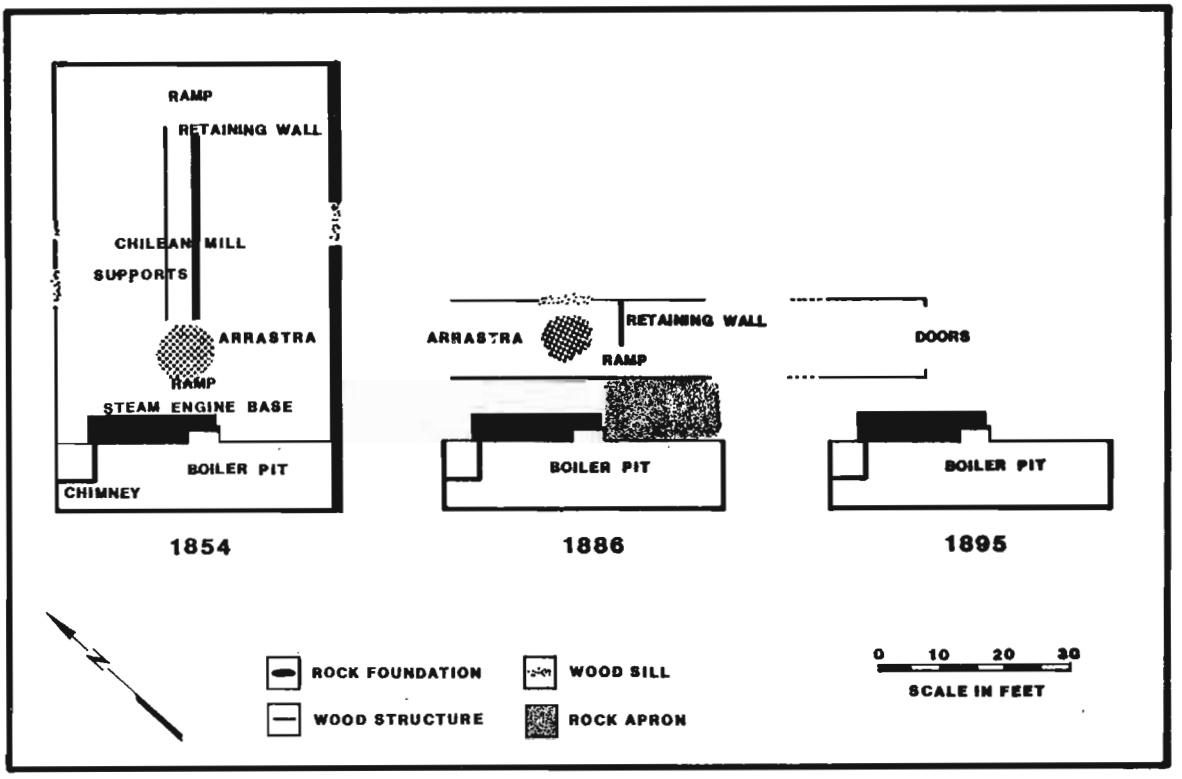
ADDITIONAL ARCHAEOLOGICAL INVESTIGATIONS AT THE ENGINE MILL HOUSE, REED GOLD MINE



CHICORA FOUNDATION RESEARCH SERIES 12

ADDITIONAL ARCHAEOLOGICAL INVESTIGATIONS AT THE ENGINE MILL HOUSE, REED GOLD MINE STATE HISTORIC SITE, CABARRUS COUNTY, NORTH CAROLINA, 31CA18**1

RESEARCH SERIES 12

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Tis there
The instictive theorizing whence a fact
Looks to the eye as the eye likes the look.

--Robert Browning

ABSTRACT

Archaeological investigations of the Reed Gold Mine Upper Hill engine mill house (31CA18**1), begun in 1985, were continued in December 1987. This site was used intermittently from the mid-nineteenth century through the early twentieth century to process gold ore taken from the underground workings of the Reed Mine. These additional investigations were designed to continue the investigation of the archaeological features at the site and to assist in the eventual public interpretation of the site. Features attributed to the workings of both Chilean mills and an arrastra were investigated. In addition, this work revealed a complex network of drainage ditches and a possible sluice for the recovery of lost amalgam. This study indicates that further archaeological and intensive historical research at the engine mill house is warranted.

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ACKNOWLEDGEMENTS

This work was funded by a grant from Philip Morris through the Gold History Corporation, with additional funding support from the Historic Sites Section, Division of Archives and History, Department of Cultural Resources. Project coordination and supervision was handled by Dr. Jack Wilson, Jr. of Historic Sites. The research goals for the project were developed by Ms. Terry Maureen Harper of Historic Sites. I wish to express my considerable appreciation for their support and assistance.

Mr. John Dysart, Site Manager of the Reed Gold Mine State Historic Site extended us every possible courtesy during this study. In addition, I wish to thank his entire staff for their support and enthusiasm for our work. Special thanks are due the Gold History Corporation for their continued interest in and support of the archaeological research at the Reed Mine. They realize that the mine's contribution to the history of North Carolina must be understood and interpreted from both historical and archaeological perspectives.

The field work was conducted by Mr. Bill Jurgelski and Mr. Bob Noel. I appreciate their work and interest in this project, as well as their support. Finally, I appreciate the time, advice, and encourage of those colleagues who have assisted with this project and the 1985 excavations.

INTRODUCTION

This brief study reports on excavations conducted at the Reed Gold Mine's engine mill house (31CA18**1) in December 1987 (Figure 1). This work was funded by a grant from Philip Morris through the Gold History Corporation and through additional support from Historic Sites Section, Division of Archives and History. A total of 393.7 person hours of archaeological investigations were conducted by a crew of three (plus a volunteer) and an additional 81.3 person hours were devoted to initial laboratory processing of the collections (washing, cataloging, and flotation of soil samples).

The Reed Gold Mine engine mill house has been the subject of sporadic archaeological investigations since the site was acquired by the state in 1971. These investigations, which were conducted in 1973 (Babits 1974;n.p.), 1974 (Babits 1974:n.p), 1979 (Sacchi 1980), 1981 (no report), and 1985 (Trinkley 1986), are more fully discussed in Trinkley (1986). No thorough synthesis of the archaeological investigations conducted at the Reed Gold Mine has appeared and several of the archaeological projects on the property have never been written up.

The scope of work for this project was devised by Ms. Terry Harper at Historic Sites and essentially was a continuation of the previous 1985 goals of "preservation, stabilization, restoration, and reconstruction" (Trinkley 1986:5; see South 1977:23-24). Specifically, the archaeological investigations were (1) to partially excavate the two rock rubble features identified during the 1985 investigations and to complete the excavations in a square where a Chilean mill has previously prevented excavations, (2) to excavate and expose the foundation wall along the east side of the structure, and to excavate and expose a short section of the wall along the north side of the structure, and (3) to excavate several features identified in the later structures during the 1985 study. As we began the project, a decision was also made to excavate the boiler pit inset, which had never been investigated. The excavation of the rock rubble features would assist in determining whether they were bases for equipment or perhaps a torn up arrastra (Trinkley 1986:35-36, 42). Excavation under the chilean mill, which had been moved prior to these investigations, would complete the excavations in this section of the structure and would help to determine the function of the rock platform previously discovered (see Trinkley 1986:39-40). The 1985 work has plotted the location of the east wall (Trinkley 1986:34), although no excavations were conducted in that area. This work was designed simply to allow access to this wall for interpretative work. The excavation of features

