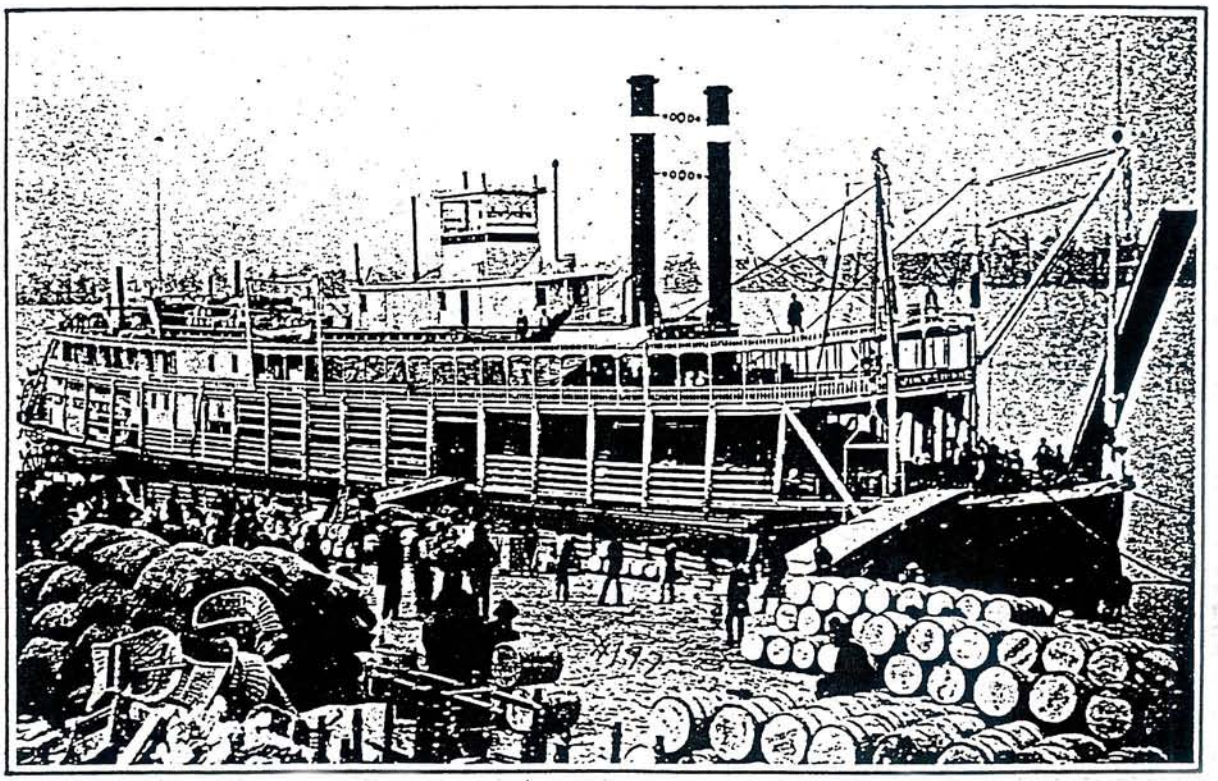
THE MEMPHIS LANDING
CULTURAL RESOURCES ASSESSMENT AND PRESERVATION PLAN, CITY OF MEMPHIS, SHELBY COUNTY, TENNESSEE

PART 1: CULTURAL RESOURCE ASSESSMENT

(DRAFT)



GARROW & ASSOCIATES, INC.

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PART 1: CULTURAL RESOURCE ASSESSMENT

(DRAFT)

Submitted to:

City of Memphis
Division of Engineering
125 North Main Street
Memphis, Tennessee 38103

Submitted by:

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Project No. 95-42-18-1834

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ABSTRACT

At the request of the City of Memphis, Garrow & Associates, Inc., prepared a cultural resource assessment and preservation plan for the Memphis Landing, a nineteenth century stone revetment on the Wolf River Harbor at the riverfront in Memphis, Shelby County, Tennessee. This volume presents the results of the cultural resource assessment; the preservation plan is found in Part 2, a separate volume. Objectives of the study include: 1) documenting the evolution of the built environment; 2) formulating a predictive model of buried archaeological deposits at the Landing; 3) identifying natural and cultural causes affecting the preservation of the Landing; and 4) assessing the significance of the Memphis Landing using criteria established by the National Historic Preservation Act of 1966.

The Memphis Landing currently covers approximately 379,000 square feet. Approximately 70,000 square feet of this total is composed of silty river clay above the waterline and below the present edge of the stone paved surface. An estimated 813,442 cobbles cover the remaining 309,000 square feet. The Landing is composed of nine different rock types in a variety of patterns that reflect historical building and repair episodes.

Current information suggests that the Landing is the product of three nineteenth century building episodes and one twentieth century repaving project. The first major paving of the Landing, of which no clear evidence remains, occurred between 1859 and 1860. Between 1866 and 1869, the stone pavement was extended south from Court Avenue to Union Avenue. The third major construction period was 1879–1881, when the Landing was extended to the south side of Beale Street. The final major modification to the Landing was ca. 1932–1937, with the completion of Riverside Drive to the east and Jefferson Davis Park on the north.

Both the historical documentation and existing site conditions give clear evidence for the necessity of periodic repair to the Landing. Factors contributing to the deterioration are both natural and cultural. Natural forces include erosion by rainwater runoff, fluctuations of the water level, and alternating siltation and scouring from river currents. In many cases, these natural effects have been exacerbated by the lack of periodic maintenance. Cultural factors include the choice of raw materials, infrastructure additions, and use-attrition.

Archaeological resources at the Landing are of two types. The first includes sections of the original stone fabric and other surface features such as moorings and stone-lined drainages. Second, there is a potential for buried archaeological deposits and features beneath the stone pavement. Based on surface and documentary evidence, the Landing can be divided into three zones. In Zone 1, significant cultural resources are present at the surface, and there is a potential for significant subsurface archaeological deposits. In Zone 2, there is little surface integrity, but there is a potential for significant subsurface deposits. In Zone 3, modern construction has destroyed the possibility of significant archaeological deposits.

The Memphis Landing was recognized as a significant historic resource by its inclusion in the boundaries of the Cotton Row Historic District, listed on the National Register of Historic Places in August 1979. It is now appropriate that the Memphis Landing be resubmitted as an individual listing on the National Register of Historic Places. On a national level, the Memphis Landing represents the significant national themes of river commerce and westward migration in the nineteenth century. Therefore, it is recommended that nomination of the Landing as a National Historic Landmark should be pursued.

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I. INTRODUCTION

This is a report of a multidisciplinary investigation of cultural resources at the Memphis Landing, a cobblestone revetment along the east side of the Wolf River Harbor in downtown Memphis, Shelby County, Tennessee. The study was conducted at the request of the City of Memphis, Division of Engineering and Division of Housing and Community Development, as part of an overall preservation plan for the Landing. The investigations reported here were performed between August and November 1995 by Garrow & Associates, Inc., Hopkins & Associates, and Geological Consultants, Inc.

The Memphis Landing, also called the Cobblestone Landing or the Memphis Wharf, is a rare historic resource that holds great value in continuing the tradition of the city's river heritage. The existing cobblestones are only a segment of a much larger paved landing first constructed during the mid-nineteenth century. In 1979, the Landing was found eligible for the National Register of Historic Places (NRHP) under Criterion A and C and is included as a disconnected contributing element of the Cotton Row Historic District (Frankle 1989). To ensure the Landing's continued existence in the face of natural erosion and proposed riverfront redevelopment, the City of Memphis is required to enact informed management practices and future design standards. This report details the existing condition of the Landing and is the first step toward formulating a final comprehensive preservation plan.

OUTLINE OF THE PROJECT

In the summer of 1994, the City of Memphis began constructing a retaining structure at the foot of Beale Street to be used as the foundation for the relocation of the Tom Lee Monument. The excavations dislocated a large section of the cobblestone Landing and exposed underlying nineteenth century archaeological deposits associated with site 40SY352 (Bowman 1981). Construction was halted at the insistence of the U.S. Army Corps of Engineers. The City prepared an after-the-fact application for a permit under Section 404 of the Federal Water Pollution Control Act of 1977 (also known as the Clean Water Act). In the review of the permit application, the Tennessee State Historic Preservation Officer (SHPO) requested Phase II testing for cultural resources as a requirement relative to Section 106 of the National Historic Preservation Act, as amended (16 U.S.C. 4870f, regulations codified at 36 CFR Part 800).

At the request of the City of Memphis, Garrow & Associates conducted archaeological test investigations at the Tom Lee Monument relocation site in October 1994. The primary goals of the investigations were to identify, record, and evaluate any potentially significant cultural resources threatened by the planned construction. These goals were addressed through a preliminary literature and records search, archaeological field investigations, and laboratory analysis (Weaver et al. 1994).

The Phase II testing identified two significant archaeological resources: the cobblestone pavement and the archaeological deposits beneath it. Rather than a single monolithic entity, the cobblestones were recognized as a complex mosaic of various shapes, patterns, and materials that together reflect changing commercial, economic, and technological conditions in Memphis during the nineteenth century. As a significant archaeological resource, the cobblestones, as well as the underlying cultural deposits, were recommended eligible for listing on the NRHP under Criterion D (Weaver et al. 1994:i, 1). Other recommendations were offered to mitigate the adverse impact to the Landing as a result of the Tom Lee Monument relocation project. These recommendations included: 1) additional historical research to document the construction

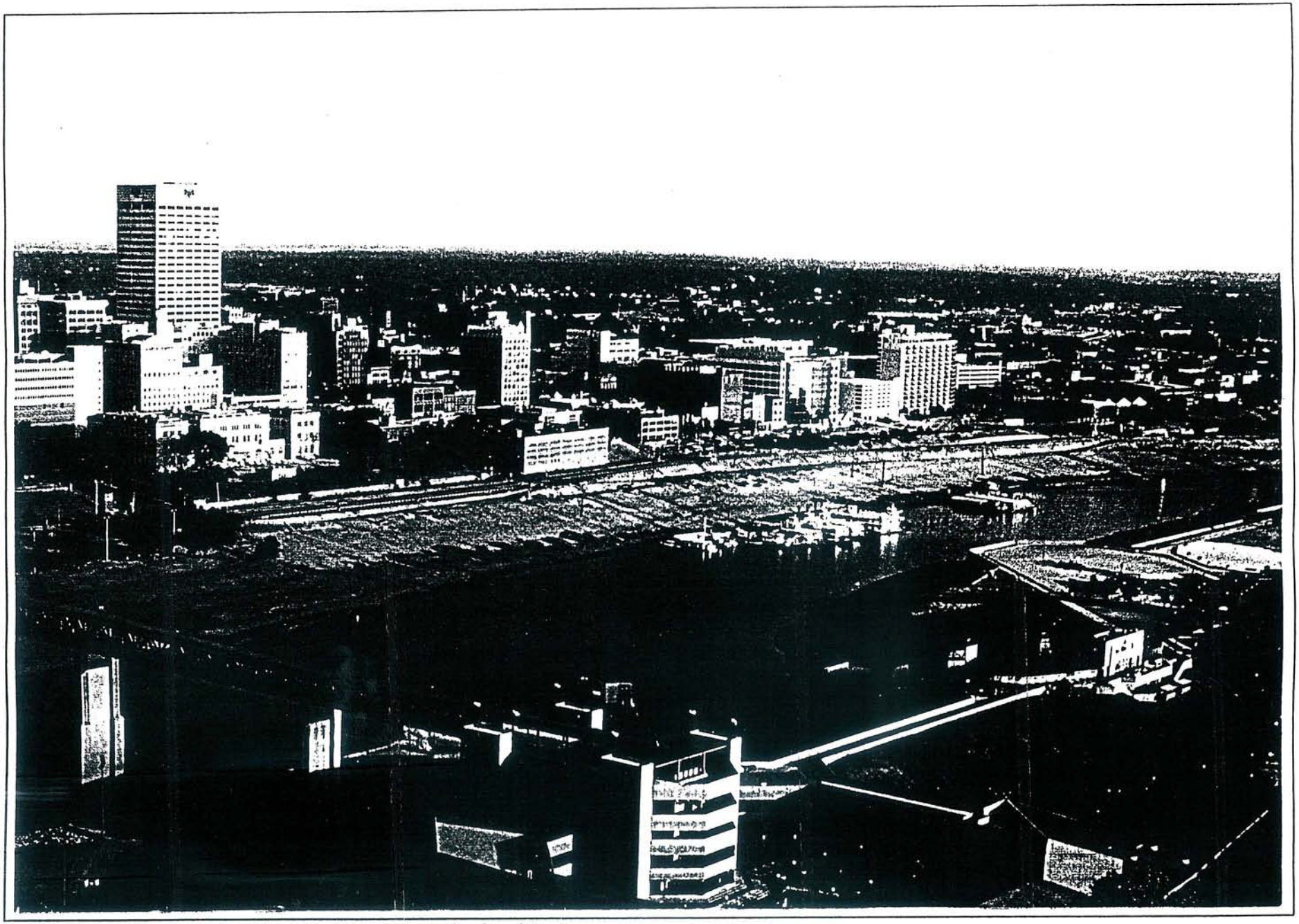


Figure 1. The Memphis Landing Today (View to the South).

sequence of the entire cobblestone Landing; 2) a study to document the existing conditions of the cobblestone Landing; 3) archaeological data recovery of buried deposits at the site of the proposed Tom Lee Monument relocation; and 4) preparation of a preservation plan that would establish standards for future treatment of the Memphis Landing (Weaver et al. 1994:54–56).

Subsequent to the Phase II report, a Memorandum of Agreement (MOA) was executed and accepted by the U.S. Army Corps of Engineers, the City of Memphis, the Tennessee SHPO, and the Advisory Council on Historic Preservation. The MOA included the following stipulation:

> 7. Preservation of Northern Cobblestone Area
>
> A. Prior to any ground disturbance, the City of Memphis shall, in consultation with the SHPO and Corps of Engineers, prepare a preservation plan for the total remaining cobblestone area north of the Tom Lee Monument relocation project area. The preservation plan shall include, but not be limited to:
>
> 1) Additional archival research;
>
> 2) Mapping and photo-documentation of the cobblestones;
>
> 3) Geologic study of the cobblestone area that includes distribution, size, texture, pattern, and lithology of the entire cobblestone area;
>
> 4) Plan for future renovation programs including repair methods;
>
> 5) Plan for future potential economic developments and long-term maintenance in the area (restaurants, boat docks, general accessibility, etc.);
>
> 6) Plans for interpretive booklets and exhibits.

To these ends, Garrow & Associates presented a proposal to the City outlining a multidisciplinary approach to the problems of preservation, maintenance, and future development of the Memphis Landing. A contract between the City and Garrow & Associates was executed in July 1995, and the services were completed between August and November 1995. The project was divided into two phases.

The first phase, reported in this volume, consists of a cultural resource assessment and was designed to further our understanding of the existing conditions, history, geological character, and archaeological potential of Memphis Landing. Specific goals of the study include:

- Documenting the evolution of the built environment;
- Formulating a predictive model of buried archaeological resources at the Landing;
- Identifying and describing natural and cultural factors affecting the preservation of the Landing;
- Assessing the potential significance of the Landing using criteria established by the National Historic Preservation Act of 1966.

The second phase of the study was the preparation of a preservation plan for the Landing. The plan develops a set of standards and guidelines for the City of Memphis that will balance the need to preserve the Memphis Landing's historical qualities with the needs that may arise in its future development. Those recommendations are presented in Part 2, a separate volume.

OUTLINE OF THE REPORT

This report details the goals, methods, and results of the cultural resource assessment of the Memphis Landing and is the first phase of an overall preservation plan. Chapter II describes the study area and presents an overview of its environmental setting. Chapter III discusses the history of the Memphis Landing. Methods and results of the lithological examination are presented in Chapter IV, and archaeological methods and findings are presented in Chapter V. Conclusions and recommendations are provided in Chapter V. An aerial view of the Landing, showing lithological pattern distributions, is included as Appendix 1.

II. ENVIRONMENTAL SETTING

DESCRIPTION OF THE STUDY AREA

The Memphis Landing is public property along the east side of the Wolf River Harbor in downtown Memphis (Figures 2 and 3). Before the formation of Mud Island at the turn of the twentieth century, the Landing was on the left descending bank of the Mississippi River approximately between River Miles 732.7 and 734.1.

Historically, the stone-paved surface associated with the great Memphis Landing began at Jefferson Avenue on the north and extended south beyond the south side of Beale Street. The stones extended from the water's edge on the west to Front Street on the east. Today, the area of stone pavement is much reduced. On the north, a large segment of the original Landing between Jefferson and Court avenues was covered with fill for Jefferson Davis Park. Construction of Riverside Drive in the 1930s destroyed or covered the eastern margin of the Landing. On the south end, where Riverside Drive is closest to the riverbank, a large segment of the stone paving is buried under talus slope and riprap at the northern end of Tom Lee Park.

For management purposes, the study area can be divided into two segments: 1) the visible, relatively intact stone pavement between Jefferson Davis Park on the north and the asphalt drive leading from the Beale Street access ramp on the south; and 2) the area south of the Beale Street access ramp disturbed by the proposed Tom Lee Monument relocation project.

The intact stone pavement north of the Beale Street ramp is the major focus of this cultural resource assessment and is shown in aerial view in Composite Map 1, Appendix 1. The area was surveyed by the City of Memphis for the study when the river level was relatively low and all of the stone pavement was exposed. The City's base map, with revisions, is presented as Figure 4. The survey established a baseline, marked in 100 foot intervals, beginning at the Beale Street ramp (point 0+00) and extending north to the base of the talus slope at Jefferson Davis Park (point 19+00). This segment of the Landing is approximately 1,900 feet long. The width of the Landing (measured from the base of the Riverside Drive embankment on the east to the western edge of the stone pavement) is quite variable. The pavement retains a maximum width of approximately 215 feet near the Landing's midsection (at the 10+00 line, just north of the intersection of Union Avenue and Riverside Drive). The pavement is narrower at the northern and southern ends, with minimum widths of approximately 120 feet at the 19+00 line (Court Street) and approximately 130 feet at the 4+00 line (Gayoso Street). Elevations at the surface of the stone pavement range from approximately 230 feet above mean sea level (AMSL) along the base of the Riverside Drive embankment (east end of the 10+00 line) to approximately 191 feet AMSL at the western edge of the intact pavement (west end of the 11+00 line). Overall, the northern end of the paved Landing is slightly higher than the south end, although the slope is consistent (Figure 5). During periods of rising high water, the river's edge reaches the eastern margin of the Landing at the southern end near the Beale Street ramp before covering the northern Court Street portion.

When the river stage is at 2 feet above the 0 water line (185.91 feet AMSL), as it was when aerial photographs were taken, the total area of the Landing north of the Beale Street ramp is approximately 379,000 square feet. Approximately 70,000 square feet of this total consists of silty river clay above the waterline but below the present edge of the cobbled surface. This area of river-deposited sediments presumably represents the area of the paved landing that has eroded away over the last 130 years. An estimated 813,442 cobbles cover the remaining 309,000 square feet.

Figure 2. Location of the Project Area.

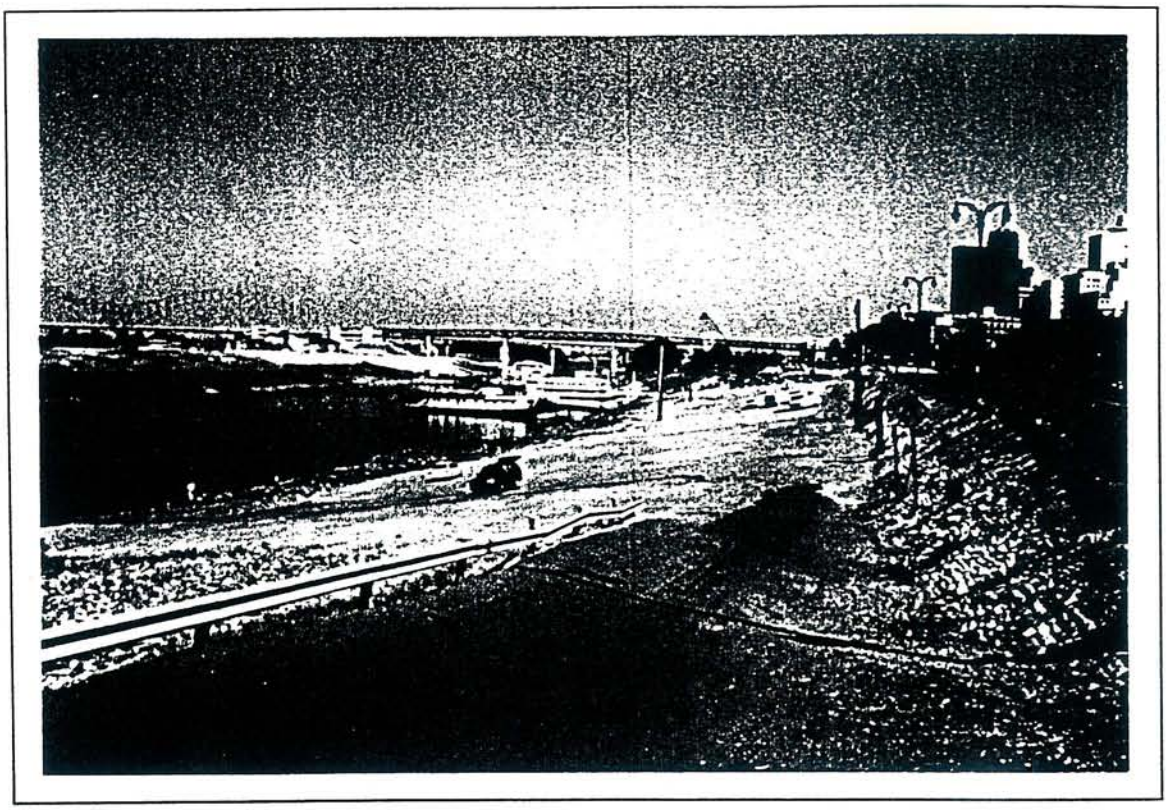
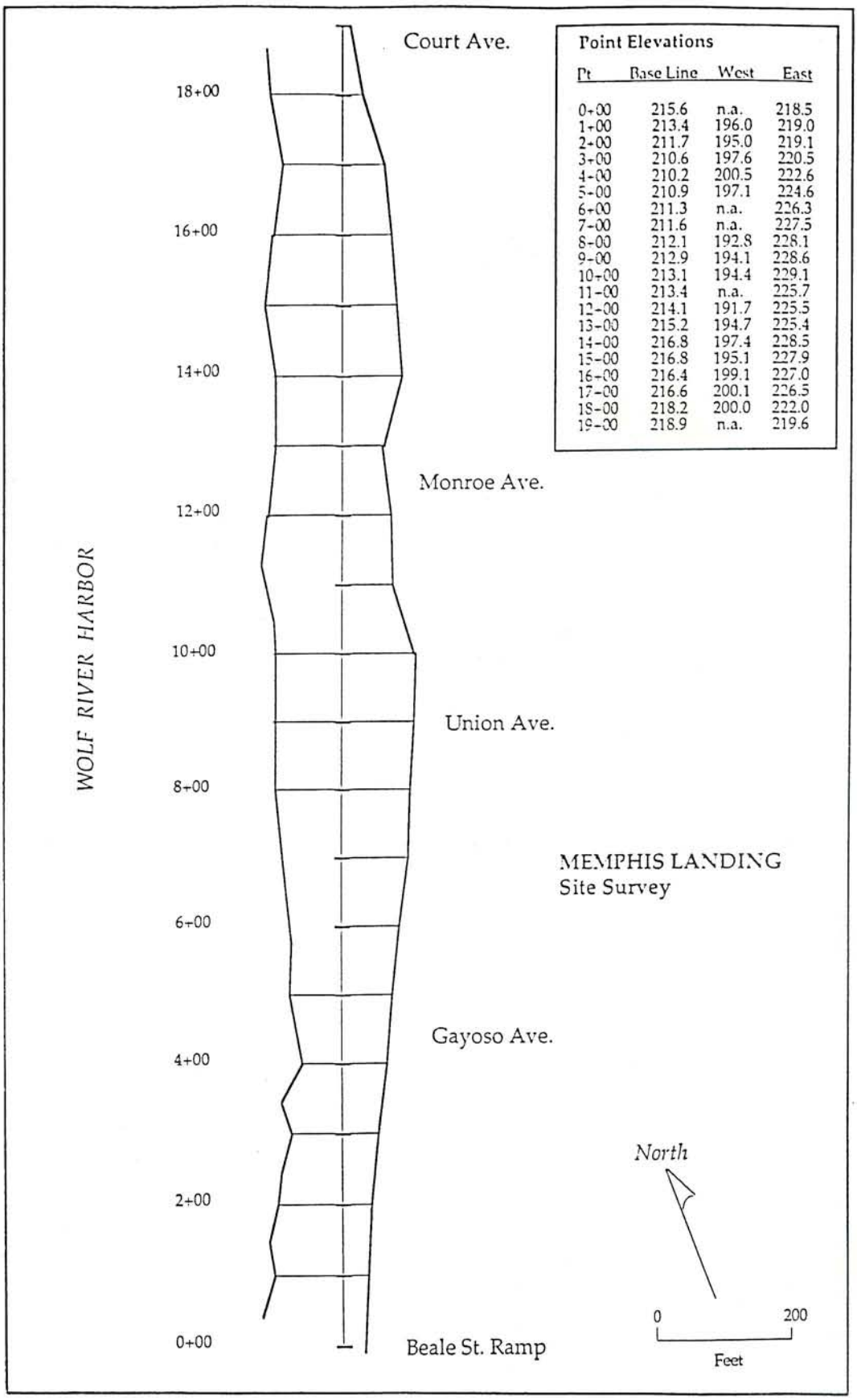


Figure 3. The Memphis Landing (View to the North from the Beale Street Ramp).



Point Elevations

Pt	Base Line	West	East
0+00	215.6	n.a.	218.5
1+00	213.4	196.0	219.0
2+00	211.7	195.0	219.1
3+00	210.6	197.6	220.5
4+00	210.2	200.5	222.6
5+00	210.9	197.1	224.6
6+00	211.3	n.a.	226.3
7+00	211.6	n.a.	227.5
8+00	212.1	192.8	228.1
9+00	212.9	194.1	228.6
10+00	213.1	194.4	229.1
11+00	213.4	n.a.	225.7
12+00	214.1	191.7	225.5
13+00	215.2	194.7	225.4
14+00	216.8	197.4	228.5
15+00	216.8	195.1	227.9
16+00	216.4	199.1	227.0
17+00	216.6	200.1	226.5
18+00	218.2	200.0	222.0
19+00	218.9	n.a.	219.6

Figure 4. City Survey of the Memphis Landing.

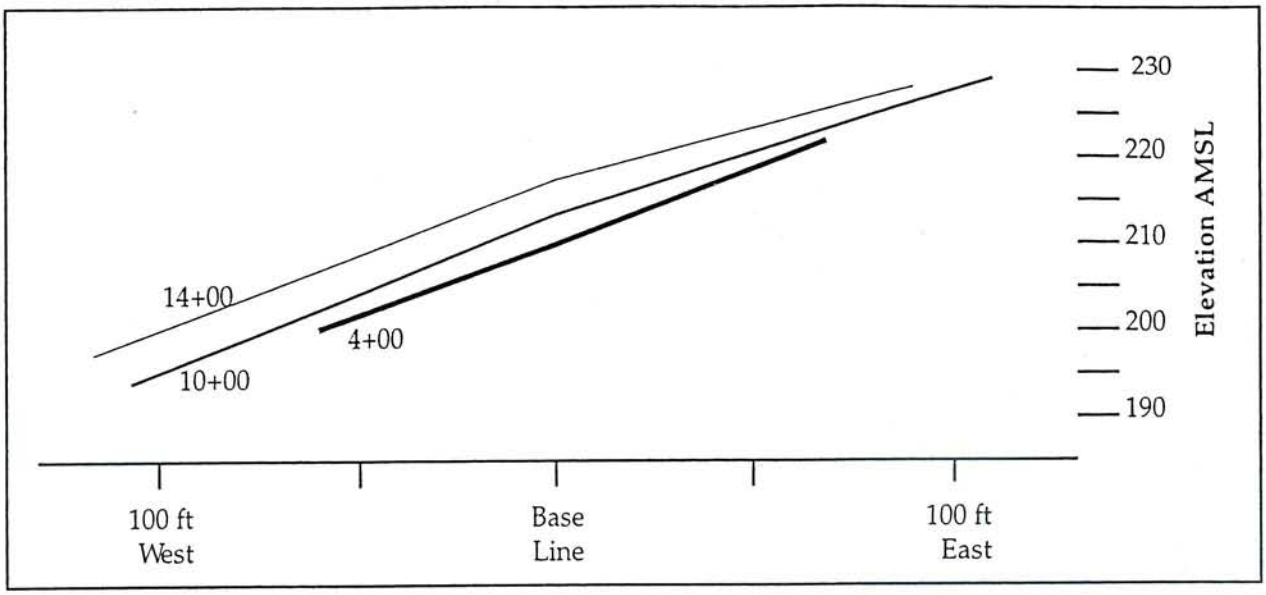


Figure 5. Comparison of Slope at Lines 14+00, 10+00, and 4+00.

