

APPENDIX II
GEOMORPHIC INVESTIGATION OF THE ARMOR SITE

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by

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Introduction

A study of the geomorphic setting of the Armor site was begun and completed during the fall of 1985. The goal of the study was to describe the physiography of the site during pre-historic occupation during the Holocene.

Location, Physiography, and Geologic Setting of the Armor Site

The Armor Site is located near a small first-order stream which enters into Mill Creek just north of where Limestone Road crosses Mill Creek in New Castle Co., Delaware (Figure 67). The site is located where this small stream enters Mill Creek. The valley at this point is broad and gently sloping.

The study area is underlain by the Metagraywacke facies of the Cambro-Ordovician Wissahickon Formation (Woodruff and Thompson, 1972). This unit is primarily composed of felsic gneisses and schists. These rocks are commonly found in soils of the study area. Fresh bedrock in the study area is overlain by 0-20 to 20-50 feet of regolith (Christopher and Woodruff, 1982).

Methods

Sediments were excavated with a 3-inch diameter soil auger. The auger easily penetrates most of the sediments of the study area. However, it cannot penetrate sediments composed of cobbles.

Samples were obtained at 1-foot intervals. Each sample was carefully described in the field. Textural descriptions are based on Folk's (1968) terminology. Colors are described with the Rock Color Chart (Geol. Soc. Am. Rock Color Chart Committee, 1980), a system derived from the Munsell classification.

The archaeological site occupies the lower end of a small first order valley on the west side of Mill Creek. The sediments here may have been affected by several processes, including floods on Mill Creek, construction activities, straightening of the small stream, and possibly farming.

In order to understand a possible complex history of sedimentation at the site itself, a representative cross-section of the valley was located which appeared to have had a fairly simple history of floodplain construction (Figure 67). A number of holes were augered at this cross-section to define typical alluvial and colluvial sediments of the watershed.

A series of holes was also augered across the valley through the archaeological site (Figure 67). This sampling program was designed to determine the spatial arrangement of sedimentary environments associated with the archaeological artifacts. An additional hole was augered on the Mill Creek floodplain to define typical sedimentary sequences of Mill Creek.

Results

Six holes were augered across the valley to define typical sediments of the watershed. These cores may be divided into two groups. Cores AR10-25-85-1, AR10-25-85-2, AR10-25-85-3, and AR10-25-85-4 had sand and gravel at their bases and silty sediment at their tops. The two units graded into one another. (See Appendix 1 for detailed descriptions.)

Cores AR10-25-85-5 and AR10-25-85-6 were considerably different. These cores contained gravelly sands and silts throughout, with little evidence of sorting. Colors are highly

variable.

The holes augered across the lower part of the valley (AR11-24-85-1 to AR11-24-85-6) contain varying amounts of silt, sand, and gravel. Generally these sediments are very poorly sorted; for example, cobbles are frequently found in a silty matrix at shallow depths in most holes.

The hole augered in the floodplain of Mill Creek (AR11-24-85-7) contains approximately 4 feet of silty sediments. These silty sediments are underlain by sands and gravels.

