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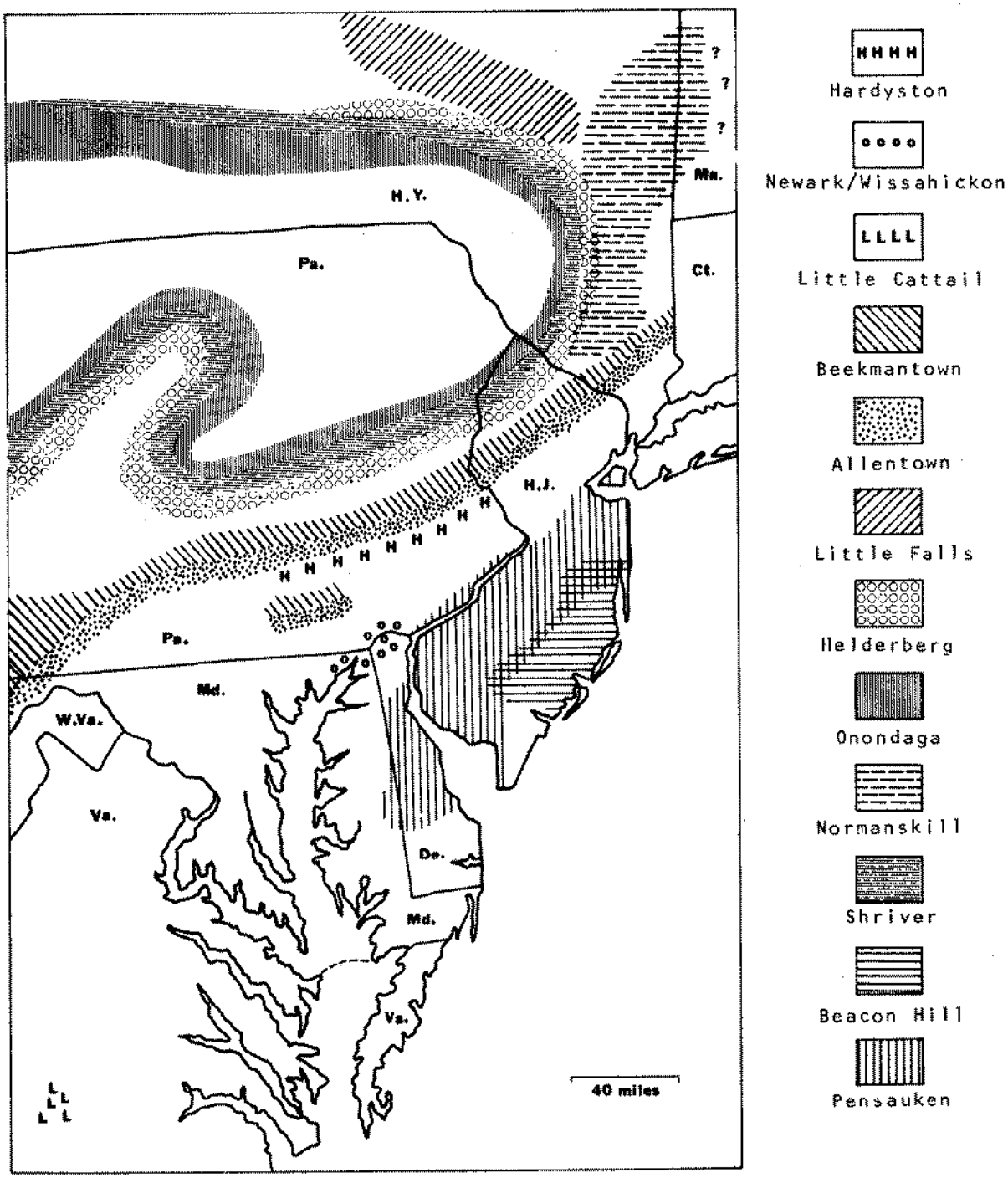

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HEAT-TREATMENT AND ITS EFFECTS ON CHERT COLOR: THE RESULTS OF THERMAL EXPERIMENTATION ON SOME HUDSON AND DELAWARE VALLEY CHERT TYPES

Lucianne Lavin *Metropolitan Chapter*

INTRODUCTION

The main constituent of most archaeological sites is the stone, or lithic material. This is especially true in Northeastern North America, where highly acidic soils usually succeed in destroying all but the most durable artifacts and ecofacts. Very often, the majority of the lithic materials are cherts. In short, chert artifacts are often the primary material from which the archaeologist seeks information on the prehistoric lifeways and culture processes once operative on the site. Identification of the sources of the raw material of the chert artifacts may provide insight into prehistoric systems of procurement and exchange, and culture contacts in general (see Lavin 1983).

Review of the archaeological literature suggests that many of the statements concerning prehistoric "trade" or culture contacts were derived from chert source identifications based solely on the superficial characteristics of chert specimens, especially color. Cherts of a specific color are often assigned to a specific chert type. Brown and red cherts from archaeological sites in Northeastern North America, for example, are often assigned to the "Pennsylvania Jasper" (Lavin and Prothero 1983). Cherts of a specific color that have not been assigned to a specific chert type, but is not known to occur in outcrops of local chert types, are usually designated as "exotic" cherts; that is, cherts directly procured or "traded" from a distant, nonlocal source locality. Recent studies indicate, however, that heat-treatment of cherts may produce color changes not found in unaltered specimens of the chert type (Klein 1973; Purdy and Brooks 1971; Rick 1978; Schindler et al. 1982). Replicative experiments in the heat-treating or "thermal alteration" of chert materials demonstrate that under certain conditions, heating causes changes in the physical properties of cherts which facilitate tool manufacture. Knapping of experimentally heated chert materials indicates that less force is required for flake removal (Crabtree and Butler 1964:1; Purdy and Brooks 1971:324; Rick 1978:45-47; Schindler et al. 1982:532), sharper edge angles may be created (Rick 1978:53), and larger pressure flakes (Crabtree and Butler 1964:1; Rick 1978:47,50-51), larger and thinner tools, and a greater variety of tool forms may be produced (Rick 1978:47,50,51,53); there is also less wear on the antler flaking tools, and on the knapper (Rick 1978:47).

Not only is there ethnohistoric and ethnographic evidence of knappers heating chert fragments prior to tool manufacture (Hester 1972; Mandeville 1973). Techniques such as thermoluminescence and optical microscopy may be used to identify heat-treated artifacts from archaeological sites, too (Flenniken and Garrison 1975; Melcher and Zimmerman 1977; Rowlett, Mandeville, and Zeller 1974). Studies indicate that heat-treated materials occur throughout North American prehistory, from PaleoIndian to Woodland times (Klein 1973:9-10; Rick 1978:3-4); however, its use may not have been continuous but cyclical, with "alternating periods of favor and disfavor," or it may have come into use in different areas at different times (Klein 1973:10-11).

Consequently, it is highly probable that some of the prehistoric groups that once inhabited the Hudson and Delaware River drainages practiced heat-treatment of lithic materials. If this were true, it might have a significant effect on area studies of procurement and exchange based on visual inspection of lithic specimens. So-called "exotic" cherts may actually be heat-altered specimens of locally available chert types. Hence, the purpose of this paper is to determine the extent of thermal alteration of color in some chert types likely to occur on New York and New Jersey archaeological sites, and in so doing, to test the reliability of color as a criterion for chert source identification in our area.

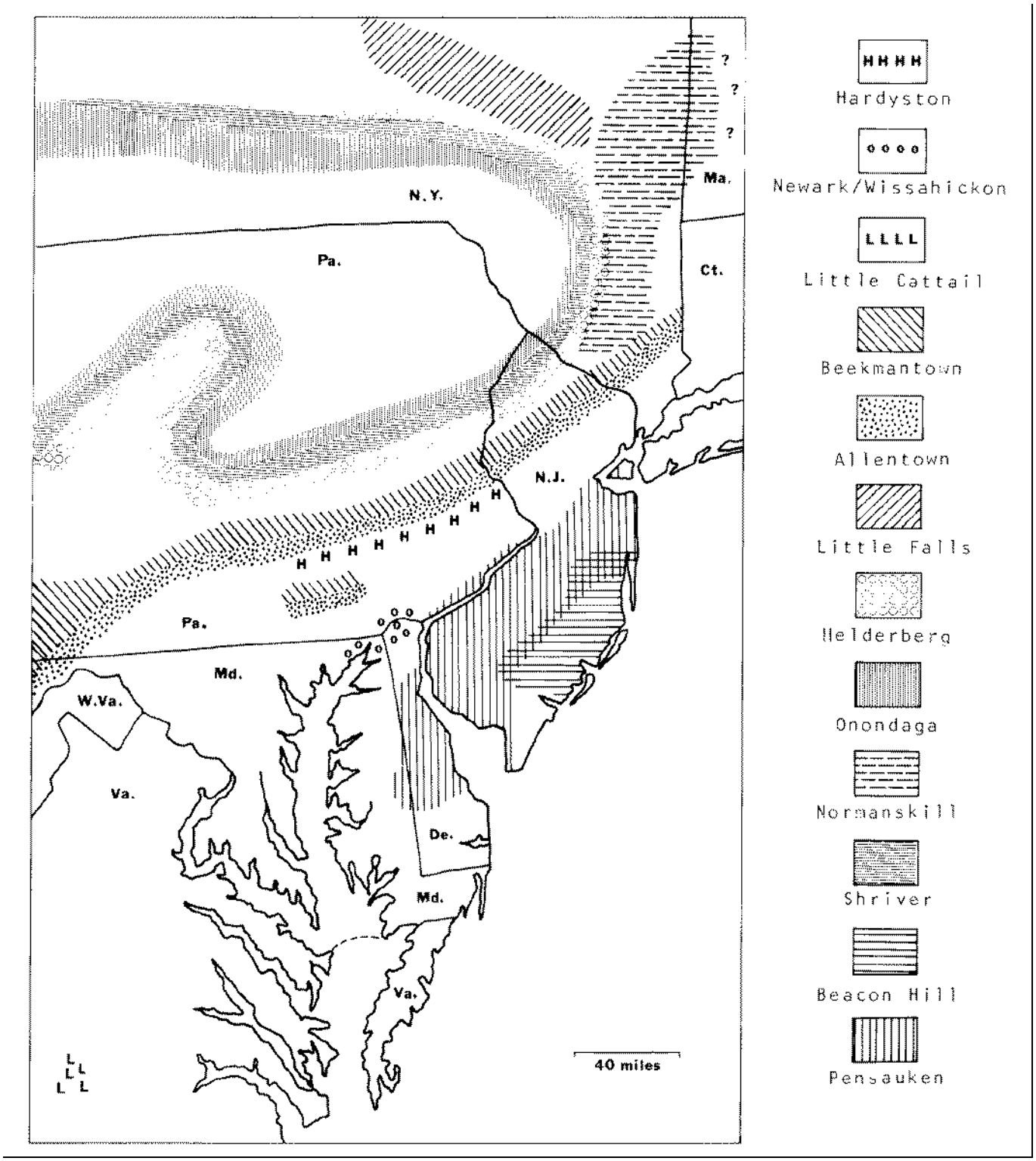

Figure 1. Geographic Location of Geologic Rock units Discussed in this paper. Map enhancement by Patricia Miller.

SOURCE SAMPLES AND HEATING PROCEDURES

As part of a greater study of chert source identification and prehistoric patterns of chert acquisition in the Delaware River Valley, a regional chert survey was instituted. Chert was collected from 95 source localities representing 27 chert-bearing formations cropping out mainly within and adjacent to the Hudson and Delaware River Valleys. Some of the cherts were gifts graciously donated by geologists or archaeologists familiar with local chert outcrops; the majority were collected by the author from prehistoric quarries, outcroppings, and roadcuts (for a full description of the research design and sampling procedures employed in the survey, see Lavin 1983). Fifty-four specimens representing 19 of the formations, or chert types studied, were thermally treated in order to discern if heating increased the color range of the types in question. Figure 1 depicts the geographic distribution of the rock units from which the specimens were collected. Each specimen was fractured into two fragments, one fragment serving as the control. Using the Munsell Color System (Anonymous 1975; Geological Society of America 1963), the color of the freshly fractured surfaces of both fragments were recorded prior to and after heating.

The Munsell Color System consists of a collection of charts displaying color chips depicting the entire color spectrum. Each color chip is described in terms of three variables: hue, value, and chroma. The “hue” of a color is its relationship to the most distinct members of the color spectrum-Red, Yellow, Green, Blue, and Purple. The "value" of a color is its degree of lightness. The "chroma" of a color is its strength or brilliance; that is, its departure from a neutral gray or black of the same lightness (Sec Anonymous 1975).

Following Klein (1973), the specimens were buried in a sand-filled crucible to insure even exposure to heat, and placed in an A-type 1400 electric furnace. The furnace was heated in 50° C increments every hour until the final or critical temperature was reached. Since prior studies of thermal alteration demonstrate that the critical temperature for color change in cherts lies somewhere between 250° C and 400° C (Klein 1973: Table 4; Purdy and Brooks 1971:323; Rick 1978:19), 44 of the 54 specimens were heated for three to four hours at a final temperature of 350° C or 450° C. Ten specimens were accidentally heated above 450° C when the temperature gauge malfunctioned on the furnace. (There final temperature is unknown, although a hand thermometer measuring up to 450° C demonstrated that it was beyond that reading. In Table 1, the maximum temperature of these 10 specimens is represented as "450° C+.") The specimens were cooled by opening the furnace door.

RESULTS OF HEAT-TREATMENT

The results of heat-treatment for each specimen are chronicled in Table l. A brief summary of the results of heat-treatment for each chert type is presented below.

Hardyston Chert ("Pennsylvania Jasper"). Hardyston Chert crops out in eastern Pennsylvania (Lavin 1983:47-49). Investigations at source localities indicate that it is often mottled or shaded; in its natural, unaltered state the chert may be brown, yellow brown, reddish brown, yellow, brownish yellow, reddish yellow, red, yellow-gray, dark gray and brown, and possibly black (Lavin 1983:49-50,138-139). The four Hardyston specimens subjected to heat-treatment were collected from the prehistoric quarry at Vera Cruz. All four of the mainly yellowish brown specimens turned red after being heated at a maximum temperature of 450° C for four hours. The results support Klein's (1973: Table 4) heat experiments with two "Pennsylvania Jasper" specimens; his specimens also changed from yellowish brown to red during heating.

Little Cattail Creek Chert ("Dinwiddie or Williamson Chert," "Cattail Creek Chalcedony"). The specimens of Cattail Creek chert were collected from the prehistoric quarry and workshop site along Little Cattail Creek and the adjoining Ampy and Williamson farmlands in Dinwiddie County, eastern

TABLE 1. The Effects of Heat-treatment on Chert Color (After Luvin 1983: Table 4).