At the time of this study, the site of the proposed Tom Lee Monument relocation project, located south of the Beale Street ramp, was covered with riprap and could not be examined in detail. However, this area was the subject of previous investigations by Weaver et al. (1994). Included here is an area of exposed stone paving, partially disturbed by construction, measuring approximately 170 feet north-south by 162 feet east-west (2,755 square feet). This area is bounded on the north by the asphalt road leading from the Beale Street ramp (the 0+00 line), on the east by the Riverside Drive embankment, on the west by the Wolf River Harbor, and on the south by a concrete culvert correlating with the centerline of Beale Street. South of the culvert, intact stone pavement is buried by layers of fill and riprap that line the western slope of Tom Lee Park. The paved surface extends at least 108 feet south of the concrete culvert at Beale Street and approximately 290 feet south of the 0+00 survey line at the Beale Street ramp.

HYDROLOGY

For most of its early history, the Memphis Landing fronted directly on the Mississippi River. Beginning about 1893, an outlying sandbar developed at the mouth of Wolf River. Formation of the sandbar increased as a result of the floods of 1912–1913, which changed the main channel of the Mississippi River from the Hopefield Chute, west of Island 40, to the existing channel east of Island 40. By the 1920s, the sandbar, now known as Mud Island, had extended so far south that Wolf River was trapped in a channel between the island and the bluff. In ca. 1935, Wolf River was diverted into the Loosahatchie Chute on the north side of Memphis, and the three-mile reach at the Wolf River's mouth became a slack-water harbor (Bragg 1977:77).

Records on water level fluctuations have been kept at Memphis since 1828, but detailed data from the Memphis gauge (at the foot of the Beale Street, River Mile 735.9) were not established until 1871 by the Mississippi River Commission. Before 1929, the zero mark on the Memphis gauge was determined to be 184.21 feet above Mean Gulf Level. Corrections were made in establishing the National Geodetic Vertical Datum of 1929 (NGVD); after this date, the zero mark on the Beale Street gauge was set at 183.91 feet NGVD (feet above mean sea level).

The Mississippi River at Memphis has a drainage area of approximately 928,700 square miles, It is approximately 2,800 feet wide from bank to bank at River Mile 735. The maximum recorded discharge at Memphis was 2,020,000 cubic feet per second (c.f.s.) during the flood of 1937. The lowest recorded discharge was 78,000 c.f.s. in 1936. The most current compiled data are from 1993, when the mean discharge equaled 816,000 c.f.s. (USCOE 1993).

The highest river stage at Memphis was recorded February 9, 1937, when the river reached 50.4 feet on the Beale Street gauge (234.31 feet NGVD). The lowest readings were on July 11 and 12, 1988, when the river fell to –10.0 feet (173.91 feet NGVD). This represents a fluctuation of 60.4 feet between the maximum and minimum recorded river levels. The expected 100-year flood mark at Memphis is 47.9 on the gauge (231.8 feet NGVD).

Preliminary figures from the Corps of Engineers have been compiled for monthly fluctuations at Memphis between 1945 and 1993 (Table 1; Figure 6). Mean fluctuations vary between an average maximum stage of 29.3 feet (213.2 feet NGVD) in April and a minimum average stage of 0.8 (184.71 feet NGVD) in October.

In 1993, a relatively wet year with flooding in the Missouri River basin, the highest stage was 33.26 feet on the gauge (217.17 feet NGVD), recorded on April 13; the lowest stage was 8.96 feet (192.87 NGVD), recorded on November 14 (a range of 24.3 feet). The yearly mean for 1993 was 22.47 feet (206.38 feet NGVD). Data on monthly fluctuations in 1993 are also shown in Table 1 and Figure 7 (USCOE 1993).

GEOLOGY, TOPOGRAPHY, AND SOILS

West Tennessee is in the Gulf Coastal Plain physiographic province, as defined by Fenneman (1938). It is situated in the northern part of the Mississippi Embayment syncline, a geological trough whose axis roughly parallels the Mississippi River. As one moves west from the Tennessee River toward the Mississippi River, progressively younger Cretaceous, Paleocene, Eocene, and Plio-Pleistocene surface strata are present. At the western boundary of the region, bottomlands in the Mississippi River floodplain are underlain by recent (Holocene) alluvium.

Between the Mississippi River floodplain and the West Tennessee Uplands is an area of gently rolling terrain called the West Tennessee Plain (Stearns 1975:4). Its topography is largely the result of sequential deposition and erosion of Pleistocene loess (eolian silts) formed at the close of the last (Wisconsinan) glaciation. The loess can be up to 80 feet thick along the Mississippi River but is increasingly thinner to the east, tapering away at about the location of Jackson, Tennessee. On the west, the West Tennessee Plain meets the Mississippi River floodplain and forms an escarpment known as the Loess Hills Bluffs. The Mississippi River abuts the escarpment at four locations between the mouth of the Ohio River and Vicksburg. The Memphis bluff, also known as the Fourth Chickasaw bluff, is the southernmost of the four locations. The Memphis bluff extends approximately 5.5 miles from about Auction Street on the north to Nonconnah Creek on the south. Elevations range from about 190 feet AMSL at the riverbank to about 280 feet AMSL between Front and Main streets.

After decades of urban development, exposures of the Memphis bluff have been modified and obscured by concrete, fill, and vegetation. Indeed, the soil survey for Shelby County classifies the project area as graded lands, silty material (Sease et al. 1989). However, correlation with other bluff exposures and with drilling logs presents a fairly good stratigraphic sequence of the bluffs. Figure 8 summarizes the late Quaternary eolian and fluvial units that comprise the Memphis bluff.

Table 1. Monthly Stages, Mississippi River at Memphis.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1993												
Mean	23.45	15.96	25.94	31.81	26.66	17.66	25.35	28.10	19.48	18.33	16.61	20.27
Max.	26.9	24.1	30.5	33.3	31.5	20.3	29.9	30.9	24.6	26.4	27.4	25.5
Min.	19.1	11.4	19.4	29.4	17.0	15.0	18.1	20.9	17.6	12.1	9.0	10.0
1945–1993												
Mean	14.7	17.5	22.4	23.9	19.7	14.3	10.8	6.1	3.7	4.3	6.7	12.1
Max.	21.3	24.6	28.6	29.3	25.7	19.7	15.7	10.6	7.5	8.8	12.2	17.9
Min.	7.4	9.6	15.0	17.4	13.3	9.6	6.1	2.2	0.9	0.8	2.1	5.5

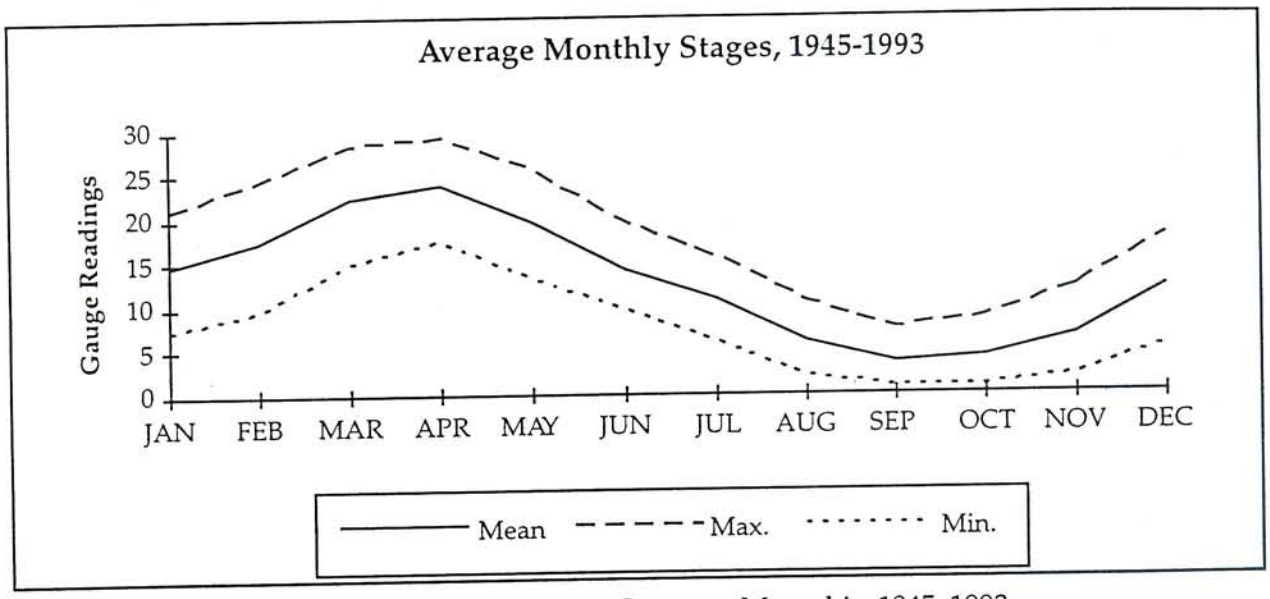


Figure 6. Average Monthly Mississippi River Stages at Memphis, 1945–1993.

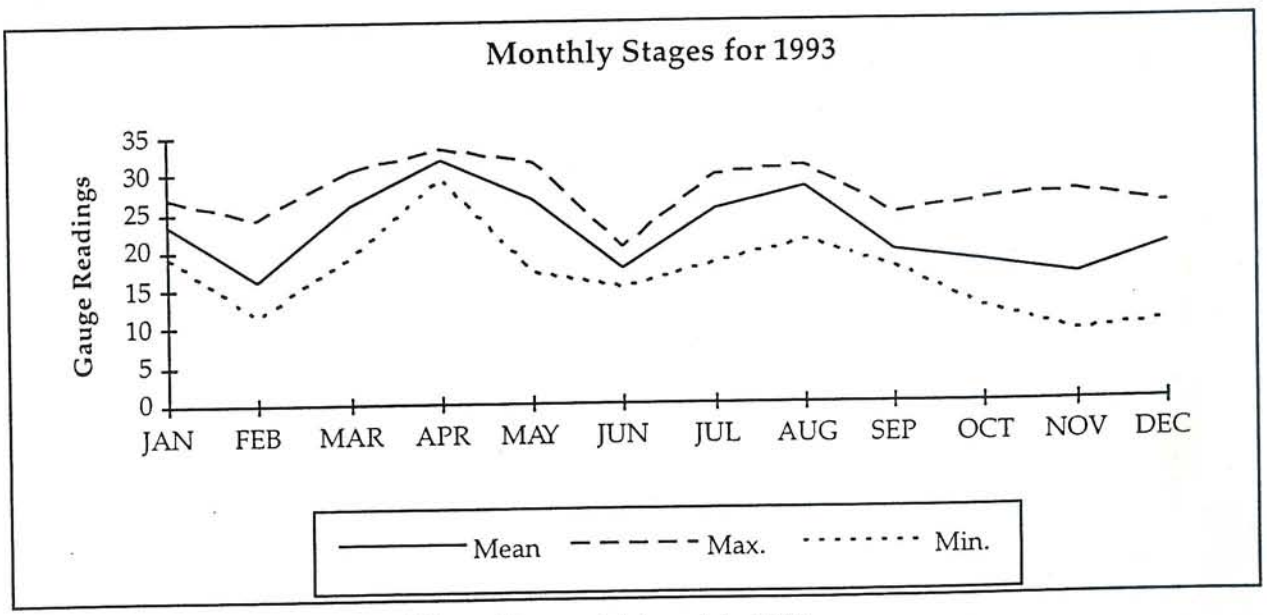


Figure 7. Monthly Mississippi River Stages at Memphis, 1993.

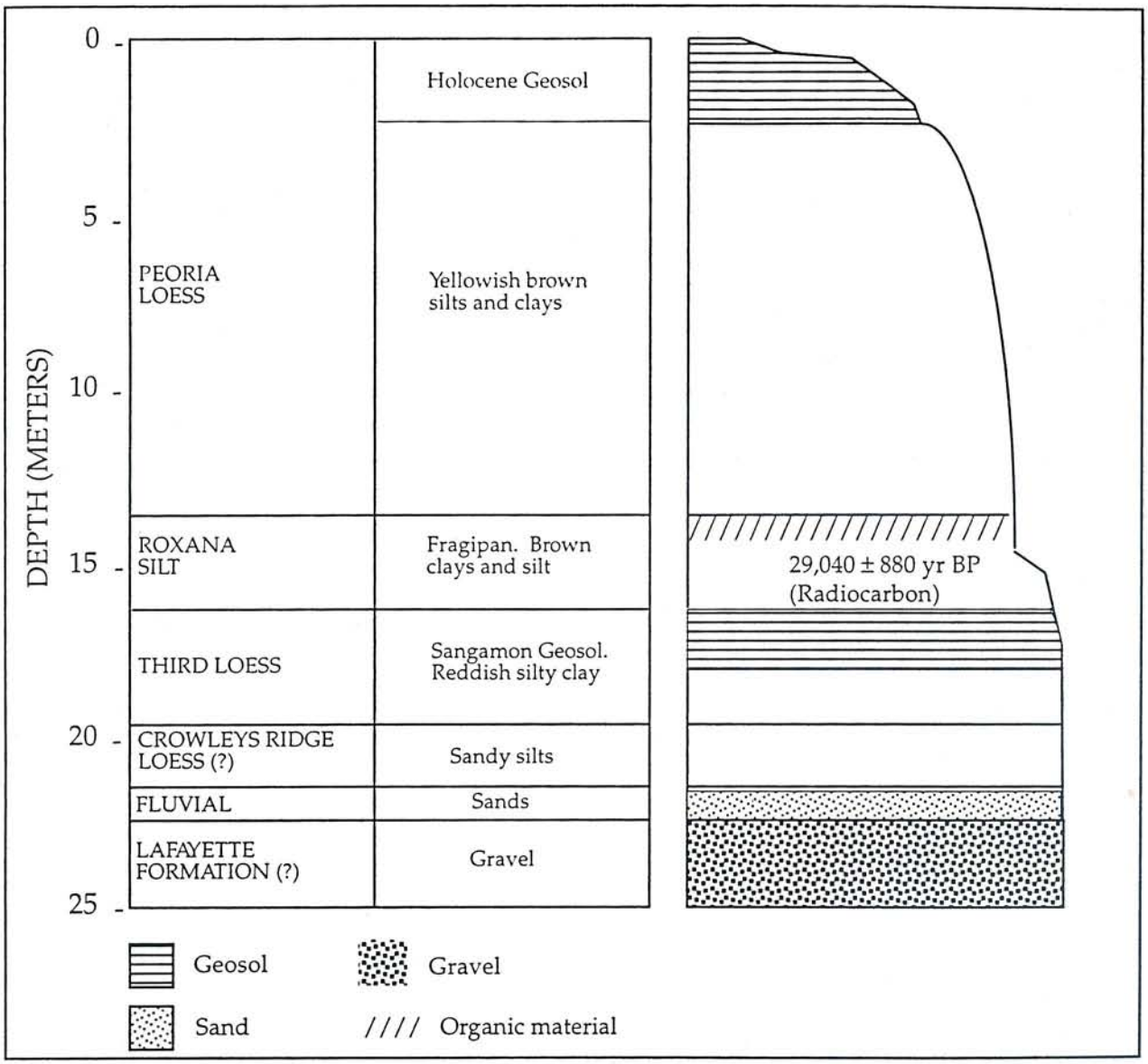


Figure 8. Late Quaternary Eolian and Fluvial Units Underlying Memphis (from Mirecki and Miller 1994:Figure 2).

Surface and near-surface geological units below the loess consist of relatively unconsolidated deposits of sand, silt, clay, chalk, gravel, and lignite belonging to the Upper Cretaceous Series of the Cretaceous System and to the Paleocene, Eocene, and Pliocene (?) Series of the Tertiary System. Paleozoic bedrock occurs at depths exceeding 3,000 feet (Parks and Lounsbury 1975:37). Table 2 summarizes the post-Paleozoic units.

CLIMATE

Shelby County, Tennessee, is characterized by mild winters and relatively hot summers, with an average annual temperature of 62°F (Sease et al. 1989:2–5). July is the warmest month, with an average of 82°F, and January is the coldest month, averaging 42°F. The average date of the last

Table 2. Post-Paleocene Geologic Units Underlying Memphis (from Parks and Lounsbury 1975:38).

System	*Series*	*Group*	*Stratigraphic Unit(feet)*	*Thickness*	*Lithology and Significance*
Quaternary	Holocene and Pleistocene		Alluvium	0–175	Sand, gravel, silt, and clay.
	Pleistocene		Loess	0–65	Silt, silty clay, and minor sand.
Quaternary and Tertiary (?)	Pleistocene and Pliocene		Fluvial deposits (Terrace deposits)	0–100	Sand and gravel; minorferruginous sandstone and (?)clay. Supplies water to many shallow domestic wells in suburban and county areas.
			Jackson Formation and upper part of Claiborne Group ("capping clay")	0–350	Clay, fine grained sand, and lignite. Supplies water to some shallow wells made in sands below the fluvial deposits, but generally considered to be of low permeability and to confine water in Memphis Sand.
		Claiborne	Memphis Sand ("500-foot sand")	600–880	Fine- to coarse-grained sand; subordinate lenses of clay and lignite. Very good aquifer from which most water for public and industrial supplies is obtained.
Tertiary	Eocene		Flour Island Formation	160–130	Clay, fine-grained sand, and lignite. Low permeability confines water in Memphis Sand and Fort Pillow Sand.
		Wilcox	Fort Pillow Sand	210–280	Fine- to medium-grained sand; subordinate lenses of clay and lignite. Once used as second principal aquifer for Memphis; now reserved for future use.
			Old Breastworks Formation	250	Clay, fine-grained sand, and lignite.

freezing temperature in the spring is March 20; November 12 is the average date for the first freezing temperature in the fall. The average growing season is 238 days. Rainfall is abundant, averaging 49.70 inches per year. January is the wettest month, with an average of 6.07 inches; October is the driest, with an average of 2.72 inches. Average annual snowfall is 3.90 inches.

FLORA AND FAUNA

A summary of paleobotanical studies in west Tennessee (Delcourt and Delcourt 1978:16–19; Delcourt et al. 1978, 1980) suggests that a mosaic of oak-pine forest and prairies dominated the region from approximately 26,000 to 20,000 B.C. Evidence of colder and wetter conditions from about 20,000 to 15,000 B.C. is indicated by the increase of spruce and northern pines. On Nonconnah Creek in south-central Shelby County, the remains of a mastodon were recovered in association with extensive botanical remains. This material dates to about 15,000 B.C. (Delcourt et al. 1980; Brister et al. 1981) and is further evidence of the climatic conditions of this period.

The loess hills east of the Mississippi River offered a less extreme environment that allowed mixed deciduous forests to persist in localized areas throughout the full glacial period. A major warming trend, starting about 15,000 B.C., was accompanied by a gradual replacement of conifers with an increasing number of deciduous species including oaks, ash, hickories, walnut, and birch. By about 3,000 B.C., modern climatic conditions had been established.

Current vegetation communities in Shelby County are included in the Mississippi Embayment section of the Western Mesophytic Forest region, as defined by Braun (1964:157–161). Like the Mississippian Plateau section to the east, a mosaic of prairie, oak-hickory forest, swamp forest, and mixed mesophytic communities is present.

The first inhabitants of what is now Shelby County encountered a wide variety of native plants and wildlife. Alluvial ridges and natural levees in the bottomlands of major drainages supported red and sweet gums, bottomland oaks, ash, honey locust, and hackberry. Low-lying areas and sloughs supported cypress, water oak, willow oak, tupelo gum, birch, cottonwood, sycamore, willow, shagbark and scalybark hickories, and other water-tolerant hardwoods. The loess-covered uplands and slopes were predominantly oak-hickory forests, with white oak, southern red oak, post oak, black oak, beech, upland hickories, sweet gum, yellow poplar, basswood, dogwood, redbud, and walnut. Cane could be gathered in the floodplains, and varieties of shrubs, vines, and herbaceous plants inhabited the uplands (Braun 1964; USDA 1964; Sease et al. 1989).

Native mammals included bison, deer, black bear, wolf, fox, bobcat, raccoon, opossum, beaver, and gray and fox squirrels. The area also supported diverse reptiles and amphibians. Turkey was an important food source for early inhabitants of the area, as were migratory and resident ducks and geese. Fish from the larger rivers and streams, oxbow lakes, and beaver ponds were also an important food source for prehistoric and historic occupants (USDA 1964, 1970).

III. HISTORY OF THE PUBLIC LANDINGS AT MEMPHIS

OBJECTIVES AND METHODS

The literature and records search addressed specific research objectives: 1) documenting the history of building episodes at the Landing; 2) documenting ethnicity and socioeconomic status of the population in the vicinity of the site; 3) documenting nineteenth century settlement patterning in the project area and its relationship to the larger settlement system of Memphis; and 4) identifying buildings and other types of features that existed at the Landing.

Historical investigations included archival research of primary records such as newspaper accounts, city directories, government documents, deed and tax records, and census reports. Sources at the Memphis and Shelby County Library and Information Center (Memphis Room) included biographical data on owners, census records, minutes of the County Court, map sources, and published secondary historical accounts. Records at the Shelby County Archives and the Cossitt Branch Library in Memphis were also reviewed. In addition, Garrow & Associates in Memphis maintains an extensive corporate library of contract reports from around the nation, historical accounts and maps from the region, information on the history of technology, and theoretical works.

HISTORY OF THE MEMPHIS LANDING

Even though the Mississippi River was still a minor transportation artery in 1819, the original proprietors of Memphis, through William Lawrence, the surveyor of the original town plan, reserved a sweeping public space at the edge of the Fourth Chickasaw bluff. The "Public Promenade" stretched across the entire river frontage of the new town, from the mouth of Bayou Gayoso on the north to the south line of the Rice Tract, the location of today's Beale Street. The Promenade was roughly divided into three parts. From Union Avenue south to the south line of the Rice tract, the Promenade extended west to the river's edge from the line of what became Clinton Street (approximately Wagner Street today). From Union Avenue north to Auction Avenue, the line of the Promenade jogged east one block to the west line of "Mississippi Row," later named "Front Row" and known today as Front Street. Exchange Square was in this part of the Promenade between Exchange and Poplar avenues, the site of the Ellis Auditorium today. North from Auction Avenue, the eastern edge of the Promenade again jogged one block closer to the Mississippi River. The riverfront extending north to the bayou was set aside as the "Public Landing." Approximately half of the Public Landing was on the Wolf River, upstream from its confluence with the Mississippi (Harkins 1982:34).

Only the part of the Promenade set aside as the "Public Landing" was intended for that purpose. Instead, the proprietors saw the promenade as a park-like space, intended for walking and other leisure activities to "contribute very much to the health and comfort of the place, as well as to its security and ornament" (Overton 1820, in Harkins 1982:34). Although the Promenade was included on the original 1819 city plan, the property was not officially transferred to the city until 1828 (Sigafoos 1979:8).

Over the course of the nineteenth century, four distinctly different public landings were developed on the Memphis river frontage. These landings were the original Public Landing (1819; between Auction and Winchester avenues), the Center Landing (ca. 1844--1845; between roughly Adams/Washington and Poplar avenues), the so-called "Cobblestone Landing" (ca.

1850; between Jefferson and Union avenues), and the South Memphis, or Beale Street, Landing (ca. 1838; between Union Avenue and Beale Street). All were within the area designated by the proprietors as public space, but only the original landing, a small part of the city's entire frontage, was originally envisioned for landing purposes. Parts of the Promenade were never developed for landing uses but still remain in the public domain. Front Street Station (former U.S. Customs House), Cossit Library, Confederate Park, Fire Station No. 1, the Pyramid area, and the Ellis Auditorium all occupy the Promenade, as do the Mud Island Terminal and Parking Garage, the Shoppers' Parking Garage, and the Lowenstein Parking Garage.

The Original Memphis Landing (ca. 1819)

The earliest development of Memphis was concentrated at the northern end of the city plan, largely north of Poplar Avenue. The development of the city in this locale was largely due to its proximity to the original river landing, immediately west of the settlement. The "Public Landing" provided for in the 1819 plan was an ideal landing for flatboats because its slope was relatively flat and its harbor was sheltered from the currents of the Mississippi River. Flatboats could maneuver in the relatively slack waters of the Wolf River, and the shallow drafts of the flatboats allowed them to ground directly on the landing itself. The same was apparently not true for steamboats, whose deeper drafts hampered their use of the landing. However, a wharfboat could provide enough distance from the landing for the steamboats to remain afloat while discharging passengers and freight (Davis 1873:114–115). The privilege of operating the wharfboat was licensed by the mayor and board of aldermen for the City of Memphis. Fees for its use were collected and shared by the wharfboat operator and the City.

The significance of the Public Landing in the Wolf River Harbor began to wane in the early 1830s with the accretion of a sandbar across the west and southwest frontages of the landing. The bar greatly increased the distance freight must be hauled from the water's edge across a surface that was only solid during the driest months of the year. A wooden walkway and wharf were built across the bar in 1837 at the end of Winchester Street, but the sandbar's continued growth rendered the wharf useless by 1838 (Davis 1873:114–115).

Development of Center Landing (ca. 1844–ca. 1886)

The now-infamous sandbar on the Memphis riverfront, called the "Batture" in nineteenth century accounts, is the topographical ancestor of today's Mud Island. As at many cities and towns along the Mississippi River, the delineation of the river's edge at Memphis was as fluid as the waters of the river itself. The Mississippi would periodically—sometimes annually—change its course, and its currents would build up land in one place and remove it from others. The growth of the Batture exemplified the river's fickle nature. The Batture did not exist in 1819, but by 1858 it had grown into an elongated triangle roughly a mile long at its base and nearly a quarter mile wide at its apex, stretching from the mouth of the Bayou Gayoso south to Jefferson Street (Rucker 1858). More than 18 formal city blocks were eventually developed on this new land once it had been raised above flood stage by paring down the bluffs to the east and depositing the fill on the Batture (Davis 1873:166).

One result of the Batture was that the original flatboat and steamboat landing became unusable. The movement of the landing to the south became a reality in 1838 when:

> . . . owing to a great extension of the bar . . . it became too shoal at low water for the steamboats to land at; in consequence of which Captain William W. Hart, the owner of the wharfboat *Orleans* dropped her temporarily some three or four hundred yards

> below the wharf [then located at Winchester Street], where the bar was more bluff . . . . [Davis 1873:115–116]

When the mayor and board of aldermen ordered Hart to return to the site of the original landing at Winchester Street, Hart refused and "drop(ped) his boat below the corporation line" at Union Avenue (Davis 1873:115–116). He reestablished the wharfboat at the foot of what was to become Hotel Street, as noted on land surveys from the early 1840s (SCDB M:246–247). Apart from his duties as wharfmaster, Hart was also general mail agent for Memphis; his relocation meant that mail was no longer delivered directly into Memphis by boat. Early historian James Davis relates, "taking advantage of this, the denizens of South Memphis conceived of the idea of laying off another town" (Davis 1873:116), an effort begun ca. 1840–1841 (see below).

Though Hart's wharf was attractive to the steamboat trade, the focus of the flatboat trade remained near the southern end of the Batture. Again, this was likely due to the shallow slope of the landing, but also to its proximity to the edge of the bluff. In ca. 1841, the flatboats "lay above Adams [Street], and the best stands [business houses] were found in that vicinity. The consequence was that businesses, which had strung out along Front Row, began to concentrate in that locality" (Davis 1873:117–118).

During the early development of Memphis, ca. 1820–1840, the river trade was dominated by the flatboatmen. By all accounts, the flatboatmen were rough, crude, and thoroughly contemptuous of local authority. Apart from their lawlessness, the flatboatmen largely refused to pay their wharfage fees, and the civil authorities were ill-equipped to back the wharfmaster in collecting them (Harkins 1982:49–51). Hart may have moved his wharfboat to South Memphis because he could not make money from the flatboatmen and decided to cater to the growing steamboat trade instead.

