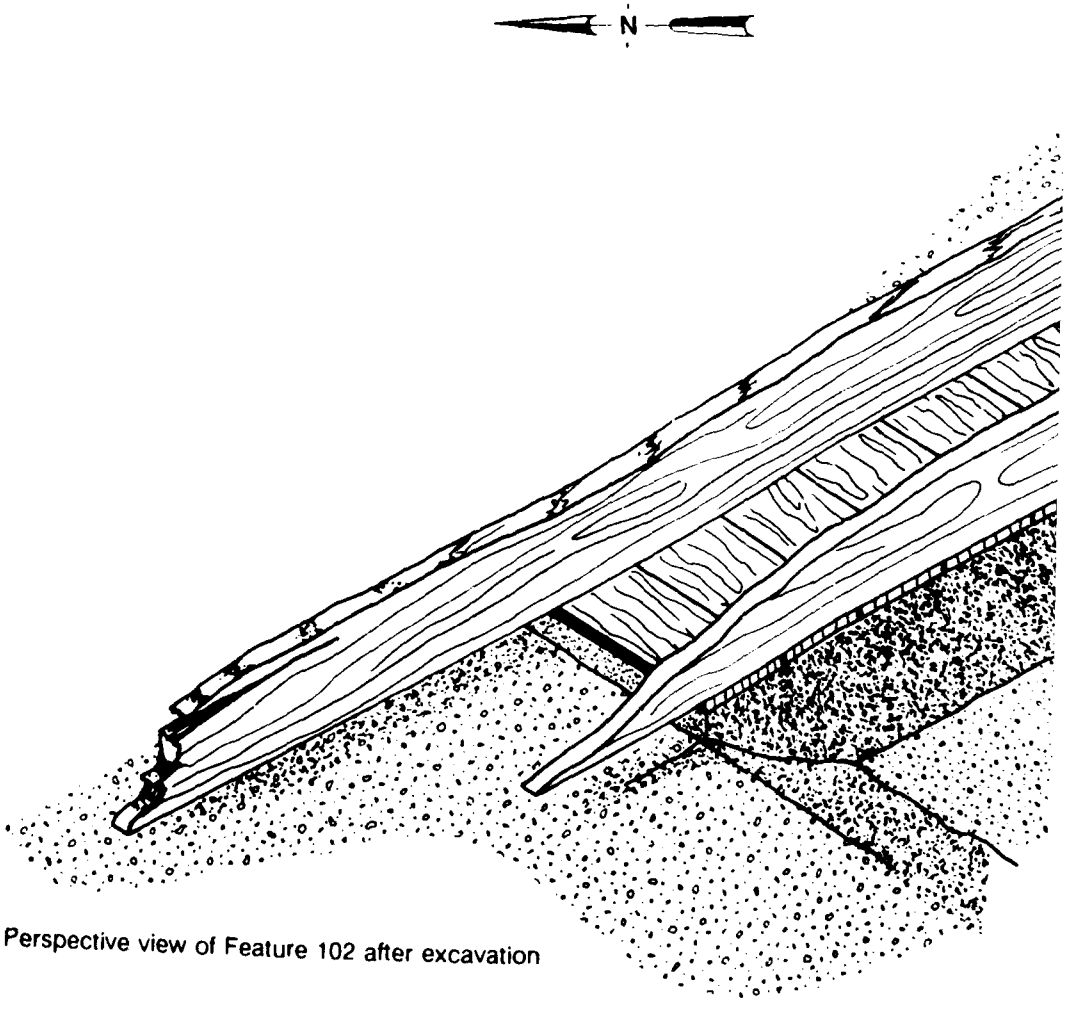
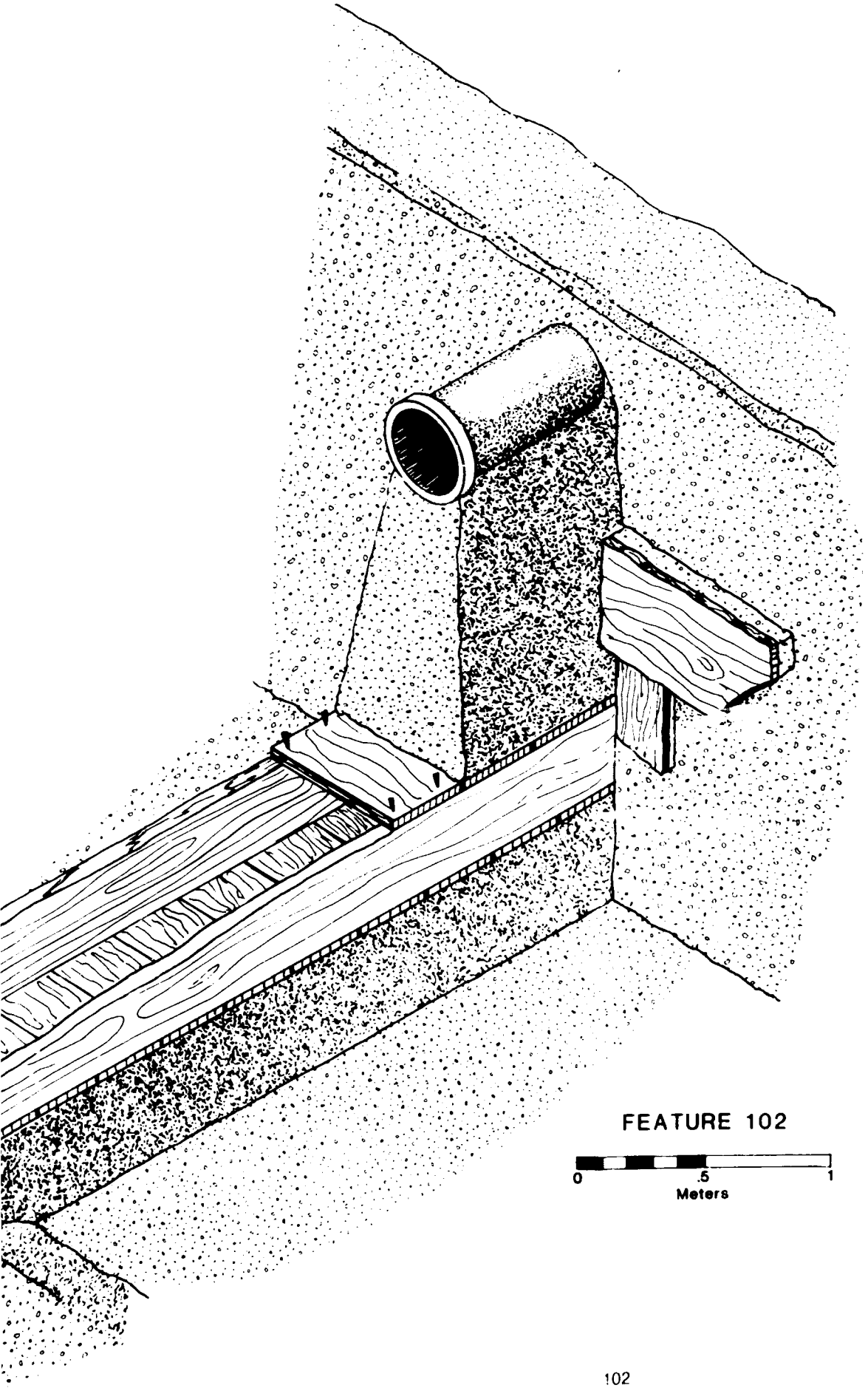


Figure 28. Perspective view of Feature 102 after excavation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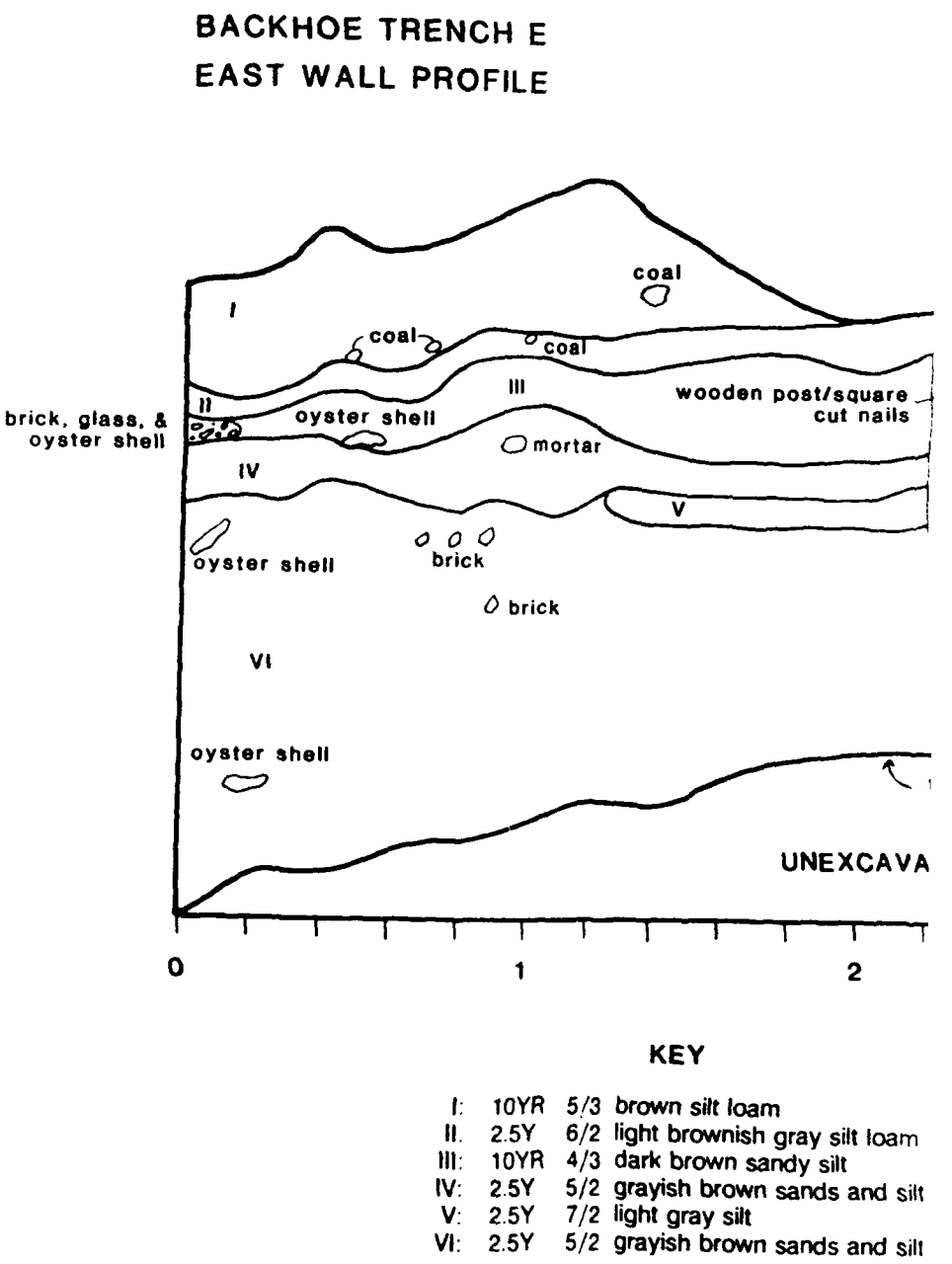
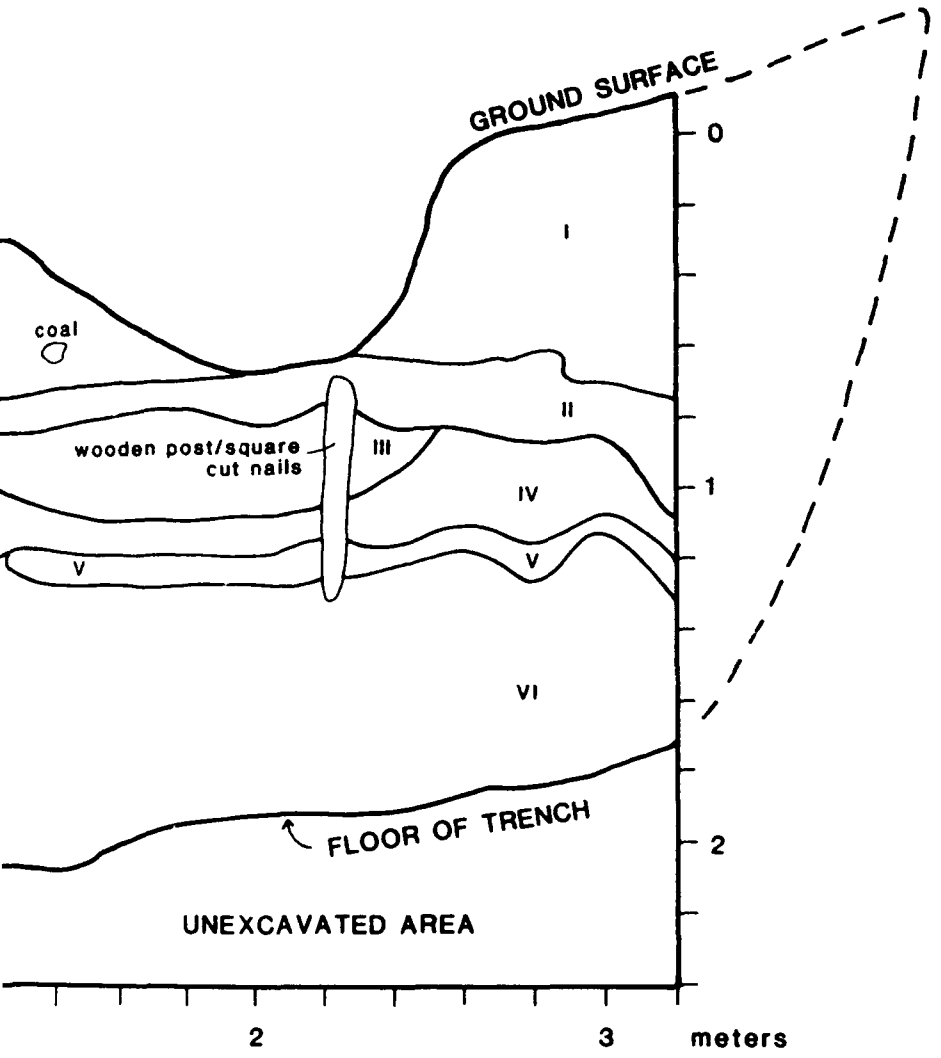


Figure 29 Stratigraphic profile of the east wall of Trench E



KEY

3 brown silt loam
2 light brownish gray silt loam
3 dark brown sandy silt
2 grayish brown sands and silts
2 light gray silt
2 grayish brown sands and silts

h E

Small Farm (Section 77)

Feature 104. Feature 104 was identified as a cypress flume during the 1984 field season. In 1987, this flume, which was located on a former small farm property in Section 77, was relocated between grid coordinates N710.23, E490.41, and N710.68, E489.81. The top elevation of the flume was 3.74 m NGVD. The end closest to the bank stood nearly 7 cm higher in elevation than the end closest to the river. The upriver side of the flume measured 4.5 m x 31 cm x 5 cm. The downriver side measured 5.10 m x 31 cm x 5 cm. The riverside ends of both boards were sheared off; most of the upper and lower cross slats were missing. Five cypress boards remained attached to the top of the flume closest to the bank (Figure 30). The flume measured a maximum of 40 cm wide from outside wall to outside wall. A number of square cut nails were present in the side boards.

A 1 x 2 m test unit was placed at the top of the bluff where Feature 104 enters the bank (Figure 31). The southwest corner of the unit served as the unit datum, at grid coordinates N711.10, E483.67, and at an elevation of 4.98 m NGVD. A plan map was made and photographic recordation completed. Excavations indicated that cypress boards remained intact underneath soil overburden. The average dimension of these boards was 37 cm x 44 cm x 5 cm. All but one of the boards were secured by a single cut nail on each side of its length. The boards were connected tightly (Figure 31). The west wall of the unit also was profiled. Soils consisted of 2.5Y 5/2 grayish brown silty clays, 2.5Y 4/2 dark grayish brown clays with wood and brick inclusions, and 5Y 6/3 pale olive sandy silts.

Feature 120. Feature 120 was identified as a metal culvert between grid coordinates N716.80, E486.57 and N716.05, E484.23. The culvert measured 30 cm in diameter and 2.8 m long. The culvert elevation was 4.44 m NGVD where it entered the bank, and 4.12 m NGVD at its riverside end; erosion caused the differing elevations. A photographic record of the feature was completed. Although Feature 120 was described as a culvert, it also may have functioned in irrigation, like Feature 100. Its elevation corresponds to that of wood flumes at the site.

Small Farm (Section 26)

Profile 8. Profile 8 was a 3 m wide vertical profile located along the bluff between grid coordinates N783.82, E488.39, and N786.79, E484.69 (Figure 32). Elevations at the downriver coordinates measured 5.39 m NGVD at the top of the bluff, and 4.54 m NGVD at the base of the profile. Workers excavated the profile by hand. Excavators encountered large wooden timbers, indicating the presence of a feature, which was designated Feature 105. A profile map (Figure 32) and photographs document the stratigraphy. Stratum I consisted of 10YR 3/3 dark brown silt mottled with 5YR 5/6 yellowish red silt and with 10YR 5/4 yellowish brown sandy silt. Stratum II consisted of 2.5Y 5/4 light olive brown silts. Stratum III represents the ca. 1917 gravel roadbed. The gravel was characterized as 2 to 4 cm in diameter and semi-rounded in this area of the site. Stratum IV consisted of 10YR 4/1 dark gray silt mottled with 5YR 5/6 yellowish red silt. This stratum contained artifacts. Stratum V consisted of soils similar to those in Stratum IV, however, it lacked mottling and had a very fine sand content. Stratum VI consisted of 7.5YR 4/0 dark gray silt with heavy wood concentrations. Stratum VI contained artifacts. Stratum VII consisted of 10YR 5/1 gray clayey silt mottled with 2.5Y 4/4 olive brown silt loam. Stratum VII contained some wood. Stratum VIII consisted of 7.5YR 4/0 dark gray silty clay. Figure 32 illustrates Profile 8. The following discussion on Feature 105 presents a more detailed description of Stratum VI.

Feature 105. Feature 105 was identified as a plank privy; vertical cypress planks were exposed at the top of the bank during the 1984 field investigations. This basin- or trough-shaped feature originated at 5.13 m NGVD, and terminated at 4.58 m NGVD, as shown in Profile 8 (Figure 32). The soil matrix consisted of dark gray silt. The plastic soil retained a high water content. A thick mattress of wood and wood shavings (both black willow and cypress were identified) facilitated the trapping of water. Wood within the feature represented the complete process of woodworking. Cut logs, partially hewn timbers, rough cut boards, wood shavings, spalls, and even wood charcoal were present. Other artifacts incorporated into the feature included ceramics, leather shoe remains, brick fragments, and square cut nails. As discussed previously, historic records show that the Vacherie Landing Wood Yard was located in this vicinity. Feature

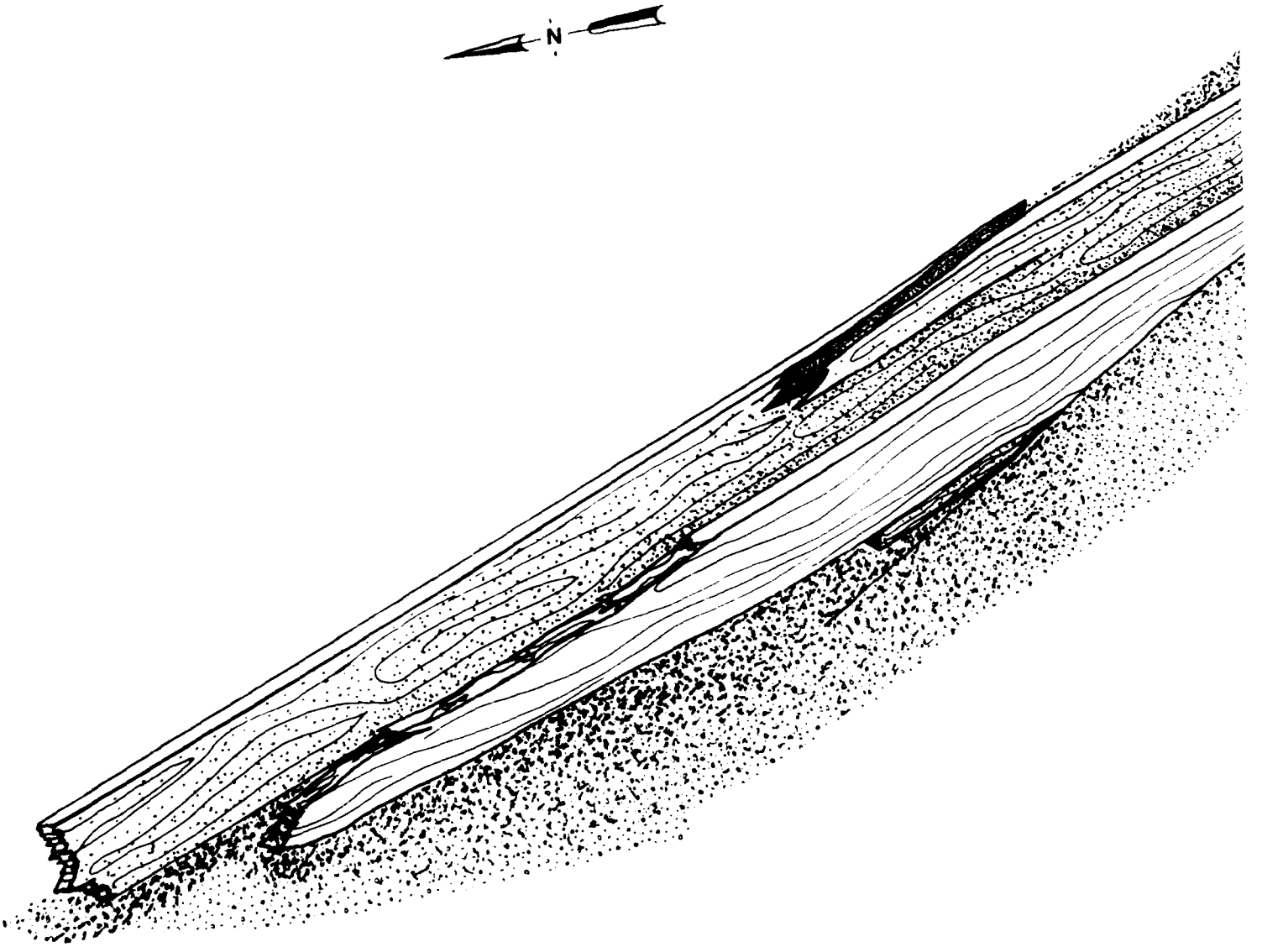
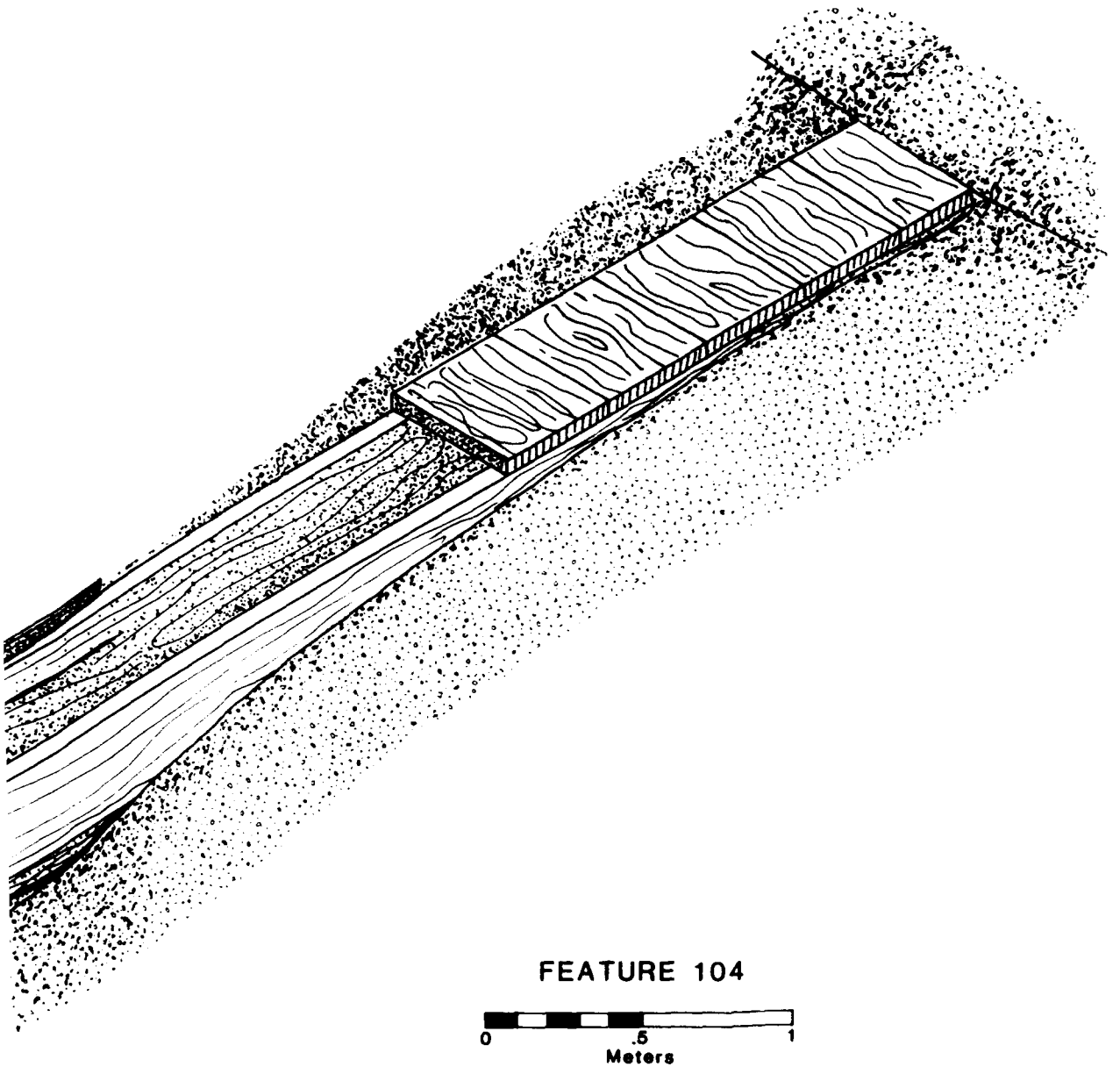