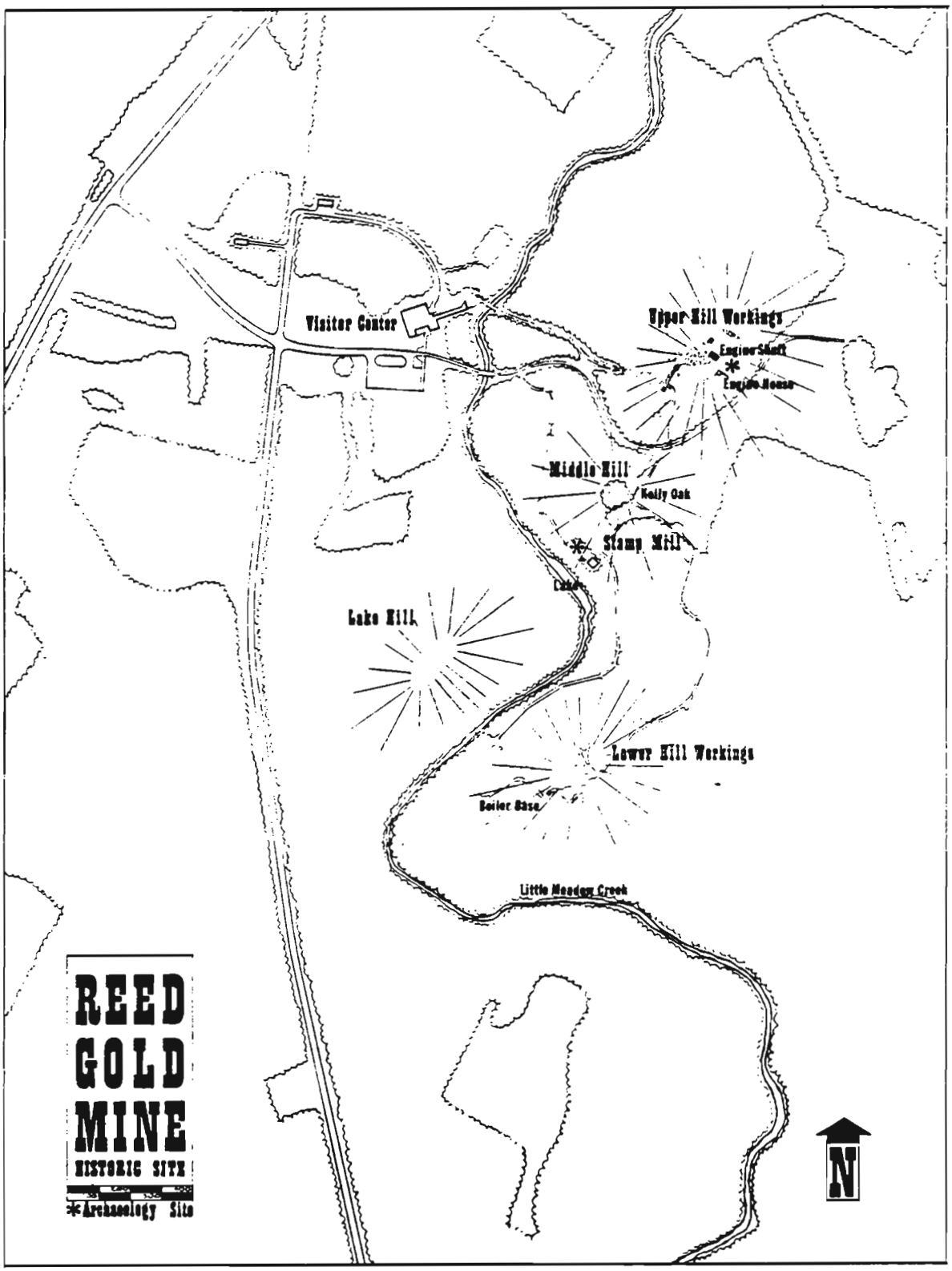

Figure 1. The Reed Gold Mine State Historic Site, Cabarrus County, North Carolina.

identified in the 1886 structure as "black humic loam" (Trinkley 1986:26) was undertaken to determine their function and relationship to the structure. Little attention was directed to these features during the 1985 work because they appeared to represent erosional scars or other relatively insignificant cultural remains.

In addition to these goals, it was decided to further explore the potential for a penetrometer to distinguish areas of heavy equipment operation through soil compaction (see Trinkley 1986:83). The 1987 work also collected large numbers of soil samples from different temporal and spatial areas of the structure in order to examine the mercury and gold concentrations in the slurry and slime soils. Considerable attention was directed to the plotting of soil types within the 1854 structure.

These studies were designed to answer long standing questions concerning the processing of gold ore in the engine mill house (see Trinkley 1986:2-3, 82-83). Although the historical sources have provided much information on the equipment contained in the 1854 structure (see Trinkley 1986:12-21), these sources have provided almost no information on how the equipment was organized or how ore flowed through the structure. These archaeological investigations, then, were designed to not only supplement the historical sources, but also to provide information that could not be obtained solely through historical investigations. The operation of the stamps and chilean mills was thought to have compacted the soil. The penetrometer, it was hoped, would reveal this compaction and allow a more definite placement of the equipment in the structure. It was also thought that quantitative analysis of the mercury and gold levels in the slime and slurry soils would assist in determining the care and success of the gold milling process through time. Plotting of the different soils (primarily red clay tailings representative of waste rock, quartz sand slurry representative of initial quartz ore processing, and clay slime deposits representative of chilean mill operation) was expected to assist in determining equipment placement in the structure.

These investigations completed the excavation of approximately 80% of the engine mill house (the boiler pit has been previously excavated, although largely unreported). It should be emphasized, however, that only 8% of the structure has been excavated to sterile. As a result, many questions concerning this site can, at best, be only imperfectly answered.

Additional information on the environmental setting of the site, as well as the site's archaeological and historical background, is available in the report of the 1985 investigations (Trinkley 1986). This report is intended only to provide a brief. technical summary of the investigations undertaken in 1987, as well as current information on aspects of the site useful for

interpretative work.

EXCAVATIONS

The 1987 excavations continued to use the grid established during the 1985 project (Trinkley 1986:24, 28). All previously set points were still in place and many of the unit nails (left in 1985) were recoverable. The site grid (aligned N43E) consists of 10 foot units which are very closely oriented to the 1854 structure. This grid served as horizontal control during the study, with units designated by their southeast corner. Vertical control was maintained through the use of an assumed elevation datum established in 1985 on the north side of the boiler pit chimney (Figure 2). All soil from the excavations was hand screened through 1/4-inch mesh. Units were troweled at the completion of excavation, photographed in both b/w and color slides, and plotted. Features were bisected, with 5-gallon soil samples, flotation samples, and waterscreening samples routinely collected. The feature fill was subjected to dry screening through 1/4-inch mesh, waterscreening through 1/16-inch mesh, and water flotation with recovery using No. 100 mesh. Features were separately photographed, plotted, and profiled during their removal.

Stratigraphic designations during the 1987 work followed the system devised in 1985 (Trinkley 1986:28-31). Zone 1 represents the relatively recent overlying humic clay, occasionally mixed with backfill from previous archaeological investigations. This zone may contain material from all episodes of activity at the mine, although late nineteenth and twentieth century materials dominate. Zone 2 represents the tailings and slurry found outside the 1854 structure. This zone represents the waste and by-products which accumulated at the site from the mid-nineteenth through twentieth centuries. Zone 4 represents tailings, slurry, and slime deposits found within the 1854 structure. These remains may date from about 1854 through the 1880s.

Fieldnotes were prepared on the forms provided by Historic Sites. Photographic materials were processed to archival standards by Chicora. All original fieldnotes and photographic materials are curated by Historic Sites as Accession Number 100, although Chicora has maintained copies of the fieldnotes and some photographs. All specimens were evaluated for conservation needs and a quantity of ferrous and cuprous metals, leather, and wood specimens were recommended as requiring immediate conservation treatment. This treatment, under the terms of this project, will be provided by Historic Sites. Artifact processing, including washing and cataloging, was conducted in the field, with all specimens turned over to Historic Sites.