The City, under Mayor William Spickernagle, moved to instill authority over the flatboatmen in 1841. A new wharfmaster was hired, and his commission on wharf fees was increased to 25 percent as an incentive to their collection (Harkins 1982:49–51). Local militias were also formed to back the authority of law. Although the boatmen first acquiesced to this new authority, the following spring 2,000 of them revolted against the wharf fees in an event called the "Flatboatmen's War." It was quickly put down by a combined force of militia and citizens, ending the flatboatmen's hold on river commerce at Memphis.

In 1844, the City formalized the development of the Batture, whose ownership had been contested by several land claims since the 1830s (Watkins 1899:9). The major component of the Batture's development was the Memphis Naval Yard, north of Market Street on the site of the present Pyramid Arena. West of Front Street between Market and Adams streets, 18 city blocks were laid out and divided by new roads named Cypress, Vine, Locust, Walnut, Dock, Fulton, Clinton, and Water streets. Warehouses, stores, taverns, small manufacturing facilities, and even a hotel were established on the Batture in the middle 1840s. At the center of this development, between the extensions of Poplar and Washington streets, was Center Landing, the second formal landing place developed by the city in its history. A "public levee" extended along the river frontage on both sides of Center Landing.

Center Landing developed as the focal point of antebellum river traffic, largely due to the commercial enterprises developed in close proximity to the landing well west of Front Street. Commerce at this landing was quite diverse. There were business houses dealing in hay, grains, meats, ice, coal, and groceries, as well as manufacturing concerns fabricating boilers, castings, and other services tailored to the river market (Rainey 1855). After ca. 1850, the Great Memphis Landing, also known as the Cobblestone Landing, began to take over the business of

the cotton factors and wholesale grocers of Front Street, along with most of the passenger arrivals and departures for Memphis.

Center Landing remained a prominent part of the Memphis waterfront until ca. 1865, when changes in the currents of the Mississippi slowly began to erode the Batture (Watkins 1899:10). In the late 1870s, a new levee was built at the Batture to stem the erosion, but these efforts proved futile (*Memphis Daily Appeal [MDA]*, 9 April 1881:4). By 1886, the paved frontage flanking the open square of the landing had slipped into the river. In the same year, the river began to accrete a sandbar once more in this location, adding as much as 77 acres to the Batture by 1894 (Watkins 1899:11–12). By the turn of the twentieth century, Center Landing was largely a memory, although businesses such as the St. Louis & New Orleans Anchor Line Elevator (ca. 1880–ca. 1898) remained to serve river traffic. Today, the Lonestar Industries concrete plant is all that remains of this once significant business place.

Development of the Great Memphis Landing (ca. 1850–Present)

During the 1840s, Memphis began to mature as a significant river port, fueled by the vast trade in the export of the region's cotton and the import of finished goods and materials upriver from New Orleans and downriver from Cincinnati, Pittsburgh, and the cities of the East. Memphis was one of the important "jumping off" points for the settlement of the West, and the city's population exploded with new residents, many of them recent immigrants.

Memphis grew south along the established street grid until it met the boundary of the independent city of South Memphis at Union Street. South Memphis had begun as a speculative land venture in the 1830s and grew to rival its older neighbor by the early 1840s. South Memphis developed its own busy landing at the foot of Beale Street. The construction of the Gayoso House hotel in 1841 on Shelby Street in South Memphis was proof of the rival town's wealth and determination. The two cities were unified in 1849.

The sense of rapid growth in the Memphis area at this time is summed up in the introduction to the 1849 Memphis City Directory:

> In 1841, Memphis extended very little below Poplar street, there being at that time but one brick house south of that street. In fact, as late as that year, the land upon which the Gayoso House now stands was an old field, surrounded by open wood, where the youth of the city, who have yet but sparsely cultivated beards, were in the habit of shooting squirrels and other game (Twyman 1849:109).

The growth of Memphis to the south extended primarily along Front Street (called Shelby Street south of Union Street) and Main Street. Main Street became the primary retail corridor for the growing city; Front Street became the primary corridor for the business houses of its cotton factors and wholesale grocery brokers. Center Landing, which had been paved with rubble stone before 1859, was still the city's center for river trade (Watkins 1899:9). However, the rapid growth of steamboat traffic on the Mississippi River and the need for greater convenience for the cotton factors of southern Front Street necessitated the expansion of the city's landing area. In short, as Memphis grew south towards Union Avenue, the need for convenient proximity to the landing moved with it.

Views of the Memphis waterfront from the 1840s through the 1870s show the Landing at the Public Promenade as a broad, smooth, steeply sloping embankment in front of a steep bluff-edge (Henry Lewis ca. 1840, in Harkins 1982:54; Anonymous 1861). The eroded edge of the bluff extended farther west than it does now, and lateral roadway cuts were aligned with

Union Street, Monroe Street, and Whiskey Chute (the east-west alley between Court and Madison streets) to connect Front Street with the Landing (Boyle & Chapman 1872).

Though the Landing is pictured as smooth-surfaced in these early views, this condition probably was not natural. Other images of the Chickasaw Bluffs north of Jefferson Street in the ca. 1830s reveal an eroded bluff above a roughly scarred river embankment, perhaps the result of the combination of bluff sloughage and river accretions over time (Anonymous ca. 1830, in Harkins 1982:48). If the images from the 1840s are accurate and the area of the Promenade was regularly sloping and smooth, this character likely resulted from the leveling and fill-work in the early 1840s to make the Promenade a more efficient landing. The limited time available for this study did not allow for further research on this issue.

The Memphis riverfront teemed during the 1840s and 1850s, as steamboats and flatboats continuously came and went from the Landing. A sample of the activity on the Landing is indicated by a report of the wharfmaster to the mayor and board of aldermen of Memphis in September 1859. The report notes that during August, 102 "steamers" had arrived at the Landing along with seven flatboats (*MDA*, 7 September 1859). Even though in this era August would have been a slow month for shipping (compared to the spring months or the autumn after harvest), an average of four river vessels arrived every day at the Memphis Landing. It is not known if the wharfmaster's report included the arrivals of Memphis-based packet lines, which held annual leases for their use of the Landing.

Even though the Memphis & Charleston Railroad had begun regular service in 1857, the river landing was at least as important to the city and its commercial well-being as the Memphis International Airport is now. The wharf fees, averaging $20.72 per flatboat and $10.37 per steamboat, were an important, regular source of revenue that allowed the city to prosper (*MDA*, 7 September 1859).

The explosion of river traffic at the Memphis riverfront in the 1850s made the expansion of landing areas a critical priority. It is unclear exactly when steamboats began tying up to the area of the Public Promenade between Jefferson and Union avenues rather than Center Landing or the South Memphis Landing. It is entirely possible that this area of the promenade was simply always considered available for use. Except for a roadway cut that led up the bluff to the level of Front Street, the steamboats required little more in the way of improvements in the landing, as long as the grade of the bank permitted the boats to move close to shore without grounding. Since the promenade was city property, the wharfmaster would still collect fees, whether a boat landed at Center Landing or a muddy stretch of shore a quarter-mile away.

Center Landing was no longer able to meet the demands of the traffic on the Memphis riverfront by ca. 1850; the riverfront between Jefferson and Union avenues was its "safety valve." However, the lack of an easily maintained surface on the Landing caused great difficulties for the stevedores who loaded and unloaded the boats, as well as for the draymen who hauled the goods up and down the grade of the Landing. Wet clay and sand churned by the iron wagon tires and hoofs of oxen and mules made the Landing virtually impassable in rainy weather. The problem was compounded by the exposure of the Landing to the river's current, which would have made it unstable at the water's edge.

Paving of what was to become the Great Memphis Landing became a priority of the city government in the late months of 1858. After all, the steamboat captains had only to deliver the freight on their boat to the Landing, but the Front Street merchants had to see that the freight, whether groceries or cotton bales, was removed from the Landing to the business houses of the city, or vice-versa. In addition, a sense of civic responsibility and public appearance had emerged by the 1850s.

Though some accounts indicate that Center Landing had been paved with "rubble stone" before 1859, that would have been a small project compared to paving the landing between Jefferson and Union avenues. The original proposal enumerated the scope of the project:

> Alderman Douglass, from the Committee on Improving the Wharf, introduced a plan for paving the wharf with limestone or granite, of not less than four nor more than eight inches in surface, to be laid on gravel not less than five nor more than eight inches in depth; the width of the pavement to be 100 feet, the length 3300; the total expense [estimated to be] $83,333.00." [*MDA*, 16 March 1859]

After the plan was amended by calling for the paving to be 12 inches deep and have a uniform grade, the board voted to adopt the report and contract the project with the lowest bidder.

This massive paving project was arguably the largest public works project conceived by the City of Memphis during the antebellum era. The completed revetment would stretch from the north end of Jefferson Street to the south line of Union Street at Howard's Row. The east end of the paving line ended at about the level of present-day Riverside Drive and stretched down the embankment to a level about equal to the 0.0 mark of the river gauge at Memphis.

The low bid for the paving project was submitted by John Loudon (often spelled Lowden and Lowdon) of Cincinnati, Ohio, and a contract for the project was approved in May 1859 (CM 1859a; *MDA*, 4 May 1859). Work on the project awaited the arrival of low water in the late summer of that year. The local newspapers reported with enthusiasm that "the first stone of the pavement at the city wharf was put down by Mr. John Lowdon, the contractor, Friday evening [September 2] and will be pushed forward to rapid completion" (*MDA*, 4 September 1859).

John Loudon (1800–1884) is an intriguing figure of the antebellum period. Born in Loudon County, Virginia, and raised in Kentucky and Ohio, Loudon took up residence in Cincinnati after his marriage to Narcissa Boyd in ca. 1825. In Cincinnati, Loudon became a stonemason and stone paving contractor and was responsible for the construction of the stone Front Street bridge over the Miami River Canal. He also completed the paving of Broadway, the first stone paving project for that city (Mathes 1897–1899:138).

Loudon moved to Memphis from Cincinnati in ca. 1859 and won the contract for the paving work of the new Memphis Landing. What seemingly set him apart from his peers in the Memphis project was his ownership of the steamboat *Granite State*, along with a series of barges used to haul stone for his contracting projects from quarries on the Ohio River (Mathes 1897–1899:138–140). The *Granite State* was commanded by Loudon's son Milton B. Loudon (ca. 1838–1873), who with his brother Hopkins Loudon coordinated the shipping of materials for his father's contracting projects (Mathes 1897–1899:258–259). That Loudon owned his own small shipping company suggests that his influence on building projects in the 1840s and 1850s could have extended well beyond that of his few known projects in Memphis and Cincinnati.

It is a popular misconception that the stone materials employed in the paving of the Great Memphis Landing originated as ship ballast, deposited in New Orleans by English or Irish sailing ships delivering baled cotton back to Liverpool (*Commercial Appeal [CA]*, 10 January and 16 May 1957). Such stories are common in riverside and coastal towns, but in the case of Memphis it is clearly no more than a charming myth. The actual source of the original stone paving was noted in city documents and newspaper accounts, which reported, "the towboat *Granite State* arrived from Cave-In-Rock yesterday, with another heavy tow of stone for paving purposes at the Landing" (*MDA*, 25 September 1859). Although the stone for Loudon's paving of the Cincinnati landing probably came from the limestone hills above that city, the limestone

used for his initial project in Memphis was probably quarried on the lower reaches of the Ohio River in Hardin County, Illinois, near the tiny port town of Cave-In-Rock.

Loudon's work in paving the wharf was not easy. It was beset immediately by problems with his labor force:

> Notwithstanding the strike among laborers in the employ of Mr. Lowdon at the Landing on Friday [September 9, 1859], a full force was engaged yesterday upon the grade and pavement, and the work of paving the Landing will be pushed forward with vigor. [*MDA*, 11 September 1859]

The ethnic composition of Loudon's work force is unknown in spite of the great attention the local press focused on the project. It may have been composed of slave labor, free labor, or a combination of both. The strike incident suggests that at least part of the work force was free laborers, perhaps immigrant masons who had found previous employment on railroad projects.

The strike was not Loudon's only difficulty; his task was immediately complicated by problems with the site:

> The new grade at the river, near the new wharfboat, does not seem to be permanent, as it has been caving in constantly since it was made by the contractor for paving the city wharf. A large area of earth disappeared from the foot of Court Street into the river Monday night [September 12, 1859], and a considerable portion of the grade yet in sight bids fair to 'go the way of the Earth' on the banks of the Mississippi. [*MDA*, 14 September 1859]

In response to the problem, the mayor and board of aldermen called a special meeting on September 13, 1859, where "there was some discussion of the mode of paving at the landing, adopted by Contractor Lowdon" (CM 1859b). The mayor was authorized "to employ an Engineer to superintend the work of paving the wharf" (*MDA*, 14 September 1859). The cause of the problem was not reported in contemporary newspapers but may have been that "certain sewers were not built according to contract," as suggested by Mayor R. B. Baugh in the special board meeting of September 13. It is equally likely, however, that the grade was being undermined at its lowest edge by the scouring of the river current, as the contract made no mention of installing riprap to protect the Landing from undercut erosion.

It is also unclear how the undermining problem was corrected; its resolution was not discussed in succeeding news accounts or mayor and board meetings. No evidence was found during the preparation of this report to indicate that the city ever retained the engineer approved by the board of aldermen. However, the paving project clearly was not finished in 1859 or 1860. Minutes of the mayor and board of aldermen provide some explanation for the length of time incurred in the project. For example, they changed the contract to require "that the Engineer be instructed to so change the grade of the wharf as to have at least six hundred feet of such grade as to give the large class of boats free and convenient access to the same" (CM Minutes June 21, 1860:738).

The same source shows that Loudon was paid for various work on the Landing as late as September 1861 (CM Minutes September 4, 1861:535). Loudon's biographers strongly suggest that he did not finish his contract before the arrival of Federal forces in Memphis in June 1862. It is clear, however, that most of the paving project was completed well before then. Indeed, according to an "audit" of the project by the City in August 1860, the paving portion of Loudon's contract was already largely done. In this audit, the City Engineer found that the work "by John Lowdon, contractor, during the years of 1859 and 1860 to be charged under the contract" included:

12,428.88 sq. yards paving between Adams and Jefferson Streets at $2 20/100 per yard	$27,343.50
7,129.39 sq. yards paving between Union and Beale Streets at $2 20/100 per yard	$15,684.66
1,784 6/10 lineal feet stone curb at $0.25 per foot	$446.15
14 anchors @ $12.00	$168.50
Total Due Lowdon	$43,642.34

The audit also noted, "Mr. Lowdon has on the wharf unused some 3000 purch [sic] of stone," estimated at a value of $9,000.00. A perch is a measure of stone equal to 5.5 cubic yards (Smith 1831:285), making the amount of unused stone on the Landing in August 1860 equal to 16,500 cubic yards.

The audit appears to contain a significant mistake—no pavement between Jefferson and Union streets is accounted for. A previous review of the project by the mayor and board of aldermen and the City Engineer inspected the quality of the "work done above Union and below Adams Street" and approved this portion for payment (CM Minutes July 27, 1860:59–61). It appears that the audit accounting of the pavement between "Adams and Jefferson" was a simple error and should have read "Adams and Union."

The audit also noted an unfinished part of Loudon's contract that required him to "grade from the wharf" some 40,000 cubic yards of earth at no charge. Grading work in addition to the stated amount would be charged to the City at $0.20 per yard (CM Minutes August 10, 1860:88–89).

Though Loudon's contract was largely completed, repair work was already needed: "that portion of the nine inch pavement between Union and Beale Streets which has given way and sunk [must] be taken up and relaid by said Lowdon" (CM Minutes August 10, 1860:88). The settling of the grade was attributed to the lack of "sewers or drains underneath said pavement necessary to conduct all water beneath it to the river." Correction of the problem was agreed to be the responsibility of the City (CM Minutes, August 10, 1860:88–89).

A colorful and somewhat ominous story contained in a biographical sketch of John Loudon suggests one other possibility for the delay. In this story, Loudon was still working on the Memphis Landing project when the Civil War erupted in 1861:

> He was returning with his steamboat and barges loaded with stone from the Ohio river to complete the work, when on his arrival in Cairo, where Gen. U.S. Grant was already posted with a strong force of Federal soldiers, he was quickly made aware of their presence by a cannonball being fired across the bow of his tow, which compelled him to round to. Gen. Grant, who knew Captain Loudon, inquired of him whether the stone on the barges was intended for Southern forts and breastworks, and on being assured that it was intended only for paving the wharf at Memphis, and not contraband for war, he allowed the fleet to proceed, but remarked, 'Captain, tell the people down there that they need not trouble themselves to lay those stones on their wharf, as we will be there before long and have need of them.' The stone reached Memphis safely, being unloaded on the wharf, where needed, but was destined never to go into the pavement, as, true to his promise, General Grant, when making his move against Vicksburg, had the same stone and a great deal more which Mr. Loudon had on hand for paving purposes,

> reloaded onto Loudon's model barges and taken to Vicksburg and thrown into the river for the purposes of changing the channel there. [Mathes 1897–1899:139]

City records confirm that Loudon was still at work on the Memphis Landing and other projects in September 1861. At the same time, Ulysses S. Grant was staging the start of the Tennessee River Campaign at Cairo, so it is possible that Loudon might have encountered Grant during one of his trips to Cave-In-Rock to quarry stone for last phase of his Landing contract. The story related above by J. Harvey Mathes continues that after the war, Loudon "returned to Memphis and completed his wharf contract, which is a lasting memorial of his usefulness" (Mathes 1897–1899:140). That work on the Landing continued after the war is confirmed by the following news report:

> Ground was broken yesterday for the new paving on the levee, which is to extend from Jefferson to Monroe Street, and to be one hundred feet in width, composed of square blocks of stone. About twenty laborers were at work this morning. We hope that the contractor will push this matter through, so that those who have business on the levee will never more have to wade ankle deep in slush. [*Public Ledger [PL]*, 19 June 1866]

The work underway in July 1866 was being carried out by John Loudon under contract with the City of Memphis (CM Minutes June 16, 1866:5). However, the mayor and board of aldermen's minutes for the period 1862–1866 have been lost or misplaced, and the details of Loudon's contract authorizing this work would be contained in that volume. The area of the project described in the 1866 news account (from Jefferson to Monroe) appears to overlap part of the project completed by 1860–1861 (Jefferson to Union). Since there is no corroborative evidence available at this time to detail the scope of Loudon's new contract or its conditions, several possibilities are suggested.

First, the river's edge in the area of the Batture north of Jefferson was prone to erosion from ca. 1859 to ca. 1884 (Watkins 1899:9–10). The erosion was already underway in 1861 when the mayor and board received proposals "for the sinking of a barge or other river craft with sufficient stone or other material to hold it in place at the landing below Poplar Street where the bank is now being washed away" (CM Minutes August 21, 1861:533). It is possible, therefore, that the new 1866 contract with Loudon was needed to repair damage in the area immediately downriver from the area being washed away in 1861.

Second, it is possible that Grant did remove stone work from the Memphis Landing, perhaps not only the supply piles of loose stone collected on the Landing by Loudon, which were in existence in 1860, but also the pavement laid by Loudon between 1859 and 1861. If so, Grant's intent apparently would have been to employ the stone in the construction of Grant's Canal on Young's Point, Louisiana, in his attempt to divert the Mississippi away from the cannon batteries of Vicksburg. However, no known news reports, city records, or secondary historical accounts support or suggest Loudon's story as reported by Mathes.

Third, and most likely, is the possibility that Loudon's original work on the Landing survived the war at least somewhat intact, and the 1866 project extended the earlier pavement. The completed strip of 1859–1861 paving is known to have been 100 feet wide, as stated in the original contract (*MDA*, 16 March 1859), but where this paving was laid within the elevation of the bluff grade itself is unnown. Was the bottom edge of this strip laid near the existing 0.0 foot mark on the Memphis gauge, or at the 10.0 foot or 20.0 foot mark? It is much more likely that the new work begun in 1866 was to extend the east-west width of the paving, as opposed to replacing part of the paving lost between 1861 and 1866.

Memphis and its river commerce recovered with surprising speed from the Civil War. Evidently, the Landing was completed from Monroe Street south to Union Street sometime

between 1866 and 1872. The city council minutes of August 1, 1868, include the following passage:

> John Lowdon calls attention to caving conditions of public landing Northward from Jefferson Street, a strip 700 x 100 already having disappeared carrying away $20,000 work of paving; that caving could be stopped by sinking of two or three old barges loaded with gravel opposite the head of "Old Hen."

On October 7, 1968, the city council minutes state: "Resolution presented to permit the contract of M. & J. Lowden to be extended to include unpaved portion of city wharf from Court to Union, work to be done within 60 days." In 1869, the City Engineer instructed J. & M. Loudon to pave the Landing at the foot of Union Street.

The local press began to clamor for the extension of the levee in 1872, when it was expected that "the City of Memphis, in all probability, will be forced to buy Howard's Row and all of the property bounded by Union, Shelby [South Front] and Beale Streets, so that space can be used to enlarge the city's levee and give more wharfage room to steamboats" (*CA*, 1 February and 19 February 1947).

Since then, periodic repairs and routine maintenance have been needed to reverse the effects of occasional erosion (CM Minutes, May 27, 1879) or, in much more recent times, the spalling of the older limestone blocks (*CA*, 13 October 1978). In turn, occasional removal of the pavement was necessary to carry out other public projects, as evidenced by the 1879 ordinance of the City of Memphis that requires "parties laying sewers to the River to use Iron pipe under the Landing" (CM Minutes, April 22, 1879).

The uppermost (eastern) edge of the Landing pavement was altered between 1881 and 1882 during the construction of the Mississippi & Tennessee Railroad. During the same period, stone blocks were used to pave many city streets, and paved roadways finally connected Front Street with the Landing (*MDA*, 31 July 1880; CM Minutes, December 9, 1880). These efforts also required the removal of "all of the bluffs out of their line between Beale and Jefferson (save that between Union and Monroe), amounting to over fifty thousand cubic yards" (Engineer's Report, in CM Minutes, December 31, 1881).

The South Memphis Landing (ca. 1838–Present)

The part of the Memphis Landing between Union Avenue and Beale Street possesses a unique history over for a forty-year period during the nineteenth century, after which it becomes an extension of the Great Memphis Landing. The South Memphis Landing, also known as Hart's Landing and the Beale Street Landing, was established several years before Center Landing, making it the second oldest of the four landings at Memphis and the older of the two surviving landings. Its importance to the history of Memphis is due to its association with the rise of the rival city of South Memphis and with its service to the famed Gayoso House hotel, immediately above the Landing on the river bluff.

The earliest references to the South Memphis Landing can be traced to 1838, when the wharfboat *Orleans* was removed by its captain, William W. Hart, from its moorings at the original Public Landing of Memphis at Winchester Street and relocated "below the corporation line" (Davis 1873:115–116). The location of Hart's new steamboat landing is confirmed by two 1841 plats prepared to establish a formal street grid, subdivision pattern, and riverfront of lands held by the South Memphis Company (SCDB M:242–247). The plats were necessary to formalize a complex real estate transaction that led to the development of the Gayoso House hotel by Robertson Topp, George McCall, and William Vance, principals in the South Memphis

Company, and Thomas Haralson, a neighboring property owner. Notations on the plats give every indication that their purpose was to formalize several existing lots, roadways, and land boundaries in this area of South Memphis (Figure 9).

The arrival of Hart's wharfboat proprietors apparently influenced the South Memphis Company to take action on the establishment of a new town, intended to rival its neighbor to the north (Davis 1873:115–116). Although the original plan of Memphis extended south of Union Avenue to the line of what would become Beale Street, the corporate line for the city established in 1827 ended at Union Avenue. The land south of Union Street was considered an annexation reserve area, and the lots sold by the Memphis proprietors in the area were termed "county lots." It is suggested that the partners of the South Memphis Company intended to force annexation of their property by making significant improvements to the land, with the Gayoso House hotel as their cornerstone. When the City of Memphis did not respond with annexation following the opening of the Gayoso House in 1844, the South Memphis Company partners turned to formal incorporation of the City of South Memphis in 1846–1847. The City of Memphis was forced to recapitulate in 1850 after a public call to unify the two cities (Harkins 1982:62).

With the relocation of Hart's wharfboat in 1838 came new access to the river landing. The 1841 plats identify "Hart's Landing" at the foot of Hotel Street, more or less aligned with the temple-front facade of the Gayoso House. The bluff west of Shelby (Front) Street between Beale Street and Union Avenue was much steeper than that north of Union Avenue, as revealed in the 1870 "Bird's Eye View of Memphis" (Anonymous 1921). Roadways connecting Front Street with the river landing were few due to the deep grade cuts necessary to traverse the steep bluff edge. As a result, roadways were only at McCall and Beale streets, according to the 1870 "Bird's Eye View" and other contemporary maps.

The 1841 plats are the last known references to "Hart's Landing" or William Hart. Assuming that Hart were still alive in 1850, when South Memphis formally merged with Memphis, his steamboat wharf would have been rendered obsolete, with his control of the landings and the collection of wharf fees superseded by the jurisdiction of the Memphis wharfmaster. This does not mean that the South Memphis Landing ceased to be a viable landing for the commercial interests of the southern part of the city. Memphis was made the Naval Station for the Mississippi River Squadron after Federal occupation in 1862, and the Landing was the harbor for its fleet (Sigafoos 1979:43). The South Memphis Landing probably was the major landing for troops stationed at Fort Pickering during this period. In a ca. 1866 illustration from *Harper's Weekly* (in Harkins 1982:8), a line of soldiers is depicted marching up the Landing. The shortest route from the Landing to Fort Pickering would have been along Tennessee Street, shown in the illustration at the crest of the bluff south of the Landing (Figure 10).

Improvement of the South Memphis Landing was first attempted in 1859–1861 as part of John Loudon's paving contract for the Landing above Union Street (CM Minutes, August 10, 1860:88–89). The South Memphis portion of the contract was made with 9-inch-deep stones (as opposed to the 12-inch-deep material to the north). Almost as soon as the paving work on the South Memphis Landing was completed, the subsurface base of the paving had "given way and sunk" (CM Minutes July 27, 1860:59–61), apparently due to the lack of drains beneath the paving. Loudon and the City agreed to work together to take up the paving and to re-lay it once drains were installed, but there is no evidence to confirm that this revision of the project was completed. The work probably was put off by the onset of the Civil War.

The 1870 *Bird's Eye View of Memphis* (Anonymous, 1921) reveals a landscape much different from that indicated by the ca. 1866 *Harper's Weekly* print. In 1870, the South Memphis Landing area is depicted as a rugged terrain with only a narrow band of low, flat ground at the river's edge, which could have been covered by high water during much of the year (Figure 11). From

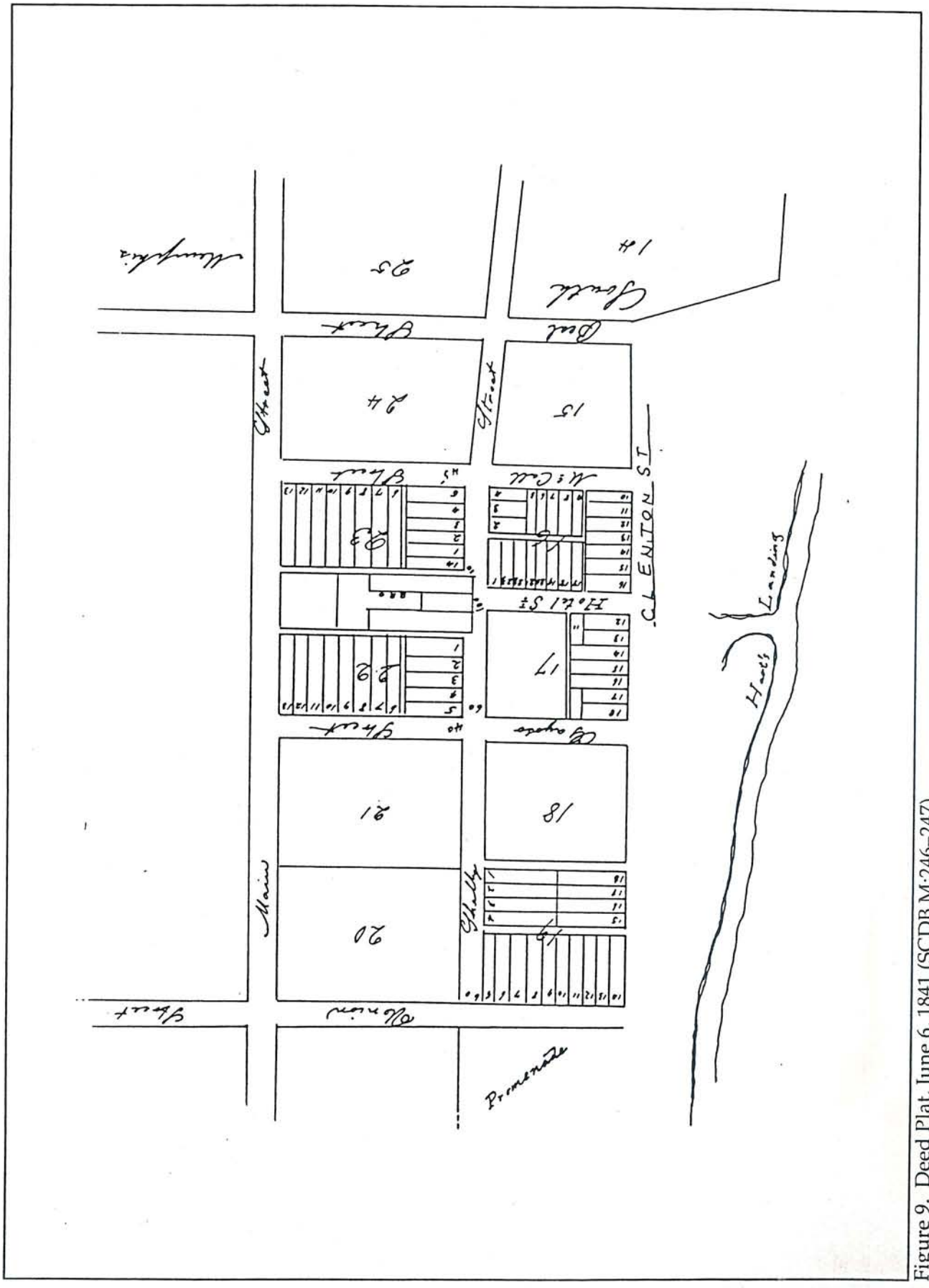


Figure 9. Deed Plat, June 6, 1841 (SCDB M:246–247).