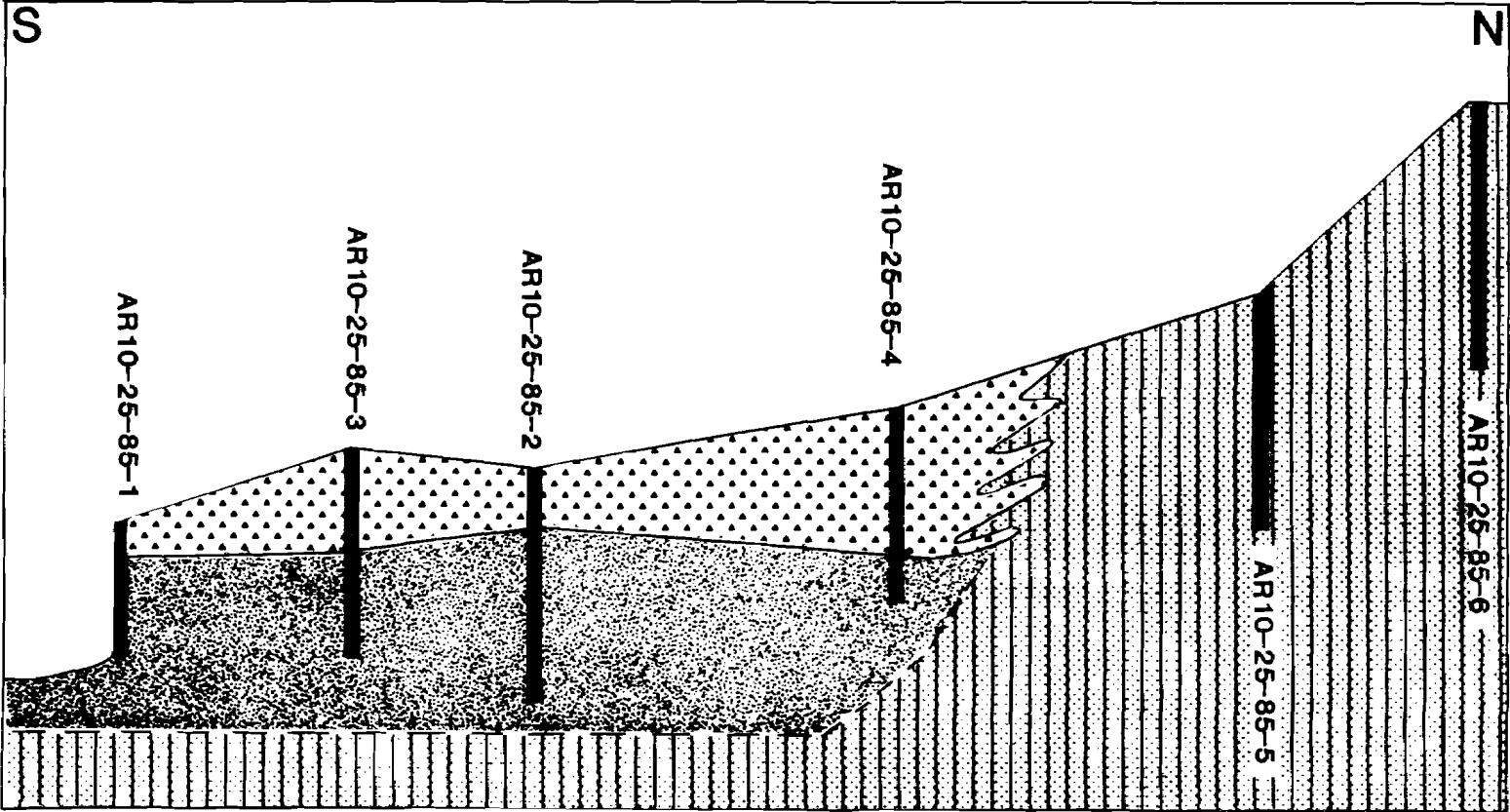
Discussion

The six holes augered upstream of the archaeological site illustrate a classical sequence of alluvial and colluvial sediments (Walker, 1984). The gravels and sands at the bottom of the 4 holes closest to the stream are relatively well-sorted, and the location of these holes next to the stream strongly suggests that these sediments were deposited as bedload in the stream channel as the channel migrated across the valley. The overlying silty sediments are typical overbank deposits (Figure 68).

The two holes farthest from the stream contain no sorted sands or gravels; the sediments here are almost exclusively very poorly sorted mixed sands, silts, and gravels. These sediments are undoubtedly colluvial (Figure 68).




Sediments at the archaeological site itself are more varied. The sediments found in the northernmost hole (AR11-24-85-1) are similar to colluvial sediments defined upstream, as are the sediments of the three southernmost holes (AR11-24-85-4 to AR11-24-85-6)(Figures 67 and 69). The two holes on the north side of

