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# Archaeological Research at the 1778-79 Winter Cantonment of the Continental Artillery, Pluckemin, New Jersey

by John L. Seidel

## INTRODUCTION

The precise location and significance of General Henry Knox's 1778-79 winter encampment has long been obscured by a preoccupation of historians with the better known winter quarters at Valley Forge and Morristown. It was not until the early 1970s, when Clifford Sekel began to pull together the mass of documentary evidence associated with the site, that something of the location, size, and significance of the encampment became known. Sekel's (1972) work sparked interest in the archaeological potential of the site and provided an excellent basis from which to start archaeological investigations.

Although the site is in a portion of Somerset County, New Jersey, which is predominantly rural, the area is already experiencing increasing development and the consequent loss of historical and archaeological resources. Both to the south and immediately up the slope to the east of the site construction of housing developments has begun. Due to the shallow and fragile nature of the archaeological remains and the adverse effects which increased erosion and human traffic will have on the site, an assessment of its archaeological significance was undertaken in 1979.

The 1979 survey and assessment suggested that the site could fill a significant gap in the archaeological and historical knowledge of the period, so preparations were made for a major research effort. The wide variety of activities which took place on the site, combined with its manageable size, make it an attractive focus for an intensive study of a Revolutionary War cantonment. This paper summarizes the history of the site and reports on the progress which has been made in archaeological research since 1979.

## THE HISTORICAL FRAMEWORK

With the onset of winter in late 1778, Washington was once again faced with the necessity of maintaining the field through the winter, while bottling up the British in New York. In December of 1778, eight brigades of the Continental Army took up positions around the Middlebrook area of New Jersey, near present day Bound Brook and Somerville. Brigadier General Henry Knox and the Park of Artillery were ordered by Washington to winter just outside Pluckemin, about 11.2 kilometers northwest of Middlebrook (Figure 1).

The crossroads village of Pluckemin was located on a direct road to the Commissary

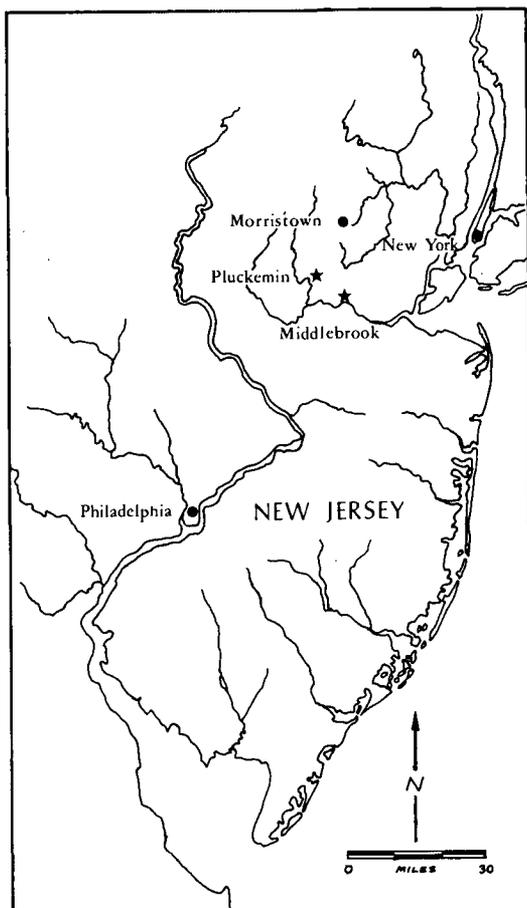


Figure 1. The New Jersey Cantonments, 1778-79.

Department in Morristown, some 23 kilometers away. Maps and spy reports rated the local roads as good, and this was important to the movement of eighteenth century artillery. The Pluckemin position was relatively safe from enemy attack, being located to the rear of the main position at Middlebrook. At the same time, the site chosen for the artillery cantonment was well defended naturally. Situated at the foot of the Second Watchung Mountain, the artillery was elevated above the surrounding area by about 40 meters. To the east and rear of the site, the mountain rose sharply to an elevation of 90 to 100 meters above the camp.