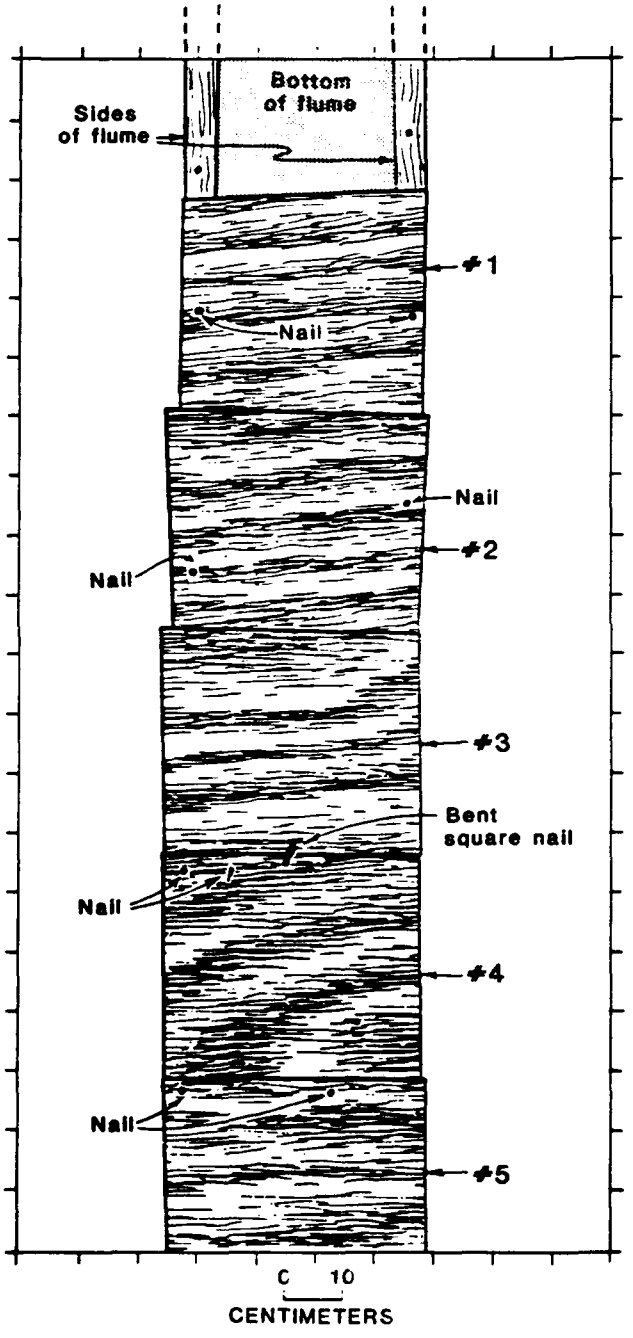
Figure 30. Perspective view of Feature 104 before excavation



FEATURE 104

0 .5 1
Meters

16 SJ 40
PLAN VIEW
Feature 104

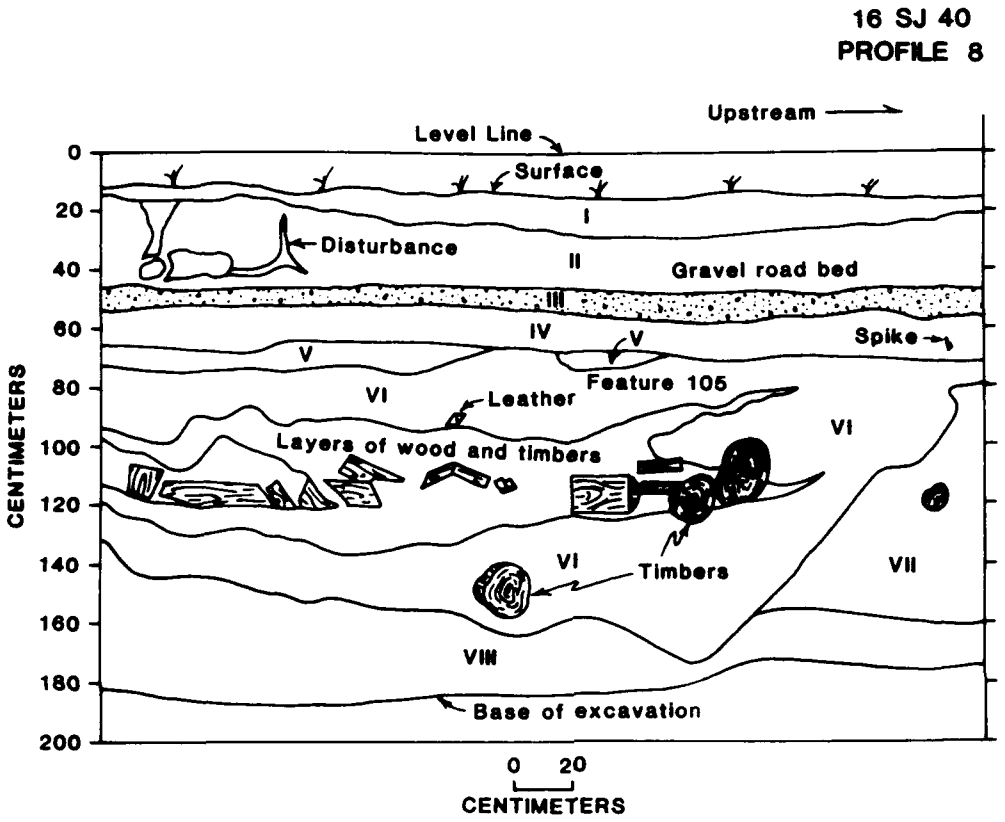


Dimensions of planks

	Length	Width	Depth
1.	32cm	x 47cm	x 6cm
2.	37cm	x 42cm	x 5cm
3.	37cm	x 44cm	x 5cm
4.	37cm	x 44cm	x 5cm
5.	27cm	x 44cm	half visible

Plan view is the covered top of flume. 1, 2, 3, 4, and 5 are all separate planks. Nails (except the bent nail) are all flush with the planks.

Figure 31. Plan view of Feature 104



KEY

I:	10YR	3/3	dark brown silt
II:	2.5Y	5/4	light olive brown silt
III:			Gravel road bed
IV:	10YR	4/1	dark gray silt
V:	10YR	4/1	dark gray silt
VI:			Feature 105
VII:	10YR	5/1	gray clayey silt
VIII:	7.5YR	4/0	dark gray silty clay

Figure 32. Bankline stratigraphic profile showing Feature 105

105 apparently represents wood waste associated with the wood yard. Presumably, that yard served steam-powered vessels at the landing.

Feature 106. This feature was located between grid coordinates N797.07, E4590.80, and N799.19, E490.30. Elevation varied between 4.12 m and 4.05 m NGVD. The feature consisted of thick willow shavings and a hand-hewn cypress log. The contents of this feature again suggested that it represented the disposal of refuse associated with the Vacherie Landing Wood Yard. The feature was photographed and mapped.

Feature 107. This feature consisted of two cypress boards 60 cm long and 2 cm thick in the exposed bluff face. Forty centimeters of dark silty loam separated these boards. The centerpoint of the feature was located at grid coordinate N814.67, E488.34. The feature originated at 4.75 m NGVD. The top of the feature was located approximately 20 cm below the buried shell and gravel roadbed. The soil matrix between the boards consisted of a 2.5 4/2 dark grayish brown clay bedded with 2.5Y 6/2 light brownish gray silt and 2.5Y 3/2 very dark grayish brown silty clays. In order to define the feature, two reference stakes were placed 1 m apart at ground surface. The upper 51 cm of overburden was removed 50 cm into the bluff. Levels within this 1 m x 50 cm block then were excavated. Two horizontal boards were encountered between the upright boards at 4.55 m NGVD. Artifacts in this level included bottle glass, ceramic sherds, and a nail which protruded from one of the horizontal boards. Ceramic sherds in this level produced a mean ceramic date of 1856. The soil matrix in this zone consisted entirely of 2.5Y 4/2 dark grayish brown clay. The alternating soil bands terminated at 4.12 m NGVD, where 2.5Y 5/4 light olive brown silty clay was encountered. These soils appeared identical to those outside of the feature. No artifacts were recovered from this level. Thus, excavations indicated that a series of cypress wood boards arranged upright and side by side existed on two sides of culturally laden deposits. A pit apparently was excavated and then lined with boards. The lower ends of these boards were pointed, and they probably were driven into the soil at the bottom of the pit. Possibly some of the soil removed from the pit was used to refill it, and it covered the bottom 5 to 10 cm of the wood. Soil accumulation followed. Wood boards were incorporated into the final fill stages of the feature, perhaps as the result of the feature's collapse. The function of this feature is uncertain. However, a cypress rice flume recorded in this area in 1984 (Goodwin, Yakubik et al. 1985) washed away, and it is likely that Feature 107 represents the landward vestiges of that feature.

Magnolia Plantation

Feature 117. Feature 117, located at grid coordinate N921, E485, within the former Magnolia Plantation property, consisted of two cypress boards eroding out of the bluff edge 63 cm below ground surface. One board measured 6 cm wide and 3 cm thick. The second board measured 10 cm wide and 3 cm thick. These boards intruded lengthwise into the bluff. Shovel testing of the bluff face at this location indicated the presence of highly disturbed soils and a lack of datable artifacts. The feature was photographed. Due to the lack of context, no further work was undertaken here. Map reconstructions indicate that a number of levees were constructed in this area. These boards apparently represent accidental inclusions within levee fill deposits.

Feature 113. Feature 113 first was recorded during the 1984 field season. The centerpoint of this feature during the 1987 field season was located at N933, E488, at 2.02 m NGVD. Feature 113, consisted of a 1.34 m x 51 cm x 10 cm slab of granite, with two thin veins of quartzite running diagonally through the rock. Surfaces of the slab were eroded slightly. No evidence of cutting or carving exists.

This feature's function remains uncertain. It conceivably was used as ballast in the hold of a boat; it possibly served as a millstone, or as footing for a structure or piece of machinery. The lack of context and artifact association preclude a determination of function.

Feature 116. Feature 116 consisted of a long rectangular wooden rice flume feature exposed on a broad erosional surface of what once was Haas Landing (Figure 33). Feature 116 was oriented roughly perpendicular to the bankline; grid coordinate N1018.192, E487.104 marked its centerpoint, at an elevation of 4.54 m NGVD. This cypress constructed, trough-shaped feature has a maximum length of 5 m; its internal width measures about 83 cm. Cypress boards or slats measuring 99 cm x 28-30 cm x 8 cm were nailed

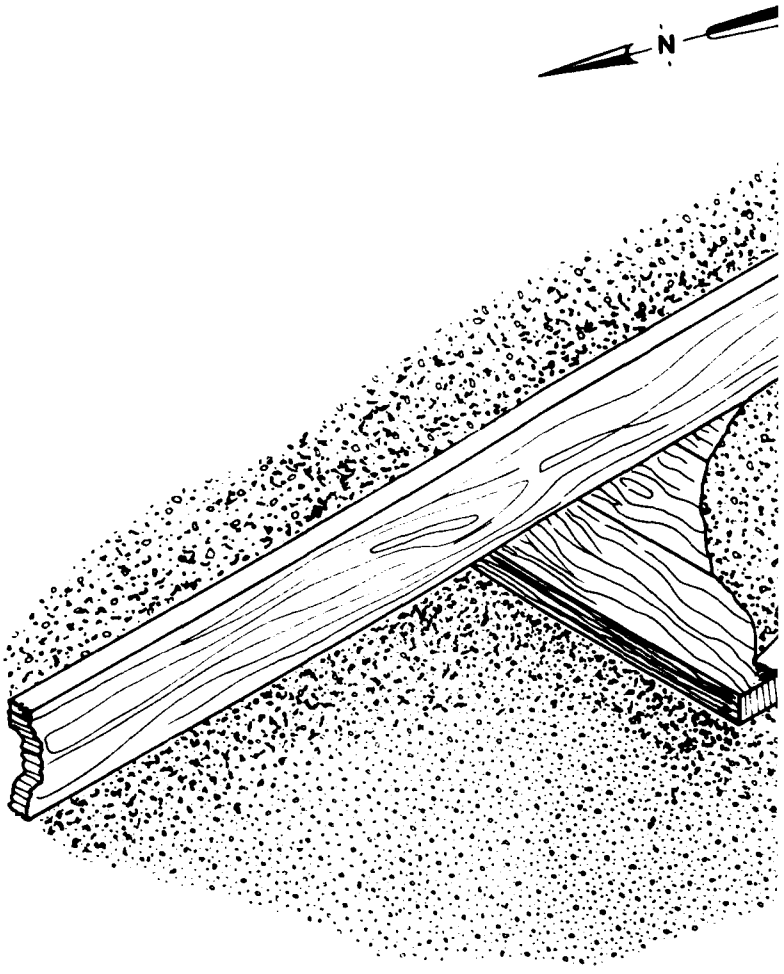
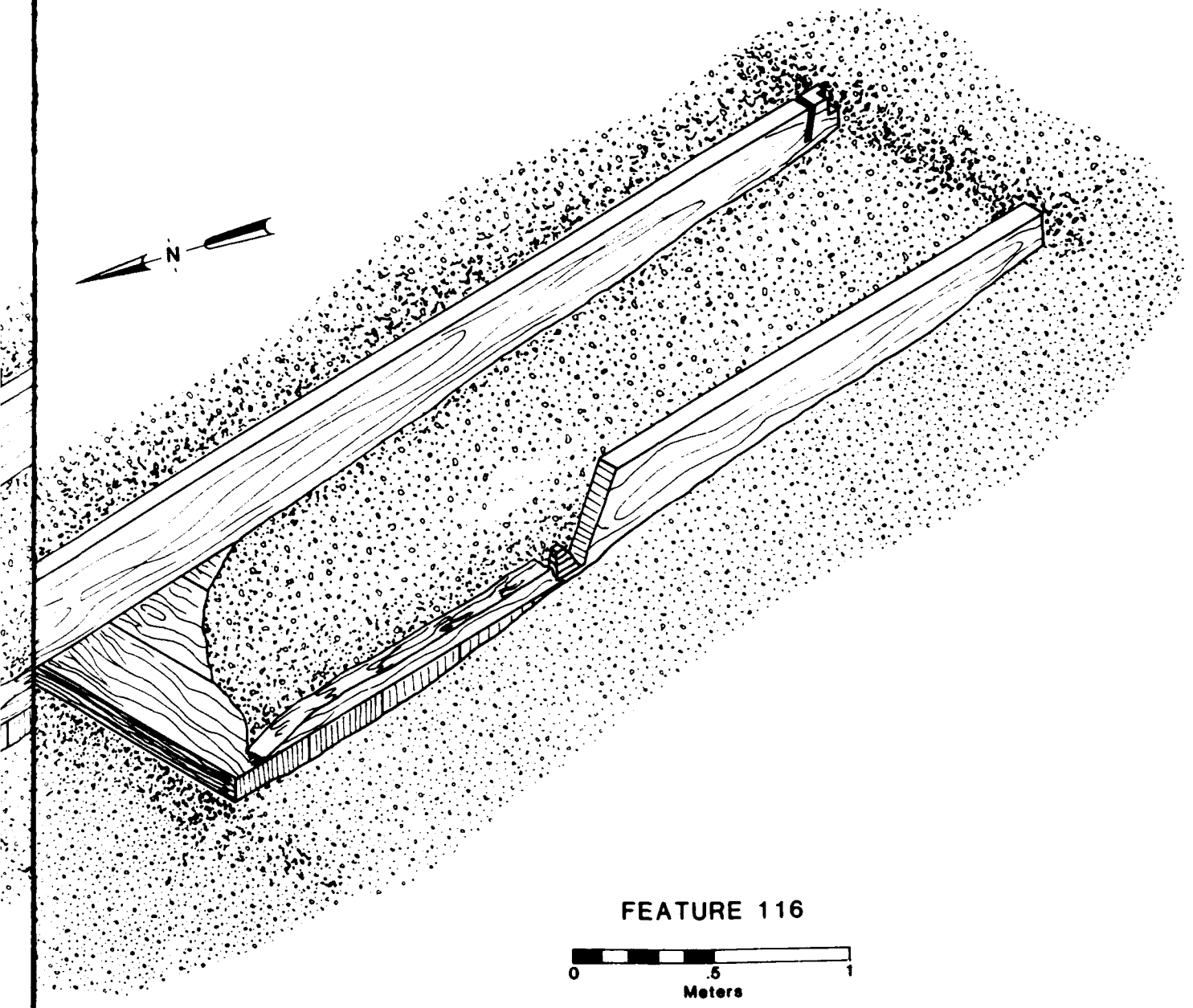


Figure 33. Perspective view of Feature 116



FEATURE 116

6

flush to the bottom of the feature. These boards extended to the outer edges of the vertical side boards. The downriver sideboard measured 5 m x 31 cm x 8 cm. The river end of this board showed irregular breakage. Its opposite end exhibited a saw cut edge: the upper inside corner of this end had a square notch, and a 2 cm wide by 6 cm deep notch was present about 4 cm from the end along the top. The upriver sideboard of Feature 116 measured 3.46 m x 31 cm x 8 cm; this board had two "V" shaped saw cuts at approximately the midway point. Wire nails and nail holes were present across the top of each sideboard, indicating that a top once fit over the feature.

Feature 116 resembles other rice irrigation flumes at 16 SJ 40. Based on its larger size and construction details, this feature appears to be more recent than similar features at the Vacherie Site. The presence of wire nails indicates that this feature post-dates 1870.

Test Unit B. Test Unit B was excavated in order to expose Feature 115. This 2 x 2 m test was located within the area once known as Haas Landing at grid coordinate N1027.57, E487.09. Ground surface at unit datum measured 4.25 m NGVD. The unit was excavated to 3.03 m NGVD. Artifacts were bagged for each level; plan view maps were drawn; and, a photographic record was made after each level was mapped. Artifacts associated with feature fill were kept separate from those originating from outside of Feature 115. Soils found outside of Feature 115 consisted of 10YR 3/1 very dark gray clays above 2.5Y 4/2 dark grayish brown silty clay with orange silt mottles. Artifacts outside of the feature were found only in the first 25 cm; they consisted of historic brick fragments, glass, metal, and ceramic sherds.

Feature 115. This rectangular (1.40 x 1.26 m) arrangement of weathered cypress boards stuck out of the ground vertically to a maximum height of about 44 cm above ground surface (Figure 34). Approximately 1.01 m of board length was buried beneath ground surface. The sides of the boards overlapped, forming an enclosure that tapered towards the bottom. Soils inside the enclosure consisted of 2.5Y 5/2 grayish brown silty clay with orange silt mottles overlaying 2.5Y 4/2 dark grayish brown silty clay. At the base of Level 5, a Dutch auger was driven into the ground in the center of this feature to 2.0 m NGVD; 5Y 4/2 olive gray clay was encountered at 2.63 m NGVD, and 5Y 5/1 gray clay was documented at 2.43 m NGVD. Artifacts in Feature 115 included brick fragments, ceramic sherds, metal, and glass.

In order to discern construction details for Feature 115, a 50 cm wide balk was left along the east side of test Unit B. Figure 35 indicates that a pit was excavated prior to the placement of the wooden boards. Each board was cut near the bottom, and driven into the clayey subsoil. Possibly some of the soil excavated from the pit was redeposited, covering the bottom 10 cm of the wood. Soil discrepancies between layers inside and outside of the feature indicate slight differences in depositional sequences. Soils "B" and "H" appear similar; however, artifacts were more abundant within the feature.

Excavation provided little information to help determine the function of this feature; however, land transfer records helped in forming hypotheses related to the feature's function. The transfer of property from Hans Haas to Paul M. Lambremont, Jr. in 1880 indicates that the owner of this property kept a number of mules. This feature conceivably was constructed in order to protect fodder for these animals. Another possible explanation for the use of this feature is that of a privy. However, no night soil was associated with the feature. It also possibly functioned as a wall.

Feature 121. Feature 121 consisted of two vertical wood board alignments (Figure 36). The downriver alignment was located between N1261.92, E497.34, and N1262.57, E494.33. The end of this feature closest to the river had the highest elevation, at 4.10 m NGVD. The downriver alignment measured 3.10 m long; it consisted of 10 vertical boards, each 37 cm wide and 2 cm thick. A horizontal board was nailed to the upriver (inside) portion of this alignment, 2 cm from the exposed upper surface. This cross slat is 18 cm wide and 2.5 cm thick. The upriver alignment of wood boards was located 1.90 m from the first alignment, between grid coordinates N1263.63, E496.29, and N1263.97, E494.44. The upriver alignment was level at 3.9 m NGVD. This section of Feature 121 consisted of 7 boards averaging 22 cm wide and 2 cm thick. Although no horizontal support was present, differential weathering and nail holes indicate that an interior slat once was present.