FIGURE 68



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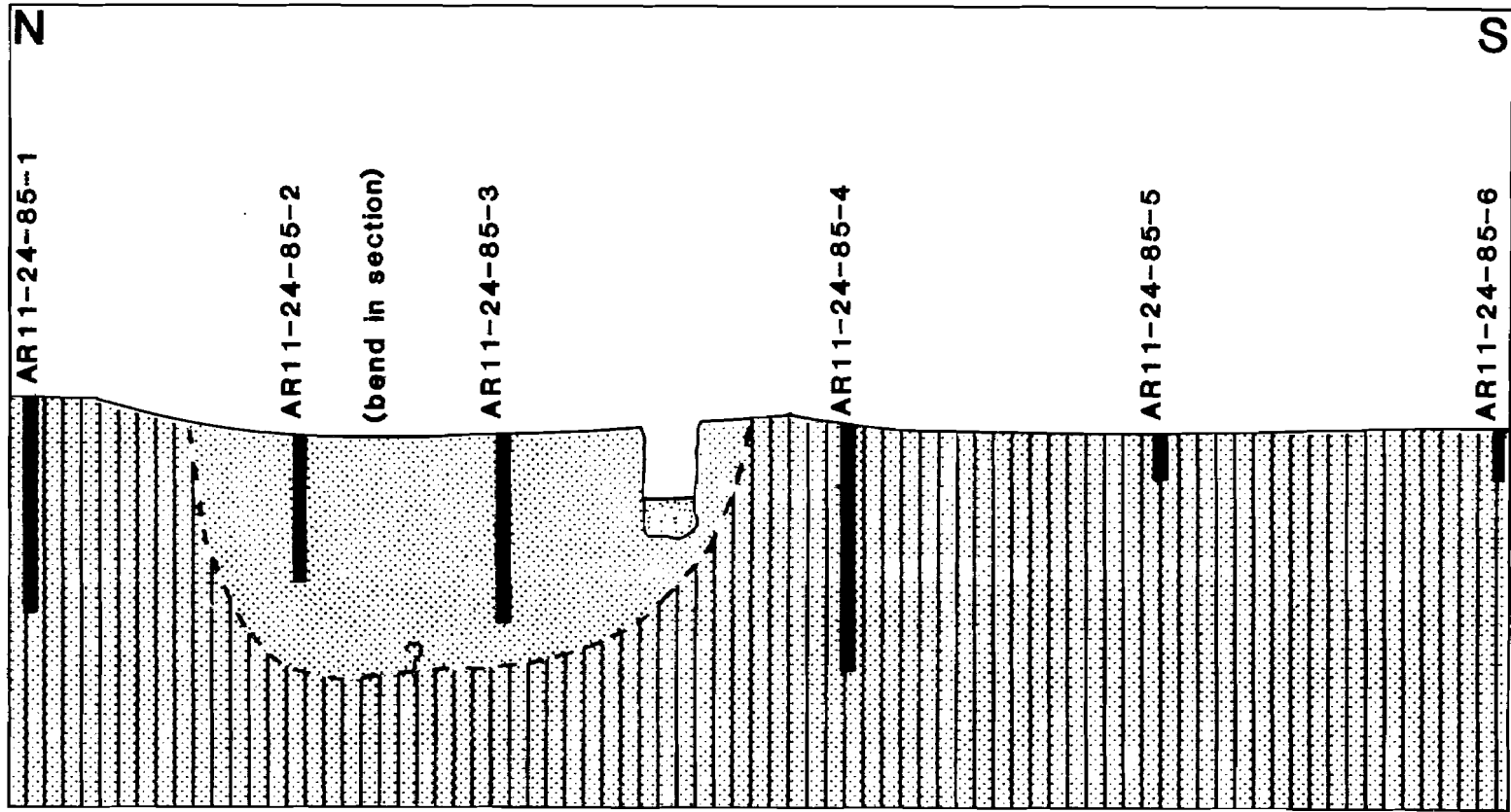
Geologic cross-section illustrating typical relationships between alluvial and colluvial deposits of the study area.

-  Overbank
-  Channel Sands and Gravels
-  Weathered Bedrock and Colluvium

0 4 8 horizontal scale
meters



vertical scale exaggerated 4x

FIGURE 69



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Geologic cross-section across the Armor archeological site and environs.

-  Weathered Bedrock or Colluvium
-  Fill or Colluvium

0 10 20 horizontal scale
meters

vertical scale exaggerated 10x

the stream (AR11-24-85-2) and (AR11-24-85-3) (Figures 67 and 69), however, contain sediments which were not found further upstream. Both of the holes produced very poorly sorted gravelly silts. The gravel was predominately cobble-sized, with very little sand or other sediment intermediate in size between silt and cobbles. Also, it is unusual to find many cobbles at the surface in an alluvial or colluvial sediments. Thus, these sediments are probably fill (Figure 69), though they may also be partly colluvial.

