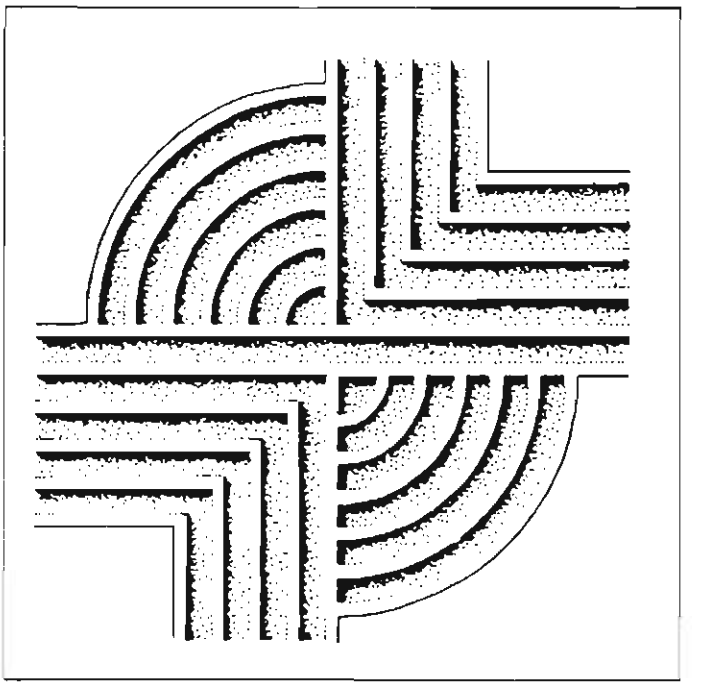
HISTORICAL, ARCHITECTURAL, AND ARCHAEOLOGICAL SURVEY OF THE PALMETTO IRON WORKS, 1802 LINCOLN STREET CITY OF COLUMBIA



RESEARCH CONTRIBUTION 109

HISTORICAL, ARCHITECTURAL, AND ARCHAEOLOGICAL SURVEY OF THE PALMETTO IRON WORKS, 1802 LINCOLN STREET, CITY OF COLUMBIA

Prepared For:
Mr. Chip Land
Planning Department
City of Columbia
Columbia, South Carolina

Michael Trinkley

RESEARCH CONTRIBUTION 109

Chicora Foundation, Inc.
P.O. Box 8664 ▪ 861 Arbutus Drive
Columbia, South Carolina 29202
803/787-6910

This report is printed on permanent paper∞

ABSTRACT AND MANAGEMENT SUMMARY

This project included archival and documentary research, limited architectural documentation, and survey level archaeological investigations at 1802 Lincoln Street with the City of Columbia. This one-quarter block area, encompassing about one acre, was the location of a foundry known originally as the Palmetto Armory and later as Palmetto Iron Works or occasionally as Shields Foundry. It is recorded as archaeological site 38RD909.

The foundry began business about 1850 on a lot which apparently had not been previously occupied and continued through about 1928, at which time the operations were discontinued. Over this 78 year period at least 15 structures were built on the foundry lot, including the main building and an office -- both of which were substantial brick buildings. Other structures included both frame buildings and sheds. The research identified a series of three historic photographs illustrating the building about 1862, 1865, and 1924. In addition, a series of maps, plats, and Sanborn Insurance Maps illustrate the use of the lot over much of this 78 year history.

This historical research also resulted in architectural documentation of the foundry building. This research identified no evidence that the building sustained major damage during the Civil War or was substantially altered as a result of the Civil War. In fact, it revealed that the original building had remained essentially intact throughout the foundry's history, until acquired by the City in 1941. At this time the eastern two-thirds of the structure were demolished and the west elevation was altered.

The archaeological investigations were undertaken to determine the nature and extent of the archaeological resources associated with the foundry lot. Although the historical research revealed that there was no evidence for domestic occupation on the one acre tract, it was possible that the yard areas, or adjoining lot lines were used for trash disposal during the nineteenth or twentieth centuries. The archaeological study, which included topographic mapping and shovel testing, revealed the presence of intact, well preserved archaeological remains including artifacts associated with the foundry operation, architectural features, possible dump areas, possible deeply buried features, and the location of additional structures.

On the basis of this study we offer several recommendations specific to 1802 Lincoln Street:

- The National Register eligibility of the building should be re-evaluated. Given the extensive demolition and reworking since 1942, it seems unlikely that the structure would today be considered eligible. However, if eligible, the

boundaries should clearly reflect the significance of the entire foundry lot as the functional industrial unit, rather than the single remaining structure.

- There is considerable likelihood that significant archaeological remains will be uncovered on the foundry site, in spite of occasional disturbance, repeated land modifications, and reported use of metal detectors on the current park site. The remains which may be identified during construction activities include both features such as foundation walls and piers, and artifacts such as tools, ceramics, and other evidence of the industrial operations at the site. Additional archaeological investigations may be considered to collect additional data from the site prior to construction activities. At a minimum the City should instruct its personnel, contractors, and subcontractors to immediately report any archaeological materials -- including bottles, piles of bricks, buried walls, or other such items.

- The signage associated with the building should be reworked to reflect the new findings discussed in this study. Not only can this information be used to better interpret Palmetto Iron Works and its place in the history of Columbia, but this preliminary research can be used to interpret the types of activities which took place on the site through time.

Additional recommendations are also offered to assist the City of Columbia in future planning projects:

- A project should be undertaken to conduct detailed historical research, such as was conducted for 1802 Lincoln Street, on a variety of potentially sensitive sites. This will provide immediate planning input for future projects.

- Coupled with historical research, the City should also prepare an archaeological preservation plan, which would better define significant portions of the city and outline procedures to protect Columbia's below ground historical resources.

- The City should undertake a project to inventory and preserve historically sensitive records within its own custody. It is unfortunate that so many records relating to 1802 Lincoln after the City's acquisition in 1942 are no longer are retrievable. This project could be undertaken in conjunction with one to inventory, copy, and appropriately curate photographic collections relating to Columbia. At the present time no such central inventory is available and the care provided to the known collections is very uneven. In fact, the structure at 1802 Lincoln Street could be readily adapted into a historical research center for the City of Columbia, used to store, and display, items of particular importance to the City's heritage.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

This work was funded and supported by the City of Columbia -- I would like to thank all those involved for their assistance and cooperation. In particular, the project manager, Mr. Chip Land of the Planning Department, was particularly helpful in organizing the work and supporting Chicora Foundation's interest in the urban archaeology of Columbia. There are many others in various city offices which deserve our thanks -- including Mr. Ed Joye, Mr. Robert McDonald, Mr. Nathaniel Griffin, Ms. Cindy Kestner, and Mr. Ray Greenway.

Outside the City we received excellent assistance from Mr. David Murphy, Chief Deputy Clerk of Court for Richland County who searched out records from the 1940s; Mr. James Hill with the South Caroliniana Library who provided us with immediate copies of Sanborn Maps; and the staff of the Richland County Public Library, which did their utmost to locate photographs for this study. The staff of Historic Columbia Foundation graciously provided access to their collections. Mr. Barry Jenkins, AIA with Jenkins, Hancock and Sides consulted on his firm's archival findings relating to the extant building. Michael Tighe, Esq., with Callison, Tighe, Robinson and Anastasion shared his information on the available title search.

The field investigations were ably assisted by Ms. Natalie Adams, Chicora Foundation's Research Archaeologist, while the artifact analysis was conducted by Ms. Debi Hacker, the Foundation's Conservation Administrator. I appreciate their professionalism and dedication to the project.

INTRODUCTION

This investigation was conducted by Dr. Michael Trinkley of Chicora Foundation for Mr. Chip Land, with the City of Columbia's Planning Department. Assistance was provided by other Chicora staff, including Ms. Natalie Adams, Research Archaeologist and Ms. Debi Hacker, Conservation Administrator. The approximately 1 acre parcel is located at 1802 Lincoln Street, on the southwest corner of the block bordered to the south by Laurel Street, to the west by Lincoln Street, to the north by Richland Street, and to the east by Park (originally Gates) Street. The property is situated on the northern edge of the original plan of Columbia, six blocks north and two blocks west of the State Capital (Figure 1). The lot at 1802 Lincoln Street is owned by the City of Columbia and is commonly known as the Arsenal Hill Park, Palmetto Iron Works, Palmetto Armory, Shields Foundry, or occasionally as "Big Top."

Figure 1. Vicinity of Palmetto Iron Works at 1802 Lincoln Street.

The tract consists primarily of a gravel parking area and grassed park facilities, although a small brick building is located on the southwest corner of the property, adjacent to Laurel and Lincoln streets. There is some, faint, evidence of previous excavations and some indication of previous construction and/or demolition activities associated with the lot. In addition, a casual walk-over will normally reveal such archaeological remains as metal fragments, glass, ceramics, and an occasional identifiable iron object. Brick and coal fragments are common.

This study was requested by the City of Columbia to evaluate the historic, architectural, and archaeological significance of the lot prior to any development activities in the immediate vicinity. Chicora Foundation was requested to submit a proposal for the investigations by Mr. Land of the City's Planning Department on April 26, 1993. A proposal was submitted that same date and was approved on April 28, 1993.

This study is intended to provide a detailed explanation of the intensive archaeological survey of the 1 acre tract, the historical research, the brief architectural evaluation, and the findings. The statewide archaeological site files held by the South Carolina Institute of Archaeology and Anthropology were examined for information pertinent to the project area. The field investigations, involving 10 person hours, were conducted on May 6 and 7, 1993 by Dr. Michael Trinkley and Ms. Natalie Adams. Historical research was conducted by Dr. Michael Trinkley on April 28-30, 1993 and required 24 person hours. Laboratory analysis and report production were conducted at Chicora's laboratories in Columbia, S.C. on May 7 and 10, 1993.

Given the large quantity of foundry waste and badly deteriorated metal, coupled with the preliminary nature of the survey, no efforts have been made to conserve the majority of the materials recovered. Selected items, representing finished products or diagnostic artifacts are in the process of conservation treatment (discussed in more detail in the **Analysis of Recovered Artifacts** section of this study).

Identification of urban sites is a complex matter, since the entire city can be considered a site. However, to simplify record keeping and cataloging, the 1 acre project area has been designated archaeological site 38RD909 and a site form has been filed with the South Carolina Institute of Archaeology and Anthropology.

The field notes, photographic materials, and artifacts resulting from this study have been curated at the South Carolina Institute of Archaeology and Anthropology using their proveniencing system which consists of the site number-site provience number-artifact type number. All original records and duplicate copies were provided to the Institute on pH neutral, alkaline buffered paper and the photographic materials were processed to archival permanence.

EFFECTIVE ENVIRONMENT

Richland County is bounded to the north by Fairfield County, to the west by the Congaree River and Lexington County, to the south by Calhoun County, and to the east by the Wateree River, Kershaw and Sumter counties. The northwestern third of the county is in the Southern Piedmont province. It is a rolling, dissected plateau. The Broad River flows southeasterly through this province and joins the Saluda River at Columbia. These two rivers form the Congaree River. The lower two-thirds of the county is in the Coastal Plain province. The upper half consist of the Sand Hills, and the lower portion is a smooth plain that contains gentle slopes. Elevations range from a low of about 80 feet at the confluence of the Congaree and Wateree Rivers to about 550 feet in the northern part (Lawrence 1976:1).

The Broad and Congaree Rivers drain most of the county except in the extreme southwestern portion which is drained by the Wateree River. Numerous smaller streams (such as Mill Creek) are found throughout the county. The vegetation consists of pine or mixed hardwoods and pine. Within the Piedmont, forest populations currently consist of primarily oaks, hickory, sweetgum, loblolly and shortleaf pine. In the Sand Hills tree species are chiefly oaks and longleaf pine. Water-tolerant oaks, maple, sweetgum, blackgum, and cypress are common in areas of wet soils (Lawrence 1976:59). Today the vegetation in the project area is entirely urban in nature, with the bulk of the lot exhibiting a low grass maintained by the City. While species is not indicated, there were 30 trees on the lot when purchased by the City in 1941 (City Engineers Office, Plan Files, Plan 30-16). Today eight oaks still exist, although none appears more than perhaps 60 years old, suggesting that all have been established after the abandonment of the foundry. Photographs to be discussed in the **Historical Research** section of this study suggest that the lot, an industrial site, was always relatively barren.

The geology of the county is characterized by unconsolidated water-laid beds of sand, silt, and clay. In the piedmont area, the soils are formed in saprolite that weathered from crystalline rocks and "Carolina slates". Soils from the river floodplains formed in sediment that washed from the uplands of the Piedmont province. The parent material in the Coastal Plain consists of marine-deposited sediment which is dominantly quartz sand and kaolinitic clays. In the Sand Hill region of the Coastal Plain, sandy sediment is predominant. Some of the soils in the county are severely eroded and the 1934 soil erosion survey of the state suggests that the project area may have exhibited moderate sheet erosion (Lowry 1934). The soils of Columbia are primarily classified as "Urban Land," indicating considerable disturbance and mixing. Previously, however they consisted primarily of the Toccoa Series along the river and the Orangeburg Series inland (such as in the project area). Toccoa soils consist of deep, well drained soils forming in thick, loamy alluvium of piedmont origin, while

the Orangeburg soils consist of deep, well drained soils formed from thick loamy marine sediments (Lawrence 1978).

The topography of the project area is slightly sloping from the southwest to the northeast, although this represents one of the highest areas in Columbia with elevations ranging around 328 to 335 feet above MSL. The area is situated just within the Piedmont above the fall line which separated the Piedmont from the Coastal Plain. Characterized by shoals, the fall line marked the uppermost limit of river navigation. Mills observed that the site of Columbia "is high, beautiful, and commanding; elevated on a plain, upwards of two hundred feet above the river" (Mills 1972 [1826]:698). He also observed that the city water works, then at springs located in what is today Sidney Park, were in "a valley between the town and river" (Mills 1972 [1826]:706).

HISTORICAL RESEARCH

Methodology

Historical research in Richland County is hampered by the loss of many pre-Civil War legal documents, which were burned during Sherman's occupation of Columbia. The records which survived have received uneven care over the past century, with some records no longer being recoverable (such as a photograph attributed to the collections of the Richland County Public Library), or their recovery being difficult (such as Richland County Clerk of Court records).

In addition, there has been relatively little synthesis of Columbia's historical, archaeological, and/or architectural resources. Unlike Charleston, which has an archaeological and historical preservation plan for the urban area (Zierden and Calhoun 1984), no such document exists for Columbia. Much of the available secondary resource material, at least for the current project, was found to be inaccurate.

This project, therefore, represents only an initial, or preliminary, survey of the available information. The historical research included a review of manuscript materials, photographic collections, and primary and secondary published materials housed at the South Caroliniana Library. The City of Columbia map collections of the Thomas Cooper Map Repository were likewise reviewed during this research. The files of the Historic Columbia Foundation were examined for architectural or other historical documentation. The photographic and local history collections of the Richland County Public Library were examined. An effort was made to locate documents relating to the property in the hands of the City of Columbia, with inquiries made to the City Engineers Office, Plan Files, Building Permits, Zoning, and the Legal Department. The National Register staff of the S.C. Department of Archives and History was also consulted for documentary information on the structure and property. Finally, the records of Richland County, specifically those of the Register of Mesne Conveyance, Probate County, and Clerk of Court, were also examined. Before synthesizing the information obtained, it may be useful to future researchers to briefly discuss the material examined at each repository.

South Caroliniana Library holdings examined included the listed Sanborn Insurance Maps, a photographic collection ("Boxed City of Columbia Nineteenth and Twentieth Century Photographs"), the WPA manuscript collections, City of Columbia maps (various dates), and various primary and secondary materials cited by Dr. Jack Meyer in his publication on William Glaze (Meyer 1982).

Thomas Cooper Map Repository holdings examined included City of Columbia Maps

and the earliest aerial imagery for the project area (dating from April 1938).

Historic Columbia Foundation files examined included miscellaneous materials under the title "Arsenal Hill" and included a copy of the National Register of Historic Places nomination (preparation date of June 2, 1971) and a unimplemented 1962 plan for creating a unified historic district with the Arsenal as one component.

Richland County Public Library materials examined included those in the South Carolina history collection. Specifically the search involved an unsuccessful effort to relocate a photographic print reproduced by Maxey (1980:44) and credited to the Library's collection. All of the available photographs were examined, as well as secondary materials inclusive of city histories and directories.

City of Columbia offices were visited during this study in an effort to locate information on modifications made to the building after its purchase by the city. An initial stop at the City Engineer's Office resulted in the recommendation to inquire on plans in the Plan Files Office where several plans were identified. Subsequent inquiries were made to Parks and Recreation, who apparently have no information on the structure. An effort to identify a building permit for the alterations to the building were unsuccessful -- apparently the City has few building permit records which predate the 1960s and none exist for this structure. A similar request for information was made from Zoning, since Building Permits are reviewed by that office. Zoning, however, has records only for the past 10 to 15 years. The City's Legal Office had no file on the building.

South Carolina Department of Archives and History was consulted since the building is listed on the National Register. This inquiry found that the only information available is that shown on the National Register nomination form; there is no research or documentary file to backup the nomination form.

Richland County offices and records explored during this study include those of the Register of Mesne Conveyance, for the completion of a chain of title to the property; the Probate Court, for information on the will of one of the property's proprietors, George A. Shields; and the Clerk of Court, for information on the sale of the property to the City of Columbia in 1941. Unfortunately, the Clerk of Court archives were abolished by County Council several years ago and the records are in storage.

Historical Synopsis

Richland County was formed in 1785 - being partitioned from Camden District. The area was settled primarily by immigrants who arrived shortly after the Cherokee were removed in 1761, creating a mixture of large plantations and small farms, all subsisting on the cash crop of short staple cotton. After much acrimonious debate Columbia was established and made the state capital that same year, with Senator Arnoldus Vanderhorst warning that Columbia would become a "refuge" for criminals intent upon escaping justice

(Green 1932:147-148). The first state house was not completed until January 1790 and oral history recalls that locals remarked that "a pretty fair plantation" had been turned into a "pretty poor town."

In spite of these snipes, the selection of Columbia was based not only on politics, but also its excellent trade location. The 1791 Horsford and Sons map of undeveloped Columbia (Figure 2) shows the location of "Taylor's Hill" and the high eminence on which the capitol was located. The lines crossing at the center locate the present Assembly (N-S) and Senate (E-W) streets, intended to be the major thoroughfares for the city.

Columbia was largely laid out on the lands belonging to Thomas and James Taylor, both of whom received a variety of early grants in the Columbia area (Green 1932:80). James Taylor was the area's largest slave holder and owner of several plantations (Montgomery 1979:6), while his brother, Thomas, held lands just to the south of Columbia, including the Taylor Brickyard (Medlin 1981:14-15).

Although the original deeds for transactions occurring prior to 1865 do not survive, it is occasionally possible to identify a later deed which provides detailed derivation information. Such was the case in this study, when an 1873 deed by William Glaze recounted that the Arsenal Hill property was:

> part of a square of 4 acres which passed under the will of Sarah Taylor to Alexander Taylor and by him conveyed to John A. Crawford who conveyed to William Glaze (Richland County RMC, DB J, p. 158).