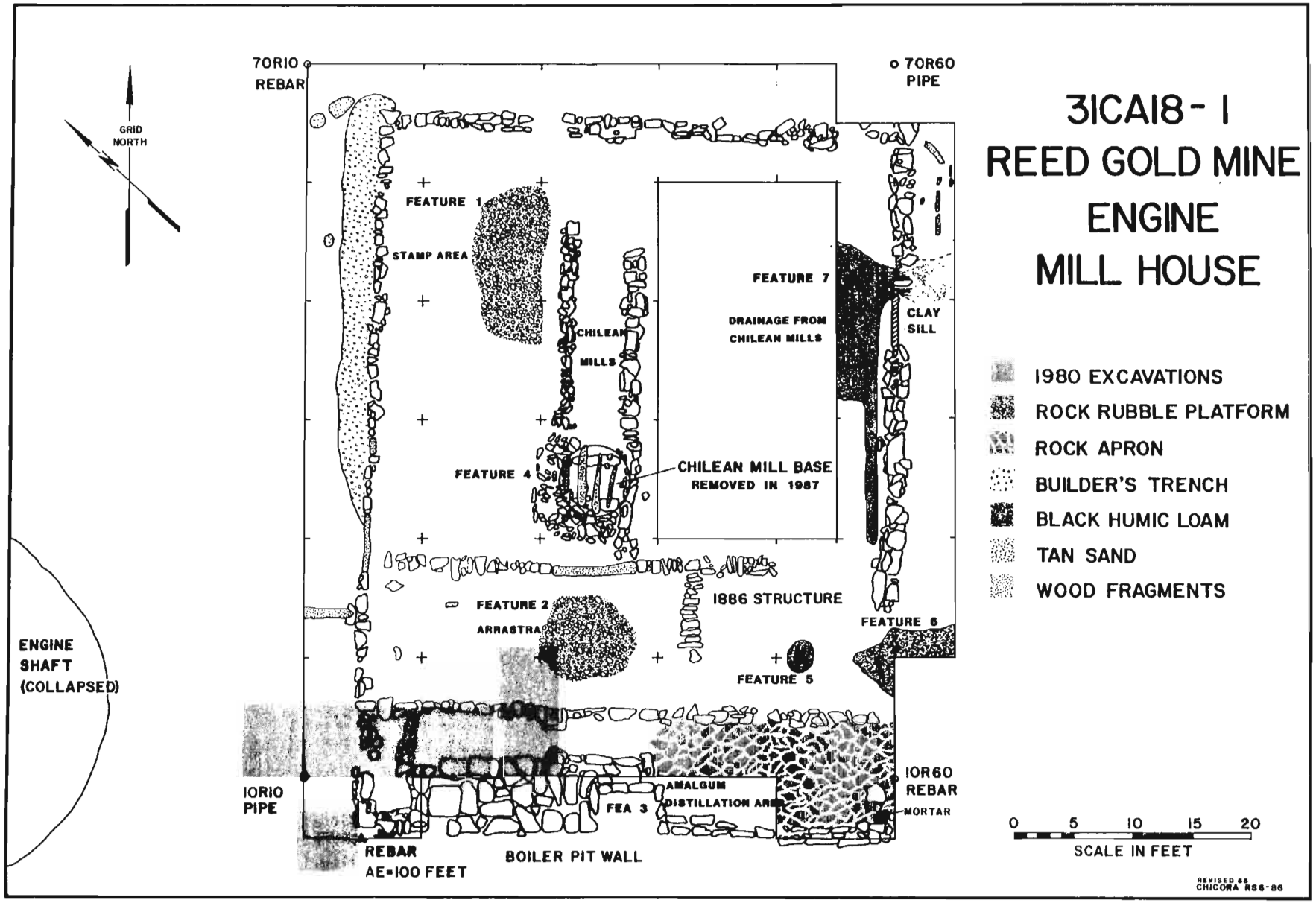

Figure 2. Plan view of the 1985 and 1987 engine mill house excavations.

Figure 3. East foundation wall of the 1854 structure.

Figure 4. West profile of the 30-50R60 trench, revealing extensive slime and slurry lenses, looking west.

The excavations opened five 5x10 foot units and two 5 foot squares along the east wall of the 1854 structure (30-50R60, 20-50R65), completely exposing the rock wall foundation (Figures 2 and 3). This foundation wall, generally two stones in thickness and up to four stone courses in height, is in good condition. Throughout its length this foundation is built on humic clay which appears to represent the site's original humic A horizon. No previous mining activities are evidenced by the soil underlying this 1854 foundation. A doorway was encountered in the wall from 46R60 northward to 53R60. For the southern two-thirds of this doorway there was a clay sill, perhaps previously supporting a wood timber although no evidence of wood was encountered. The northern portion of this sill had been eroded or intentionally cut away by a drainage system (discussed as Feature 7 below). On either side of the doorway, on the structure's exterior, were wood stains. These may be part of the drainage system, although they were not investigated during this work.

Squares 30-50R60, on the structure's interior, were excavated to sterile red clay subsoil. These excavations revealed extensive slime and slurry deposits typical of chilean mill operation (Harold Nash, personal communication 1987; see Figure 4). At the base of these units is a north-south linear trench feature (Feature 7) which parallels the foundation from about 28R58 to 41R58 where it enters a large "pool" of slime and slurry deposits. This "pool" is found to the N54 line, extends westward into the profile, and appears to break through the clay door sill to extend into the R65 line where it is somewhat contained by the two wooden projections on either side of the doorway. These interior units clearly reveal that extensive milling had been conducted to the west, with the resulting slime and slurry running down to the east and out the structure.

During the excavation of the units on the exterior of the east wall, several additional wooden stains with nails were encountered, similar to those found in 1985 (see Trinkley 1986:36). This continues to support the idea that the 1854 structure was not maintained after the 1855 failure of the Reed Gold and Copper Mining Company.

Square 60R55, opened to expose the last remaining section of the north wall, was a 5x10 foot unit. The interior Zone 4 deposits were excavated to sterile subsoil, while the exterior Zone 2 deposits were excavated only to the point that the foundation was clearly visible. With the north wall completely exposed it became apparent that a previous trench, attributed to Babits' 1974 work, had been excavated through the wall at R57, completely removing a section of the wall. It appears that this northern wall has not been as extensively robbed as previously thought (see Trinkley 1986:34).

Previous excavations in 30R40 had been hampered by the presence of a large chilean mill base (Trinkley 1986:39). Prior to our studies in 1987, this mill base had been removed to allow continued investigation of this square and the unusual "flat rock platform" identified in 1985. The removal of the mill base revealed a large quantity of wood, which appeared to be oriented north-south as distinct beams or logs. Unfortunately, this wood had been exposed since the mill's removal, about six months earlier. The initial cleaning of Zone 4 in this unit, to better reveal the wood, revealed a series of wood supports for the chilean mill and further work was conducted with this support system designated as Feature 4. The unit (and feature) fill was composed almost entirely lenses of slime and quartz sand slurry deposited by the operation of the mill. This excavation revealed that the Chilean mill, contrary to earlier findings, was in situ.

Feature 1, an extensive rock pile found in units 40-50R30 at the base of the 1985 Zone 4 excavations, was previously interpreted as a possible Chilean mill base. The feature measured 14 by 6 feet. It was thought that the rocks might allow drainage of the slime and slurry and provide a better support for the heavy mill than the unconsolidated clay soils (Trinkley 1986:36). This feature was bisected east-west along the N53 line and the north half was excavated. Underlying the rocks is a thin (ca. 0.1 foot) band of humic clay, which in turn overlies 1854 slurry deposits. Around and in the rocks are found both red clay tailings and slurry deposits, both thought to represent post-1854 deposits. The feature appears to represent a waste rock pile lying on the abandoned floor of the 1854 structure, with post-1854 tailings and slurry deposits built up over the pile. Mining operations after the abandonment of the 1854 building apparently deposited the waste rock in this area and additional mining operations simply covered over the pile.

The excavation of a 3.5 by 5 foot unit at the base of the rock pile, into the underlying 1854 slurry and tailings, revealed a rectangular stain designated Feature 1a. This stain, which measured 3.0 by 0.8 foot, was centered at 55.5R28.4 and originated just above sterile subsoil (AE 97.20 feet). Upon excavation, this pit was found to contain a wood beam (AE 97.02 feet), measuring about 2.5 by 0.7 foot with its long dimension oriented north-south. Although a positive function is not possible without additional excavations, it is probable that this beam represents a support for a stamp. Placed in the subsoil, the beam would have provided some cushioning for the stamps' operation, would have ensured that it was raised above the earthen floor, and would have spread the equipment's weight more evenly, ensuring a more secure position. This interpretation is supported by the penetrometer studies (discussed below), although additional excavations, to sterile subsoil, are needed in the northwest corner of the 1854 structure. The use of large timbers to support, elevate, and level the stamps was continued into the

twentieth century as evidenced by a 1934 photograph of a stamp in operation at Bost's mill (N.C. Department of Cultural Resources Negative N71.10.13).

Feature 2, situated in units 10-20R40 at the base of the 1985 excavations, was originally interpreted as a Chilean mill support. The feature was thought to be a rock pile, similar to Feature 1, sunk into a hole in order to provide better drainage (Trinkley 1986:42). The feature appeared to be associated with the 1886 structure. Upon excavation it was determined that these interpretations were entirely incorrect.