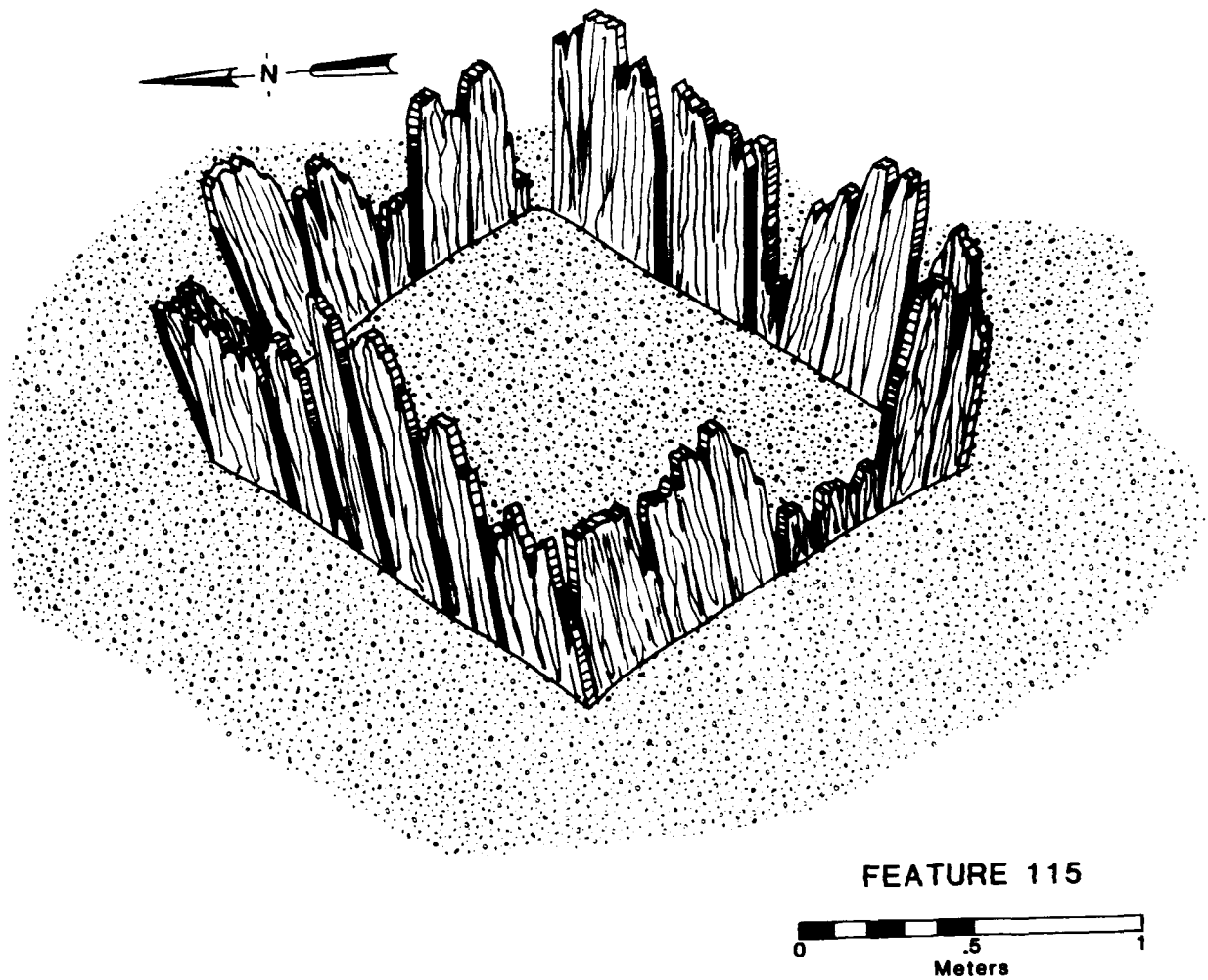
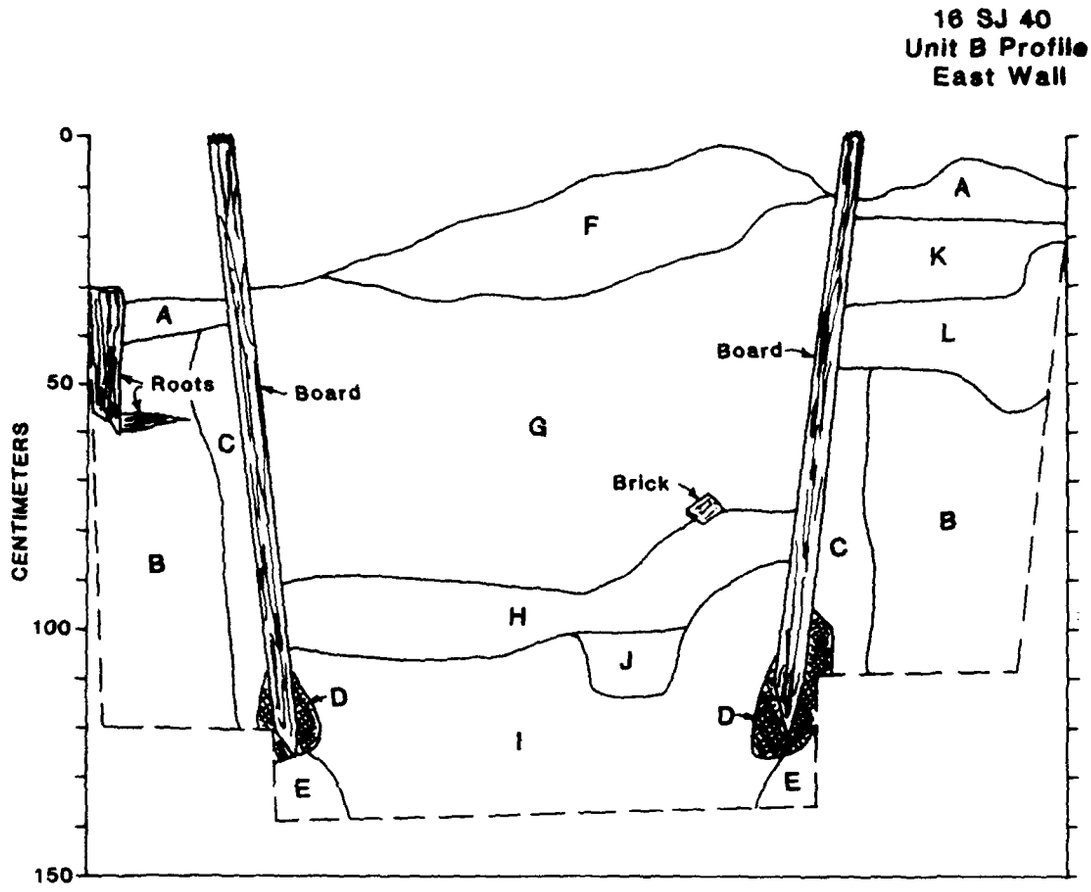


Figure 34. Perspective view of Feature 115 before excavation



KEY

A:	10YR	5/2	silty loam with pea gravels
B:	2.5Y	4/2	silty clay (mottled)
C:	2.5Y	5/2	silty clay
D:	2.5Y	6/1	gray clay
E:	2.5Y	6/2	silty clay
F:	10YR	4/3	dark brown silty clay
G:	2.5Y	5/2	grayish brown silty clay (orange mottled)
H:	2.5Y	4/2	dark grayish brown silty clay
I:	2.5Y	6/1	gray very silty clay
J:	2.5Y	7/2	and 2.5Y 6/1 very silty clay (mottled)
K:	2.5Y	5/2	grayish brown silty clay (orange mottled)
L:	10YR	3/1	very dark gray silty clay

Figure 35. Stratigraphic profile showing Feature 115

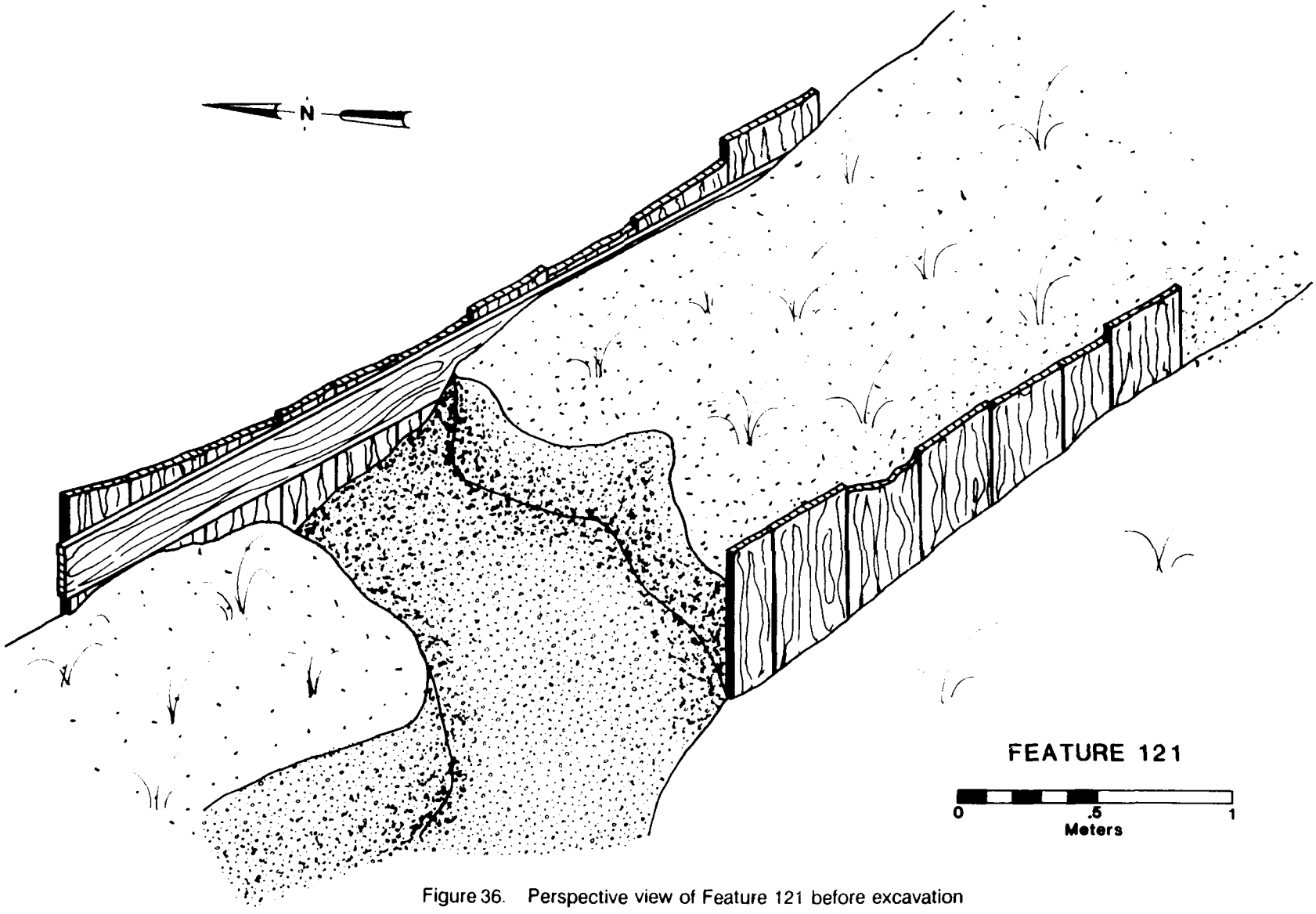


Figure 36. Perspective view of Feature 121 before excavation

A 1 x 2 m unit was oriented along magnetic north between the two wood alignments to determine how the walls relate to each other. The unit was oriented adjacent to the downriver wall, and revealed construction detail along this wall. Prior to excavation, the surface elevations for all four corners of the unit were measured. The surface exhibited both scouring and redeposition of *Rangia* shell which washed in from a shell road at slightly higher elevations. Soils consisted of 2.5Y 4/2 grayish brown silty clay and contained twentieth century glass. A slight change in soil color occurred at about 1 m below surface, where soils consisted of 2.5Y 4/0 brownish gray clay. Wall profiles indicated that vertical boards measured 56 cm long.

Although neither a wood bottom nor top were evidenced within the 1 x 2 m unit, three attached plank boards were noted bobbing directly offshore at low water levels during the 1987 field season. The width of these boards resembled the width between the vertical board alignments of Feature 121; this observation led to the probative hypothesis that Feature 121 recorded in 1987 constitutes the altered and "topless" flume feature recorded as Feature 111, during the 1984 field season. Feature 111 was described as a cypress flume with a cover. This feature measured 1 m wide in 1984.

Feature 121 does not exhibit the construction details typical of other rice flumes at the Vacherie site. Rice production supplanted sugar production between 1873 and 1881 at Magnolia Plantation. Historical accounts suggest that the last rice flumes in this area were constructed prior to 1888. A late construction date for this feature may explain the differences in construction.

During 1984, R. Christopher Goodwin & Associates, Inc. identified four other features on the property which once was Magnolia Plantation (Table 1). Feature 109 was identified as a plank privy. Features 110, 111, and 112 all were identified as cypress flumes. With the exception of Feature 111, as previously mentioned, no evidence for these features existed in 1987, demonstrating substantial bankline erosion in this portion of the site since the 1984 field season.

CHAPTER VIII

LABORATORY ANALYSES

Introduction

Most of the archeological features excavated at Vacherie during 1987 comprised components of rice agricultural systems, and did not provide large artifact inventories. In fact, domestic remains recovered at Vacherie (e.g., glass and ceramic sherds) consisted of redeposited refuse, eroded and redeposited refuse, or secondarily deposited fill. The privy fill at Feature 122 clearly provides the best archeological context for domestic remains at the site. Nevertheless, analyses of artifacts from 16 SJ 40 can provide useful information on behavior, site chronology, and on site formation and destruction.

This chapter describes ceramic sherds, glass, and nails recovered from 16 SJ 40, using formal analytical procedures. In addition, this chapter examines the archeological chronology of the site and its constituent features; this discussion begins at the upriver boundary of the site, and proceeds downriver, using features, archeological tests, and sections (e.g., Township, Range, and Section) as spatial references. This chapter also reviews the functional classification of the remains; the results of functional analyses, when compared to expectations of former land use, are important to batture archeology from the methodological standpoint. Finally, this chapter briefly examines the issue of economic status.

All artifacts from 16 SJ 40 were washed and sorted, and attribute data were encoded on a computerized site catalog, to allow manipulation of parts or all of the artifact data sets. Category represented the first and primary classification level, based on the format currently employed by the Louisiana Division of Archeology. Group represented the second level, based on South's (1977) functional classificatory method. The third level, Type, symbolizes an attempt to group materials by their comparable diagnostic attributes. The fourth and final level, Subtype, when combined with Category, Group, and Type, provided a unique code at a detailed level of pattern analysis.

As noted above, ceramics, nails, and glass, were assigned formal archeological classifications. For other classes of artifacts, descriptive overviews of the nature of the materials recovered are presented. The identification and classification of ceramic artifacts are emphasized here because of the utility of ceramics in chronological, socioeconomic, behavioral, and even demographic reconstructions. Glass artifacts also served as chronological indicators. Additionally, a crossmend analysis was conducted for one feature.

Ceramics

Based on technological and stylistic variables, a fairly coherent and well-developed classification exists for eighteenth century ceramics. However, similar classification for nineteenth century ceramics lacks clarity; gradual changes in paste and glaze, compounded by the simultaneous use of decorative designs on differing ware types, complicate attempts to delineate a concise ceramic chronology for this period. For the analysis of the Vacherie ceramic subassemblage, a combined date range accounting for all of these variables was employed in the assignment of dates. In this manner, 11 ceramic types with 14 distinct decorative designs were identified and documented. Table 11 lists these adjusted dates.

Tin glazed earthenware was considered in three categories: *faience, delft,* and *majolica. Faience* originated in France; *delft* was manufactured in Holland and England; *majolica* came from Italy, Iberia, and Mexico. Tin glazed earthenware has a soft porous paste, ranging in color from cream to pink. The paste usually ranges in color from yellow to buff to red. The thick and opaque glaze or enamel is produced by adding tin oxide to a lead glaze.

Creamware, a refined earthenware, is identified by its thin cream colored paste and clear glaze with a slight green tint. A fashionable tableware, creamware frequently was undecorated; molded decoration represents the primary technique used in the decorated variety. Applied techniques, while not as popular,

Table 11

CHRONOLOGY OF CERAMIC TYPES AND GLASS ATTRIBUTES AT VACHERIE (16 SJ 40)

Ceramic Ware & Decorative Type	Date Range	Mean Date	Source
Ironstone, Plain White	1813-1900	1856	Wetherbee 1985; Godden 1965
Ironstone, Plain Grey	1813-1900	1856	Wetherbee 1985
Ironstone, Transfer Printed	1813-1900	1856	
English Mocha	1795-1890	1843	South 1977
Pearlware, Plain	1780-1830	1805	South 1977
Pearlware, Hand Painted	1780-1830	1805	South 1977
Pearlware,			
Scalloped, Impressed Straight Lines	1795-1840	1817	Miller 1985*
Unscalloped, Impressed Lines	1825-1840	1933	Miller 1985*; South 1977
Creamware, Plain	1762-1820	1791	South 1977
Creamware, Annular	1790-1820	1805	South 1977; Miller 1985*
Whiteware, Plain	1820-1900	1860	South 1977
Whiteware, Transfer Printed	1820-1860	1840	South 1977; Miller 1985*
Whiteware, Shell Edged			
Scalloped, Impressed Straight lines	1820-1845	1832	Miller 1985*
Unscalloped, Impressed Lines	1820-1891	1856	Miller 1985*
Whiteware, Dipped	1820-1890	1855	South 1977; Miller 1985*
Whiteware/Ironstone	1813-1900	1856	Goodwin, Yakubik et al. 1984
Yelloware			
Plain	1830-1900	1865	Ramsay 1947
Annular/Dipped	1830-1900	1865	Ramsay 1947
Stoneware, Ale Bottle	1850-1900	1870	Ketchum 1971
Late Spongeware	1880-1920	1900	Ray 1974
Glass Attributes			
Machine Made Bottle	1920-Present	1954	Munsey 1970; Jones and Sullivan 1985
Solid Rod Pontil	1800-1850	1825	Munsey 1970
Bare Iron Pontil	1840-1870	1855	Munsey 1970
Amethyst Colored Glass	1850-1920	1885	Jones and Sullivan 1985
Clear Glass	1864-Present	1925	Goodwin and Yakubik 1982

*Personal communication.

also were utilized.

Josiah Wedgwood perfected Creamware ca. 1762; by the 1790s, its popularity secured England's domination of the world ceramic market. Although delftware and white salt-glazed stoneware failed in their attempts to fulfill the Englishman's desire for Chinese porcelains, the creamware alternative succeeded. Creamware's success is attributed to the timely 100 per cent tariff imposed on the importation of porcelain, to astute marketing techniques (Miller 1980), and to its cost, which was substantially lower than that of porcelain. While this ware successfully competed with porcelain, its popularity began to wane in the late 1700s. Wedgewood developed a new ware that could not compete in the market with porcelain but that he hoped would substitute for the preferred ware. This ware, termed pearlware by archeologists and historians, is characterized by its cream-white paste covered with a thin soft blue to blue/green glaze that was thinly potted, especially at the foot rings (Sussman 1977). The bluing was added to imitate the bluish cast given off by Chinese porcelains. This development of an English imitation bone china gradually decreased the desirability of Chinese porcelains. To continue the competition for the porcelain market, potters gradually began to add less bluing to their pearlware glazes until the glaze became almost clear. This clear glazed version generally is referred to as whiteware, although no ware distinction was made by the potters for wares with bluing and those without. Throughout this period, decorations on both wares remained the same.

Introduction of the ware most commonly referred to as ironstone added a new dimension to the refined earthenware progression. Ironstone, first produced around 1813, did not gain widespread acceptance until the 1840s. When this more durable ware became very popular in the Americas, one variety containing bluing--some say in the paste while others say in the glaze--helped revive blue glazed pearlware. This "revival pearlware" had a harder, more brilliant glaze than the earlier version; tinting ranged from deep blue to almost colorless (Sussman 1977).

For more than a century, few notable changes occurred in pastes and glazes of either of these wares. However, changes did occur in decorative designs. These stylistic variations occurred simultaneously on both ironstone and whiteware. Because of the previously mentioned difficulties in ware distinction, documentation of these stylistic attributes serves as an essential analytical tool for dating ironstones, whitewares, and ironstone/whiteware. Stylistic documentation, such as George Miller's chronology on shell edged decorations (personal communication 1985) and Wetherbee's (1985) stylistic documentation of ironstone patterns, provides date ranges based upon decoration. The following decorative types were evident on pearlware, whiteware, and ironstone sherds:

Edged ware

Edged ware, more commonly called "shell edged," was primarily manufactured in blue and green. In use as early as 1775, it was one of the first patterns applied to pearlware. Early examples were intricately molded, presumably to represent naturalistic shell rims. Through time, incised and molded decorations became increasingly simplistic, until the rims became unscalloped. Incisions developed to simply straight lines. Under glaze hand painting applied to enhance molded designs followed a similar progression. In early examples, color application followed the relief of the molding; in later examples, the color was no more than a straight band following the circumference of the rim.

Transfer Printing

Transfer printing was produced by English potters as early as 1750, but it only was applied as over glaze decoration until post-1760. This process started with a design engraved on copper plating. Once the plate was covered with paint, tissue paper was placed over it, transferring the design to the tissue paper, which in turn was transferred to the ceramic object. When the color was dry, the paper was washed off, leaving only the painted design. Transfer printing enabled the potter to produce identical intricate detailed designs on innumerable matching pieces at a cost far below that of similar hand-painted pieces (Miller 1980:4).

Mocha

Dendritic and/or finger-trailed "common cable" decorative designs applied on a dipped background with banded borders occurred from the eighteenth through the nineteenth century.

Flow Blue

Flow Blue is a variation of transfer printing introduced in the early 1820s by Josiah Wedgewood II. Thought by some to have been a mistake of the potters, this decorative design was produced intentionally by placing cobalt transfer printed wares in saggers during the glaze firing, resulting in the flowing of the color outside the lines of the pattern. There are two distinct categories of Flow Blue. 'Old' Flow Blue was used primarily on stoneware; patterns were excessively blurred, often beyond the point of pattern recognition. 'New' Flow Blue was used on ironstones from the late 1800s to early 1900s. Designs were sharper in definition, and often were embellished with overglaze gild. Popularity of cobalt as a primary decorative color was fostered by the 1775 discovery of a cobalt source near Truno, England (Blake 1971:iii). By 1818, most of the 140 Staffordshire potters used cobalt blue as their major decorating color. Prior to that time, the high cost and limited availability of imported cobalt limited its use (Blake 1971:iv).

Yelloware can be distinguished by yellow paste and clear glaze. The process for manufacturing yelloware was introduced to the United States as early as the 1830s; it rapidly became popular to American potters. Generally, yellowares from American sites are regarded as domestically manufactured. Usually unmarked, yelloware vessel forms include items such as large bowls, chamber pots, spittoons, and ginger beer bottles. Decorations can be divided into three basic categories: simple banding or rings in white, yellow, brown, or blue; rockingham type glaze, the most popular of the yelloware decorative designs, characterized by the dark brown to yellow sponged-glaze effect known as tortoise shell; and a third, less popular, variation consisting of designs similar to those evidenced on English mocha. In popular use from the mid 1850s until the turn of the century, yellowares still are produced in limited numbers today. However, modern yelloware generally displays a whiter paste with a yellowed glaze. While treated separately by some authorities, brownware and yelloware differ essentially only in degree of clay refinement and baking temperature, the lighter ware being more highly fired (Ketchum 1971:93).