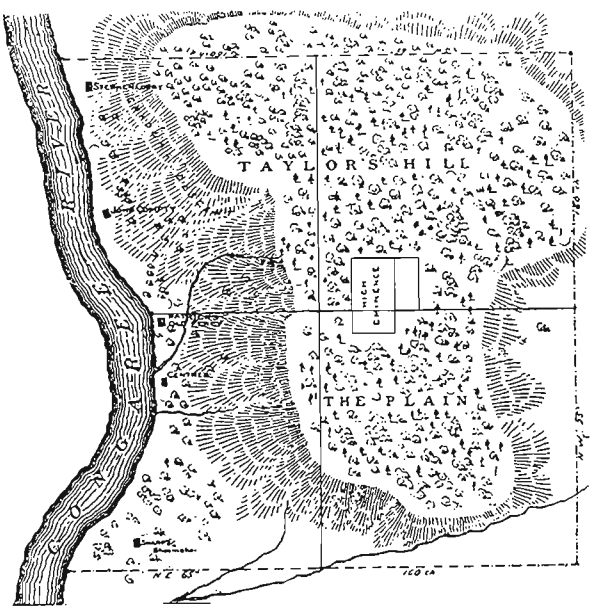


Figure 2. 1791 Horsford and Sons map of undeveloped Columbia.

This account suggests that the property was originally part of the Taylor plantation holdings. The Taylor home during the nineteenth century was situated on the southeast corner of Richland and Barnwell streets and the Taylor family cemetery is still located at 1701 Richland Street, about a block from the project area.

Unfortunately, it has not been possible to identify the exact year in which Glaze acquired the property. The bulk of the secondary accounts (e.g., Meyer 1982:9; Maxey 1982:44; Robbins 1888:48) and one primary account (*South Agriculturist*, February 1853) suggest an 1850 beginning date. At least one secondary account, however, remarks that, "the building was erected in 1837, and was occupied by the Palmetto Iron Works in 1840" (Scruggs 1936). The authority for these early dates were listed as Miss Annie Kinds, 631 Laurel Street; L.P. Purse, Owner; and "personal experience and word of daughter of former owner of the foundry."

There seems little reason to accept the 1837 date, given the other inaccuracies contained in Scruggs' short article and the nature of oral accounts, although it seems likely that the Palmetto Armory was built *at least* by 1850 and perhaps slightly earlier. One of the earliest identified maps of Columbia, "Map of Columbia From An Accurate Survey by Messrs. Arthur and Moore, Drawn by John B. Jackson About 1850," shows Glaze owning the entire block bounded by Lincoln to the west, Richland to the north, Plain (later Park) to the east, and Laurel to the south (Figure 3). The "Palmetto Armory," measuring approximately 140 feet east-west by 40 feet north-south, was already built. To the east is the Taylor's home, still held by Mrs. Sarah Taylor. Although not labeled, and perhaps a copy, the 1854 "Map of the Town of Columbia" likewise shows the Palmetto Armory (Figure 4).

The period from about 1850 through the early 1860s is poorly documented. The only account from this period is what would today be considered an "advertorial" in the 1853 issue of *The Southern Agriculturist*. The article, "The Palmetto Armory," reported that the building was:

> erected during the year 1851 by Messrs. Wm. Glaze and James Boatwright . . . . The main building of the Armory, on the South front, is three stories high, and 64 feet long, to which is attached a one story extension of 90 feet, giving a total length of 154 feet; and being located on Arsenal Hill, immediately crowning the valley in which is situated the City Water Works (*The Southern Agriculturist*, February 1853, page 50).

Accompanying the article was an engraving purporting to illustrate the Armory (Figure 5). Curiously, this illustration has been widely used. For example, it served as the basis for the National Register's architectural description of the Armory prior to the burning of Columbia is 1865. It was even used by Glaze on his 1861 letterhead (Meyer 1982:35). A comparison of the verbal description to the engraving reveals certain fundamental similarities -- a somewhat smaller three story building with a somewhat larger one story addition. There are certain major architectural features clearly illustrated -- a smokestack and a cupola. Beyond

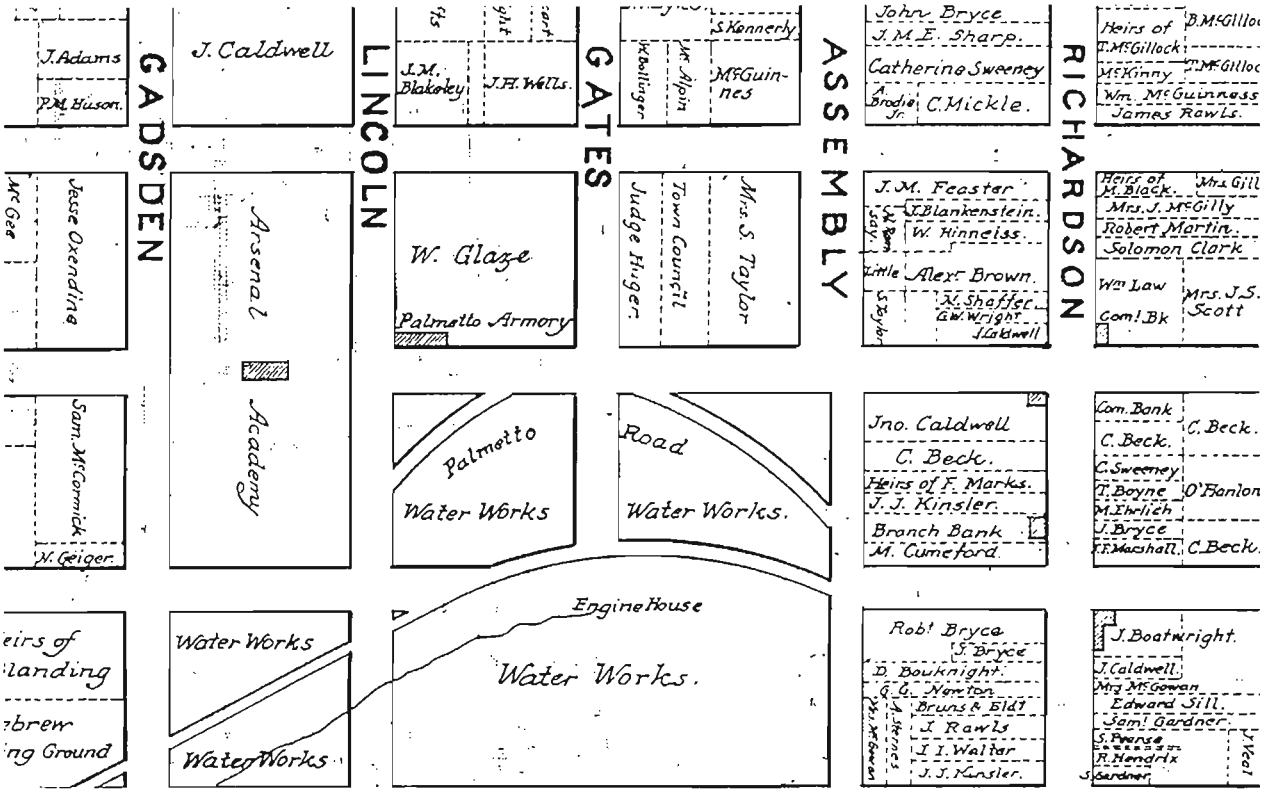


Figure 3. 1850 "Map of Columbia From An Accurate Survey by Messrs. Arthur and Moore."

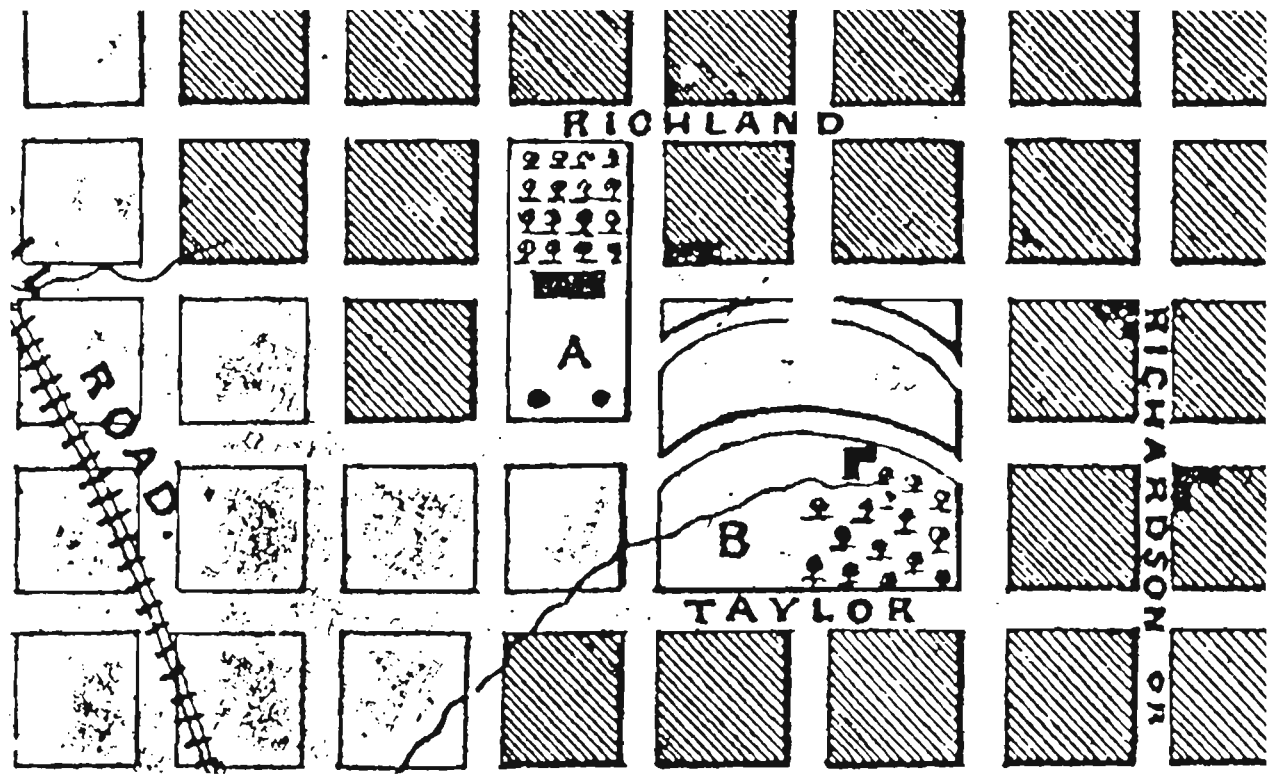


Figure 4. 1854 Walker and Johnson "Map of the Town of Columbia."

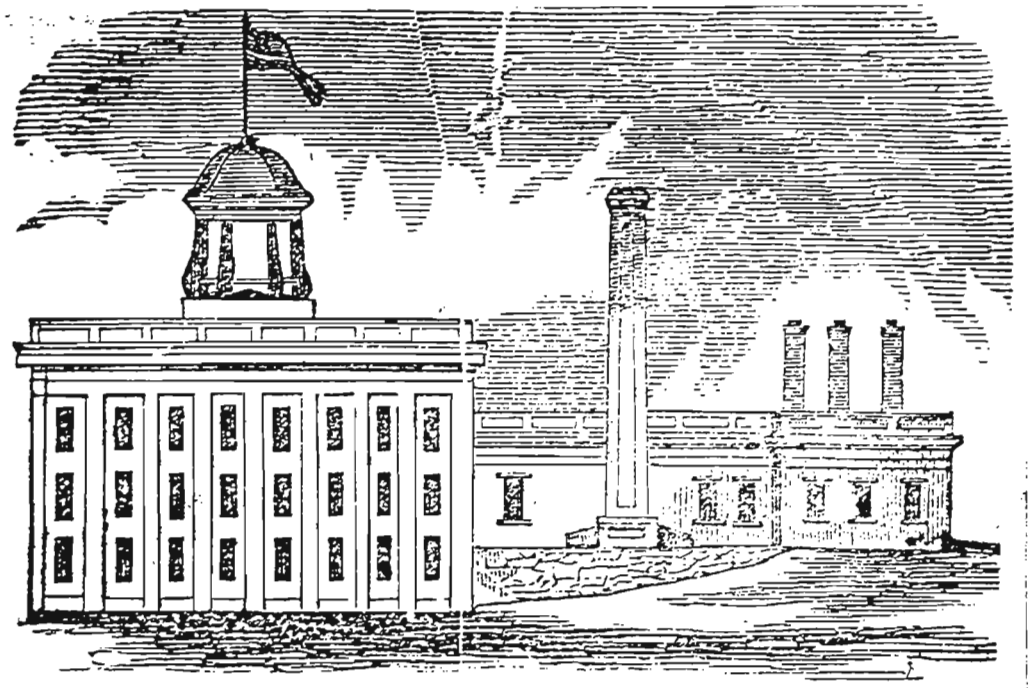


Figure 5. Engraving of the Palmetto Armory from *The Southern Agriculturist*.

these features, however, there seems to be little reason to consider the engraving a valid representation of the building. Rather, it appears to represent *an artist's representation*, especially when compared to photographs taken in the 1860s (discussed below). Certain essential features are more-or-less correctly incorporated, while the details have been elaborated upon to produce the desired effect.

Meyer (1982:11) provides a through account of Glaze's largely unsuccessful efforts to engage in arms manufacturing during the 1850s and early 1860s. While some munitions were produced by Glaze, it appears that the foundry continued to concentrate on more ordinary items. By 1861 the operation was known as the Palmetto Foundry and George A. Shields was listed as foreman.

Maxey (1980:44) published a photograph from the Richland County Public Library's collection of the Palmetto Iron Works reputed to date from 1864 (reproduced here as Figure 6) . Unfortunately the original of this photograph can not be identified in the library's collection, making independent verification of the date impossible. It seems reasonable, however, to accept this approximate date (especially when it is compared to Figure 7 below). Perhaps the most striking feature is that the photograph bares only the most superficial resemblance to the 1850 engraving. The only consistent feature is a smokestack. The three stories in part of the building can only be interpreted as the basement, first story, and perhaps a loft area in the foreground, while the one story portion may be taken to represent

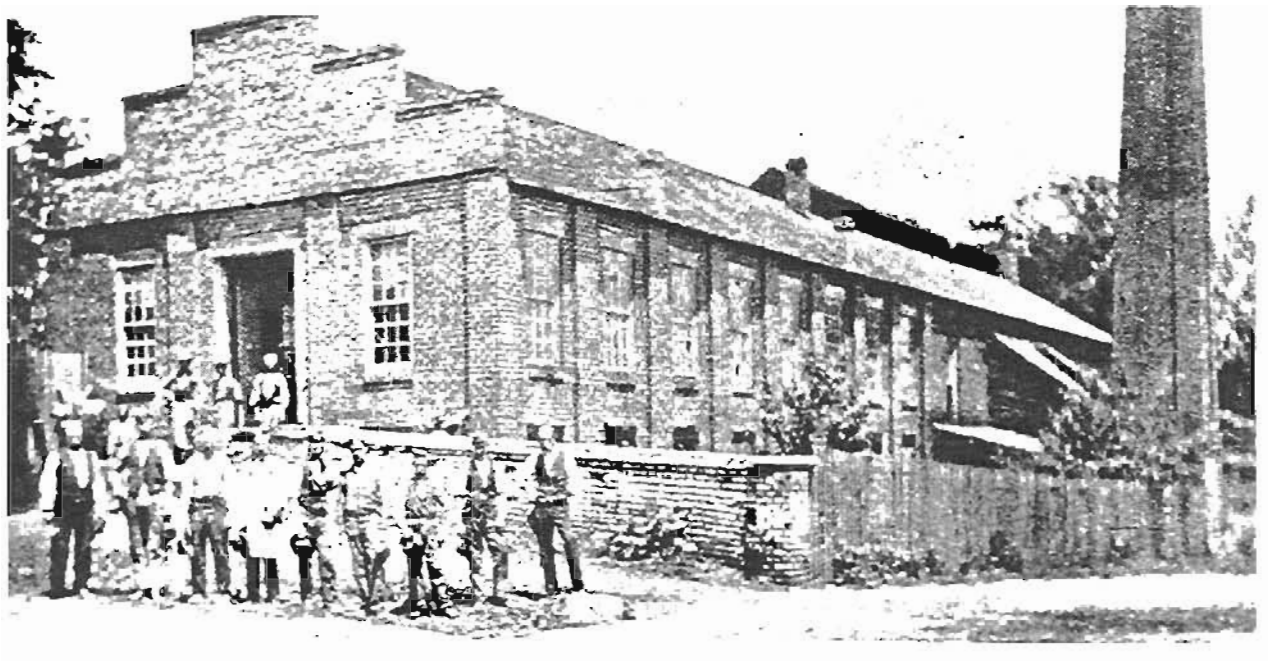


Figure 6. Palmetto Iron Works, reputed to be ca. 1862 (copied from Maxey 1980:44).

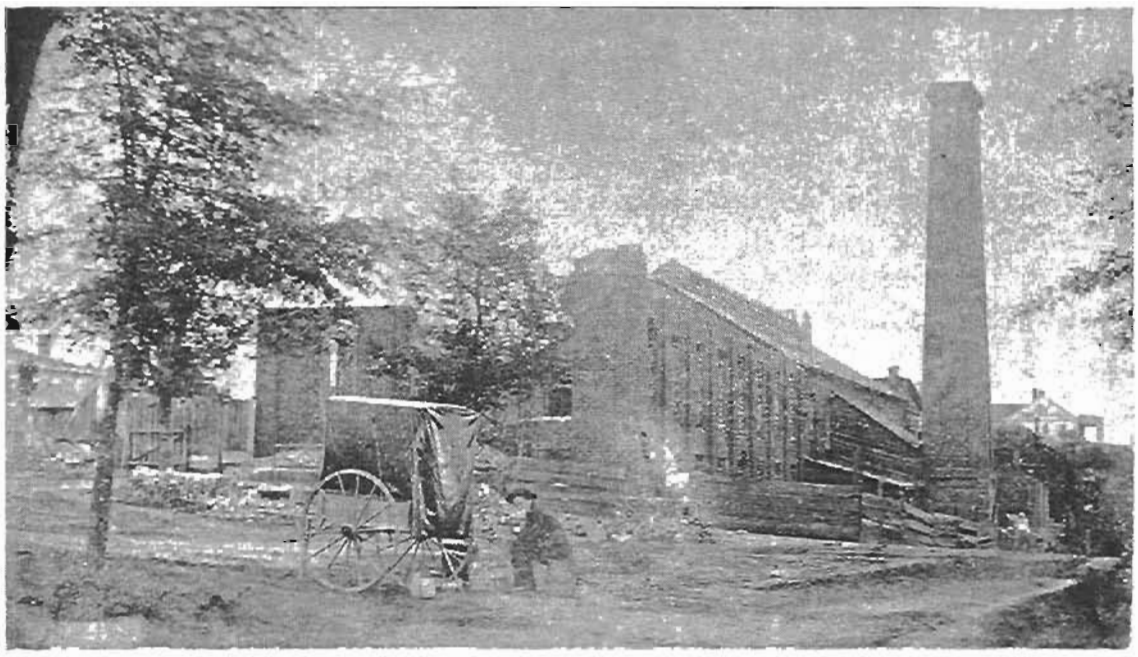


Figure 7. Ruins of Palmetto Iron Works, ca. 1865 (courtesy of South Caroliniana Library).

the foundry area toward the smokestack. There is no evidence of the cupola shown in the earlier engraving. Additional construction details include the brick wall fronting Lincoln Street, the pedimented west facade, and the frame lean-to additions in the vicinity of the stack.

Much of Columbia was burned the night of February 17, 1865, after surrendering to Sherman's forces. Whether this was an accident or an intentional act has been debated for generations. It is unlikely, however, that the Ironworks were burned during this initial firing. One eye witness remarked to the Commission investigating the burning that her niece:

> had been carried up to the Taylor house, on Arsenal Hill. . . . I spent the night [of February 17, 1865] at the Taylor House, which a Federal Officer said should not be burned, out of pity for my niece (Carroll 1893:19).