The feature was bisected north-south along the R35 line and the western half was removed. The feature contained rock rubble fill, originating at AE 98.47 feet and continuing to a depth of 1.49 feet. Mixed with the rock were small quantities of red clay tailings and sandy slurry. In several areas at the base of the feature were found lenses of white slime and slurry. The rocks appear to be carefully worked, most having flattened surfaces and adhering clay slime. The feature is roughly circular (in several areas indistinct edges blur the regularity of the outline) and about 8 feet in diameter.

The feature's size, shape, and fill all tend to suggest that it represents an arrastra which has been dismantled to collect fugitive amalgam. The floor of the feature is into sterile red subsoil, so it is possible that this is the location of the 1854 arrastra built by Posselt. Its location with respect to the door of the 1886 structure, however, suggests that it may have been used by later mining operations and its current condition may reflect a relatively recent dismantling.

While not identified with this feature, the 1987 archaeological studies did recover two fragments of arrastra drag stones. Both were prepared from white quartz and one contained two iron hooks for the attachment of the drag chains. These hooks were sunk into drilled holes which had been filled with a lead base solder. The other stone evidenced two drill holes, but both hooks were missing. The stones, found in units 30R50 and 50R60, were roughly worked on their upper surfaces, but finely polished on the drag surface, which was beveled (see Knapp 1973:159). It is likely that these specimens represent two different stones, each at least 2 feet in length and a foot in thickness. Not enough of the stone remains to determine their width.

Several accounts provide general descriptions of arrastra (e.g., Egleston 1887-1890; Leeds 1854), although no description of the arrastra built by Posselt is provided in the historical accounts. The technical literature of the period suggests that a well built arrastra contains carefully dressed stones, fitted together with cement (Egleston 1887-1890:I:271). Such an arrastra

would last up to year before it would be dismantled to collect the fugitive amalgam and rebuilt. It has been assumed that Posselt, given his technical expertise, would have constructed such a well-built arrastra. The current example, however, does not evidence any cement and the stones, while clearly prepared, cannot be considered "carefully dressed." While perhaps this feature represents a post-1854 arrastra, no evidence of cement or such stones has been found elsewhere on the site. The archaeological evidence suggests that the arrastra built by Posselt did not represent extraordinary effort. In fact, Young notes that a significant feature of an arrastra was that it "could be cheaply erected almost anywhere by anybody" (Young 1970:70). This secondary source, primarily relating to mining activities in the west, has been extensively relied on to document construction using upright rocks as a base and large rocks as side walls (e.g., Knapp 1973:Figure 18; Knapp 1975:15). These views, however, may represent arrastra typical of other regions or characteristic of only the best construction. Leeds, for example, notes that an arrastra may be constructed with a stone bed and "a circular frame-work of staves, forming a large and shallow tub" (Leeds 1854:362). The archaeological evidence suggests flat rocks, not upright rocks, laid as a pavement. It may be that rocks suitable for an upright construction technique could not be found at the Reed mine. Egleston notes that "the difficulty of getting the stone for the pavement, and of properly constructing it [the arrastra], has caused the invention of an iron arrastra" (Egleston 1887-1890:II:394).

Feature 2 appears to represent an excellent example of the "real-verses-ideal" comparison discussed by Council and Honerkamp (1984; see also Trinkley 1986:5). The "ideal" arrastra, clearly detailed in several historical records, appears to be very different from the "real" arrastra, as observed in the archaeological record at the Reed Gold Mine.

Figure 3 designates the boiler pit insert at units 0R40-50. Although this feature might strictly be considered part of the boiler pit, it was not investigated during earlier archaeological studies. During the 1985 work it was, absent any excavation, suggested to represent an access area for engine parts (Trinkley 1986:14). This insert, which measured about 2.5 feet in length (east-west) and 2.2 feet in depth (north-south), contained fill sloping down toward the boiler pit. The feature was bisected north-south with the western half removed first. The fill was found to be rubble, typical of that previously removed from the boiler pit. Artifacts included a number of large metal fragments. The eastern half, upon excavation, revealed a quantity of charcoal in the inset's northeast corner, along with several small fragments of cloth (possibly preserved by the densely packed charcoal).

The inset is lined on the east and west with 13 inch English

common bond brick walls, while the north wall of the inset consists of the cemented over boiler pit stone wall. This cement goes to the edge of the brick liner on the east and west. The base of the inset consists of an earthen floor and a portion of the stone wall, both of which have also evidence a cement coating. The floor is found at an elevation of AE 95.82 feet and the bricks (although the courses are in poor condition) continue to a level of AE 97.61 feet (representing seven courses). The top course of brick on the eastern wall is capped by a large boiler pit stone, clearly indicating that the brick liner and inset was built at the same time as the boiler pit itself.

The bricks are hand made and measure 7-1/2 by 3-7/8 by 2-5/8 inches. The mortar is a very soft mixture of lime and sand which readily crumbles. This brickwork, in all respects, is identical to that found in the boiler pit.

This feature appears to represent a hearth and partial chimney flue, based on its size, construction technique, burnt side walls, and the presence of a large mass of charcoal pushed against the east wall. It seems unlikely that such a small fireplace could add any appreciable heat to the building. The historical documents, however, indicate that a distillation process was used on the amalgam to separate the mercury and gold, although the location of this process is not discussed. It seems reasonable that the separation would be done at the same location as the amalgamation process. This feature is thought to represent the fire box, fed from the boiler pit, for the distillation process.

Feature 4, previously mentioned in the discussion of the excavations at 30R40, has been interpreted as a Chilean mill support. The feature, found immediately under the Chilean mill, consisted of four, equally spaced wood supports oriented north-south. These wood supports were badly decayed and had suffered additional damage being exposed to the weather for several months. Upon careful examination they appeared to represent logs in the round, with limb knots, not prepared beams. These wood supports were laid on rock sills extending east-west between the two central foundation walls in the 1854 structure. The fill was exclusively a series of sand slurries and clay slimes resulting from the operation of Chilean mills.

The stratigraphy of Feature 4 strongly suggests that while the removed Chilean mill was in situ, it represents a post-1854 operation, set up on logs to mill rock coming from the Engine shaft. This may represent the 1886 work by Dr. J.P. McCombs and Captain Gad (Trinkley 1986:21). In any event, it pre-dates 1920 when the mill is shown in its previous position in a photograph (N.C. Department of Cultural Resources Negative N73.5.394). A photograph of a 1934 Chilean mill at Roger's prospect in Union County, North Carolina reveals that the stones were set up on

wooden supports, off the ground, and also that the timber supports for the drive mechanism may be set on the ground rather than set into the ground (N.C. Department of Cultural Resources Negative N71.10.15). As a consequence, such a mill would leave little archaeological evidence.

This feature, in conjunction with the plotting of soil types during the 1987 excavations, may help to explain the function of the two parallel stone foundations in the center of the 1854 structure. The distance between these walls (5 feet) and their length (40 feet) suggests that the 1854 chilean mills may have been placed in a row between these walls on wood beams. The distance between the walls is the width of the mill bases, and three bases would fit on the wall with several feet between each one. Excavations in the R60 line clearly revealed that there are large quantities of slime and slurry originating toward the west. This is in sharp contrast to the site area west of these parallel foundations where very few slime or slurry deposits were encountered. In addition, it seems likely that the Feature 7 drainage system (discussed below) served to drain the three 1854 chilean mills.

Feature 5 was centered at 20.1R51.8 and was encountered at the base of Zone 2a during the 1985 excavations. The feature, which measured 2.7 feet in diameter, was bisected along the N20 line and the north half was removed first. Complete excavation of the feature revealed a shallow (0.5 foot in depth) basin shaped pit. The feature fill was entirely black loam with only small quantities of charcoal and a small quantity of rocks, none of which offered any evidence of burning. The only artifacts recovered include a single cut nail fragment and several unidentifiable nail fragments. The function of this feature is unknown, although the pit appears to be a low area which was filled with rock rubble and humic soils.

Feature 6 is similarly enigmatic. The feature, identified in 1985 at the base of Zone 2a, was found in units 10-20R60, 20R65, and going east under the R60 and R65 profiles (see Figure 2). The current excavations did not completely expose this feature, so its complete size and shape are not currently known. The feature was bisected along the N20 line and the north half was removed, revealing a shallow depression (about 0.1 to 0.3 foot in depth) with two north-south troughs or trenches up to 0.9 foot in depth spaced 5.5 feet apart. The feature fill consists of black loam with artifacts exhibiting a long temporal span. While the troughs cannot, at present, be explained, this feature appears to represent organic erosional fill.