CHERT TYPE	SAMPLE # CONTROL	SAMPLE # VARIABLE	MAX. TEMP.	# OF HOURS AT MAX. TEMP.	COLOR BEFORE HEATING	COLOR AFTER HEATING
1. HARDYSTON	48A1.11	48A1.12	450° C	4	Dark yellow brown (10YR 3/4–6) and dark brown (10YR4/3).	Dusky red (10R3/3–4).
2. HARDYSTON	48A2.11	48A2.12	450° C	4	Yellow brown (10YR5/6–8) with black (N2) and dark brown (7.5YR2–3/4) streaks & blotches.	Weak to dusky red (10R 3–4/4), with some red to light red (10R5–6/6) blotches.
3. HARDYSTON	48A3.11	48A3.12	450° C	4	Dark gray brown (10YR4/ 2) and yellow brown (10 YR-5–6).	Weak to dusky red (10R 3–4/2).
4. HARDYSTON	48A4.11	48A4.12	450° C	4	Yellow browns (10YR4–5/ 6.10YR5/8. 10YR4/4) and weak red (10R4/4).	Dark red (10R3–4/6) to weak red (10R5/4)
5. LITTLE CATTAIL CREEK	47A7.11	47A7.12	450° C	4	Black (N2.5) with very pale brown mottle (10YR 7/5).	Black (N2.5) & light brown gray (10YR6/2) to pale brown (10YR6/ 3); part of mottle turned reddish brown (2.5YR5/4).
6. LITTLE CATTAIL CREEK	47A11.11	47A11.13	450° C	4	Yellow browns (10YR4–5–4.10YR4/6) & red brown (5YR4/4) with black (N2) streaks & mottles.	Dusky red (10R3/2), very dusky red (10R2.5/2), & red black (10R2.5/1).
7. LITTLE CATTAIL CREEK	47A12.11	47A12.13	450° C	4	Dusky red (10R3/4), red (10R4/6–8), light gray (10YR7/2), light brown gray (10YR6/2), & yellow (10YR7/6).	Dark red (10R3/6), dusky reds (10R3/2. 10R2.5/2), red black (10R2.5/1), & pink (5YR7–8/3–4).
8. NEWARK (JASPER)	43A1.11	43A1.12	350° C	3	Yellow brown (10YR5/8).	Dark red (10R3/6).
9. NEWARK (CECIL BLACK)	41A2.11	41A2.12	450° C	4	Black (N2) with a few mottles of yellow brown (10YR5/4).	Reddish black (10R2.5/1), dark reddish gray (10R3/1), & dusky to dark red (10R3/4–6).
10. NEWARK (CECIL BLACK)	46A2.21	46A2.22	450° C	4	Black (N2.5) with a few brown (7.5YR5–6/8) mottles.	Black (N2.5) with red (10R4–5/8) mottles.
11. WISSAHICKON	44A1.14	44A1.13	450° C	4	White (2.5Y8/2), pale yellow (2.5Y8/4), & light brown gray (2.5Y6/2).	Very pale brown (10YR8/4) & red (2.5YR5/6).
12. ALLENTOWN	63A1.51	63A1.52	450° C	4	Black (N2.5).	Black (N2.5).
13. ALLENTOWN	69A1.41	69A1.42	450° C	4	Olive gray (5Y6/1) to v. dark olive gray (5Y3–4/1) & white (N9).	Red browns (5YR4–6/3), gray (5YR5–6/1), & some yellow red (5YR5/8).
14. LITTLE FALLS	40A1.11	40A1.12	450° C	4	Bluish gray to light bluish gray (5B6–7/1), with black (N2) blotches.	Greenish gray (5GY6/ 1) with black (N2) blotches.
15. LITTLE FALLS	40A1.31	40A1.32	450° C	4	Greenish gray (5GY5/1).	Dark olive gray (5Y4/ 1).

TABLE 1. Continued.

CHERT TYPE	SAMPLE # CONTROL	SAMPLE # VARIABLE	MAX. TEMP.	# OF HOURS AT MAX. TEMP.	COLOR BEFORE HEATING	COLOR AFTER HEATING
16. NORMANSKILL	82A1.12	82A1.11	450° C	4	Black (N2.5).	Black (N2.5) with one small splotch of strong brown (7.5YR5/6).
17. NORMANSKILL	82A2.21	82A2.22	450° C	4	Bluish greenish black (5BG2/1) with black (N2) blotch.	Greenish black (5G2/1).
18. NORMANSKILL	17A1.11	17A1.12	450° C	4	Black (N2).	Black (N2).
19. NORMANSKILL	1A5.11	1A5.12	450° C	4	Black (N2).	Black (N2).
20. NORMANSKILL	1A1.11	1A1.12	450° C+	3	Dark green gray (5GY4/1, 5G4/1), olive gray (5Y4/.8–1), & dark bluish gray (5B4/1).	Medium gray (N5).
21. NORMANSKILL	1A1.21	1A1.22	450° C+	3	Dark blue gray (5B3/.7) & olive gray (5Y4/1).	Very light gray (N8), pinkish gray (5YR8/1), & very dark brown gray (5YR3/1).
22. NORMANSKILL	1A3.21	1A3.22	450° C+	3	Dark to light bluish gray (5B3–5/1,5B7/1) with small blue black (5B2/1) & brown gray (5YR4/1) spots.	Dark gray (N4), very dark brown (5YR3/1), & very light gray (N8) to pink gray (5YR8/1); small light red (10R6/6) blotches.
23. NORMANSKILL	1B.21	1B.22	450° C+	3	Dark gray (N4) with dark green gray (5G4/1).	Very light gray (N7–8) with medium to dark olive gray (5Y3–4/1) & red (10R4/6).
24. NORMANSKILL	1B.31	1B.32	450° C+	3	Very dark gray (N3).	Very light gray (N8) with mottles of very dark gray (N3), medium gray (N5), & light brown gray (10YR7/2).
25. NORMANSKILL	1C6.11	1C6.12	450° C+	3	Dark gray (N4) with black (N2) streaks.	Light gray (N7–8) with brown black (5YR2/1) mottles; black streaks turned dusky red (10R3/4).
26. NORMANSKILL	1D.11	1D.12	450° C+	3	Very dark gray (N3); pale brown (10YR7/4) specks.	Light brown gray (10YR6/2) & olive gray (5Y6/2); brown black (5YR2/1) specks.
27. KITTATINNY	8A1.11	8A1.12	450° C+	3	Dark gray (N4) & very dark gray (N3); streaks of yellow red (5YR5/6) & yellow brown (10YR5/6).	Very light gray (N8) to white (N9); streaks of dusky red (5R3/4), yellow (10YR8/6) & very pale brown (10YR7/4).
28. KITTATINNY	8A1.11	8A1.12	450° C+	3	Black (N2).	Very light gray (N8) to white (N9); mottles & streaks of weak red (10R5/4), medium to medium light gray (5–6).

TABLE 1. Continued.

CHERT TYPE	SAMPLE # CONTROL	SAMPLE # VARIABLE	MAX. TEMP.	# OF HOURS AT MAX. TEMP.	COLOR BEFORE HEATING	COLOR AFTER HEATING
29. KITTATINNY	8B2.11	8B2.12	450° C ÷	3	Dark gray (N4), very dark gray (N3) & medium gray (N5); yellow brown (10YR 5/4) & dark gray brown (10YR4/2) spots.	Very light gray (N8) with black (N2) specks.
30. KITTATINNY	8A1.21	8A1.22	350° C	3	Very dark gray (N3), dark gray (N4), & medium gray (N5); veins of very pale orange (10YR8/2), strong brown (7.5YR5/8), & very pale brown (10YR7/4).	White (N9) with some medium light gray (N6); a few veins of red (10R4/6–8) & dark red (10R6/3).
31. KITTATINNY	8A2.21	8A2.22	350° C	3	Black (N2).	White (N9).
32. RICKENBACH	9A1.11	9A1.12	350° C	3	Black (N2).	Black (N2.5).
33. RICKENBACH	60A1.11	60A1.12	450° C	3	Black (N2.5) & very dark gray (N3).	Very dark gray (N3) & dark gray (N4).
34. EPLER	67A1.34	67A1.33	450° C	3	Black (N2), dark brown gray to brown black (10YR2–4/1), & dark gray browns (10YR2–4/2).	Black (N2).
35. EPLER	68A1.11	68A1.13	450° C	3	Very dark gray (N3), brown grays (10YR4–5/1) & gray browns (10YR4–5/2).	Black (N2) with some dark brown (7.5YR4/2).
36. BEEKMANTOWN (EPLER OR RICKENBACH)	59A1.11	59A1.12	450° C	3	Very dark gray (N3), brown grays (10YR4–5/1) & gray browns (10YR4–5/2).	Very dark gray (N3) & reds (10R6/4–6, 10R5/4–6).
37. HALCYON LAKE	6B1.11	6B1.22	450° C	3	Very dark gray (N3).	Very dark gray (N3).
38. HALCYON LAKE	6B1.21	6B1.22	450° C	3	Medium gray (N5) with specks of brown yellow (10YR6/8) & very pale brown (10YR7/4).	Medium gray (N5) with spots of reddish yellow (5YR6/8).
39. HELDERBERG (ALSEN)	4A1.11	4A1.12	350° C	3	Black (N2).	Light gray (N7).
40. HELDERBERG (KALKBERG OR PORT EWEN)	37A1.11	37A1.12	450° C	3	Very dark gray (N3).	Very dark gray (N3).
41. HELDERBERG (COEYMANS)	73A1.12	73A1.11	450° C	3	Black (N2.5).	Very dark gray (N3).
42. HELDERBERG (NEW SCOTLAND)	71A1.22	71A1.23	450° C	3	Black (N2.5).	Black (N2.5).
43. ORISKANY (SHRIVER)	53A1.11	53A1.12	450° C	3	Black (N2) & dark brown (7.5YR3/2).	Very dark gray (N3) & dark brown (7.5YR4/2).
44. ONONDAGA	11A2.11	11A2.12	450° C	3	Black (N2).	Black (N2).
45. ONONDAGA	13A1.11	13A1.12	450° C	3	Black (N2).	Black (N2).
46. ONONDAGA	70A1.51	70A1.52	450° C	3	Black (N2).	Black (N2.5).
47. ONONDAGA	55A1.32	55A1.31	450° C	3	Black (N2) & very dark gray (N3).	Very dark gray (N3) & dark gray (N4).

TABLE 1. Concluded.

CHERT TYPE	SAMPLE # CONTROL	SAMPLE # VARIABLE	MAX. TEMP.	# OF HOURS AT MAX. TEMP.	COLOR BEFORE HEATING	COLOR AFTER HEATING
48. ONONDAGA	56A1.31	56A1.32	450° C	3	Very dark gray (N3) & dark brown (7.5YR3/2).	Dark gray (N4) & dark brown (7.5YR4/2).
49. ONONDAGA	56A1.41	56A1.42	450° C	3	Dark bluish gray (5B4/.2) & reddish gray (5YR5/2).	Medium gray (N5–5.5) & reddish gray (5YR5/2).
50. ONONDAGA	49A1.11	49A1.13	450° C	3	Medium bluish gray (5B 5.5–6/1), very dark brown gray (10YR3/1), dark gray brown (10YR4/2) & dark yellow brown (10YR3/6).	White (10YR8/1), light gray (N7), & dark to very dark brown gray (10YR3–4/1).
51. ONONDAGA	49A4.11	49A4.13	450° C	3	White to light brown gray (10YR7.5–8/1) with dark to very dark brown gray (10YR3–4/1) mottles.	Light gray (N7) to light brown gray (10YR7/1) with very dark brown gray (10YR3–4/1) mottles.
52. ONONDAGA	49A2.12	49A2.11	450° C	3	Dark to very dark brown gray (10YR3–4/1) & dark gray brown (10YR4/2).	Dark gray (N4), medium gray (N5), and dark gray brown (7.5YR4/2).
53. PENSAUKEN	74A1.51	74A1.52	450° C	3	Very pale brown (10YR7/4), yellow (10YR7/6), yellow brown to brown yellow (10YR6/4–6) & red yellow (7.5YR6/6).	Reddish brown (2.5YR4/4).
54. BEACON HILL	76A1.81	76A1.82	450° C	3	White to pale yellow (2.5Y8/2–4) & very pale brown (10YR8/3).	Light reddish brown (5YR6/3–4), pink (5YR8/4) & light brown gray to pinkish gray (5YR6–8/1).

Virginia (Lavin 1983:46). Technically speaking, it is not a Hudson or Delaware Valley chert type. Yet because it is a high-quality chert located not very far south of the Delaware Bay, there is a possibility that it may have been imported into the Delaware Valley by some prehistoric groups to facilitate tool manufacture. In its unaltered state, Little Cattail Creek Chert is usually mottled; the following colors have been reported: white, cream, yellow, brown, grays, black, blue, bluish white, yellowish red, reds, pale olive, grayish brown, brownish gray (Lavin 1983:46,136-137).

Three specimens were heated at a maximum temperature of 450° C for four hours. A black specimen with a pale brownish yellow mottle changed to a mottled black, light brownish gray and pale brown; the mottle turned reddish brown. A mottled yellowish brown and reddish brown specimen became mottled red and reddish black. A light brownish gray, light gray, and yellow specimen mottled with red changed color to mottled reds, reddish black, and pink. These results support McCary's (1975:55) conclusions that brown Little Cattail Creek cherts usually turn red when heated.

Newark Chert ("Newark Jasper," "Cecil Black Flint"). Newark Chert crops out in eastern Maryland and northern Delaware (Lavin 1983:54). The three specimens subjected to heat-treatment were collected from loci in both Maryland and Delaware. Unaltered cherts are often shaded or mottled; colors include black, brown, yellowish brown, brownish yellow, yellow, yellowish red, tan, and grayish brown (Lavin

1983:55, 143). Heated for three hours at a maximum temperature of 350° C, a yellowish brown specimen turned dark red. Two specimens of black chert with a few brownish mottles were heated for four hours at a maximum temperature of 410° C. One specimen remained black, while the other turned reddish black and dark reddish gray; the mottles in both specimens turned red. The results concur with Stafford's (1971:8) research that heating above 250° C will turn yellow and tan colors an orange or red. The results also support Wilkins' (1967:38) experiments indicating that black specimens may turn some form of red during heating. Klein's (1973: Table 4) report, however, that two yellowish brown specimens heated to 300° C and 400° C, respectively, turned a lighter, less yellow, brown indicates that not all Newark Jasper specimens turn red upon heating.

Wissahickon Chert ("Broad Rim Chalcedony"). Wissahickon chert crops out in eastern Maryland, northern Delaware, and southeastern Pennsylvania (Lavin 1983:53-54). Unaltered specimens are often shaded or mottled; colors include white, gray, tan, brown, grayish brown, brownish gray, yellowish brown, and yellow (Lavin 1983:54, 142). A shaded white, yellow, and light brownish gray specimen heated for four hours at a maximum temperature of 450° C changed color to a mottled very pale brown and red. Red coloring has not been reported in the unaltered color range of the chert type.

Kittatinny Chert. The specimens were collected from a residual or redeposited (i.e., secondary glacial) deposit in northern New Jersey representing an unidentified unit(s) of the Kittatinny Carbonate. Rock units comprising the Kittatinny Carbonate have since been identified as Leithsville Dolomite, Allentown Dolomite, and Beekmantown Carbonates, which include the Kickenbach Dolomite, Epler Dolomite and Limestone, and Ontelaunee Limestone of eastern Pennsylvania and northern New Jersey (See Lavin 1983:36-37). For a description of the color range of unaltered specimens of Kittatinny Chert, see the individual descriptions of the specific rock units listed below.

Heating to a critical temperature of 350° C and over 450° C for three hours produced drastic color changes in the five chert specimens. Both the two black specimens and the three mottled gray specimens (one mottled dark gray specimen, and two mottled dark gray and medium gray specimens) turned very light gray or white; three specimens contained red streaks or splotches, and one of them also contained yellow and very pale brown streaks.