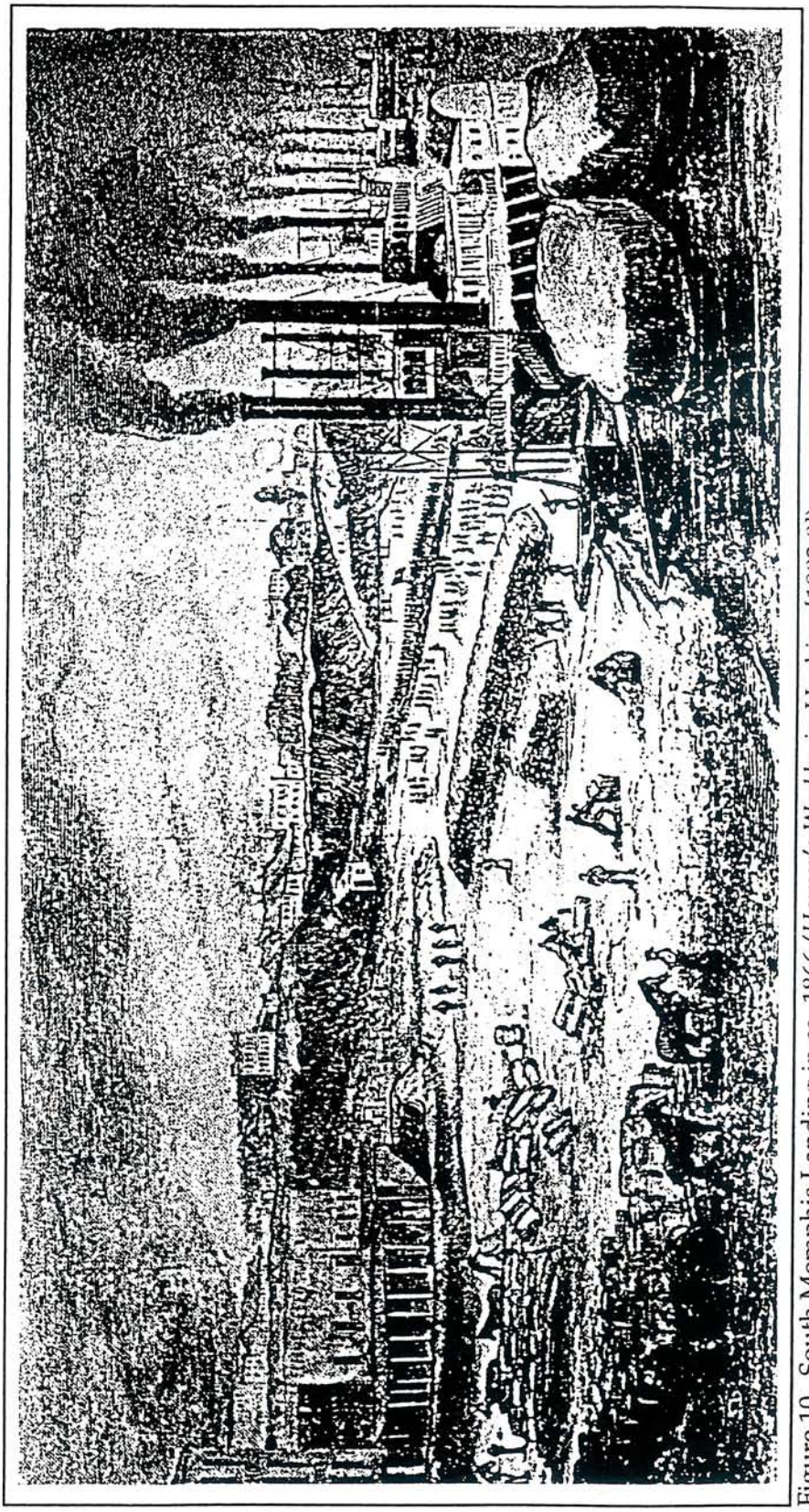


Figure 10. South Memphis Landing in ca. 1866 (*Harper's Weekly*, in Harkins [1982:8]).

Missing page 28
(probably drawings)

its upper edge along Shelby Street, the Memphis bluff descended to the Mississippi River in a series of rough terraces. South of Beale Street, the steep edge of the bluff meets the river, making Beale Street Landing the southernmost landing in the city. Steamboats and barges were tied up to small docks north of Beale Street supported and secured by wooden pilings. The conditions of the South Memphis Landing documented in the 1870 "Bird's Eye View" were little changed from its appearance in 1841 and may have been similar to the appearance of the Memphis Landing before early grading work in the 1840s.

The differences between the landing terrain shown in the ca. 1866 *Harper's Weekly* print (in Harkins 1982:8) and the 1870 "Bird's Eye View of Memphis" are substantial. Given descriptions of the later grading work needed to pave the South Memphis Landing, the view of the terrain in the "Bird's Eye View" is more likely correct, though it shows no evidence of the paving strip laid down by John Loudon in 1859–1861. It is entirely possible that this paving had previously collapsed into the river or been covered by the collapse of the bluff terraces above the Landing at South Memphis indicated in the "Bird's Eye View."

In spite of these difficult conditions, the landing at South Memphis was extremely active in serving large river-related enterprises nearby. Large antebellum concerns such as the Duval, Algeo & Company "Mammoth Ice House" on Beale Street depended on access to the Landing both to unload the tons of ice delivered annually to their ice house from Illinois and to service the shipping companies and passenger boats that plied the river (Williams 1860:72). Apart from freight traffic, the Landing was also where passengers disembarked for their stay at the Gayoso House, the city's premier hotel in the antebellum era.

The significance of the South Memphis Landing to the city's river commerce changed dramatically in 1871 with the start of construction on the Vicksburg & St. Louis Anchor Line's massive freight elevator at the foot of Beale Street, which was completed July 17, 1872, at a cost of approximately $125,000 (*MDA*, 3 July 1878). Maps indicate that the footprint of the building stretched more than a city block, from the north side of McCall Street to the south side of Beale Street (Boyle & Chapman 1872) (Figure 12), "covering nearly an acre of ground" (*MDA*, 3 July 1878). Like a grain elevator, this facility was built as a storage and transfer building on the river landing that could handle material cooperatively among many owners. Unlike a grain elevator, this facility was built to handle "packaged" goods in crates or barrels in both large and small quantities, ready to be loaded onto packet boats from its riverside floating dock.

The scant descriptions of this facility suggest that the elevator stood three or four "stories" high and open to the elements except for the top floor, which was enclosed for offices and other facilities (*PL*, 4 July 1878; *CA*, 15 January 1941). The structure was built so that rising river waters might inundate one floor, leaving the next higher floor operational for the storage and distribution of the material to the floating dock. Though undocumented, the movement of freight up or down inside the building was likely assisted by a rudimentary freight elevator.

There are no known contemporary photographs or drawings of the elevator. However, descriptions of it and a conceptual drawing of the facility are contained in the "Steamboats on the Lower Mississippi River" Manuscript Collection by William H. Tippett, ca. 1967, housed in the History Department of the Memphis and Shelby County Public Library and Information Service. According to these materials and contemporary descriptions in local newspapers, the elevator was stepped into the embankment of the bluff, with its entrance in the uppermost floor near the high water mark. Freight entering the building at the upper floor could be stored for weeks, if necessary, before being lowered to the appropriate floor for loading onto steamboats.

On July 1, 1878, the steamer *Capitol City* caught fire while tied to the dock of the elevator, and the strong western winds that evening quickly spread the fire to the elevator building itself (*PL*, 2 July 1878). The structure was totally destroyed. At the time, the elevator was holding an

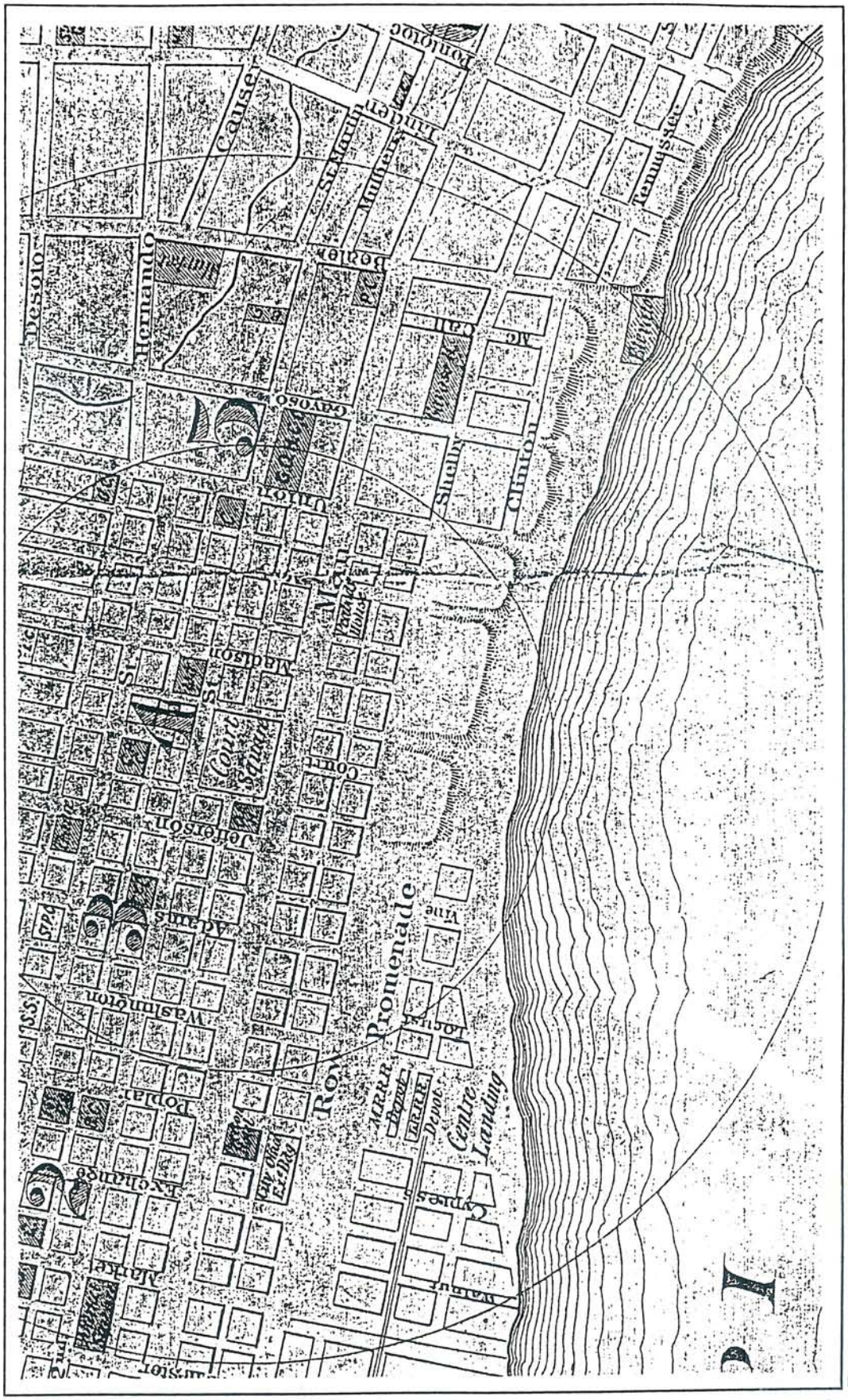


Figure 12. Map of Memphis, Tennessee (Boyle & Chapman 1872).

estimated 2,500 barrels of flour, cornmeal, and tar, 600 sacks of oats, bran, and cornmeal, and 700 barrels of cottonseed oil, among other sundry freight, representing the goods of 20 or more local firms (*PL*, 3 July 1878). Two persons on board the *Capitol City* died in the blaze. The total loss was variously estimated at between $125,000 and $200,000. The pilings at the second floor level were all that remained of the great building by mid-afternoon the next day (*PL*, 3 July 1878).

The loss of the freight elevator was a great blow to the City of Memphis. The Anchor Line did not respond to the calls to rebuild the facility and abandoned the site instead. A similar facility, known as the Memphis Package Elevator, was built by another company in the early 1880s on the north end of the levee in the vicinity of the Mississippi & Tennessee Railroad Depot at Jefferson and Chickasaw streets (Sholes 1882:273).

The fire at the Anchor Line elevator apparently led the city government to realize that improvements to the South Memphis Landing were well overdue. Earlier efforts to enlarge and pave this part of the riverfront were probably sidetracked by larger problems such as the financial Panic of 1873 and, of more local significance, the onset of the second yellow fever epidemic in the same year. Although there is no direct historical evidence, part of the motivation to pave the South Memphis Landing may have been provided by recommendations of the National Board of Health in the wake of the Yellow Fever Epidemic of 1878. In any case, in March 1879 the legislative council of the Memphis Taxing District of Shelby County received a communication from its city engineer, recommending "completion of the levee south of Union Street" (CM Minutes, March 20, 1879).

Earlier, in February or early March 1879, the legislative council had adopted the concept of using the former freight elevator site for a public dump. Bids for the proposed project were opened on March 18, 1879. At the same meeting, the council received:

> a communication from Jno. A. Scudder [?], Prest of the Elevator Co. to Ad Storm, Supt (of the Elevator Co.) notifying him that the Elevator Co. was willing to abandon the old elevator site—On motion of Mr. Goyer the elevator site was accepted from the Elevator Co. in its present condition. [CM Minutes, March 18, 1879]

In March 1879, T. C. Betts was awarded the contract for constructing the dump (CM Minutes, March 28, 1879), which was to be operated in conjunction with a "dump or dredge boat" from the elevator site (CM Minutes, April 10, 1879). Though outraged citizens succeeded in having Betts's contract annulled less than three weeks later because of its potential as "a Great nuisance &c." (CM Minutes, April 28, 1879), the project was completed and was in use during the winter months of 1879, when it was reported that the sanitary condition of the city was "aggravated by the location of the present public 'dump boat' at the foot of Beale Street, a decided nuisance at this time" (National Board of Health 1879:249). The use of the site for the loading of a dump boat is known to have continued beyond 1882 (CM Minutes, June 28, 1882).

Apart from the use of the elevator site for the mooring of a dump boat, the legislative council did continue with its plan to pave the landing, which was awarded to "M. Larkin & Co." (CM Minutes, April 28, 1879). Material for the paving project was provided under a separate contract:

> awarded to J. A. Loudon upon executing a satisfactory bond for three to five thousand yards of dimension stone to be delivered on the landing at such points as may be designated. All stone to be delivered by the 15th October next. [CM Minutes, July 17, 1879]

James A. Loudon was one of the three sons of John Loudon, the contractor for the original paving of the Memphis Landing in 1859 (Mathes 1897–1899:140). He apparently continued the family's shipping business after his brother Milton's death of yellow fever in 1873.

Unfortunately for the city and its citizens, on the same day that the paving contract was announced, the evening newspapers brought news of a new outbreak of yellow fever (*PL*, 17 July 1879). This was the last of the great epidemics of the 1870s. The legislative council effectively disbanded until November 12, when frosts had removed further threat of fever for the year (CM Minutes, November 12, 1879).

When the local government returned to its normal functions, it once again took up the business of paving the southern part of the levee. Evidently, Larkin & Company had finished part of the original work before the epidemic; a renewed contract included "paving of the wharf & Landing from the north edge of the elevator to the south edge of Beale Street a distance of about 400 feet by 200" (CM Minutes, July 8, 1880).

The records of this new 1880 paving contract are somewhat confusing. The project was awarded once again to Larkin & Company (CM Minutes, February 24, 1880), although there is no record of a bid being let for the 1880 phase of the project. It appears that Larkin & Company was unable to carry out the project, perhaps from an inability to post the required bond. The next found reference to the paving work is in June 1880, when it was reported that "Contractor Grider will go to work on his levee paving contract this morning. He will break ground at the lower end of the old elevator and work up to Beale Street" (*MDA*, 22 June 1880). Again, the minutes of the legislative council do not seem to contain information on changes in the contract or the bidding for the work.

Adding to the confusion over this matter, the legislative council then directed the City Engineer, Niles Meriweather, to design new specifications and advertise for bids to pave the area of the wharf from the elevator to Beale Street (CM Minutes, July 8, 1880). In the same meeting, the council also directed that "the F & P Comm [Fire and Police Commissioners] be and are hearby [sic] authorized to take such steps as may be necessary to insure more rapid progress on the part of W. H. Grider & Co. under their contract on the Levy [sic]" (CM Minutes, July 8, 1880). Bids for the paving work requested on July 8 were opened on July 19, and the contract for "paving the wharf from N. side of old elevator to S. side of Beale Street [with] the district reserving the right to do any or all of the grading" was awarded to O. H. P. Piper. Once again, in the same meeting, the council considered the previous contract of W. H. Grider and continued it, with the admonishment that Grider "push the work of paving the Levee" (*MDA*, 20 July 1880).

No further reference to O. H. P. Piper's contract was found in the records of the council after August 7, 1880, when the council moved that "the reservation of the district to do the grading was stricken out of O. H. P. Piper's contract for the levee work and the time extended to January 15, 1881 instead of Dec. 1st 1880" (CM Minutes, August 7, 1880). There was no mention of increasing the amount of Piper's contract to accomplish the additional work, which may have caused him to cancel the obligation.

In August 1880, local newspapers reported, "the burned piling at the old St. Louis Packet Company elevator, at the foot of Beale Street, is being cut away at the bottom of the river by a submarine diver. This portion of the landing can then be utilized by steamboats" (*MDA*, 17 August 1880). Three weeks later, it reported that the "submarine diver is blowing up with dynamite the old elevator piles at the foot of Beale Street" (*MDA*, 8 September 1880). Though not mentioned by name, it is believed that this was done by Grider as part of his larger contract for the levee work, which included "paving of certain parts of the wharf & landing and for certain rip rap work and repairing on the landing" (CM Minutes, October 1, 1881).

Like the experiences of John Loudon a generation before him, W. H. Grider also had difficulties caused by the sediments at the base of the bluff. "A communication from Contractor W.H. Grider, as to the danger of landslides where pavement is being put down by him, was received and filed [by the legislative council]" (*MDA*, 24 August 1880). Whether because of the "danger of landslides," the costs of the "submarine diver" removing the old pilings of the elevator, or some other complication, Grider filed a petition with the legislative council "for compensation for extra work under his contract on Levee" (CM Minutes, February 10, 1881). The issue of the additional compensation was contested among the members of the legislative council for four months, and though the matter was settled with the authorization for payment of an additional $1,000, the decision was far from unanimous and was highly disputed (CM Minutes, May 19, 1881).

The bitterness over this matter conveyed by the minutes of the legislative council may reflect other political problems afoot at the time, but it was Grider's work for the City that attracted political scrutiny. When high water apparently prevented Grider from completing his contract on time, the majority of the legislative council took the opportunity to cancel the contract, whether deserved or not:

> The following resolution by Mr. Galloway was adopted—Whereas on February 21, 1880 the district entered into contract with W. H. Grider & Co. for the paving of certain parts of the wharf & landing and for certain rip rap work and repairing on the landing & whereas the said Grider & Co. having done the paving & not the rip rap & repairing, caused by the stage of water & other reasons satisfactory to this Council; therefore be it resolved, that said Contract is hereby declared annulled & Canceled without damage to either party. [CM Minutes, October 1, 1881]

In 1881, soon after the cancellation of Grider's contract, the council requested a report on the status of all city projects from the City Engineer, which in part reads:

> Considering the difficulties and drawbacks encountered, a large amount of work has been done in the past three years in grading and extending the wharf and landing southward from Union street and to the south side of Beale. About thirty thousand square yards of new pavement has been laid, making the new levee front some eleven hundred feet, by two hundred and fifty feet with the slope. Two-thirds of this work is of first-class block stone and the remainder first-class rubble-range work. About four thousand cubic yards of stone rip-rap has been placed at this levee as a protection against washing and undermining of same. The total expenditure for wharf improvements to the present will approximate $54,000. [CM Minutes, December 31, 1881]

The reference above suggests that the paving of the South Memphis Landing was finally completed, which is confirmed by an extensive earlier article on the entire scope of riverfront improvements (*MDA*, 9 April 1881). However, recent archaeological excavations of the Beale Street Landing site (40SY352) suggest yet another paving episode south of the 1881 work. The archaeological evidence at this site suggests that the paving was installed quite late in the nineteenth century, if not in the early twentieth century (Weaver et al. 1994; see below). No historical records have been found that document this phase of paving work on the Landing.

The Memphis Landing in the Modern Era (ca. 1881–Present)

The paving of most of the South Memphis Landing in ca. 1881 effectively ended the period of Memphis's history in which areas of the city were served by their own individual river landings. With the completed South Memphis Landing, the city's paved landing surface extended

unbroken from Beale Street north to Jefferson Street, a distance of more than one-half mile, averaging 225 feet in width (*MDA*, 9 April 1881).

Photographs of the unified Memphis Landing show that, in section, the paving extended up the gentle and continuous slope to a narrow terrace, approximately beneath today's Riverside Drive (Figures 13 and 14). The terrace appears to have been a north-south driveway for the Landing, providing the opportunity to move goods across the length of the Landing without remaining on its somewhat aggressive slope (an average of 1 foot in rise for every 6 feet of run). Adjacent to this terrace was the Mississippi & Tennessee Railroad line, which was built into the pavement of the Landing from Union Avenue north to Jefferson Street. South of Union Avenue, the rail line rose on an embankment to bring it to the top of the river bluff south of Beale Street. From this point, the east-west streets of the city connected the levee with Front Street, effecting a seamless flow of stone paving from the water's edge to Front Street.

Over the next five decades, the Memphis Landing changed little from its appearance in 1881. Occasional construction projects involved lifting the paving stones for the placement of storm sewers, such as the ca. 1915–1920 construction of the massive Memphis Siphon storm water sewer, which exits beneath the Landing at Gayoso Avenue.

A natural process set in motion in ca. 1890 did cause a most significant and lasting effect to the use of the Memphis Landing. Changes in the course of the Mississippi River caused a sandbar that spread from the mouth of the Wolf River, creating the feature known as Mud Island. Once again, the Mississippi River proved its unpredictability. The sandbar began to accrete near the mouth of the Wolf River and spread quickly south, trapping the Wolf River between the sandbar and the bluff. Historians continue to debate the cause of its creation. Some attribute it to a sandbar that grew in the lee of a boat that grounded above the Wolf River in 1918; others attribute it to a change in the Mississippi currents as a result of the floods of 1912–1913, which changed the main channel of the river from the Hopefield Chute, west of Island 40, to the existing channel east of Island 40.

No matter the cause of Mud Island, the effect was that Memphis Landing was no longer seen by the city as its principal port to sustain open river commerce. In ca. 1935, Wolf River was diverted into the Loosahatchie Chute on the north side of Memphis, and the three-mile reach at the Wolf River's mouth became a slack-water harbor (Bragg 1977:77). One result has been the rapid accumulation of silt in the channel, and the Wolf River Harbor at the Memphis Landing has on occasion actually run dry. Annual dredging by the U.S. Army Corps of Engineers was and still is needed to keep the channel open to navigation. Even more important, the development of barge lines and diesel towboats made the Landing obsolete. In 1946, the Corps of Engineers adopted a project for a new industrial channel and harbor at Tennessee Chute on President's Island.

The formation of Mud Island on the city's river doorstep appears to have had a psychological as well as physical effect on the people of Memphis. Mud Island changed the city's view of its riverfront, even before the general collapse in the viability of river transportation in the 1940s and 1950s. As early as the 1920s, urban planners and city officials began to wonder about the future role of the riverfront and its service to the city. The evolution of various proposals for the treatment of the riverfront over the next five decades reflects the degradation of the Landing as a port facility as well as the city's desire to adapt the Landing for some new role.

The first of the grand proposals to redevelop the Memphis Landing was put forward by Harland Bartholomew in his city plan of 1924, which first initiated the concept of the Landing as a place more for automobiles than riverboats (Harland Bartholomew & Associates 1924). Bartholomew's concept transformed the Landing into a City Beautiful setting of grand manufacturing and port facilities, dominated by wharfs elevated above high water in the area

Figure 13. Memphis Riverfront and the Lee Line Headquarters at the Foot of Beale Street (View to the North) (no date).

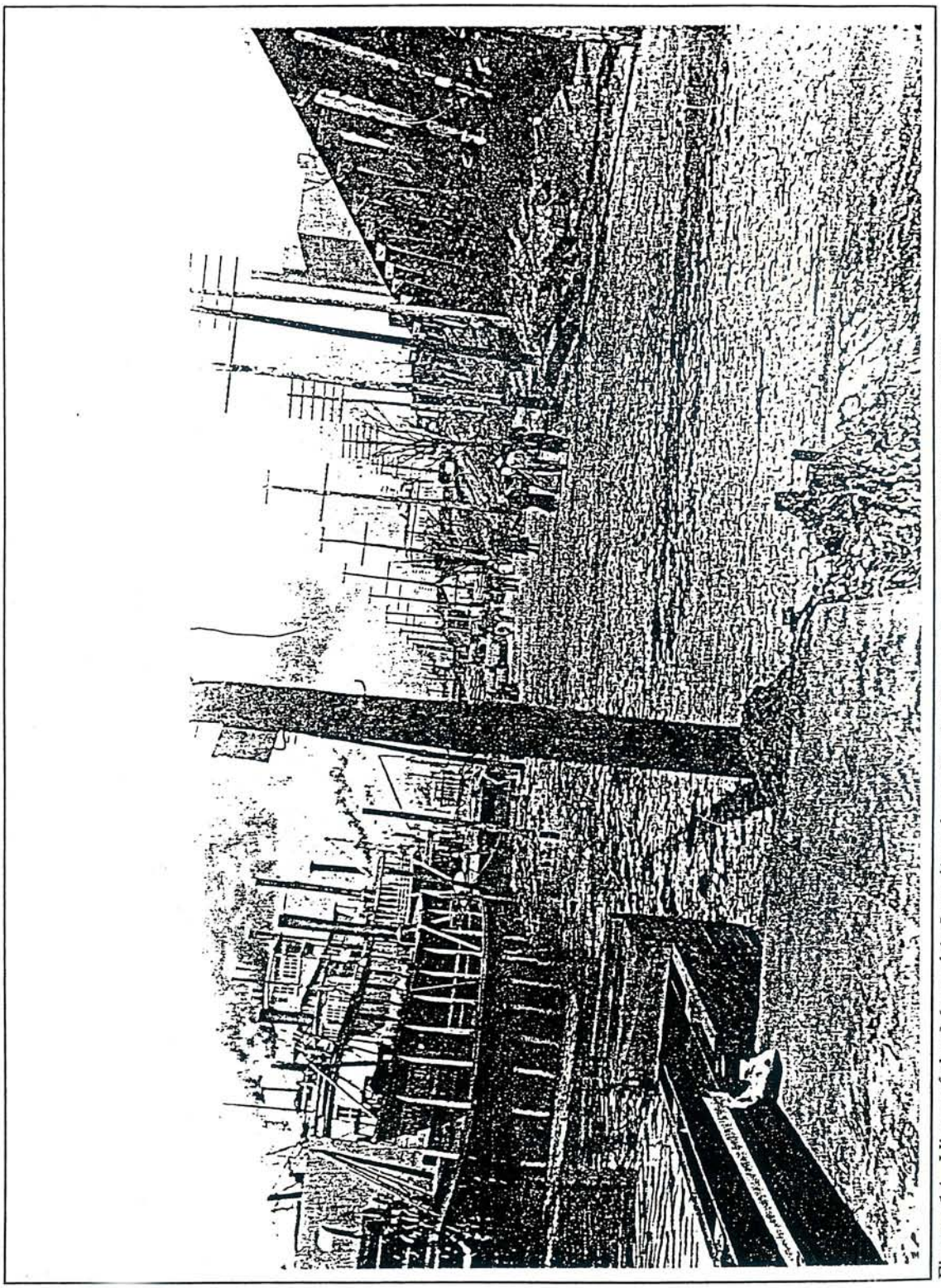


Figure 14. View of the Memphis Landing from Beale Street during High Water, ca. 1903.

west of Riverside Drive and north of Adams Street (Figure 15). Between Union Avenue and Adams in the area between Front Street and Riverside, a structure four blocks long was proposed to create a gigantic terrace, retained by a continuous arcade on its western side. Bartholomew proposed transforming half of the paved Landing into a parking lot by changing the grade of the Landing to a level surface. The remaining half was still to be used as a landing for river traffic.