The last feature investigated during this study, designated Feature 7, was a north-south linear trench and associated "pool" of slime and slurry adjacent to the east wall of the 1854 structure found in units 30-50R60 (Figure 2). Evidence of this

feature was found in the lower levels of the Zone 4 slurry deposits, indicating that the feature was constructed after some mining activity had taken place in the 1854 structure. Excavation, however, was not attempted until sterile soil was identified at the base of Zone 4. The trench feature found in square 30R60 was removed, providing a feature profile at the N40 line, and the section of the "pool" in square 50R60 was also removed, providing feature profiles at the N50 and R60 lines.

The southern portion of the trench, in 30R60, revealed two episodes of excavation (Figure 5). The first excavation produced a trench 1.2 foot in width and 0.6 foot in depth with steep sides and a rounded bottom. The fill was red clay slime with very few artifacts. The second excavation episode produced a trench 0.7 foot in width and 0.4 foot in depth with an orange clay slime fill. This second trench, based on its profile, appears to have been dug with a shovel to clean out and re-establish the original trench. Both trenches appear to have channeled slime and water along the foundation edge to about N42 where a large "pool" of slime water formed. The southern point of origin for this ditch could not be determined because of the extensive damage to the 1854 structure caused by the construction of the 1886 mill house.

The "pool" portion of Feature 7 extends from N43 northward to about N55, westward under the R55 profile, and eastward through a breach in the clay sill of the doorway in the eastern wall of the 1854 structure. The portion of this "pool" excavated in 50R60 revealed a complex arrangement, with the north-south feeder ditch emptying into a larger, main drainage running east-west (Figure 6). The fill was entirely clay and quartz sand slimes and slurry with very few artifacts. Evidence was found in this area for the original and re-dug feeder ditch. At the base of the main ditch there was a wood plank, about 1.0 foot in width and 1 inch in thickness with a square cut-out in the center. This plank, which continues under the R55 profile to the west and the R60 profile to the east, out of the structure, was found in association with heavily corroded sheet metal and wire screening. The smaller feeder ditch likewise yielded evidence of both wood planking and wire screening, although much less well preserved.

This feature appears to represent an intricate drainage system inside the 1854 structure, constructed to carry off the waste water from the Chilean mills. The north-south running feeder ditch was apparently placed to prevent erosion to the structure's eastern foundation wall by channeling the water to a main ditch area. This main ditch, lined with a wood and metal arrangement, continued to channel the waste water outside the structure with the slime and slurry puddling adjacent to the doorway. It may be that the wood and screening served as a sluice to assist in the collection of lost amalgam from the Chilean mills. Feature 7, combined with the abundance of slime and slurry deposits found in the eastern third of the 1854

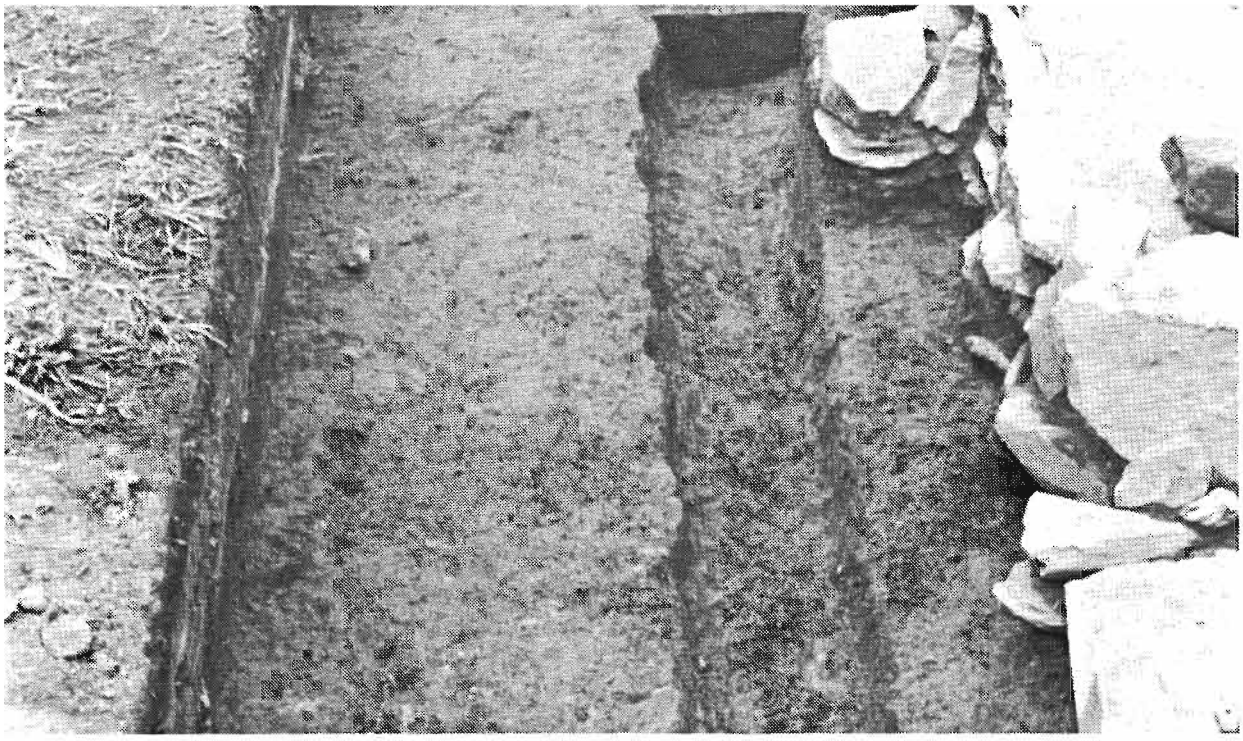

Figure 5. Feature 7 feeder dith in 30R40, excavated. View is to the north.

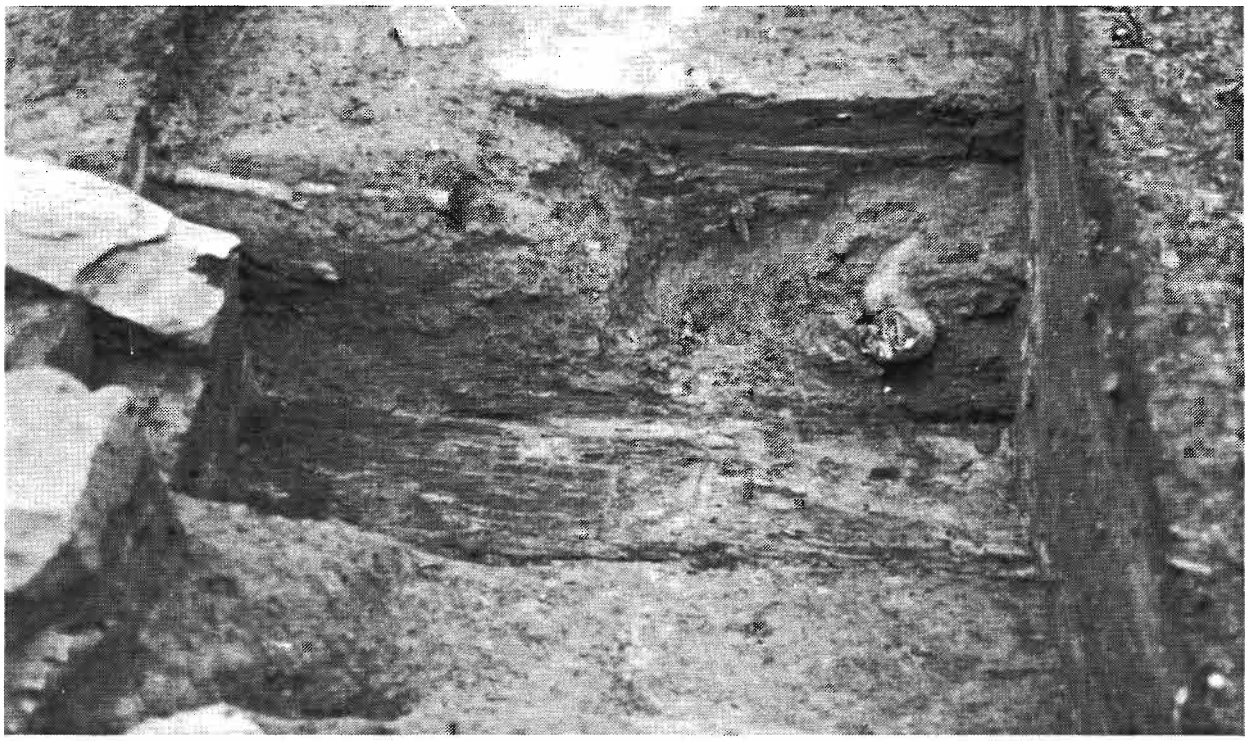

Figure 6. Feature 7 "pool" area in 50R60 excavated. Note the wood plank at the base of the feature. View is to the south.

structure, provides additional evidence for the placement of the Chilean mills on the double foundation walls running through the center of the structure. This ditch system may not only have served as a drain for the waste water and slimes, but may also have been designed to assist in the gold collection process. This feature represents a very important industrial aspect of the engine mill house site which has been only partially investigated.