Allentown Chert. Allentown Chert crops out in eastern Pennsylvania and northern New Jersey (Lavin 1983:60-61). Unaltered specimens are sometimes shaded or mottled; colors include black dark gray. Medium gray, laminated white and black, and olive gray or white (Lavin 1983:61,148-149). Two specimens from two eastern Pennsylvania loci were heated to 450° C for four hours. A black specimen exhibited no color alteration. A specimen of mottled olive grays and white turned a mottled reddish brown, yellowish red, and gray after heating. Neither reddish brown nor yellowish red have been reported in the unaltered color range of the chert type.

Beekmantown Chert (Rickenbach or Epler Formation). The Beekmantown Group of carbonates crops out from southern New York, throughout northern New Jersey, eastern and central Pennsylvania, and into Maryland. Its eastern outcrop consists of the Rickenbach Dolomite, Epler Dolomite and Limestone, and Ontelaunee Limestone (Lavin 1983:65-68). Unaltered cherts are black, dark gray, medium gray, light gray, or white (Lavin 1983:67-68,151-155). This shaded specimen of dark gray, brownish grays, and grayish browns was collected at a northwestern New Jersey roadcut probably representing either the Rickenbach or Epler Formation. It turned a mottled very dark gray and red during heating. Red has not been reported in the unaltered color range of Beekmantown cherts.

Rickenbach Chert. Rickenbach chert crops out in eastern Pennsylvania, northern New Jersey, and southern New York (Lavin 1983:65-66). Unaltered chert is sometimes shaded; colors include black, dark gray, light gray, and white (Lavin 1983:68, 151). Two specimens from two northern New Jersey loci were heated. A black specimen was heated to a maximum temperature of 350° C for three hours, while a shaded black and very dark gray specimen was heated to a critical temperature of 450° C for three hours. Both specimens showed only a slight increase in value after heating.

Epler Chert. Epler Chert crops out in eastern Pennsylvania, northern New Jersey, and southern New York (Lavin 1983:65-66). Unaltered chert is sometimes shaded or mottled; colors include black, dark

gray, light grays, brownish grays, reddish gray, brownish black, and white (Lavin 1983:68, 152). Two specimens from eastern Pennsylvania were heated to a maximum temperature of 450° C for three hours. A specimen of shaded black, dark grayish brown, brownish black, and dark brownish gray turned completely black. A very dark gray specimen with brownish gray and grayish brown turned black with a few dark brown blotches.

Halcyon Lake Chert. Halcyon Lake chert crops out in southeastern New York (Lavin 1983:67-68). Unaltered specimens are sometimes shaded; colors include black, dark gray, medium gray, and light brownish gray (Lavin 1983:155). Two specimens - a medium gray specimen and a very dark gray specimen - were heated to a maximum temperature of 450° C for three hours. There was no change in color, except that brown and yellow "specks" in the former specimen turned reddish yellow.

Little Falls Chert ("Knauderack Chert"). Little Falls Chert crops out in eastern and east-central New York, especially within the Mohawk Valley area (Lavin 1983:62). Unaltered cherts may be shaded or Mottled; colors are reported to include light blue, bluish white, light bluish gray, bluish black, pearly, white, cream, tan, dark brown, red, medium gray, light grays, and light greenish gray (Lavin 1983:62, 157). Two specimens were heated for four hours at a maximum temperature of 450° C. The greenish gray specimen turned dark olive gray. The bluish gray specimen turned greenish gray. Olive gray has not been reported in unaltered specimens of Little Falls chert.

Normanskill Chert. Normanskill Shale crops out in the mid-Hudson Valley of eastern New York, northwestern Massachusetts, and southwestern Vermont (Lavin 1983:70). Most of the unaltered chert is homogeneous in color; some cherts are shaded. Mottled chert is extremely rare. Colors include black, dark gray, medium gray, light gray, gray and black, green, olive green, greenish gray, olive gray, olive black, bluish gray, bluish black, bluish green, black and green, red and green, and red (Lavin 1983:70-71, 159-160).

Eleven specimens were heated. The experiments indicate that at a maximum temperature of 450° C there was virtually no color change in the black cherts, but slight to major changes in the dark gray, bluish gray, and greenish gray cherts. The dark gray cherts turned either a very light gray or a light brownish to light olive gray, often with mottles of dark gray, medium gray, and/or brownish gray or brownish black; one specimen also contained red streaks. A dark gray and greenish gray specimen turned very light gray and olive gray with red. The greenish gray specimen turned a medium gray. A bluish greenish specimen turned greenish black. A shaded dark to light bluish gray specimen with blue black and brownish gray spots turned a mottled dark gray, very dark brownish gray, very light gray, and pinkish gray with red blotches. A shaded bluish gray and olive gray specimen turned a mottled very light gray to pinkish gray, and very dark brownish gray. Pinkish gray and brownish gray are colors not found in freshly fractured unaltered specimens of the Normanskill Chert type (although some outcrops of Normanskill Chert do weather a brownish color; see Lavin 1983:71, Table 3).

Helderberg Chert. The Helderberg Group crops out in central and eastern New York, northwestern New Jersey, and Pennsylvania, extending into Maryland and West Virginia. In the New York-New Jersey-Pennsylvania area, the group consists of eight or nine formations, mostly carbonates, six of which are chert-bearing (Lavin 1983:81-83). Unaltered chert is always homogeneous; no shading or mottling has been reported. In the Hudson Valley area, colors include black, dark gray, blue black, and blue gray. In New Jersey and Pennsylvania, only black and dark gray cherts have been found (Lavin 1983:83-84, 164-168).

One specimen each from the Alsen, Kalkberg/Port Ewen (samples of each formation from the same collecting locus were inadvertently given the same catalog number), Coeymans, and New Scotland Formations were heated. The black Alsen specimen from a locus near Catskill, New York, was heated at a maximum temperature of 350° C for three hours. It exhibited a drastic color change to light gray, well outside the normal color range of Helderberg Chert. The three remaining Helderberg specimens were heated at 450° C for three hours. They exhibited little or no change in color. The black Coeymans specimen increased slightly in value to very dark gray. The black New Scotland and very dark gray Kalkberg/Port Ewen specimens exhibited no color change.

Shriver Chert. The Shriver Chert is a formation of the Oriskany Group; it crops out in northwestern New Jersey and Pennsylvania (Lavin 1983:85). Unaltered chert is dark gray and black, sometimes with dark brown shading (Lavin 1983:84, 169). A black specimen with dark brown shading was heated to a maximum temperature of 450° C for three hours, it showed a slight increase in value to very dark gray and a lighter brown, still within the normal color range of the unaltered chert.

Onondaga Chert ("Onondaga Flint," "Buttermilk Falls Chert"). The Onondaga Formation crops out from Ontario through New York, northwestern New Jersey and Pennsylvania, and into Maryland (Lavin 1983:90). Unaltered chert may be homogeneous, shaded or mottled. Colors include black, dark gray, medium gray, light gray, white, blue gray, light blue, dark blue, blue black, khaki, tan, brown and gray, brown and blue, light or dark brownish grays, and pink. Only black and dark gray cherts have been reported from northwestern New Jersey and Pennsylvania (Lavin 1983:92-93, 172-174).

Nine specimens were heated at a maximum temperature of 150° C for three hours. The two black specimens from two loci in northwestern New Jersey exhibited no color change. A black specimen from northeastern Pennsylvania exhibited only a slight increase in value to a lighter grayish black. Specimens from the eastern New York loci showed , slight increases in value, and in one case, a change in hue: A black and very dark gray specimen turned very dark gray and dark gray. A very dark gray mid dark brown specimen turned dark gray and a lighter brown. The dark bluish gray specimen ~shaded with reddish gray turned medium gray and reddish gray. The three specimens from the Divers Lake prehistoric quarry near Buffalo, New York, exhibited color changes in hue and value: one specimen exhibited a decrease in chroma: A mottled specimen of medium bluish gray, dark brownish gray, dark grayish brown, and dark yellowish brown turned mottled white, light gray, and dark brownish gray. A white and light to dark brownish gray specimen showed a change in hue from Yellow-Red to Neutral. A dark brownish gray and grayish brown specimen turned dark to medium gray and dark grayish brown, also exhibiting changes in hue.

Beacon Hill Chert. The Beacon Hill Formation is a secondary fluvial sand and gravel containing chert pebbles and cobbles; it crops out in central and southern New Jersey (Lavin 1983:98). Unaltered chert is mostly shaded but some specimens are homogeneous. Colors include browns, yellow, brownish gray, yellowish white, and white (Lavin 1983:99, 181). Heated to a maximum temperature of 450° C for three hours, a specimen shaded white, yellow, and pale brown turned light reddish brown, pink, light brownish gray, and pinkish gray-a coloring not reported in the unaltered color range of the chert type.

Pensauken Chert. The Pensauken Formation is a secondary fluvial sand and gravel containing chert pebbles and cobbles; it crops out in central and southern New Jersey, and southeastern Pennsylvania (Lavin 1983:109). Unaltered chert is mainly shaded but homogeneous specimens occur. Colors include black, dark grays, medium gray, light grays, browns, buff, yellow, brownish gray, grayish brown, olive gray, yellowish white, and white, and possibly bluish black (Lavin 1983:109, 182-183). Heated to a maximum temperature of 450° C for three hours, a specimen shaded pale brown, yellow, yellowish brown, brownish yellow, and reddish yellow turned reddish brown, a color not reported ill the unaltered color range of the chert type.

SUMMARY

In summary, heating produced no color change in only eight of the 54 specimens. The majority of these (six) were black (Munsell Color Code N2 or N2.5) cherts representing the Allentown, Norman skill, New Scotland, and Onondaga chert types; two specimens of very dark gray (N3) chert represent the Halcyon Lake and Helderberg (Kalkberg or Port Ewen Formation) chert types. It should be stressed, however, that we cannot infer from these data that dark cherts in general will exhibit no color change after heating. Perusal of Table 1 will show that some dark chert types, such as Alsen and Kittatinny, undergo marked color changes during heating.

Forty-six of the 54 specimens exhibited some form of color change. Of these, one exhibited a change in hue only. Nine exhibited a change in value only; all nine increased in value (that is, the cherts became lighter in color). The remaining 36 specimens exhibited changes in line and value and/or chroma; the

majority of these showed an increase in value (lightening of the chert) and/or decrease in chroma (decrease in color strength, or an increase in grayness). Several of the specimens turned red, reddish brown, or mottled brown and red or pink upon heating. They include Hardyston, Newark, Little Cattail creek, Wissahickon, Beacon Hill, and Pensauken cherts. Several other chert types exhibited an "exotic"" coloring not seen in unaltered specimens (that is, those occurring naturally in source outcrops). This "exotic" coloring often took the form of red or pink mottling or streaking; it occurred in specimens representing the Normanskill, Beekmantown (Kickenbach or Epler Formation), and Kittatinny chert types, The thermal alteration of several Normanskill specimens to mottled or shaded grays or brownish gray and red or pink is distinctly "exotic" to the normal Normanskill color range. Rick's (1978:30) thermal study of lower Illinois Valley chert types also showed trends toward reddening and lightening of chert color after heating. Some specimens of the Normanskill, Allentown, Alsen, and Little Falls chert types exhibit other "exotic" colors or values not seen in unheated specimens of those types, such as brownish gray shaded or mottled Normanskill cherts, reddish brown and yellowish red Allentown cherts, light gray Alsen chert, and olive gray Little Falls chert. Many of the specimens, however, exhibit only a slight change in hue, value, or chroma, and this color change is well within the normal range for the chert type (that is, the "natural" color range noted at its source outcrop area).

In my sample, only brownish cherts turned completely red upon heating. But other studies (Klein 1973; Purdy and Brooks 1971; Rick 1978) indicate that gray cherts may do so, too. Heating of some of my black, gray, or bluish gray specimens did, however, produce red or pink streaks and blotches. According to research by Purdy and Brooks (1971:323), thermal alteration to a red or pink coloring is dependent upon the amount of iron oxide contained within a chert specimen. Significantly, microscopic analysis indicates that iron oxides are often present in specimens of the chert types discussed in this paper (Lavin 1983:138-182, Appendix c).

At present, sample size is too small, and/or variations within some chert types are too great to allow one to predict the type of color change induced by heating a specific type. The thermal alterations discussed above do have important repercussions for studies of lithic procurement and exchange, however, as they indicate color is not a reliable criterion for chert source identification, especially when the cherts in question are red, pink, or brown. Heat-treatment of some chert types did extend their normal color range to include hues and/or values that were previously considered diagnostic of "exotic" chert types and indicative of trade relationships. The thermal experiments demonstrate that the lithic source of red chert artifacts from northeastern archaeological sites need not necessarily he the Hardyston ("Pennsylvania Jasper") Formation, as is often postulated in site reports. Other possibilities include thermally altered Little Cattail Creek Chert from eastern Virginia, Newark Jasper or Wissahickon Chert ("Broad Nun Chalcedony") from northern Delaware, eastern Maryland, and southeastern Pennsylvania, or the Beacon Hill or Pensauken secondary fluvial "pebble cherts" from central and southern New Jersey. White or light gray chert artifacts found on archaeological sites in the Hudson or Upper Delaware Valleys may not represent "exotic" chert types imported into the area through exchange or procurement; they may merely be thermally altered representatives of the locally available Normanskill, Alsen (Helderberg), for Kittatinny chert types.

These thermal experiments indicate a need for more heat-treatment studies of these and other regional chert types in order to better document the extent of thermally-induced color changes in local cherts. In this way, we may prevent their inclusion in the "exotic" chert category and the promulgation of fictitious "trade" relationships.

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THE RABUILT CAVE SITE-PKE 4-1 SITE REPORT

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INTRODUCTION

Rabuilt Cave is located in the town of Poughkeepsie between the villages of Red Oaks Mill and Wappingers Falls, New York. Occupying lot #6-20 in the Rabuilt Homes Development, it has been assigned site number PKE 4-1 by the State Archaeologist.

Most of the hills in the surrounding area are based on a limestone ridge which extends northerly to the village of Rhinebeck and southerly to the city of Peekskill, roughly paralleling the Hudson River. We believe this ridge contains many more as yet undetected cave and rock shelter-type sites, making it a valuable archaeological resource.

Wooded hills and semi-dry swamps laced with many small and some large streams including the Wappingers Creek make up the areas geography. The area is still rich in faunal and floral resources making it more than suitable for habitation.

The cave is situated in a limestone outcrop at an elevation of 200 feet commanding a favorable view of the valley floor below. The entrance, facing southeast, offers adequate wind and storm protection. Two huge limestone boulders partially block the cave entrance making entry rather difficult. It is believed that these boulders were situated above the entrance during the period of occupation making this a combination cave/rockshelter-type site. Supportive of this argument is that artifact concentration was highest just inside the entrance diminishing rapidly farther back.

GEOLOGY

The cave appears to have been formed by the two cycle process of ground water solution dissolving the limestone surrounding a crack along a bedding plain during a period when the gallery was below the existing water table. As the water table dropped below the gallery level, the ground water drained away and was replaced by ground air effecting the second stage of the process, that of depositional replenishment where in the evaporation of percolating vadose water (water table streams) and the escape of carbon dioxide from it causes it to deposit calcite and form drip stones on the cavern roof and floor. (Davis 1967:17-28).