Though none of Bartholomew's grand vision was ever enacted, the formal adoption of the entire plan by the City of Memphis in 1924 demonstrates that the city itself had come to realize that the Landing's role was changing. More than any other, the fundamental change was the alteration of the Landing from its original role in primarily serving the river, to a role of serving the land, i.e., to "largely solve the automobile parking problem" (Harland Bartholomew & Associates 1924:n.p.). At this point, the Landing likely was perceived by city dwellers as a place for unrestricted parking for the downtown area, a condition that continues today.

The next major project proposed for the Landing was actually built; it began a perceptional shift by the city that has had lasting consequences. During the 1920s and 1930s, the currents of the Mississippi River succeeded in undermining the face of the river bluff south of the Landing at Beale Street and extending roughly to Calhoun Street. The Landing itself was saved from damage by the shield of Mud Island. Erosion of the base of the bluff caused several catastrophic collapses. Over time, whole block-long lengths of streets, buildings, and even an Illinois Central Railroad train disappeared as the bluff gave way and tumbled toward the river (*Commercial Appeal*, July 29, 1934). The resulting "moonscape" of eroded ground at the bluff edge became a dumping ground, whether by design (to stem further erosion) or by neglect.

Under the advocacy of Mayor Watkins Overton, a plan was put forward in 1933–1934 to complete Riverside Drive along the foot of the bluff south of the Landing and to extend the roadway across the brow of the Landing to Jefferson Street (*Commercial Appeal*, July 29, 1934). The plan for Riverside Drive had been first envisioned by George Kessler, landscape architect of the Memphis Park and Parkway System, and proposed in 1908. The drive would connect downtown with Riverside Park and the west end of South Parkway.

Riverside Drive was completed in 1937 with funding from the Public Works Administration. It elevated the grade of Riverside Drive and the Illinois Central Railroad tracks to a level at least 15 feet above the pavement of the Landing. The current system of automobile ramps was then installed, along with most of the culverts, walkways, and stairs that connect Riverside with the Landing surface. On the north end of the Landing, the block between Jefferson and Court avenues was raised to the level of Riverside Drive to create Jefferson Davis Park.

The construction of Riverside Drive and Jefferson Davis Park represents another era in the Landing's service to the city. The Landing no longer was connected to Front Street by a seamless transition of paving up the face of the bluff. The Landing was still being used for river-related traffic, including the Lee Steamship Line, but the influence of the river interests over the city was now clearly broken. From this point on, downtown Memphis "turned its back" on the river as a resource to seek its future elsewhere.

From this point in the 1930s until only quite recently, urban planners employed by the City of Memphis saw the Landing as a nuisance rather than an asset. Harland Bartholomew revisited the Wolf River Harbor in his comprehensive city plan of 1955, but this time recommending eliminating the harbor altogether by diverting the Wolf River and filling the harbor from Beale Street to Poplar. A level plane would be established from Riverside Drive to the west edge of Mud Island, to be developed with an expressway, a large park, a "Heliport" west of Jefferson Davis Park, a small boat basin, and seven massive surface parking lots large enough to accommodate about 2,700 cars (Harland Bartholomew & Associates 1955:Plate 39).

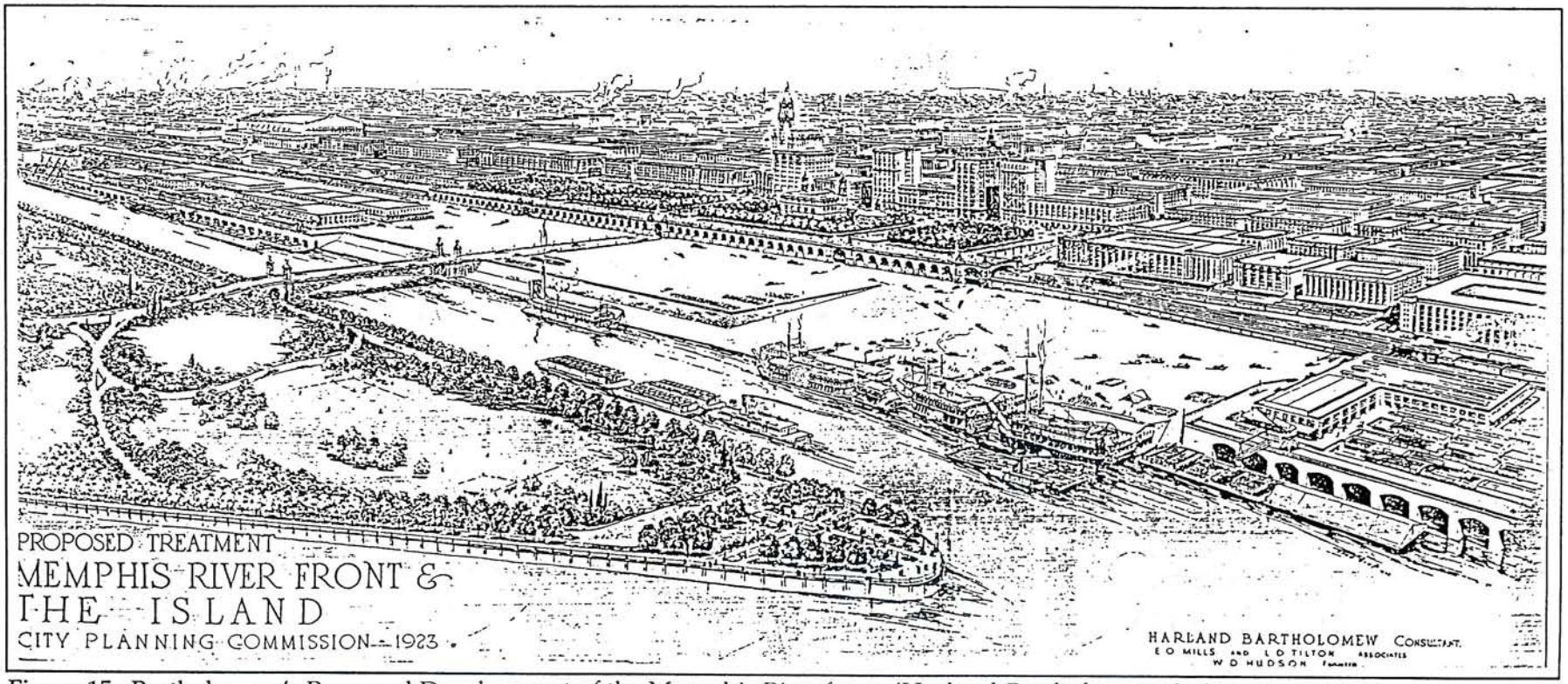


Figure 15. Bartholomew's Proposed Development of the Memphis Riverfront (Harland Bartholomew & Associates 1924).

In 1970, Bartholomew revised his vision of the riverfront by proposing a riverfront expressway over the Landing, one with 12–17 lanes (*Commercial Appeal*, October 12, 1970). Four years later, the Marcou, O'Leary & Associates "Downtown Memphis Plan and Program," less ambitious than Bartholomew's plan, proposed to cover the face of the bluff from Front Street to the plane of Riverside Drive with a massive terraced structure for apartment use, built over Riverside Drive stretching from McCall to Poplar. The Landing was to be destroyed in order to create a revetment to support the foundations of the apartment mega-structure (Marcou, O'Leary & Associates 1974).

The fact that most of the ambitious plans for the Memphis riverfront proposed after ca. 1920 were never built suggests that the city has never been willing (or financially able) to discard its river heritage entirely. This is fortunate, since the survival of this nationally significant historical resource now provides a great opportunity to contribute to our downtown redevelopment by returning to what it always has been—a commercial landing on the Mississippi River. The flatboatmen and the grand steamboat palaces of the nineteenth century may be long gone, but the Landing remains one of the few places in America where one may actually touch that heritage. Preservation and restoration of the Landing is a worthy investment in our future.

IV. LITHOLOGY OF THE COBBLESTONE LANDING

GOALS AND METHODS

Definition of the Study Area

The geological survey was restricted to that part of the Landing where the stone pavement is relatively intact and visible at the surface. Beginning at Jefferson Davis Park on the north, the study area extends south to the northern edge of the area disturbed by construction of the Tom Lee Monument relocation project. The study area extended from the water's edge on the west to the base of the embankment at Riverside Drive on the east. The embankment itself was not included. The total area included in the geological survey measures approximately 1,900 feet north-south and between 120 and 215 feet east-west. At the time of the survey, the river stage was at 2 feet above the 0 water line (approximately 186.0 feet AMSL), and the total area of the study area was approximately 379,000 square feet. Approximately 70,000 square feet of this total consists of river-deposited sediments below (west of) the present edge of the cobbled surface. This unpaved area presumably represents portions of the paved landing that have been eroded away by the Mississippi River over the last 130 years. Approximately 813,442 individual cobbles cover the remaining 309,000 square feet.

Goals and Objectives

The overall goal of this part of the study was to assess the existing conditions and geological character of the Cobblestone Landing within its historical context. Specific objectives were to:

1) Identify and describe the types of stone used in construction and repair of the Landing;
2) Identify possible source areas of the stone;
3) Identify and describe stone patterns making up the overall fabric of the Landing, and interpret these patterns within a historical context;
4) Identify and describe natural and cultural causes affecting the preservation of the Landing.

These objectives were accomplished by mapping and recording a number of lithological variables, beginning with individual stones, the patterns in which they were laid, and the patterns in which they were repaired. These methods are discussed below.

Methods

To begin recording the lithological character of the stone pavement, it was first necessary to clean and expose parts of the pavement buried beneath vegetation and river-deposited sediments that had accumulated at the water's edge for almost a decade. To allow the best possible photo image, the area was meticulously cleaned of sediments, drift debris, and vegetation. Areas where grass and weeds obscured the stone surface were treated with an herbicide that meets federal and state guidelines for use on riverbanks. The dead stubble was then cleaned away with string-line grass trimmers.

Heavy siltation on top of cobbles was removed using a bulldozer. Deck-mounted water cannons mounted on reserve fire department pumpers supplied the necessary waterpower to remove the remaining silt and clay overburden. During this phase of the study it became necessary to estimate the approximate buried western margin of the cobblestones. Removing the overburden completely would leave the edge of the cobblestones susceptible to immediate erosion and eventual displacement. For this reason, some areas of the western margin of the Landing may extend farther under the overburden than is indicated on the accompanying maps.

Control points were established across the study area by a survey crew from the City of Memphis, Division of Engineering. A baseline was extended from the south end of the Landing at the Beale Street Ramp (0+00) to the north end, corresponding to the base of the talus slope at Jefferson Davis Park (19+00). The baseline was marked with points at 100 foot intervals. Control points were also placed along lines perpendicular to the baseline (i.e., east-west). These points were marked on the surface of the stones with 18 x 18 inch white squares. A survey map of the study area (see Figure 4) produced by the City Engineer's office provided accurate elevations and locations of these control points and the boundary of the study area.

To create an accurate map image that would distinguish individual stones, it was necessary to apply state-of-the-art graphic arts and digital enhancement computer programs to a series of aerial photos. The Landing was photographed from a helicopter when the river had subsided below the western edge of the cobblestones. The 35 mm negatives were scanned directly into computer software that enhanced resolution and color contrast. The digital image was increased 500 percent, producing a scale of 1 inch to 9 feet. This image was printed out in a series of 10 36 x 36 inch line art images, each representing a section approximately 200 x 200 feet. This series of 10 large-scale digital images was used by the field geologists to encode information on each individual cobble. This recordation was accomplished by color coding. The photographs were also manipulated in the computer to form color and line art composite images that were used for pattern analysis and cultural impact studies (Appendix 1).

Individual stones were examined for mineralogical characteristics. To identify accurately the various lithologies used in building the Memphis Landing, thin section samples of each rock type were taken and microscopically analyzed under normal and polarizing light at the University of Memphis, Department of Geological Sciences.

In addition, paving stones were examined for variation in shape and size. Shape was described as one of three principal forms: 1) nondimensional; 2) roughly dimensional; or 3) dimensional. Size, for the purposes of this analysis, was described as one of two forms: 1) cobble (less than 38 inches circumference; or 2) boulder (larger than 38 inches circumference). These variables were derived by quantitative analysis of individual rock types from different sections of the Landing.

Explanation of the Coordinate System

The following discussion refers to coordinate points established by City surveyors. As mentioned above, the site grid is based on a north-south baseline marked in 100 foot intervals, beginning at the Beale Street entrance ramp (0+00) and continuing to the base of the talus slope at Jefferson Davis Park (19+00) (see Figure 4). This baseline runs approximately 20 degrees east of north (magnetic). Reference points were also established at right angles from the 100 foot markers along the baseline, usually at the base of the Riverside Drive berm on the east and at the edge of the stones at the west.

All reference points in the following discussion refer to this grid system and are indicated by a pair of coordinates. For example, North 355/West 25 refers to a point that is 355 feet north of

point North 0+00 and 25 feet west of the baseline. Likewise, the coordinate North 1850/East 100 refers to a point 1,850 feet north of the beginning point at the Beale Street ramp (0+00) and 100 feet east of the baseline.

RESULTS OF THE GEOLOGICAL SURVEY

The first step in this phase of the investigation was to identify the rocks in the study area. This was accomplished by macroscopic examination in the field and microscopic examination in the laboratory. Nine distinct rock types were recognized as comprising the existing stone pavement at the Memphis Landing (Figures 16-21):

Type 1.	Limestone fossiliferous pellet grainstone
Type 2.	Limestone oolitic fossiliferous pellet grainstone
Type 3.	Sandstone quartz wacke
Type 4.	Limestone crinoidal bryzoan grainstone
Type 5.	Limestone crinoidal bryzoan grainstone
Type 6.	Syenite
Type 7.	Pink Granite
Type 8.	White granitic gneiss
Type 9.	Rhyolite

Type 1. Limestone Fossiliferous Pellet Grainstone

Description: Sandsize pellets of rounded and angular intraclasts. Grains are often in contact but do not compose the majority of the rock. Matrix is grainy with calcite crystals intergrown. Large nodules of chert and large nodules of calcitic crinoid fossils are common.

Age: Mississippian age is indicated by Rhynconellid Brachiopod fossils and Bryzoan fans.

Color: Dark gray to buff white on weathered surfaces, dark gray to tan on fresh surfaces.

Durability: This rock type is very resistant and durable. There is some breakdown where concentrations of fossils or large nodules create weak bedding planes that are more vulnerable to the stress of heavy traffic.

Distribution: The predominant rock type of the Memphis Landing is fossiliferous pellet grainstone (Type 1). Approximately 220,000 square feet of the Landing is cobbled with Type 1. It is the predominant rock type from North 850 to North 1900 and composes 40 percent of the Landing from North 0 to North 850. This rock type has been used as a major building component and a major repair component of the Memphis Landing.

Dimension: Type 1 (limestone) is found on the Landing in many forms. It ranges from large square mooring blocks (22 x 22 inches) and nondimensional boulders to roughly dimensional cobblestones. It is most often found as a nondimensional cobble with an average circumference at surface exposure of 25 inches. These stones are commonly set 8–12 inches to the grade and weigh about 50 pounds.

Missing pages 43 to 45
(probably photos)

Possible Origin: This Mississippian age limestone is comparable to those members of the St. Louis limestone formation of central Tennessee, Kentucky, southern Illinois, southern Indiana, and Missouri that contain chert nodules, crinoid fossils, and intraclastic grains. The St. Louis limestone is readily available to river towns in all the areas mentioned above and has been quarried extensively in the past.

Type 2. Limestone Oolitic Fossiliferous Pellet Grainstone

Description: Contains approximately 55 percent calcitic oolites in stratified layers.

Age: Mississippian age crinoid and brachiopod fossils.

Color: Light gray on fresh surface, white to buff gray on weathered surfaces.

Durability: Resists weathering well. Of the estimated 56,000 square feet of the Landing that is covered by Type 2 between North 0 and North 850, less than 10 percent needs repair. This stone is usually found with the bedding planes of the rock laid perpendicular to the surface, possibly to increase durability. This rock type tends to break down and erode where river silt is allowed to accumulate on top of the Landing, especially south of North 850 and below the 15 foot watermark.

Distribution: Type 2 (limestone) is the predominant rock type from North 0 to North 850, accounting for 40 percent of the total. Between North 850 and North 1900, Type 2 accounts for 4 percent of the total and is a major repair component. Three large repairs are found at North 1200/West 100; North 1200/East 0; and North 1500/West 100 (see Appendix 1). Type 2 was also used in drainage patterns at North 220 and North 875.

Dimension: Roughly dimensional cobblestones, which vary in size at surface exposure, with an average face of 5 x 13 inches. Stones usually become irregular and without rectangular form below surface level.

Possible Origin: Type 2 resembles members of the Monteagle formation of Mississippian age, which is found in central Tennessee, Kentucky, southern Illinois, and southern Indiana. Monteagle limestone, as in all geological member and formation names, is often identified with a different name from region to region; there is no set nomenclature. In Illinois, for example, Monteagle limestone is known as St. Genevieve limestone.

Type 3. Sandstone Quartz Wacke

Description: A medium grained argilaceous sandstone with 10 percent matrix that is largely opaque hematite.

Age: Unknown.

Color: Dark gray on fresh surfaces, reddish orange on worn surfaces.

Durability: This stone resists breakdown under normal conditions at the Landing. Less than 10 percent of the sandstone cobbles have broken down along bedding planes.

Distribution: Type 3 (sandstone) was used as a major repair component from North 0 to North 1105, but predominantly south of North 700. Approximately 10,500 square feet of the Landing is cobbled in Type 3. Large repairs in sandstone (measured to center of repair) can be found at

North 130/West 75; North 175/East 20; North 375/West 15; North 660/West 20; and North 1040/East 80. It was also used in drainage patterns at North 220/West 45 and North 220/East 25.

Dimension: Type 3 is found as roughly dimensional cobbles with an average surface exposure of 4.5 x 9 inches and a depth of about 8 inches. At North 880, about 100 large, irregular boulders of Type 3 are mixed randomly with Type 1. This is the only concentration of boulder-sized Type 3 on the Landing.

Possible Origin: Because no fossils were present in this sandstone, its date of formation could not be determined for this study. However, its hematitic nature resembles many different types of Arkansas sandstone. Type 3 may be related to the Crystal Mountain sandstone, which was readily available near Little Rock. The Crystal Mountain sandstone is Ordovician (505 million to 438 million years) in age and bears medium grained, hematitic facies similar to those of Type 3. The Jackfork Sandstone of the Ouachita Mountains is also similar in lithology to Type 3.

Type 4. Limestone Crinoidal Bryzoan Grainstone

Type 4 limestone is used in conjunction with Type 1 in repairs and building phases throughout the Landing but is most prevalent south of North 800. To the naked eye, some facies of Type 4 cobbles are indistinguishable from certain facies of Type 1. Therefore, these units are mapped as one but described separately.

Description: Crinoid and Bryzoan fossils are present in varying abundance. Granular cement is 100 percent calcite. Zones of intraclastic material are present.

Age: Mississippian in age, as indicated by the Mississippian age guide fossils.

Color: Light brown to light gray on weathered surfaces, usually brownish white on fresh surfaces but often light gray.

Durability: This stone weathers well under normal, dry surface conditions. When it is found well above the water level at the Landing, it is reasonably durable. Below the 20 foot mark on the river gauge, this rock has deteriorated in large numbers, causing up to 30 percent of the repairs south of North 800. This deterioration is accelerated where river silt, deposited by high water events, is allowed to remain on top of the cobblestones.

Distribution: Throughout the Landing, in conjunction with Type 1 building patterns and Type 2 repair patterns. A minor building and repair component of the Landing, it is especially prominent between North 100/West 90 and North 300/West 65.

Dimension: Roughly dimensional cobbles and boulders. Its average surface exposure is 5 x 11 inches with average depth to grade of 10 inches.

Possible Origin: Type 4 resembles members of the Bangor formation of the entire mid-continent of the U.S. It is readily available in the Mississippi, Ohio, and Tennessee river drainages.

Type 5. Limestone Crinoidal Bryzoan Grainstone

Description: Grains not in contact, 100 percent calcite cement. Same fossil assemblage as Type 4. Possibly related in source area to Type 4.

Age: Mississippian.

Color: Dingy white to light tan.

Durability: Although this rock type does not tend to break along bedding planes, its overall nature tends toward dissolution. Like Type 4, it has 100 percent calcite cement and will break down easily when exposed to persistent moisture.

Distribution: Type 5 has been used as a minor repair component of the Landing. About 6,000 square feet of the Memphis Landing is cobbled with Type 5. Repair patterns of Type 5 are found from North 450 to North 1500. The largest of these repairs is at North 850 to North 990 at the western boundary of the Landing; it covers about 1,800 square feet. Other Type 5 repairs are at North 1130/West 110; North 900/East 10; and North 480/West 35.

Dimension: Type 5 is found as a dimensional paving stone, 5 3/8 x 11 inches at surface exposure, with an 8 inch depth to grade. Type 5 is the only true dimensional stone of the Landing found in uniform sizes. On rare occasions, the stone is placed with the 8 inch dimension as surface exposure.

Possible Origin: Although Type 5 does not seem to have the weak bedding planes of certain rocks of Type 4, they are remarkably similar under the microscope. For this reason, Type 5 is probably also from the Bangor limestone formation of the mid-continental U.S.

Type 6. Syenite

Description: Intrusive igneous rock with 80–90 percent potassium feldspar, minor constituents of plagioclase opaque mafic minerals.

Age: Unknown.

Color: Grayish blue on fresh surfaces, light gray on weathered surfaces.

Durability: Extremely durable. Little or no breakdown in this environment.

Distribution: Type 6 (syenite) is used a minor component in small repairs throughout the Landing and as a subsidiary part of larger repairs. Approximately 10,000 square feet of the Landing is paved in syenite. It is often found in conjunction with Type 7 (pink granite), Type 8 (white granite), and Type 2 (limestone). The larger syenite repairs are at North 380/West 80; North 500/West 80; and North 1500/East 20.

Dimension: Roughly dimensional cobbles with punky, conchoidal fracture. Average dimension at surface exposure is 5 x 10 inches with 8 inches to grade.

Possible Origin: Type 6 is an igneous intrusive rock that in mineralogy greatly resembles the Granite Mountain syenite deposit near Benton, Arkansas.

Type 7. Pink Granite

Description: Approximately 65 percent potassium feldspar, 30 percent quartz, 10 percent mafics (amphibolite). Exhibits a granopheric structure (micro pegmatite), which is a common texture, but not usually as coarse (large intergrowths). No evidence of metamorphic foliation.

Age: Unknown.

Color: From dark red to orange matrix with dark phenocrysts.

Durability: Extremely durable. Little or no breakdown in this environment.

Distribution: Type 7 (pink granite) was used as a minor repair component and is found throughout the Landing in small repair patterns and as an element of larger repairs. The largest concentration of Type 7 is can be found between North 390 and North 440. Approximately 1,500 square feet of the Landing is paved in Type 7.

Dimension: Roughly dimensional cobbles with an average surface exposure of 50 square inches (5 x 10 inches), with 8 inches to grade.

Possible Origin: Because the only local pink granite readily accessible to river transport comes from the St. Francis Mountains of Missouri, the pink granite of the Landing probably originates from this area. Other known sources of granopheric structure in pink granites are in the San Juan Mountains of Colorado, many outcrops in Canada, and small amounts in the Piedmont province of the Appalachians.

Type 8. White Granitic Gneiss

Description: Approximately 50 percent quartz, 40 percent potassium feldspar, 5 percent albitic plagioclase, and 5 percent mica-like material with some calcium component. In thin section analysis, no gneissic banding is present. Therefore, on a microscopic level, this rock type may be identified as a "granitic schist." However, in macroscopic view, this rock type does exhibit gneissic structure and will be referred to as "granitic gneiss" on that basis.

Age: Unknown.

Color: Reddish white to dull white.

Durability: Extremely durable. Little or no breakdown in this environment.

Distribution: Type 8 (white granite) was used as a major and minor repair component in small amounts throughout the Landing. It is found in large homogeneous patterns at North 25/West 50; North 500/East 40; North 650/East 40; and North 800/East 80. Approximately 12,000 square feet of the Landing is paved in Type 8.

Dimension: Roughly dimensional, rectangular to square cobbles with an average surface exposure of 55 square inches (5.5 x 10 inches) and an average depth to grade of 9 inches.

Possible Origin: White granitic gneiss is a common igneous intrusive rock of the U.S. It is found locally in the Piedmont province of the Appalachians; it is also found in Michigan and Minnesota. The white granitic gneiss at the Landing probably is from eastern Tennessee and was originally brought in by rail.

Type 9. Rhyolite

Description: Igneous rock composed of large plagioclase phenocrysts in a ground mass of quartz and potassium feldspar.

Age: Unknown.

Color: Dark pink to purple.

Durability: Extremely resistant to breakdown.

Distribution: Rhyolite is used throughout the study area as a minor repair component. Less than 500 stones of rhyolite were identified. Because of its rarity, rhyolite is not a component of the pattern analysis.

Dimension: Roughly dimensional cobbles with an average surface exposure of 49.5 square inches (5.5 x 9 inches) with an 8 inch depth to grade.

Possible Origin: The only source of rhyolite in the Mississippi River Valley is in the St. Francis Mountains of Missouri. Small amounts exist in the Piedmont province of the Appalachians.

SOURCES OF THE STONE PAVEMENT MATERIALS

One goal of this research was to identify the origin of the stones used in paving the Memphis Landing. We have had limited success in this matter. None of these rock types resembles "ballast stone," which usually had rounded surfaces so that it would not damage the deep-draft wooden hulls of seagoing vessels. Although a large proportion of the cobblestones at the Memphis Landing have rounded features at surface exposure, they are extremely angular below the surface level of the Landing.

The historical record suggests that the original 1859 paving of the Landing was made with limestone originating in Illinois. The source of the stone paving was noted in city documents and newspaper accounts, which reported, "the towboat *Granite State* arrived from Cave-In-Rock yesterday, with another heavy tow of stone for paving purposes at the Landing" (*MDA*, 25 September 1859). However, the origins of paving stone employed after the Civil War is not as clear. Postbellum paving episodes may also have been done with limestone blocks from the Ohio River Valley, since the supplier, John Loudon, was used to dealing with the quarries of the lower Ohio River Valley. It would seem logical that he returned to these quarries for the new paving stone unless directed to do otherwise.

A survey of the minutes of the mayor and board of aldermen (later the legislative council) from 1875 to 1882 reveals occasional references to requiring a particular type of stone for a project. When the city began its massive street and wharf paving program about 1879, the city fathers apparently were not particular. Thousands and thousands of cubic yards of stone graded as dimensional, random-range rubble-quality, irregular riprap, and gravel (for Telford or McAdam paving) were purchased by the City for the various projects (CM Minutes, December 31, 1881, among others). Most of the stone used in the Landing can be considered either dimensional stone or random-range rubble stone. Unfortunately, the source of the purchased stone is rarely noted. Only a few copies of contracts for paving work or stone purchases exist from the pre-1900 "Tickler" files of petitions, contracts, bids, and other documents submitted for review by the mayor and board or the legislative council. None of these files contained information on the paving contracts or stone purchases by the City before 1885. In spite of the importance of the railroad in moving finished goods as well as bulk materials such as stone, no references to the shipment of stone via rail were noted in the minutes reviewed for this study.