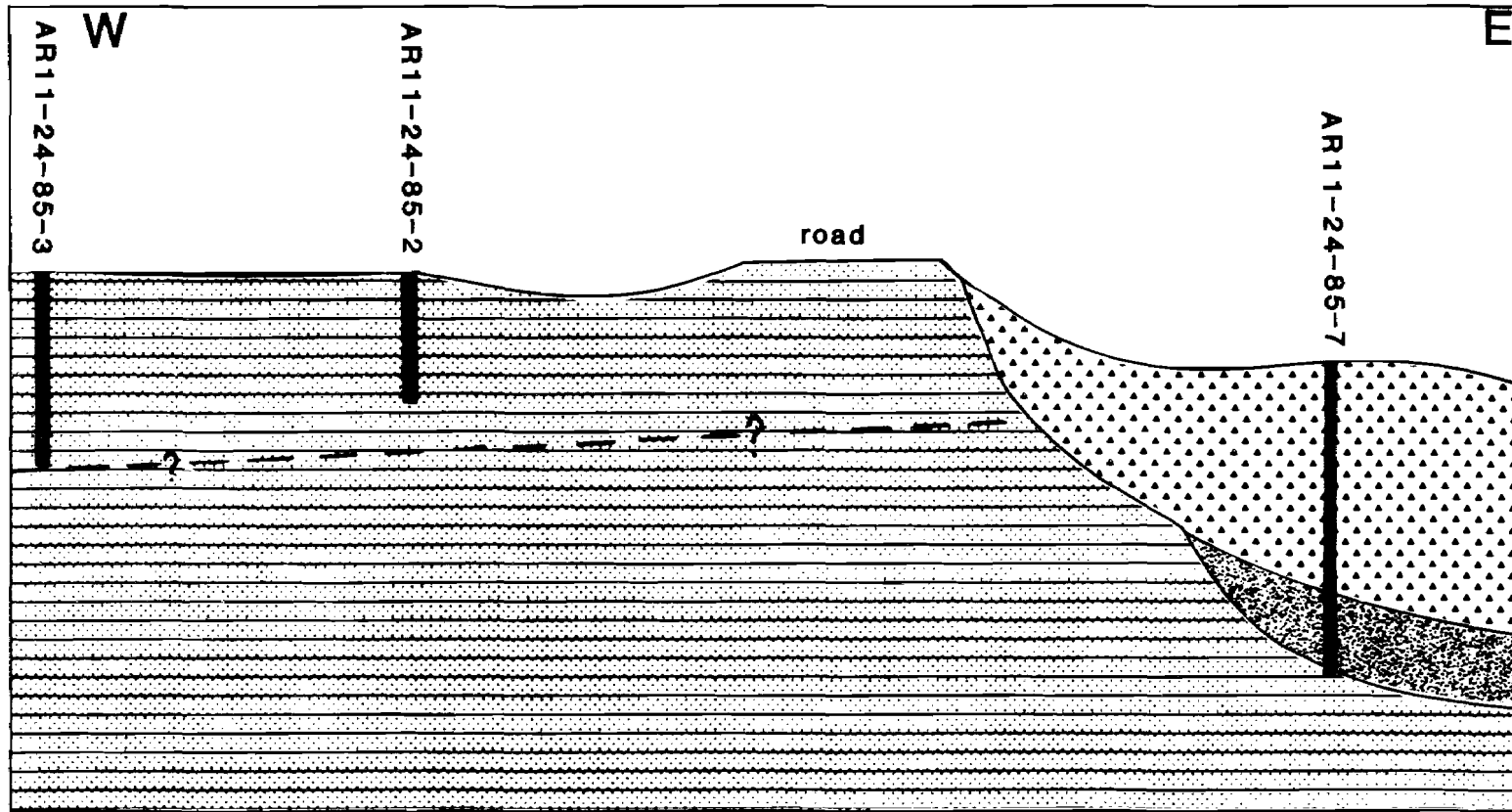
The hole augered into the Mill Creek floodplain exposed typical alluvial sediments. The overbank sequence is much thicker than that of the small stream by the archaeological site (Figure 70).

Conclusion




There are few, if any, true alluvial sediments in the lower part of the valley where the artifacts have been found. Furthermore, the sequence deposited by Mill Creek is much thicker than that typically deposited by the small first-order stream near the Armor Site.

These observations suggest two conclusions: first, that Mill Creek has not occupied any part of the floodplain near the archaeological site; and second, that the small stream has not migrated far from its present location. Thus, the present topography and physiography has not varied significantly for a considerable length of time. When these sites were occupied, the geomorphic setting of this valley was probably very similar to that of the present.

FIGURE 70



Geologic cross-section illustrating the relationship between floodplain sediments of Mill Creek (AR11-24-85-7) and sediments of the small watershed of the archeological site.

-  Fill (or Colluvium)
-  Channel Sands and Gravels
-  Overbank

0 5 10 horizontal scale
meters

vertical scale exaggerated 5x

Two facts moderate the strength of these conclusions. First, the two cores on the north side of the channel are very shallow, and alluvial sediments may underlie the fill. Second, aerial photos suggest that the small stream has been straightened. Thus, part of the floodplain may not adequately represent the history of the stream under natural conditions. The area affected by fill or by channelization is relatively small, however, so the basic conclusions are probably correct.