Porcelain, a highly vitrified ceramic with an alkaline glaze, first was manufactured in Asia and later in England, continental Europe, and the United States. Porcelain clay was used to produce items including fine dinnerware, accessory serving pieces, and ornamental pieces such as figurines.

Table 12 lists ceramic sherds for each provenience at 16 SJ 40 by ware and decorative type. As Table 12 illustrates, almost one third of all ceramics from the site derived from a single plank lined privy, Feature 122. There, whiteware clearly predominated. Whitewares, both plain and with various decorations, were found throughout the project area. Ironstone sherds were recovered from six of the test areas; a large concentration of ironstone sherds was recovered from Feature 122. Examples of yelloware were recovered from Units C and D, and Feature 122. Creamware was found in four test areas; Feature 115 contained the highest concentration of creamware. Pearlwares consisted primarily of undecorated body sherds, but shell edged, mocha, hand painted, and transfer printed decorations were found throughout the project area. Forty pearlware sherds were recovered from nine of the 13 tests that produced historic artifacts. Isolated examples of porcelain, redware, and buff bodied earthenwares were recovered from tests within the project area.

Glass

Since bottle glass constitutes 77.6 per cent of the glass assemblage, a detailed bottle glass chronology was developed for this analysis. Technology for mold produced bottles existed for centuries. However, not until the seventeenth and eighteenth centuries, when hinged metal molds were developed, did

Table 12

CERAMIC WARES AND TYPES AT VACHERIE (16 SJ 40)

Ware/Type	Unit B	Unit C	Unit D	Feature 100A	Feature 100B	Feature 102	Feature 105	Feature 107	Feature 114	Feature 115	Feature 121	Feature 122	Trench E	Totals
Porcelain														
Plain, Soft												1		1
Plain, Hard		1		1								1		3
Total														**4**
Domestic Stoneware														
Brown, Salt-Glazed		1	1											2
Gray, Salt-Glazed												1		1
Gray, Albany Slip			2									1		3
Gray, Alkaline Glaze									1			1		2
Ginger Beer Bottle						1	1	1				2		5
Total														**13**
Ironstone														
Plain, White		1		5	1	7		1		2		16		33
Annular								1						1
Total														**34**
Creamware														
Plain			1							9				10
Annular				1	1									2
Total														**12**
Pearlware														
Plain		4	3	1	1				1			9		19
Underglaze, Polychrome	1													1
Mocha										4				4
Flow Blue, Transfer Printed										4				4
Annular				2										2
Underglaze, Hand Painted			2						2				1	5
Shell Edged														
Scalloped Rim, *Straight Lines*					1					1				2
Unscalloped, Impress Lines		1											2	3
Total														**40**

	Unit B	Unit C	Unit D	Feature 100A	Feature 100B	Feature 102	Feature 105	Feature 107	Feature 114	Feature 115	Feature 121	Feature 122	Trench E	Totals
Redware														
Clear Glaze												1		1
Brown Glaze										1				1
Total														2
Early Refined Earthenware														
Mocha		1	1	2		3	4		3			12	6	32
Total														32
Whiteware														
Plain	2	15	6	18	27	16	1	3	3	28		40		159
Transfer Printed			1	1	1	1	1		2			2		9
Overglaze, Transfer Printed				1										
Dipped		1	1	7	2	1						5		1
Sponge/Spatter												2	2	17
Blue, Hand Painted			1											4
Polychrome		1		2	1	1	1			1				2
Shell Edged											1			8
Scalloped Rim, Curved Lines											1			1
Scalloped Rim, Impressed Bud					1							1		2
Unscalloped, Impressed Lines			1				1							2
Total					1	1			1			3		6
														211
Yellowware														
Plain		1				1								2
Dipped/Annular			1									1		2
Rockingham Glaze		1												1
Molded												1		1
Total														6
Tin Enameled Earthenware														
Rouen Faience										2				2
Faience				1						2				2
Total														5
Buff Bodied Earthenware														
Clear Glaze									1	1				2
Total														2
TOTAL	3	29	21	42	37	31	10	6	14	55	1	101	11	361

mold-blown bottles begin to replace free-blown bottles (Munsey 1970:38). These molds did not gain widespread use until the early 1800s. At that time, the pace of technological advancement increased dramatically in many areas of the glass manufacturing industry.

Development of shoulder and full height molds, new empontilling methods, and improved finishing techniques constitute major areas of advancement. Shoulder height molds lack seam lines just above the curve of the shoulder. The shoulder height multi-piece (1820-1920), and the one-piece dip mold represent main types of shoulder height molds. On full height molds, vertical seams appear from the base to just below the lip. Seams on the lip were obliterated during the finishing process. Principal varieties of this mold type include bottom hinge, 1810-1880 (Munsey 1970:39), with a basal seam running either diagonally or straight across the bottom; multi-part leaf mold, 1850-1920, with 2, 3, or 4 vertical leaf parts and a separate base part; and a 3-part dip mold, 1850-1920, an improved version of the dip mold that allowed variation in bottle shape not possible with the dip mold. Separate basal parts such as cup and post bottom are used as a descriptive term; unfortunately, these mold attributes provide no chronological information, since they appear on both machine-made and hand-molded containers.

Turn-paste and plate molds were used at that time, as well. Turn-paste molds (1870-1920) produced a symmetrical bottle by turning a bottle inside a paste-coated mold. While this method obliterated seam lines, it also prevented the embossment of bottles. Plate molding, 1821-1920 (Jones and Sullivan 1985:49), represents an adaptation of the previously mentioned molds and contained removable or interchangeable plates. Thus, the same main or base mold could be used to manufacture bottles with different embossments.

Four common methods existed for holding bottles during the finishing stage of hand blown glass. All methods held the bottles by the base, allowing the craftsman free access to finish the bottle lip. Two of these methods are characterized as glass-tipped, using either a solid iron bar or blow pipe. Solid iron bar pontils typically leave a solid jagged circular scar when the rod is broken off from the bottle base. Blow pipe scars leave jagged ring scars rather than solid rod scars. While both methods still are employed on art glass, their use on bottles was replaced by bare iron empontilling in the mid-1800s.

Bare iron empontilling employed a flared iron rod which was heated red hot and applied directly to the bottle base surface. When it was removed, a smooth, indented, circular scar remained. This quicker method remained popular until the early 1870s, when it was replaced by the snap-case method as the primary empontilling method. A snap-case empontilling device is defined as "a four-pronged clip attached to an iron rod, a closely fitting case of wrought iron mounted on a long handle from which only the neck of the bottle is allowed to project" (Jones and Sullivan 1985:46). This method provided no evidence of its use and does not aid in dating.

Finish, the formation of bottle lips, represents the last step in bottle production. Lipping tool and flared (or fired lip) methods comprise the two primary methods employed in the mid- to late nineteenth century. A lipping tool is a hand-held clamp and plug device. The plug is placed in the bore of the reheated bottle neck and the two-pronged clamps around its outer edge. The tool is rotated manually, thus shaping the lip. This method characteristically obliterates mold seams on the neck, and leaves horizontal striations in the glass and an excess of puddled glass on the neck at the bottom of the tooled finish.

In the fired or flared lip method, the neck of a full height mold bottle is reheated by placing it in the "glory hole" of the furnace. This reheating melted and smoothed rough edges left by the mold. This process also faded or obliterated seam marks, depending upon the amount of reheating and the distinctiveness of the marks.

Late nineteenth century glass container manufacturing became progressively more mechanized, beginning with the development of semi-automatic machinery (ca. 1880), and culminating with the introduction of a fully automated version (1903). Michael Owens developed the first successful fully mechanized process; by the 1920s, his machines became the number one manufacturing method utilized in North America.

Semi-automatic and fully automatic machines differed primarily in the methods of transferring molten globs from furnace to mold. Semi-automatic machines received the glob manually, while fully automatic machines were fed directly from the furnace, eliminating any manual involvement. Cost and increasing demands, not quality, were the reasons for changing to fully automatic machines. Machine manufactured bottles, while retaining some quality standards, could be produced at a quicker rate and with less labor. With lower production costs passed on to the consumer, machine made bottles quickly became the preferred product.

A majority of glass recovered from the surface collection was determined to be machine made, thereby manufactured in the twentieth century. Subsurface testing, on the other hand, produced examples of bottle glass exhibiting iron pontil scars, hand turned lip finishes, and turn paste and two-piece molds. In fact, with the exception of Unit B, all subsurface tests produced examples of at least one of these diagnostic nineteenth century attributes. Feature 122 contained the highest concentration of iron pontilled bottles; it also contained specimens of turn paste molded and hand turned lip finished bottles.

Nails

Three stages make up the technological chronology of nails: wrought nails, cut nails, and wire-drawn nails. While wrought nails still are manufactured today, they are used primarily for restoration and reproduction purposes. Hand forged wrought nails functioned as the primary construction fastener in the seventeenth and early eighteenth centuries. Their use effectively ended with the introduction of machine-cut nails (Nelson 1963).

Cut nails were introduced in the 1790s. These nails had a machine cut body with a hand made head. Cut nails did not replace wrought nails as primary construction fasteners until around 1815, when technological advancements produced a totally machine made version (Nelson 1963). Corrosion hindered any attempt to classify nails found at 16 SJ 40 as either wrought or cut nails.

Wire-drawn nails first were introduced in the United States about 1850 from Europe. Early wire nails were used primarily for box construction; they were not adapted for building construction until the 1870s. Although cut nails are preferred by some builders today, wire nails virtually replaced them by the turn of the century (Nelson 1963). At Vacherie (16 SJ 40), nails were recovered from Units C and D, and from Features 102, 107, and 122. All identifiable nails were determined to be cut nails. Nail frequencies are discussed in the section of this chapter dealing with functional analyses.

Miscellaneous Artifacts

Artifacts of other material types recovered from 16 SJ 40 included metal objects such as tools, hardware, machinery parts, kitchen utensils, pocket knives, and metal clothing elements such as buttons and belt buckles; organic remains, such as bones, oyster shells, and fruit pits or seeds; and wooden items such as fence planks, revetment matting, and miscellaneous lumber. These items are described within their functional context and within the interpretive sections of this report.

Chronological Analyses

Ceramics, glass sherds, and nails were used in dating archeological features and tests at 16 SJ 40. For ceramics and glass, mean dates were calculated using mean date formulae developed by Stanley South (1977:201-236). While this formula initially was developed for eighteenth century ceramics, this does not preclude its application to nineteenth and twentieth century ceramics and glass (Goodwin, Yakubik et al. 1984). Table 13 illustrates chronological information from ceramic and glass sherds from each feature and test at 16 SJ 40.

Table 13

HISTORIC CERAMIC AND GLASS DATES FOR SUBSURFACE TESTS, INCLUDING PROBATIVE FEATURE CHRONOLOGIES

	MCD[1]	N	MGD[2]	N	Hypothetical Date Range
Section 30					
Feature 122	1851	112	1877	2	1840-1870
Section 28					
Feature 100	1851	60			1835-1875
Feature 114	1834	10			1840-1870
Section 27					
Unit C	1853	23			1820-1880
Unit D	1839	16	1862	3	1820-1890
Feature 102	1854	30	1895	1	1840-1860
Trench E	1841	9			1820-1890
Section 26					
Feature 105	1858	5	1858	2	1845-1870
Feature 107	1858	2	1862	1	1830-1900
Magnolia Plantation					
Feature 115	1843	44	1954	2	1810-1890
Unit B	1842	3	1954	2	1820-1860

1 = Mean Ceramic Date 2 = Mean Glass Date

Although all subsurface tests contained materials with definite datable attributes, only Feature 122, a privy found at the historic location of tenant quarters in Section 30, comprised both sufficient numbers of artifacts and the contextual integrity for statistically reliable dating. While Features 100, 102, and 115 each contained smaller numbers of datable remains (Table 13), their numbers were large enough to provide temporal information. However, these datable remains were located in disturbed contexts. Feature 100 contained mixed refuse. Features 102 and 115 also reflect depositional refuse. Thus, the dates from these contexts apply directly only to the artifacts present; they may or may not reflect the age of the individual features. Nevertheless, dates obtained from all subsurface tests, as illustrated in Table 13, demonstrate remarkable consistency throughout the project area. This indicates that most domestic remains at 16 SJ 40, even those from disturbed contexts, probably represent the refuse of roughly contemporaneous occupations.

The artifacts recovered from controlled surface collections along the bank line were deposited after erosion of the river bank. Therefore, chronological placements of those collections were unpredictable. However, as Table 14 illustrates, ceramic dates from these surface collections also were consistent; they either were slightly earlier than those derived from the subsurface tests, or they fell within the range of variability of the subsurface collections.

The following discussion of test and collection chronologies begins with the downriver end of the project area. Tables 13 and 14 summarize ceramic and glass chronologies. This discussion utilizes *section* as its geographic reference because of its relationship to land tenure history, and because of its utility in historic map interpretation. Datable artifacts recovered from the historic tenant quarters area in Section 30 consisted solely of materials recovered from Feature 122, a privy. The ceramic subassemblage from this feature dated from 1780 to 1900, with the majority of sherds dating from the 1820s to the 1890s. Artifacts found on the surface in this section generally dated ten years earlier than those constituting the fill of Feature 122. The bracketed date range obtained for glass artifacts was 1850-1870. Additionally, cut nails dating from 1815 to 1870 were recovered from 15 of the 18 proveniences within Feature 122. No nails were found in the upper two levels of the area surrounding the feature. Two artifacts from Feature 122 provided direct chronological information. One ironstone sherd with a maker's mark of Edward Clark, Tunstall, England, dates from 1865 to 1877. A glass bottle maker's mark of the Cunningham & Ihmsen Glass Works dates from 1865 to 1879. Also, one stoneware ginger beer bottle was stamped with a partially readable maker's mark Murray A-- But--, Pottery, Portobella (Scotland). This type of bottle was manufactured widely throughout the British Isles during the latter half of the nineteenth century.

Section 28 historically contained a small farm. It is represented by artifacts from Features 114 and 100. Chronological information on Feature 114 was provided by 11 ceramic sherds (Table 13), dating from 1780-1900. Mean ceramic dates for Feature 100 were calculated separately for areas inside and outside the flume retainer tank walls. With the exception of two pearlware and one creamware sherds, this feature also demonstrated a mid- to late nineteenth century date range. As illustrated in Table 14, surface collections in Section 28 reflect mid-nineteenth century occupation.

Another small farm site historically was located in Section 27. Artifacts from Section 27 came from Units C and D, from Feature 102, and from Trench E. All ceramic dates, as illustrated in Table 13, were based on analogy and identification; no maker's marks were found. Dates for Unit C were based on 25 sherds. Seventy-two per cent of these datable wares were either whitewares, ironstones, or yellowares, all with a terminus ante quem of 1900+. Seventeen ceramic sherds from Unit D possessed datable attributes, as did six ceramic sherds from Trench E. A majority of ceramic sherds recovered from Feature 102 dated from the 1820s to the 1890s. The dates for artifacts found on the surface in this section resemble those for artifacts found during subsurface testing. Glass dates also were obtained for Feature 102. Two glass artifacts from Feature 102 provided a combined date range of 1870 to 1900 (Table 15); glass recovered from Unit D was not useful chronologically.

Features 105 and 107 are located in Section 26, the historic location of a small farm. Five ceramic sherds from Feature 105 provided a date range of 1813 to 1900, with a mean ceramic date of 1858. One datable diagnostic bottle glass fragment dated from 1845 to 1870. These date ranges indicate a mid-nineteenth century deposition. Datable remains from Feature 107 consisted of five ceramic sherds. Date

Table 14

HISTORIC CERAMIC AND GLASS DATES FOR SURFACE COLLECTIONS

Provenience	MCD[1]	Count	MGD[2]	Count
Surface Collections				
N 50- 100	1835	34	1954	1
N 100- 150	1836	7		
N 150- 200	1826	39		
N 200- 250	1841	4	1954	1
N 250- 300	1840	35	1946	18
N 300- 350	1842	10	1941	17
N 350- 400	1841	8	1954	36
N 400- 450	1835	16	1954	9
N 450- 500	1832	2	1954	7
N 500- 550	1841	6	1954	4
N 550- 600	1847	25	1954	9
N 600- 650	1841	41	1876	8
N 650- 700	1845	15		
N 700- 750	1852	22	1954	1
N 750- 800	1825	12		
N 800- 850	1839	10	1954	1
N 850- 900	1851	49	1895	1
N 900-1000	1848	35	1941	7
N1000-1050	1845	15	1954	7
N1050-1080	1859	7	1954	1
N1150-1200	1860	1	1954	2
N1200-1275	1845	4	1954	1
Totals		**397**		**131**

1 = Mean Ceramic Date 2 = Mean Glass Date

Table 15

CERAMICS, GLASS, AND METAL WITH MANUFACTURERS' MARKS

Mark	Date	Source	Provenience
Ceramics			
Charles Meakin, Hanley Burslem, England	1833-1889	Godden (1964)	Surface
Edward Clark, Tunstall, England	1865-1877	Wetherbee (1985)	Feature 122
Murray A-But, Pottery, Portobella, Scotland			
Glass			
Anchor Hocking	1938-Pres	Toulouse (1971)	Surface
Maywood Glass Company	1930-1940	Toulouse (1971)	Surface
Maryland Glass	1907-1916	Toulouse (1971)	Surface
ABG Company	1886-1928	Toulouse (1971)	Surface
Duraglas	Post 1954	Toulouse (1971)	Surface
Louisville Glass Works	1870-1900	Toulouse (1971)	Surface
Cunningham & Ihmsen	1865-1879	Toulouse (1971)	Feature 122
Ihmsen Glass Company	1870-1895	Toulouse (1971)	Feature 102
Frederick Hampston Glass Works, England	1880-1900	Toulouse (1971)	Feature 102
Metal			
Artic Company	1880 Patent Date		

ranges for these items, as shown in Table 13, demonstrate deposition from the early nineteenth century to the turn of the twentieth century. Dates for cut nails recovered from both features reinforce this interpretation, but contribute little to narrow it. Collectively, dates from this section suggest a depositional date range of 1810 through the 1870s.

Artifacts recovered from the former Magnolia Plantation property include those found within Feature 115, Feature 121, and Unit B. Nineteen artifacts were found in Unit B, the test unit surrounding Feature 115. Temporal information was derived from ceramic sherds, including one polychrome pearlware sherd (1795-1840) and two plain whiteware sherds (1820-1900); and, from two fragments of machine made bottle glass. These discrepancies in ceramic and glass dates indicate mixed deposition. Date information for Feature 115 was obtained from 44 ceramic sherds. Over 50 per cent of these consisted of whitewares and ironstones, with a terminus ante quem of 1900+. Datable glass was machine made (1920-present).

While ceramic wares from all tests and surface collections appear to span a time period from the early to late nineteenth century, a higher percentage of later wares, such as whitewares and ironstones, is evident. While this percentage does not preclude earlier occupation, it does indicate an increased intensity of occupation during the latter half of the nineteenth century.

Functional Analyses

Materials from the site also were examined in an attempt to establish use patterns and to elucidate the nature of the site. South's (1977) classificatory system was used in this analysis, although his groups were redefined and expanded in order to focus on this assemblage. The functional groups used in this effort were:

Kitchen group artifacts included material remains directly associated with food preparation and service. Elements of this group included ceramic food service and storage vessels; glass food containers, serving vessels, and drinking vessels; metal implements, cooking vessels, and utensils; and, food remains such as bones, cobs, nuts, seeds, pits, and shells, e.g. oyster shells.

Architecture group artifacts were identified as those elements directly associated with building. Not included in this group were those elements used to enhance the building environment. Typical artifacts included brick, mortar, nails, window glass, building hardware, cementing agents, shingles, etc.

Furniture group artifacts consisted of those associated with the enhancement of the building environment. Besides the obvious furniture elements, this group included flower pots, mirror glass, figurines, and other miscellaneous decorative household items.

The *Arms group* was designed to encompass all forms and varieties of weaponry. This included gun and pistol parts, ammunition, knives, swords, bayonets, etc.

The *Clothing group* designated artifacts directly associated with clothing, such as buttons and snaps; accessory clothing items such as belt buckles, shoe hooks, and shoes; and, those items used in the construction and repair of clothing such as needles, pins, scissors, and thimbles.

Personal group artifacts included elements directly associated with an individual or with individual use. Besides coins and keys, this group included items of cosmetic and personal hygiene, such as combs and brushes, and all writing materials. The only exception to this classification was the exclusion of tobacco-related artifacts, which were assigned to a distinct group.

The *Tobacco group* included all tobacco pipes and smoking paraphernalia.

Mortuary group remains consisted of items associated with the various aspects of the interment procedure, such as coffin hardware, grave markers, and grave ornamentation.

Activities group artifacts more aptly could be called the miscellaneous group of this classification system. It was designed to encompass elements with more than one possible function, or those that did not fit into any of the previous functional group classifications. These artifacts include tools, toys, table items, and miscellaneous hardware elements.

Table 16 illustrates the results of functional analysis of remains from 16 SJ 40. Appendix V shows the absolute frequencies of remains by functional group. As Table 16 and Appendix V illustrate, proveniences containing the largest numbers of remains also contained high frequencies of Kitchen and Architectural group materials. In particular, Feature 122, the only clearly domestic feature at 16 SJ 40, clearly represents refuse disposal in an abandoned privy located in the vicinity of the quarters area of Section 30. Functional analysis determined that five functional groups were present at Feature 122, representing 94 per cent of the 1,424 artifacts recovered there. Functional groups included Kitchen (60 per cent); Architecture (37 per cent); Clothing (1 per cent); Personal (<0.1 per cent); and, Activities (2 per cent). The Kitchen group was represented by 170 ceramic sherds, and by 538 fragments of glass. Architecture group specimens consisted of one hundred and one (20 per cent) brick fragments, 152 (31 per cent) cut nails, and 243 window glass sherds (48 per cent). The Personal group consisted of one key. The clothing group included one bone button, four leather shoe parts, and one rubber boot. Activities elements included a machinery part, a length of heavy chain, eight lamp glass fragments, part of a porcelain toy cup, and two lengths of non-electrical wire. This functional classification demonstrates domestic occupation; however, it provides little specific insight into the nature of that occupation. Remnants of worn-out shoes of various sizes, a lost button, and a child's toy exemplify remnants of day to day living in a family setting, and contribute to the conclusion of domestic occupation.

Features 100 and 114 were located in an area known to have contained a small farm site in Section 28. Sixty artifacts were recovered from Feature 114; the functional classes present included Kitchen (43 per cent); Architecture (47 per cent); Personal (3 per cent); and, Activities (7 per cent). Kitchen group artifacts included 13 ceramic sherds, three animal (cow) bones, six oyster shells, and two pieces of bottle glass. Architectural elements included 13 brick fragments, and 10 cut nails. Personal group artifacts consisted of a key and a graphite pencil lead. Activities artifacts included a file, a length of chain, and a machinery part. Although the Kitchen and Architecture group remains probably derive from a domestic setting, they clearly are out of context, having been washed or dumped into the ditch (Feature 114).

Similarly, Feature 100 in Section 28 was an agricultural flume. Artifacts were found both inside the flume retainer walls, and in fill outside of and surrounding the feature. Seventy-eight per cent of the recovered materials fit into six functional groups. Kitchen group artifacts (50 per cent) comprised 43 ceramic sherds; food remains, including seven bones, six peach pits, and nine oyster shells; and bottle and table glass. Architectural elements (34 per cent) included 28 cut nails and 29 brick fragments. The Furniture group (0.8 per cent) consisted of a porcelain figurine fragment and one clock part. There was one Clothing group element, a segment of leather belt; one Personal group element, a badly corroded pocket knife, also was present. Activities group artifacts (11 per cent) consisted of a variety of items representing a number of differing activities. They included a doll part, three lengths of chain, three wagon parts, a tin can fragment, two machinery parts, a dry cell battery, three pad locks, one file, eight lengths of non-electrical wire, one lamp part, and part of a metal candlestick. Mortuary items included three small fragments of a single tombstone. This functional hodgepodge, found in association with the Feature 100 flume, illustrates both multi-component origin and tertiary redeposition. Although domestic refuse was present, so were artifacts denoting a production facility and a cemetery site.