Some of the stone used in the city's paving work originated from north-central Tennessee, in the vicinity of Clarksville:

> Messrs. John McNabb & Bro. have struck a bonanza in the way of a stone quarry, which meets the wants of Memphis for metaling the streets, and they have contracted for 100 carloads of stone spalls, facing eight inches and seven by twelve inches or fourteen inches, to be delivered here on the cars. The quarry [is] near Edmondson's ferry on Mr. W. O. Reynold's place. The stone is a kind of granite, very hard and sparkles like isinglass, and lies in ledges from five to fourteen inches thick. The Memphis authorities are highly pleased with the quantity, it being the very thing wanted, and will probably replace all of the old Nicholson pavements with it. McNabb has commenced work with a number of hands, getting out the stone, which is brought down river by the Gracey and loaded on the cars here. [*PL*, 28 March 1881]

As clear as the reference appears, there is room for confusion. A review of the geological formations indicates no granite anywhere near Clarksville, Tennessee. Apart from this one reference, the origin of stones imported for street or landing paving projects in the 1870s and 1880s is unknown.

However, tentative conclusions can be based on lithologic similarity of the cobblestone to known geological formations of the eastern and central U.S. For instance, Type 1 (limestone fossiliferous pellet grainstone) is similar to the Mississippian age St. Louis formation of the mid-continental U.S. Type 2 (limestone oolitic fossiliferous pellet grainstone) is very similar to the Mississippian age Monteagle formation. Both rock types could have originated in formations in central Tennessee, Kentucky, southern Illinois, southern Indiana, or Missouri. Type 4 (limestone fossiliferous crinoidal bryzoan grainstone) is also of Mississippian age and bears similarity to the Bangor limestone of the mid-continental U.S. It is also readily available in the Mississippi, Ohio, and Tennessee river drainages.

Type 5 (limestone fossiliferous crinoidal bryzoan grainstone) is generally of the same lithology as Type 4, except that thick beds of large fossils are not present. Type 5 is unique in its machined dimensionality. These same limestone blocks were used in 1983 to line the sidewalks in Jefferson Davis Park. It is quite probable that the Type 5 cobblestones were used to repair the Landing during the same period.

Type 3 (sandstone quartz wacke) is of indeterminate geologic age but is similar in lithology to several sandstone formations in Arkansas, such as the Crystal Mountain sandstone and Jackfork sandstone. Both of those are Paleozoic in age. The use of this stone for repairs suggests it was first procured late in the nineteenth century or, more probably, in the twentieth century.

A twentieth century affiliation is also suggested for use of the igneous materials. Type 6 (syenite) is similar to the igneous intrusive rocks of the Granite Mountain and the Benton, Arkansas, areas. Other intrusive bodies near Little Rock also produce syenite. It is a relatively uncommon rock type, unlike Mississippian age limestone, so the Type 6 cobbles probably were derived from one of the low quartz igneous intrusions of Arkansas.

Type 7 (pink granite) is possibly related to the igneous rocks of the St. Francis Mountains of Missouri. This is the only regional source of pink granite, although a few small deposits are in the Appalachians. Type 9 (rhyolite) is also possibly related to the igneous rocks of the St. Francis Mountains, one of the few sources of rhyolite in the mid-continental U.S. Type 8 (white gneissic granite) is possibly related to the metamorphosed igneous rocks of the Piedmont province of the Appalachians.

PATTERN ANALYSIS

Mapping individual stones on the field maps allowed the researchers to group patterns of similar stones at various levels of analysis. The focus of the survey was on the Landing proper; the cobblestone pavement on entrance ramps and along the Riverside Drive berms are not accounted for in this analysis.

Two major parameters were considered in defining pattern units: 1) predominant rock types; and 2) direction of placement (parallel, perpendicular, or diagonal to the waterline of the Mississippi river). Other variables in the analysis included the average size and shape of the stone; the function of the stone (pavement vs. drainage); changes in the physical texture in groups of stones (i.e., variability of different types of rock within a pattern); and the nature of the boundary between patterns.

These factors were also applied in deriving relative dates for the patterns. Of particular importance were changes in texture. In some cases, a relatively pure monolithic pattern meets a pattern with greater variability, including stones from the monolithic pattern. Logic would suggest that the more variable pattern is younger, incorporating stones from an existing pavement. The nature of the contact, or boundary, between patterns also proved useful in the relative dating of the patterns. Patterns described as intrusive usually exhibit a sharp contact with surrounding patterns.

Eighteen dominant patterns were identified (see Appendix 1). Within these patterns are hundreds of patches of stone that indicate subsequent repair or infrastructural renovation after the placement of the original unit. The 18 dominant patterns are:

Pattern 1.	Predominant Type 1 (limestone)/parallel
Pattern 2.	Predominant Type 2 (limestone)/parallel
Pattern 3.	Predominant Type 3 (sandstone)/parallel
Pattern 4.	Predominant Type 4 (limestone)/parallel
Pattern 5.	Predominant Type 5 (limestone)/parallel
Pattern 6.	Predominant Type 6 (syenite)/parallel
Pattern 7.	Predominant Type 7 (pink granite)/parallel
Pattern 8.	Predominant Type 8 (white granite)/parallel
Pattern 9.	Predominant Type 1 (limestone), but more than 25 percent Type 4 (limestone)/parallel
Pattern 10.	Predominant Type 2 (limestone), but more than 25 percent Type 1 and Type 4 (limestone)/parallel
Pattern 11.	Predominant Type 2 (limestone)/diagonal (NE-SW)
Pattern 12.	Predominant Type 1 (limestone)/perpendicular
Pattern 13.	Predominant Type 2 (limestone)/perpendicular
Pattern 14.	Predominant Type 3 (sandstone)/perpendicular
Pattern 15.	Predominant Type 8 (white granite)/perpendicular
Pattern 16.	Predominant Type 1 (limestone)/diagonal (NW-SE)
Pattern 17.	Predominant Type 2 (limestone)/diagonal (NW-SE)

Pattern 18. Predominant Type 8 (white granite)/diagonal

These pattern designations are subject to refinement with further work. In particular, larger patterns defined here may prove to be made up of smaller units, or subpatterns.

Based on the distribution and character of the major patterns, the Landing can be divided into four major subareas:

Subarea 1. North 1900–North 875 (Court Avenue to Union Avenue)

Subarea 2. North 875–North 460 (Union Avenue to Gayoso Avenue)

Subarea 3. North 460–North 0+00 (Gayoso Avenue to the Beale Street entrance ramp)

Subarea 4. The service road at the foot of the Riverside Drive embankment.

The discussion will begin at the northern end of the study area and move south, in a roughly chronological order with respect to the building phases of the Landing.

Court Avenue to Union Avenue (North 1900–North 875)

From North 1900 (northern boundary of the mapped area at Court Street) to North 850 (the south side of Union Avenue), the Landing is composed of approximately 151,000 square feet of stone paving, the vast majority of it Pattern 1. In this section, less than 30 percent of the Pattern 1 stones show rough dimensionality. On the ground, Type 1 (fossiliferous limestone) stones appear to be laid randomly. However, in large-scale overview offered by the composite image, it is apparent that most of the original stones were laid in courses parallel to the river and that the original patterns of placement have been obscured by hundreds of small repairs over the past century.

The sharp boundaries of repair patterns indicate that they are intrusive to the original Pattern 1 fabric. There are large Pattern 2 (Type 2 [oolitic limestone]) intrusions at North 1500/West 85; North 1300/East 25; and North 1250/West 40. Pattern 5 (Type 5 [dimensional limestone]) intrusions are at North 1100/West 105; North 900/West 105; and North 905/East 10. In addition, there are smaller patches of Pattern 6 (syenite), Pattern 8 (white granite), Pattern 7 (pink granite), and Pattern 3 (dimensional sandstone).

Union Avenue to Gayoso Avenue (North 875–North 460)

At approximately North 875 (south side of Union Avenue), there is a marked change in lithology. North of this line, Pattern 1 (nondimensional fossiliferous limestone) predominates, but south of the line stones are included with Pattern 9. Although Type 1 (limestone) is still present in large amounts in Pattern 9, it is now noticeably mixed with Type 4 (limestone) at random intervals. The original amount of Type 4 can only be approximated because much of it has been replaced by mends using other rock types.

From about North 850 to North 650, the Landing is predominantly Pattern 2 (roughly dimensional Type 2 [oolitic limestone]) laid in uniform courses parallel to the river. Pattern 2 appears to be intrusive into the surrounding Pattern 9, and therefore younger. Pattern 2 in this section defines one of the largest repair patterns of the Landing, covering approximately 17,000 square feet. South of North 620, the predominant Pattern 2 is transitional into Pattern 9.

Lesser repairs include large, well-defined patches of uniform rock types that are intrusive into Pattern 9 and Pattern 2. Pattern 3 (Type 3 [dimensional limestone]) intrusions are present at North 650/West 20; North 690/East 40; North 630/East 20; and North 635/West 70. Pattern 8 (Type 8 [white granite]) intrusions are at North 640/East 60 and North 625/East 35. In this section, the ages of Pattern 3 and Pattern 8 cannot be ascertained, but they are more recent than Patterns 9 and 2. Other repair patterns west of the baseline in this section are Pattern 2 at North 550/West 30 (covering about 2,500 square feet); Pattern 3 at North 530/West 15, North 500/West 40, and North 475/West 15; Pattern 6 at North 500/West 80 and North 630/West 75; and Pattern 5 at North 490/West 35 and North 510/West 30.

A large intrusion of Type 8 (granite) at North 500/East 95 is in contact with the Riverside Drive embankment. This intrusion is significant because the cobbles are laid with their long axes parallel to the Mississippi River waterline. North of this granite, the cobblestones on the service road are perpendicular to the waterline; this will be fully discussed later.

Beale Street Landing (North 460–North 0)

The southernmost section of the Landing is characterized by complex patterns of original placement and repair. At about North 460 (north side of Gayoso Avenue), Pattern 9 becomes transitionally mixed with Pattern 10, comprised predominantly of Type 2 (oolitic limestone) with a mixture of Types 1 and 4 (fossiliferous limestone). This part of Pattern 10 also contains large amounts of granite, sandstone, and rhyolite, apparently laid as part of the pattern and not as repairs. Pattern 10 continues to about the North 390 line and covers the large storm drain leading west from Gayoso Street. The drain is believed to have been built about 1912, which would make Pattern 10 a relatively late repair. The terminus of this drain is at North 410/West 110.

At about North 390, at the south end of the sewer intrusion, there is a sharp contact between Pattern 10 and Pattern 11 to the south. Pattern 11 is characterized by almost pure, roughly dimensional Type 2 (oolitic limestone) from North 390 to North 105, down the center of the Landing. It covers approximately 10,000 square feet. Aside from the diagonal patterns of the service road at the base of the Riverside Drive berm, Pattern 11 is the only diagonal pattern on the Landing. It is extremely uniform in stone size and in grade. This diagonal pattern runs northeast-southwest. It is possible that a diagonal pattern was chosen to reduce slumpage of the grade due to riverbank undercutting and to allow better drainage of runoff water. The nature of the sharp contact between Patterns 10 and 11 is ambiguous but suggests that Pattern 10 (i.e., the sewer built ca. 1912) was laid after Pattern 11.

South of about North 400, Pattern 10 extends south on both the east and west sides of Pattern 11. A recent examination suggests a subtle change in Pattern 10 in these areas. Over the sewer, Pattern 10 contains a greater proportion of igneous rock (granites and rhyolite). South of the sewer, units mapped as Pattern 10 have less igneous rock and more oolitic limestone. From a lithological (and historical) perspective, then, it seems appropriate to separate Pattern 10a (the area over the sewer) from Pattern 10b (areas to the south containing less igneous rock). Pattern 10a is transitional with Pattern 10b, but the lower percentage of igneous materials suggests 10b was laid before construction of the sewer.

On the east side of Pattern 11 from about North 400 to North 350, Pattern 10b exhibits a sharp contact with Pattern 11 to the south. The contact is ambiguous, but at present we suggest Pattern 10b is later than Pattern 11. From North 400 to North 225, Pattern 10b occurs west of the diagonal Pattern 11. Stones from Pattern 10b are fitted into the contact with Pattern 11, again suggesting that Pattern 11 is older. Pattern 10b continues south along Pattern 11 until it reaches the major drainage at approximately North 220.

The northern edge of the drainage, composed of Type 3 (sandstone), is in sharp contact with Type 10 (limestone). However, the southern edge of the drainage is in transitional contact with a pattern of fossiliferous Type 1 and Type 4, shown in Appendix 1 as Pattern 9. This segment of Pattern 9 differs somewhat from the Pattern 9 north of the sewer, having a greater proportion of deteriorated Type 4. For this and other reasons discussed below, this text refers to it as Pattern 9b.

Pattern 9b extends west and south of Pattern 10b and west of Pattern 11 from North 215 to North 105. Apparently, Pattern 9b was placed after Patterns 10b and 11, as there are Pattern 9b cobbles shaped to fit into the contact with Pattern 11. In Pattern 9b, Type 4 (limestone) is present in its least durable facies. Thick, irregular bedding planes, composed of large Mississippian age fossils, create planes of weakness inside the rock vulnerable to weathering and heavy loads. Many of these Type 4 cobblestones have been replaced, but it is impossible to tell whether its breakdown has necessitated all the repairs in this pattern.

From approximately the 200 line to the asphalt drive at North 90, there is a large Pattern 3 (Type 3 [dimensional sandstone]) intrusion. This is the largest Pattern 3 repair, covering approximately 3,500 square feet. South of the North 105 line, asphalt and concrete impair accurate pattern analysis. However, many small and large intrusive repairs exist with a continuation of Pattern 9 south of the North 0 line.

The Foot of the Riverside Drive Embankment

From North 0 to about North 500, stone patterns comprising the service road at the western base of the Riverside Drive berm are consistent with the major patterns west of the road. North of this point to North 710, orientation of the stones on the road changes from parallel to perpendicular or diagonal to the river. These patterns are probably all related to post–New Deal construction phases of Riverside Drive. The sequence of rock patterns is as follows: Pattern 12 (perpendicular Type 1) from North 500 to about North 550; Pattern 13 (perpendicular Type 2) from North 550 to North 700; Pattern 15 (perpendicular Type 8) from North 700 to North 730; Pattern 17 (diagonal Type 2) from North 730 to about North 770; and Pattern 18 (diagonal Type 8) from North 770 to about North 850. From there to the Monroe Street ramp, stones in Patterns 13, 14, and 12 have perpendicular orientations.

North of the Monroe Street entrance ramp to the Landing (North 1400–North 1700), a continuous pattern of perpendicular Type 1 (Pattern 12) is next to the Riverside Drive embankment. Large intrusive patches of Pattern 18 (parallel white granite) are at North 1445/East 45 and North 1590/West 50.

NATURAL AND CULTURAL EFFECTS ON THE LANDING

Many areas of the Landing are presently damaged and are undergoing various degrees of degradation due to erosion and everyday use. The largest factor appears to be erosional undercutting and deterioration of the westernmost cobbles by the Mississippi River. Other damaged areas are due to infrastructure additions, commercial and public use, and street runoff from Riverside Drive.

Except for between North 875 to about North 1220, which has been maintained by the Memphis Queen Line, the western edge of the Landing shows major disrepair. The jagged edges of the pavement are primarily due to erosional undercutting by the river and the use of bow thrusters of large river craft (tugboats and steamboats). Erosion at the foot at the Landing has

caused courses of stone above the affected area to sag, causing more erosion and more necessary repairs. Erosion of individual stones accelerates when sediments are allowed to remain over the pavement after periods of high water. The acidity of the Mississippi River and the river-deposited sediments act to decompose the limestones, especially Type 4.

Of the hundreds of smaller repair patterns throughout the Landing, many are undoubtedly associated with the bow thrusters on large river craft. The thrusters push the boat backward by pulling water from under the front of the boat and impelling it forward and downward. The enormous pressure created by these thrusters easily undermines and displaces the cobbles. Since the thruster use is often prolonged to get a large vessel moving, the resulting scar on the Landing can be quite large. The jagged cleft at North 1800/West 75 reveals the damage that bow thruster can cause. Some stones on the northern edge of the scar are still partially fitted to pattern after having been lifted above the surface level of the pavement. Stones that have been completely undermined are displaced on top of the raised stones along with underlying gravels. This is definitely not a consequence of erosion. This cleft has an area of about 900 square feet.

Other commercial uses of the Landing have dislodged moorings. A crater-like hole at North 1690/East 10 was caused by a large steamboat tied to a mooring during a windstorm in the spring of 1993. The wind pushed the boat northward, pulling the mooring out of the pavement along with a 10 x 10 foot area of cobblestone. A similar crater at North 1690/West 25 may have had a similar cause. It measures about 15 x 15 feet and shows no signs of bow thruster damage. Many of the circular repairs at the Landing may represent other dislodged moorings.

Other repairs at the Landing are due to infrastructural additions. From North 400 to North 460, a subtle repair pattern exists over the large storm sewer that runs west from beneath Riverside Drive at Gayoso Avenue. The repair is described as subtle because many of the stones that were taken up to install the sewer were used in the subsequent repair. Since they were reinstalled in a professional and uniform manner, the resulting pattern is barely noticeable from East 0 to East 75. From East 0 to West 50, where the sewer repair abuts an older, intrusive Type 3 repair (Pattern 3), the contact is more easily distinguishable.

From North 515/East 25 to North 875/East 75, a 5–8 foot wide repair pattern is present in relation to the recent installation of water supply lines. This repair was substandard. The surface is highly irregular and in many areas is impassable to vehicles.

From North 1000 to North 1900, the Landing exhibits an irregular surface with many high and low areas. The problem is probably caused by differential settling of individual stones and small-scale, substandard repairs where replacement stones were not set to grade. The compaction of the stones is compounded by automobile traffic, especially during periods of grade saturation.

Runoff from Riverside Drive seems to have had minimal impact on the Landing itself, although the Riverside Drive embankment has suffered greatly. At North 1615/West 75, a teardrop-shaped scar appears due to lack of maintenance in a high runoff area. The scar is about 15 x 7 feet and is associated with an older, partially obliterated drainage pattern. Lack of maintenance has worsened the damage. Two very small repair patterns are just east of this teardrop-shaped scar.

V. CULTURAL FEATURES OF THE MEMPHIS LANDING

In addition to the stone mosaic, itself an artifact of monumental proportions, smaller cultural features are also present at the Landing. These include moorings for river craft and infrastructure additions such as culverts, stone drainages, sewers, water lines, telephone poles, and electrical lines. As part of the field survey, these cultural features were located, described, photographed, and mapped. Temporary features such as concrete parking dividers and miscellaneous concrete and asphalt patching were excluded from the study. The major classes of cultural features are discussed below. Feature distributions are shown on Figures 22 and 23.

MOORINGS

A total of 112 moorings was recorded during the survey of the Landing (Figure 22). Also called "deadmen" and "ring bolts," the moorings are in various states of preservation. Many have been pulled completely out and are lost. Others are partially dislodged. Most are not functional. Some links have been stretched and broken, making them appear older than adjacent contemporary moorings.

Moorings are divided into six types on the basis of material, size, and morphology (Figures 24–29). In most cases, the descriptions refer to that part of the mooring exposed at the surface and, like the cobblestones, represent only one side of the whole. The typology proposed here very likely would be refined with additional subsurface data.

MooringTypology

Type 1. This is the most common type of mooring (n=77, or 68.8 percent). It is present throughout the project area but most prevalent in the northern part. The type is recognized by a square iron plate at or immediately below the surface. The plate measures 1.0 x 1.0 foot and contains an oval opening through which the ringbolt stem extends from the top of the plate into an underlying cast iron or concrete block measuring 1.0 x 1.0 x 1.0 foot. The ringbolts are 2.5 inches thick and 7.5 inches in diameter. A variety of chain links can be attached to Type 1 moorings. A common configuration consists of a single large link (14.5 inches in diameter) connected to the ringbolt; two sets of smaller links (11 inches across) connect to the large link, which allows attachment by two separate tie-down lines.

Type 2. Type 2 moorings (n=4, or 3.6 percent) are nearly identical to Type 1 moorings. The major difference is the face of the square iron plate. Type 2 moorings have an indented face bordered by a raised band along the edges. Two pairs of Type 2 moorings are in the southern part of the Landing. The first pair is between North 300 and North 350, the second at about North 550.

Type 3. This type includes four examples (3.6 percent) in the northeastern section of the Landing at North 1600. One of these, M-7, is pulled completely from the ground, exposing the entire mooring. It consists of a rectangular iron plate, 12.0 x 8.0 inches, set into a fossiliferous limestone block by three bars. The limestone block is massive, measuring 27.0 x 27.0 x 50.0 inches. The iron plate has a welded ring and is separated from the stone by a thin layer of cement. The mooring was dislodged when high winds blew a moored vessel several feet to the north.

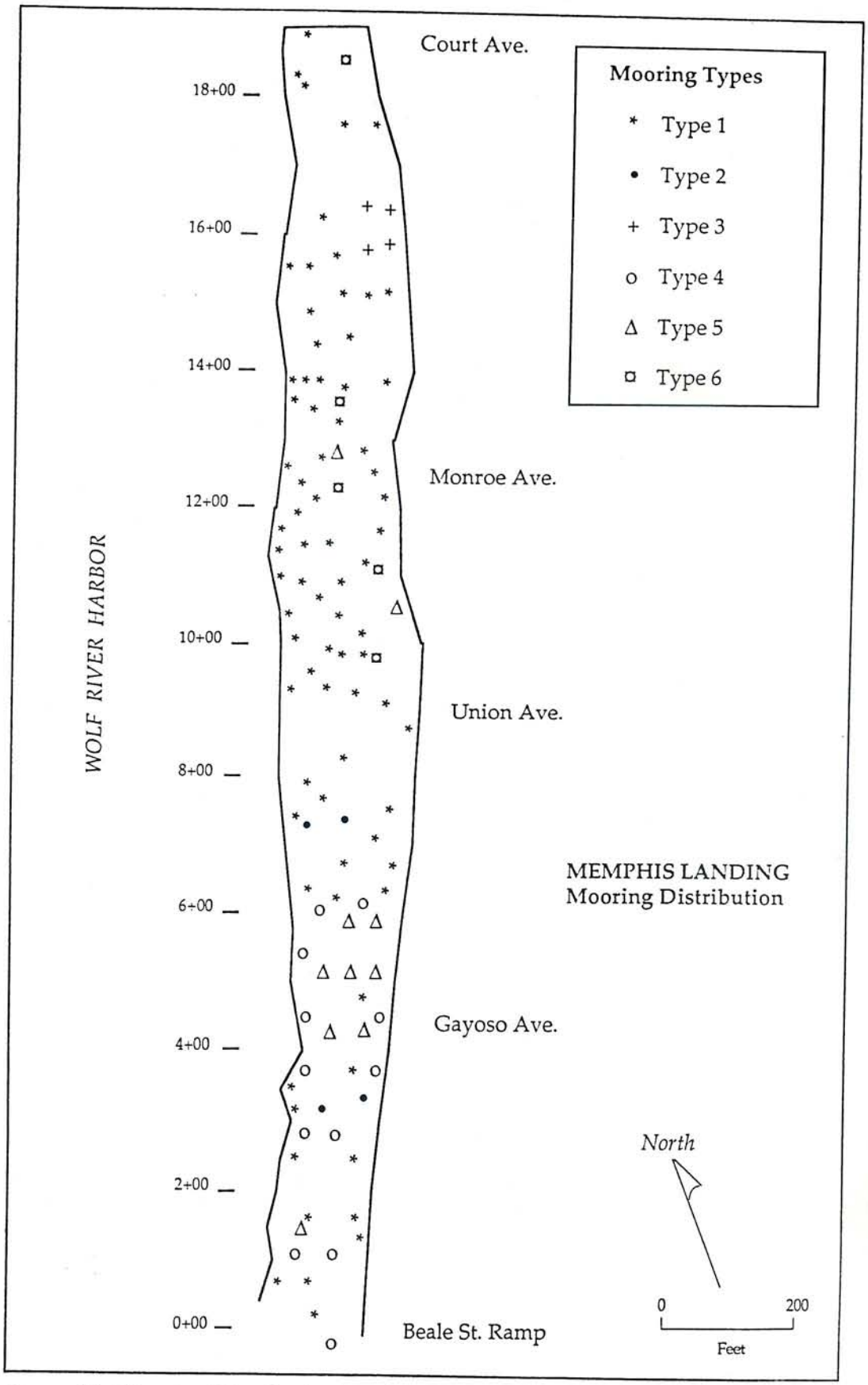


Figure 22. Mooring Distributions at the Memphis Landing.

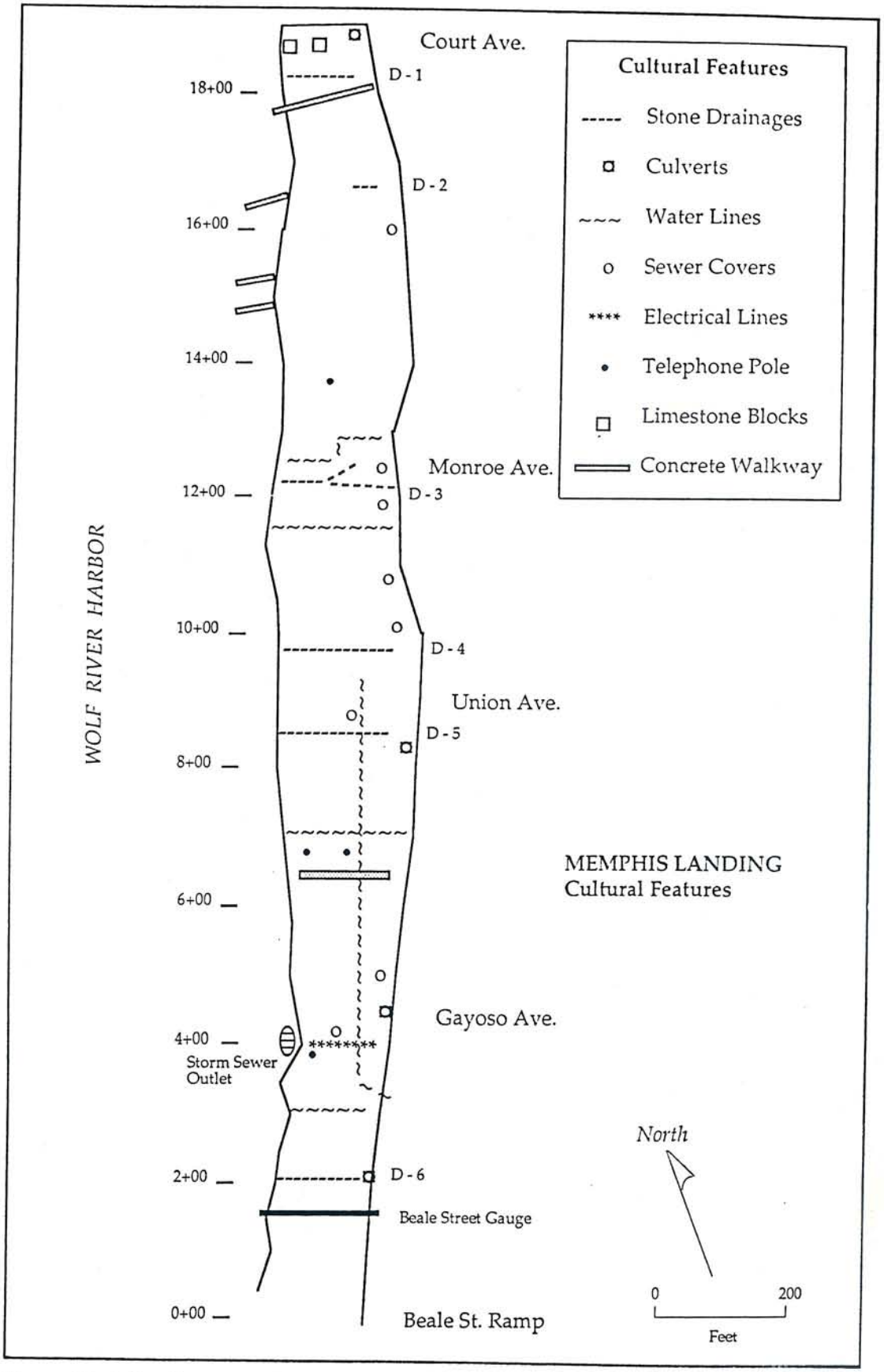


Figure 23. Miscellaneous Cultural Features at the Memphis Landing.

Figure 24. Mooring Type 1.

Figure 25. Mooring Type 2.