ARTIFACT ANALYSIS

As previously discussed, the initial processing and cataloging of the collections was conducted in the field laboratory with the specimens curated by Historic Sites as Accession Number 100. All necessary conservation treatments will be conducted by Historic Sites in Raleigh. Since the cataloging process is clearly distinct from analysis, it is not possible, at present, to extensively discuss the findings from the 1987 excavations. It appears, however, that the 1987 specimens do not appreciably change any of the interpretations offered as a result of the earlier investigations (Trinkley 1986). This section is intended to present a preliminary summary of the collections.

The 1985 and 1987 collections, excluding materials recovered from feature excavations, are shown in Table 1, which is organized by artifact class (South 1977). Table 2 presents the materials recovered from features during the recent excavations.

Although this information is largely self-explanatory, several aspects should be emphasized. In the Kitchen Group all of the glass fragments, at this stage of analysis, have been categorized as "indeterminate bottle or container fragments." In actuality, there are a small number of medicine bottles, but a number of the fragments actually represent large chemical bottles, probably used in assaying. As such, these specimens would best be included in the Activities Group rather than the Kitchen Group. The Kitchen Group percentage, as a result, is overestimated.

In the Architectural Group, cut nails dominate the collection, closely followed by unidentifiable nail fragments, which is a new category. During the 1985 analysis it was possible to identify nail fragments with a degree of certainty not possible in the current study based on cataloging alone. In addition, it appears that the ferrous specimens from the R60-65 units are much more corroded than those found elsewhere in the site, perhaps because of their association with the constantly wet slime and slurry deposits. The very limited numbers of wire nails and window glass reflect the previous findings (Trinkley 1986:73). Wire nails are largely limited to the post-1854 structures, with the few found in the vicinity of the original engine mill house probably reflective of repair during the early 1880s period. Window glass continues to be very rare in the 1854 structure, clearly indicating that the structure did not have glass panes, but probably shutters.

The absence of Furniture Group specimens, especially glass

	1985	1987	Total	
Kitchen				
Ceramics	153	19	172	
Wine Bottles	18		18	
Canning Jars/Lids	7		7	
Patent Med. Bottles	95		95	
Pharm. Bottles	6		6	
Indet. Bottle Glass	213	125	338	
Metal Cans	37	5	42	
	529	149	678	11.52%
Architectural				
Window Glass	179	20	199	
Wrought Nails	8		8	
"Modern" Cut Nails	2004	408	2412	
Wire Nails	1332	21	1353	
UID Nails		300	300	
Spikes	8		8	
Staples	11		11	
Wood Screws	65	4	69	
	3607	749	4356	74.00%
Furniture				
Lamp Glass	120		120	
	120	0	120	2.04%
Arms				
Cartridges	12	1	13	
Shotgun Shells	6		6	
Percussion Caps	1		1	
	19	1	20	0.34%
Clothing				
Shoe Fragments	27	1	28	
Buttons	3	3	6	
Fasteners	2	1	3	
Thimble		1	1	
Scissor Blade		1	1	
	32	7	39	0.66%
Personal				
Slate Pencil	1		1	
Perfume Bottle	1		1	
	2	0	2	0.03%
Tobacco				
Pipe	1		1	
Snuff Can	1		1	
Tobacco Tamper	1		1	
	3	0	3	0.05%
Activities				
Tools	12	1	13	
Farm Implements	1		1	
Toys	1		1	
Storage Items	79	40	119	
Stable and Barn Items	15	2	17	
Misc. Hardware	213	18	231	
Plumbing Hardware	17	3	20	
Machinery Hardware	54	19	79	
Ore Reduction Hardware	46	5	51	
Other	130	11	141	
	568	99	667	11.33%
Totals	4882	1005	5887	

Table 1. Artifacts recovered from the 1985 and 1987 excavations at 31CA18**1, excluding features.

	F.1	F.2	F.3	F.4	F.5	F.6	F.7
Kitchen							
Ceramics						2	
Architecture							
Window Glass			1				
Wire Nails	1	3	2			1	
Cut Nails	55	11	6	3	1	6	1
UID Nails		11			2	1	
Spikes							1
Screws	8						
Arms							
Shotgun Shell						1	
Clothing							
Buttons	1					1	
Activities							
Storage Items		2	1				
Misc. Hardware	5		4	1			1
Plumbing			10	2			
Ore Reduction		1					3

Table 2. Artifacts recovered from feature excavations in 1987.

lamp chimneys, supports the previous conclusion that these lamps are a late phenomenon, associated with the 1886 structure (Trinkley 1986:73). The relative abundance of clothing items along the eastern edge of the 1854 structure may suggest that this area, with access to the outside, may have been an area for lounging. This is supported to some degree by the recovery of a thimble and a scissor blade fragment, both items most often associated with some degree of domestic activity. The failure to identify additional Personal or Tobacco items continues to suggest a bleak lifestyle among the Reed miners and laborers. A more clear view of miner lifestyle and status, however, can be obtained only through excavation of the cabin area where domestic activity should occur.

Several observations are pertinent in the Activities Group. First, belt hooks, common in the 1985 excavations, were absent adjacent to the eastern wall. While the amount of excavation undertaken this season might have affected the recovery of these items, their absence may also relate to the location of the belt mechanism more to the west in the 1854 structure. Storage items, primarily strap metal, are very common along the eastern edge of the building, perhaps because this area provide the major access to the 1854 structure (with the western doorway being used to transport ore into the structure). Ore reduction hardware is also uncommon in the eastern portion of the structure, suggesting that the stamps were located elsewhere.

CONCLUSIONS

Pre-1854 Activity

There is ample historical evidence that John Reed began underground or "hard rock" mining on Upper Hill by 1831 (Knapp 1973:42-43). The ore, however, was transported to Lower Hill, where an arrastra had been erected to amalgamate the gold (Knapp 1973:52). As a consequence, the Upper Hill archaeological record is expected to be sparse for this early period. In fact, the most convincing evidence of this work remains the tailings found in 1985 underlying a segment of the 1854 foundation. Most of this foundation, however, appears constructed on the 1854 humic A soil horizon and the evidence of previous mining in very limited. In those areas where old humic soil could be identified there were very few in situ artifacts, clearly indicating that while mining may have taken place on Upper Hill during the early nineteenth century, no structures were present, no domestic activity took place, and the industrial activity was very limited. It seems likely that the bulk of the 20 males employed at the mine in 1850 (Knapp 1973:59) were working below ground, transporting the ore to the arrastra on Lower Hill, and operating the arrastra.

The 1854 Structure

The Reed Mine achieved its fame from the 1853-1854 activity by the Reed Gold and Copper Mining Company and the technological leadership of Dr. Louis Posselt. The archaeological investigations have emphasized the construction and operation of the Upper Hill engine mill house and boiler, although considerable activity took place over the entire tract.