The Pluckemin cantonment was initially intended to house the Military Stores Department, the Park of Artillery, and the Continental Artillery Brigade staff (some 300 men of all ranks and units). These units arrived on December 7, 1778, and their numbers were increased later in the month by the arrival of additional artillery units from the Middlebrook area. Units present at Pluckemin during the winter included 22 companies of the 1st, 2nd, and 3rd Regiments of Continental Artillery, two companies of

Artillery Artificers, and one company of Continental Armourers (Sekel 1972). Enlistments were down in all of these units and effective strength was even lower, so the total number of men present at the cantonment probably numbered just over 1000.

Construction of barracks was begun in early December, and by the beginning of February most of these buildings were completed (Sekel 1972). In addition to the barracks, historical sources indicate the presence of separate quarters for officers, a guard house, an armorer's shop, a forge, a laboratory for reconstitution of powder and ammunition, storage facilities for the Military Stores Department, and an "Academy Building," where classes were held for training officers in the technical and practical aspects of their profession. The presence of ancillary facilities which are not directly mentioned, such as bake ovens, a wagon park, a bullock and horse corral, and another magazine are also suspected.

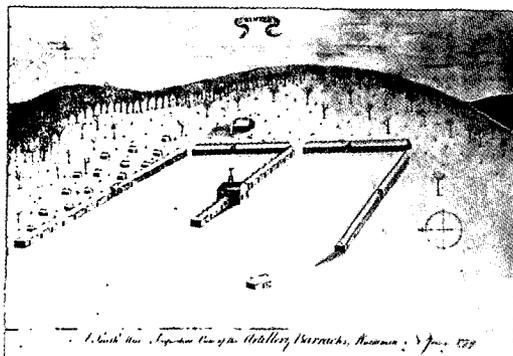
A civilian guest of an "elegant entertainment" given at Pluckemin to celebrate the anniversary of the French Alliance left the following description of the cantonment in the Pennsylvania Packet of March 6, 1779:

The huts of this corps [the artillery] are situated on a rising ground, at a small distance from the road and unfold themselves in a very pretty manner as you approach. A range of field pieces, mortars, and heavy cannon, make the front line of a parallelogram; the other sides are composed of huts for the officers and privates; there is also an academy where lectures are read on tactics and gunnery, and work huts for those employed in the laboratory, all very judiciously arranged. This military village is superiour, in some respects, to most of those I had seen. Its regularity, its appearance, and the ground on which it stands, throws over it a look of enchantment....

A second major clue to the layout of the cantonment was discovered late in the 1979 field work, when a private collector came forward with a drawing entitled "A South-West Perspective View of the Artillery Barracks, Pluckemin, N. Jersey. 1779" (Figure 2). The drawing depicts the same parallelogram described in the Pennsylvania Packet, excluding the front line of artillery. The drawing, done by Captain John Lillie of the 12th Company of the 3rd Continental Artillery, closely corresponds with surface features mapped during the 1979 field work.

In the remainder of this text, each of the major buildings in the Lillie drawing is given a name according to its known function or its location within the site (see Figure

2). The line of buildings with the Academy in the center will be referred to as the "Academy Line". The line paralleling it to the north will be referred to as the "North Line" and the line to the south the "South Line". The rear line of the parallelogram (the east side) is composed of two long buildings, the northernmost of which will be called the "Northeast Line" and the southernmost the "Southeast Line".



**Figure 2. A South-West Perspective View of the Artillery Barracks, Pluckemin N. Jersey, 1779 by Captain John Lillie.**

Some tentative correlations may be made between structures depicted in the Lillie drawing and facilities mentioned in historical sources. The safest correlation is to equate the Academy building with the cupola-topped structure in the drawing. Documents also refer to a "long Room" attached to the Academy, where Brigade business took place and which apparently housed the Officer of the Day and the Adjutant (Sekel 1972:40, 41, 75). This room may have been attached to the west side of the Academy, since rooms to the east were probably barracks.