Appendix I - Core Description

Core # AR10-25-85-1

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-10	sandy clayey (15%) silt; moderate brown (5 YR 4/4)	overbank
10-27	oxidized coarse sand and granules; moderate brown (5 YR 3/4)	point bar
27-53	silty med.-grained sand; olive gray (5 YR 4/1)	point bar
>53	muddy sand, gravel (cobbles, pebbles, and boulders)	point bar

Core # AR10-25-85-2

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	clayey (25%) silt with rare quartz sand grains, frequent root mottles; moderate yellowish brown (10 YR 5/4)	overbank
30-48	sandy silt and silty sand; olive gray (5 YR 4/1)	point bar
48-61	muddy gravelly (granules) coarse sand with abundant leaves and wood fragments; dusky yellowish brown (10 YR 2/2)	point bar
61-76	gravelly coarse sand; light brown (10 YR 5/6)	point bar

Core # AR10-25-85-3

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-15	clayey (20%) silt, small orange mottles near roots; dark yellowish brown (10 YR 4/2)	overbank
15-30	sandy clayey (15%) silt, mottled, occasional coarse quartz, sand grains, rare pebbles; moderate brown (5 YR 4/4)	overbank
30-46	sandy clayey (15%) silt, heavily mottled; moderate brown (5 YR 4/4)	overbank
46-61	muddy fine-med. sand grading below to coarse sand and granules; dusky yellowish brown (10 YR 2/2)	point bar

Core # AR10-25-85-4

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	clayey (15%) silt, slightly mottled; moderate yellowish brown (10 YR 5/4) to moderate brown (5 YR 4/4)	overbank
38-61	clayey (10%) silt, common small mottles; olive gray (4 YR 4/1)	overbank
61-76	muddy sandy gravel (pebbles), pebbles are rounded and clearly have been transported; dusky yellowish brown (10 YR 2/2)	point bar

Core # AR10-25-85-5

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	gravelly sandy clayey silt with very angular granules and pebbles; moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/2)	colluvium
30-61	sandy silty clay, abundant charcoal, occasional quartz granules; dark yellowish brown (10 YR 4/2)	colluvium
61-91	sandy silty clay, rare charcoal; olive gray (5 YR 4/1), grades into saprolite below	weathered bedrock

Core # AR10-25-85-6

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	gravelly (granules and pebbles) clayey sandy silt; moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/1)	colluvium
30-61	sandy clayey silt; light brown (5 YR 5/6)	colluvium
61-91	similar to above with coarse sands and gravel	colluvium
91-107	sandy silt; light brown (5 YR 5/6)	saprolite

Core # AR11-24-85-1

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	clayey sandy silt; moderate brown (5 YR 4/4)	colluvium
30-61	sandy clayey silt; moderate yellowish brown (10 YR 5/4)	colluvium
61-91	sandy clayey silt, some small charcoal fragments, micaceous, a few granules	colluvium
91-122	sandy silt, abundant biotite, a few granules of mica schist	saprolite

Core # AR11-24-85-2

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	silty sand and gravel (granules, pebbles, and cobbles); dark yellowish brown (10 YR 4/2)	fill or colluvium
30-61	clayey silt, sand, and gravel (mostly granules and pebbles), 1 piece of charcoal 2 cm in diameter; moderate yellowish brown (10 YR 5/4)	fill or colluvium
61-?	Gravel? (couldn't penetrate further)	fill or colluvium

Core # AR11-24-85-3

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	silt with occasional gravel (cobbles & pebbles); dark yellowish brown	fill or colluvium
30-61	sandy silt with occasional gravel (cobbles); moderate brown (5 YR 4/4)	fill or colluvium
61-91	sandy silt and gravel (pebbles and cobbles)	fill or colluvium

Core # AR11-24-85-4

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-61	Mottled clayey silt, abundant mica; dark yellowish brown (10 YR 4/2)	colluvium
61-91	silty clay grading down to gravelly sandy silty clay, locally mottled, olive gray (5 YR 4/1)	colluvium
91-122	silty sand, sandy silt	colluvium

Core # AR11-24-85-5

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	sandy clayey silt, some pebbles and cobbles; dark yellowish brown (10 YR 4/2)	colluvium

Core # AR11-24-85-6

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-30	clayey sandy silt, with 1 cobble; dark yellowish brown (10 YR 4/2)	colluvium

Core # AR11-24-85-7

<u>Depth (cm)</u>	<u>Description</u>	<u>Interpretation</u>
0-61	clayey silt; moderate to dark yellowish brown (10 YR 5/4 - 10 YR 4/2)	overbank
61-91	clayey silt, small pieces of charcoal, dark yellowish brown (10 YR 4/2)	overbank
91-152	sandy gravel; dusky yellowish brown	point bar