It seems unlikely that a major fire at a foundry only a block away would have made the Taylor house a less than safe refuge. It is more likely that the foundry was intentionally burned on either of the next two days, when Sherman's troops began the deliberate process of destroying military targets. An April 4, 1865 account in the *Official Records* by Sherman reports that:

> During the 18th and 19th the arsenal, railroad depot, machine shops, foundries, and other buildings were properly destroyed by detailed working parties (*Official Records*, Series 1, Volume 47, Part 1, page 22; see also Barett 1956:91, n.132).

The extent of that destruction is seen in a photograph taken shortly afterwards (Figure 7). Curiously, considering the damage done to the rest of Columbia, the damage to the Palmetto Ironworks is limited. The photograph shows the rear portion of the building apparently intact -- the stack is standing, as are the wood frame lean-to additions. Obvious damage is confined to the western third of the structure and even in this area it seems that the walls are largely intact. The brick wall in front of the building has been pushed over in several areas and the pedimented gable has fallen to the steps below, with only the southwest corner partially intact. To the east may be a portion of Glaze's dwelling, while to the north there is some indication of additional structures associated with the foundry.

It is clear that the foundry was repaired after the Civil War, the only real question being how quickly and to what extent. An 1868 advertisement in *The Daily Phoenix* indicates that the works were completely functional by that time. The ad announced:

> For Sale at Palmetto Iron Works, Columbia, S.C. 1 25 Horse Power Engine with tabalat Boiler and Saw Mill complete. Will be sold separately if desired. 1 10 and 1 8-Horse Power Engine, suitable for plantation use. Keeps on hand Gin Segments, all sizes; Plates and Balls for Cotton Screws; Sugar Mills, with or without frames, all sizes. Also manufacturing Mendenhalls Patent Hand or

> Power Loom. One can be seen in operation at the Works. Iron and Brass Castings made to order; Mill Gearings, Pulleys, Hangers and Shafting, Jobbing promptly attended for and all work warranted. Geo. A. Shields (*The Daily Phoenix* [Columbia, S.C.], May 20, 1868, page 2).

This suggests that the shop was completely functional within at least three years, consistent with other efforts to rebuild Columbia very quickly. While ad was signed by Shields, it is clear from the title search that Glaze was still the owner. Regarding the extent and nature of the repairs, J.F. Williams relied on memory to remark that:

> the Palmetto Iron Works were rebuilt in a small way [after the Civil War]. The little building that has been used for an office for many years now was built and used for a machine shop. Mr. Shields gave John Moody a barrel of flour and $10.00 in gold to build it. Afterwards they took off the top story of the old shop and moved in there (Williams 1929:127).

Unfortunately, this is not consistent with either the 1865 photograph of the building (Figure 7) which reveals limited damage, or the ca. 1924 photograph which indicates that the structure was basically rebuilt as originally constructed. Again, we see a pattern of inaccuracy in the oral histories surrounding the foundry and its operation.

In 1869 the "Map of the City of Columbia, S.C. by Alexander Y. Lee (Figure 8) reveals that the block originally owned by Glaze has been subdivided, with the northeast corner now owned by Marshall[1]. Glaze continues to be listed as the owner of the northwest and southeast quadrants, with the Palmetto Foundry situated on the southwest corner. An 1871 advertisement for the foundry (under the heading "Shields and Glaze") is printed directly above an ad for William Glaze "dealer in Gold and Silver Watches, Clocks, Jewelry" and other items (Columbia History Vertical File, Richland County Public Library; Figure 9). This suggests that by this time Glaze was no longer actively associated with the foundry, a fact discussed by Meyer (1982:14-15). Glaze was apparently unable to totally recoup his losses from the Civil War and by 1868 had petitioned the United States District Court as bankrupt (*The Daily Phoenix* [Columbia, South Carolina], May 5, 1868 and May 28, 1868).

The Richland County Court of Common Pleas issued a writ of *fieri facias* in March 1867, awarding $12,513.87 to E.J. Arthur. Glaze's property, described as a:

> Lot of Land containing 3 acres more or less . . . on which is erected a large

[1] While the deed from Glaze to Marshall could not be identified, a deed from Edward W. Marshall to D.B. Miller, dated May 18, 1870 was found in Richland County RMC, DB E, pg. 654. This deed transferred a one acre lot "with buildings thereon" bounded to the north by Richland Street, to the east by Gates Street, and to the south and west by lands "now or formerly belonging to Wm Glaze." The lot was to be held by Miller in trust for the use of Julia A. Bouknight, wife of Caleb Bouknight.

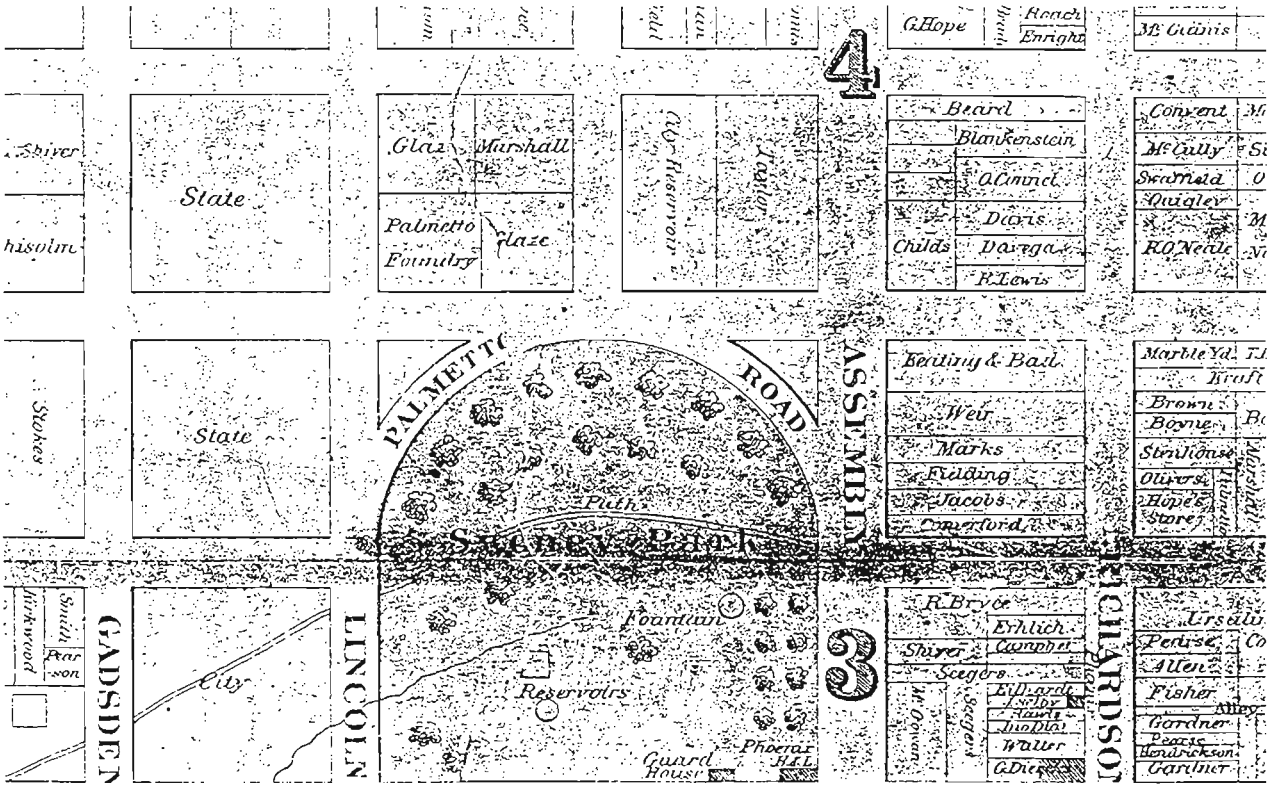


Figure 8. 1869 "City of Columbia, South Carolina."

Figure 9. 1871 ads for Shields & Glaze and William Glaze.

> Machine Shop and Foundry, and a fine dwelling House, now occupied by William Glaze and bounded on the North by Richland Street and E.W. Marshall Lot; on the East by Gates Street and E.W. Marshall; on the south by Laurel Street; and on the West by Lincoln Street (Richland County RMC, DB H, p. 110)

was sold by the sheriff in May 1872 for $7300 to George A. Shields.

The "Bird's Eye View of the City of Columbia, South Carolina" was prepared that same year -- 1872 -- and shows the foundry with at least three outbuildings on the southwest corner of the block. A large two story house is shown on the northeast corner, on Marshall's property (previously deeded to Miller in trust for Julia Bouknight), while an equally large house is shown with several outbuildings on the southeast corner, probably representing Glaze's dwelling (Figure 10).

About three months later, in July 1872, Shields sold a one acre lot back to Glaze for $1000. Situated on Richland Street the lot was bounded to the north by Richland, east by the Bouknight lot previously discussed, south by Shields' property "upon which his machine shop stands" and west by another lot of Shields (Richland County RMC, DB H, p. 527)[2] Shields also sold a one acre lot, situated on the corner of Gates and Laurel streets, to Hamet Ann Glaze in July 27, 1872 (Richland County RMC, DB H. p. 528). Although the deed fails to specifically mention the presence of Glaze's dwelling (shown on this corner in the 1872 Bird's Eye View of Columbia), the lot sold for $4000, indicating that the house was included. Several years later Shields disposed of the corner lot fronting Richland and Lincoln to J.W. Fry for $1000 (Richland County RMC, DB D, p. 234) (see Figure 11).

The foundry was briefly mentioned in 1884, along with the other machine shops operating in Columbia: Pozer & Dail's, Congaree Iron Works, and Phoenix Iron Works. Together these four shops employed 59 whites and 35 blacks. Their combined capital was $72,000 and annual value of production of $105,000. There is also an indication that business was good, with a 40% increase in profits reported over a year's time (News and Courier 1884:n.p.).

In February 1884 the first Sanborn Insurance Map[3] of Columbia, South Carolina was issued. The Palmetto Iron Works was illustrated on Sheet 5, with George A. Shields listed

---

[2] This lot was subsequently sold by Glaze, in October 1873 to Francie N. Ehrlich, a Columbia merchant, for $950 (Richland County RMC, DB J, p. 158).

[3] The Sanborn Maps were produced by the Sanborn Map Company during the last half of the nineteenth and first half of the twentieth centuries "for the purpose of showing at a glance the character of the fire-insurance risks of all buildings." These maps tend to be highly accurate, being constructed on the basis of field surveys and direct observation by Sanborn surveyors (for more information see Keister 1993).

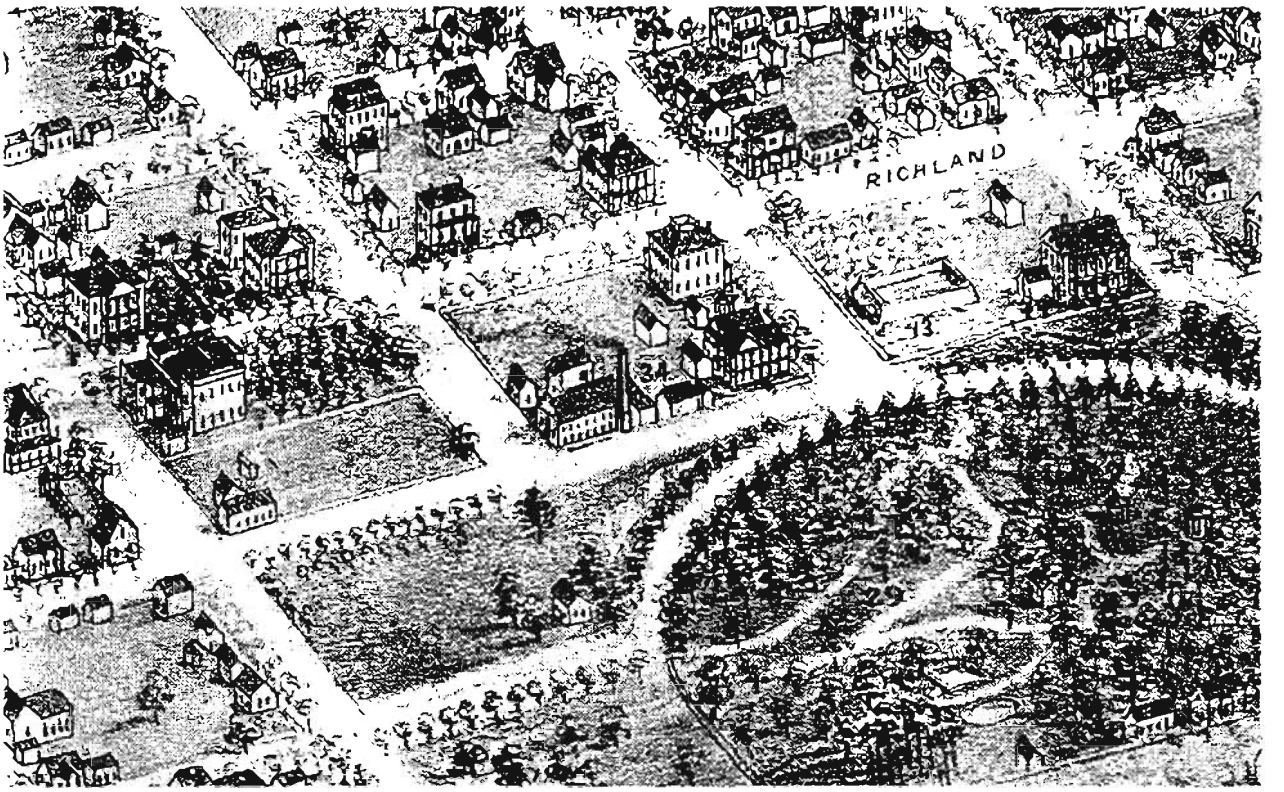


Figure 10. 1872 Bird's Eye View of the City of Columbia.

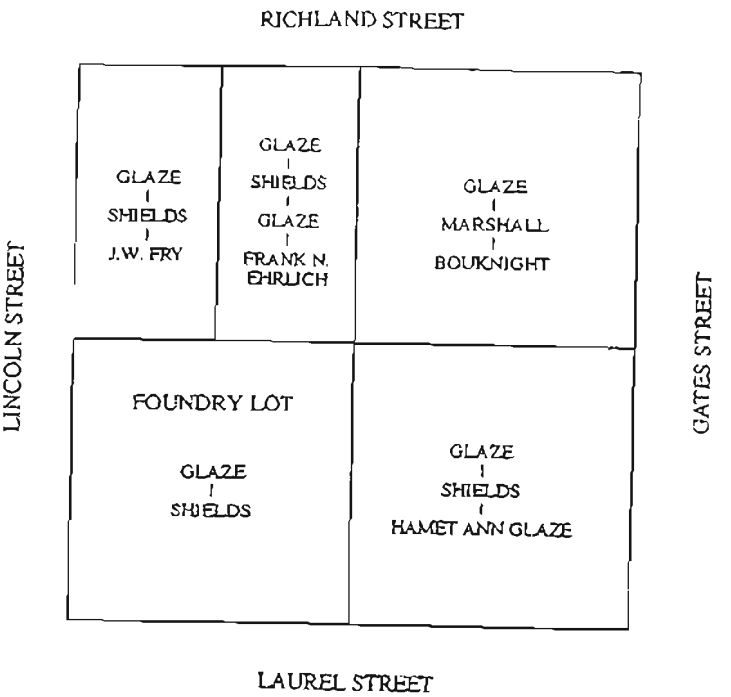


Figure 11. Schematic diagram showing Shields' disposition of the foundry lot.

as proprietor and 35 employees (Figure 12). On the northeast corner is the Marshall-Bouknight house, servant's house, shed, and two additional outbuildings. On the southeast corner is the Glaze house, with a kitchen. Between the two is another dwelling, suggesting that one lot had been further subdivided.

Figure 12 is the first detailed drawing of The Palmetto Ironworks which can be compared to either the 1850 description or the various photographs (Figures 6 and 7). The iron works consist of nine structures, each of which will be discussed in more detail below.

> (1) The main structure consists of a one-story rectangular brick building with a combination shingle and non-combustible roof. On the west elevation there is a fire wall protruding 18 inches above the roof line, while on the north elevation there were seven window openings on the first floor. This structure was divided into four solid wall partitions, the easternmost of which formed two distinct rooms. The western-most room consisted of the "Pattern[4] and Machine Shop," the next room was the "Forge[5]" and "Shop" which included a 15 horsepower engine. In the third room was the foundry[6], while the eastern room included the "core oven[7]," which had a iron door, and an unlabeled room containing a cupola[8]. This central portion of the structure

---

[4] The patterns were those used in making the molds for casting. Through time the number of areas used for storage of "patterns" increases, suggesting that the shop did considerable business in casting work.

[5] The forge was the central element in blacksmithing, allowing metal to be heated sufficiently for working and even welding. Forges could be permanent affairs made of brick or could be more portable affairs, made out of metal. Fans, which offered superior service, largely replaced bellows in the late nineteenth century.

[6] Benjamin observes that, "a well-appointed foundry, in addition to the room required for the actual work of moulding and casting, should have room for storing and preparing the materials of the moulds, such as grinding and sifting the sand, loam, coal, coke, plumbago, or charcoal. There should be a workshop for making the patterns which are to be used in the formation of the moulds. The molding-room embraces an area of greater or less extent, but even in moderate establishments it is necessarily of considerable size. . . . The floors of such foundries are also covered or rather filled with molding sand to a considerable depth, varying from 5 to 10 feet" (Benjamin 1893:I:321-322).

[7] In founding, a "core" is usually an internal mold filling the space intended to be left hollow in a hollow casting. Ovens were used for baking the molds used in casting (see Benjamin 1893:II:410-411 for additional information on casting techniques). The term "core" is occasionally a reference to coke (which is the "core" of coal) and may imply an oven using coke as fuel. Regardless, ovens and furnaces were common in foundries.

[8] The "cupola" referred to by Sanborn is a cupola furnace, not a small circular structure built on top of a roof. It seems likely that the engraver for *The Southern Agriculturist*, told the foundry had a cupola, and knowing nothing about the industry, assumed a structural feature, adding it to his largely imaginative drawing. The cupola, however, was a furnace for melting metals prior to casting.