In January the artillerists had begun work on a "New Line of Barracks" (Brigade Orderly Book: 2 January 1779) to be erected for seven of the companies which had arrived from Middlebrook. These barracks, occupied by Lamb's 2nd Regiment on the 3rd of February, 1779 (Sekel 1972), evidently consisted of seven rooms, with one company allotted to each room:

Capt Baumans Company to take the Room on the Right Capt Lees on the Left. Capt Doughty on the Right next Baumans, Capt Moodies on the Left next to Lees. Capt Motts and Late Mansfields on the Right of Center, & Late Lockwoods on the Left of Center... (Regimental Orders, Feb. 3, 1779; quoted in Sekel 1972).

It is reasonable to assume that all of the barracks would have had chimneys, so the only structure fitting this description in the Lillie drawing is the eastern extension of the Academy Line (seven chimneys and seven doors). The first group of barracks completed housed 15 companies. If the same practice of allotting one company to a room was followed,

the first barrack may correspond to the North Line, which has 15 doors. Various clues point to the Northeast Line, a building with 14 rooms, as quarters for officers. The resulting pattern is thus very similar to the manner in which artillery was arranged in tent camps, forming a parallelogram with enlisted men on the sides, guns to the front, and officers to the rear (Muller 1780: Plate XXVIII; Smith 1779: Plate II).

Following common practice, it is likely that the cabin in the foreground of the drawing is a guardhouse, and the two lieutenant colonels present at camp may have been quartered in the cabin up the slope to the rear of the Northeast Line. The prevailing northwesterly winds of the winter suggest that the forge would have been situated in the southeast portion of the cantonment. This would have lessened the chance of accidental fires spreading from the forge. The laboratory, where powder was reconstituted and ammunition repaired and manufactured, would have been removed from the forge and the chance of stray sparks and fire. Additional work areas would have existed for the artificers.

Historical sources yield very few clues as to the details of building construction. Roofs were shingled (Sekel 1972), but it is not known whether the rest of the structures were built with logs or boards. The standard practice on other sites, described by Thacher (1862), was to construct houses of logs without the use of nails. Chimneys were

probably constructed of stone, at least up to the eave line.

The artillerists' stay at Pluckemin was relatively short. In early June 1779, the artillery left Pluckemin to follow the army north for the coming campaign. Upon their departure, the sick were moved into the artillery installation from public buildings and barns in the Middlebrook area (Fitzpatrick 1931-44). Records indicate that the Pluckemin buildings were utilized as a general hospital by the army into June of 1780, but whether it continued in use beyond that time is unknown.

### THE 1979 SURVEY

In 1979 an initial survey of the site was undertaken, designed to gather some of the background data necessary for formulation of a comprehensive archaeological research design. It included research into past land-use, the impact of human and natural aspects of the environment on the present remains, a botanical survey, and mapping of visible surface features.

The most important result of the 1979 work was the preparation of a site plan, which is shown in a much simplified form in Figure 3. The parallels to the Lillie drawing are apparent. The most striking similarity is the mapping of a structure with 13 chimney mounds, which corresponds to the Northeast Line, and a long structure in line with it to the south, corresponding to the Southeast Line. Although a portion of the North Line may be represented