Three archeological tests conducted within Section 27 were analyzed functionally; two of these, Units C and D, comprised 2 x 2 m excavations into the top of the bluff. Seventy-nine per cent of Unit C artifacts were identified as either Kitchen (61 per cent) or Architecture (38 per cent) group elements. Kitchen related artifacts included 28 ceramic sherds and nine bottle glass sherds. The Kitchen group artifacts appear to be domestic in origin. Food remains included fifteen cow bone fragments, one peach pit, and three oyster

Table 16

NUMBER AND FREQUENCY OF ARTIFACT FUNCTIONAL GROUP PERCENTAGES FOR THIRTEEN TESTS AT VACHERIE (16 SJ 40)

Provenience	N	K	A	F	R	C	P	T	Z	X
Feature 100	241	50	34	0.8		1	0.4		11	2
Feature 102	136	84	12	1			0.7		1	
Feature 104	1		100							
Feature 105	31	3	97							
Feature 107	18	61	39							
Feature 114	60	43	47				3		7	
Feature 115	130	58	39					1	1	
Feature 121	6	67	33							
Feature 122	1344	60	37			0.8	<0.1		2	
Unit B	12	100								
Unit C	91	61	38							
Unit D	54	81	18							
Trench E	18	78	22							

KEY

A = Architecture C = Clothing F = Furniture K = Kitchen M = Unidentified N = Number of Artifacts
P = Personal R = Arms T = Tobacco X = Mortuary Z = Activities

shells. The Architecture group included eight cut nails, and 25 brick fragments. The absence of associated features and the presence of levee and road fill in this area suggests that all of these remains were redeposited.

Eighty-seven per cent of the 62 artifacts recovered from Unit D were classified into two functional groups. The Kitchen group (81 per cent) consisted of 21 ceramic sherds, including whitewares, stonewares, pearlwares, yellowares, and creamwares; and, of 20 glass fragments and two unidentified fragments of glass tableware. No food remains were recovered. Architectural elements included three brick fragments and three cut nails. Artifacts recovered from this unit also appear to be domestic in origin and redeposited.

Approximately 88 per cent of Feature 102 artifacts were classified functionally. Four groups were identified: Kitchen (84 per cent); Architecture (12 per cent); Furniture (1 per cent); Personal (0.4 per cent); and, Activities (1 per cent). Kitchen group artifacts included 37 ceramic sherds, including whitewares, pearlwares, ironstone, English mocha, and yellowares; food remains, including three cow bone fragments, 22 oyster shells, and one fruit pit; and 52 glass fragments. Architectural elements included six brick fragments and six cut nails. Furniture elements consisted of two sherds of a porcelain figurine. Activities artifacts included a porcelain doll part and lamp glass. These artifacts represent late nineteenth century domestic refuse. The toys, figurines, and food remains imply a family homesite origin, however, since Feature 102 was an agricultural rice flume, the presence of these remains probably indicates historic refuse deposition not related to or interpretable from the feature.

Finally, 130 functionally identified artifacts were recovered from Feature 115, within the confines of the former Magnolia Plantation property. These represented four functional groups: Kitchen (58 per cent); Architecture (39 per cent); Tobacco (1 per cent); and, Activities (1 per cent). Kitchen group artifacts included ceramic sherds, one of which was a water-worn faience sherd from level 3; eight pieces of bottle glass; and, ten cow bone fragments. The Architecture group consisted of 34 brick fragments. No nails were recovered from Feature 115. The Tobacco group consisted of two ball clay pipe stems. Two undefined non-electrical wire fragments constituted the Activities group elements. Although the function of Feature 115 cannot be determined either from its morphology or from its contents, it may represent the remains of a well or holding tank of some kind.

Sufficient numbers of artifacts were found to permit functional analysis of remains from Features 100, 102, 114, 115, and 122, as well as from Units C and D. However, with the exception of the privy in Section 30 (Feature 122), for which functional analysis indicated a domestic origin, this analytical framework did little to clarify the functions of the features in question. Feature 100 produced artifacts indicative of multiple functions, all clearly redeposited in and around the holding tank associated with rice irrigation. None of these artifacts, except cut nails, have any direct functional relationship with the feature. Similarly, Features 102 and 114 contained domestic refuse out of context in agricultural settings. Excavations at Units C and D provided evidence of diffuse domestic refuse, redeposited away from any discrete feature or functional area. Feature 115, a well (?) or tank, contained domestic refuse that may have washed or been thrown inside, but that clearly should be considered intrusive. Thus, these functional analyses confirm that mid- to late nineteenth century refuse was deposited in discrete loci, e.g., in privies and wells in domestic areas, and that it was deposited across the levee from habitation areas, in piles, dumps, natural holes, ditches, etc. The privy in Feature 122, then, provides the single sealed and undisturbed archeological context with domestic refuse at 16 SJ 40.

Comparative Analyses

The ceramic subassemblage from 16 SJ 40 also was examined on the basis of the socioeconomic classification outlined by George Miller (1980:3). Percentages of four ceramic groups, based on decoration, were calculated for each excavation unit or feature (Table 17). From least expensive to most expensive decoration, Miller's classification system includes (1) plain or undecorated wares, (2) minimal decoration, (3) simple hand painted wares, and (4) transfer printed wares. Since Miller's classification was designed for whole ceramic vessels, any analysis based on sherd counts will show high percentages of plain wares.

Table 17

COMPARATIVE PERCENTAGES OF CERAMIC DECORATIVE DESIGNS BY UNIT AT VACHERIE, (16 SJ 40)
(Ceramic Price Scaling, After Miller 1980)

Classification	Unit C	Unit D	Feature 100	Feature 102	Feature 114	Feature 115	Feature 122
Plain	80.0	55.6	70.5	78.1	33.3	87.5	72.0
Minimal Decoration	15.4	22.2	21.8	15.6	33.3	2.1	25.6
Simple Hand Painted	3.8	16.6	3.8	3.1	16.7	2.1	1.2
Transfer Printed	0.0	5.5	3.8	3.1	16.7	8.3	1.2

Comparisons of ceramic price levels were made between tests and features within 16 SJ 40. Seven tests contained sufficient numbers of ceramic sherds for comparison. The results of this analysis are shown in Table 17. All of the tests included in this comparison provided evidence of low to moderate priced ceramics. Feature 114 ranked higher than any of the other tests; Unit C had the lowest ranking. Because of the lack of directly associated structures and residential features and the disturbed context of the remains, little further information can be gathered from these analyses. It is noteworthy, however, that no relatively high status collections, indicative of a planter's residential occupation, were found at either Magnolia or Crescent Plantations.

Crossmend Analyses

A crossmend analysis was conducted of ceramic sherds recovered from privy fill at Feature 122. Figure 37 illustrates the results of this analysis. Nine crossmends were found. Seven mends reveal that Levels 2 through 6 represent a single depositional event, further indicating that the layer of gray silty clay above the shell concentration did not result from a distinct depositional episode. The remaining two crossmends show that Levels 9 through 13 also represent a homogenous depositional layer. The absence of any crossmends from Levels 7 and 8 indicates three distinct deposits within the shell concentration; however, the stratigraphic record does not verify this suggestion.

Surface Collections

Controlled surface collection of the bank line started at the downriver end of the project area, collection was conducted in 50 m increments. Recently deposited refuse such as styrofoam cups and plastic bottles were ignored. Temporal information from ceramic sherds recovered during this bank line collection was compared with the results of the 1984 survey (Goodwin, Yakubik et al. 1985). The 1984 survey found, in general, that earlier material was located on the downriver end of the site area, while most of the more recent material (ironstone, later utilitarian stoneware, porcelaneous stoneware) came primarily from the upriver end of the site. This pattern was not confirmed by the current collection. Rather, the 1987 collection demonstrated a more consistent date range. These materials produced mean ceramic dates ranging from 1833 to 1860 (Table 13), a difference of only 27 years.

The surface collection also was compared with the subsurface tests in the corresponding section. This comparison produced mixed results. In some sections, surface collection artifacts were dated earlier than those from test excavations. For instance, within Section 30, the surface collection artifacts dated ten years earlier than those from the tenant quarter privy. Artifact dates from the small farm site, Section 28, showed a similar pattern. Dates for the surface collection near the small farm site located in Section 27 fell between the mean ceramic dates for the two test units (Unit C, and Unit D) excavated there. Surface collection in the vicinity of the Magnolia Plantation, however, produced dates comparable to those of subsurface testing in that area. Therefore, despite the difference in recovery techniques, temporal information from surface collections and from test excavations generally fall within an acceptable range of variability.

This indicates that controlled surface collections represent a reliable source of chronological information for buried historic sites on the batture. In fact, at 16 SJ 40 surface collections tend to be earlier than buried refuse, or refuse deposited in discrete loci such as privies. Therefore, surface deposited domestic remains at 16 SJ 40, when intrusive modern glass is removed, appear to represent a single synchronic period. Because of the linearity of historic settlement, bankline erosion and concomitant landward migration tend to affect remains from one period of occupation at a time. In addition, erosive processes at 16 SJ 40 probably deposited remains from the former ground surface along the beach, leaving subsurface refuse disposal areas buried. Surface collections, then, reveal the sparse and somewhat mixed residue of daily life redeposited from the old A horizon, while privy fill, well fill, etc., present a dense, episodic view of the occupation. Along the batture, then, natural and cultural processes may alter the stratigraphy; in some places, however, the segregation of components may be maintained. Thus, both surface collections and subsurface testing are necessary for meaningful interpretation of the site.

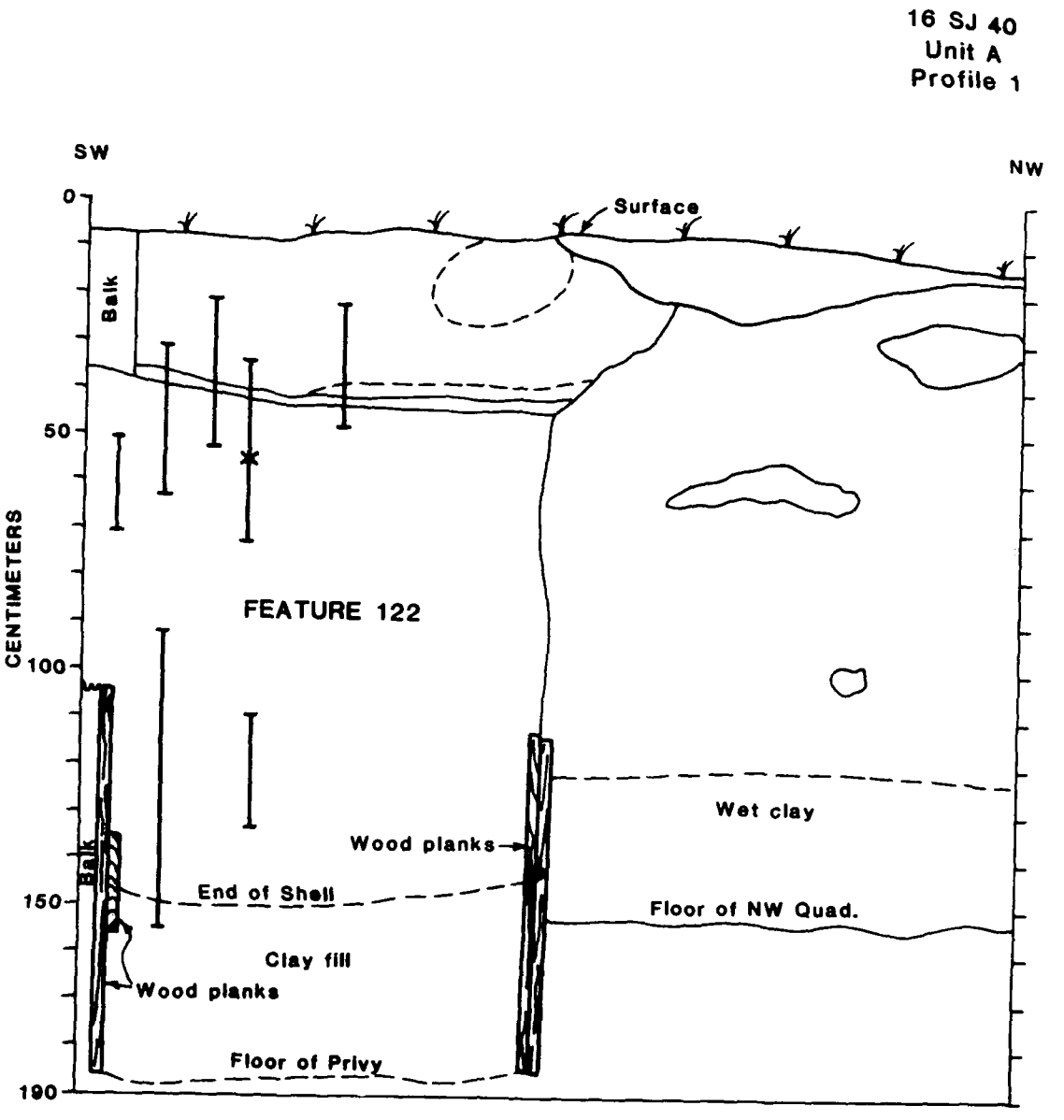


Figure 37. Vertical delineation of crossmends in Feature 122

CHAPTER IX

CONCLUSIONS

Four research issues guided historical and archeological investigations at 16 SJ 40: rice agriculture in St. James Parish; the study of differences between large and small landholdings in the reach; intrasite arrangement of features; and, site formation and degradation. Important data about these research issues were collected during the study. These data are discussed below.

Analyses of archeological and historical data demonstrated that the development of the river rice industry represents the most significant economic theme in the history of the 16 SJ 40 area. This development occurred between 1850 and 1885. During most of this period, sugar cultivation predominated above and below the Vacherie site.

Sixteen historic archeological features were investigated and recorded during 1987 at 16 SJ 40. Cypress flumes constitute the majority of, and the most significant, features found at 16 SJ 40. Cypress flumes functioned as irrigational devices for rice fields. Rice cultivation represents the dominant industry at Vacherie following the Civil War. Table 18 details 16 features, nine of which directly relate to irrigation/drainage functions, fundamental components of the river rice industry between 1850 and 1885. Fifty-six per cent of all identified features derive from rice irrigation. Feature 118 probably represents a cache of wood used for constructing or repairing rice flumes. Two features (12 per cent) are associated with the Vacherie Landing Lumber Yard, which were associated indirectly with the rice industry because rice was the principal product shipped from Vacherie, and lumber fueled the river vessels that transported rice; lumber also was used for rice flume construction. One feature (6 per cent) served a domestic function. The remaining features were unidentifiable; however, half of these (two of four) probably represent disturbed levee fill. Despite the fact that sugar cultivation predominated above and below the site during the postbellum period, archeological features at the site confirm that rice agriculture served as the principal commercial endeavor in the vicinity of 16 SJ 40. Sugar production did prevail at the lower end of 16 SJ 40, within Crescent Plantation; after 1896, Crescent Plantation functioned as the only producer of sugar within 16 SJ 40. As expected, no flumes were discovered in the lower portion of the project area within the limits of Crescent Plantation. Because of the extensive cultivation of rice on that property in the 1870s and 1880s, prior to the invention of a suitable pump, a flume undoubtedly existed at one time. However, resumption of sugar production at Crescent in 1897 probably eliminated the need for such a dangerous breach in the levee. Economic motives for providing additional security to the cane fields prompted legislation in 1890 and 1892. These acts required parish police juries to remove all "flumes, dahls, [and] pipes" (Kerr 1920:183-184) from the levee. The presence today of flumes within the rest of the site pointedly illustrates that the desire to protect the cane fields of Crescent Plantation, rather than compliance with the law, was the overriding concern of property owners.

Magnolia Plantation, located at the upriver end of the site, represents the largest single holding within 16 SJ 40. A total of four rice flumes (Feature 110, N1222; Feature 121, N1266; Feature 112, N1272; and Feature 116, N1017.5) were discovered along the river frontage of Magnolia in 1984 and 1987 (Feature 110, discovered in 1984, had disappeared by 1987; Feature 111 of the 1984 survey was renumbered Feature 121 in 1987). Feature 116 was located at the lower end of Magnolia Plantation; the remaining three were situated near the center of the plantation. The only two flumes (Features 121 and 112) of substantial flow capacity within the entire site were located within this concentration of flumes.

Magnolia Plantation was divided in 1882 and again before the end of the decade. The Haas family owned a portion of Magnolia plantation in 1888; that year, they apparently constructed Feature 116. The division of Magnolia Plantation undoubtedly accounts for the close proximity of these flumes.

The distance between the centrally located flume concentration and the single flume (Feature 116) located downriver is approximately 50 per cent greater than the mean distance between the centrally located flumes, which were utilized by small farmers. This difference in spacing can be attributed to the fact that the downriver flume on Magnolia Plantation was constructed in 1888 to irrigate the lowest portion of the

Table 18

SUMMARY OF ARCHEOLOGICAL FEATURES RECORDED IN 1987 AT VACHERIE (16 SJ 40)[1]

Feature	Description	Section	Artifactual Analysis Date Range	Rice Irrigation Historic Associations	Function
100	Cypress flume with metal conduit and water retainer tank.	28	1835-1875	1850-Post 1885	Irrigation
102	Cypress flume.	27	1840-1860	1850-1890	Irrigation
104	Cypress flume.	27	1850-1890		Irrigation
105	Basin shaped pit with wood refuse.	26	1845-1870	ca. 1857	Lumber Refuse Disposal
106	Wood Refuse	26		1857	Lumber Refuse Disposal
107	Vertical board alignments; remnants of flume (?)	26	1830-1900	1850-1890	Irrigation
113	Granite slab.	71			Unknown
114	Filled trench showing retainer walls.	28	1840-1870	Pre 1870	Irrigation
115	Rectangular wood containment area.	76	1810-1890		Unknown
116	Cypress flume.	76	1870s-1890	1888	Irrigation
117	Wood boards in bank not salvaged.	71			

Feature	Description	Section	Artifactual Analysis Date Range	Rice Irrigation Historic Associations	Function
118	Cypress Wood block and boards.	30	1845-1870s		Construc-tion
119	Cypress wood in clay.	28			
120	Metal culvert.	77		1870-1915	Irrigation or Drainage
121	Parallel rows of vertical boards.	75		1850-1890	Irrigation
122	Privy	30	1840-1870	Pre 1914	Domestic

[1]**Features 101, 103, 108, 109, 110, 111, and 112 were recorded in 1984 (Goodwin, Yakubik et al. 1985); those features were not present in 1987.**

Haas plantation. The greater distance between Feature 116 and Feature 110, both on the Haas property, meant that Feature 116 required a larger flow capacity than those flumes located downriver. The additional capacity enabled it to furnish irrigation water for approximately twice the acreage irrigated by the flumes downriver.

In 1984, five flumes (Feature 100, N452.5; Feature 101/114, N498; Feature 102, N587.5; Feature 104, N7111; Feature 107, N860) were located between Magnolia and Crescent Plantations. Only 37 m separated Features 100 and 101. However, approximately 133 m (± 9 m) divided Features 100 and 102, 102 and 104, and 104 and 107. This pattern closely corresponds with that of land ownership in the area. Feature 107 was located in Section 26, which initially contained river frontage of three arpents, 13 ft, 9 in; Feature 104 was located in Section 77, which initially consisted of river frontage of two arpents; Feature 102 was located in Section 27, which initially encompassed river frontage of two arpents; Feature 114 and Feature 100 were located in Section 28, which initially contained river frontage of three arpents, 4 ft 7 in (Appendix III). Feature 100 possibly provided irrigation water for Section 29. This association of one flume to one section in an area of small landowners indicates that no community flumes existed; instead, each property owner had his own. Tenants who tilled the fields of a single owner used only a single flume.

Based on morphology, each flume probably had a similar flow capacity. The dimensions and spacing of these flumes would indicate the ability of each to provide water to approximately 133 m of river frontage, or between two and three arpents, the typical size of holdings in this area (Appendix III).

The downriver flume (Feature 116) on Magnolia Plantation was larger than Features 100, 101/114, 102, 104 and 107. Although the artifactual analysis (Table 13) indicates that Feature 114 was constructed earlier than the other flumes, it is not possible to seriate these flumes accurately because of refits and repairs completed during their period of use. This is especially true of Feature 100, which had a metal pipe inserted through a pre-existing cypress flume. As detailed in Chapter V, the use of flumes along the Mississippi for rice irrigation began about 1850, and continued until their construction was outlawed in 1890. Therefore all of these flumes presumably were constructed within this forty year period. Earliest rice production in the area probably occurred on the small farms. Although not conclusive, artifacts recovered in the immediate vicinity of the flumes would indicate that flumes located in the center of the 16 SJ 40 site, which consisted of small holdings, are of the earliest construction (Table 13). Feature 102 probably dates from the antebellum period. Either Feature 112 or 121, the two flumes having the greatest flow capacity, undoubtedly was constructed between 1865 and 1868. By 1869, a substantial amount of rice was harvested at Magnolia Plantation; none was produced there prior to the Civil War. By 1895, the Haas family had a pump and siphon on their property. With the development of a suitable pump, the river rice industry no longer depended upon the stage of the Mississippi River (Table 8; COB 53, Folio 502, St. James Parish).

Following the 1890 and 1892 legislation prohibiting the placement of flumes through the levee, mechanized siphons replaced the rice flumes at 16 SJ 40. Subsequent levee construction damaged or destroyed some of the abandoned flumes, while a blanket of overbank deposition helped preserve others. By 1987, riverine cutting destroyed some of the flumes and threatened others.

Rice cultivation represents a singular historic theme for the 16 SJ 40 area during the latter half of the nineteenth century, because sugar cane, the crop extensively cultivated before the Civil War, regained primacy in the area immediately up and downriver by the end of the nineteenth century. At Vacherie, the relationship of each individual owner to at least one flume of his own is especially important. This pattern contradicts the generally accepted view that the decades immediately following the Civil War saw an increase in community labor. It also contradicts the hypothesis advanced previously about the rice flumes at Vacherie (Goodwin, Yakubik et al. 1985). From this perspective, then, the Reconstruction period can be understood better as a process. Furthermore, that process can be characterized as complex and multifaceted, rather than monolithic.

Indeed, recent historical and archeological research in the adjoining river parish region (Shannon et al. 1990), in conjunction with this report, demonstrates the divergent systems of monocrop production, patterns of land ownership, and organization of farm labor that developed after the Civil War. The existing histories of the plantation system notwithstanding, the specific economic and environmental parameters of

these dual agricultural systems appear to demonstrate continuity from the antebellum period through Reconstruction, at least in the river parish region.

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ACKNOWLEDGMENTS

We would like to express our gratitude to institutions and individuals who helped us in the research and production of this report. We would like to thank the Louisiana Department of Culture, Recreation, and Tourism, Division of Archeology, and Dr. Kathleen M. Byrd, State Archeologist, for assistance in obtaining state site files, records, and data. Dr. George Shannon directed and supervised field investigations at 16 SJ 40 during the 1987 season. Field investigators included Dr. George W. Shannon, Jr., Rebecca E. Bruce, E. Jeanne Harris, James M. Wojtala, Percy Harrison, Tim Anderson, John A. Turner, and Carol J. Poplin. Robert Pagart prepared pencil "as built" drawings of the features in the field, and assisted Hobert Creasy and Cyd Goodwin, who prepared maps and figures for this report. William A. Morgan served as senior editor. Production was made possible by Lyn O'Brien. A special thanks goes to George Faucheux and O. L. Haas, who granted us interviews and contributed their knowledge of the history of the project area.