Evidence supporting this theory includes the concave shape of the cave walls making its width greater above the floor as opposed to vadose stream produced caverns in which the floor is the widest point. Secondly there is no apparent grading with respect to any external control as in vadose stream produced caverns. Thirdly the irregularities in the floor profile support the ground water solution process since the wide floored galleries of vadose corrosion cannot have such depressions because their widening could not have begun until their floors had been reduced to fairly even gradients.

One more argument for the two cycle theory of formation of this cave was noted in Stratum IV in the form of a clayey residue in the matrix caused by the removal of calcite by solution in low-lying ground water, a trait not present in caves excavated by vadose corrosion (Davis, 1967:17-28).

STRATIGRAPHY

The stratigraphy of the cave floor fill may be described as follows. Stratum I averaged 15 cm in depth and consisted of dark brown topsoil, leaves, bone and lone fragments, stone rubble which had been detached from the ceiling, and modern trash; consisting of three soda cans and the unburnt stubs of many candles. It was clearly evident that this site had recently been disturbed, fortunately not to) any great extent. Stratum 11 averaged 30 cm deep along the base line, rising sharply, to 15 cm near its

junction with the north wall. From the base line it slowly diminished in depth to 10 cm in squares CO+C1 and GO-C1. It consisted of a greasy dark brown soil heavily saturated with broken bones, along with a few intrusive candle stubs indicating that some mixing of Stratum I and II had occurred. Stratum III was concentrated primarily along the base line averaging 30 cm in the front halves of squares A0+A1 and A0-1 where it intersected bedrock causing it to diminish to 15 cm in depth. Averaging 15 cm in squares 130+B1 and BO-1 it again intersected bedrock just before reaching squares C0+Cl and C0-Cl, causing termination there. Consisting of gray brown silt, again saturated with bones and bone fragments it was undisturbed in context. Stratum IV was contained wholely in square A0+A1. Occupying the southeast corner of the square, it was 15 cm deep and consisted of a mixture of light tan and gray clay with some hone fragments. Intersecting bedrock at a depth of 90 cm below datum, Stratum IV completes the cave stratigraphy. Some mention should be made here about the limestone ceiling slabs found in abundance at all levels. A natural component of any local cave fill, they made troweling difficult.

METHOD OF EXCAVATION

The cave consisted of two galleries averaging four square meters each, in area, interconnected by a shaft five meters long and one meter wide. Excavation was limited to the outer most gallery.

Our grid plan, through a bit unorthodox, provided satisfactory control of the physical and cultural site context (Figure 1). It consisted of six one meter squares and three square extensions, originally left as baulks for the purpose of stratigraphic definition and later removed because of the abundance of refuse bone observed within the profile, beginning 15 cm inside the gallery entrance and terminating 1 meter into the interconnecting shaft. With the exception of the baulk left along base line - A1/+A1, the entire cave fill was carefully removed and sifted through a 1/8 inch mesh screen. Aware of recent site intrusion by point hunters (one of whom introduce us to the site after showing us two projectile points recovered near the cave entrance), we elected to excavate in 15 cm arbitrary levels unless disturbance proved to be minimal. In that event natural or cultural stratigraphy would dictate the excavation units observed. A datum point was established in the southeast corner of the cave between coordinates +A1 and A0. All profile depths will be related to this point. Sec Figure 2.

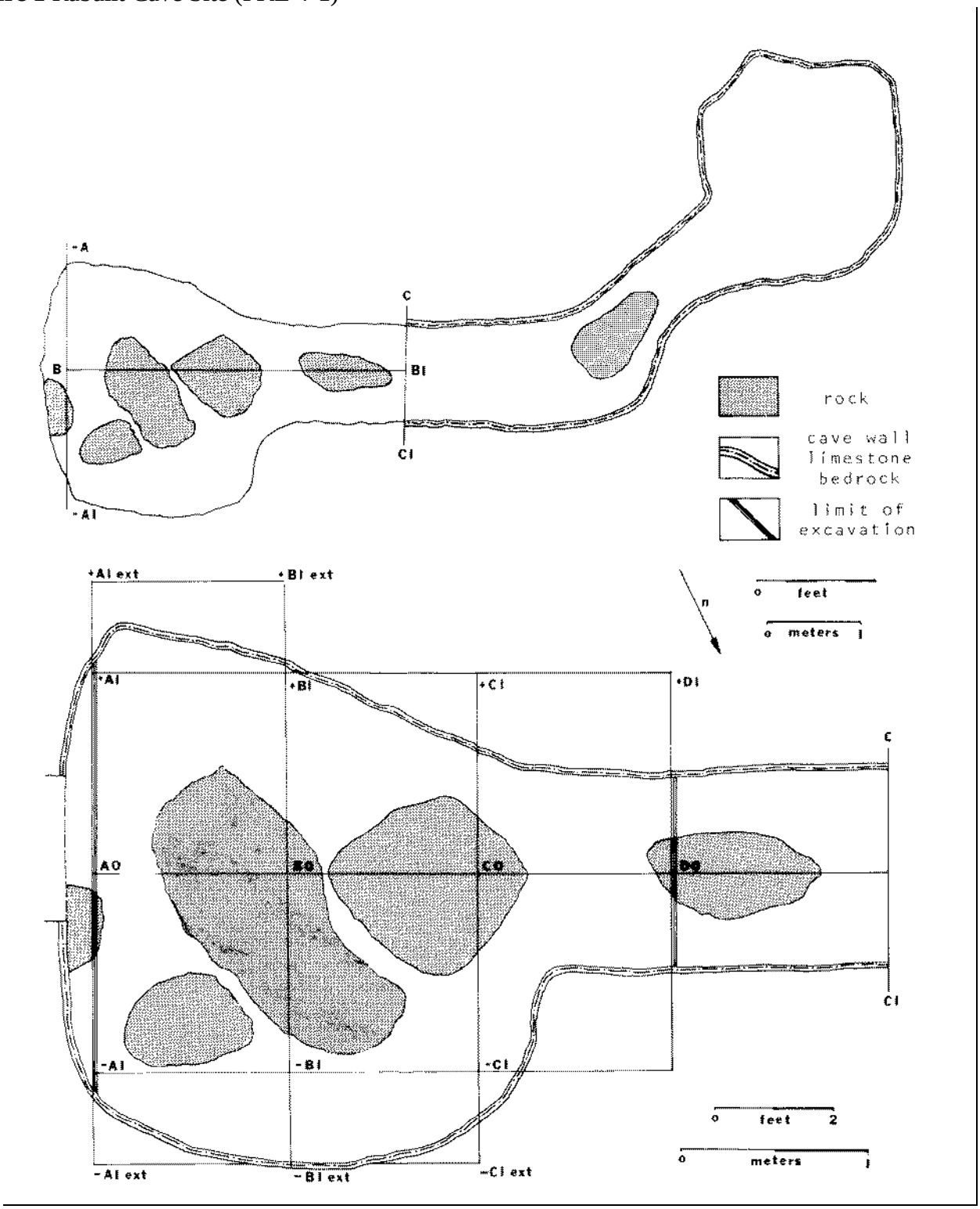
ARTIFACT DESCRIPTION

Zone I

Due to the complete lack of diagnostic lithic material, and since obvious mixing of levels one and two had occurred, they will be treated as a single occupational zone. However, the two projectile points, one a Snook Kill (black flint) and the other a Sylvan stemmed (quartzite) (Plate I), presented to us by Steven Kondor suggested a successive or dual occupation. Steve introduced the site to us in the fall of 1975 and indicated the area and depth of recovery of these points on our site map. They were found relatively close together at the junction of Stratum one and two.

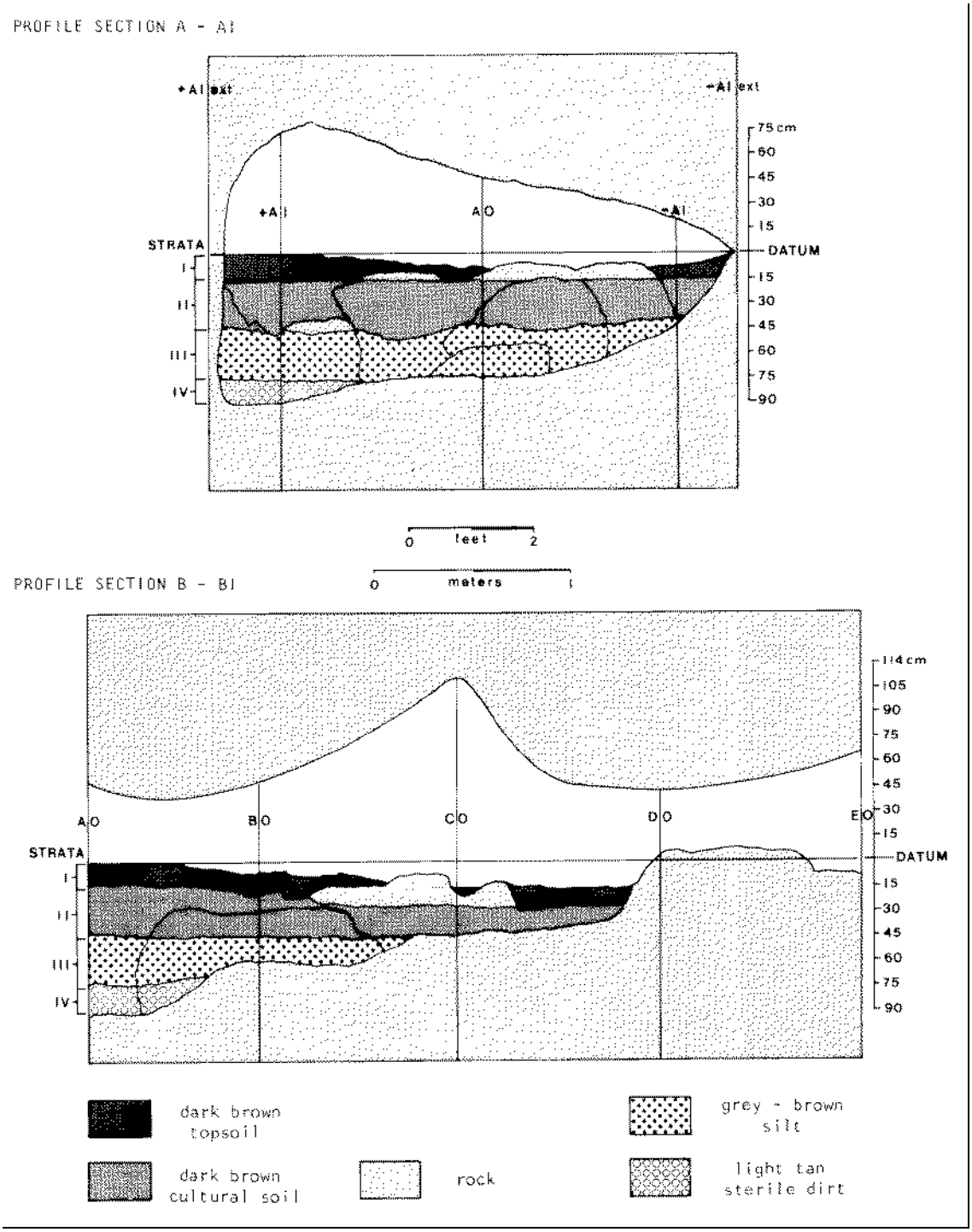
Similar combinations of Snook Kill and Sylvan points were found at the Sylvan Lake Rockshelter, where they (Snook Kill) intruded upon the last Occupation by Sylvan Lake groups (Funk 1976:148-72). Snook Kill occupations occurred stratigraphically above the Sylvan Lake zone at Parham Ridge (Funk 1976:187-88); and were stratigraphically superior to Sylvan stemmed points and below an Orient Fishtail and two probably Early Woodland points at the Zimmerman Shelter (Funk 1976:106-112). The majority of artifacts recovered from Zone I were made from mammal bone; indicating at least a partial reliance on this material in tool manufacturing by these groups. Found were one, two barbed harpoon blade (12.5 cm long) made from the right proximal end of a of deer's tibia, one barbed harpoon blade fragment (35 mm long) made from an unidentified mammal, one pressure flaking tool of ground bone (28 mm long), one drilled segment of the plastron of a woodturtle, three pen point awls consisting of long bone splinters with round points, two distally ground raccoon ulnas, one distally ground raccoon radius, one ground distal end of a raccoon humerus, one distally ground Lynx sp. ulna, one

Figure 1 Rabuilt Cave Site (PKE 4-1)



Map Enhancement by Patricia Miller.

Figure 2



distally ground Lynx sp. radius, and the medial portion of a raccoon fibula ground proximally. The last seven appear to be awls as do the next two consisting of small unidentifiable bones with ground points. Two problematic bone tools recovered consisted of sections of a split long bone with graving spurs ground on one side. They are believed to be seam markers or scribers used to mark animal hides in the

in manufacture of clothing.(1) One problematic flint tool, (Plate I, C) pointed at one end as the result of pecking and polishing and generally crescent shaped, was recovered from this zone. A hinged flake appears to have been removed at the point tip suggesting that the tool was possibly used for pressure flaking and retouch work (Table I, Plate I) One anvilstone and three hammerstones (one pitted)

Table 1/Plate I. Metrical Attribute and Distribution Summary of Zone I Artifacts by Square

Plate I Letter	Artifact	Length	Width	Thickness	Material Type	Material Description	Usage Indication	Square Depth
				A0+A1				
A	Projectile Point (Snook Kill)	5.05	2.70	.60	Lithic	Black Flint	FL	15cm
B	Projectile Point (Sylvan Stemmed)	5.30	1.85	.60	Lithic	Quartzite	FL	15cm
D	Flaker	2.85	1.15	.60	Bone	Unidentifiable	GR,PL	28cm
E	Awl	3.45	1.25	.55	Bone	Humerus Raccoon	GR,PL	22cm
F	Awl	2.65	.80	.55	Bone	Splinter	GR,PL	31cm
G	Awl	4.15	.65	.55	Bone	Fragment	GR,PL	41cm
H	Graver or Seam marker spur	2.35	.65	.40	Bone	Unidentified	GR,PL	32cm
I	Awl tip	2.25	.55	.45	Bone	Fragment	GR,PL	41cm
				A0 – A1				
C	Pressure flaker (?)	3.50	1.50	1.50	Lithic	Flint	PK,PL	18cm
R	Awl	11.50	1.30	.75	Bone	Ulna Raccoon	GR,PL	23cm
S	Awl	11.85	1.30	.80	Bone	Ulna Raccoon	GR,PL	18cm
				B0 – B1				
O	Harpoon Blade	12.25	2.65	.65	Bone	Tibia (cf Deer)	GR,PL	21cm
P	Awl	12.30	1.00	.60	Bone	Radius Lynx sp.	GR,PL	11cm
Q	Awl	10.95	.65	.50	Bone	Radius Raccoon	GR,PL	25cm
J	Harpoon Fragment	3.55	1.45	.95	Bone	Unidentified	GR	15cm
K	Graver or Seam marker pointed	4.05	1.80	.65	Bone	Unidentified	GR	20cm
U	Awl	7.15	1.65	1.20	Bone	Ulna Lynx sp.	GR,PL	38cm
				C0+C1				
M	Awl	2.55	.75	.60	Bone	Unidentified	GR,PL	22cm
T	Awl	7.80	.50	.35	Bone	Fibula Raccoon	GR,PL	25cm
				C0 – C1				
N	Awl	4.60	.90	.60	Bone	Splinter	GR,PL	23cm
L	Drilled Turtle shell	2.70	2.80	.30	Bone	Plastron Wood Turtle	DR	22cm

Usage indication key:
FL-flaked
PK-pecked
DR-drilled
GR-ground
PI-polished

(1) We observed Netsilik Eskimo women using similar tools in the film "At the Caribou Crossing Place" from the "Man: a Course of Study" Anthropology course, Jerome S. Bruner, founding director (1969), designed for use in public schools.

complete the list of Zone I artifacts (Table II, Plate II). In addition to the aforementioned artifacts, 1,016 bones and bone fragments were recovered from this zone.