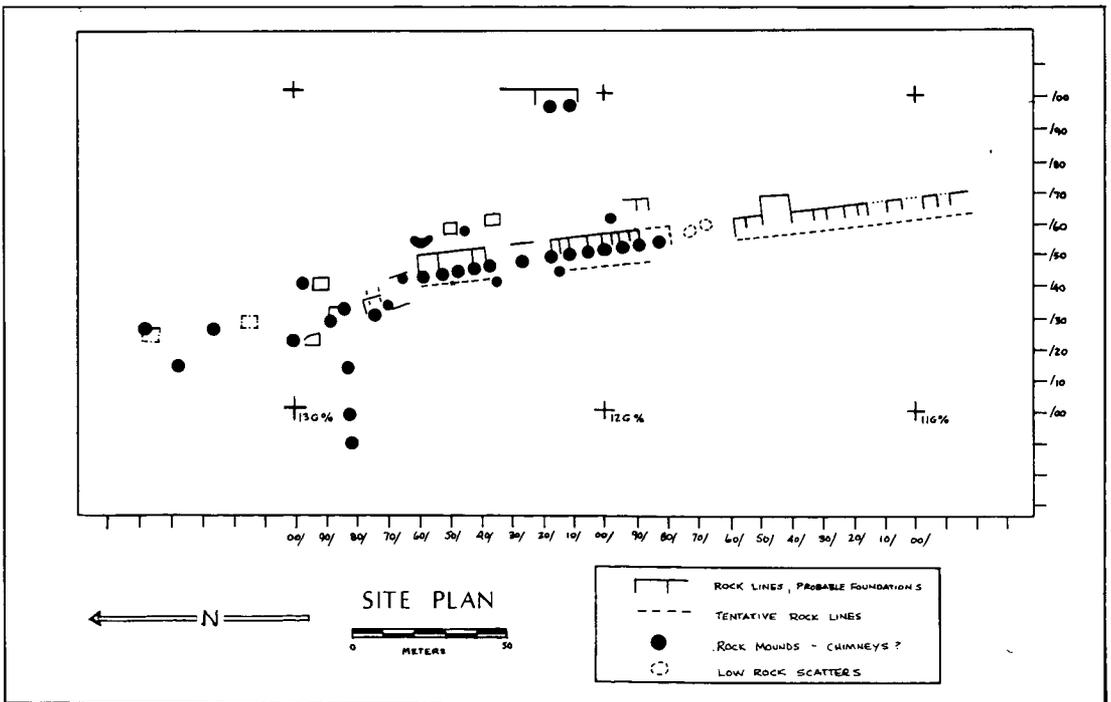


Figure 3. Site plan from 1979 survey.

by features mapped on the site plan, no visible features of the Academy and South Lines remain due to cultivation in this western portion of the site.

## RESEARCH STRATEGY

The results of the survey and background studies were used in 1980 to develop a comprehensive research strategy for the site. An open-ended series of research questions was compiled, and an appropriate methodological approach was formulated. Both are flexible, in that they are intended to take into account new data and an increased understanding of the site as research progresses.

The research strategy has aimed at answering questions on a number of levels. The first and most immediate goal is to locate the various buildings of the cantonment. For a variety of reasons, research on similar sites has focused primarily upon the location of huts within brigade lines and the identification of details of internal architectural construction. However, the emphasis upon recovery of architectural information has resulted in insufficient and inadequately reported data relevant to larger research problems (Poirier 1976).

Moving beyond this kind of focus requires a search for areas other than barracks, such as orderly huts, work areas, quarters for families and camp followers, and other components not usually examined. Once these various areas have been located, portions of each may be carefully examined so that patterning within and between features and artifacts may be investigated. It should then be possible to address a wider range of specific questions and gaps in knowledge, along with more general questions.

A variety of specific questions have been posed for examination at Pluckemin. A partial list might include an investigation of the differing conditions and quarters for various military segments of the cantonment, such as enlisted men, non-commissioned officers, subalterns and captains, and field officers. Evidence relating to non-military portions of the cantonment's population may also be studied, such as the "civil list" (commissaries, conductors, clerks, etc.), women and children, servants and slaves, and temporary inhabitants such as wagon drivers. Notions on equipment and hardware used by American artillerymen are based on military treatises and similar documents. These conceptions may bear little resemblance to actual usage, and this is true of other aspects of military history. The industrial segment of the site opens up another sphere of investigation, as relatively little is known of American efforts during the Revolution (Mulholland 1981: 118-142). The cantonment was apparently intended as an important industrial and resupply center, so evidence of the capabilities of the Pluckemin artificers, the types of materials repaired and manufactured,

and sources for materials may prove informative. This, in turn, raises questions about logistics and supply. Poirier (1976) made an initial attempt to extract this kind of data from an archaeological context, but the study of logistics during the American Revolution has generally been neglected by historians and archaeologists alike.