Finally, we express our gratitude to the staffs of the Louisiana Historical Collection at the Howard Tilton Memorial Library at Tulane University, and of the Archives and Manuscripts Division at the Louisiana State University library, for their assistance in providing and locating information on land tenure and the history of the rice industry in Louisiana.

APPENDIX I

DETERMINATION OF NO ADVERSE EFFECT

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

21 DEC 1987

Planning Division
Environmental Analysis Branch

JAN-6 1988

Mr. Robert Fink
Chief, Western Division of Project Review
Advisory Council on Historic Preservation
730 Simms Street, Room 450
Golden, Colorado 80401

Dear Mr. Fink:

In accordance with 36 CFR Part 800.5(d), Protection of Historic Properties, the U.S. Army Corps of Engineers, New Orleans District requests your comment on a finding of no adverse effect to the Vacherie Site (16SJ40). In consultation with the Louisiana State Historic Preservation Officer, this agency has applied the Criteria of Effect in reviewing the impact of a federal undertaking on the Vacherie Site. A copy of the State's letter of concurrence is enclosed. The following describes the conditions of significance, effect and data recovery which we have considered in determining an appropriate action to take prior to construction of a portion of Vacherie Revetment. The site and project reach are located between miles 149.5 and 148.5 on the right descending bank of the Mississippi River in St. James Parish, Louisiana. The location is illustrated on the enclosed map.

The site was located during survey of the Mississippi River bankline by R. Christopher Goodwin and Associates, Inc. in 1984 and reported in a document entitled: Cultural Resources Survey of Five Mississippi River Revetment Items. The study was conducted under contract for the New Orleans District. A literature search was conducted prior to the survey phase. Fieldwork included pedestrian survey of the entire project reach at 20 meters transect intervals, artifact collection, recordation of features, and profiling of a sample of the cutbank to study soil deposition and cultural stratigraphy. The site was identified as significant for its association with events contributing to broad patterns of regional history, an opinion with which the State Historic Preservation Officer concurred by the enclosed letter dated November 13, 1984.

The site, 665 meters long, historically consisted of a series of small landholdings bracketed between Magnolia Plantation at the upstream end of the project reach and Crescent Plantation at the downstream end. With minor variation, this

property division remained stable from the earliest period of settlement in St. James Parish in the mid eighteenth century, through the antebellum period of sugar production, the adoption of rice agriculture during the Reconstruction Period, until the abandonment of the property fronting the river to levee setback in 1917. Eight cypress rice flumes were identified in the river's cutbank, and four plank lined privies were found along the exposed beach. Exposures of sealed cultural deposits (up to 20 cm thick and 80 cm below surface) were located intermittently in the bank profile. Although ceramic sherds dating from the late eighteenth century were found among the secondarily deposited artifacts, no early artifacts were found in situ in the sealed deposits. The majority of artifactual material dated from the mid to late nineteenth century. Artifacts collected from one privy yielded a Mean Ceramic Date of 1846.9 to 1856.76. The contractor identified three, general, archeological and historical research problems to which the site might contribute data. These were settlement history in St. James Parish; the role of the rice industry in the late nineteenth century economy of St. James Parish and the German Coast; and the potential for gaining comparative assemblage information from large landholdings and single family units of the same time period. Of particular interest are the rice flumes, a feature type not previously identified along the Mississippi River in the New Orleans District.

The site is limited largely to its bankline expression. The 1917 levee, built by the State of Louisiana, had to be set back in three segments to its current alignment by the Federal Government between 1929 and 1947. It was during these construction phases that large borrow pits were excavated on the batture, landward of the abandoned 1917 levee. Since that time, the river has eroded the bankline back to the 1917 levee alignment, leaving a very narrow corridor of nineteenth century deposits. The batture is heavily wooded with mature, mixed hardwoods.

The site is in the unfortunate position of sustaining assured impact either from the yearly cycle of the river, from natural erosion, from the actions of others, or from revetment construction by the U.S. Army Corps of Engineers. With each high water event which inundates the batture, the site is masked beneath additional overbank deposits. The bankline, the most sensitive area of the site, is alternately subject to scouring, during periods of high river elevation, and caving, as the soils dry out and slump during low water months. Further localized bankline erosion is caused when barges tie up to trees on the batture and are thrown into the bank face by wave action from the navigation channel. In a July 1987 inspection trip to the site, it was noted that a backhoe trench, approximately two

meters deep, had been cut perpendicular to the bankline and through the site by an unknown party, possibly the Lafourche Basin Levee District, to drain water into the river from one of the borrow pits behind the site. In sum, the site is subjected to continual erosive action, both natural and man-induced.

The Corps of Engineers proposes to construct an articulated concrete mattress revetment across the length of the site. This construction item is part of an on-going channel improvement program designed to halt erosion of the Mississippi River's bankline, to maintain levee stability, and to lessen land loss by maintaining the river's present channel. The property is held in private ownership. This project item is to be constructed in cooperation with the Lafourche Basin Levee District. It is funded under the Flood Control, Mississippi River and Tributaries Project which was authorized by Congress under the Flood Control Act of May 15, 1928 (Public Law 391), as amended. A final environmental impact statement for the project, entitled: Mississippi River and Tributaries, Mississippi River Levees and Channel Improvement, Cairo, Illinois to Venice, Louisiana Reach, was prepared by the U.S. Army Corps of Engineers, Vicksburg District in February 1976.

Site 16SJ40 occupies a gap between two previously constructed segments of the Vacherie Revetment Item. Construction of the revetment cannot be avoided without eventually endangering the stability of the adjacent man-made levee and creating a potential for either levee failure and crevasse, or the need for levee setback. In either case, property loss to individuals and businesses located on the landside of the levee would result.

Revetments have been constructed along the Mississippi River in Louisiana since 1878. The first measures were placed in the New Orleans area to prevent bank caving around wharves. The Vacherie Revetment reach occupies the right descending bankline between river miles 150.3 and 144.3 and is being constructed in stages, as erosion requires action and money is appropriated for the work. The first segment was built in 1971. The portion under consideration here is 1,440 meters long. Its easement completely envelops 16SJ40. Construction requires mechanical clearing of all vegetation from a minimum 100-foot-wide strip parallel to the bankline. The bankline is then graded to a standard slope using bulldozers and a barge-mounted dragline. Depending upon the height of the bank profile, grading may remove as much as 100 lateral feet of the bank edge and 12 vertical feet from the upper bankline. All of 16SJ40 would be removed during grading. A continuous, articulated concrete mattress is then mechanically laid from the low water line to a point several hundred feet into the river channel. Riprap, or

large stone, is piled onto the bankface above the top of the mattress to retard erosion.

The Corps of Engineers has taken the linear nature of the site and the above destructive factors into account in its application of the Criteria of Effect and has concluded that a finding of no adverse effect is appropriate. Although revetment construction will destroy the site, the value of the site lies only in its potential to yield archeological and historical data. Forces beyond the control of the U.S. Army Corps of Engineers are destroying the site, a bit each year, without benefit of data recovery. There is no feasible means of both saving the site in situ and ensuring levee stability at a cost less than that of data recovery.

To ensure preservation of the data for which the site was found significant, we propose recordation and data collection from 16SJ40, and additional historical research related to the site. Four issues have been identified which lend themselves to investigation. These are:

1. The study of nineteenth century rice agriculture in St. James Parish. Archeological examination will focus on the construction and mechanical aspects of the 16SJ40 rice flumes, definition of intersite variability, and analysis of both economic and behavioral status implications. The flumes will be fully recorded by their dimensions, manner of construction and installation, in stratigraphic relationship to other historic features. Oral informants will be sought. Archival research will focus on the economic and trait contexts of St. James Parish rice agriculture in comparison with similar industries in the St. Mary Parish-New Iberia vicinity and in South Carolina. Information will be sought concerning how rice was grown, how field systems were operated, how various irrigation and dewatering systems were installed and operated, the impacts of flume construction on levee stability, and comparison of 16SJ40 features with published, technical information, if any exists.

2. The study of variability between large (monocrop) and small (subsistence agriculture or mercantile) landholdings in the Vacherie reach. This issue will be approached archeologically, archivally, and analytically via artifact variability related to crop and farm size. Examination of economic status and activity (i.e., utilization of food resources) is expected to be revealed through recovery and analysis of remains from the plank privies. Archival research should assist in the determination of whether observed differences represent temporal or socioeconomic variation between large and small landholdings.

3. The study of the intersite arrangement of features. Although the history of impacts to the site is known since 1917, archival research is required to better identify that portion of the site being examined, in its nineteenth century context. This is an archival issue because of the limited areal extent of the site. Additional data regarding intersite arrangement are expected from study of the site's artifact assemblage, artifact density, and spatial variability.

4. The study of site formation and degradation processes. This is an archeological problem, to be approached through examination of microstratigraphy and the study of levee and road building sequences. The problem will be specifically addressed through excavation of deep trenches, clearing of additional profile exposures, and excavation of areal units where cultural deposits are best preserved.

It is our opinion that a data recovery program based upon the problems outlined above will more successfully preserve the historical and scientific value of 16SJ40 than leaving the site in situ and exposed to the types of erosion and gradual destruction outlined above.

We look forward to your comment. Should you have any questions about this project, you are invited to contact Ms. Carroll Kleinhans at (504) 862-2548.

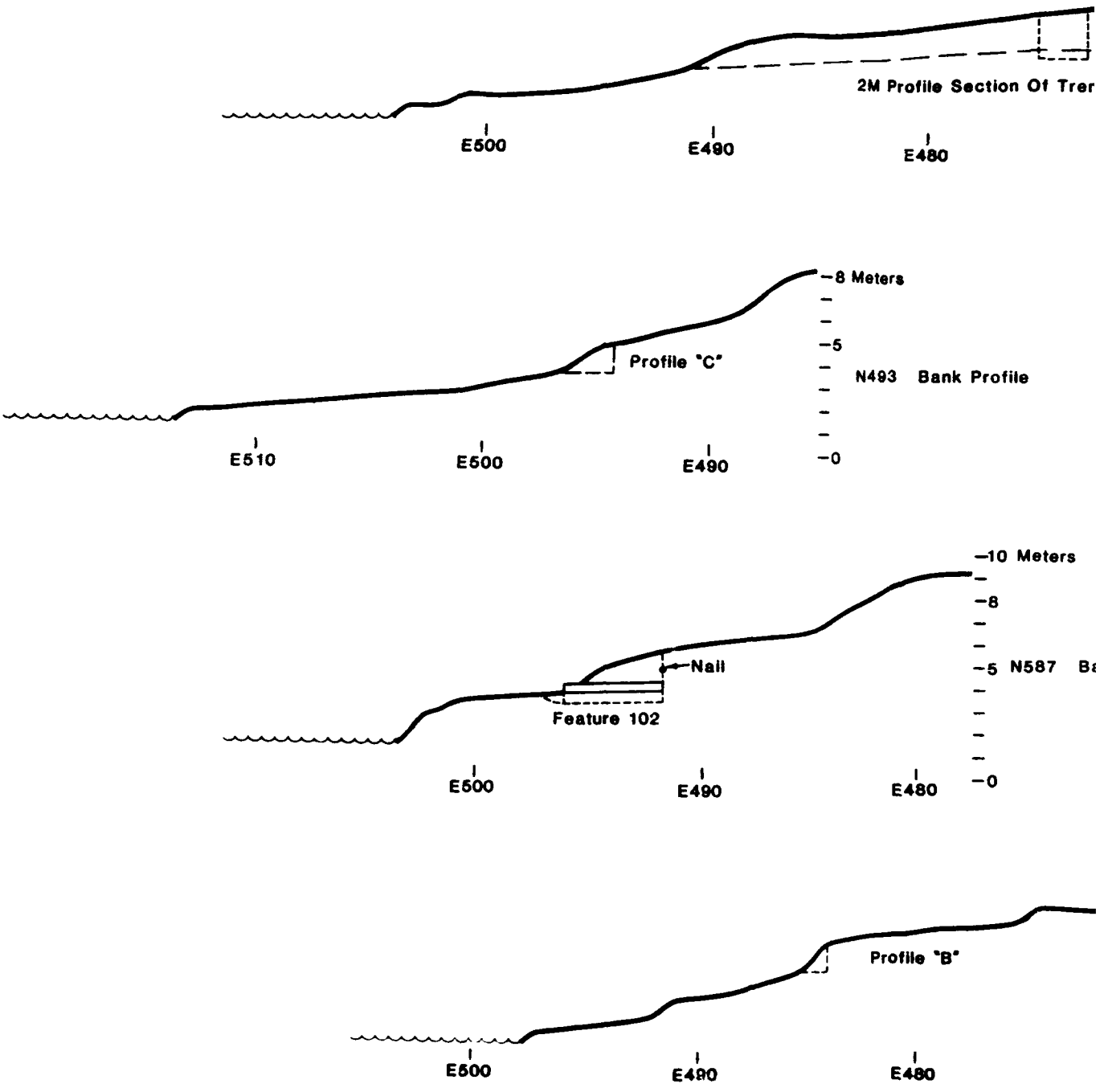
Sincerely,

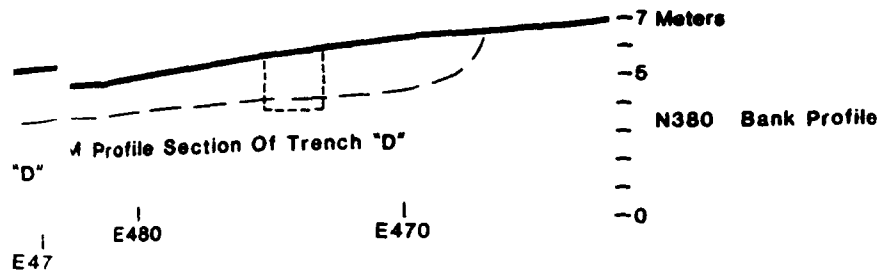
for Cletis R. Wagahoff
Chief, Planning Division

Enclosures

APPENDIX II

BATTURE ELEVATIONS (CROSS-SECTIONS) AT VARIOUS GRID LINES AT 16SJ40

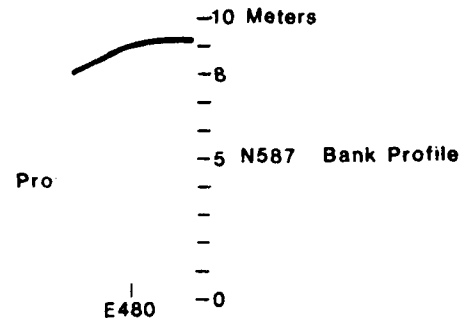

2M Profile Section Of Trer
E500
E490
E480
8 Meters
5
0
Profile "C"
N493 Bank Profile
E510
E500
E490
10 Meters
8
5
0
Nail
Feature 102
N587 Ba
E500
E490
E480
Profile "B"
E500
E490
E480

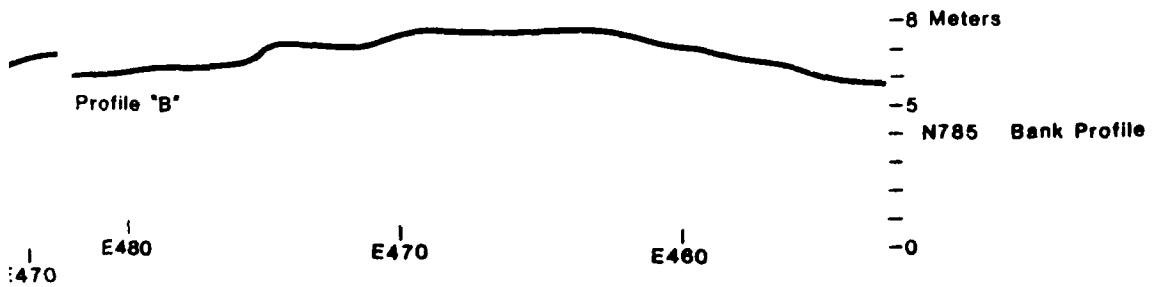


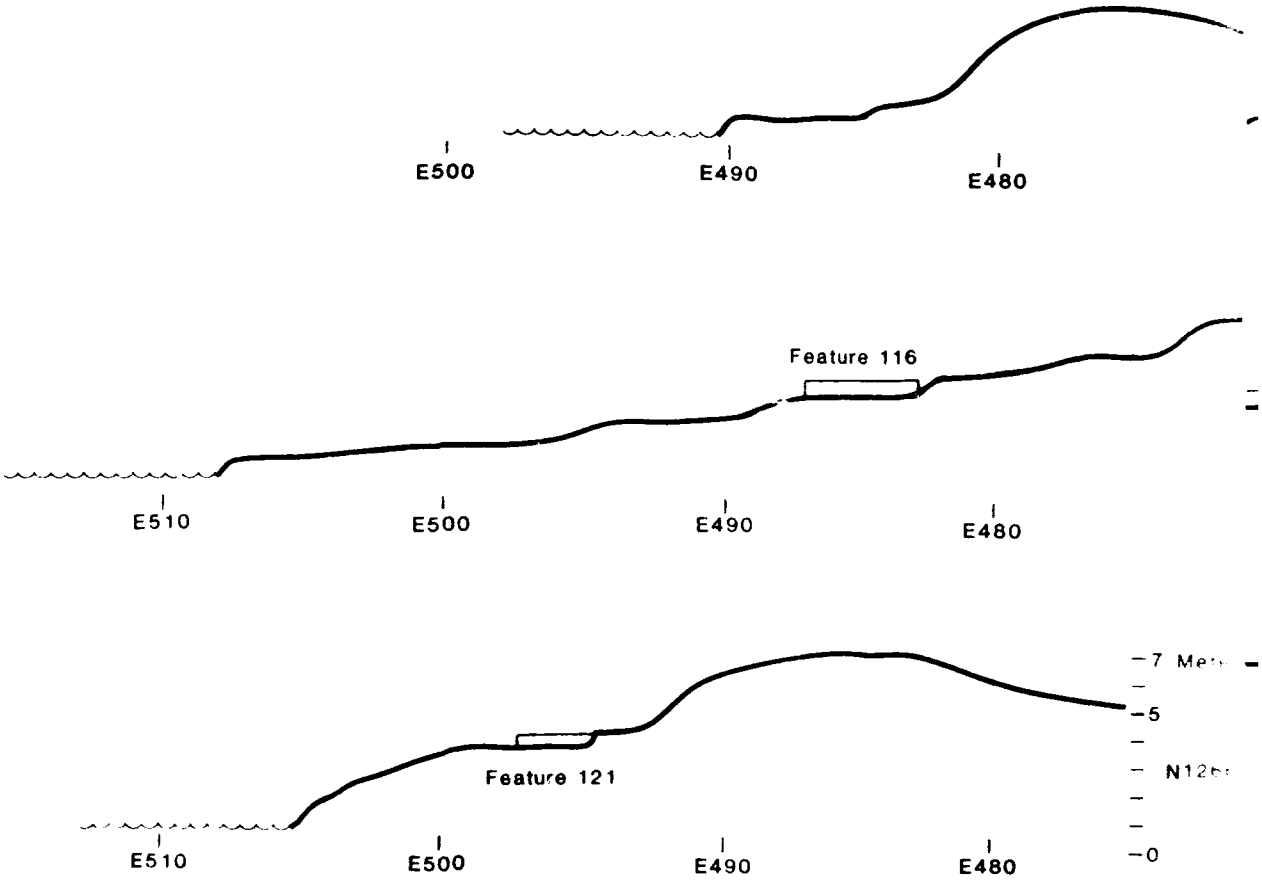
ters

93 Bank Profile

ELEVATIONAL DATA FROM 16 SJ 40, SHOWING TOPOGRAPIC PROFILES FROM TOP OF BANK TO THE WATER'S EDGE

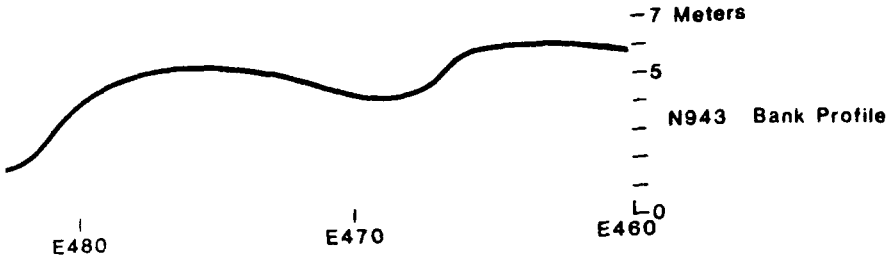


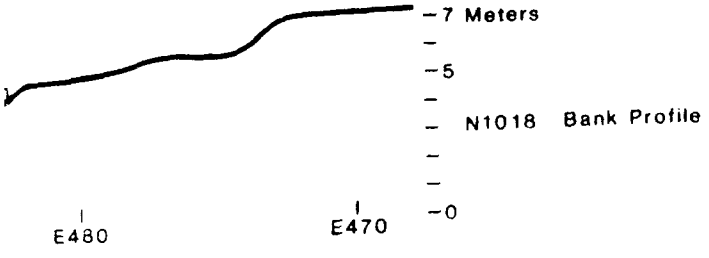


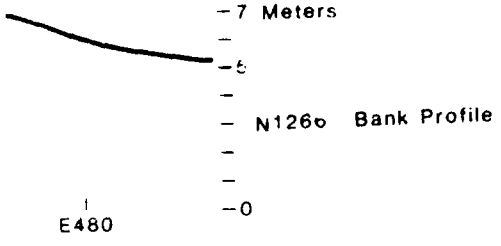


ELEVATIONAL DATA FROM 16 SJ 40.
SHOWING TOPOGRAPIC PROFILES FROM
TOP OF BANK TO THE WATER'S EDGE

0 5 10
Meters

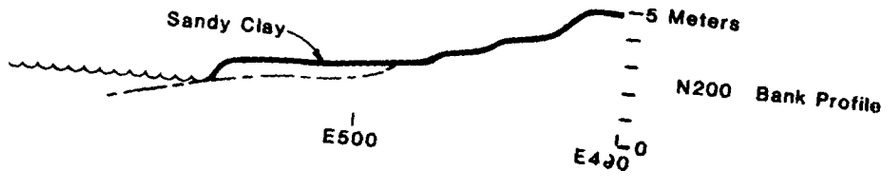


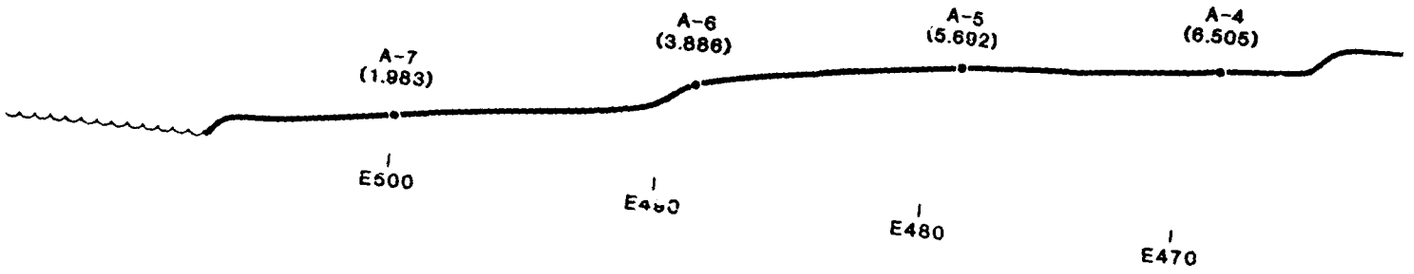


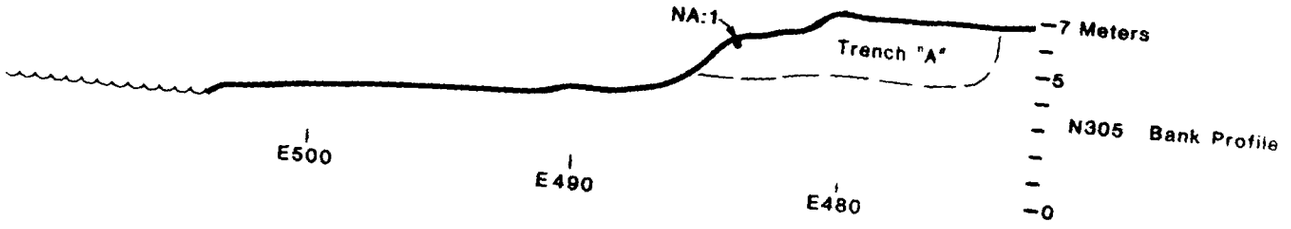


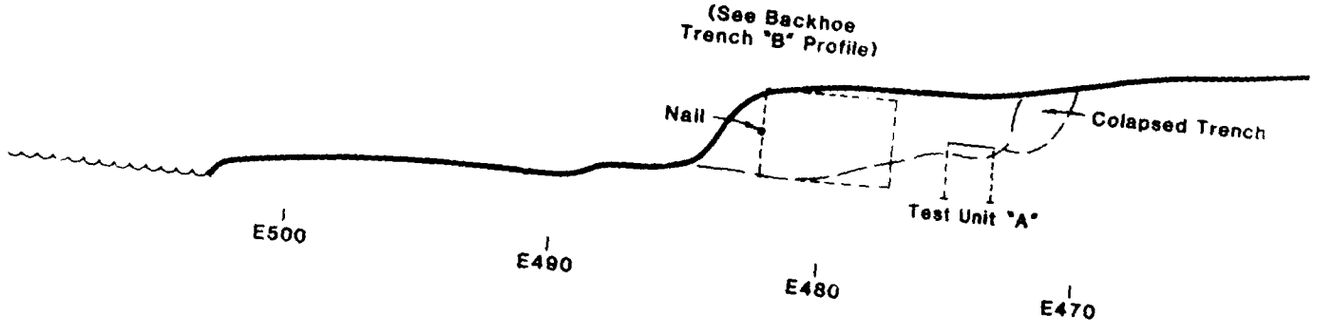
FROM 16 SJ 40.
PROFILES FROM
WATER'S EDGE