The conversion of a small, family mine into a large industrial activity probably required the clearing of Upper Hill and surrounding areas. The cut oak and pine provided the timbers for the engine mill house and fuel for the boiler. There was apparently no use of coal during this early period. The structure was laid out with its long dimension roughly oriented northeast-southwest, parallel to the Upper Hill ridge line (Figure 7). The entire structure was laid out to measure about 44 by 70 feet, with the boiler pit measuring 11 feet in width and the engine mill house about 59 feet. The foundation was not laid below grade, except in a few areas where the natural ground level required a shallow builder's trench. The stones for the foundation were native to the area, probably coming from the mining activities at one or more of the opened shafts. This foundation, of minimally dressed blocks, evidences a dry laid

coursed random rubble construction. The uphill (west) wall is just under a foot in thickness, while the down-slope (east) wall is about two courses in thickness because of its greater height. The boiler pit was built below grade, with the wall between the pit and the engine mill house widened to support the horizontal shaft steam engine. The chimney and the boiler pit walls were laid in mortar.

Three doorways, two on the west wall facing engine shaft and one on the east wall, have been documented (Figure 7). The two doors on the west wall are documented by gaps in the foundation (one about 2 feet in length and the other about 5 feet) and the remains of a wood sill laid directly on the ground. The larger door probably permitted the passage of ore from the shaft into the structure, while the other may have served as a pedestrian passageway. The third doorway, on the east side of the 1854 structure, is evidenced by a 5 foot gap in the foundation wall and the presence of a raised clay sill. No wood is present at this doorway, although there has been considerable disturbance caused by the waste water from ore milling.

The superstructure was constructed of pine timbers and siding. The archaeological evidence supports the use of 1x6 inch siding, although it is not possible to determine if it was applied horizontally as either lapped or clapboard, or perhaps vertically as either board-on-board or board-and-batten. The ca. 1880 Kelly map, which shows an inset drawing of the structure, suggests that some type of vertical board cladding was used. Although window openings were apparently present, again based on the Kelly map, the archaeological evidence strongly suggests that they were shuttered openings, not glassed. The only archaeological evidence of roofing consists of the quantity of small nails (primarily 4d), which were probably used to attach wooden shingles. The Kelly map, viewing the engine mill building from its gable end, provides no information, although the adjacent structures appear to be roofed with board shingles, a common nineteenth century technique.

Unfortunately, little can be said concerning the presence of a structure over the boiler pit since no thorough analysis of the archaeological collections from that area have ever been conducted. The extension of the structure over the boiler pit seems likely and a fugitive roof stain has been previously noted on the chimney stone. A thorough interpretative study of the boiler pit archaeology is also necessary (1) to determine the function of the various features identified in the pit, (2) to determine the function of the piping visible in the pit, (3) to determine whether the pit was actually stone lined on its eastern end, (4) to determine how access was obtained, if it was completely lined, and (5) to determine the placement of equipment in the pit.

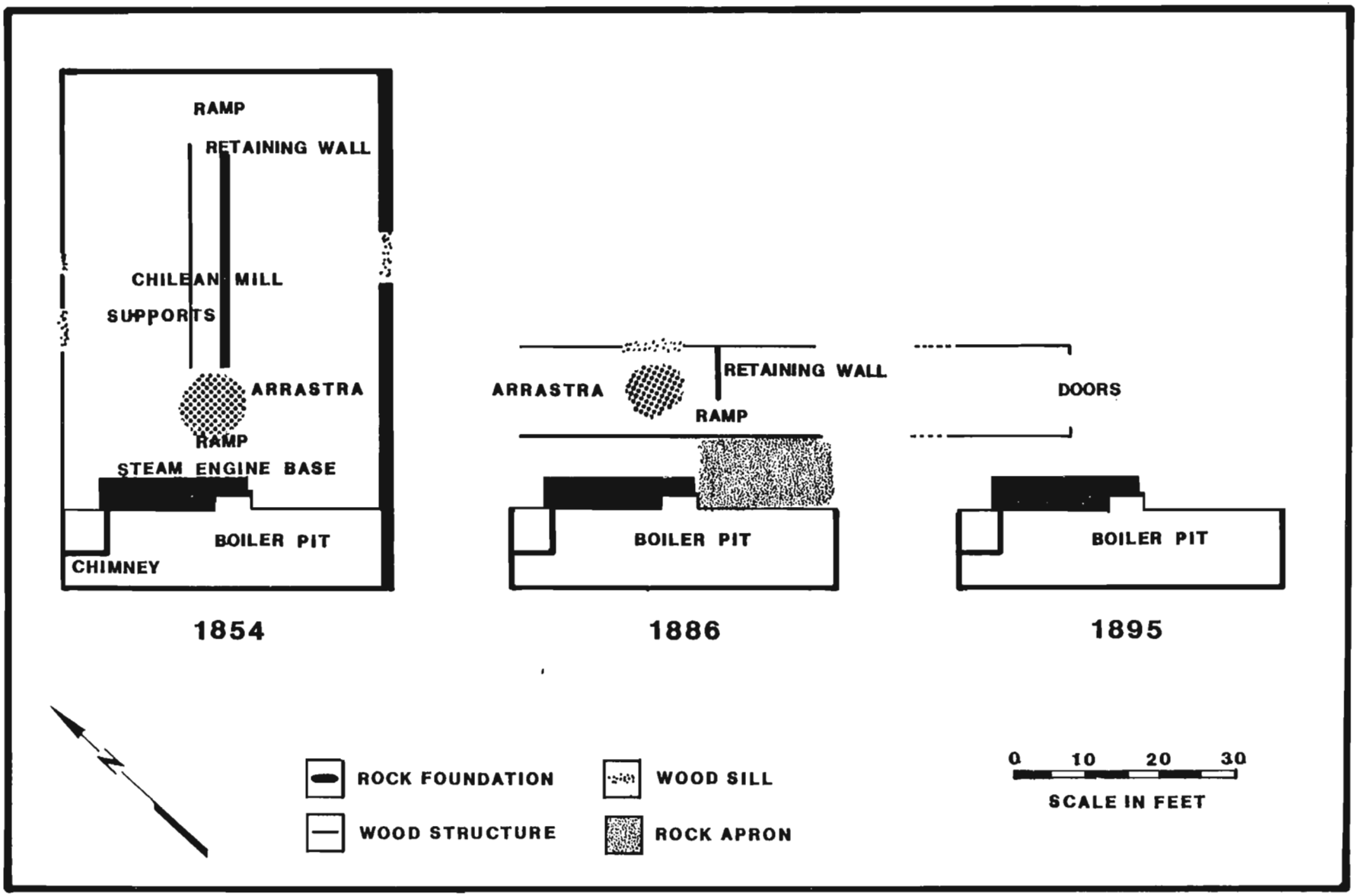

Figure 7. The engine mill house through time.

Running down the center of the engine mill house was a coursed random rubble wall about 40 feet in length (Figure 7). This wall allowed each half of the 44 foot wide structure, which was built on a slope, to be leveled for machinery. At each end of the retaining wall were 10 feet wide ramps which allowed access from one level to the other. Parallel to this wall, and about six feet to the west, was another, less well constructed, wall.

The historical data reveal that the engine mill house contained a 50-horsepower steam engine, four sets of stamps, three Chilean mills, at least two shaker tables, and an arrastra. The steam engine was mounted on the northern boiler pit wall (see Trinkley 1986:14) and the remaining architectural evidence indicates that a horizontal shaft engine was employed. The location of the stamps is not so easily determined, although both the engineering and architectural evidence points to them being situated in the western third of the building. Since the stamps would likely have been the first milling activity, they were probably located in close proximity to the doorway to the engine shaft. The location of the Chilean mills, however, is more clearly known. The current archaeological studies suggest that the mills were placed on wood supports between the two central stone walls, with a drainage system constructed to channel the waste water and slurry out of the structure. This drainage system may also have been designed to assist in the recovery of lost amalgam. The single arrastra was apparently located just south of the three chilean mills. All of these mills could have been belt operated off a drive shaft running through the center of the structure. Such an arrangement is feasible and a quantity of belt hooks have been recovered in the archaeological record. Since the shaker tables were largely used to sort the dry quartz sands coming from the stamps, it seems likely that they would be situated between the stamps and the mills, possibly in the northwest corner of the structure where the largest quantity of quartz sand has been found archaeologically.

Recent archaeological excavations also suggest that the gold and mercury amalgam was separated in the engine mill house, at a fire box just south of the steam engine. That this activity took place where the gold was collected is more reasonable than that the amalgam was transported to elsewhere on the property (cf. Knapp 1973:100).