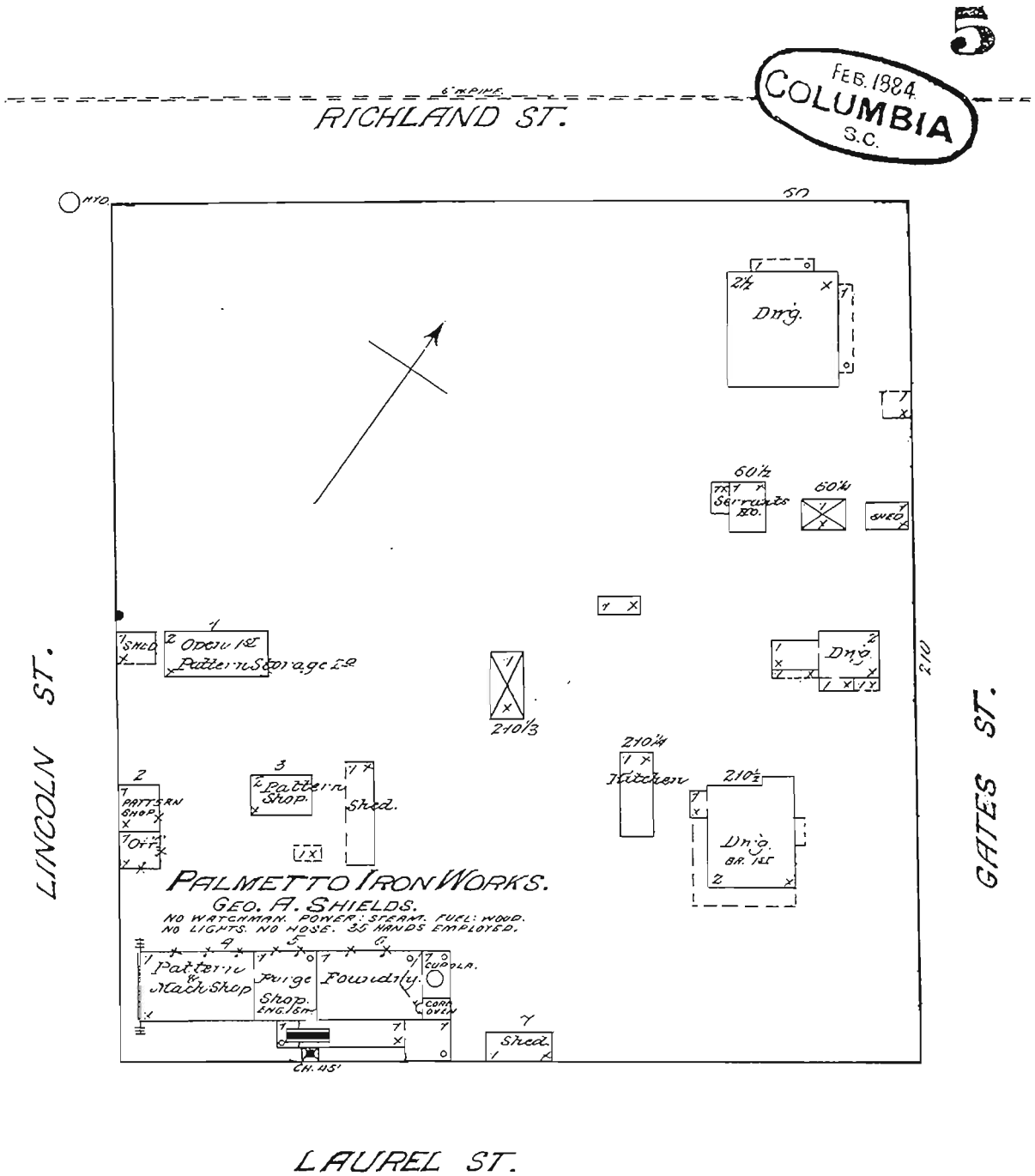


Figure 12. 1884 Sanborn Insurance Map of foundry and associated lots.

In the mid to late nineteenth century such furnaces were usually made of boiler iron in the form of a cylinder 10 to 16 feet in height, 2 to 6 feet in diameter, and were lined with fire brick (see Benjamin 1893:I:798).

measured 160 feet east-west by about 38 feet north-south. To this were added a series of three additional rooms, each one story with either shingle or non-combustible roofs, and the 45 foot high stack.

(2) Adjacent to Laurel Street and about 158 feet east of Lincoln Street was a one story shingled shed measuring 35 feet east-west by 15 feet north-south.

(3) Adjacent to Lincoln Street and about 105 feet north of Laurel Street was a one story shingled brick building divided into two rooms. To the north was the "Pattern Shop," while the "Office" was in the south room. There were two windows on the east elevation and one on the south. The building measured about 45 by 20 feet.

(4) Adjacent to Lincoln Street and about 210 feet north of Laurel Street was a one story shed with a shingle roof. It measured 20 feet east-west by 18 feet north-south and the south elevation was open.

(5) Immediately to the east of the Lincoln Street shed was a two story shingled building measuring 55 feet east-west by 25 feet north-south. The first story was "open," while the second floor contained "Pattern Storage."

(6) In the central yard area was a two story shingled building labeled "Pattern Shop." This structure measured 30 feet east-west by 20 feet north-south.

(7) Also in the central yard was a one story shed with its west elevation open. The structure measured 18 feet east-west by 55 feet north-south.

(8) The third structure clustered in the central yard was a one story shingled shed measuring 15 feet east-west by 9 feet north-south.

These structures, especially the main building (discussed as #1 above) appear to represent that observed in all of the photographs. Except for the one-story notation the drawing is even accurate to the dimensions, a little over 160 feet. The southern extensions, the nature of their construction, and the presence of the stack, are all correctly positioned when compared to the ca. 1864 and 1865 photographs.

Four years later, in 1888, the foundry shows little change (Figure 13). Structure 1 shows no significant change, although the fire wall is reported as only 12 inches above the roof line and windows are now shown in the south elevation. The drawing also reveals that while the building is brick, it has a wooden cornice, indicating a gabled roof (the same is indicated for Structure 3). Structure 2 has a somewhat different foot print, but probably represents the same shed. Structures 3, 4, 5, 6, and 7 are unchanged. Structure 8 is now shown as "Scales," perhaps suggesting that an overhead shed roof had been removed. Two new buildings are shown, one immediately north of Structure 7 and another at the northeast

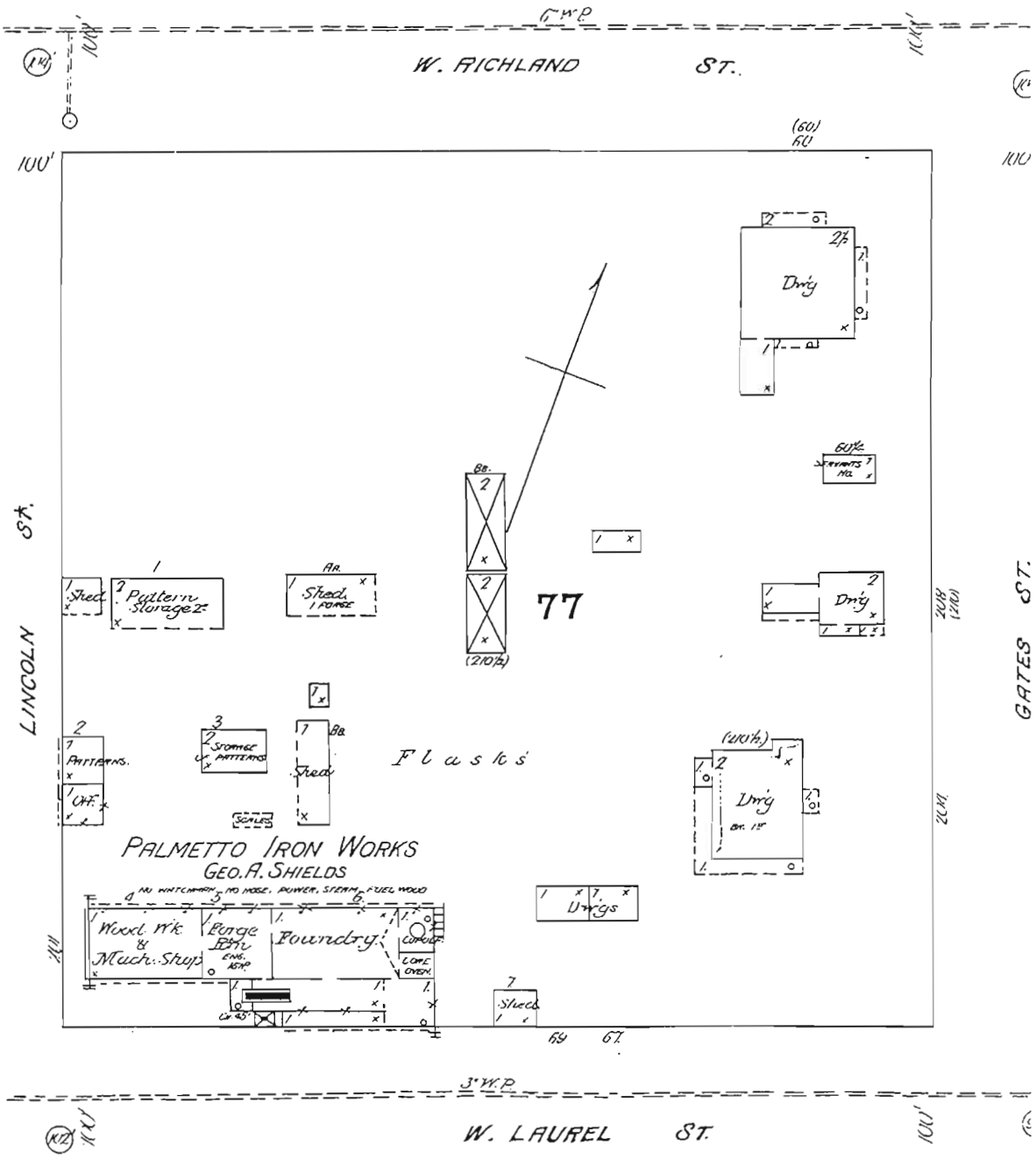


Figure 13. 1888 Sanborn Insurance Map of foundry and associated lots.

lot edge:

> (9) In the central yard area was a one story shingled building measuring 10 feet east-west by 15 feet north-south.
>
> (10) On the northeastern lot edge is a one story shingled shed measuring 45 feet east-west by 20 feet north-south. Contained in the shed, open on the south and west elevations, was one forge.

Robbins (1988:48) reveals that in 1888 the foundry was producing steam engines, saw mills, "Palmetto Cotton Planters for H.D. and E.L. Wilson of Abbeville," and "all kinds of iron work and repair."

The 1893 Sanborn Map of the Palmetto Iron Works is virtually identical to the 1888 edition (Figure 14). Figure 15 shows the 1898 layout, again with only minor changes. The sheds on Laurel and Lincoln streets (Structures 2 and 4) are no longer shown. Likewise the small sheds in the central yard area (Structures 8 and 9) have been removed. Structure 3, which previously consisted of two rooms is now one, used as "Pattern Storage." Structure 7, which had been previously listed as simply a "shed," is now shown as a "Sand Shed," probably for casting sand. Structure 10, which previously contained a forge, is shown on the 1898 map as a "Blacksmith."

There are a series of three city maps (dating 1895, 1903, and 1905) which document that the foundry continued to be a city landmark. The 1904 Sanborn Map (Figure 16) shows the property as little changed. Structure 1 is suddenly shown as one story with a basement, suggesting that the previous surveys simply failed to indicate that the building, on a slope, contained two floors. In addition, the cupola is shown as standing 5 feet above the roof, suggesting that it was a fairly small furnace (see Benjamin 1893:I:798). For the first time the thickness of the walls are also noted as ranging from 16 inches (where a basement was present) to 8 inches (where only one story existed). The fire wall is shown as extending 18 inches above the roof line, suggesting that the reduction shown on the 1888 and 1893 drawings was incorrect. The blacksmith in Structure 10 is apparently no longer operating, since the only caption is "Old." Two new structures are shown:

> (11) In the central yard area an open one story, shingled shed is shown to measure about 10 feet east-west by 18 feet north-south. This structure, while having a radically different foot print, is in the vicinity of previously identified Structure 8.
>
> (12) Along the eastern lot line is a one story, shingled structure measuring about 28 feet east-west by 25 feet north-south. Open to the north, the

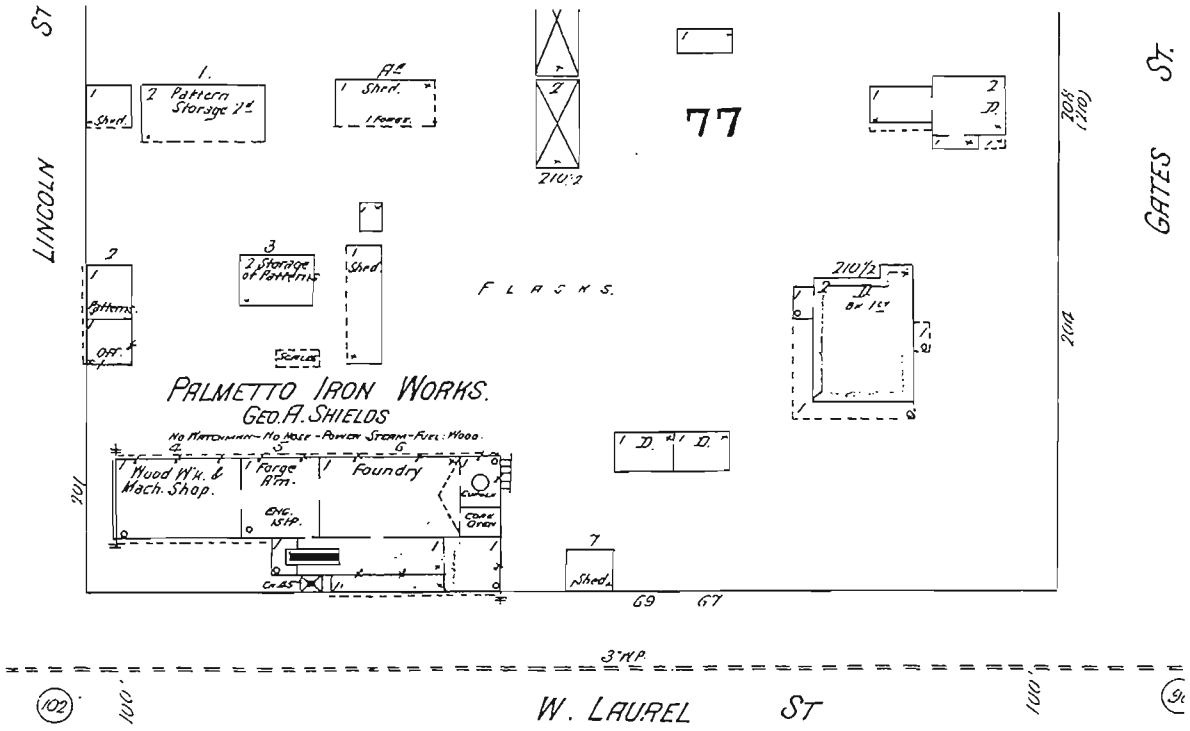


Figure 14. 1893 Sanborn Insurance Map of Palmetto Iron Works.

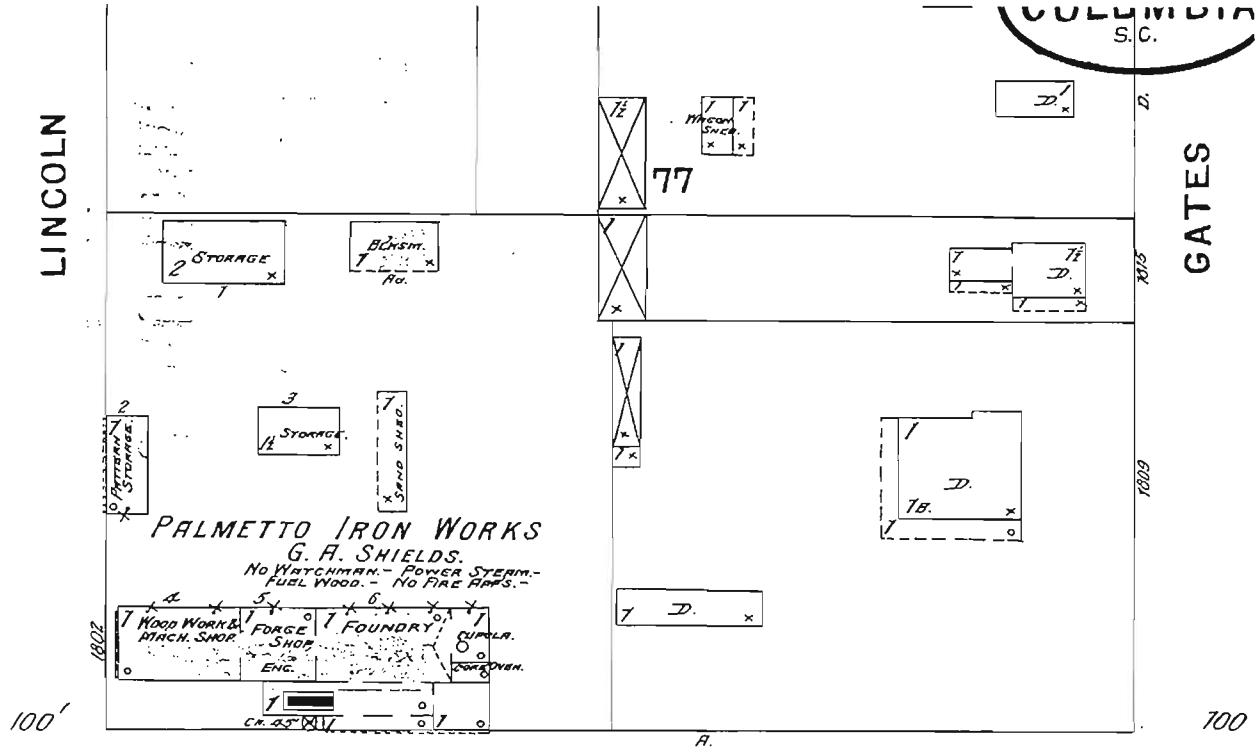


Figure 15. 1898 Sanborn Insurance Map of Palmetto Iron Works.

structure is labeled a "Coke Shed[9]."

The lot layout remained stable into 1910, although Structure 11 is no longer shown (Figure 17).

George Shields died on August 3, 1911, leaving a will dated April 21, 1909 with a codicil dated January 5, 1910 (Richland County Probate Court, Box 191, Package 5997). Shields' will provided that his estate be divided between his two daughters, with Mrs. Ella King (also known as Charlotte King) receiving his "homestead lot at the northwest corner of Laurel and Wayne Streets with the dwelling house and all other improvements and all furniture and other household goods," as well as:

> my lot of land on the northeast corner of Lincoln and Laurel Streets and all the buildings and other improvements thereon, all fixtures attached thereto and all the tools, implements and appliances of the business heretofore and now used by me in my foundry and machine works on said premises.

Shields directed that his other daughter, Mrs. Libby Scott, should receive stocks (largely in cotton mills) in the sum of $15,000.

The inventory of Shields estate revealed:

One lot and dwelling corner Wayne and Laurel Streets and contents consisting of household effects	5000.00
One lot, Foundry and Machine Shop corner of Lincoln and Laurel Streets containing	
2 small machine lathes[10]	
1 24" machine lathe	
1 48" machine lathe	
1 wood turning lathe[11]	

[9] Coke is the substance left after the volatile components of coal have been driven off by dry distillation, often firing. "Hard coke" was often the preferred fuel of blacksmiths (see Richardson 1890:2:51).

[10] Machine lathes were intended for metal working and were often characterized as foot-lathes, hand-lathes, self-acting lathes, chucking or face lathes, and boring lathes. The inventory here is insufficient to speculate on the types present at Palmetto Iron Works.

[11] The wood working lathes were primarily designed for wood-turning in cabinet, sash and door, and pattern shops. Frequently wood working was an adjunct of blacksmiths and small foundries.