The absence of living floors., hearths, debitage, and rejects associated with the lithic tool industry indicated to its that this area of the cave was utilized primarily as a midden for the deposition of refuse. All of the artifacts recovered from this context were either broken or badly worn and were probably discarded along with the refuse hone. Occupation is believed to have been concentrated outside the cave, under the overhanging ledge. Lithic artifact distribution (three hammerstones, one anvilstone and two projectile points) concentrated at the present cave entrance supports this theory (Funk, personal communication 1978).

ZONE II

Zone II was entirely contained with Stratum III (45 cm-75 cm) below datum. Only five artifacts were recovered from this zone, four of which were bone, consisting of two raccoon ulnas with their proximal ends removed and distally ground, (one of which was intentionally perforated near the proximal end suggesting possible use as a needle), and the other two were simply ground and shaped fragments of unidentified bone, one of which probably, served as a hide flesher.

The fifth artifact, of lithic material, is a double basal notched projectile point, trianguloid in outline with straight edges. The basal notches form a very weak stem and two very distinct barbs at the base. One of the barbs has been broken and both notches exhibit grinding. The point is 5.8 cm long, 2.9 cm wide at the base and only 6 mm thick at its thickest point. Bifacial thinning has been accomplished by striking lateral flakes from both edges towards the center resulting in the presence of medial ridges on both the dorsal and ventral sides. Edge retouch was accomplished through additional pressure flaking.

The point was found in situ in square A0+A1 at a depth of 70 cm below datum in direct association with two fragments of unidentified large mammal bone (Plate III, Table III). This point type appears to be rare in this area, hence we were unable to locate much reference material with which to compare it. When found in northeastern sites, it seems to be a one of a kind point, with little if any other diagnostic material associated within its context.

Elizabeth Dumont offers this description of a similar point recovered at the Rockelein Site, Sussex County, New Jersey:

> In the 18 in. of cultural deposits between L and Q levels (40 in.-58 in. below the surface) three LeCroy points were recovered (Plate I, b-d), two untyped bifurcated points (Plate I, e.g.) one concave base Kirk-like or Otter Creek-like side notched point (Plate I, f), and a basally notched point resembling the small variety of Eva point from Tennessee. (Plate I, k). . . . The Eva-like point, which Kinsey has also discovered in surface collections on the Pennsylvania side of the Upper Delaware and has assigned a Late Archaic provenience, (Kinsey 1972:419) has been dated at 7,150 BP in Tennessee, (Lewis and Lewis 1961:40, 43, 44). Its presence in Rockelein is anomalous; yet a similar specimen was recovered at the Hollowell site on Staten Island (Ritchie and Funk 1971:47).
>
> (Dumont 1979:46).

Table II/Plate II. Metrical Attribute and Distribution Summary of Zone I Artifacts by Square

Plate II Letter	Artifact	Length	Width	Thickness	Material Type	Material Description	Usage Indication	Square Depth
					A0 – A1			
B	Hammerstone	11.85	7.20	7.40	Lithic	Quartzite	PK	30cm
C	Hammerstone	6.60	9.30	4.15	Lithic	Sandstone cobble	PK	35cm
D	Hammerstone	6.20	7.50	4.70	Lithic	Sandstone	PK	43cm
					B0 – B1			
A	Anvilstone	12.40	10.70	7.35	Lithic	Quartzite	PK	35cm

PK-pecked

Table III/Plate III. Metrical Attribute and Distribution Summary Zone II Artifact by Square

Plate III Letter	Artifact	Length	Width	Thickness	Material Type	Material Description	Usage Indication	Square Depth
A	Hammecstone	9.6	7.1	5.1	Lithic	Sandstone	PK.GR	88cm
B	Flesher	4.7	1.3	1.2	Bone	Unidentified	GR.PL	63cm
C	Mat Needle	7.6	1.0	.5	Bone	Ulna (Raccoon)	GR.PL.	63cm
D	Worked bone	4.0	1.55	1.0	Bone	Unidentified	GR.PL.	61cm
E	Awl	8.1	1.25	1.05	Bone	Ulna (Racccon)	GR.PL.	84cm
F	Projectile Point (Eva-like)	5.7	2.8	.65	Lithic	Unideotified Flint	FL.	90cm

FL-flaked
GK-ground
PK-pecked
PL-polished

BONE RECOVERY

The major portion of cultural material recovered from the Rabuilt Cave site was refuse bone. The hone was carefully removed from the soil and placed in moisture tight containers. Bone that is allowed to dry too quickly will splinter and crack, making identification almost impossible (Robbins 1973:177). The material was cleaned, using warm water, and dried slowly away from direct heat or sunlight. Much of the bone was recovered by sifting the soil through 1/8 in. mesh screen while some of it was recovered through flotation.

METHOD OF IDENTIFICATION

In our analysis we have grouped the osteological material from all three zones. Total bone fragments for the site numbered 2360. 37.5% (885 bones) were identifiable although only 17% (399 bones) were identified. This was due to the many vertebra, teeth and phalanges that would not have changed the minimum number of individuals by much, but would have consumed valuable time. Minimum number of individuals was determined in the manner Chaplin has explained in the "Study of Animal Bones From Archaeological Sites." The lone bones were compared for each species and .the elimination of total animals were made. (Appendix 2).

The bones were treated the same as all artifacts in that numbers were assigned according to the square and level of excavation. The bones were glued together to enable a better view of elements represented. They were then sorted by similarity and grouped as closely as possible to species using Olsen's "Animal Remains from Archaeological Sites" (Olsen 1973). Joanne Bowen, then associated with the American Indian Archaeological Institute, Washington, Connecticut, aided us in the final identification. She loaned us her comparative collection, and helped us to establish one of our own. Additional identifications were made through the use of Yale's osteological laboratory.

All identified fragments were recovered by species and bone element (See Appendix I).

FAUNAL ANALYSIS

The cave midden is probably a refuse pit related to the larger site occupied outside. Soil disturbance due to limestone droppings and recent human activity has warranted treating the entire midden as a whole. Separation was made in association with artifacts and distinct soil changes. Similar animal remains recovered at all zone levels told us that the subsistence Patterns remained basically the same. The absence of deer in Zone II could have been misleading as large bone fragments were found

that were unidentifiable but probably deer. Breakdown into two zones of artifact distribution presented us with a clear picture of the artifact assemblage, but separation of osteological material was not so evident in the faunal analysis. Bone was grouped in association with the three stratigraphic zones, Zone I - strata 1 and 2, Zone 2 - stratum 3, and Zone 3 - stratum 4.

MINIMUM NUMBER OF INDIVIDUALS

Emphasis should be made here on the problems of estimating minimum number of individuals (MNI). The bones recovered from the site were the remains of many ecological and human factors. Although the cave provided ideal preservation, much could have been lust through rodent activities as well as larger game taking it from the site.

Human activity is evident on most of the bone. Some bone was burnt reflecting roasting, and almost all the bones were broken or butchered. Bone tools were plentiful. The processes that these fragments were subjected to, have determined the degree of bone survival (Appendix 2).

DEPOSITION AS THE RESULT OF ANIMAL ACTIVITY

One factor, which affects faunal representation from cave sites, is the probability that some of the species might have used the cave as a den or simply went in there to die. The possibility also exists that some of the smaller species represented, normally not considered to be of any nutrition al value to man, were there as the result of predator activity.

While many of the animals represented in the Rabuilt Cave assemblage are know n to use this type of shelter occasionally, we believe the gallery to be too large for natural selection by all but the snakes and large canis species. Mammals tend to seek out dens with entrances and galleries large enough to enable them to enter, but small enough to keep out larger predators. Dens used for liberation must also be small enough to allow the resident to retain its body temperature through out the hibernating Season.

The evidence of small bird and mammal remains on the site being the result of predator activity Is also in question. Predators, in most instances consume their entire catch, with the exception of fur or feathers, at the site of kill. In the event that the prey was brought into a den to be consumed by the Young, the same results would have occurred. In fact, the presence of osseous material remaining on sites supports the theory that the bones were depleted of marrow and grease, probably through boiling before being deposited in the midden, leaving little to entice the scavenger. Yellen (1974:44-45) draws basically the same conclusion in describing the factors responsible for bone disappearance on !Kung Bushmen sites. He noted the presence of hyena, jackal and lesser predator tracks on abandoned !Kung sites, however he felt that while some bones, especially small intact bones from the extremities certainly were removed in this way, his own guess is that carnivores cause less disruption than might be expected since little is left when the !Kung have finished with the bones. The massive jaws of the hyena, for example, are adapted to cracking the marrow rich longbones, but the !Kung always do this themselves and boil and pick the bones clean. Yellen did note the effects of noncarnivore activity such as rodent gnawing as a destructive factors on !Kung sites. We have noted similar destructive affects on the osseous material collected at Rabuilt Cave.

AGE

Age was determined by apiphysis fusion or the lack of it. Immaturity was determined by the lack of fusion of the epiphysis in long bones and/or deciduous teeth in the mandibles. Maturity was characterized by complete fusion. Senile bone showed up in only one species, (Raccoon) with tremendous wear on the teeth (see plate IV). The teeth were removed from the mandible to be certain that this was not a primary tooth but rather a secondary tooth of considerable age. The total midden had 74% mature, 24% immature and 1% senile. Additionally one fetal deer was identified through the use of Yale University's comparative collection.

BUTCHERED BONE

Butchered bone was not very evident although almost all the large bones were broken for possible marrow extraction. A bone was only noted as butchered when a cut mark was clearly evident. In Zone I only deer showed definite butcher marks although the breakage of skunk and squirrel long bones at the distal end of the humerus should be noted. It could he assumed that the non-meat producing portion of the humerus along with the ulna and other lower extremities of the leg were cast aside before processing the meat any further. Raccoon and skunk displayed butchering marks in Zone It. Woodchuck, raccoon and skunk showed the above mentioned leg bone breaking technique. In Zone III deer and raccoon displayed butchering marks.

POUNDS OF MEAT

Pounds of meat was derived by taking the MNI's and using Theodore White's study to estimate pounds of meat per species (White 1953) Appendix 3.

SITE SELECTION AND FAUNAL EXPLOITATION

In any discussion of Archaic settlement patterns or more appropriately, site selection, a number of environmental factors as well as animal resource availability must be dealt with. The object being to determine the optimum place and time for exploiting the available resources at their peak of abundance and in the case of animal resources, when they were in the best condition to offer the most quality meat and by-products for the least amount of effort. This concept of being at the right place at the right time is certainly demonstrated by the varied site types assigned to the Archaic period in the northeast. We find river based fishing camps, inland hunting camps, camps which indicate the exploitation of wild plants and vegetables, and quarry sites. With the exception of the latter, it is obvious that seasonality as well as climatic conditions would surely dictate site selection by these groups.

One important environmental determining factor must be considered when estimating late Archaic seasonal settlement patterns, that being the Climatic Optimum, or Hypsithermal period of warm dry climate (Ogden, 1965; Deevey and Flint 1957; Beetham and Niering 1961). This period began at approximately 1000 BC and ended around 1000 BC, coinciding with the late Archaic phase of northeastern prehistory. This condition could have possibly affected the seasonal availability of some of the faunal resources previously considered intrusive to other-wise well defined fall-winter, or late winter-early spring inland hunting camps. The Climatic Optimum may also have created a number of small ecological sub-zones concentrated in areas where water was readily available such as low wetlands and spring fed lakes and streams. These areas certainly could have supported the types of animals that have been represented from most northeastern inland hunting camps, and would no doubt have been important plant gathering stations as well.

With this in mind, we will examine one of these site types inland hunting camps, with the hope of shedding some light on when and why this location was selected for use by late Archaic groups. Cultural material collected at the Rabuilt Cave site suggests that animal resource availability was an important criterion in determining site selection during all of the periods of occupation. Additionally, it seems that much concentration was placed on small game and fur hearing animals and although it few deer were taken (5.2% of the minimum number of individuals) their numbers represent a marked contrast with the predominance of deer on the majority of contemporary sites reported on within the mid to lower Hudson Valley. For example, at Fish Club cave (COX6) deer accounted for 96% of the refuse bone, and at the Zimmerman Rockshelter (COX24) deer was by far the most popular food animal at all levels. Farther south, at the Claverack Rockshelter (CTL6), deer accounted for 90% of the faunal remains while (in close proximity to Rabuilt Cave) the Sylvan Lake Rockshelter (CLO2), was also a deer hunting camp with deer comprising 95% of the faunal remains from Stratum I, 90% from Stratum 2, and 64% from Stratum 3. We have used rockshelter sites for examples for two reasons. First, because bone preservation was greatest at these sites as opposed to open camps, and secondly, to demonstrate

that the type of site (cave or rockshelter) was not itself, an indicator of the activities which were carried on there. Their location with regards to ecological sub-zones was however, an economic indicator and helped to determine the season of occupation. These sites were all located in wooded valleys interlaced with small streams, well back from major waterways and adjacent to large expanses of upland forest. This type of eco-zone has been noted in modern tines to support good deer populations especially in years of heavy mast crops of beechnut, hickory nuts and acorns, during the fall and early winter.

RESOURCE ANALYSIS (Methodology)

Due to the diversity in game exploitation suggested by the faunal remains recovered from the Rabuilt Cave Site; and in view of the observation that deer were taken less frequently than most of the medium mammal species, (a marked contrast with it's dominant representation on most late Archaic back country hunting camps reported on within the Hudson Valley), we decided to perform a site catchment analysis with the hope that it could provide us with the types of information necessary for us to be able to explain this diversity.

Using a U.S. geological survey map Poughkeepsie Quadrangle NY, 7.5 minute series, a series of circular catchments was laid out at 1/2 kilometer intervals around the camp (Figure 3). A total of five catchments were represented. The largest with a radius of 2.5 kilometers, represents, we believe, the maximum effective range of resource exploitation for the small groups of hunter-gatherers, possibly small nuclear families) that occupied the site.

While it was doubtful that the map could provide us with much in the way of prehistoric vegetational representation, it did present us with the geological and hydrological features located within the catchment areas.

Extensive walking surveys were conducted throughout the course of a year over the entire catchment area. The surveys provided us with information relating to preferred habitation zones and food procurement activities demonstrated by a variety of wild life, either residing in, or hunting within the catchments. The seasonal availability and location of numerous plant forms, which were abundant enough for successful human harvesting, were also recorded.