The last concern involves the length of time that Posselt's engine mill house was standing and being used.The initial engine mill house, built in 1854, is illustrated on the Kelly map, which Knapp (1973:211) attributes to the early 1880s. It has been assumed, therefore, that the engine mill house was still standing during the 1881 activity of Mr. Nesbit (Trinkley 1986:21). While this may be, it seems more reasonable to assign the Kelly map to the period immediately after the Civil War, perhaps from the time

of Stevens' report of the mine in the American Journal of Mining (Stevens 1866). It seems more likely that the major structures would be standing and still usable after 12 years then that they would have survived almost 30 years (only to be replaced a few years later). After 1868 the mine was apparently inactive until 1881. It was during this period that the original engine mill house was finally abandoned. The sporadic activity reported in 1881, 1886, and 1887 (Trinkley 1986:21) probably occurred in a new engine mill building.

The 1886 Structure

As discussed above, there was intermittent work on Upper Hill during the 1880s: in 1881 the 1854 steam engine was repaired and presumably operated using Posselt's boiler, and in 1886 a Chilean mill was being used to process ore. It was during this period that the second archaeologically documented engine mill house was built on Upper Hill. Lacking any more definitive historical evidence, it has been suggested that this structure was built in 1886 (Trinkley 1986:79). It actually may have been built as early as 1881, at the same time that Nesbit was rebuilding the steam engine (Trinkley 1986:21).

The structure, regardless of its exact date of construction, was smaller and probably less well constructed that its predecessor. The archaeological evidence, however, suggests that it was used not only as a shelter for the steam engine, but also to house some limited ore processing. This 1880s structure was not the building shown in a number of twentieth century photographs.

The structure was constructed from 5 to 10 feet north of the boiler pit and measured 42 feet in length by 12 feet in width (Figure 7). It rested on poorly constructed dry laid rock rubble foundations to the north and south, but lacked stone foundations to the east and west, at the short ends of the structure. The foundation rock is well prepared greenstone, apparently robbed from the 1854 foundations, although no effort was made to fit the stones into orderly courses. The absence of stone foundations at either end of the building suggests the ends served as doorways. There is a wooden sill laid on the ground along the north side of the structure, indicative of another opening.

The construction of the 1880s structure required the complete removal of a portion of the 1854 engine mill house's eastern wall. In addition, several feet of the central retaining wall for the original structure was removed for the northern wall. Another retaining wall, about 5 feet east of the first, was constructed so that the 1880s structure was also at two levels, with a 5 foot wide natural slope "ramp" connecting the two levels.

Inside this 1800s structure, at its upper level, were the remains of the 1854 arrastra. Whether it was being used is not known, although it was probably torn up to search for lost gold sometime in the 1880s, based on the presence of wire nails and roofing nails. The doorway, which is in line with both this arrastra and the 1854 Chilean mill supports, suggests that the structure contained the necessary gearing to operate at least one Chilean mill, situated outside the structure. In fact, an 1886 newspaper account indicated that a "Chilean mill is being made ready so as to get at results as soon as possible" (North Carolina Herald, January 7, 1886, p. 3). Outside the structure, between its south wall and the boiler pit, a roughly laid rock apron was constructed, measuring about 10 by 20 feet. The purpose of this feature is not known, although it may have served as a storage area.

Less information is available on the construction of this second structure, although the quantity and sizes of nails suggests that it was wood frame. There is an abundance of window glass, and analysis of the glass thickness supports a construction date in the first half of the 1880s (Trinkley 1986:48-49). The reduced quantity of small wire nails suggests that the roof was no longer wood, but may have been galvanized iron. A small quantity of wire roofing nails are present and may date from this early period.

The 1895 Structure

By 1894-1895 the Reed Gold Mine was again active under the "forward looking" management of Dr. Justin D. Lisle. That a third structure was built is clear from both the archaeological evidence and the photographic record; that it was built during this period is only suggested by historical documents, which show increased activity at the site, and interviews with individuals familiar with the site at the turn of the century.

Although Lisle's activity lasted only until 1898, he constructed a 10-stamp mill at the foot of Middle Hill, removing ore processing from Upper Hill for the first time since 1854. It is probable that this new Upper Hill structure housed only a hoist and a steam tractor engine, the boiler pit no longer being used. Ore from the Engine Shaft may have been moved to Middle Hill by a tram system, although little evidence of this was discovered during archaeological investigations.

The presence of a hole in the north face of the boiler pit chimney has been interpreted as a flue for a blacksmith forge thought possibly to be present at the site in this late period. It seems more likely that this flue was present from the original 1854 building episode. Little archaeological evidence has been identified to support the contention that any smithing activities were taking place on the site.

In a sense, the 1898 structure is the best documented building of the three, as it is shown standing in at least two early twentieth century photographs (Trinkley 1986:Figures 6 and 7). The structure measured 12 feet in width, but was only 27 feet in length. It had an attached, but offset, 10 foot square whim house. The photographs show a frame building covered with horizontal wood siding (probably of a simple drop type), and double doors (which moved on an overhead rail) on its east end and north face. A narrow door was on the south side of the whim house. The roof was metal.

This structure was built using the westernmost 15 feet of the 1880s stone foundations. The remainder of the structure's length may have been supported by log piers or the sill may have rested directly on the ground. Only half of this structure has been examined archaeologically and there is considerable mixing of the 1880s and 1895 remains. Further investigations might be carried out westward toward the Engine shaft, although the shaft has become enlarged through slumpage, probably destroying large portions of the whim house.

Evaluation of Research Goals

The research goals proposed by Ms. Harper (complete exposure of the 1854 foundation walls on the north and east sides, complete excavation of the Chilean mill base, and excavation of the various features previously identified) were all accomplished. In addition, this project also excavated several units within the 1854 structure to sterile subsoil, revealed an intricate drainage (and possible recovery) system within the 1854 structure, completed the boiler pit inset excavation, conducted a preliminary study of soil compaction, and collected a number of soil samples for analysis of gold and mercury levels.

This archaeological study provides an essential supplement to the historical and technological record of mining activity at the Reed Gold Mine. The archaeological excavations have provided essential information about the site not available through historic accounts (such as the three construction periods and the specific details of internal structure arrangement). The archaeological details revealed by this study (in combination with the 1985 excavations) provide the information necessary for thorough, accurate site stabilization and interpretation. In addition, these studies provide the most detailed examination of nineteenth century mining activities currently available for the southeast.

The soil compaction tests revealed unconsolidated soil strengths ranging from 1.25 tons/square foot to 4.5 tons/square foot in the 1854 structure. No clear pattern could be distinguished at the site, probably because so few areas have been excavated to the 1854 floor level or to subsoil. In

addition, recent archaeological evidence suggests that the equipment may have been loaded onto wood timbers sunk into the floor. This practice would have reduced the area over which the load was spread, concentrating the weight on a relatively small area of soil.

If funding is allocated for the analysis of the soil samples, it will be possible to make some preliminary observations regarding the efficiency of the milling operations at the Reed Gold Mine, comparing the 1854 operations under the direction of Posselt with "industry averages" and also comparing the 1854 operations to those taking place later in the nineteenth century.

Future Research

If further research is undertaken at the engine mill house site it should emphasize (1) the completion of the archaeological analysis of the boiler pit collections and the production of a thorough report detailing the operation of the boiler, (2) additional technological research by archaeologists and engineers to detail the operation of the mill house and the boiler pit, (3) excavation of all previously opened areas to sterile, and (4) excavation of the remaining 20% of the site area (units 30-50R50-55).

Of particular concern at the engine mill house is that in spite of Knapp's (1973) excellent preliminary work, there are still extensive technological and engineering questions. A collaborative effort between archaeologists and engineers may be able to answer many of the questions concerning site arrangement, gearing, the type of steam boiler used, and the arrangement of the boiler pit. It seems reasonable that this work, in fact, take place prior to any further efforts to interpret the site for the public.

Areas of particular research opportunities outside the engine mill house site include John Reed's home site and the miners' cabins. While John Reed is the "father" of the Reed Mine, little is known of his family or their lifestyle. Archaeological investigations are an ideal mechanism to learn more about this individual and his family. In addition, these studies would provide invaluable information about the lifestyle of Piedmont North Carolina's yeoman farmers in the nineteenth century. Likewise, very little is known of the miners who worked at the Reed. Archaeological investigations of the 1854 and post-1854 cabin areas could provide significant information to integrate with the limited historical accounts (see Glass 1985).

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