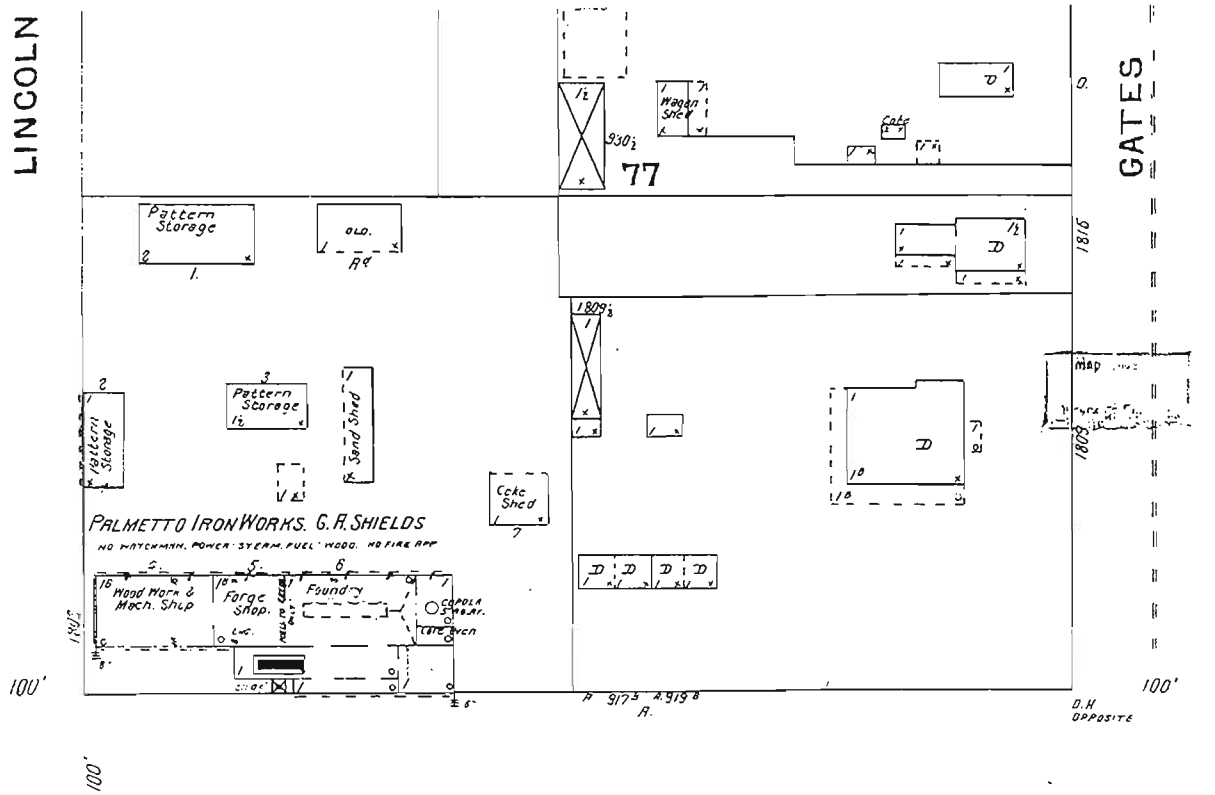


Figure 16. 1904 Sanborn Insurance Map of Palmetto Iron Works.

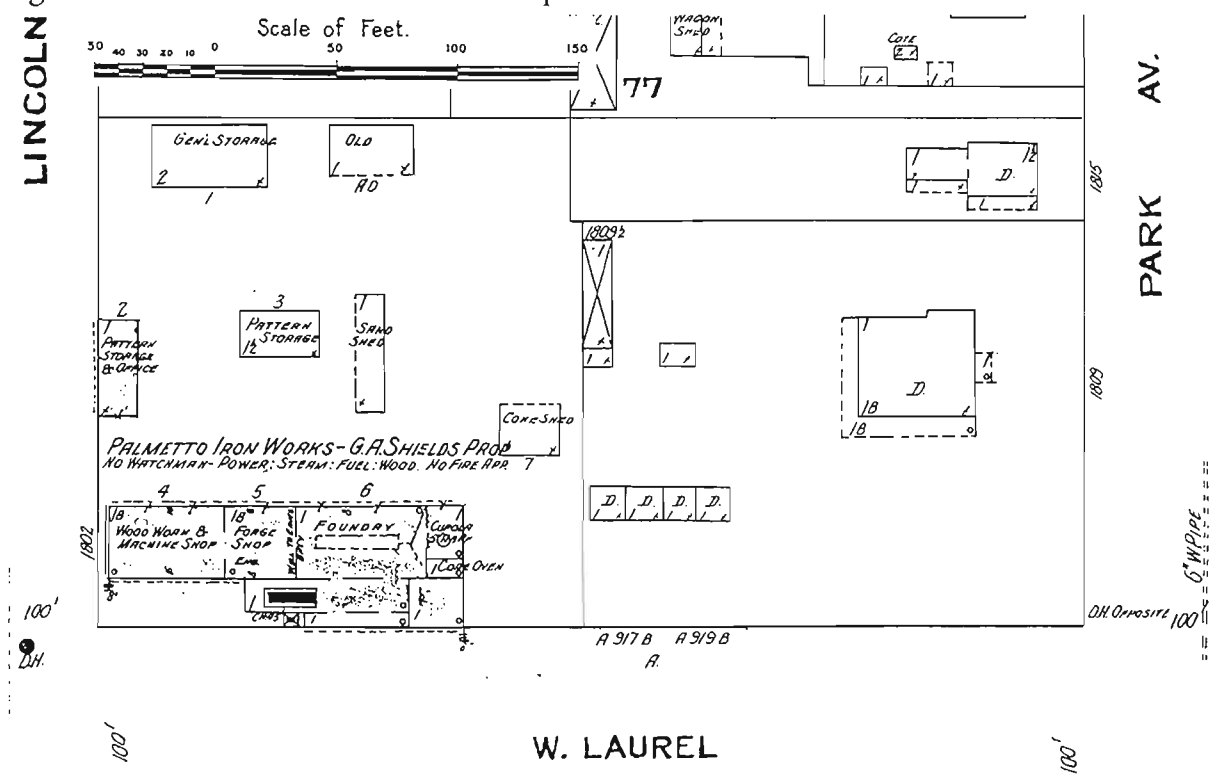


Figure 17. 1910 Sanborn Insurance Map of Palmetto Iron Works.

1 small shaper[12]	
1 large planner[13]	
1 milling machine[14]	
1 Keyseating machine[15]	
1 drill press	
1 blacksmith anvil	
1 blacksmith fan	
1 cupola	
1 blast fan	
2 buildings assorted patterns	
lot of tools, implements and appliances	1000.00

The list of accounts due reflected a wide diversity of clients, including a variety of individuals, cotton mills, lumber companies, and other Columbia businesses (such as Columbia Supply, Colonia Hotel, and Gregory Conder Motor Company). The disbursements, coupled with the evidence of continuing clientele, reveal that the business was thriving. Purchases were made for coke, iron, and wood. Other disbursements were regularly made for employees. One such pay period included:

Robert King	$50.00
C.K. Hogland	$59.50
J.F. Williams	$56.60
L.P. Purse	$70.50[16]
F.B. Muller	$16.50
W.B. Whiton	$15.00
Mrs. Robert King	$60.00
John	$8.10
George	$7.50
Henry	$6.00
Fate	$6.00

---

[12] The shaping machine, often just called a shaper, is a modified form of the planner, designed to work smaller surfaces. It was designed for planning keyways, slots, and similar small items.

[13] Metal planners are designed to produce flat surfaces on metal.

[14] The milling machine, according to Benjamin (1893:II:359), "assumed a position of great importance in the manipulation of iron work" since it allowed multiple small items to be precisely worked through rotary cutting.

[15] Also known as "key-seat cutters," these machines allowed blacksmiths and foundries to cut keyways for door locks.

[16] L.P. Purse, listed as the owner by Scruggs (1936), was apparently the shop superintendent or foreman, a position of such responsibility that it is reasonable that Scruggs would have been confused.

While Shields' estate was not vast, it was sufficient to meet the directions of the will. Unfortunately, several years prior to his death he had co-signed a loan for W.A. Clark with the Bank of Columbia. When Clark failed to make the payments, the Bank attached Shields' estate. The estate was also a creditor to Thomas Taylor, Jr., although the exact nature of that debt is not clear in the surviving estate papers.

In 1919 the Sanborn Map of the Palmetto Armory listed the proprietor as D. King[17] (Figure 18). In Structure 1 the foundry was shown as "raised 4 feet[18]," while the remainder of the building was essentially unchanged. Structure 12 is no longer present and Structure 7 has been replaced by two structures:

(13) At the northern edge of the Structure 7 foot print is a one story shingled structure measuring about 12 feet square and labeled "Sand Shed"

(14) At the southern edge of the Structure 7 foot print is a one story shingled building measuring 12 feet east-west by 18 feet north-south labeled "Cleaning."

(15) Immediately south of Structure 6 in the central yard is an open one story shed with a shingle roof measuring 18 feet east-west by 25 feet north-south and labeled "Iron Shed."

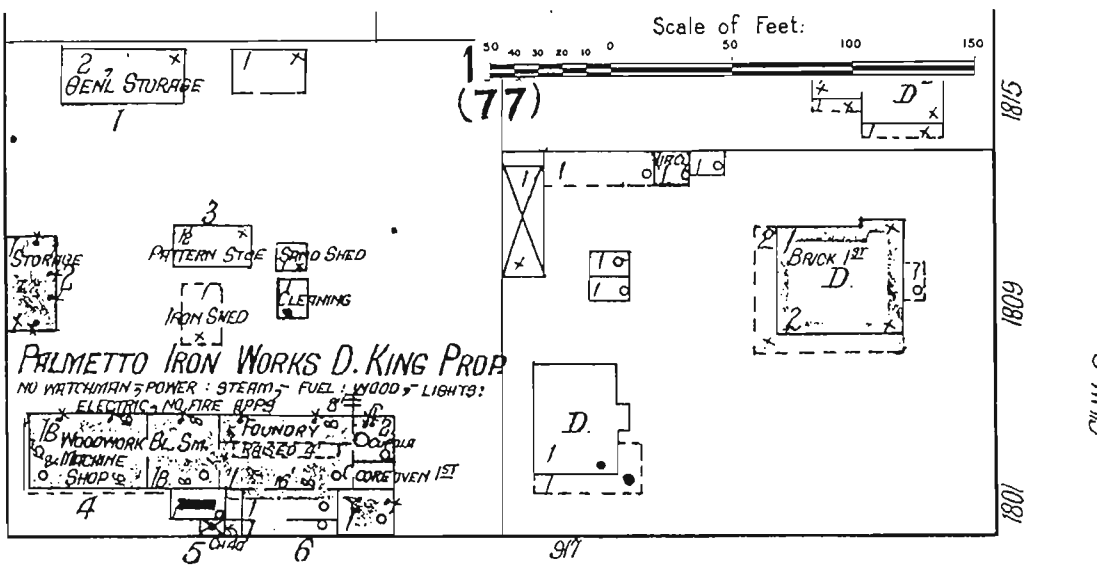


Figure 18. 1919 Sanborn Insurance Map of Palmetto Iron Works.

[17] Strictly speaking the owner was Mrs. Charlotte Ella King, the daughter of George A. Shields. Her husband, Robert King, was the manager until his death, at which time his brother, David, assumed the duty.

[18] The reference to the raised floor probably reflects the sand laid down for casting purposes (see note 6.

A photograph reputed to date from 1924 (Maxey 1980:45; Figure 19) shows the building from virtually the same angle as Figures 6 and 7. There is no discernable difference in the west or south elevations, although the window pane configuration has changed through time. A ca. 1924 photograph of a "little cast iron figure[19] of negro 'horse-boy' to hold reins of waiting horse" manufactured at Shields Iron Works fortuitously also includes the north elevation of the foundry, the central yard, and a portion of a structure to the north (probably Structure 15). In the yard is stacked a large quantity of iron gearing and rods. Several trees are present, one of which may be a pine and the other possibly an oak. The north elevation of Structure 1 appears to be in good condition, and a pedimented gable (matching that on the west elevation) is clearly visible on the east elevation in the background. Beyond is a faint image of what may be the cupola rising above the roof line. Returning to the central image in the photograph, the caption on the reverse indicates that "hundreds" were cast at the foundry and:

> the last of them stood on the corner post (S.W.) of the wall in front of the building in 1924. When it was lifted down this snapshot was made (South Caroliniana Library, Boxed City of Columbia Nineteenth Century Photographs - Palmetto Armory/Iron Works).

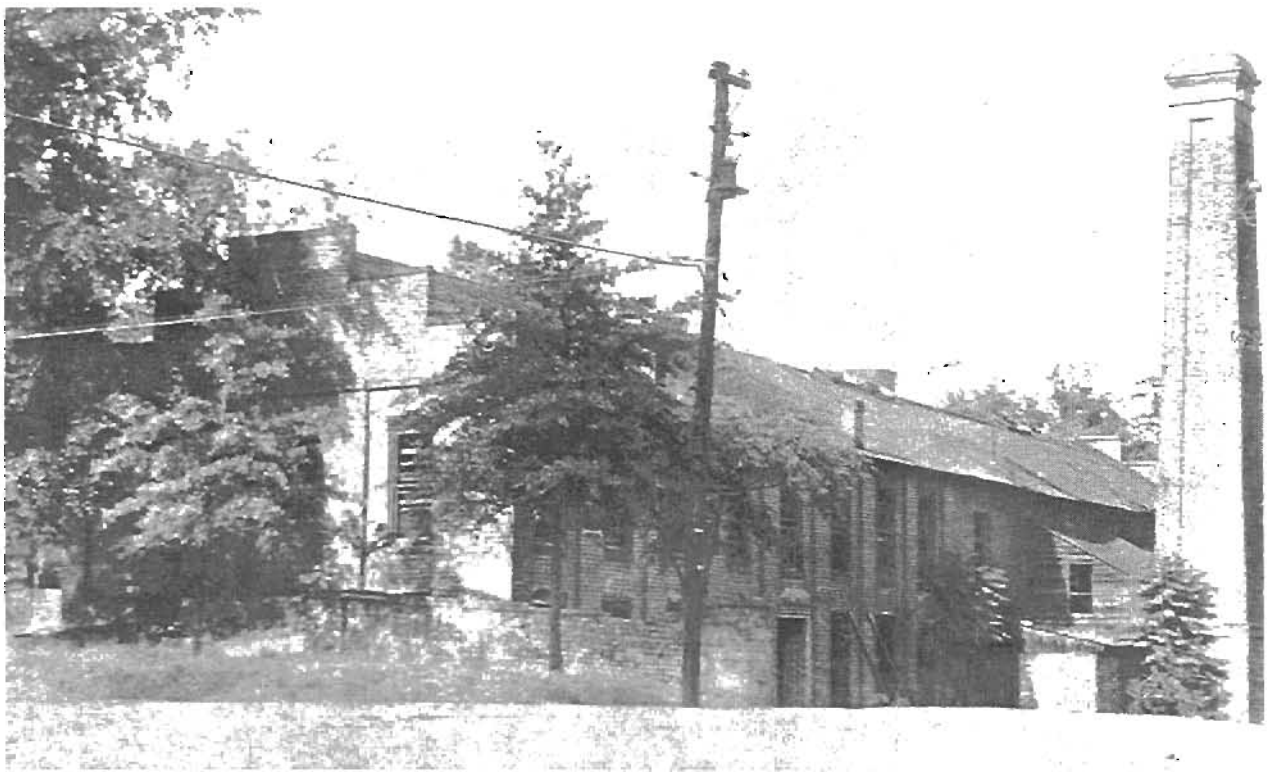


Figure 19. Palmetto Iron Works, ca. 1924 (from Maxey 1980:45).

[19] This photograph also suggests that the figure was sand casted, with little effort to clean the final piece.

Charlotte Ella King died intestate in 1926, leaving a number of sons, daughter, and grandchildren, all with a claim to the estate. The inventory and appraisement of her estate listed both her house and the "old Palmetto Iron Works, with a quantity of machinery, tools, etc. which are not separately appraised, as they would be worth little or nothing if taken out of the building, but the building may sell as a foundry" (Richland County Probate Court, Box 321, Package 10,087). The assessed value of the foundry was $3,920, while its appraised value was $10,000. The shop, struggling under the debts of George Shields, and now under the division of a small estate among many children, was closed in September 1927. The 1928 "Map of Columbia, South Carolina and Vicinity by Tomlinson Engineering failed to note the location of Shields Foundry as on previous editions.

The estate, for a variety of reasons, was slow to be administered, although efforts were made in the early 1930s to convert the foundry and its materials to ready cash. In 1929 a small lot of "scrap iron" was sold. Additional lots were sold in 1930 and 1931, as well as a used clutch, a used lathe, and a used grinder. In 1934 the estate sold the "old used safe" which dated back as least to Shields for only $15. That same year "used (practically junk) machinery including engine, keyseater, shaper, bolt cutter, miller, lathes, and vices" were sold for $42.50. As late as 1935 the estate was selling off "old used brick" from the lot, suggesting that some buildings on the property were being demolished. According to the City tax rolls, only two buildings were on the lot from 1935 through 1941. These were probably Structures 1 and 5 or 10.

In 1930 a court case, Jessie King, Administrator of the Estate of Charlotte Ella King et al. v. George Shields King et al., was initiated in an effort to marshall the real estate assets and close the estate (Richland County Court of Common Pleas, Roll 28592). The foundry lot was described:

> northeast corner of Laurel and Lincoln Streets, containing about one acre, more or less, and known and described as Shields Foundry Lot . . . . [hereon are] located certain buildings containing some articles of machinery, tools and other appliances, all of which were at one time used by George A. Shields, the grandfather of plaintiffs, as an iron foundry and machine shop, but for a number of years little use has been made of the foundry.

Elsewhere the property was described as "unproductive and does not yield sufficient income to pay the taxes thereon" and indeed the Palmetto Iron Works owed upwards of $1000 in back City, County, and State taxes.

The named defendants were all the minor children due and inheritance. Since they were not of legal age the court case sought to allow the property to be sold and a division of the proceeds made. Before this could be accomplished, however, King's just debts had to be settled. L.P. Purse brought suit claiming a significant interest in the foundry, noting that he had been advancing Palmetto Iron Works funds since at least 1919. The matter was referred to the Master and extensive testimony was taken relevant to the debts. Some of this

testimony offers a better picture of the foundry operations during the early twentieth century. For example, Purse noted that between four and six individuals worked in the shop during this period. His salary, as superintendent, was 68¢ an hour and $1.02 an hour for overtime. Workers during this period included W.G. Bankhead, Roland Rabon, and Dave Bloom, as well as some additional individuals who worked on a job at the South Carolina State House, rather than at the foundry. Wood was purchased from George Lucas, William Jackson, and J.B. Ellenger. W.R. Hornsby provided drayage for Palmetto Iron Works during the early 1920s.

As a result of this case the property was ordered sold and on July 14, 1941 Harry M. Lightsey, Master, transferred the property to the City of Columbia for $6500 (Richland County RMC, DB EP, p. 215). The proposed sale, however, had been negotiated for months in advance of the actual sale, on June 2, 1941 the City Engineer, W.S. Tomlinson wrote Robert King:

> the City is now ready to comply with its contract for the purchase of this property. . . . We find, however, upon inspection, there is a large amount of junk, etc. on the years which we understand is claimed by other parties. This is to advise that the City will give up until June 14th to remove this junk. It is distinctly understood that no brick nor any attachments to the building will be removed (Richland County Court of Common Pleas, Roll 28592).

Apparently much of this "junk" belonged to L.P. Purse and he was blamed for almost costing the Kings the sale of the property. For his part, Purse claimed that he had difficulty finding labor to move the items. As partial settlement of his case Purse had previously accepted a metal planner and a New England metal lathe.

A 1938 aerial photograph (ACSC ATA-13-3) shows the property is covered in many trees, although the foundry is clearly visible and intact. The northwestern quadrant of the block appears to be densely wooded.