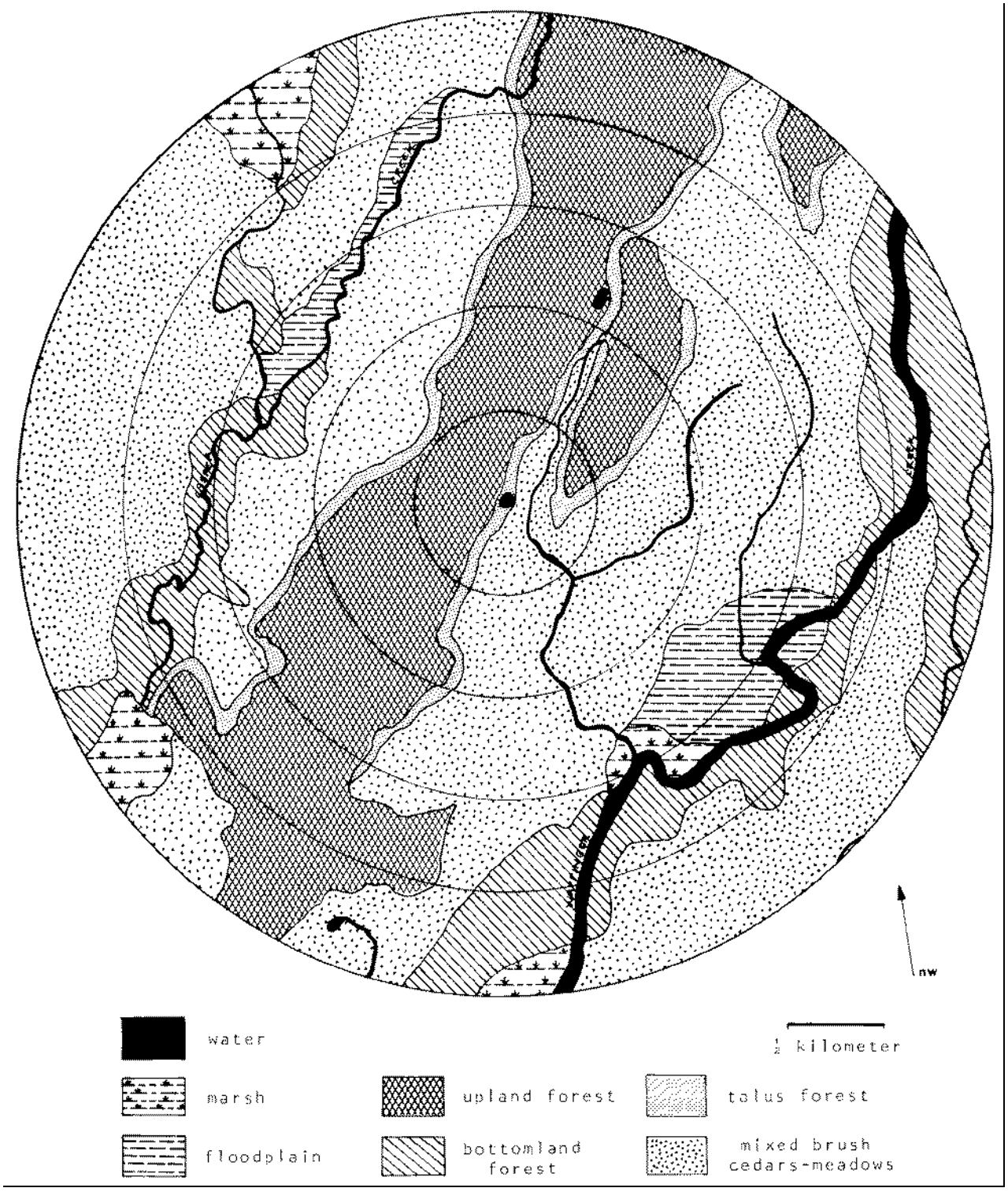
Since we had no evidence, from the site, of any plant resource exploitation during any of the occupation periods (possibly this was due to the area available for sampling) we are forced to make the assumption that either many plants were not seasonally available at the time when the site was being occupied, or that they simply were not abundant enough to provide a profitable harvest. Occasional plant utilization would seem likely, however.

Plant utilization, by animals found within the catchments area, was investigated in the survey since with few exceptions most of the animals, represented from the site context, can still be found in harvestable numbers within these catchments. We feel safe in making the inference that the same plant forms that support wild life populations at the present, must have also supported similar wild life populations during the late Archaic period.

A set of tables was compiled based on the information collected from the surveys and information contained in a number of the "Petersons Field Guide and Golden Field Guide Series" (e.g., mammal, birds, fish, reptiles). The first of these tables (Table III) lists the seasonal availability of various generalized plant and animal forms occurring within the catchments area. The purpose of this table is to demonstrate likely interaction between plants and animals as a factor in determining when concentrations of easily exploitable game, and or, plants would be taken.

The catchments were partitioned into a series of habitat types based primarily on soil, vegetation, topography and hydrology. These habitat types are divisions of three major zones of habitation including upland forests, a fringe area, (containing a mixture of brush, cedar trees, and meadows), and lowlands. (Table IV), delineates the three habitation zones contained within the catchment region, and indicates the likely habitation preferences of all of the species identified from the Rabuilt Cave Site context. Additionally it provides information on the extent of animal resource exploitation for each of the species including MNI's, number and percent of butchered bones, and number and percent of bones converted into tools.

Figure 3 RABUILT CAVE SITE CATCHMENTS



Map enhancement by Patricia Miller.

Table III. Seasonal Availability of Plants and Animals

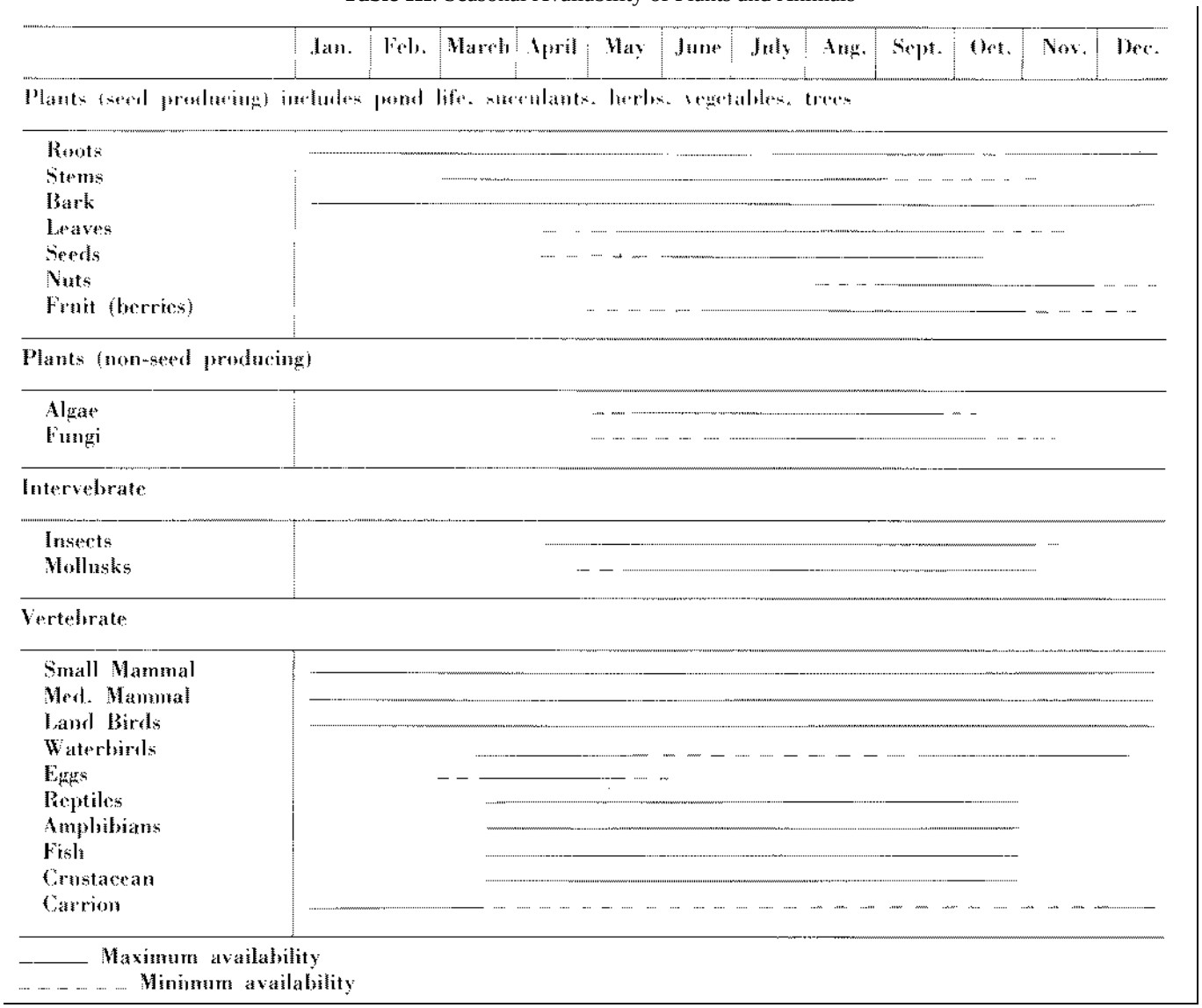


Table V indicates the likely periods of exploitation of the identified species based on seasonal abundance of food chain resources resulting in high concentrations of animals at preferred feeding stations, (e.g. white-tailed deer in areas of plentiful mast crops), or increased animal activity during their respective breeding seasons.

It may be noted that animals are usually healthiest during these periods and would have provided more pounds of meat through less effort than at other seasons.

THE SETTING AND ITS RELATIONSHIP TO SEASONAL OCCUPATION

As stated previously there were three distinctive habitational zones contained within a 2.5 kilometer radius of the site. Faunal resource exploitation was undoubtedly practiced in each of the zones based on the ecological factors determining plant and animal availability.

The first habitation zone may be defined as the lowlands. Containing major streams, tributary streams, marshes, flood plains, and bottomland forests, it represents the home range of the majority of

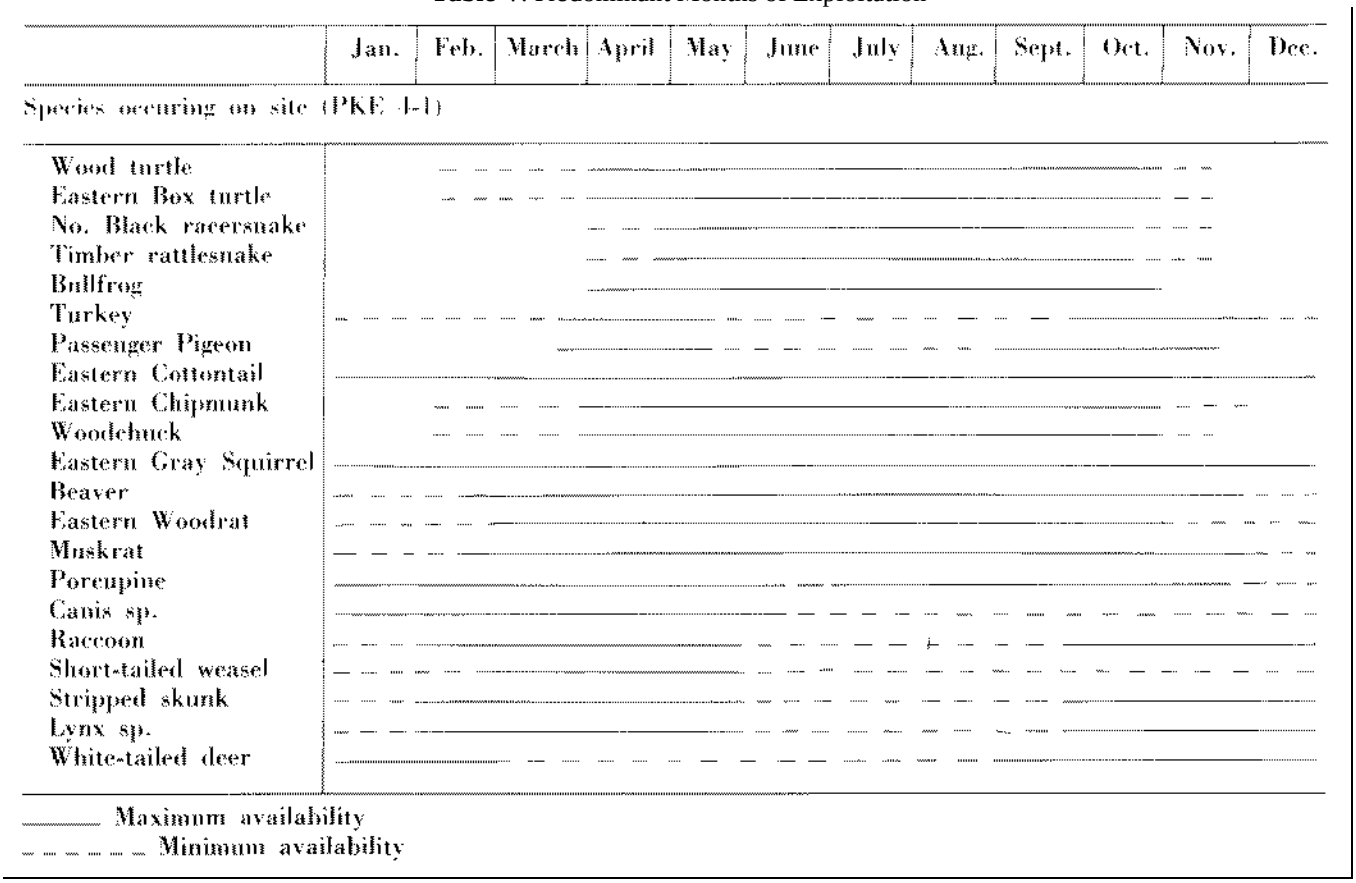
Table IV. Animal Resource Ranges/Exploitation

	Wood turtle	East. Box turtle	No. Black Racersnake	Timber Rattlesnake	Bullfrog	Turkey	Passenger Pigeon	Eastern Cottontail	Eastern Chipmunk	Woodchuck	East. Gray Squirrel	Beaver	Eastern Woodrat	Muskrat	Porcupine	Canis sp.	Raccoon	Short-tailed Weasel	Striped Skunk	Lynx sp.	White-tailed Deer
Lowlands																					
Major Streams & Rivers					X							X		X			X				
Tributary Streams	X				X							X		X			X		X		
Marshes	X	X			X									X			X	X	X	X	X
Floodplains	X	X						X		X						X	X	X	X	X	X
Bottomland Forest	X						X	X	X	X	X					X	X	X	X	X	X
Forest Edge (fringe)																					
Lakes & Ponds	X	X			X							X		X			X		X	X	
Tributary Streams	X				X							X		X			X		X	X	
Mixed brush, cedars & meadows	X	X	X				X	X	X	X	X					X	X	X	X	X	X
Uplands																					
Talus Forest			X	X					X		X		X		X	X	X	X		X	X
Tributary Streams												X								X	
Lakes & ponds												X								X	
Upland forest				X		X	X		X		X				X		X				X
Total Bone	2	2	4	5	1	1	2	3	9	8	19	6	4	6	5	3	136	1	110	9	17
Percent of total bone	.6	.6	1.1	1.4	.3	.3	.6	.8	2.5	2.3	5.4	1.7	1.1	1.7	1.4	.8	38.5	.3	31.2	2.5	4.8
Butchered Bone												1					15		2	2	6
Percent of total bone												.3					4.2		.6	.6	1.7
MNI's	1	1	2	5	1	1	1	1	3	3	7	4	2	1	2	1	14	1	20	2	4
Percent of total MNI's	1.3	1.3	2.6	6.5	1.3	1.3	1.3	1.3	3.8	3.9	9.1	5.2	2.6	1.3	2.6	1.3	18.2	1.3	26.0	2.6	5.2
Bone Tools	1																7			2	1

fauna identified from the site context. It also represents the preferred plant and animal exploitive range, based on seasonal availability, by a number of animals that denned or nested in one or more of the other zones (e.g. raccoons, and skunks took frogs, fish and young nesting birds from the wetlands during the warmer months).