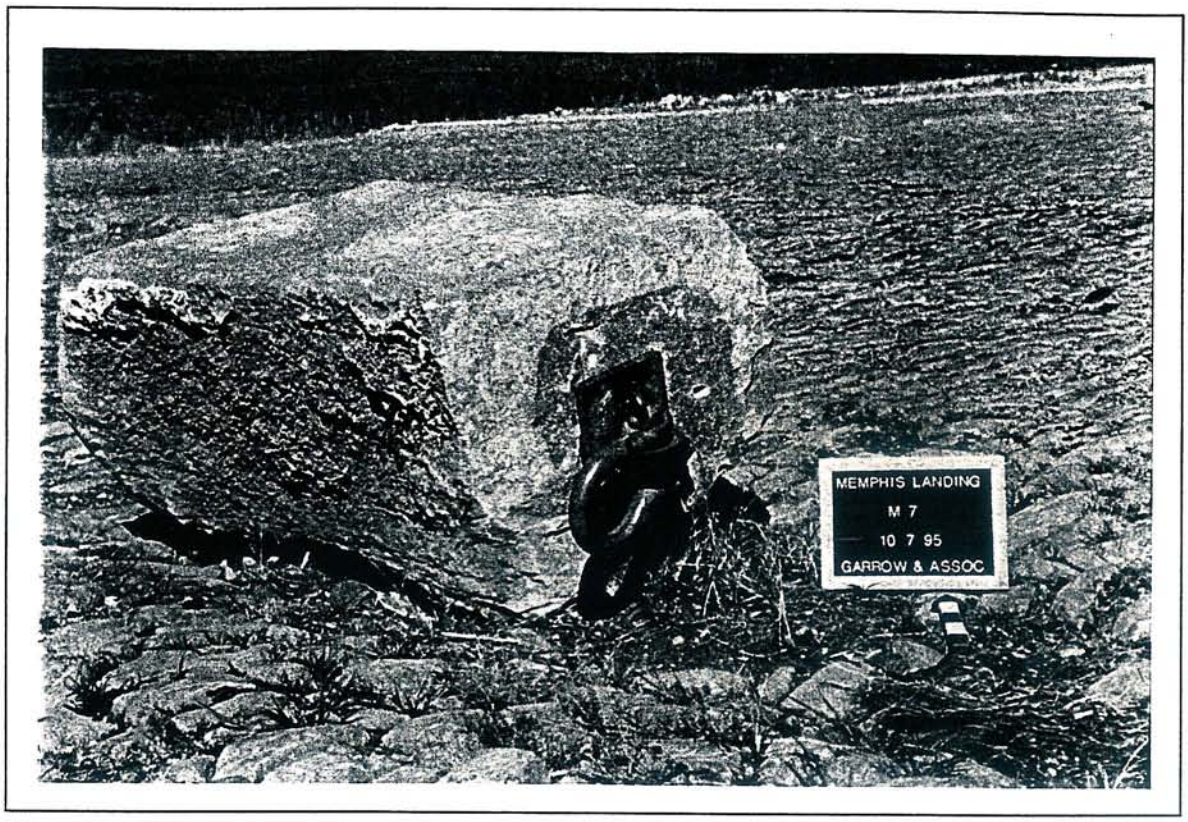


Figure 26. Mooring Type 3.

Figure 27. Mooring Type 4.

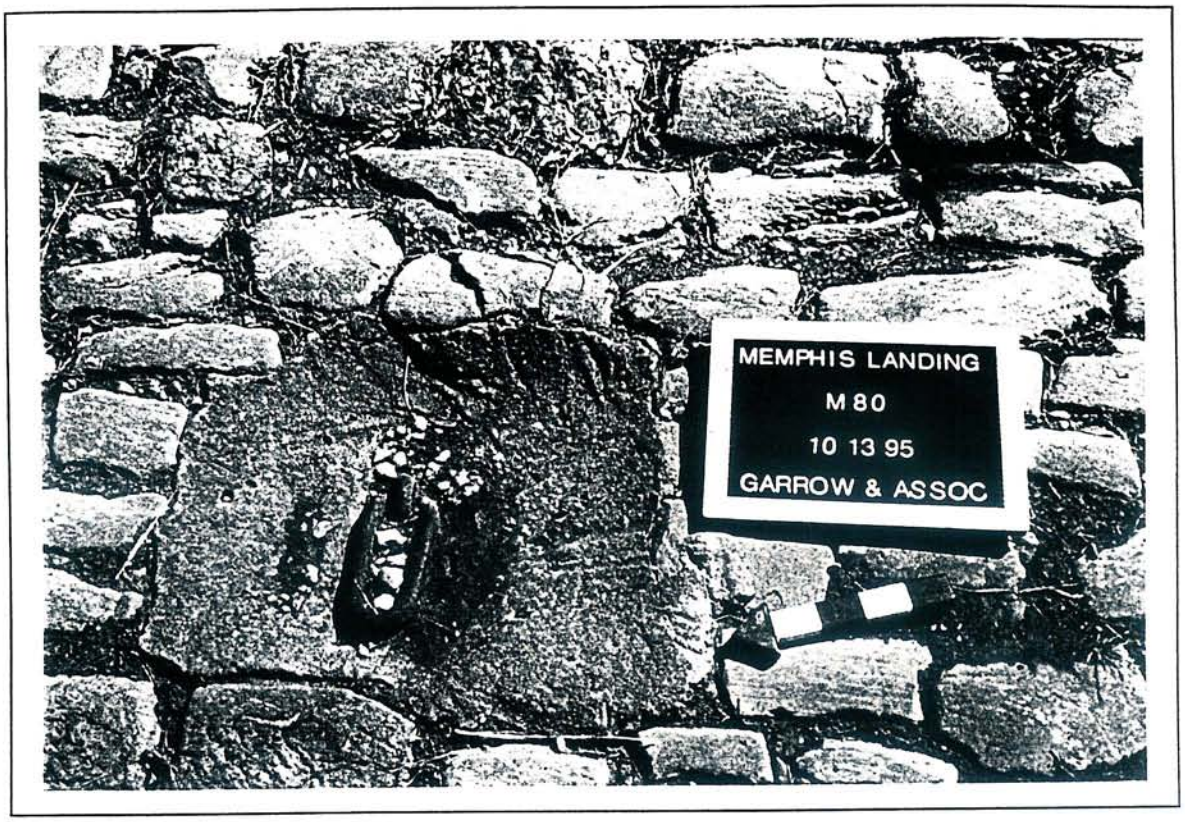


Figure 28. Mooring Type 5.

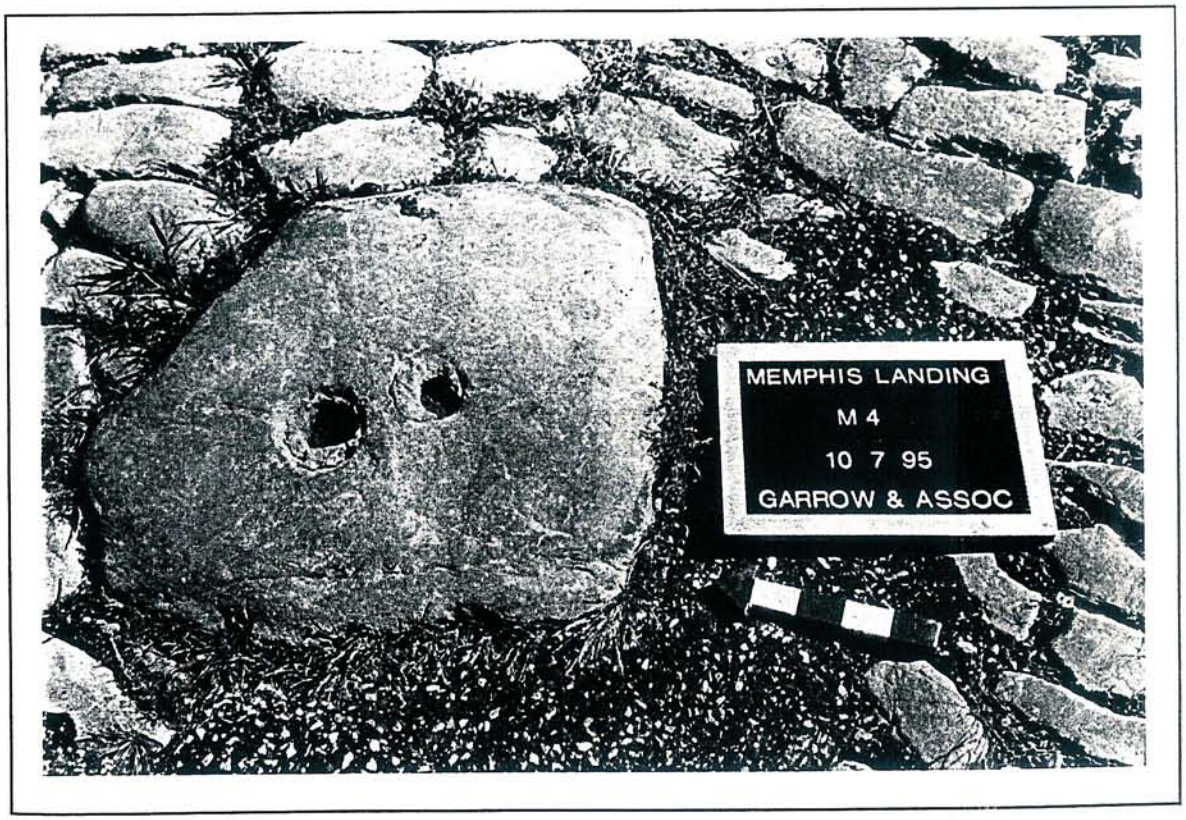


Figure 29. Mooring Type 6.

Type 4. Type 4 moorings (n=12, or 10.7 percent) are distinct in form, consisting of a pan-shaped basin 29.0 inches in diameter. The ringbolt is 7.0 inches in diameter and 2.5 inches thick. These mooring are restricted to south of North 650 and are arranged in pairs perpendicular to the river.

Type 5. This category (n=10, or 8.9 percent) includes a variety of different forms, all apparently noncommercial in manufacture. Many consist of a simple bent iron bar set in concrete. Type 5 moorings are found south of Monroe Avenue (North 1300), with seven examples concentrated between North 600 and North 400.

Type 6. This is the most unusual category of mooring at the Landing, consisting of five (4.5 percent) large fossiliferous blocks exhibiting one or two drilled holes partially filled with lead. It is assumed some sort of iron ring was attached, although their function as moorings cannot be confirmed at this time. These features are exclusive to the northern half of the Landing between North 1900 and North 950. No examples are found south of Union Avenue.

The first example, M-4, is at North 1830/West 30. The limestone block is roughly pentagonal (approximately 27.0 x 21.0 inches). Two holes, 3.5–4.0 inches in diameter, are spaced 5.5 inches apart. Both holes are partially filled with lead. M-27 (North 1305/West 0) has a square exposure measuring 22.0 x 24.0 inches with a single drilled hole 3.25–3.75 inches in diameter. M-36 (North 1220/West 10) measures approximately 28.0 x 23.0 inches, with two drilled holes 3.5–4.0 inches in diameter. The stem of an iron link is attached to one of the holes with lead. The fourth example, M-46 (North 1130/East 25), measures approximately 29.0 x 27.0 inches and has a single lead-filled hole about 2.5 inches in diameter. The southernmost example, M-59 (North 970/East 40), is a square block of limestone measuring approximately 27.0 x 28.0 inches. A single irregular hole about 2.5 inches across was drilled. A twisted iron bar fragment is in the hole, but no lead remains.

Mooring Distributions and Chronology

The distribution of the moorings is shown on Figure 22. Of particular interest is the pattern of concentric arcs associated with the Type 1 moorings north of Union Avenue. As outlined above, the historical and lithological evidence suggests the Landing north of Union Avenue predates the South Memphis Landing. The association with Pattern 1 limestone suggests the Type 1 moorings are original to the stone fabric and were placed in a designed configuration. Type 1 moorings are present south of Union Avenue but are located in a random fashion. These may represent moorings salvaged from earlier construction.

Type 6 moorings are also restricted to the northern part of the Landing. These limestone blocks with lead-filled holes seem to fit with the surrounding stone matrix and are also probably associated with the 1860s construction stages. The five examples tend to be located along the eastern side of the Landing. Whether they represent an original form predating the Type 1 moorings is unknown.

The location and overall condition of the other mooring types suggest they are later additions. The four Type 3 moorings appear almost new and are probably the most recent. The pan-shaped Type 4 moorings may date from the 1870s or 1880s, but they often appear to be intrusive into the surrounding cobblestone matrix, suggesting they were placed after the major building episodes. The "handmade" moorings classified as Type 5 are also quite recent. The concentration of Type 5 moorings between North 400 and North 600 suggests they were constructed and used by the Waterways Marine wharfboats.

SURFACE DRAINAGES

There are two types of drainage patterns at the Landing: 1) shallow swales, usually consisting of rectangular stone laid perpendicular to the river; and 2) "de facto" drainage patterns across the stones from culverts running beneath the berm at Riverside Drive. The former appear to have been included in the original design and construction of the stone fabric. They efficiently funnel rainwater toward the river, except where the channels have been disrupted by patching or blowouts. The second pattern is associated with later road construction. Except in one case, the culverts beneath Riverside Drive are not aligned with the stone drainage channels on the Landing. Therefore, the surface drainage from these outlets disperses randomly, eroding the soil matrix and dislodging the cobblestones.

Six channeled stone drainages are visible today. Each consists of 1–8 courses of stones, with long axis of the stone perpendicular to the waterline. These are discussed below.

Drainage 1

Beginning at the north end, the first drainage (designated D-1 on Figure 23) crosses the baseline at approximately North 1810. Beginning at the base of the Court Street ramp, the east half of this drainage consists of one course of roughly rectangular Type 1 stones set perpendicular to the river and the surrounding stone matrix. The west half is wider and consists of two stone courses. Portions of the drainage are affected by bow thruster holes and later concrete repairs.

Drainage 2

East of Mooring No. 7 (at approximately North 1668/East 20) is a short drainage segment (D-2). The drainage is approximately 24.0 feet long and consists of nondimensional Type 1 stones, five courses wide, laid perpendicular to the river and the surrounding matrix stones. The feature is disrupted by the stone-paved service road at the base of the berm to the east. Evidently, the west side of the drainage extending toward the river is also obscured by later paving, although no observable changes in the stone fabric indicate this.

Drainage 3

Drainage 3 crosses the baseline at about North 1250 (Figure 30). West of the baseline, the drainage consists of six courses of perpendicular Type 2 stones. The use of oolitic limestone in this section of the Landing suggests that the drainage is younger than the surrounding Type 1 matrix. East of the baseline, the drainage pattern branches into two diagonal drainage patterns (at about 30 degrees to the main stem) composed of Type 1 stones. The two diagonal patterns are totally obscured by small, discontinuous repair patterns at their eastern ends. The drainage is obliterated at North 1250/West 65 by recent repairs near the 10 foot watermark.

Drainage 4

Drainage 4 crosses the baseline at about the North 975 line. The western part of the drainage pattern is composed of eight courses of perpendicular Type 1 stones. East of the baseline, the drainage tapers to four stones wide and then one stone wide as it crosses the service road. East of the baseline, the drainage angles slightly to the south (less than 10 degrees). The stones are

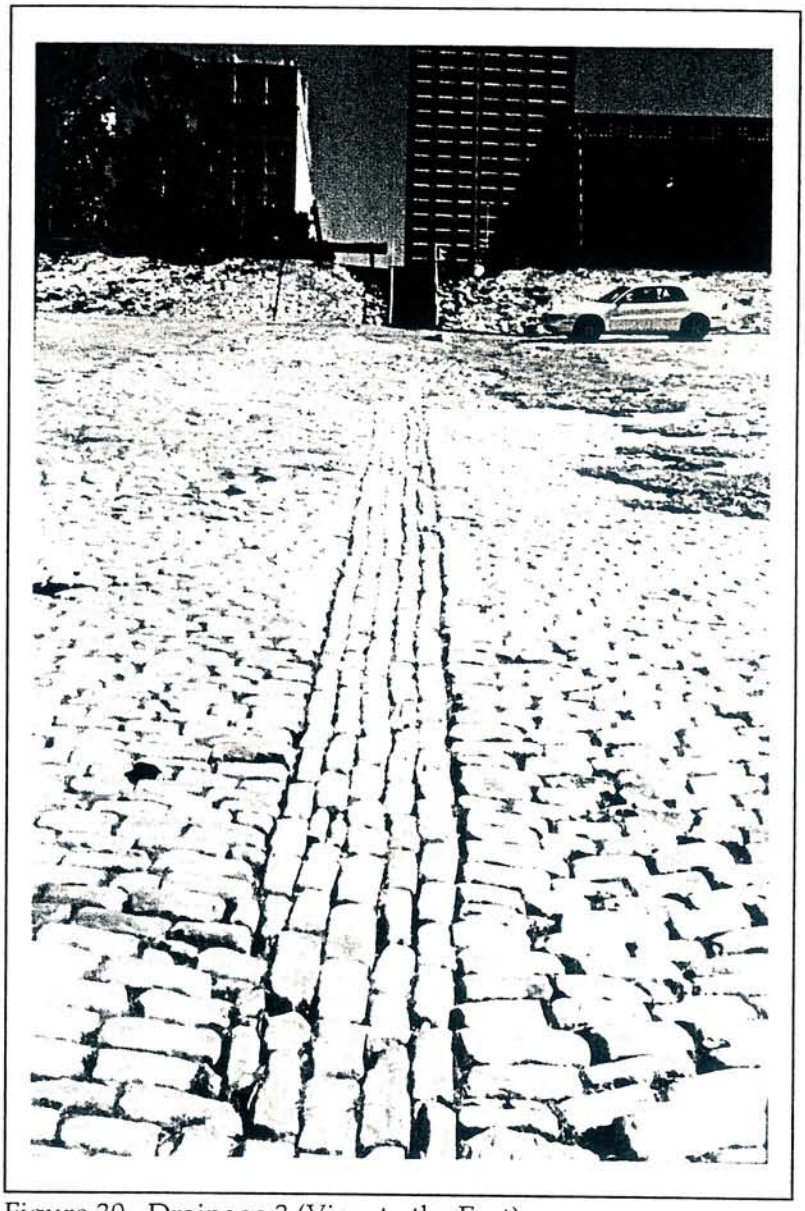


Figure 30. Drainage 3 (View to the East).

predominantly uniform in size and dimension, but many nondimensional stones are present. It ends abruptly at the west end at a patch of dimensional limestone.

Drainage 5

Drainage 5 crosses the baseline at approximately North 875. The drainage pattern is composed of Type 2 (oolitic limestone) intrusive into the Type 1 stones that surround it. It is composed of six courses of perpendicular, dimensional cobbles. Drainage 5 extends to the western edge of the cobbled Landing but at its eastern edge terminates abruptly at the service road. The eastern part of the drainage was impacted by a recent water line.

Drainage 6

Drainage 6, which crosses the baseline at about North 220, is the most complex drainage pattern at the Landing (Figure 31). At the eastern end, the drainage begins at a culvert beneath Riverside Drive. The section crossing the service road consists of horizontal Type 3 (sandstone) surrounded by horizontal Type 2 (oolitic limestone). Between North 220/East 30 and North 220/West 35, the drainage consists of an outer edge of one course of perpendicular Type 2 outlining 10 horizontally placed Type 2 pavers. One course of perpendicular Type 2 stones is at the center.

West of North 220/West 35, the drainage pattern changes to Type 3 (sandstone) and shifts slightly to the north. The overall width of the Type 3 drainage is 18 inches, slightly wider than the Type 2 drainage to the east. The northern edge in this portion is in sharp contact with the surrounding Pattern 10 limestone; the southern edge is transitional with Pattern 9b. The northern half of the sandstone drainage is composed of one perpendicular course at the contact with Pattern 10, followed by six horizontal and three perpendicular courses in the center. On the south half, 5–8 horizontal courses are at the transitional contact with Pattern 9b. The westernmost section of Drainage 6, between the sandstone and the edge of the pavement, consists of three courses of perpendicular Type 1 and Type 2 stones.

The nature of the contacts in this drainage pattern suggests the eastern part (Type 2) was laid first, followed by the middle part (Type 3) and finally the Type 1 and 2 mixture.

Culverts

Four culverts are situated along the base of the Riverside Drive berm (see Figure 23). Beginning at the north end, the first is opposite Court Avenue at approximately North 1873. The second is south of Union Avenue (North 870) and almost matches the stone-paved Drainage 5. There are one culvert near the intersection of Riverside Drive and Gayoso Street (North 450) and one north of the Beale Street Ramp (North 220). The latter corresponds to Drainage 6.

STORM SEWERS

Apparently, two kinds of storm sewers are present at the Memphis Landing: those dating from the twentieth century, which are intrusive into the original stone paving; and nineteenth century sewers, constructed at the same time or shortly after the stones were laid at the Landing.

Missing page 67
(probably photos)

The locations of twentieth century storm sewers are evident from manhole covers (n=8) and changes in the stone fabric at the surface. One manhole cover at North 1600 is marked "SEWER," and a series of four manhole covers runs along the east side of the Landing between North 1600 and North 1000 (between Monroe and Union avenues). These locations are consistent with the sewer system indicated on a plan provided by the Bureau of Sewer Design, which shows a 21 inch sewer line extending south from Jefferson Davis Park. The line runs along the west side of the Court Avenue ramp, then follows the service road to the west side of the Monroe Avenue ramp. From there, a 27 inch line extends south along the service road toward Union Avenue. This sewer system was probably constructed at the same time as Riverside Drive (ca. 1935).

Unfortunately, sewer lines are not indicated on the next Bureau of Sewer Design plan drawing, which covers the area south of the Monroe Avenue ramp. An open manhole at about North 890/East 30 corresponds to the approximate centerline of Union Avenue. From the surface, the sewer appears to extend to the southwest and may connect with the sewer outlet at Gayoso Avenue. However, no surface indications suggest this.

The Gayoso Street sewer drains into the harbor at North 400 (Figure 32). The sewer was constructed after the original stone fabric, as evident in Pattern 10a (Appendix 1). A manhole cover is about midway between the water's edge and the service road. This feature may represent the massive Memphis Siphon storm water sewer constructed ca. 1915–1920.

Documentary evidence suggests that sewer lines were laid in association with the original paving as early as 1860. These nineteenth century sewers are not usually evident at the surface. The Bureau of Sewer Design plan of the Landing indicates an "abandoned" 18 inch line that begins at Jefferson Davis Park and extends beneath the ramp at Court Avenue to the west side of the Monroe Avenue ramp. There the line connects with a 20 inch line that turns west down the centerline of Monroe Avenue to the river. This line probably corresponds to a cast-iron drainage pipe visible at the west side of the cobblestone pavement during low water (Jimmy Ogle, personal communication 1995). The plan indicates a second "abandoned" line extending from the south side of Court Avenue to the harbor. This line may be buried under the talus slope of Jefferson Davis Park. In all likelihood, there are other, undocumented nineteenth century sewer lines in the southern part of the Landing.

UTILITIES

Below-ground utility lines from the twentieth century include at least five water lines and one electrical line (see Figure 23). Water lines were recognized from the placement of water meters and spickets that tie into a water main that runs north-south beneath the Riverside Drive berm. Most the east-west water lines crossing the Landing are small. Except for a water line at North 330 covered with concrete, repaving has incorporated salvaged stones, and the lines are fairly inconspicuous. The exception is the large water line disturbance extending north-south across the pavement from about North 300 to Union Avenue (see Figures 23 and 33). The trench for this line was excavated in about 1992 to serve the Stacker Lee restaurant. The trench is approximately 3 feet wide and accommodates two PVC pipes. The stones were replaced haphazardly, resulting in alternating swales and ridges along the 600 foot length of the trench. The base of the trench is lined in concrete, which has disrupted the natural drainage by accumulating moisture and promoting vegetation (Figure 33).

Electrical service to the Landing is by buried cables under the Monroe Avenue ramp, as indicated on a plan provided by Memphis Light, Gas, & Water. An above-ground cable extends west from the ramp to a pole and then to the floating complex maintained by the

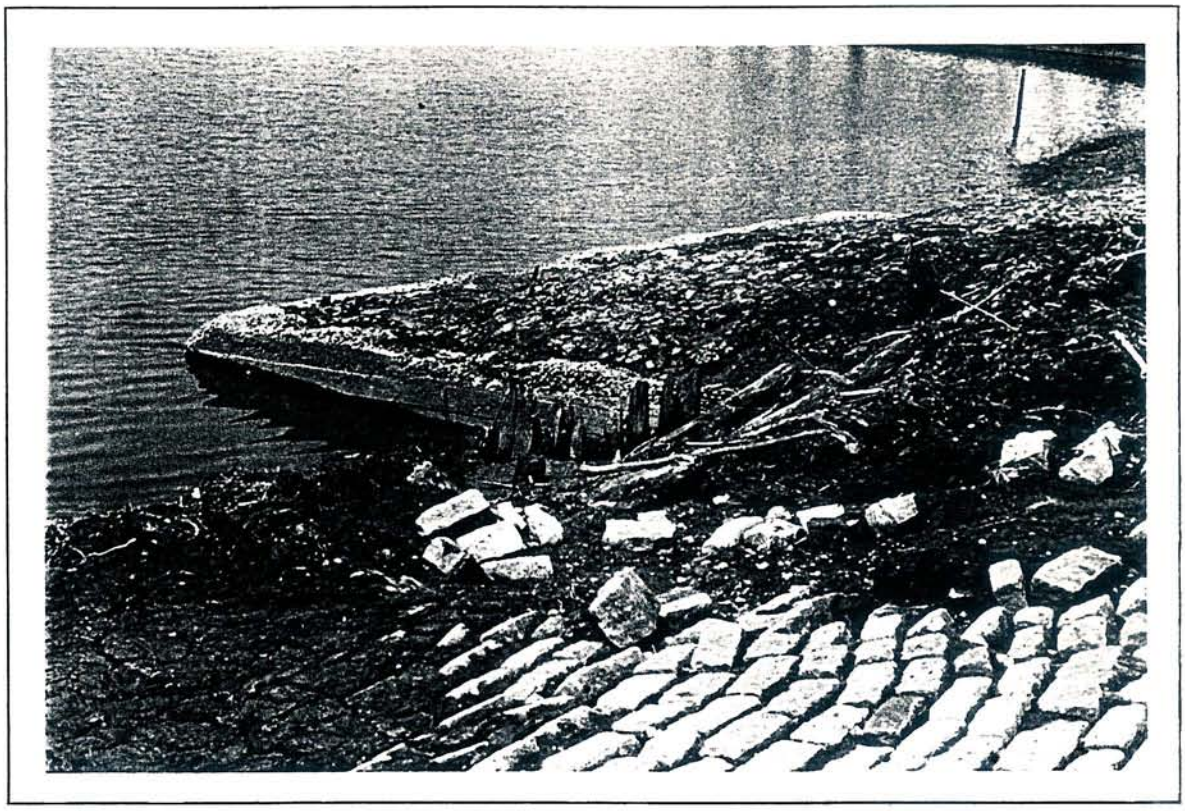


Figure 32. Gayoso Street Sewer (View to the North).