On September 17, 1941 the City of Columbia's Department of Engineering produced a topographic map of Shields Foundry (City Engineers Office, Plan Files, Plan 30-16; Figure 20), showing the building, the location of the brick wall in front of the building, and a brick wall running from the southeast corner of the structure to the southeast property corner and about 10 feet north along the property line. Overall the building measured 156.6 feet -- again almost identical to the 1850 measurement of 154 feet and the Sanborn measurements of 160 feet. There is no doubt that the building purchased by the City in 1941 was the same structure originally built by William Glaze about 1850 and repaired after the Civil War.

The topographic information on the map reveals that the property sloped up from an elevation of 327 feet MSL in the southwest corner to 337.5 feet MSL in the northeast portion of the lot. There is no evidence for any other structures associated with the foundry, suggesting that the other seven buildings had been demolished sometime between 1919 and

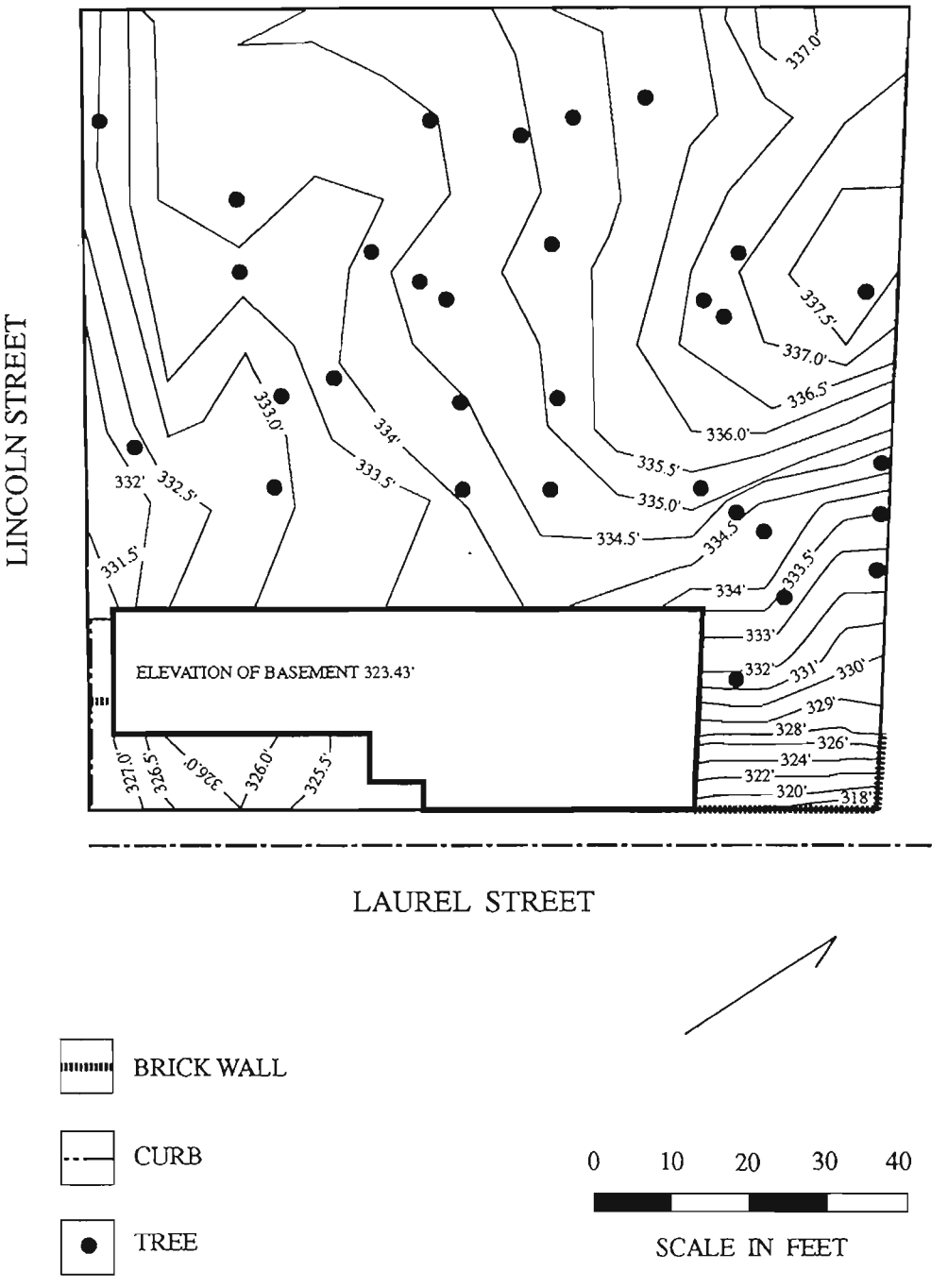


Figure 20. Palmetto Iron Works in 1942 (redrawn from City Plan 30-16).

1942.

A December 1942 newspaper account describes the city's new property as "the shell of the old building" (*The State* [Columbia, South Carolina], September 14, 1942), but provides no additional information regarding the plans the City had for the building. The 1949 "Map of Columbia, South Carolina" shows the property labeled as "Big Top," the only identified reference using this term (Figure 21).

The 1956 Sanborn Map reveals that by this date the City had demolished the eastern two-thirds of the structure, the associated stack, and had reworked the east elevation. The property was labeled a "Community Center," and confirming the 1942 topographic map, there were no other structures shown on the lot (Figure 22). Glaze's original antebellum dwelling on the southeast corner was demolished sometime between 1956 and 1970, as was the Mitchell/Bouknight house situated on the northeast corner of the block. By 1970 the block consisted only of the remnants of the Palmetto Foundry and an office building.

Summary of Historical Research

This historical research has revealed that much of the "oral tradition" surrounding the Palmetto Iron Works is in error. This uncritical acceptance of reminiscences and legend has resulted in muddled interpretations and incorrect interpretation of the foundry's architectural and industrial evolution. While there can always be debate regarding specific points and the interpretation of maps, plats, and even photographs, these lines of evidence must be given greater credence than oral legend.

It has not been possible to accurately date the first construction episode in the southwestern quadrant of the block. Based largely on the economic history developed by Meyer (1982) it seems likely that the structure was built sometime between 1845 and 1850. There is ample evidence that the building shown in Figures 6, 7, and 19 accurately represents the original structure and that the engraving produced for *The Southern Agriculturist* in 1850 was an artist's conception with only a vague approximation of reality.

While the building was damaged by Sherman's troops, this damage was relatively minor and the foundry was rebuilt to appear essentially as it had prior to 1865. The building stood, with almost no alteration until the eastern two-third (probably representing everything east of the wood working and machine shop room) were demolished by the City of Columbia sometime between 1942 and 1956.

Using a conservative beginning date of 1850 and a liberal ending date of 1928, the structure had an active life of 78 years and a mean historic date of 1889. Over this 78 year history a series of 15 structures were built, repaired, demolished, and rebuilt on the one acre lot, with the foundry serving as an anchoring point. While a few of these buildings may have been substantial brick structures, more were probably set on piers and many were simple sheds which likely left only minor archaeological evidence. All of the structures on this lot

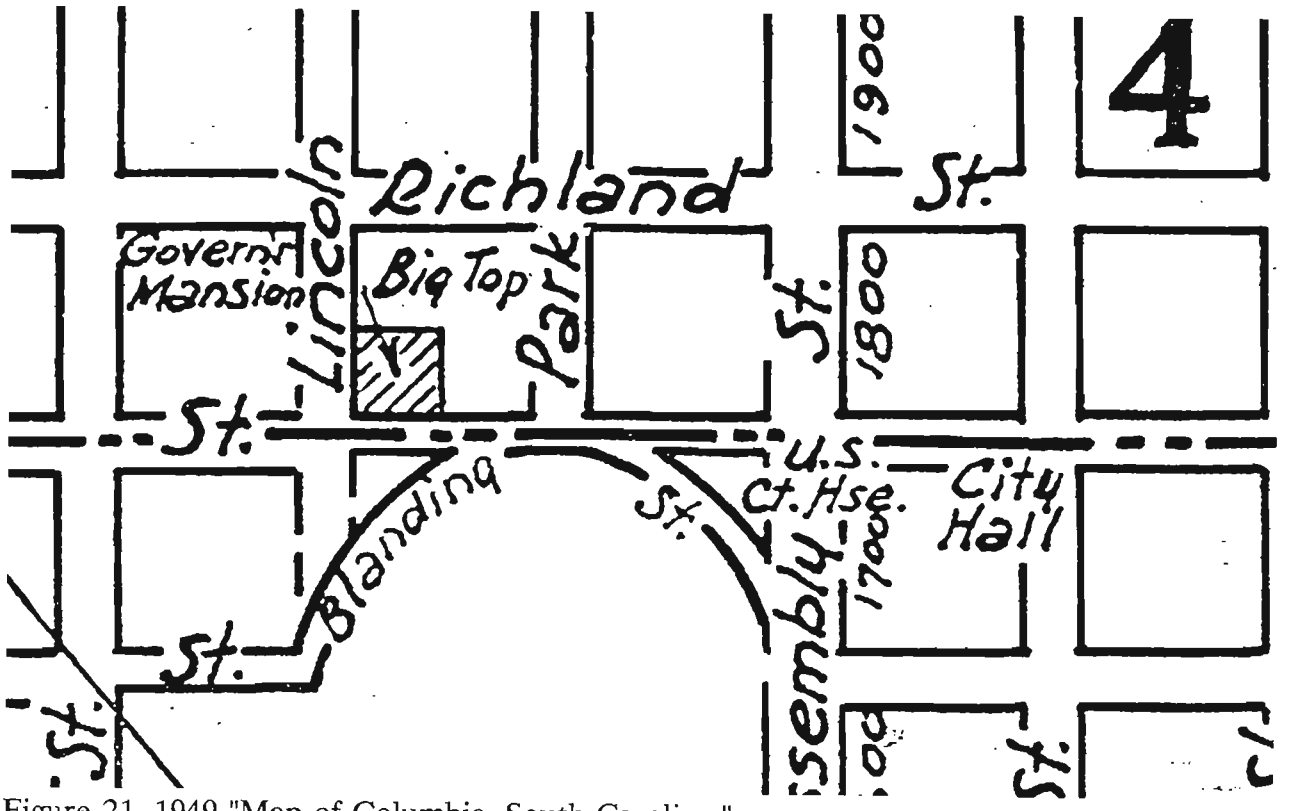


Figure 21. 1949 "Map of Columbia, South Carolina."

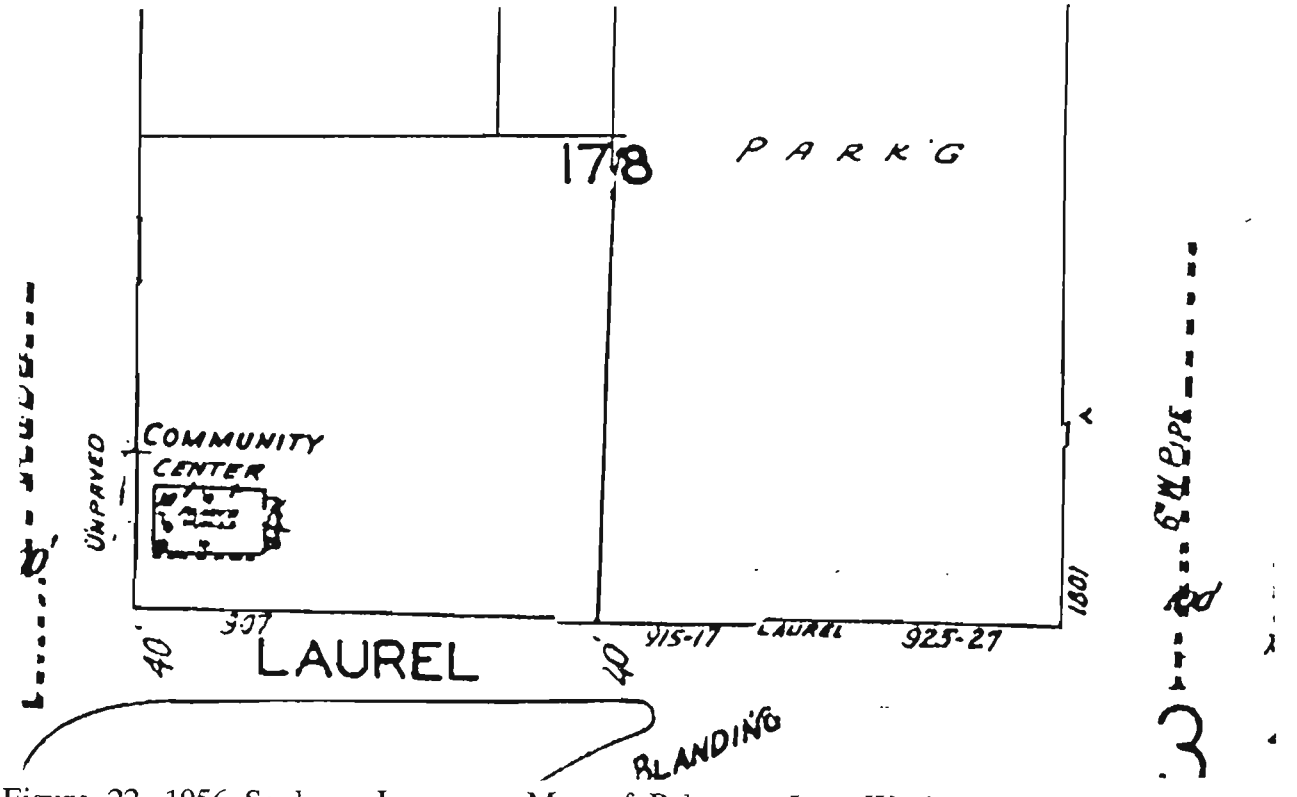


Figure 22. 1956 Sanborn Insurance Map of Palmetto Iron Works, now a "Community Center."

were associated with the foundry -- there is no evidence that any domestic quarters were situated with the one acre southwestern block quadrant. Consequently, it is likely that only artifacts associated with industrial activities will be present in the archaeological record (although trash disposal along lot lines from adjacent domestic occupations are likely).

FIELD INVESTIGATIONS

The Nature of Industrial and Urban Archaeology

The research at the Palmetto Iron Works represents some of the first industrial archaeology in the Columbia area (although Adams and Trinkley 1992 explores the Columbia Canal and Trinkley 1989 briefly examines the Saluda Factory site). In addition, this research is the first time an urban archaeological investigation has been conducted in the City of Columbia (although for over a decade The Charleston Museum has been studying and preserving the urban archaeological resources of Charleston).

While the historic preservation movement of the 1960s recognized the importance of both public and private structures to an understanding of America's "social history," it was not until more recently that structures related to the history of technology and industry were recognized as important to an understanding of America's material culture and development. The archaeological study of the physical remains of industry, engineering, and technology have come to be known as "industrial archaeology." The industrial archaeology of virtually the entire South, including South Carolina, reflects its change from a primarily agricultural society to a more diversified industrial base with many extractive industries dominating early and mid-nineteenth century life.

Because the sites studied by industrial archaeologists date from the period of the American Industrial Revolution and hence are relatively recent in age, there is a tendency either to emphasize recordation of standing structures or to rely on the historical, documentary, or engineering record. Yet, as Council and Honerkamp note:

> industrial sites reflect pattern human behavior, and it is this behavior that is becoming the object of study. The industrial site is not a static relic, but a mirror of dynamic industrial and technological processes and their relationship with society and cultural processes (Council and Honerkamp 1984:6).

Simple plan drawings and photographs, while recording the physical remains, fail to recognize or reflect any anthropological concern with the activities which took place at these sites. The historical record of these sites, as previously discussed for the Palmetto Iron Works, consists of newspaper accounts, engineering and technical manuals, deeds, plats, maps, and abundant speculation. Council and Honerkamp observe that this historical record "is not a ready-made source of interpretations for the industrial archaeologists [but rather] it is a data source that must be controlled" (Council and Honerkamp 1984:7). There may be a variety of reasons why the historical record may be intentionally or unintentionally misleading. Even reliance on technical manuals must be questioned, as Penn (1978) argues

that the diffusion of technical knowledge in the nineteenth century was frequently slow, informal, and based on personal experience.

Like industrial archaeology, urban archaeology is a relatively new field in archaeological research, with about 20 years of methodological, intellectual, and theoretical refinement. While the definitions of both the urban setting and urban archaeology are diverse, it is typically defined as the study of relationships between material culture, human behavior, and cognition in an urban setting (see Staski 1982:97). The urban setting is defined as a permanent location in which the density of settlement and the amount of human energy expended per unit of land are greater than in the surrounding (i.e., non-urban) region.

In urban archaeology the city itself is the "site" being studied. While excavations may be undertaken at a particular dwelling or of a particular block, the city remains the logical unit of study, reflecting the complexity of the sociopolitical unit. Research typically focuses on such questions as the nature of urban development and urban adaption. Coupled with this emphasis on the city as site, is an equally important recognition that urban archaeology requires a very different methodological approach from other forms of perhaps more traditional archaeological research. Part of the difference is that cities represent living sites, constantly undergoing change and modification. While archaeologists not familiar with the evolutionary processes of the city might view urban sites as "disturbed," this would be myopic. Archaeological investigations in the urban setting must simply recognize the nature of these alterations and urban processes.

Likewise, documentary sources can be a major tool in the archaeological study of the urban setting -- if the research is property conducted and oriented toward answering the right questions. But, just as with industrial archaeology the documentary record can be manipulated and archaeological research offers the potential to not simply augment the historical accounts, but also to alter the historical record.

Methodology

The proposed survey technique was close interval (i.e., 25 foot) shovel testing on transects also spaced at 25 foot intervals, with all fill screened through ¼-inch mesh. While even 25 foot intervals are not sufficient to confidently identify many of the 15 structures known to have existed at the foundry, such tests would begin to accurately reveal the variety of artifacts present, their density, the condition of the site in various areas of the lot, and the probability that significant archaeological or architectural remains might be present on the lot.

To implement this survey, a grid was established across the site to ensure more accurate placement of shovel tests, to allow the vicinity of recovered features to be relocated in the future, and to assist in the collection of elevations for a new contour map of the lot. The grid was oriented N66°E, following the general orientation of the remaining portion of Glaze's building (see Figure 23). This orientation, which followed that of the lot, not only

made the survey more convenient, but was also felt to make the recovery of additional buildings more likely. The shovel tests were numbered sequentially from one through 60, covering the bulk of the lot available for inspection. A few of these tests were not excavated because of obstacles (such as tests 15 and 16 which fell on the concrete shuffle board court or tests 27 -30 and 43-46 which fell in the gravel parking lot).

Tests 1 through 12 were hand excavated and measured approximately 1 foot square. These initial tests revealed a number of deep units with hard packed soil, making hand excavation difficult. Consequently, a two-person 12-inch power auger was used to excavate the remainder of the tests. This technique not only decreased the time spent excavating the tests, but also assured uniform excavations which penetrated sterile subsoil. Fill from the auger tests, of course, continued to be hand screened through ¼-inch mesh.

Findings

Soils on the lot evidenced considerable variability, reflecting the tremendous range of activities which took place on the site over its 78 year history. Tests 1-5 and 8-12 were placed within the demolished portion of the original foundry. Consequently these tests evidenced large quantities of iron objects (including finished items, scrap, corroded objects, molted metal, and slag), coal and coke fragments, and molted lead and brass. Smaller quantities of window glass, ceramics, nails, and brass objects were also recovered. Several tests revealed very hard packed and burned clay floors, probably representing the floors of the foundry. Two shovel tests also evidenced what appear to be in situ brick piers or walls, suggesting that the demolition did not grub out foundations. Subsoil, where identified, was consistently a very firm red clay. Overlying the subsoil was from 0.9 to 1.5 foot of clay loam, ranging in color from black to reddish-brown. One test, over 2.1 feet in depth, failed to reveal subsoil, suggesting the presence of an intact feature other than walls or piers.