The second habitational zone may be described as the forest edge or fringe area. Containing mixed brush and cedars, which would have provided suitable cover for a number of species represented on our faunal list; meadows, which were seasonally attractive to grazing animals such as the deer and woodchuck; and hydrological resources in the form of lakes, ponds, and tributary streams, which

Table V. Predominant Months of Exploitation



characterize the home range of some of our aquatic mammals including the beaver and the muskrat; this zone would likely have provided the residents of Rabuilt Cave with a continuous exploitable resource base throughout the year as a variety of plants and animals became available.

We have defined the final habitational zone, contained within our catchments areas, as the uplands, characterized by an upland forest, containing a mixture of deciduous hardwoods and conifers: and a talus forest comprised of glacial boulders, brush and hardwoods.

Though the uplands zone accounts for less than 30% of the catchment area, it is the zone in which the camp was located and may have been an attractor to groups entering the region in the fall in pursuit of the white-tailed deer. While providing a suitable winter yard area for a limited population of deer, the seasonal abundance of mast crops would have made exploitation of wild turkey, raccoons, and other lesser game quite profitable throughout the autumn months as well as have provided an exploitable vegetal resource for the inhabitants of the camp. Noting also, the nearness to a source of potable water in the form of a spring fed tributary stream, we believe the camp's centralized location to be ideally suited to the profitable exploitation, of resources contained within the previously defined habitats.

As the result of the apparent interaction between the various habitats contained within the catchments area, evidenced by the variety of game animals represented on the site, we propose that the site was occupied continuously from early autumn through late spring. We base this proposition on the logical scheduling of animal resource exploitation based on animal population densities, weight, quality of meat and usable by-products as well as inferrable plant resource availability. For example, raccoons and skunks are known to congregate in stands of wild grapes, a preferred autumn food source. Since grapes grow predominately in the lowlands, the scheduling of plant as well as animal resource exploitation in areas containing an abundance of wild grapes during the early autumn seems likely.

As mast crops of the beech, hickory and oak became available later in the fall, concentrations of deer and wild turkeys as well as numerous lesser game would dictate a shift in animal resource exploitation from the lowlands into the upland forest.

During the winter, emphasis would have been placed on the fringe area, where small birds and mammals provided a winter food source for omnivores such as the raccoon and skunk as well as the carnivores represented in our site context by the lynx species and the canis species.

Increased animal activity, relative to the breeding season, during the spring would have provided an expanded animal resource base from which to schedule exploitation. Activity may have been divided between the lowlands and the forest fringe where a variety of animals as well as the first edible plants of the season could have been simultaneously harvested.

Additional evidence supports the proposition that the camp was used from early autumn through late spring. We noted the presence of deer antler as well as the remains of a fetal deer within the site context.

While the presence of deer antlers, or deer skulls displaying shed antler bases on archaeological sites may serve to generally define a cold weather camp, we find the differentiation between fall, winter, and early spring to be problematical in that deer antler shedding may be affected by dietary conditions. For example, we visited a Pennsylvania hunting preserve, where the deer had been well fed all winter and had retained their antlers through early spring. On the contrary, in recent times, years of poor mast crops have yielded numbers of antlerless bucks, taken on doe permits during the regular New York State deer hunting season (November 20-December 18).

We also believe that the faunal representation, of which 75% of the animals were mature while 25% were immature, is an indication that the site was occupied fairly early in the fall, but not used during the summer when a higher percentage of immature animals would have likely occurred.

SITE ACTIVITY

Although the context of Rabuilt Cave proved to be little more than that of a midden for refuse bone with disappointingly few lithic tools and no living floors, it is still possible to suggest some of the major camp activities related to the exploitation of faunal resources for all of the three periods of occupation.

The midden was literally saturated with bone and bone fragments, some of which displayed butchering marks while others, in the form of long bone pieces, were probably the results of marrow extraction. A large percentage of the bone sample had been (probably) boiled to obtain bone grease and a small number were charred (4.4%), either as the result of the roasting of some portions of meat, or they may have simply ended up in the hearth by accident. Many of the boiled bones had been broken into pieces much smaller than those required for marrow extraction. Louis A. Brennan (personal communication, 1982) had offered a possible explanation for this occurrence, presenting evidence from shell midden sites in the lower Hudson Valley and the Tiger Lily Site, (Wisiewski, Gwynn 1983:15, 16) mount Sinai Harbor, New York. Brennan felt that after marrow removal, the collagen (almost pure protein) contained in the interstices of bone apatite can be extracted to provide an extremely nutritious, high protein soup stock. Samples of bone from shell midden sites located along the lower Hudson estuary were discovered by Brennan to have been split and chopped into small fragments and to have been 80%, collagen depleted (Brennan 1981:47-51), which he interprets as clear evidence for boiling for the purpose of collagen extraction.

The animal bones from Rabuilt Cave display similar features and we tend to agree with Brennan's hypothesis in general. However, we believe that collagen may have been extracted for uses other than dietary in nature or at least in addition to it.

William A. Burns of the American Museum of Natural History, (Burns 1983:26-27) describes a method of tanning animal hides employed by the museum which closely relates to the method described by Driver (1961:164-66) in which the hides were first stretched by lacing them to wooden frames by means of thongs run through holes around the periphery. Secondly, they were scraped to remove all flesh and fat from the skin side of the hide using various forms of the end scraper. When this was accomplished the hair was removed from most of the larger hides by first placing them into a milk bath consisting of lime and water which loosened the hair so that it could be easily removed from the hide. After the hide had been fleshed and dehaired, if this was desired, it was treated with a skin-dressing agent which perhaps acted chemically as well as physically on it. By far the most common agent was animal brains, normally those of the same animal which furnished the hide. When dry, the hide was softened

by drawing it back and forth over a dull stake. The hide was now ready for oiling, a process using warm animal or vegetable on which rendered the skin soft and supple. Finally the hides would be smoked to color them and to render them water repellant. It is in the oiling step that we find another possible use for collagen, possibly contained in the light oil used in replenishing some of the natural oils that had been leeched out during the tanning process.

We recovered a large number of bone awls of various types along with some bone scrapers including one end scraper suggesting that the processing of animal hides was an important activity at Rabuilt Cave. The absence of lithic scrapers and knives is puzzling in view of the presence of cobble hammerstones found near the cave entrance, suggesting that either all of the hide processing was conducted outside the cave or that bone scrapers were preferred over lithic ones for scraping hides. We also noted that the cave itself would have provided the lime necessary for the dehairing process as well as a handy smoking chamber and drying room for the hides. The blackened gallery ceiling supports the latter inference.

The large number of skull fragments represented in the oseous material, recovered fromthe site context, supports the theory that the residents of Rabuilt Cave were splitting the skulls of most of the animals to remove the nasal passages and brains which were either eaten or, in the case of the brains, may have been used in the hide tanning process. One may only suggest that the cobble hammerstones recovered at the cave entrance were used to break the long bones for marrow extraction since no other activities requiring the use of this tool have come to light. We must assume that the few projectile points and the one problematic pointed flint object recovered on the site were made elsewhere.

Michael Gramly has proposed an alternative to Brennan's hypothesis concerning the presence of small long bone fragments recovered from archaeological sites. Using material recovered at Pipestave Hollow (Gramly 1977), where numerous bone tools were recognized, he has proposed a bone flaking industry in which some of the large pieces of split long bones were set aside, as preforms, later to be flaked and ground into usable artifacts. The resulting waste flakes of bone are similar in size and shape to those Brennan has suggested were used for collagen extraction. Gramly, (personal communication, 1983) has experimented to some extent with this process using deer bone as a base material. The pieces were percussion flaked using a pebble hammerstone with the work supported on a wooden table. The results prove that bone is easily and quickly flakeable into various tool forms which can be ground with little effort into the desired finished tools.

While it may be inferred that a bone flaking industry may have existed during the late Archaic period and that the small long bone fragments recovered from these sites may be the waste flakes from this industry, we are doubtful bone that was 80% collagen depleted would have been suitable for conversion into bone tools. We would also doubt that the waste flakes would have been collected to be used later for collagen extraction. Obviously more testing must be done on refuse bone before we can properly address these propositions. One factor which excludes cave and rockshelter sites from this type of analysis is the presence of talus, which could have broken many of the bones as it fell from the ceiling to the floor of the shelter.

SUMMARY AND CONCLUSION

Rabuilt Cave was undoubtedly created by the action of high water tables, (possibly a glacial lake) towards the end of the Wisconsin glaciation, which dissolved the limestone, surrounding a bedding plain, within the limestone formation. Further enlargement of the gallery is attributed to the effects of cold wet periglacial conditions, which, through thermal action, released a number of angular limestone slabs from the ceiling, forming a sizable talus slope outside the cave, over which a prominent ledge eventually developed. ,

Gradual post glacial moderation in climate, resulted in the decline of the surrounding boreal forest and the expansion northward, of the locally modern deciduous forests. This transformation was reported to have been completed, in the northeast, by approximately 7000 B.C. (Guilday 1967). The deciduous forest provided habitations suitable to a variety of exploitable wildlife, which gradually attracted bands of hunter-gatherers into the Hudson Valley.

By approximately 4,500 B.C., a period of warm, dry climate, defined as the Climatic Optimum or Hypsithermal, (Ogden, 1965; Deevey and Flint, 1957; Beetham and Niering, 1961), appears to have influenced local habitational development, and possibly created a number of regionally exploitable ecological subzones in localities where adequate water supplies persisted (e.g. large streams, wetlands, and spring fed lakes). Evidence and radio-carbon date pertaining to the influence of a climatic optimum in the Hudson Valley have been presented by Louis A. Brennan through his description of shellfish exploitation, which was practiced on the lower Hudson estuary during the Late Archaic period. Brennan (1981:43) stated that the discard of the valves of oyster (*Crassostrea virginica*) in heaps, in which the ribbed mussel (*Modiolus plicatulus*) often occurs, along with the hard clam (*Venus mercenaria*) and the bay scallop (*Pectins Acquipecten*) in the Lower Tappan Zee, was practiced at aboriginal campsites along the Lower Hudson estuary from, by radiocarbon assay, 7000 to 2500 years ago, at which time the Lower Hudson ceased to support oysters by reason of periodically reduced salinity.

The reduction in salinity, we believe, was the result of increased fresh water replenishment in the Lower Hudson estuary during the period of warm moist climate which succeeded the Climatic Optimum. The first brief occupation of Rabuilt Cave, be hunters possibly representing the Vosburg Laurentian manifestation (about 3400-3000 B.C.), or at least contemporary with them, was indicated by the occurrence of a double basal notched "Barbed" projectile point, (plate V) which represents the lone diagnostic artifact recovered from the deepest stratified level of the cave. The point, defined by some researchers as Eva-like, has been locally classified as either Eshback or Milford, depending on its spatial provenience within the upper Delaware Valley, where it replaced the Vosburg point on some contemporary sites located farther to the north.

Others have temporally assigned the point to an early Archaic provenience as suggested by its, occurrence on the Hollowell site on Staten Island in contexts dating 8000 B.P. (Ritchie and Funk 1971:44-59) and on the Rockelein site on the Delaware River (Dumont 1979:46) where it was found in association with LeCroy points, which have been dated elsewhere at around 8250 B.P. (Broyles 1971:69).

We have assigned it to a late Archaic temporal provenience due to its relationship with other successive Late Archaic components represented at Rabuilt Cave.

A suggested subsistence, based on the faunal exploitation of a variety of terrestrial mammals including the deer, raccoon, and skunk is suggested for this occupational period.

By about 2500 B.C., early groups representing the Sylvan Lake complex began living on the site. These groups are characterized by their use of narrow stemmed quartz and quartzite projectile points. Employment of the atlatl, equipped with Innate stone weights to propel darts, tipped with these small stemmed points, may be suggested through the implied use of a problematic tool, (Plate 3 letter C) which may be a Innate bannerstone reject later utilized for pressure flaking bone or lithic material. A notable increase in refuse bone and the recovery of numerous lone tools indicates a long period, or possibly many short episodes of occupation by the Sylvan Lake people. Subsistence based on the exploitation of the white-tailed deer as well as numerous lesser game species, suggests that the camp was occupied continuously from early autumn through late spring. Inferred camp activities include, the butchering of animals, the breaking of long bones for marrow extraction, some bone boiling and roasting, and various activities related to the hide working industry; represented by the bone awls, end scraper and hammer and anvilstones recovered from the Sylvan Lake zone. Evidence of lithic tool production was nearly absent in all of the three occupation zones. This is likely due to the area of the site available for sampling, where very little in the way of work station activities would have normally occurred. However, one bone pressure flaking tool, as well as the flint pressure flaker previously described, indicate that some point sharpening or edge retouch work was being done on the site.

Some interaction with people representing the Susquehanna tradition (1500-1000 B.C.) appears to have taken place during the terminal occupation of Rabuilt Cave. A Snook Kill point recovered near the junction of Stratum I and II suggests either a subsequent Susquehanna Occupation or a possible relationship with Sylvan Lake people still residing in the area. Soil mix up at this level made occupational delineation impossible. A two barbed, bone harpoon recovered front Zone I may be attributed to either group.

Shortly after the deposition of Stratum I, sometime after 1000 B.C., all occupation of the cave ceased rather abruptly. Wetter climate succeeding the Climatic Optimum, may have caused the overhanging ledge outside the cave to collapse destroying a major portion of the sites habitation area and limiting access to the cave, thereby rendering the site uninhabitable.

Combined evidence relating to the three phases of occupation indicates that an episode of environmental stability existed throughout the late Archaic period within the Hudson Valley. Established ecological subzones containing an abundance of exploitable terrestrial fauna is suggested by similarities in the subsistence patterns displayed by these late Archaic groups. While zones situated in upland forest regions enabled hunter-gatherers to specialize in the exploitation of deer, turkey and mast crops throughout the fall and early winter, zones located in the lowlands provided a mixed bag of resources enabling longer seasonal periods of occupation, and less chance for failure, due to the availability of primary as well as secondary exploitable nutritional sources. Undoubtedly, camps situated in these previously defined lowland regions could have provided year round subsistence for small groups of hunter-gatherers. The limited representation of summer animals and the lack of fish and fowl suggest however, that these inland camps were abandoned during the warm months, when relocation to the banks of the Hudson River provided easy access to seasonally available sources of shellfish, anadromous fish and nesting wild fowl, as well as a cool comfortable camp environment.

ACKNOWLEDGEMENTS

It is appropriate to give thanks to all the people who have aided us in this archaeological endeavor. We would like to thank Steven Kondor, Sr. for introducing us to this site, and the late Harry Raker, landowner, for their cooperation and enthusiastic support throughout the excavation.