On a different level, research should provide evidence of social aspects of the cantonment, such as possible socioeconomic distinctions between officers and enlisted men. If, as seems likely, rooms within barracks may be identified archaeologically and correlated with specific companies, these areas may be scrutinized for regional differences in remains (the various regiments and companies at Pluckemin tended to be recruited from specific areas). This may be linked to the study of logistics, as the states which raised various regiments were responsible for their supply. The Virginia Regiment, for example, was the best supplied unit at Pluckemin (Prince 1958). It was also the best disciplined (Sekel 1972), suggesting a correlation between supply and various types of behavior.

Research should allow intersite as well as intrasite comparisons. By looking at the regularities and variabilities between sites such as Pluckemin, Valley Forge, Morristown, and New Windsor, we may begin to see what parts of the system were unchangeable cultural constants, and what parts of the system may have been changed or adapted in response to variables such as supply and weather. These variables may be expected to have influenced the archaeological record in much the same manner as differences in access to markets, availability of resources, and economic factors affect the patterning seen in domestic sites.

The above is not to be taken as a complete assay of research problems at Pluckemin, but it does provide insight into the directions which research may take. The kinds of questions raised place certain requirements on field methods. Of obvious importance is a tight control over the spatial distribution of remains, particularly lateral distributions. This is of added importance due to the lack of deep stratigraphy. Another requirement is a sampling of all areas of the site and a detailed examination of large segments of each area.

In general, the objective has been to utilize nondestructive techniques first, and then to move to excavation. Thus the fieldwork has been undertaken in four overlapping stages: survey and remote sensing; surface collection; exploratory excavation; and more intensive excavation to expose fairly wide areas.

## SURFACE COLLECTION

The shallow nature of many Revolutionary War sites means that surface studies can be

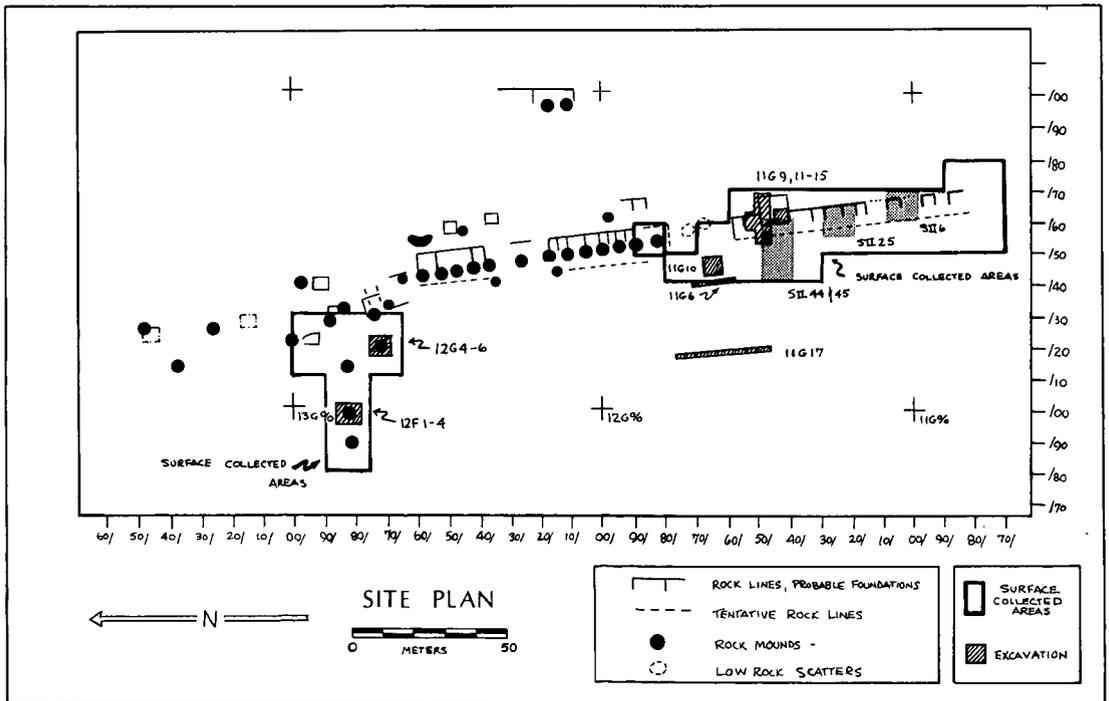
particularly informative. The shallowness of the Pluckemin site is due to a variety of factors, primarily the short duration of occupation, coupled with the effects of erosion in keeping organic debris swept off the slope. In some areas this has meant a loss of remains to erosion and movement of artifacts downhill, but in many cases this movement has been minimal. Thus, the results of the initial survey could be combined with documentary evidence to gain a basic understanding of the cantonment's layout. The large numbers of artifacts apparent on the surface of the site might yield additional clues to building locations and functional areas. Indeed, the amount of material on the surface at Pluckemin raised some question as to how much intact evidence would be recovered through excavation. Intensive collection of surface remains might be one of the most productive research strategies on such a site and be worth a substantial investment of time.