Tests adjacent to the eastern lot line exhibit considerable diversity, with several revealing extensive deposits which may represent dumps. Others, such as Tests 36 and 37 suggest that some areas have been disturbed by the construction of the retaining wall associated with the Chamber of Commerce parking lot. Along the northern property line there is less evidence for disturbance and test 51 revealed an extensive deposit representing machine shop trash, including metal planning debris. Test 57 revealed an extensive burn deposit, perhaps reflecting a burned structure, or structural debris from the foundry's 1865 fire.

The central portion of the site, encompassing tests 23-26, 31-33, and 38-42 exhibit a thin A horizon, typically 0.4 to 0.5 foot in depth overlying a reddish-brown firm clay. Artifacts in this central area are less common and there seems to be less variety. Elsewhere on the site auger tests revealed the probable existence of wood frame structures, based on the recovery of nails; coal dumps, based on the presence of large quantities of coal fragments; and a probable blacksmith operation, based on the presence of slag and metal debris.

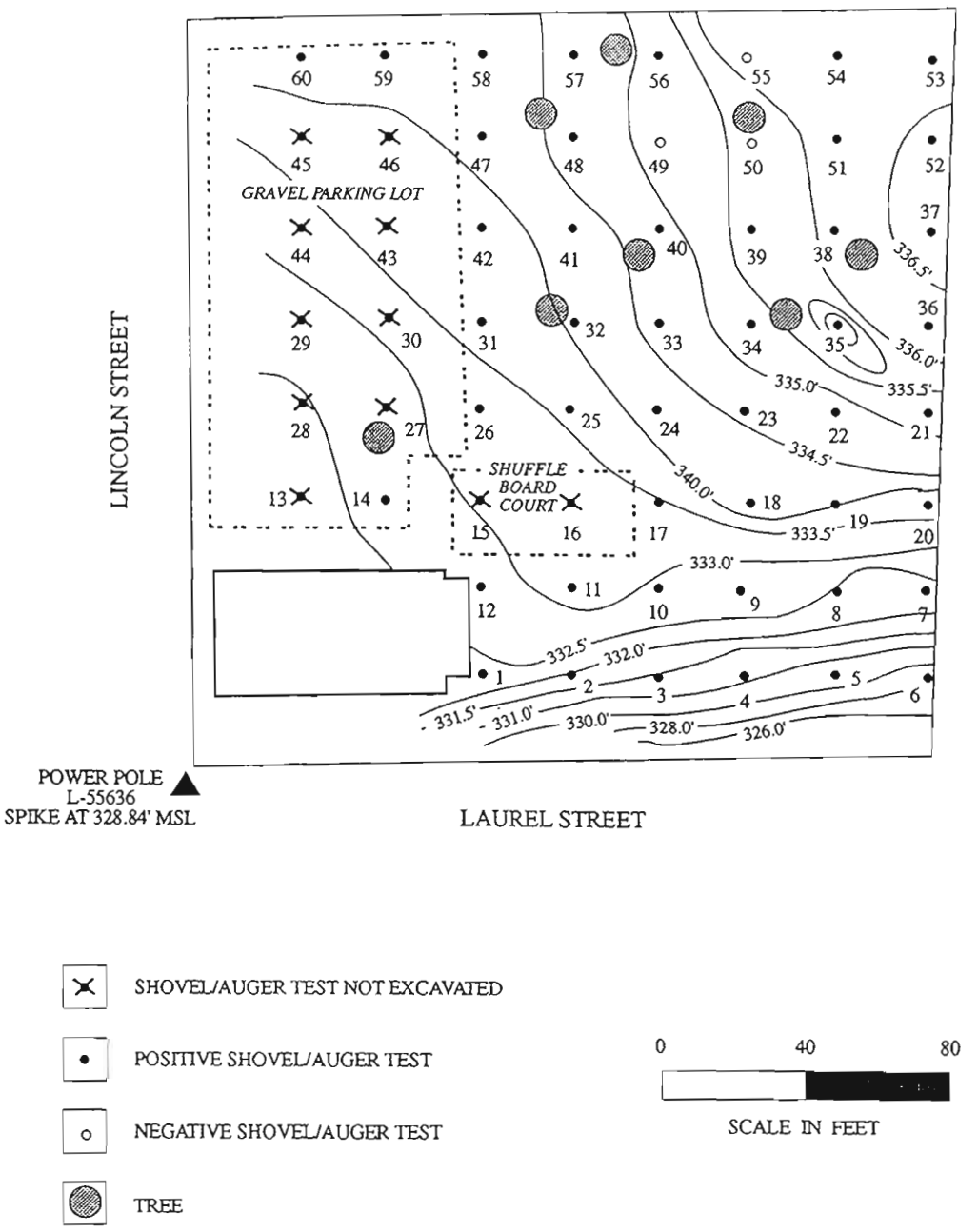


Figure 23. Topographic map of the Palmetto Iron Works site as it appears today, showing shovel tests and other features.

Only three tests in the gravel parking area were explored. Test 14 revealed about 0.2 foot of crush run overlaying about 0.2 foot of clay fill. Under this clay fill was dark brown sandy loam with abundant artifacts, representing the intact site zone. Tests 59 and 60 revealed similar stratigraphy, except there was no clay fill -- the crush run directly overlies black humic loam.

A contour map of the site as it appears today was prepared during the course of this study and is reproduced here as Figure 23 (see also Figure 24). Comparison with Figure 20, a topographic map prepared in 1942, reveals that the land form has changed very little in the intervening 40 years. The minor differences in both elevations and contour placement is readily attributable to the differences in benchmarks and map construction techniques. There is no evidence for extensive ground reworking during the park's maintenance. This is very important, since it supports the data obtained from the subsurface tests and clearly reveals that the site exhibits a high degree of integrity.

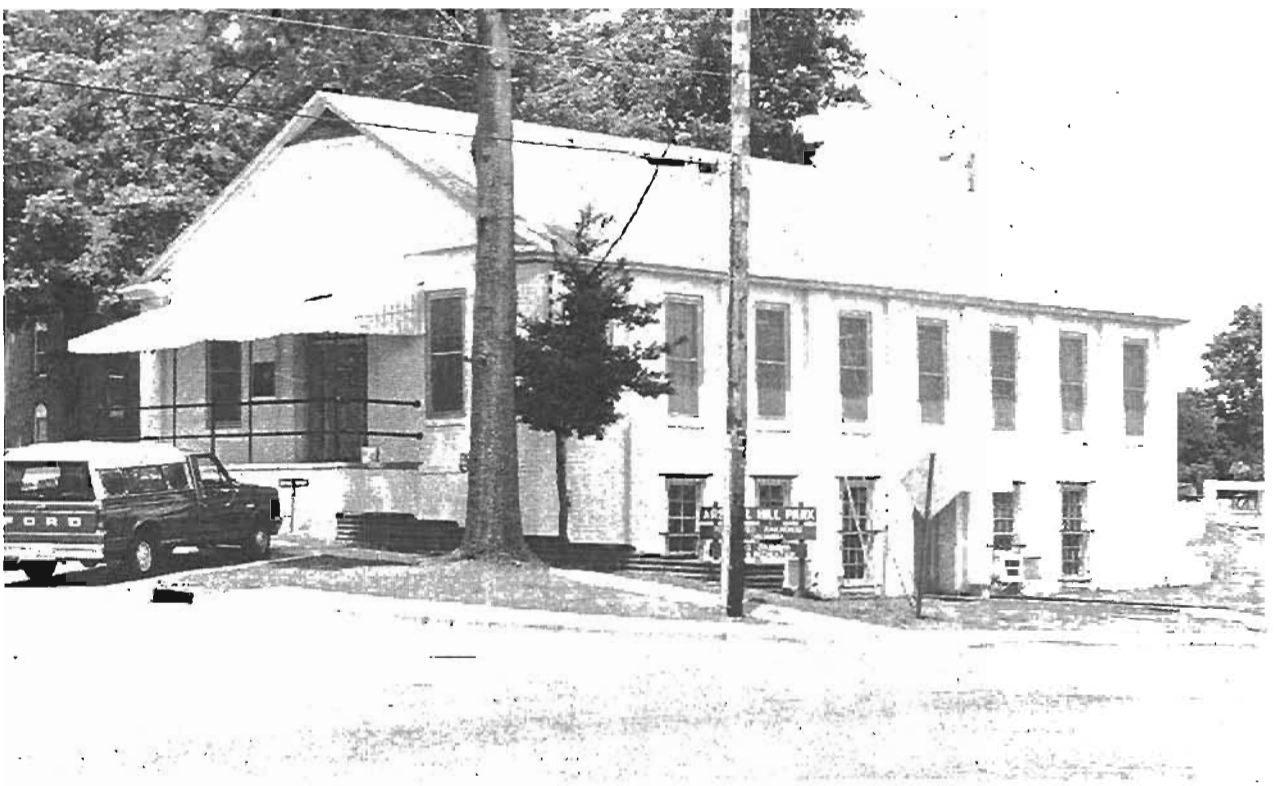


Figure 24. The Palmetto Iron Works site today, view to the north-northeast.

ANALYSIS OF RECOVERED ARTIFACTS

Descriptions

The artifacts recovered during this brief study of the Palmetto Iron Works encompass three general classes: ceramics, glass, and metal (primarily iron). Analysis on such a level, however, fails to reveal adequately the complexity and variety in the archaeological record. As a consequence, the artifacts will be discussed by artifact groups, such as Kitchen, Architecture, and Activities (largely following the methodology of South 1977). Such an approach allows the quantification and discussion of artifacts in a broad functional framework (see Table 1). The initial analysis will not attempt to consider temporal episodes, but rather will consider all of the artifacts at a synchronic level. Although some information is offered on the temporal range of various items, no diachronic study is attempted because of the limited nature of these investigations (shovel or auger tests are simply not adequate for such studies).

Kitchen Artifact Group

The Kitchen Artifact Group at the Palmetto Iron Works consists of only nine ceramics, one milk glass fragment, one manganese bottle glass fragment, one "black" bottle glass fragment, 41 clear bottle fragments, one aqua bottle fragment, three brown bottle fragments, five green bottle glass fragments, three crown cap fragments, and two clear tumbler fragments, for a total of 67 specimens, representing 8.6% of the artifacts recovered.

The ceramics include three fragments of undecorated whiteware, three fragments of a brown transfer printed whiteware, one fragment of a red transfer printed whiteware, one tinted whiteware, and one white porcelain. The whitewares account for five vessels: one undecorated whiteware plate, one undecorated whiteware saucer, one red transfer printed cup, and one brown transfer printed cup and one tinted whiteware plate. The undecorated whitewares have a mean date of 1860 using South (1977). The non-blue transfer printed whitewares have a mean date of 1851 according to Bartovics (1978:213), while the tinted glaze ware has a mean date of 1941 (Bartovics 1978:213).

The single "black" bottle glass is actually a dark olive green color which appears black in reflected light. The small fragment available does not evidence mold lines, although it does not appear sufficiently robust to represent either a champagne or wine bottle; it is more likely a fragment of an ale bottle. The specimen probably dates from the nineteenth century, although a more specific date is not possible given the small fragment and the absence of the neck and lip. While no effort was made to determine the minimum number of vessels for the other bottle glass recovered, they are diverse and may represent a variety

Table 1.
Artifacts Recovered from Palmetto Iron Works

SHOVEL/AUGER TESTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	Totals
Whiteware, undec					1																															1																								2
tinted																																																		1										1
brn tp																																																		3										3
red tp																																																			1									1
Porcelain, white																																																			1									1
Bottle glass, amn				1																																																								1
clr	3	2			2	1		1			5							1	3					1	1						1	1			2												4			6	2	3	1					1		41
blk																																																		1										1
aqua																																							1																					1
brn					1														1																												1													3
grn							1												1				1								1																1													5
Milk glass																																															1													1
Tumbler glass, clr			1																																												1													2
Crown cap											2																																										1							3
UID nails																																																		47										47
Cut nail frags			1		1	3				7								22			2	9	1															1	1									1		5		3							1	58
Cut nails																		2						1																										1								1		5
Wire nail frags			4		10			3		1				1										2										1													1			29			3					2		57
Wire nails																			1																															4										5
Wrought nails	1																																1																											2
Window glass					4	4	1	2	1	6	5							2	1						2																					1	1			35			1				2	1		69
Bakelite frag		1																																																										1
Iron																																																												
Flat iron frags	1			4	15	6		2		3		1						4	6	1				3	3						18	1							2	7						1		1	2	17					3	3	1			105
UID iron frags	6	2	8	11	5	12	3				4	1						5			4	2									3										1					3	1		1	20	4		3		3	2			1	128
Machine frags				2	4	3												4	1												2																		1	4										21
Melted frags	1				37	5	9	61	3	15									1																																					1				133
Rod stock								12											2																															9	1									24
Wire					1																																													2										3
Shavings				1		1					5																																							16										23
Slag samples					1				2								4													1				2								4																		7
Copper/brass																																																												
Machine frags	1				1																																													3										5
Melted frags						1				1																																								1										3
Wire																			2																															9										11
Shavings																																																		1										1
UID frags																																																		6										6
White metal																																																												
Machine frags																			1																																									1
Melted frags								2																																										1										3
Tools																																																												
Hacksaw blade					1																																													1										2
File frag																					1																																							1
Wrench																																																		1										1
Marble																																			1																									1
Coke frags																	2																																											2

of bottles, including alcohol and soda or mineral water. Several offer some temporal clues. For example, one specimen, evidencing silk screen printing, postdates about 1930 (Jeter 1987:30), while the manganese glass fragment probably dates between the 1890s and the early 1910s (Lorrain 1968). The crown closure devices found at the site postdate their introduction in 1892 (Lorrain 1968:44).

The examples of tumbler glass are clear, straight-sided examples with fine rouletting on the sides. These represent jelly jars common during the early twentieth century and found at a wide range of tenant, industrial, and mill village sites throughout South Carolina.

Kitchen remains are found clustered in two locations on the lot -- in the vicinity of the main structure demolished in the mid-twentieth century and in the northeast corner of the lot. Reference to the previous historical research reveals that the northeast lot corner was not an area of particularly extensive occupation. This area may exhibit denser remains since it was used for refuse disposal, representing an area far removed from the major operations on the lot.

Architectural Artifact Group

The Architectural Artifact Group includes window glass and nails. Surprisingly, no construction hardware was recovered, nor was there any evidence of door lock parts, or even screws which might have been associated with hinges. This lack of variety may be the result of both extensive re-use of available hardware and eventual salvaging upon abandonment.

The category of window glass includes 69 fragments of both light green and clear rolled glass. These specimens were classified as window lights based on thickness, clarity, and lack of curvature.

Three types of nails were recovered from the site: wrought (n=2), machine cut (n=63), and wire (n=62). In addition, 47 unidentifiable nails were also recovered (representing fragments too deteriorated to allow further identification). Of the 147 nails, only 10 (or 6.8%) were sufficiently intact to allow their size to be determined. All were 8d (SAE = 2½ inches) to 20d (SAE = 4 inches) in size, representing nails primarily used in framing and heavy framing. No nails which might have been used on small timbers or roofing were recovered and very few were found which might have been associated with siding.

Hand wrought nails date from the seventeenth century and Nelson notes that "it is not uncommon to find a few . . . used well into the nineteenth century" (Nelson 1968:3). It is also likely that cut nails replaced wrought nail technology more quickly in urban areas, such as Columbia. While the Palmetto Iron Works would have been capable of producing nails, the process was labor intensive and the operators probably found it more economical to purchase nails rather than manufacture them.

"Modern" machine cut nails account for about 50% of the collection. These nails were first manufactured in the late 1830s and have uniform heads and shanks with burrs on the edges (Nelson 1968:7). Wire nails, which account for about 49% of the collection, were first widely available in the 1850s, but were apparently not commonly used until the 1870s (Nelson 1968:9-10). The wire nails have round heads and round, pointed shanks. The almost equal quantities of both cut and wire nails suggests that new construction and repairs were constantly being undertaken at Palmetto Iron Works.

Architectural debris are found concentrated in four areas of the Palmetto Iron Works lot. The vast majority of the materials appear to be associated with the portion of the main structure demolished sometime between 1942 and 1956. Secondary concentrations are also found in the east central portion of the lot, adjacent to the lot line; in the northeast corner of the lot; and in the northwest corner of the lot. It is likely, given the extensive number of structures associated with the foundry through time, that testing at 10 foot intervals would be necessary to more closely define structure locations.

Personal Artifact Group

The only item which *may* represent a personal item is a fragment of bakelite. While it cannot be identified, many items were made of this material during the late nineteenth and early twentieth centuries, including combs, picture cases, and even frames.

The dearth of personal artifacts (and the total absence of other artifact groups, such as furniture, arms, clothing, and tobacco) may partially be explained by the survey technique and sampling bias. However, it is also likely that, as an industrial site, these various artifact groups will be poorly represented.

Activities Artifact Group

The Activities Group gives evidence of a variety of specialized artifacts at the Palmetto Iron Works. The 472 artifacts in this group have been divided into three classes: tools, foundry materials and waste, and toys (representing a slight modification of those classes suggested by South 1977).

The category of tools includes two hacksaw blade fragments, a fragment of a half round file, and a blacksmith wrench. These items are all associated with the industrial operations which were conducted at the site. Hacksaws were common tools at least by the 1860s (see Russell and Erwin 1980 [1865]:166) and probably date from the beginning of the industrial revolution. The half round file is flat on one side and curved on the other. It would have been used on curved surfaces, either metal or wood. Both blacksmiths and machinists used a variety of wrenches (see Richardson 1890:2:160; Russell and Erwin 1980 [1865]:242).

The single toy identified at the site is a glass marble. This item may date from the

use of the foundry, or may date from the more recent use of the site as a park.

The vast majority of the Activities Artifact Group consists of materials categorized as foundry materials and waste. These include iron, copper/brass, lead, and white metal materials. Iron items include flat fragments, including bar stock, unidentifiable fragments of flat stock, as well as curved fragments which may have been pipes. Unidentifiable fragments include primarily corroded or distorted items. Melted fragments are lumps of iron, possibly from smelting operations. Rod stock includes primarily unaltered iron rod. Shavings are the discarded bi-products of planing and milling. Copper and brass objects include a variety of unidentifiable and/or machine parts, wire, melted fragments, and shavings. White metal and lead items consist primarily of melted lumps.

As an assemblage the materials present at the site are clearly associated with the foundry and blacksmithing operations. Many of the melted lumps exhibit sand impressions, as though they were dropped during sand casting. Others appear to be waste, with slag-like inclusions. The shavings are clear evidence of planning or milling. Some iron objects show evidence of welding or cutting, both functions of blacksmithing. Many of the iron remains are parts of tools or machinery being repaired, replaced, or cast by the firm.

The tests at the site also produced a large quantity of clinkers or slag -- waste products from both blacksmith and forging operations. Slag forms from iron oxides (hammer scale, cinders, slag inclusions in wrought iron) and other components such as sand, loam, melted parts of the force or hearth lining, and from ashes and fuel. It may be characterized as either smithy slag (from blacksmith operations) or forge slag (from forging). The examination of slag using visual inspection, chemical analysis (i.e., wavelength dispersive X-ray fluorescence analysis) and microscopic analysis can reveal the activities the shop was engaged in, such as smelting, refining, and casting. It can reveal the extent to which metals other than iron, such as copper alloys, were worked. It can also reveal the proportions of wrought iron and steel worked in the shop.