10

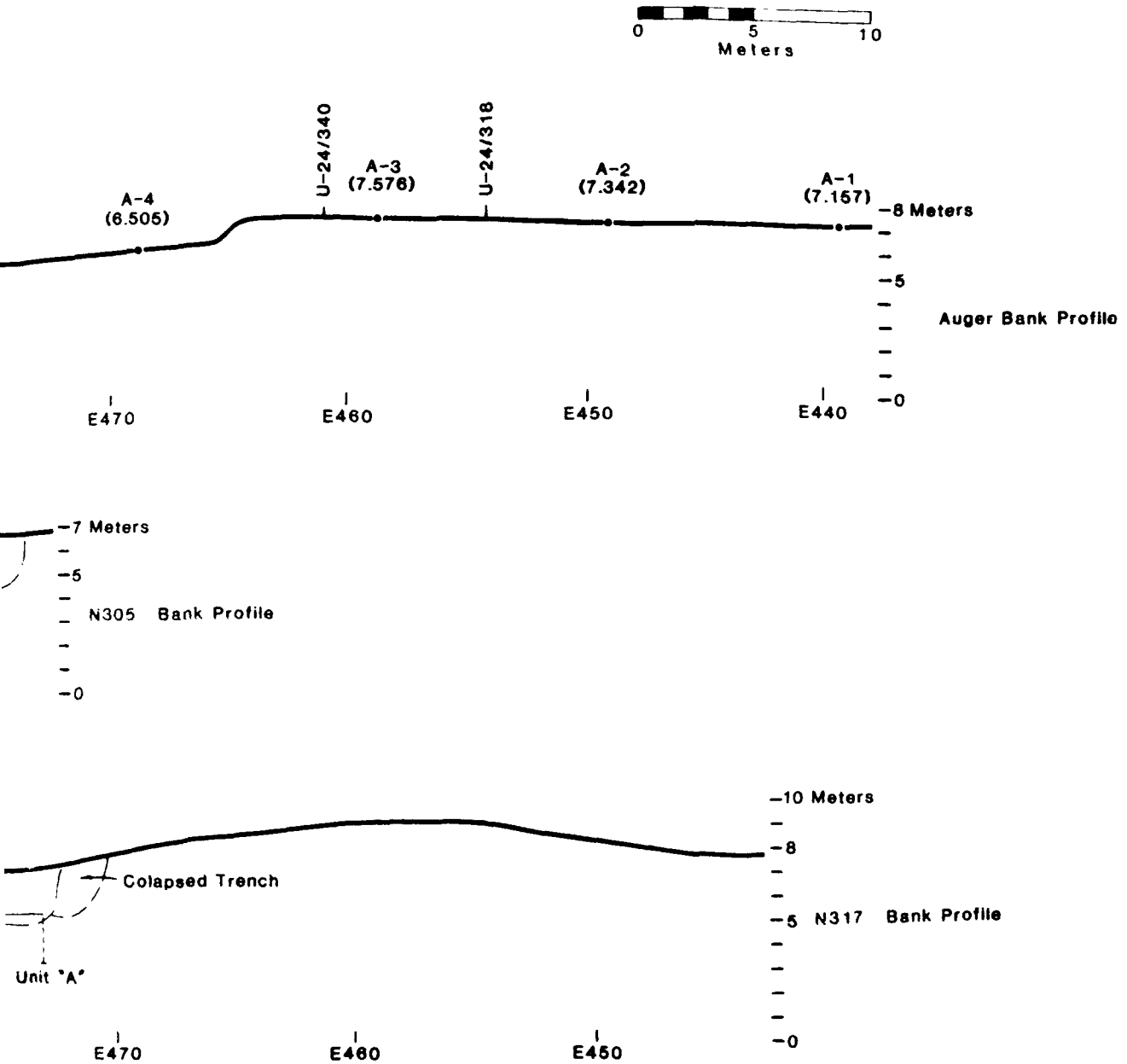

Sandy Clay
5 Meters
N200 Bank Profile
E500
E490
0


A-7
(1.983)
A-6
(3.886)
A-5
(5.692)
A-4
(6.505)
E500
E490
E480
E470


NA:1
Trench "A"
7 Meters
5
N305 Bank Profile
0
E500
E490
E480


(See Backhoe
Trench "B" Profile)
Nail
Colapsed Trench
Test Unit "A"
E500
E490
E480
E470

ELEVATIONAL DATA FROM 16 SJ 40, SHOWING TOPOGRAPIC PROFILES FROM TOP OF BANK TO THE WATER'S EDGE



APPENDIX III

LAND CLAIMS MADE TO THE UNITED STATES GOVERNMENT IN THE STUDY AREA

CLAIMS MADE TO THE UNITED STATES GOVERNMENT FOR LANDS WITHIN THE PROJECT AREA

(Volume and Page Numbers Refer to the *American State Papers: Public Lands* [Lowrie and Franklin 1834; Dickens et al. 1861])

VACHERIE REACH: ST. JAMES PARISH

Section 25: **Township 12S, Range 17E**

Antoine Frederic in conflict with Jacques Roman.

No. 105. Antoine Frederic [See Section 83, below]

No. 252. Jacques Roman claims a track of land, situate on the west side of the river Mississippi, in the county of Acadia, containing four arpents and fourteen toises in front, and forty arpents in depth, and bounded on the upper side by land of George Mouton, and on the lower by land of Mathias Frederic.

This land was surveyed in year 1771, in favor of Jaun Saunier, who obtained a complete grant of the same in the year 1773, from Governor Unzaga; the present claimant holds under said grant by virtue of successive sales. (Confirmed Vol. 2:280).

Section 83: **Township 12S, Range 17E**

No. 105. Antoine Frederic claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing four arpents eighteen feet and four inches in front, and eighty arpents in depth, and bounded on the upper side by land of Louis Mouton, and on the lower by land of Charlotte Frederic.

This is part of a tract of land of fourteen arpents ten toises and four feet in front, said to have been granted to Mathias Frederic, Sen. under whose title the claimant holds, as one of the heirs of his father. The first depth of forty arpents having been inhabited and cultivated for more than ten consecutive years, prior to the 20th December, 1803, the Board confirm; but reject the balance of forty arpents, the second depth. But see No. 308, page 285, respecting second depth (Vol. 2:268). [See Section 71, below]

Section 75: **Township 12S, Range 17E**

No. 106. Noel Gisdar claims a tract of land situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents nine feet and two inches in front, and eighty arpents in depth, and bounded on the upper side by land of Antoine Frederic, and on the lower by land of Francis Frederic.

This is part of a tract of land mentioned in the last No. 105 the claimant holds by right of his wife, one of the heirs of Mathias Frederic, deceased. The first depth of forty arpents having been inhabited and cultivated for more than ten years, prior to the 20th December, 1803, the Board confirm; but reject the balance. See No. 308, page 285, with respect to the second depth here claimed (Vol. 2:268). [See Section 71, below]

Section 76: **Township 12S, Range 17E**

No. 107. Francois Frederic claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing four arpents eighteen feet and four inches in front, and eighty arpents in depth, and bounded on the upper side by land of charlotte Frederic, and on the lower by land of the heirs of Mathias Frederic, deceased.

This is part of a tract of land mentioned in No. 105, the claimant holds as one of the heirs to his deceased father. The first depth of forty arpents having been inhabited and cultivated for more than ten consecutive prior to the 20th December, 1803, the Board confirm; but reject the second depth of forty arpents (Vol. 2:268). [See Section 71, below].

Section 71: **Township 12S, Range 17E**

No. 308. Pierre Frederic, for himself, and for the infant heirs of Mathias Frederic, deceased, and also for Francois Frederic, Antoine Frederic, and Noel Guisclar, as husband of Charlotte Frederic, claims a tract of land situate on the west side of the river Mississippi, in the county of Acadia,containing fourteen arpents, and to the remaining six arpents and thirteen toises front the depth of eighty arpents, and which said tract is bounded on the upper side by land of Louis Mouton, and on the lower by land of Estevan Tupo.

In the year 1755, a tract of land of twenty arpents front, on the usual depth of forty, was granted by Louis de Kerberrec, at that time Governor, to Andre' Neau, which was afterwards transferred to one Delery, who, being unable to support the road and levee, twelve arpents of it were re-annexed by his consent, in writing, to the domain. The remaining eight arpents front, with the depth of forty, (part of the present claim,) passed, by virtue of successive sales, under the aforesaid grant, to Mathias Frederic; six arpents and thirteen toises in front, with the depth of forty, the balance of the tract here claimed, was granted to Juan Mouton by Don Louis de Unzaga, in the year 1773; and, in 1783, Mathias Frederic, who had become proprietor of said land, obtained a regular order of survey from Governor Miro, directing him to be put in possession of the second depth of the aforesaid six arpents and thirteen toises front. The tract now claimed is held under these several grants by the claimants, as heirs of Mathias Frederic, deceased. Confirmed.

N. B This tract of land was divided among the aforesaid claimants, whose several respective claims have been registered and acted upon by the Board; but, in consequence of the title to the second depth of the six arpents and thirteen toises mentioned above not having been recorded by Antoine Frederic, in claim No. 105, and by Noel Guisclar, in claim No. 106, whose shares included the said six arpents and thirteen toises, the second depth was rejected. The titles being here recorded, the second depth to said land is now d\confirmed (Vol. 2:285).

Section 82: **Township 12S, Range 17E**

Nos. 88 (below) and 308 (above). Pierre Frederic in conflict with himself.

Section 26: **Township 12S, Range 17E**

No. 88. Pierre Frederic, for the heirs of Mathias Frederic, claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing three arpents thirteen feet and nine inches in front, and forty arpents in depth, and bounded on the upper side by land of Pierre Frederic, and on the lower by land of Francis Frederic.

This is a part of the land for which there was an order of survey in the year 1756, mentioned in No. 87; and it having been inhabited and cultivated ever since that period, until on and after the 20th December, 1803. Confirmed (Vol. 2:266).

Section 77: **Township 12S, Range 17E**

No. 117. George Autin claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents in front, and forty in depth, and bounded on the upper side by land of George Lequel, and on the lower by land of Etienne Toupe.

It appears that this land was inhabited and cultivated on the 20th December, 1803, and that the same was continually inhabited and cultivated by those under whom the claimant holds for more than ten consecutive years next preceding. Confirmed (Vol. 2:269).

Section 27: **Township 12S, Range 17E**

No. 196. Etienne Toupe claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents in front, and forty in depth, and bounded on the upper side by land of George Antin, and on the lower by land of Madame Trosler.

It appears that the claimant did actually inhabit and cultivate the land now claimed on the 20th December, than ten consecutive years next preceding. Confirmed (Vol. 2:276).

Section 28: **Township 12S, Range 17E**

No. 87. Pierre Frederic claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing three arpents four feet and seven inches in front, and forty arpents in depth and bounded on the upper side by land of the heirs of Mathias Frederic, deceased, and on the lower by land of Christophe Troxler.

This is part of a tract of land of nine arpents and twenty-four toises in front, on the usual depth, for which there appears to have been an order of survey in the year 1756, from the French Government; the land having been inhabited and cultivated ever since the period, until on and after the 20th December, 1803, Confirmed (Vol. 2:266).

Section 29: **Township 12S, Range 17E**

No. 173. Christophe Trosler claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents in front, and forty in depth, and bounded on the upper side by land of Pierre Mathias, and on the lower by land of Gabriel Rodrigues.

It appears that the land now claimed was inhabited and cultivated on the 20th of December, 1803, and that the same was continually inhabited and cultivated by those under whom the claimant holds for more than ten consecutive years next preceding. Confirmed (Vol. 2:274).

Section 30: **Township 12S, Range 17E**

No. 197. Gabriel Rodrigues claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents in front, and forty in depth, and bounded on the upper side by land of Jean Rom, and on the lower by land of Christophe Trosler.

It appears that the claimant did actually inhabit and cultivate the land now claimed on the 20th December, 1803, and that the same was continually inhabited and cultivated by him, or those under whom he claims, for more than ten consecutive years next preceding. Confirmed (Vol. 2:276).

Section 31: **Township 12S, Range 17E**

No. 18. Jean Rom claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing three arpents and twenty-four toises in front, and forty arpents in depth, and bounded on the upper side by land of Gabriel Rodrigue, and on the lower by land of Baptiste Luquel.

It appears that the claimant did actually inhabit and cultivate the land now claimed on the 20th December, 1803, and that the same was continually inhabited and cultivated

for more than ten consecutive years next preceding. Confirmed (Vol. 2:260).

Section 32: **Township 12S, Range 17E**

No. 29. Baptiste Luguet claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two and a half arpents in front, and forty arpents in depth, and bounded on the upper side by land of Jean Rhom, and on the lower by land of Evariste Hautin.

It appears that the land now claimed was inhabited and cultivated on the 20th December, 1803; and that the same was continually inhabited and cultivated by the claimant, or those under whom he claims, for more than ten consecutive years next preceding. Confirmed (Vol. 2:262).

Section 33: **Township 12S, Range 17E**

No. 241. Louis Falgout claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing two arpents and twenty-six toises in front, and forty arpents in depth, and bounded on the upper side by land of Jean Baptiste Chenier, and on the lower by land of Pierre Olivier.

It appears that the land now claimed was inhabited and cultivated on the 20th December, 1803, and that the same was continually inhabited and cultivated by those under whom the claimant holds, for more than ten consecutive years next preceding. Confirmed (Vol. 2:279).

Section 34: **Township 12S, Range 17E**

No. 347. Pierre Olivier claims a tract of land, situate on the west side of the river Mississippi, in the county of Acadia, containing five arpents in front, and forty in depth, and bounded on the upper side by land of William Billon, and on the lower by land of Louis Talgout.

It appears that the land now claimed was inhabited and cultivated on the 20th December, 1803, and that the same was continually inhabited and cultivated by the claimant, or those under whom he claims, for more than ten consecutive years next preceding. Confirmed (Vol. 2:289).

APPENDIX IV

INTERVIEW WITH GEORGE FAUCHEUX

APPENDIX IV

EDITED TRANSCRIPT OF AN INTERVIEW WITH GEORGE FAUCHEUX, A FORMER RICE FARMER AND A NATIVE OF THE PROJECT AREA, AT VACHERIE, LOUISIANA ON SEPTEMBER 24, 1987

Present: George W. Shannon, Jr., Ph.D., Supervisory Archeologist, R. Christopher Goodwin & Associates, Inc.

E. Jeanne Harris, Lab Supervisor, R. Christopher Goodwin & Associates, Inc.

George Faucheux

Transcription from 73 to 165

Shannon: Does this make any sense to you for some kind of pump here and this is like a wooden holding tank for water and then...

Faucheux: In other words, right here the water would come out, some of it would back-up and you would lose half of your water and you would block that up right here where the water wouldn't back-up--it would go forward after that.

Shannon: Well how big would this holding tank have been? Would it have stopped right there where that little wall is or would it have gone back further?

Faucheux: It could have gone back further.

Shannon: A whole lot further?

Faucheux: Oh yeah.

Shannon: Because all that bank line wasn't there then.

Faucheux: That was there later.

Shannon: Could you kind of describe what type of pump might have been here? Was it like a big boiler or was it...

Faucheux: It was like a boiler. You ever seen them old farm tractors?

Shannon: Yeah.

Faucheux: Well they had a wheel on the side and they used to put a belt on it and the belt used to turn that pump. Like that used to do right now you ever seen the crawfish pond what they put in the crawfish pond and everything.

Shannon: Yeah.

Faucheux: Well, it's almost the same kind of pump like that. Pump the water out and throw it over the hill.

Shannon: So they had a pipe that went straight up here and over in that direction?

Faucheux: And over that direction like this. Must have put in on the hill there. In other words, when the pump would shoot the water out it would just gradually float out, and fill up the pond.

Shannon: Then did you have some kind of gate on this pond, or did you dig ditches or did you have some kind of siphon leading from the pond to the ditch?

Faucheux: The siphon used to be from the pond, over the levee, and into the ditch.

Shannon: When you were out here doing your rice agriculture, was that big levee out there then...

Faucheux: Yeah.

Shannon: So it went all the way over in that direction?

Faucheux: The only time that I could remember them moving it, they made a new levee from the starting of that building, kind of little curve right over there down to that big curve over there. That was in 1947. But the date is still on the culvert on the road. That's when they made the culvert that year that might have been in 1946, 45 when they built that levee. It was just a section it wasn't that long. We had to re-do all our work back here again, to get that water over that levee.

Shannon: I see. I suppose that was pretty hard work. Rice farming is hard, isn't it? You have to get out there with a tractor and plow that under?

Faucheux: Plow used to leave the weed. One year you would make it in one place next year you would make it in the other place.

Shannon: Had to rotate it.

Faucheux: Rotate it.

Shannon: How did you harvest the rice? Did you get out there with some kind of combine?

Faucheux: Well, lately we had a combine. A long time ago, we used to cut it by hand and just wrap it up with rope and then later on pick it up and bring it to the combine, a thrasher. They used to call that a thrasher. You just used to feed it.

Shannon: So is there any way of telling how big of an area that you had opened up. A couple hundred acres?

Faucheux: Close to 4 to 500 hundred acres and we had to combine then.

Shannon: We were trying to figure how they actually laid this in here and we picked up the edge of the original ditch, that bluish color clay is the filling and the lighter yellow stuff is the actual bank. So, apparently they dug a ditch and had to lay all of this in.

Faucheux: That trough, I believe that trough was something like a culvert underneath the old highway.

Shannon: O.K., you don't think that's a flume.

Faucheux: No. They never made them like that.

Shannon: I see.

Faucheux: That could be a ya know an old time culvert underneath the highway. Because they have the bottom and the top on it.

Shannon: Yeah. That's right. The flumes that you used didn't have a top. They were just a trough.

Faucheux: Just a trough.

Shannon: That's interesting. I hadn't thought about that. This is all cypress board isn't it?

Faucheux: Yeah. That's the only thing that they had at that time. They don't know nothing about no pine or anything like that. It was cypress.

Shannon: They used some big boards. I really appreciate your information.

Faucheux: O.K., thank you. How are you gonna find that pump you said you was gonna look for?

Shannon: Oh, you want to go down here and show me where you think it is? That would be good.

Faucheux: I'll take a walk with you.

Transcription from 305 to 416

Faucheux: Now you see right here. One of the trees got that all blocked up and everything. You know the canal I was talking to you about we dug, it goes all the way through here to that other little pond over there.

Shannon: You dug that yourself? Did you have heavy machinery to do that?

Faucheux: We had a drag line. We rented a drag line to do that. And we used to pump the water through my pond here. We had a siphon right here.

Shannon: Right where that tree's at?

Faucheux: A little further closer to the levee. We used to suck the water from here. Run the pipe on an angle like that right there, let it sit on the levee. Go straight across and then go down. You still have the old ditch there on the other side of the levee and all the water in the back. And further over there you can see on the levee, you gonna see a little canal coming close to the levee we had another pipe there. It used to sit up in there. We used to pump the water on the other side. It would suck the water out, don't you see. We plug the water, in other words, and we would pump. It would gradually just suck itself out after that.

Shannon: I see, you wouldn't have to have a pump then.

Faucheux: No. No pump. The only thing that we had to do was just prime it ya know and when they get all the suction toward the levee open up the gate and let it go.

Shannon: How did you prime it? Did you have a pump for that?

Faucheux: You had a pump. You know them old time pumps that used to use for a well. Well you had two of them, like uh, let's see, what you call that again, a tank. You had two of them in there, you had a wheel and a tractor used to turn it by a belt and just pump and put the water in it and the water will go across.

Shannon: If you wanted to cut that suction off, what did you have to do or did you ever want it to stop? Did you ever get to a point where you had to much water or anything?

Faucheux: Well when we had enough water the only thing we had to do it was just open that valve on the top of it. You would open the valve.

Shannon: This area here that you've dredged out went into a pond back in here.

Faucheux: Right over here. That's a pond right there.

Shannon: And right over in here you had a siphon.

Faucheux: We had another siphon going to the levee.

Shannon: It went over the levee?

Faucheux: Gone over the levee.

Shannon: And down to a ditch.

Faucheux: Down to a ditch.

Shannon: So your fields are right back in here, then.

Faucheux: The pump would be somewheres but just like I said it was a good while and everything the river took it all. There's no more... you see that's another piece of pipe we used to use right here. You see that old gravel road there with the tar mixed in.

Shannon: Did you work just with your family or did you hire people on to work with you?

Faucheux: Well we used to have about three or four people working for us and then you know in other words it was a family proposition we just hired a couple of the negroes to work for us. You couldn't do everything by yourself.

Shannon: No, it's a lot of work.

Faucheux: And that's another one (Feature 116) like (Feature 100) one y'all found over there.

Shannon: Yeah, it looks just like it to me. It didn't have the pipe in front of it.

Faucheux: No. This here could have been in the old time you just set the pump up right there and just threw the water right up in it.

Shannon: And then you could run it further back toward the levee or... so they would have had some other kind of pipe off of this to take the water.

Faucheux: In other words, they used to use that pipe in the river to throw the water in that trough and the water would go into a pond.

Shannon: Oh, I see. Cause a lot of that land up there wasn't there then.