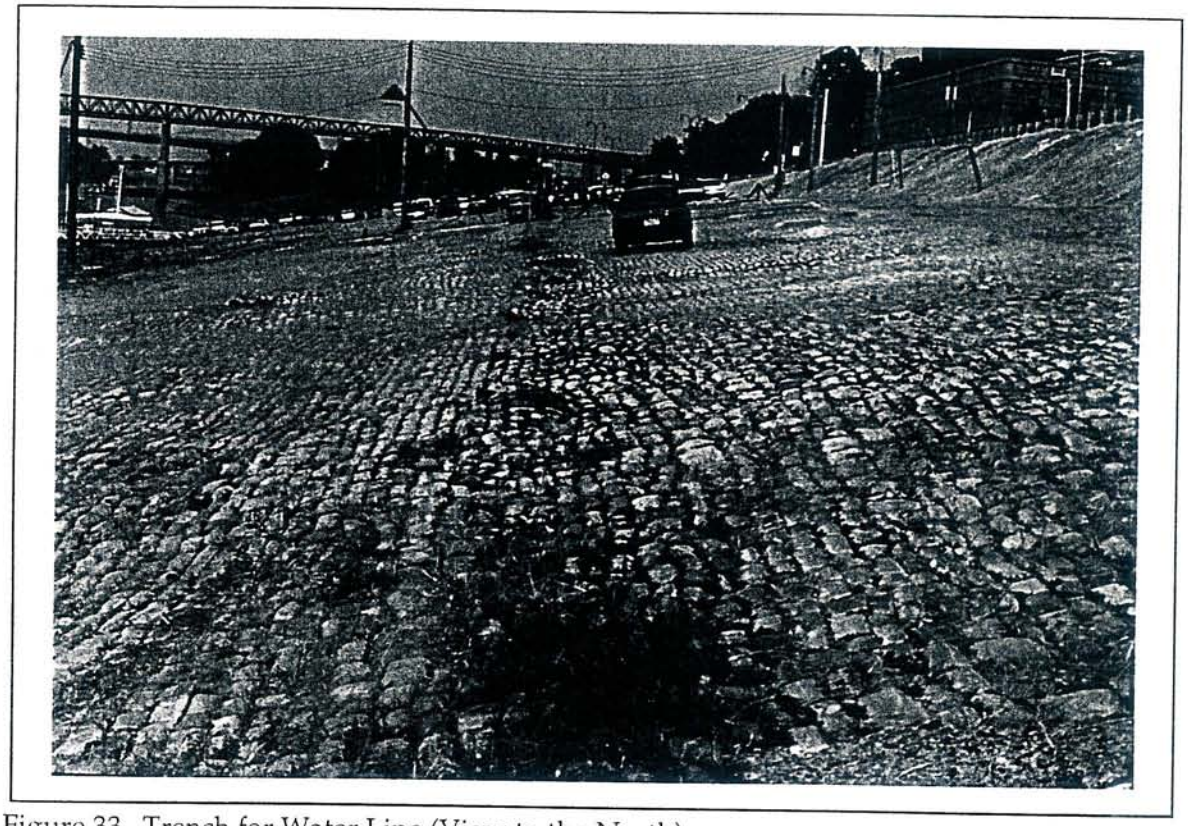


Figure 33. Trench for Water Line (View to the North).

Memphis Queen Line. Buried cables indicated on the plan extend south from the ramp under the service road toward the Beale Street ramp. A buried connection to this line, covered in concrete, extends east-west from the service road to the former location of the Waterways Marine. This buried cable follows the line of the Gayoso Street sewer (see Figure 23).

WALKWAYS AND ASPHALT DRIVEWAYS

Modern alterations to the surface of the Landing include six concrete walkways, four asphalt walkways, four asphalt driveways, and dozens of smaller concrete or asphalt patches.

Two of the six concrete walkways were laid east-west over the stone pavement; the rest are at the western edge of the pavement (see Figure 23). The 45 inch wide concrete walkway crossing the Landing between North 1800 and North 1700 is visible on photographs from the 1940s. The second example at approximately North 650 is of similar construction and may have led to boats at the Waterways Marine.

Asphalt was used to construct the circular drive serving the Memphis Queen Line west of the Monroe Street Ramp. At low water, the western edge of the drive is connected to the water's edge by four asphalt walkways and one concrete walkway (see Appendix 1). A second asphalt drive, extending from the base of the Beale Street ramp at the southern end of the Landing, is used to launch boats. Remnants of two other asphalt drives running east-west across the Landing are present at approximately North 305 and North 250 (see Appendix 1). One badly deteriorated east-west asphalt walkway crosses the Landing at about North 1385.

OTHER FEATURES

Limestone Blocks

At the northern end of the Landing are two fossiliferous limestone blocks much larger than the surrounding limestone matrix stones. Located southwest and southeast of Mooring No. 1, at approximately North 1890, both measure 27.0 x 28.0 inches. Their function is unknown.

The Beale Street Gauge

The Beale Street River Gauge, at about North 150, is an iron ribbon 6.0 inches wide set in a concrete foundation 16.0 inches wide (Figure 34). The gauge is in two sections and is marked in tenths of feet. On the Landing proper, the distance between one-foot marks is 80.0 inches (1:6.66 slope). At the western edge, the gauge is covered by sediments below the 9.2 foot mark; the stone paving begins at about 10.0 feet. On the east, the gauge becomes part of the Riverside Drive berm at the 35 foot mark. The gauge top at the roadway level is 48 feet. On the berm, the one-foot marks are 22 inches apart (1:1.83 slope). Given that the gauge does not appear to run under the berm, the gauge probably was constructed sometime after Riverside Drive (ca. 1935).

Metal Poles

Between North 1800 and North 1675, at least eight 3 inch diameter metal pipes are set into the pavement and cut off at surface level. These probably were the bases of metal poles. The rectangular pattern suggests some sort of fencing in this section of the Landing.

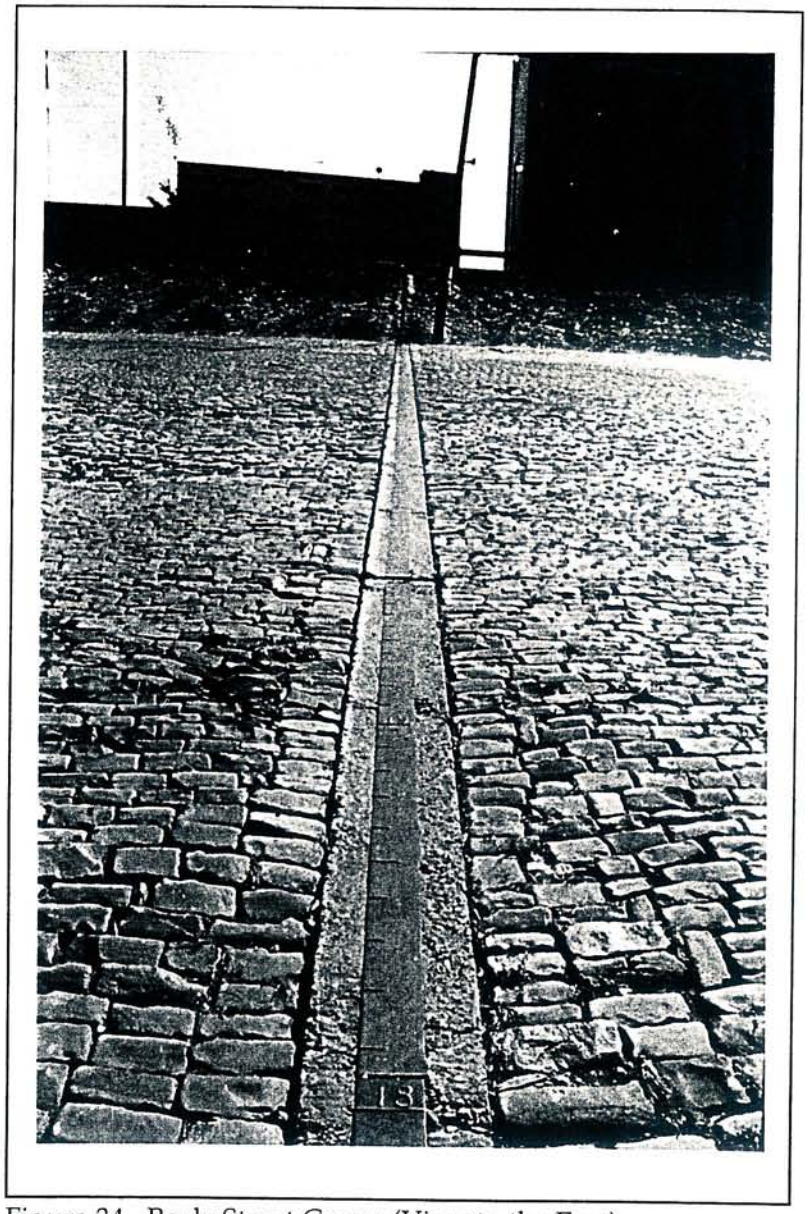


Figure 34. Beale Street Gauge (View to the East).

VI. SUMMARY AND CONCLUSIONS

In this final chapter, we address questions posed in the original research design. Results of the study are summarized in terms of the four main objectives presented in Chapter I: 1) documenting the evolution of the built environment; 2) formulating a predictive model of buried archaeological deposits at the Landing; 3) identifying natural and cultural causes affecting the preservation of the Landing; and 4) assessing the significance of the Memphis Landing using criteria established by the National Historic Preservation Act of 1966.

EVOLUTION OF THE BUILT ENVIRONMENT

To arrive at an understanding of how and when the Memphis Landing was constructed, we must compare the results of the literature and records research with the results of the on-site geological and archaeological surveys. The conclusions presented here are considered preliminary and could change in light of new historical information, subsurface archaeological data, or a reevaluation of the lithological patterns of the stones themselves.

Review of the Historical Record

The available historical record, presented in Chapter III and summarized in Table 3, suggests that the cobblestone Landing visible today is the product of three major nineteenth century building episodes and one twentieth century repaving project. The first major paving of the Landing was between 1859 and 1860. An 1860 audit suggests that John Lowdon had paved 12,428.88 square yards between Adams and Union streets and 7,129.39 square yards between Union and Beale streets. Work was already underway to repair part of the pavement between Union and Beale Streets that had "given way and sunk." The contract for the work suggests this pavement was 100 feet wide. Unfortunately, no extant documentation or maps indicate whether this paving was located against the bluff or at the water's edge.

The second major paving episode commenced after the Civil War between 1866 and 1869. In 1866, the City awarded a contract to John Loudon for new paving from Jefferson to Monroe streets, "to be one hundred feet in width, composed of square blocks of stone." In 1868, a resolution extended a contract with M. & J. Louden to cover the unpaved portion of the city wharf from Court to Union streets. In 1869, J. & M. Loudon were contracted to pave the Landing at the foot of Union Street. The historical record suggests that the Landing was complete to Union Street by ca. 1869.

Ten years later, in 1879, the third and final nineteenth century effort to pave the Landing began with a contract to M. Larkin & Company. Material for the paving project was provided under a separate contract to James A. Loudon. In all probability, the work was halted due to the Yellow Fever epidemic of that year. However, Larkin & Company had probably finished part of the original work before the epidemic, for a renewed 1880 contract to Larkin included paving from the north edge of the old elevator site to the south edge of Beale Street (an area about 400 x 200 feet). At this point, the historical record becomes complicated. In June 1880, newspaper reports indicate W. H. Grider & Company began paving at the lower end of the old freight elevator, working toward Beale Street; in July 1880, the legislative council directed the City Engineer to design new specifications and advertise for bids to pave the area of the wharf from the north side of the old elevator to the south side of Beale Street. This contract was awarded

Table 3. Historical Summary of the Memphis Landings.

1819	Public Promenade is established from the mouth of Bayou Gayoso to Beale Street. The Public Landing extends from Auction Street to Winchester Street.
1830s	A sandbar accretes across the west and southwest frontages of the Public Landing. A wooden walkway and wharf are built across the bar in 1837 at the end of Winchester Street.
1838	Captain William W. Hart, wharfmaster, moves the wharfboat south to the vicinity of Union Street.
1844	The City formalizes the development of the Batture. Center Landing is established between the extensions of Poplar and Washington streets. A "public levee" extends along the frontage of the river on both sides of Center Landing. At least portions of Center Landing are paved before 1859.
1859	In March, the City "introduces a plan for paving the wharf with limestone or granite, of not less than four nor more than eight inches in surface, to be laid on gravel not less than five nor more than eight inches in depth; the width of the pavement to be 100 feet, the length 3300." Amendments establish a uniform grade and set the depth of the paving at 12 inches. The completed revetment is to stretch from the north end of Jefferson Street to the south line of Union Street at Howard's Row. In September, the first stones of the pavement at the city wharf are put down by the contractor, John Lowdon.
1860	Audit shows Lowdon has paved 12,428.88 square yards between Adams and Jefferson (Union?) streets and 7,129.39 square yards between Union and Beale streets. Also mentioned is the requirement for Loudon to "grade from the wharf" some 40,000 cubic yards of earth. Lowdon is already obliged to repair "that portion of the nine inch pavement between Union and Beale Streets which has given way and sunk." The settling of the grade is attributed to the lack of "sewers or drains underneath said pavement necessary to conduct all water beneath it to the river."
1861	Mayor and board receive proposals "for the sinking of a barge or other river craft with sufficient stone or other material to hold it in place at the landing below Poplar Street where the bank is now being washed away."
1862	In June, Federal forces arrive in Memphis.
1865–1886	Changes in the currents of the Mississippi slowly begin to erode the Batture. By 1886, the paved frontage flanking the open square of the landing slips into the river.
1866	The City awards a contract to John Loudon for new paving from Jefferson to Monroe streets, "to be one hundred feet in width, composed of square blocks of stone."
1868	Loudon calls attention to caving conditions of public landing northward from Jefferson Street; a strip 700 x 100 already had disappeared, carrying away $20,000 worth of paving. Caving could be stopped by sinking two or three old barges loaded with gravel opposite the head of "Old Hen." Resolution extends the contract of M. & J. Lowden to include unpaved portion of city wharf from Court to Union; the work is to be done within 60 days.
1869	City Engineer instructs J. & M. Loudon to pave Landing at the foot of Union Street.
1871–1872	The Vicksburg & St. Louis Anchor Line's massive freight elevator is constructed at the foot of Beale Street.
1878	Freight elevator is destroyed by fire.

Table 3. Historical Summary of the Memphis Landings. (cont.)

1879	Ordinance requires "parties laying sewers to the River to use Iron pipe under the Landing." City Engineer recommends completing the levee south of Union Street. Contract is awarded to M. Larkin & Co. Material for the paving project is provided under a separate contract with James A. Loudon. In March, T. C. Betts is awarded the contract to construct a "dump or dredge boat" at the elevator site.
1880	In June, Grider begins paving, breaking ground at the lower end of the old elevator and working up to Beale Street." In July, newspapers report a renewed contract for Larkin & Company to finish "paving of the wharf & Landing from the north edge of the elevator to the south edge of Beale Street, a distance of about 400 feet by 200." Also in July, the City Engineer designs new specifications and advertises for bids to pave the area of the wharf from the elevator to Beale Street. A contract calling for "paving the wharf from N side of old elevator to S. side of Beale Street [with] the district reserving the right to do any or all of the grading" was awarded to O. H. P. Piper. The fire and police commissioners are authorized to insure more rapid progress by W. H. Grider & Co. to complete work. In August, a diver cuts away the burned pilings at the bottom of the river at the old St. Louis Packet Company elevator at the foot of Beale Street.
1881	In October, the contract with Grider & Co., "having done the paving and not the rip rap & repairing" because of the "stage of water and other reasons," is canceled. In December, a status report indicates the progress over the "past three years in grading and extending the wharf and landing southward from Union street and to the south side of Beale. About thirty thousand square yards of new pavement has been laid, making the new levee front some eleven hundred feet, by two hundred and fifty feet with the slope. Two-thirds of this work is of first-class block stone and the remainder first-class rubble-range work. About four thousand cubic yards of stone riprap has been placed at this levee as a protection against washing and undermining of same." The city's paved landing surface extends in an unbroken line from Beale Street north to Jefferson Street, a distance of more than one-half mile, averaging 225 feet in width.
1881–1882	The uppermost (eastern) edge of the Landing pavement is altered during the construction of the Mississippi & Tennessee Railroad. These efforts also require the removal of "all of the bluffs out of their line between Beale and Jefferson (save that between Union and Monroe), amounting to over fifty thousand cubic yards."
ca. 1912	The massive Memphis Siphon storm sewer is constructed beneath the Landing between Union and Gayoso avenues.
1932–1937	Riverside Drive is constructed.

to O. H. P. Piper. In any case, the paving appears to have been complete by 1881, when the City Engineer reported:

> a large amount of work has been done in the past three years in grading and extending the wharf and landing southward from Union street and to the south side of Beale. About thirty thousand square yards of new pavement has been laid, making the new levee front some eleven hundred feet, by two hundred and fifty feet with the slope.

Although archaeological contexts at the Beale Street Landing Dump site indicate post-1881 paving episodes (Weaver et al. 1994), the next major modification to the Landing, ca. 1932–1937, was the completion of Riverside Drive. This project, funded by the Public Works Administration, elevated the grade of Riverside Drive and the Illinois Central Railroad tracks to a level at least 15 feet above the pavement on the eastern side of the Landing. The current system of automobile ramps was installed at this time, along with most of the culverts, walkways, and stairs that connect Riverside Drive with the Landing surface. On the northern end of the Landing, the block between Jefferson and Court avenues was raised to the level of Riverside Drive to create Jefferson Davis Park.

Correlation of the Lithological and Historical Records

A working hypothesis throughout the project centered on the idea that raw material usage, construction pattern, and cultural features at the Landing could be associated with distinct building episodes reflected in the historical record. What we have been able to surmise from these separate lines of evidence suggests a complex sequence of procurement and construction over the last 136 years.

In regard to raw materials, we now know that the Memphis Landing is composed of nine rock types in three basic shapes: dimensional, roughly dimensional, and nondimensional. The Landing is approximately 85 percent nondimensional or roughly dimensional Mississippian age limestone (Types 1, 2, and 4). Evidence (detailed below) suggests the earliest extant sections of the Landing (ca. 1860–1868) were constructed using nondimensional fossiliferous limestone (Type 1). Later sections of the Landing south of Union Avenue (ca. 1880) were first built using nondimensional Type 1 with a high percentage of Type 4. Type 4 breaks apart under heavy use, and large-scale repairs apparently were undertaken almost immediately, using a better-quality, roughly dimensional oolitic limestone (Type 2). Later repairs are associated with roughly dimensional sandstone (Type 3). Construction of the service road at the base of Riverside Drive in the 1930s includes large areas of pink and white granites (Types 7 and 8), suggesting these materials were not incorporated into the fabric of the Landing until the twentieth century. The granites are sometimes found as pure patches but usually are in association with Type 1, 2, and 4 limestone blocks salvaged from the existing or disturbed areas of the pavement. In all likelihood, the use of rhyolite (Type 9) and syenite (Type 6) also dates from this period. Dimensional limestone (Type 5) appears to be the most recent raw material used, as similar stone was used in the construction of sidewalks at Confederate Park in 1983.

We have been partially successful in correlating extant stone patterns with the historical documentation. Although the use of specific stone types does seem to have rough chronological significance, the pattern analysis is complicated by the use of later stone types, including the igneous materials, as individual replacement stones. It also appears that older limestones were displaced and used for later repairs. Repairs began well before the Landing was completed and now account for 20–50 percent of the total area. These repairs have been necessitated by erosional undercutting from the Mississippi River, erosion due to runoff from Riverside Drive, breakdown and dissolution of less durable rock types, infrastructural additions to the Landing (sewers, utilities, etc.), and other damages caused by commercial and public use of the Landing. Repairs can usually be distinguished from the older pattern(s) of placement by the intrusive nature of the boundaries and the differences in rock type from pattern to pattern.

The Landing from Court Avenue to Union Avenue appears to have been constructed in a single building event (Pattern 1). Although many intrusive repair patterns are present, nondimensional fossiliferous limestone (Type 1) is predominant and continuous from the northern edge at Jefferson Davis Park to the drainage at North 875. From the lithology and the distribution of moorings, this section of the Landing likely corresponds to the second episode of

construction, completed between 1866 and 1869 by John Loudon and his sons. This section may even include the first portion of the Landing between Adams and Union streets, completed by Loudon between 1859 and 1860. The absence of any clear separation between the first and second stages of construction is not surprising, considering that the same contractor and supplier of stones were used for both stages. As mentioned in Chapter III, it is also possible that the work completed in 1860 was removed during the Civil War, eroded away, or was located against the bluff under what is now Riverside Drive.

Lithological evidence also suggests the area of the Landing south of Union Avenue (North 475) is associated with the third stage of construction, dated ca. 1879–1881. Instead of relatively homogenous and monolithic in character, the South Memphis Landing reflects a complex mosaic of patterns and mends. This complexity is mirrored in the historical record of multiple contractors and overlapping project areas.

At Union Avenue, there is a pattern change from Pattern 1 to the north to Pattern 9 to the south. The latter is a mixture of fossiliferous limestone (Type 1) and a low grade and friable limestone (Type 4). The rock types in Pattern 9 are similar in age and composition to the major component in Pattern 1 and are likely from the same source. We know from the historical record that Larkin & Company was using limestone procured from James Loudon. All this suggests Pattern 9 north of the Gayoso Avenue sewer (i.e., North 475) was laid by Larkin & Company ca. 1879.

Pattern 9 is the oldest pattern from North 875 to about North 475, but it is smaller than the 17,000 square foot coverage of Pattern 2 repairs. Pattern 2 and Pattern 11, which differ only in orientation, are almost entirely composed of high grade oolitic limestone. The change in building material suggests a change in contractors. In this case, the historical record suggests these patterns can be attributed to either O. H. P. Piper or W. H. Grider & Company. It is also possible that Patterns 10b and 9b are associated with one of these two contractors. Both patterns contain rock components found in Patterns 1 and 2 along with later materials, and it stands to reason they are later additions that incorporated materials already available. Alternatively, these units may be associated with unrecorded late nineteenth or twentieth century repairs.

The next major building episode is probably associated with the construction of the Gayoso Street storm sewer in ca. 1912. The sewer is covered with a mixture of limestones with a high incidence of igneous materials, designated Pattern 10. These repairs were followed some twenty years later by construction of the service road along the berm of Riverside Drive.

Technological and Sociocultural Factors

In addition to documenting the physical environment at the Landing, our research was directed at furthering our understanding of the technologies employed in its construction. To date, no construction manuals have been located that provide information on nineteenth century methods and techniques of shaping and laying the stones. Such record groups may not exist. Contracts between the City and the Loudons specify the size and quality of stone used in the Landing, but these specifications have not been correlated with existing patterns and distributions of stones.

To date, our best information on construction techniques comes from archaeological evidence uncovered in Test Unit 1, located in the proposed Tom Lee Monument relocation site (40SY352) (Weaver et al. 1994:49–52). Test Unit 1 exposed nondimensional stones ranging in size from 0.6 x 0.3 feet to over 1.5 x 1.0 feet. Beneath the surface, some of the stones were massive, measuring more 1.5 feet in thickness. Spaces between the stones were often chinked with rock

spalls, then filled with sand. Other stone rubble in the sand layer beneath the stones suggests the stones were at least partially shaped while they were being laid. In most cases, facing the stones was completed on only the exposed side. The cobblestones are set in a coarse quartz sand layer 0.6–0.9 feet thick. A number of artifacts were recovered from the sand, including a high percentage of nails, tacks, and straight pins. Their significance and how they might relate to construction techniques are unknown. These questions can be addressed through further archaeological investigations.

Another objective of the research is humanistic in nature. The Landing as a physical entity should not be separated from the people who laid the paving and made a living working the steamboat trade. For the most part, the historical record is silent on these issues. Although we have a good deal of information on the contractor, John Loudon, the ethnic composition of his work force is unknown in spite of the attention lavished on the project by the local press. It may have been composed of slave labor, free labor, or a combination of both. The incident of a strike suggests that the work force included at least some free laborers, perhaps immigrant masons who had found previous employment on railroad projects. Questions of work conditions, ethnicity, and the organization of the work force should be part of a long-term research design.

THE POTENTIAL FOR ARCHAEOLOGICAL RESOURCES

A major goal of the project is to identify the types of archaeological resources that might exist at the Landing and to delineate those areas with a high potential for archaeological resources. Because archaeological remains have the potential of contributing to our understanding of the social and technological history of the Landing, we recommend that all future construction and restoration efforts consider possible adverse effects to potentially significant archaeological deposits.

Archaeological resources at the Landing are of two types. The first includes sections of the original stone fabric and other surface features such as moorings and stone-lined drainages. Secondly, there is the potential for buried archaeological deposits and features beneath the stone pavement. Excavations at the proposed Tom Lee Monument relocation site indicate extensive buried cultural deposits beneath the southern section of the Landing (Weaver et al. 1994). Buried deposits associated with the Beale Street elevator are likely. Other refuse deposits are also likely, as suggested by cultural artifacts exposed in blowouts in the northern part of the Landing. In addition, historical documentation suggests that the practice of sinking boat hulls filled with gravel and rock may have been incorporated into the construction design as a means of bank stabilization. Finally, it is quite likely that sections of the original stone pavement are buried beneath modern landfills at Jefferson Davis Park on the north, Tom Lee Park on the south, and Riverside Drive on the east side of the Landing. Because these sections of pavement have remained covered for over sixty years, they could hold the key to refining the chronology of major rebuilding episodes and material acquisition.

Both buried archaeological deposits and surface features at the Memphis Landing can further our understanding of historic construction methods, exchange, and industry. However, in sections of the Landing the integrity of the cultural resources has been compromised by modern construction. Based on this variable integrity, we propose the Landing be divided into three zones.

In Zone 1, surface stones and associated features have good integrity. In addition, there is a potential for archaeological features and deposits buried beneath the surface. Zone 1 is associated with the original nondimensional Type 1 limestone in the northern part of the

Landing (shown as Pattern 1 in Appendix 1). A large part of the southern Landing associated with Patterns 2, 9, 10b, and 11 are also included, as are those portions of the original pavement believed to be buried under Tom Lee Park, Riverside Drive, and Jefferson Davis Park. It is recommended that future redevelopment of the Landing avoid disturbing the stone paving in Zone 1, or at the least minimize disturbance of the stones and underlying strata. If avoidance is impractical or unfeasible, Phase III archaeological data recovery is recommended to mitigate any adverse effect to the stones and/or underlying buried deposits.

In Zone 2, patching and road construction has replaced the original stone fabric, thereby compromising the integrity of the nineteenth century construction. Included in Zone 2 are the roadbed along the base of the berm west of Riverside Drive and the many patched areas in both the northern and southern parts of the Landing associated with Patterns 3, 5, 6, 7, 8, 9b, 10b, and 12–18. Current information suggests that any replacement of the stones or new surface constructions in these areas will have little or no adverse impact on significant archaeological deposits at the surface. However, because the present investigations did not include subsurface testing, significant, intact archaeological deposits beneath the stones are possible. Therefore, it is recommended that any new construction or restoration activities that impact deposits beneath the stones in Zone 2 should include Phase II archaeological testing to determine the significance of any possible buried deposits.

Zone 3 includes that part of the Landing where the original nineteenth century stone construction has been replaced by newer stone construction and there is little possibility of intact archaeological deposits beneath the stones. Zone 3 includes the area above the Gayoso Street storm drain and other areas previously impacted by sewers and utility lines. Zone 3 corresponds to Pattern 10a shown Appendix 1. Because of the low probability of intact cultural deposits, no further archaeological work is recommended for project impacts restricted to Zone 3.

FACTORS CONTRIBUTING TO THE DETERIORATION OF THE LANDING

The Memphis Landing is a product of its use and its location in a high energy environment. The historical documentation and site inspection give clear evidence of the necessity of periodic repair to the Landing.

Factors contributing to the deterioration are both natural and cultural. Natural forces include erosion resulting from rainwater runoff, fluctuations of the water level, and alternating siltation and scouring from river currents. In many cases, these natural effects have been intensified by the lack of periodic maintenance. Cultural factors include the choice of raw materials, infrastructure additions, and use-attrition.

Specifically, the research suggests eight ongoing or proposed factors that constitute adverse effects to the continued preservation of the Landing:

1) Siltation and sediment buildup resulting in the chemical deterioration of the stone fabric and other cultural features;
2) Erosion resulting from unchanneled surface runoff from culverts under Riverside Drive;
3) Erosional undercutting from dredging and river action;
4) Displacement of stones by the bow thrusters of large river craft;

5) Displacement of the moorings from the lateral drifting of vessels during high winds (insufficient docking system);

6) Parking and automobile traffic;

7) Unsupervised utility installations;

8) Proposed new construction.

Specific recommendations addressing each factor are discussed in detail in Part 2, the Preservation Plan for the Landing, a separate volume of this report.

SITE SIGNIFICANCE

The Memphis Landing is perhaps the one historic resource in Memphis that best exemplifies the scope of the City's history. When constructed during the nineteenth century, the Memphis Landing was second only to the St. Louis city landing in its scale and level of commercial activity. Today, of all of the great river landings on the Ohio, Missouri, and upper Mississippi rivers, the Memphis Landing is acknowledged to be the best preserved of these important commercial places.

The Memphis Landing was recognized as a significant historic resource by its inclusion in the the Cotton Row Historic District, listed on the National Register of Historic Places in August 1979. Given the detailed information gathered during the course of this cultural resource assessment, it is now possible—and appropriate—to resubmit the Memphis Landing as an individual listing on the National Register of Historic Places. Although this form of recognition is adequate to afford the Landing protection under the National Historic Preservation Act of 1966, it does not provide a comparative context to evaluate the Landing on a larger scale. On a national level, the Memphis Landing may best represent the significant national themes of river commerce in the nineteenth century, not to mention its significant role in westward migration. No resources listed as National Historic Landmarks represent these themes. Therefore, it is recommended that nomination of the Landing as a National Historic Landmark should be pursued.

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