Because of the potential importance of surface collection and the manageable size of the site, complete collection of the central areas was decided upon rather than a sampling strategy. Total collection carried with it an added benefit, in that removal of vegetation made it possible to record more completely surface configurations of rock and similar features by drawing and photography. Precise grid coordinates were recorded for most artifacts, although widespread and common artifacts of nondiagnostic importance were collected within one meter squares. Artifact distributions were plotted, and the general

outlines of rock or rubble configurations and similar features were drawn.

Once the vegetation had been removed from some areas it became clear that there were surface features visible which had not been recorded during the initial survey. The large number of rocks scattered across the surface and the relatively large areas covered precluded complete scaled plan drawings, so photography was substituted as a more rapid means of recording.

The overhead photography system was designed to take vertical photographs so that a photographic plan or mosaic could be made of large areas. Because the site is wooded, the system had to fit under an 18-foot canopy. The system consists of two aluminum bipods connected by a steel cable. A 35-millimeter camera with a 35-millimeter lens is fastened to a self-levelling mount and then raised and suspended on the cable. The camera is then pulled to predetermined points on the cable and exposures are made so that an area roughly 10 meters by 4 meters can be recorded with a single run along the cable. A total of 24 images are taken of a 10-meter square, which provides enough overlap that only the centers of the images may be used. Radial distortion is thus minimized, and plans may be drawn from the resulting mosaic; or artifact distributions, contours, and similar information may be laid directly over the photos. This system has significantly reduced the amount of time needed to record an area and has proven enormously helpful in interpretation.



To date, 36 10-meter squares have been collected and recorded (see Figure 4). Most of the southern half of the site has been covered, and collection has begun in the north as well. Additional areas have been collected as required prior to excavation. Statistical analysis of these areas is not yet complete; however, some representative areas may be discussed as examples of the type of information being retrieved from surface collection. The results from three areas within the Southeast Line provide a good example (areas mentioned in the following discussion are stippled in Figure 4).

Unit SII6 is a 10-meter square in the southern end of the site. It is thought to correspond to the south end of the Southeast Line. Six hundred twenty-nine artifacts were recovered from this area, 85.4% (537 pieces) of which were slag. Excluding the slag, 91.3% of the remaining material was scrap metal, 7.6% were weapon parts, and 1% were readily identifiable tools. No ceramics, bone, shell or glass fragments were recovered from this area.

Area SII25 is located towards the center of the Southeast Line. Although it is only 10 meters north of SII6, the artifact inventory is strikingly different. Out of a total artifact count of 1,129, 94% were fragments of sheet metal or tin. Nineteen nails made up 2% of the sample, while container glass and ceramics each accounted for less than 1% of the total.