Faucheux: No, that was build up and everything that was the old levee right here and when the COE would make a new levee they would keep half of the old levee to make the new levee with they would not have enough land to make that levee that big.

Faucheux: And we had that pump. That pump was sitting somewheres around here but you know you don't see anything exactly that would give you a good location where it is because all that done caved in and everything.

Shannon: Yeah, and changes are rapid.

Faucheux: That's right. That pump should have been somewheres around here. And we used to come there with a tractor or a bulldozer come right here to level off a section on this river bank and set our pump shove our pipe into the river and then just crank it off and let the water go to the pond and when the pond will fill up enough we start that siphon over there.

Shannon: In the spring time when the river came up real high did you try to get your pump out or did you just let it sit there?

Faucheux: Yeah, we had to get the pump out. You left the pipe there. We didn't mess around with the pipe. Just leave the pipe there.

Shannon: Was it there when you came back the next year.

Faucheux: Yeah, it was still there. Now the last time, I don't believe it was. You know that's where that bunk house was around here that they landed right here.

Shannon: That's a bunk house.

Faucheux: Yeah, in other words, that boarding house.

Shannon: Oh, really.

Faucheux: All them people that used to work on that. They used to board right here.

Shannon: I didn't know that. Well, how long ago was that? Was that back in the 50s?

Faucheux: No, no. That was about two, three years ago when they came here and put that mat down.

Shannon: Put up a little place for an office I guess.

Faucheux: You have to come all the way this way?

Shannon: Yeah, in fact we go down there a hundred yards down there.

Faucheux: It's gone--it must have slipped into the river. You had two sections of cast iron pipe about 20" right into the woods.

Shannon: Where about did it come off the bank?

Faucheux: The bank is all eaten up. It was about like this.

Shannon: What was that for, do you know, the pipe?

Faucheux: Well that would be a culvert for the highway. Now what you want to do, walk back of the levee or walk on the levee?

Shannon: Why don't we walk back on the levee.

Faucheux: Is that too muddy?

Shannon: Yeah.

Faucheux: That lumber yard came and threw concrete down here (at Haas Landing).

Shannon: So this isn't a road or anything?

Faucheux: No. That's not no road or anything like that.

Shannon: I was thinking this was a road.

Faucheux: That lumber yard back here used to come and when there was too much concrete they would come and throw it back of the levee.

Shannon: Actually that makes a lot of sense, because it's not very even or anything. It wouldn't make a very good road. They bring the shell in too?

Faucheux: Sometimes the Levee Board used to bring some shells down here and the parish used to get them too.

Shannon: Yeah, I guess they'd come in here and borrow it.

Faucheux: And the Highway Department would and you see how much that caved. They'd be street laborers.

Shannon: Yeah, in fact, we were, our company was out three or four years ago in the same spot doing some work and at that time the bank was even further out and it's come back a lot.

Faucheux: That used to be my road there.

Transcription from 433 to 452

Faucheux: Gravois used to run that lumber yard. Now you see where them green trees was. All of that used be a farm. They used to pump water and the water used to get up about three or four foot against the levee. That was the levee that prevented it from going anywheres else. Your eyesight is good?

Shannon: Pretty good. Yeah. I hope so. Used to be. Got a lot of sweat in my eye right now I'm not so sure.

Faucheux: Well clean them out now.

Shannon: O.K.

Faucheux: Can you spot that date on that culvert over there?

Shannon: Well, maybe it's not that good.

Faucheux: Look out, they might have a snake in there.

Shannon: 1947? You remember them putting that in?

Faucheux: Yep. When the road was all made and everything the culvert was down but you see that little scenic drive that's when they made them cement slabs in 1947.

Shannon: Just like they used that culvert to drain that road, they would have used those wooden culverts on the bank to drain those old roads.

Faucheux: Drain the water along the levee or along the highway.

Transcription from 465 to 504

Faucheux: Now they build a subdivision out here. But you see just on that telephone line that used to be the ditch.

Shannon: I see, so all of that was your rice field.

Faucheux: That's right. All that all the way to the pond from there to where you see that picket fence is from there to all the way to you see where that hall is over there that rusty building over there. That was nothing but rice.

Shannon: Your rice went all the way back to where the tree-line is back there.

Faucheux: Way back. All the way to the back.

Shannon: That must have been a lot of rice.

Faucheux: We used to take our pipe and run it across the levee. Run it down you see where that siphon is there pass it through that culvert and you see the ditch it go straight up in the back.

Shannon: How about that. So you actually utilized that culvert. You put it right through there.

Faucheux: Right through the culvert. We didn't want to bust up the highway and everything. So, we got the permission to pass it through the culvert from the Highway Department.

Shannon: Did you have to raise your pipe above the levee so people could get up and down the levee.

Faucheux: We used to put it laying down flat on the levee and then we would get some dirt and put it over.

Shannon: Oh, I see. Yeah. You have no idea how much you're helping us right now, I'll tell you.

Faucheux: That used to be another one right here.

Shannon: A culvert coming across.

Faucheux: Coming across the road and going in there was a ditch right here on the corner here just like you see the telephone post and that picket fence.

Shannon: O.K., now here you didn't need a pump, you just used a siphon?

Faucheux: Just used a siphon. Get the water from the canal over there.

Shannon: And that water, the water, would you like flood the entire field. Or would it just go down the ditch and get the field wet.

Faucheux: We used to have a lot of dams you know made out of wood, if wanted so much water for this ditch, we would just raise one board up and the water would fill up 'til it flooded and then we used to dam the water and then the water would stay in there. You had to leave at least plenty water for rice.

Shannon: Yeah, it takes a lot doesn't it? Did you ever have a bad year when you couldn't get the flumes to work and didn't have enough water?

Faucheux: No, that's one thing we didn't have no problem with. The only thing we had problem with from time to time would be like when you get a heavy rainstorm it used to knock all the rice down.

Shannon: What time of year did you plant your rice? Was that a summertime crop?

Faucheux: Yeah, it was a summertime crop.

Shannon: But you haven't grown rice in this area since about 1950 or 60 or so.

Faucheux: Around 1960 that would be.

Transcription 511 to 542

Faucheux: And after that, the government kept on cutting the quota and keep giving more quotas to Northern Louisiana you see. And shoot you couldn't make no damn money with this what they only give you about 150 acres, you can't make nothing off a 150 acres that's one rice field. So, we just quit and we sold the quota to the farmers in North Louisiana.

Shannon: So, I don't know much about farming but you're saying that government would tell you each year how much you could produce?

Faucheux: Yeah, they would fine. They would put a quota on you. You could plant like this here they would tell you the most you could have is 300 acres. That's all you could have planted. You better have 300 acres and not a 1/2 acre more. You used to get hell with the federal man. He would come down here and check on that area every now and then. If you were strict on everything else or you would going to stick on something you're all right.

Shannon: So what do most folks do that gave up rice farming...just retire?

Faucheux: We try raising cattle. We lost our behind. Went by about 1000 head of cattle. The man he never told him the cow was pregnant so we took the cow and haul him down here in a truck and every thing in a 18 wheeler and all that. And the cow and all that bucking em up all over it give it two or three months and we lucky we didn't lose every damn cow we had.

Shannon: That's too bad.

Faucheux: Because it was killing the calf and everything, we lost our butt on that too. And, then after that we tried a little bit of sugar cane and we give that up too.

APPENDIX V

ARTIFACT FUNCTIONAL GROUP FREQUENCIES BY PROVENIENCE, SITE 16SJ40

APPENDIX V

ARTIFACT FUNCTIONAL GROUP FREQUENCIES BY PROVENIENCE, 16 SJ 40 SITE

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
General	43	3								46
Controlled										
N 50- 100	60	4	1					1		66
N 100- 150	11	3								14
N 150- 200	99	4						2		105
N 200- 250	8									8
N 250- 300	163	44						1		208
N 300- 350	120	7						1		128
N 350- 400	142	11				1				154
N 400- 450	107	6	1	1				2		117
N 450- 500	22	3						3		28
N 500- 550	25	3								28
N 550- 600	67	6	1					4		78
N 600- 650	89	3						2		94
N 650- 700	32									32
N 700- 750	44	1						1		46
N 750- 800	22	2			1			2		27
N 800- 850	30	12						8		50
N 850- 900	110	3						1		114
N 900-1000	79	2						3		84
N 1000-1050	37	1						2		40
N 1050-1080	11	1						2		14
N 1080-1150	3	3						1		7
N 1150-1200	9	6			1			2		18
N 1200-1275	7							2		9

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Feature 100A										
General	38	18			1			6	3	66
Piece Plot		1								
Level 4	10	4						1		2
Level 5	4	7						1		15
Level 6			1							11
Level 7	5	2								1
Level 8	2	3								7
Level 9	2	3								5
Level 10	5							4		9
										5
Total	**66**	**38**	**1**		**1**			**12**	**3**	**121**
Feature 100B										
General	49	31	1		1	1		11	2	96
Level 1	3	2						2	1	8
Level 2	2	11						1		14
Level 3	1	1								2
Total	**55**	**45**	**1**		**1**	**1**		**14**	**3**	**120**
Feature 102										
General	62	14	2							78
Level 1	29	1				1				31
Level 2	23	2						2		27
Total	**114**	**17**	**2**			**1**		**2**		**136**

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Feature 104										
Fill Above Flume		1								1
Total		**1**								**1**
Feature 105										
General	1	30								31
Total	**1**	**30**								**31**
Feature 107										
Level 1	7	5								12
Level 2	4	2								6
Total	**11**	**7**								**18**
Feature 114										
General	10	15						1		26
North 1/2	16	13				2		3		34
Total	**26**	**28**				**2**		**4**		**60**

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Feature 115										
Level 1	10	3								13
Level 2	18	25					1	2		46
Level 3	44	22					1			67
Level 4	3	1								4
Total	**75**	**51**					**2**	**2**		**130**
Feature 121										
Level 1	4	1								5
Level 2		1								1
Total	**4**	**2**								**6**
Feature 122 Eastern 1/2										
Level 2	4	1								5
Level 3	1									1
Level 4	28	10						4		42
Total	**33**	**11**						**4**		**48**

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Feature 122 Western 1/2										
General	3									4
Level 1	1	1						1		2
Level 2	23	7								31
Level 2, Southwest 1/4	55	16			1			1		73
Level 3	120	52				1		1		177
Level 4	51	22						4		74
Level 5	85	68						1		157
Level 6	48	53						4		101
Level 7	12	5								17
Level 8	11	1								12
Level 9	27	16								43
Level 10	46	15								62
Level 11	45	18			1			1		66
Level 12	66	7						2		73
Level 13	142	172			9					330
Level 14	36	29			1			7		66
Level 15	4	4								8
Total	**775**	**486**			**12**	**1**		**22**		**1296**
Unit B										
Level 1	10									10
Level 2	2									2
Total	**12**									**12**

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Unit C										
Level 1	4	1								5
Level 2	4	6								10
Level 3	12	3								15
Level 4	28	16								44
Level 5	7	7								14
Level 6	1									1
Level 7		2								2
Total	**56**	**35**								**91**
Unit D										
Level 1	18	3								21
Level 3	7	1								8
Level 4	6	4								10
Level 5	3									3
Level 6	6	2								8
Level 7	4									4
Total	**44**	**10**								**54**
Profile 8	12	1			5					18
Total	**12**	**1**			**5**					**18**
Shovel Test 2	2	2								4
Total	**2**	**2**								**4**

Provenience Surface Collections	K	A	F	R	C	P	T	Z	X	Totals
Trench E										
General	7	1								8
Level 1	7	3								10
Total	14	4								18

KEY

K = Kitchen	A = Architecture	F = Furniture
R = Arms	C = Clothing	P = Personal
T = Tobacco	Z = Activities	X = Mortuary
M = Unidentified		

APPENDIX VI

SCOPE OF SERVICES

CELMN-PD-RA 12 August 1987

SURVEY AND DATA RECOVERY AT VACHERIE REVETMENT
ST. JAMES PARISH,
LOUISIANA

CONTRACT NUMBER DACW29-86-D-0093

1. Introduction. This delivery order calls for two levels of archeological investigation within the Vacherie Revetment reach on the Mississippi River in St. James Parish, Louisiana (Figure 1, Mississippi River Aerial Mosaic File Nos. 34-35). Vacherie Revetment is a 3.7 mile long project of which approximately 2.5 miles have been constructed. Literature search, survey and testing of any discovered sites are required between Miles 150.3 to 150.0-R. Data recovery is required at 16SJ40, located between miles 149.5 to 148.6-R. These two investigations are incorporated under this delivery order but will be reported separately for management purposes. The delivery order period is 275 days.

2. Archeological Background. In 1984, R. Christopher Goodwin and Associates, Inc. surveyed the segment of Vacherie Revetment between miles 149.5 to 148.6-R under the auspices of Contract No. DACW29-84-D-0029. Site 16SJ40 was recorded as a 665m long, multi-component historic property, comprising remains from Magnolia and Crescent Plantations and multiple small nineteenth century habitations and businesses. The site was defined based upon profiles, features exposed in the bankline face, and artifact scatters on two terraces. Sealed deposits were identified dating from the late eighteenth century to 1917. Fourteen features were identified, one of which eroded from the bankline prior to completion of the survey. The initial survey recommended that the site be considered eligible to the National Register of Historic Places for the following reasons:

A. sealed cultural deposits ranging the breadth of the nineteenth century
B. the presence of eight rice flumes (a type of feature not previously identified on the Mississippi River batture) evidencing several periods of manufacture;
C. the opportunity to compare the assemblages of large landholdings with those of single family units from the same time period.

A brief inspection of the 16SJ40 on July 9, 1987 found some change in site conditions, but most features are still intact. Eight features were readily identified, not all of which appear to correspond directly with previously identified features. Very little artifactual material was observed eroding from the bankline with the exception of the Range U-51 vicinity. Two former levee roads are still visible in multiple locations.

3. Description of the Study Area. The study area will be confined to the Mississippi River batture between Ranges U-114 to U-99 (M-150.3 to 150.0-R survey reach) and Ranges U-68 to U-10 (data recovery reach). Excavation within 16SJ40 shall be sufficiently scaled to complete sampling from the entire extent of the site on the batture. Survey of the M-150.3 to 150.0-R reach shall cover the width of the batture.

4. General Nature of Work to Be Performed.

A. Phase 1 (Data Recovery from 16SJ40). Based upon prior knowledge of 16SJ40, the Contractor will prepare a detailed research design for data recovery as part of his proposal for this delivery order. The work to be performed by the Contractor requires site mapping, excavation of a sample of the site and archival research. All data will be analyzed, described and integrated into a scientific report of findings. All work will be performed within the context of an approved, detailed research design which emphasizes recovery and analyses of data relevant to specific research problems a the elements for which 16SJ40 was found eligible to the National Register Historic Places.

Within 3 days of delivery order award, the Contractor will implement the field phase of the research design prepared as part of the proposal. All field work at 16SJ40 must be finished no later than October 2, 1987.

B. Phase 2: (Survey of Miles 150.3 to 150.0-R). The Contractor shall commence study of the M-150.3 to 150.0-R segment by conducting a literature, map, and records review relevant to the project area. This review shall include but not be limited to study of historic maps, the State Archeologist's site and standing structure files, the National Register of Historic Places, geological and geomorphological data, archeological reports, ethnohistoric records, historic archives, and public records. Specific data will be collected on the proposed construction item and on all sites located. The goals of the literature and records review are to familiarize the reader with the geomorphology (point bars, cutbanks, crevasses, relict channels, etc.) of the study area; establish the distribution of prehistoric and historic sites in the region and their proximity to the study area; identify previously recorded sites, standing structures, National Register of Historic Places properties and National Landmarks in or in close proximity to the project area; provide national, regional and local context for assessing the historical, architectural and archeological contribution of all sites and structures located in the project area; and predict resources which can be expected to be located within the project area. Economic and social trends, channel migration, major natural events, and all previous construction affecting land use patterns and the state of preservation of predicted resources will be analyzed and presented. The literature search will place this contract effort within the context of similar work conducted previously along the Mississippi River.

The Contractor will conduct an intensive survey of the M-150.3 to 150.0-R reach. An intensive survey is a comprehensive, systematic, and detailed physical examination of a project item for the purpose of locating and inventorying all cultural resources within the impact zone and will include subsurface testing and evaluation of identified resources against the National Register of Historic Places criteria of significance (36 CFR 60.4). The survey will provide adequate information to seek determinations of eligibility from the Keeper of the National Register, and will innumerate project effects on each resource located within the study area. The evaluation will be conducted utilizing current professional standards and guidelines including, but not limited to :

the National Park Service's draft standards entitled, "How to Apply the National Register Criteria for Evaluation", dated June 1, 1982;

the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation as published in the Federal Register on September 29, 1983;

Louisiana's Comprehensive Archaeological Plan, dated October 1, 1983;

the Advisory Council on Historic Preservation's Section 106 Update/3 entitled, "Manual of Mitigation Measures (MOMM)", dated October 12, 1982.

Maximum transect width will not exceed 20 meters. The areas surveyed and all sites located within project boundaries will be recorded (in ink) to scale on the appropriate 7.5 minute quadrangle and aerial mosaic project maps. The quadrangle maps will be used to illustrate site forms (see below). The project maps will be returned to the COR with the draft report of investigation.

All sites will be sufficiently tested using shovel, auger or other excavation techniques to determine and record site size, depth of deposit, stratigraphy, cultural association, function, approximate date of occupation, and condition. Site boundaries, test excavation units at sites (including test pits, shovel tests, auger intervals, backhoe trenches, etc.) and activity areas will be measured and mapped to scale. All scaled field maps and report illustrations of sites and the survey area will accurately reference grid locations in terms of levee stations or range markers in close proximity to the illustrated work area. The actual elevation (NGVD) of all buried deposits will be determined and mapped.

The Contractor will fill out and file state site forms with the Office of the Louisiana State Archeologist and cite the resulting state-assigned site numbers in all draft and final reports of this investigation. The Contractor will submit updated state site forms to the State Archeologist for all previously discovered sites. These forms will correct previously filed information and summarize what is known of each resource as a result of this investigation. One unbound copy of each site or standing structure form will be submitted to the COR with the draft report.

All standing structures located in the survey area will be identified by function, dated and described using standard terminology of formal and/or vernacular architecture, as appropriate to each structure. Each standing structure will be recorded (using a simplified, standardized format selected by the Division of Archaeology and Historic Preservation), accompanied by a minimum of three, clear, black and white photographs showing front, back and side views of the structure. The Contractor will determine whether subsurface features are present. If present, the structure and all features shall be treated as a site, which shall be mapped and recorded on State of Louisiana site forms. The Contractor shall assess the significance of all standing structures using information collected during the survey and literature search phases of this work item.

C. Phase 3: Data Analysis and Report Preparation. The Contractor shall prepare separate reports of investigation for the Phase 1 data recovery investigation at 16SJ40 and the Phase 2 survey and testing of the M-150.3 to 150.0-R reach. The same standards shall apply to both reports. All literature, map search, field and laboratory data collected from each reach will be integrated to produce separate, graphically illustrated, scientifically acceptable draft reports discussing the two work areas.

All survey, testing and/or excavation data will be analyzed using currently acceptable scientific methods. The Contractor shall catalog all artifacts, samples, specimens, photographs, drawings, etc., utilizing the format currently employed by the Office of the Louisiana State Archeologist. The catalog system will include site and provenience designations.

Project impacts on all cultural resources located and/or tested in the M-150.3 to 150.0-R reach will be assessed. The Contractor shall provide justification of the rationale used and a detailed explanation of why each resource does or does not meet the National Register significance criteria (36 CFR 60.4). For each resource recommended as eligible to the National Register and assessed to be impacted by construction, the Contractor shall recommend mitigation alternatives. Inferential statements and conclusions will be supported by field, map or archival data. It will not be sufficient to make significance recommendations based solely upon the condition and artifactual content of the site in question. All significance assessments of sites and structures will be stated in terms of the context of similar Mississippi River floodplain sites.

5. Reports.

A. Monthly Progress Reports. One copy of a brief and concise statement of progress shall be submitted with and for the same period as the monthly billing voucher throughout the duration of the delivery order. These reports, which may be in letter form, should summarize all work performed, information gained, or problems encountered during the preceding month. A concise statement and graphic presentation of the Contractor's assessment of the monthly and cumulative percentage of total work completed by task shall be included each month. The monthly report should also note difficulties, if any, in meeting the contract schedule.

The body of the M-150.3 to 150.0-R study report shall include the following: 1) introduction to the study and study area; 2) environmental setting; 3) review and evaluation of previous archeological investigations; 4) distribution of prehistoric and historic settlement in the study area; 5) research design; 6) description of field and laboratory methodology, statement of project objectives, analysis of effectiveness of methods; 7) data analyses and cultural material inventories; 8) data interpretation; 9) data integration; 10) conclusion; 11) recommendation; 12) references cited; and 13) appendices, as appropriate. In order to preclude vandalism, the draft and final reports shall not contain specific locations of archeological sites.

An estimate of the acreage surveyed for this project will be given in the M-150.3 to 150.0-R report introduction.

All written reports of both investigations shall follow the format set forth in MIL-STD-847A with the following exceptions: 1) separate, soft, durable, wrap-around covers will be used instead of self covers; 2) page size shall be 8-1/2 x 11 inches with a 1-1/2-inch binding margin and 1-inch margins; 3) the text reference and Reference Cited formats of Society for American Archaeology will be used. Spelling shall be in accordance with the U.S. Government Printing Office Style Manual, dated January 1973.

The COR will provide all review comments to the Contractor on the M-150.3 to 150.0-R reach report within 45 days after receipt of the draft reports (168 days after delivery order award). Upon receipt of the review comments, the Contractor shall incorporate or resolve all comments with the approval of the COR and submit one preliminary final report within 198 days after delivery order award. Final comments will be returned to the Contractor within 212 days after delivery order award. The Contractor shall submit one reproducible master copy and 40 bound copies of the M-150.3 to 150.0-R reach report of investigation, and all separate appendices, to the COR within 242 days after work item award.

The COR will provide all review comments to the Contractor on the site 16SJ40 report of data recovery within 45 days after receipt of the draft reports (199 days after delivery order award). Upon receipt of the review comments, the Contractor shall incorporate or resolve all comments with the approval of the COR and submit one preliminary final report within 229 days after delivery order award. Final comments will be returned to the Contractor within 244 days after delivery order award. The Contractor shall submit one reproducible master copy and 40 bound copies of the site 16SJ40 report of investigation, and all separate appendices, to the COR within 275 days after work item award.

6. Disposal of Records and Artifacts. All records, photographs, artifacts, and other material data recovered under the terms of this delivery order shall be recorded and catalogued in a manner compatible with those systems utilized by the Louisiana SHPO and by State and Federal agencies which store archeological data. They shall be held and maintained by the Contractor until completion of the delivery order. Final disposition of the artifacts and records will be

in accord with applicable Federal and State laws. Unless otherwise specified, artifacts will be returned to the landowner or permanently housed with the Louisiana Division of Archaeology and Historic Preservation or in a repository selected by the State Archeologist. The Principal Investigator shall inform the COR in writing when the transfer of data has been completed and shall forward to the COR a catalog of items entered into curation. The location of any notes, photographs or artifacts which are separated from the main collections will also be documented. Presently existing private archelolgical collections from the project area which are used in data analyses will remain in private ownership. The Contractor shall be responsible for delivery of the analyzed archeological materials to the individual landowners, the Louisiana SHPO's office, or any other repository designated by the Government following acceptance of the final report. All artifacts to be permanently curated will be cleaned, stabilized, labeled, catalogued on typed State curation forms, and placed in sturdy bags and boxes which are labeled with site, excavation unit or survey collection unit provenience.