Fuels present at the site and presumably used in metal working included both coal (identified as hard anthracite) and coke. Charcoal was found in a number of tests, but all of that suitable for ethnobotanical study was found to be soft wood (*Pinus* spp.) not likely to be used as either smith or forge fuel. The recovered charcoal was more likely either fireplace fuel or the remains of structures burned on the site during the Civil War.

Pattern Analysis

Generally those exploring industrial sites do not provide much information concerning the artifact patterns present. Yet South has succinctly stated that "we can have no science without pattern recognition, and pattern cannot be refined with quantification" (South 1977:25). Certainly there is no need to demonstrate, through comparison with the Carolina Artifact Pattern that the Palmetto Iron Works is not a domestic structure. Nor is it wise, or even possible, to establish some sort of "iron working industrial pattern" based

on this very limited work. Rather the quantification of artifacts by discreet groups will aid in the understanding of activities which took place at the site and may, eventually, aid in revealing patterned regularities at industrial sites in general.

Table 2 provides a synopsis of the recovered artifacts by artifact groups. The largest is that of specialized activities -- accounting for 60.3% of the recovered materials (excluding slag and fuel samples). The next most abundant materials are those associated with architectural remains, accounting for 31% of the collection. Kitchen artifacts represent 8.6% of the collection, although many of the items, such as soda and mineral water bottles would not necessarily be found only in a kitchen context. Likewise, some of the recovered kitchen remains are possibly associated with rear or side yard dumps and may not be associated with the foundry at all.

Table 2.
Artifact Pattern at Palmetto Iron Works, based on shovel and auger testing

Kitchen Artifact Group		
Ceramics	9	
Bottle/Container fragments	53	
Crown closures	3	
Tumbler fragments	2	
	67	8.6%
Architecture Artifact Group		
Window glass	69	
Wrought nails	2	
Machine cut nails	63	
Wire nails	62	
UID nails	47	
	243	31.0%
Personal Artifact Group		
Bakelite fragment	1	
	1	0.1%
Activities Artifact Group		
Tools	5	
Toys	1	
Foundry materials/waste	466	
	472	60.3%

This pattern emphasizes those materials directly associated with the foundry operations. Even the architectural remains are relatively inconsequential in comparison. This is probably the result of the industrial operations "overwhelming" the other activities which took place on the property -- even those associated with construction and building. It is likely, however, that excavations (rather than simply shovel/auger tests) would recover at least small quantities of clothing, personal, and perhaps even tobacco related artifacts.

Dating Synthesis

Although plagued by a very small sample size and the possibility that the recovered materials did not originate in the foundry, Table 2 documents the mean ceramic date for the site. The 1866 date is 23 years earlier than the posited mean historic date for the site. This difference is almost certainly the result of the sample size coupled with the technique's lack of temporal sensitivity for the late nineteenth and early twentieth centuries.

Table 3.
Mean Ceramic Date for Palmetto Iron Works,
based on shovel/auger testing

Whiteware, non-blue transfer printed	1851	4	7404
tinted glaze	1941	1	1941
undecorated	1860	3	5580
Totals		8	14,925

Mean Ceramic Date = 14,925 ÷ 8 = 1865.6

Previous discussions have revealed that other artifacts, including bottle/container glass, glassware, and even the nails, span the nineteenth and early twentieth centuries. The archaeological remains, in general, support the historical documentation, and suggest that remains from throughout the foundry's history are present.

Conservation Treatments

Conservation treatments are being undertaken on those few items which may be suitable for eventual display. All of the selected iron specimens exhibited sound metal after the mechanical removal of gross encrustations. These objects are being subjected to electrolytic reduction in a bath of sodium carbonate solution with currents no greater than 5 volts. It is anticipated that this process will be continued for a period of up to 20 days. When all visible corrosion is removed, the artifacts will be wire brushed and placed in a

series of deionized water baths to remove soluble chlorides. When the artifacts test free of chlorides (at a level of no greater than 0.1 ppm), they will be dewatered in acetone baths and a series of phosphoric (10% w/v) and tannic (20% w/v) acid solutions will be applied. After air drying for 24 hours in a controlled environment with a relative humidity no greater than 50%, the specimens will be coated with a 10% solution (w/v) of acryloid B-72 in toluene.

The several brass items, if they exhibit active bronze disease, are being subjected to electrolytic reduction in a sodium carbonate solution with up to 4.5 volts for periods of up to 72 hours. Hand cleaning with soft brass brushes or fine-grade bronze wool will follow the electrolysis. Afterwards the surface chlorides will be removed with deionized water baths and the specimens will be dried in an acetone bath. The conserved cuprous items will be coated with a 20% (w/v) solution of acryloid B-72 in toluene.

CONCLUSIONS AND RECOMMENDATIONS

This is a unique project. It represents one of the first efforts at urban archaeological research in the City of Columbia. Just as importantly, it was conducted by the City of Columbia not because it was required, but because there is a growing interest in the preservation of the City's heritage and awareness that development does not have to mean the loss of that heritage.

The historical research conducted by Chicora Foundation revealed that William Glaze's armory and foundry began about 1850. While it changed hands on several occasions, it appears to have continued as a substantial business undertaking into the early twentieth century, closing its doors in 1927. Over its 78 year history at least 15 structures were built on the one acre foundry lot, representing a wide array of industrial shops and sheds related to forging, casting, foundry work, pattern construction, machine shop work, and wood working. The documentary evidence is clear that Glaze lived to the east of the lot, while later in time the shop foreman, L.P. Purse, lived north of the lot. At no time does it appear that any domestic dwellings occurred on the foundry lot.

The originally constructed building, contrary to much local legend, was not totally destroyed by Sherman's troops, but suffered only minor damage. The foundry was rebuilt shortly after the Civil War, apparently to the same appearance as Glaze's original design. The foundry continued, with no substantive rehabilitation or reworking until it was purchased by the City of Columbia in 1941. Sometime between 1942 and 1956 the eastern two-thirds of the main foundry building was demolished by the City, with the east elevation totally reworked and the pedimented gable on the west elevation removed. The extent of interior modifications could not be determined since it has been impossible to identify any City files dealing with the building.

A comparison of a 1942 topographic map of the lot to one created by Chicora Foundation reveals little ground disturbance during the City's ownership. There is no indication that the conversion of the property into a park necessitated any substantive grading. The gravel parking lot was apparently laid on the original topography.

The archaeological investigations, consisting of a one foot shovel or auger test every 25 feet across the tract, supported the topographic evidence. The only indications of damage to the archaeological remains present on the lot are some filling associated with a recent retaining wall along the eastern property boundary and some limited leveling for the parking lot. Even the demolition of the original structure appears to have resulted in little damage -- there is no evidence that the foundations were grubbed out or that the property was

extensively rutted. Throughout the one acre lot intact deposits range from 0.3 to 1.8 revealing no evidence of damage or fill episodes. In fact, several tests exhibited very deep deposits, perhaps reflecting features or trash deposits. At least two tests encountered what may be intact brick foundations associated with the original structure.

The shovel and auger tests also revealed evidence of intra-site patterning, including the possible existence of several additional structures, possible rear and side yard trash disposal areas, and an area possibly associated with structural burn. It is likely that additional investigations would yield further information on the nature of the foundry lot (including the location of structures and the types of activities which took place on the lot), as well as information on the nature of the industrial activities which took place in this and similar blacksmith, casting, foundry, and metal working shops.

The only standing architectural remains associated with this site represents a small portion of the original building. The structure has been modified both in size (or scale), as well as in outward features (such as the radical change of gables, the removal of associated landscape walls, the addition of a rear room on the east elevation, and the addition of utilities) affecting the appearance of the building. Interior alterations are less well documented, although it is likely that the building shell was extensively reworked in the mid-1940s. Based on the documented, and suspected, alterations to the structure, it seems unlikely that it would today be considered eligible for inclusion on the National Register of Historic Places. A definitive assessment was beyond the scope of this reconnaissance study, although such a detailed architectural assessment should be undertaken, especially if there is an interest in rehabilitation of the existing structure.

It would not be difficult, based even on this reconnaissance level study, to support the eligibility of the associated industrial archaeological remains. The archaeological remains have not suffered the damages seen in the standing building and are capable of addressing a broad range of questions relating to early industrial/technological activities, as well as addressing the industrial growth of Columbia. Consequently, it may be more appropriate to consider the significant site boundaries as representing the entire one acre lot, rather than the poorly preserved standing architectural remains.

Additional Work

Archaeological Investigations

Industrial sites, such as Palmetto Iron Works, offer tremendous research opportunities since there is much to learn about the technology of nineteenth century foundry and machine work. Such research questions, however, require extensive excavations and detailed analysis, often coupled with chemical studies. In very general terms it would not be unreasonable to expect archaeological research at a site such as Palmetto Iron Works to require a month of time and significant funds. Such a research plan may well be beyond the capability of the City of Columbia. Since it would be tragic to lose this site without any

further research, it is appropriate to briefly consider alternatives, such as monitoring and green spacing.

The first approach would have construction activities monitored by archaeologists. Monitoring allows significant archaeological features, such as unrecognized architectural remains, privies, and trash dumps, to be explored within the context of on-going construction activities. Monitoring is best undertaken during the initial phases of ground disturbance, i.e., during clearing and grubbing, grading, and subsequent excavation. It is during these operations that there exists the greatest potential for uncovering additional remains. At the Palmetto Iron Works such a program would likely involve further exploration of brick walls, collection of artifacts displaced during grading and other construction activities, sample excavations of different site areas, and mapping of other site features. Afterwards there would be analysis of the recovered collections, conservation treatments, and report production.

For monitoring to work smoothly, it is important to have the procedures and scheduling of such work clearly developed. Ideally, the monitoring team should be on-site during the initial ground moving operations and should have the authority to halt construction if significant archaeological remains are discovered, allowing additional archaeological investigations. The period of this additional investigation, of course, can vary from a few hours to several days, depending on the nature and extent of the identified remains. During this period the monitoring team should have access to equipment capable of assisting, for example, in further uncovering walls.

While less costly than full archaeological research, monitoring will have both direct costs (for the time of archaeologists, supplies, conservation, and publication), as well as indirect costs (for possible equipment downtime and delays in construction).

As an alternative, it may be appropriate to consider how portions of the site can be green spaced, or preserved in place. For example, the current investigations have demonstrated that there are several site areas which are more significant than others -- the area east of the standing structure representing the remains of the original building and the northeastern property corner representing what may be a dump area. These two site areas could be green spaced through carefully controlled capping or as green areas without any disturbance. This approach may result in a loss of useable acreage, although there would be little or no archaeological costs associated with the decision. Chicora Foundation can easily develop guidelines for green spacing which would help ensure the preservation of selected site areas.

Of course, it may be that it is impossible to fund either adequate monitoring or allow green spacing. In such a case it may be appropriate to consider funding other activities which would serve to help preserve future sites.

Signage

This study has documented that much of what is known about the foundry is incorrect, or at least misleading. At an architectural level, for example, we have seen no evidence of stone foundations (all foundations are brick) or of sun dried brick (all of the brick is hand made and fired). As previously discussed, we have also documented the appearance of the original structure and traced that structure's history down to the early 1940s. These revisions in the architectural history of the site should be reflected in new signage. Coupled with that signage should be equal attention to the entire lot as the functional industrial unit. The building existed within the context of at least 14 other structures through time, as well as extensive industrial activity. At the same time, this study documents the ability of urban archaeological techniques to address significant issues in the growth and development of Columbia.

New signage should reflect that contribution, since the archaeological remains are likely of equal or greater interest among the public as are the architectural remains. Such signage is an opportunity to acquaint citizens with the history of Columbia and the importance of early industrial activities. It would place "Arsenal Hill" in a better frame of reference and would benefit efforts at developing meaningful walking tours by groups such as Historic Columbia Foundation.

Chicora Foundation has extensive experience in the development of interpretative signage for projects such as this. There are several basic keys, or principles, for the success of interpretative signage which Chicora follows in the development of meaningful interpretative signage:

- Signage must be part of a larger whole -- it must help the visitor experience the site and understand its story. In this case the signage should relate to both the major themes identified during historical research.

- Signage must be based on a unified theme -- in this case perhaps the evolution of Columbia. It is possible to incorporate both the technology of foundry operations and the site's importance to Columbia. This is a perfect mix since it invokes both science and humanities. It offers something to everyone, and it has the potential to make visitors ask questions and want to learn more.

- Signage is best when it is closely associated with the experience -- it should deal with "real" things that the visitors see. In this case the signage should center on the structure, but also force the visitor to image the site as it was during perhaps 1860 or 1890.

- Signage should be compatible with the site -- enhancing, not distracting from, the site visit. At this site each of the panels should emphasize a major

theme, avoiding irrelevant or distracting information. This is best assured by the development of a unified theme.

- Signage should be short and concise -- avoiding the urge to "stuff" every bit of information possible on the sign face. People ignore long, complex label copy, but will be drawn into short copy accented with graphics.

Future Planning Projects

While not specifically helping to preserve the remains at 1802 Lincoln Street, there are a variety of programs which could assist the City in long-term preservation planning. It may be that such undertakings would be more cost-effective than any additional research at the Palmetto Iron Works site.

One such project would include detailed historical research, such as was conducted in this project, for other carefully selected potentially significant sites in the City. Having this information immediately available would help the City plan for both preservation ***and*** development.

Another project, best coupled with additional historical research, is the development of an archaeological preservation plan. Such a plan would highlight areas in the City of particular interest, where it is likely that significant archaeological remains are likely to exist. Such a document would allow the City to develop procedures and programs to protect Columbia's below ground historical resources.

Finally, Columbia is in danger of losing many of its historical documents. Photographic collections, in particular, are scattered among a number of repositories and receive very uneven care. It would appropriate for the City to fund a project to gather together these, and other, resources to ensure their availability in future research efforts.

The present Arsenal Hill park building could be rehabilitated to include both exhibit and storage facilities for the City's history. Serving as a research center and a visitor center, this would be a unique response. Such rehabilitation (see Trinkley 1992 for additional details) might include:

- restoring the original, ca. 1850 west facade,

- converting basement areas to office space for a curator and work areas for visiting scholars,

- converting the upper floors to storage and exhibit spaces,

- installing an HVAC capable of maintaining 40% RH,

- ensuring the thermal efficiency of the structure and the presence of an adequate vapor barrier,

- installation of historically appropriate windows with UV filtration capability, and

- installation of appropriate fire detection and fire suppression systems to safeguard the collections.

SOURCES CITED

Adams, Natalie and Michael Trinkley
1992 *Archaeological Reconnaissance and Survey of the Granby River Front Tract, Richland County, South Carolina*. Research Contribution 86. Chicora Foundation, Inc., Columbia.

Barrett, John G.
1956 *Sherman's March Through the Carolinas*. University of North Carolina Press, Chapel Hill.

Bartovics, Albert
1978 The Archaeology of Daniels Village: An Experiment in Settlement Archaeology. Ms. on file, Department of Anthropology, Brown University, Providence, Rhode Island.

Benjamin, Park, editor
1893 *Appletons' Cyclopaedia of Applied Mechanics*. 3 volumes. D. Appleton, New York.

Carroll, James Parsons
1893 *Report of the Committee Appointed to Collect Testimony in Relation to the Destruction of Columbia, South Carolina on the 17th of February, 1865*. Bryan Printing, Columbia.

Council, R. Bruce and Nicholas Honerkamp
1984 *The Urban Railyards Site: Industrial Archaeology in Chattanooga, Tennessee*. Publications in Archaeology 38. The Tennessee Valley Authority, Chattanooga.

Green, Edwin L.
1932 *A History of Richland County*. R.L. Bryan Company, Columbia.

Jeter, Paul
1987 *South Carolina Beverage Bottles, 1880-1980*. n.p., n.p.

Keister, Kim
1993 Charts of Change. *Historic Preservation* 42-49.

Lawrence, Carl B.
1978 *Soil Survey of Richland County, South Carolina*. U.S.D.A., Soil Conservation Service, Washington, D.C.

Lorrain, Dessamae
1968 An Archaeologist's Guide to Nineteenth Century American Glass. *Historical Archaeology* 2:35-44.

Lowry, M.W.
1934 *Reconnaissance Erosion Survey of the State of South Carolina*. U.S.D.A., Soil Conservation Service, Washington, D.C.

Maxey, Russell
1980 *South Carolina's Historic Columbia: Yesterday and Today in Photographs*. R.L. Bryan, Columbia.

Medlin, William F.
1981 *Richland County Landmarks*, vol. 1. Ben Franklin Press, n.p.

Mills, Robert
1972 [1826] *Statistics of South Carolina*. Hurlbut and Lloyd, Charleston, South Carolina. 1826 facsimile ed. The Reprint Company, Spartanburg, South Carolina.

Montgomery, John A.
1979 *Columbia, South Carolina: History of A City*. Windsor Publications, Woodland Hills, California.

Meyer, Jack A.
1982 *William Glaze and the Palmetto Armory*. Museum Bulletin 6. South Carolina State Museum, Columbia.

Nelson, Lee H.
1968 *Nail Chronology as an Aid to Dating Old Buildings*. Technical Leaflet 48. American Association for State and Local History, Nashville, Tennessee.

News and Courier
1884 *South Carolina in 1884*. News and Courier Press, Charleston, South Carolina.

Penn, Theodore Z.
1978 Archaeological Evidence and the Study of Historical Industry. In *Symposium, Historical Archaeology and the Human Sciences*, edited by

Dianne Newell, pp. 6-8. Occasional Publications Number 3. Society for Industrial Archaeology.

Richardson, M.T., editor
1889-1891 *Practical Blacksmithing*. 4 volumes. Weathervane Books, New York.

Robbins, D.P.
1888 *Historical and Descriptive Sketch of the Leading Manufacturing and Mercantile Enterprises, Public Buildings, Officials, Professional Men, Schools, Churches, Etc.; Railroads, Canals, River, Advantages and Surroundings of Columbia, South Carolina*. Presbyterian Publication House, Columbia.

Russell and Erwin
1980 [1865] *Illustrated Catalogue of American Hardware of the Russell and Erwin Manufacturing Company*. Francis Hart and Company,York. 1865 facsimile ed. Association for Preservation Technology, Ottawa.

Scruggs, S.M.
1936 Early Columbia: The First Foundry. Ms. on file, WPA Collection, South Caroliniana Library, University of South Carolina, Columbia.

South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.

Staski, Edward
1982 Advances in Urban Archaeology. In *Advance in Archaeological Method and Theory*, vol. 5, edited by Michael Schiffer. Academic Press, New York.

Trinkley, Michael
1989 *Archaeological Evaluation of the Proposed Riverbanks Botanical Gardens, Lexington County, South Carolina*. Research Contribution 36. Chicora Foundation, Inc., Columbia.

1992 *Preservation Concerns in Construction and Remodeling of Libraries: Planning for Preservation*. South Carolina State Library, Columbia.

Williams, J.F.
1929 *Old and New Columbia*. Epworth Orphanage Press, Columbia, South Carolina.

Zierden, Martha and Jeanne Calhoun
1984 *An Archaeological Preservation Plan for Charleston, South Carolina.* Archaeological Contributions 8. The Charleston Museum, Charleston, South Carolina.

Archaeological Investigations

Historical Research

Preservation

Education

Interpretation

Heritage Marketing

Museum Support Programs

Chicora Foundation, Inc.
PO Box 8664 ▪ 861 Arbutus Drive
Columbia, SC 29202-8664
Tel: 803-787-6910
Fax: 803-787-6910
www.chicora.org