A bit farther north in the same building, in areas SII44 and SII45, there is another shift in artifact types. Here there is more variety in the artifact inventory and a more even mix of types. Tools, scrap metal, tin, and weapon parts were again encountered, but in much smaller proportions. Out of 153 artifacts, 29% were ceramics, and 22% were nails, while container glass made up 12% of the sample, and personal items constituted 3% of the total. Bone and shell were also present in smaller numbers, along with some fragments of cooking utensils.

The differences between these three portions of the Southeast Line are striking even without further statistical analysis. The high proportion of slag and scrap metal in the southern end clearly suggests the location of the forge. SII25, on the other hand, may well have been a tinsmith's shop. The virtual absence of ceramics, glass, bone, and shell emphasizes the industrial nature of these areas and is in striking contrast to areas SII44 and SII45. The larger proportion of ceramics, glass, and personal items in the latter area are more consistent with what one expects from living quarters. The mixture of these items with some tools and scraps, combined with the proximity of probable workshops, suggest that the north end of the Southeast Line provided living quarters for armorers or artificers. This interpretation

corresponds closely with the conjectural camp pattern discussed earlier, in which the Southeast Line was identified as industrial in nature.

Surface collection in the north also supports the interpretation of the northern features as barrack remains. The bulk of the materials recovered in the north are either personal items such as shoe buckle fragments and buttons or items related to food preparation, such as ceramics, container glass, and bone and shell. The results of this superficial analysis of surface collection clearly indicate the value of such studies at Pluckemin. A more precise analysis should yield more precise information as to the location of rooms within buildings and the activities which took place there.

## EXCAVATION

Excavation is still in the early stages, since surface collection has taken priority in the field work. Any detailed discussion of the results would thus be premature. The results, however, do support the evidence collected from the surface.

### *The South Line*

Exploratory excavations have been used to search for evidence of the Academy Line, the North Line, and the South Line. The area in which the South Line was probably located is now wooded but was cultivated during the nineteenth and early twentieth centuries. Foot survey therefore failed to find any evidence of buildings or activity areas. Remote sensing (magnetometer and radar), auger testing, and the removal of plow zone along transects have proved equally unproductive, although the search continues.

### *The North Line*

Exploratory tests to the north have been more successful, although they are not without their problems. Based solely upon the Lillie drawing and the 1979 survey, it is not possible to be certain whether the three mounds mapped in a line south of grid point 13G 0/0 (Figure 3) are the remains of chimneys in the North Line or of cabins behind the Line. The only way to address this question is to excavate a portion of these mounds and the features to the east, demonstrating a continuity or discontinuity between remains. Continuity would suggest the abutting rooms of barracks, while discrete and separate rooms would suggest cabins to the rear of the Line.

Excavation units 12GF1-4 (an area 7.5 by 7 meters) and 12G4-6 (4.5 by 6 meters) were designed to resolve this problem (see hatched areas in Figure 4 for excavated areas). Although 12GF1-4 was severely disturbed by pot-hunting in years past, a beaten earth floor and the outline of the western half of a room were discerned this past summer. Excavations in both areas are being expanded,

and answers should be forthcoming in 1984. Hearths were discovered in both areas, and most of the material recovered in the units consists of bone, ceramics, buttons, and similar artifacts, reinforcing the hypothesis that these were living quarters.

### *The Academy Line*

The Academy Line, like the South Line, also lies within a cultivated area. It too has resisted attempts at discovery through remote sensing techniques, so we have turned to excavation. First, a trench (11G6, Figure 4) oriented perpendicularly to the projected line of this building was excavated in hopes of crossing the Line. These excavations recovered only tentative evidence of a structure, consisting of a narrow, compact level of clay overlaid by rock rubble and a concentration of nails. A larger area 11G10 (4 by 7 meters) was opened to the east of the trench in order to follow this lead. Two rock concentrations were uncovered beneath the plow zone in 11G10. The rock scatters were separated by approximately 4.6 meters, and the bulk of the artifacts fell either within the concentrations or to the west. The rock was embedded in compact clay similar to that encountered in 11G6. It is suggested that these features represent the corner footings for the eastern end of the Academy Line. After plowing and 200 years of gradual deterioration, artifacts lying within an area demarcated by compact clay and rubble footings may be all the evidence that can be expected.

In 1983, excavations to the west of these remains were begun in an attempt to strengthen the evidence and to determine more precisely the orientation of the Academy Line. A 25-meter long trench (11G17) was positioned some 30 meters west of 11G6. Removal of the plow zone over most of the trench revealed a homogeneous soil with relatively few artifacts or rocks. The sole exception was an area 4.6 meters wide located directly on a line projected through the remains in 11G6 and 11G10. In this 4.6-meter wide area lay a platform or surface of rock rubble with artifacts mixed in the soil above. It seems reasonable to assert that the Academy Line has now been located, although further investigation will be needed if the academy building itself is to be located.

A comparison of the ceramics recovered from the Academy Line area, which is thought to have housed enlisted men (Lamb's Regiment), and those found in supposed officers' barracks (excavation units 11G2, 8, 30 along the Northeast Line) emphasizes the potential importance of plow zone contexts. Fifty sherds were recovered from 11G6 and 11G10, including unrefined earthenwares, delft, gray and white saltglazed stonewares, porcelain, creamware, and redwares. Forty percent of these were redwares, 30% were refined earthenwares, and 8% were porcelain. In the Northeast Line, 45% of a total of 77 fragments

were redwares; but only 5% were refined earthenwares, and 39% were porcelain.

These samples are admittedly small and come from too restricted an area to permit any hard conclusions to be drawn, but they suggest that ceramic ratios and distributions may provide important indications of socio-economic differences among the troops. The large amount of porcelain found in the officers' barracks is more consistent with the strict class hierarchy found in the British army of the period (Ferguson 1977) than with our traditional concept of a democratic American army made up of "yeomen soldiers." Nonetheless, it lends support to recent historical research such as Lender's (1975) study of the New Jersey Line which indicates a similar hierarchy in American Continental Lines, with officers drawn primarily from the upper class and enlisted men recruited from the lower levels of society.

### *The Southeast Line*

Because the Southeast Line is the area most completely recorded with mapping, surface collection, and photography, wide area excavations have been started here (Figure 4: units 11G9, 11-15). The objective in this area is to open a wide section through a building. Excavations here are not complete, but a hearth and a cut-stone foundation for the front wall have been uncovered, along with rubble footings for the side and rear walls. In back of the building a compacted work area was traced, and trash deposits, primarily of container glass, were found at the rear edge of the work area. Inside the building, remains have been somewhat more complex, with far larger numbers of artifacts than are normally encountered on such sites (771 small finds from area 11 alone). A general mix of artifact types is being recovered, similar to the variety found here during surface collection. The large number of nails recovered from this area suggests that this building was more substantial than the simple log structures found on many other sites. From the various types of nails recovered, it is suspected that this segment of the building had wood flooring and interior trim, indicating that a great degree of care was taken in construction.

## CONCLUSIONS

The picture that is emerging from research at Pluckemin is that of a well supplied and well organized military installation that was used to train and resupply the army, preparing it for coming campaigns. Part of a concerted effort on the part of Generals Washington and Knox to set up such industrial and training centers, the Pluckemin cantonment was one of the first successful attempts to combine the two functions. As such, the site offers an array of features not normally found on one site.

Despite the short duration of occupation, the remains are providing information on the range of activities undertaken at the site and promise insights into the social relations between segments of the site's population. The value of surface collection on such sites and the importance of the spatial distribution of remains has also been emphasized. It is hoped that a comprehensive study of the Pluckemin cantonment will provide a model for work on similar sites.

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