We could not have continued after excavation if we did not receive the support and encouragement, as well as criticisrn and scholastic direction from Drs. Roger Moeller, Russell Handsman, Robert Funk and the late Louis Brennan.

For photographic work, we give our deep appreciation to Erwin Bruening and Gus Dering.

Our special thanks to JoAnne Bowen for all the time and knowledge she gave to direct the osteological study of this report.

We would like to thank the American Indian Archaeological Institute and Vassar College for the use of their libraries, and the Yale-Peabody Museum for use of their osteological collection.

APPENDIX 1

Identified Fragments-By Species and Zone

Zone I	Cranial	Teeth	Mandible	Vertebra	Scapula	Humerus	Radius	Ulna	Metacarpal	Carpals	Innominate	Femur	Patella	Tibia	Fibula	Metatarsal	Tarsals	Astragalus	Calcaneus	Metapodial	Phalange	Antler	Sesamoid	Coracoid	Furculum	Sternum	Carpo-Metacarpus	Tibiotarsus	Tarso-Metatarsus	Carapace	Plastron	Other	MNI	Total bone
cf Spotted turtle																														5				5
Wood turtle																														1		1	1	2
East. Box turtle																														1		1	1	2
No. Black racersnake			2	2																													2	4
Timber rattlesnake			3																														3	3
cf Bullfrog						1																												1
Bullfrog											1																						1	1
Turkey										1																							1	1
Passenger Pigeon			1					1																									1	2
cf Blue/Gray Jay																											1		2					3
N.E. Cottontail						1					1	1																					1	3
Chipmunk			6			1					2																						3	9
Woodchuck	1		2			1		2											1														2	7
cf Gray Squirrel				1		1					2	2							2															7
Gray Squirrel	1		3		2	6		3			3			1																		6	18
Beaver		3																															2	3
cf Eastern Woodrat						1																												1
Eastern Woodrat	1		3									1																					3	4
cf Muskrat												1																						1
Muskrat	1	2	1									1		1																			1	6
Porcupine		1	1													2																	1	4
cf Carnivora			1																															1
Canis sp.		2																															1	3
cf Raccoon		15	3					3								1			2													3		27
Raccoon	4	33	12	6	2	16	2	10			3	2	1	3	1			1	9														10	108
Weasel											1																						1	1
cf Stripped Skunk			1				2										6																	9
Stripped Skunk	3	9	26	1		11	8	18			1			3				10	3														15	93
cf Lynx sp.					1																													1
Lynx sp.		2	2				1	2					1							1							1						2	9
cf White-tailed deer														1																				1
White-tailed deer		5		1		1					1	1			2				3	4	2	1											3	21
Zone II																																		
Gray Squirrel								1																									1	1
Beaver		2																															1	2
Porcupine		1																															1	1
cf Raccoon		2	1									1																						4
Raccoon		12	2		1	1	1	3					2					1	1														2	24
cf Fisher	2																																	2
Skunk	2		1			1	2	1						1																			1	8
cf Lynx sp.													1																					1
Zone III																																		
cf Red-tiled Hawk/ Goshawk												1																						1
Woodchuck								1																									1	1
Beaver																				1													1	1
cf Raccoon																																1		1
Raccoon				1			2												1														2	4
Skunk			2					5																									4	7
cf White-tailed deer	1											1																						2
White-tailed deer															1						1												1	1

Appendix II
Minimum Number of Animals Present and Percent

	Zone I	Zone II	Zone III	Total	Percent
Wood turtle	1			1	1.3%
Eastern Box turtle	1			1	1.3%
No. Black Racer Snake	2			2	2.6%
Timber Rattlesnake	5			5	6.5%
Bullfrog	1			1	1.3%
Turkey	1			1	1.3%
Passenger Pigeon	1			1	1.3%
No. Eastern Cottontail	1			1	1.3%
Eastern Chipmunk	3			3	3.9%
Woodchuck	2		1	3	3.9%
East. Gray Squirrel	6	1		7	9.1%
Beaver	2	1	1	4	5.2%
Eastern Woodrat	2			2	2.6%
Muskrat	1			1	1.3%
Porcupine	1	1		2	2.6%
Canis sp.	1			1	1.3%
Raccoon	10	2	2	14	18.2%
Weasel	1			1	1.3%
Stripped Skunk	15	1	4	20	26.0%
Lynx sp.	2			2	2.6%
White-tailed deer	3		1	4	5.2%
Totals	62	6	9	77	100.1%

APPENDIX III
Calculation of Pounds of Meat Consumed*

ANIMAL	MNI	AVER. LIVE WEIGHT	% OF USABLE MEAT	POUNDS OF USABLE MEAT	TOTAL POUNDS OF USABLE MEAT
Turkey	1	12	70	8.5	8.5
N. E. Cottontail	1	3.5	50	1.75	1.75
Woodchuck	3	8	70	5.6	16.8
Gray Squirrel	7	1.5	70	1	7
Beaver	4	55	70	38.5	154
Muskrat	1	3	70	2	2
Porcupine	2	15	70	10	20
Canis sp.	1	60	50	30	30
Raccoon	14	25	70	17.5	245
Skunk	20	7	70	5	100
Lynx sp.	2	30	50	15	30
White-tailed deer	4	200	50	100	400
TOTAL POUNDS OF USABLE MEAT					1015.05

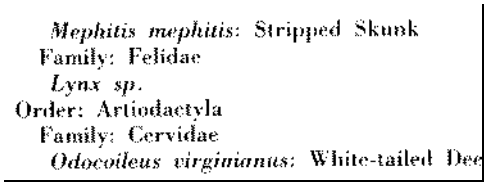
*White, Theodore E., 1953, "A Method for Calculating the Dietary Percentage of Various Food Animals Utilized by Aboriginal People"

APPENDIX 4

Identified Faunal Remains-All Zones

I Class: Reptilia
Family: Testudinidae
Sub-family: Emydinae
cf. *Chrysemys picta*: Painted Turtle
Clemmys insculpta: Wood Turtle
Terrapene carolina carolina: Eastern Box Turtle
Family: Colubridae
Coluber constrictor constrictor: Northern Black Racer Snake
Family: Viperidae
Sub-family: Crotalinae
Crotalus horridus horridus: Timber Rattlesnake
II Class: Amphibia
Family: Ranidae
Rana catesbeiana: Bullfrog
III Class: Aves
Order: Falconiformes
Family: Accipiter
cf *Accipiter gentilis* or *Buteo jamaicensis*: Goshawk or Redtailed Hawk
Order: Galliformes
Family: Meleagrididae
Meleagris gallopavo: Turkey
Order: Columbiformes
Family: Columbidae
Ectopistes migratorius: Passenger pigeon
Order: Passeriformes
Family: Corvidae
cf *Cyanocitta cristata* or *Perisoreus canadensis*: Blue or Gray Jay
IV Class: Mammalia
Order: Lagomorpha
Family: Leporidae
Sylvilagus floridanus: Eastern Cottontail
Order: Rodentia
Family: Sciuridae
Tamias striatus: Eastern Chipmunk
Marmota monax: Woodchuck
Sciurus carolinensis: Eastern Gray Squirrel
Family: Castoridae
Castor canadensis: Beaver
Family: Cricetidae
Neotoma floridana: Eastern Woodrat
Ondatra zibethicus: Muskrat
Family: Erethizontidae
Erethizon dorsatum: Porcupine
Order: Carnivora
Family: Canidae
Canis sp.
Family: Procyonidae
Procyon lotor: Raccoon
Famiy: Mustelidae
cf *Martes pennanti*: Fisher
Mustela erminae: (Ermine) or Shortail Weasel

APPENDIX 4 Continued.



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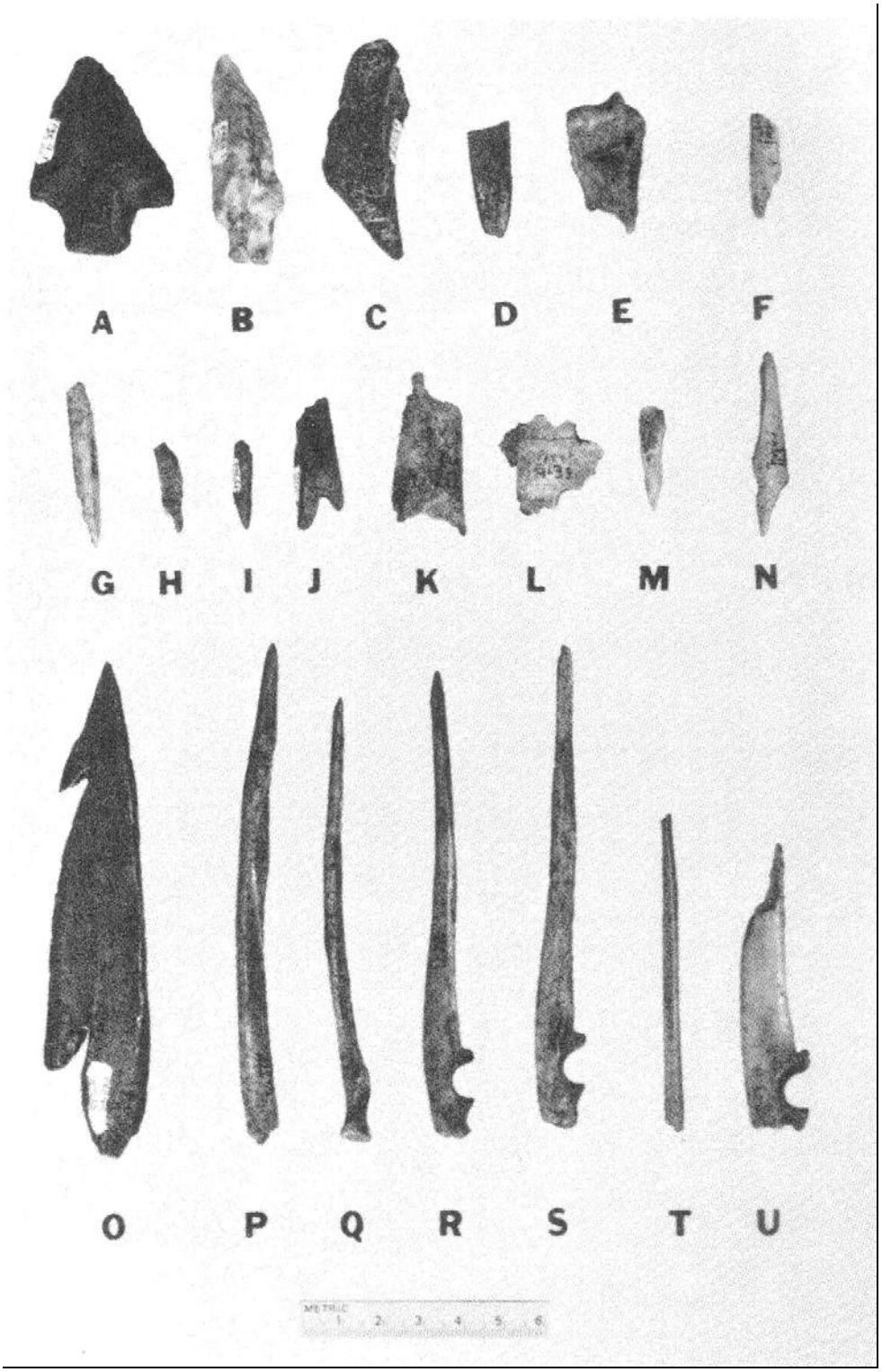
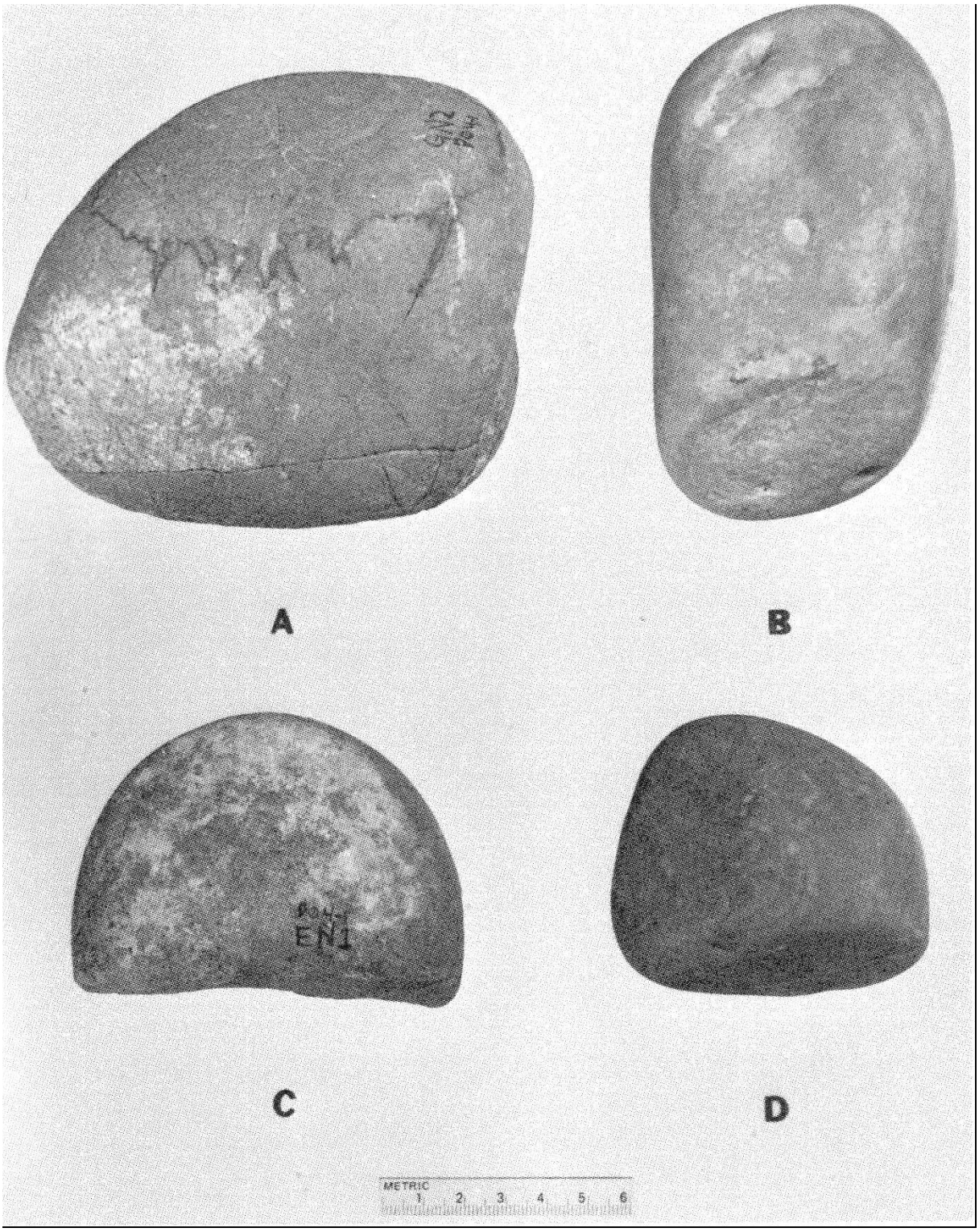


Plate I-Zone I Artifacts (letters A-U)



Pate II-Zone I Artifacts (letters A-D)

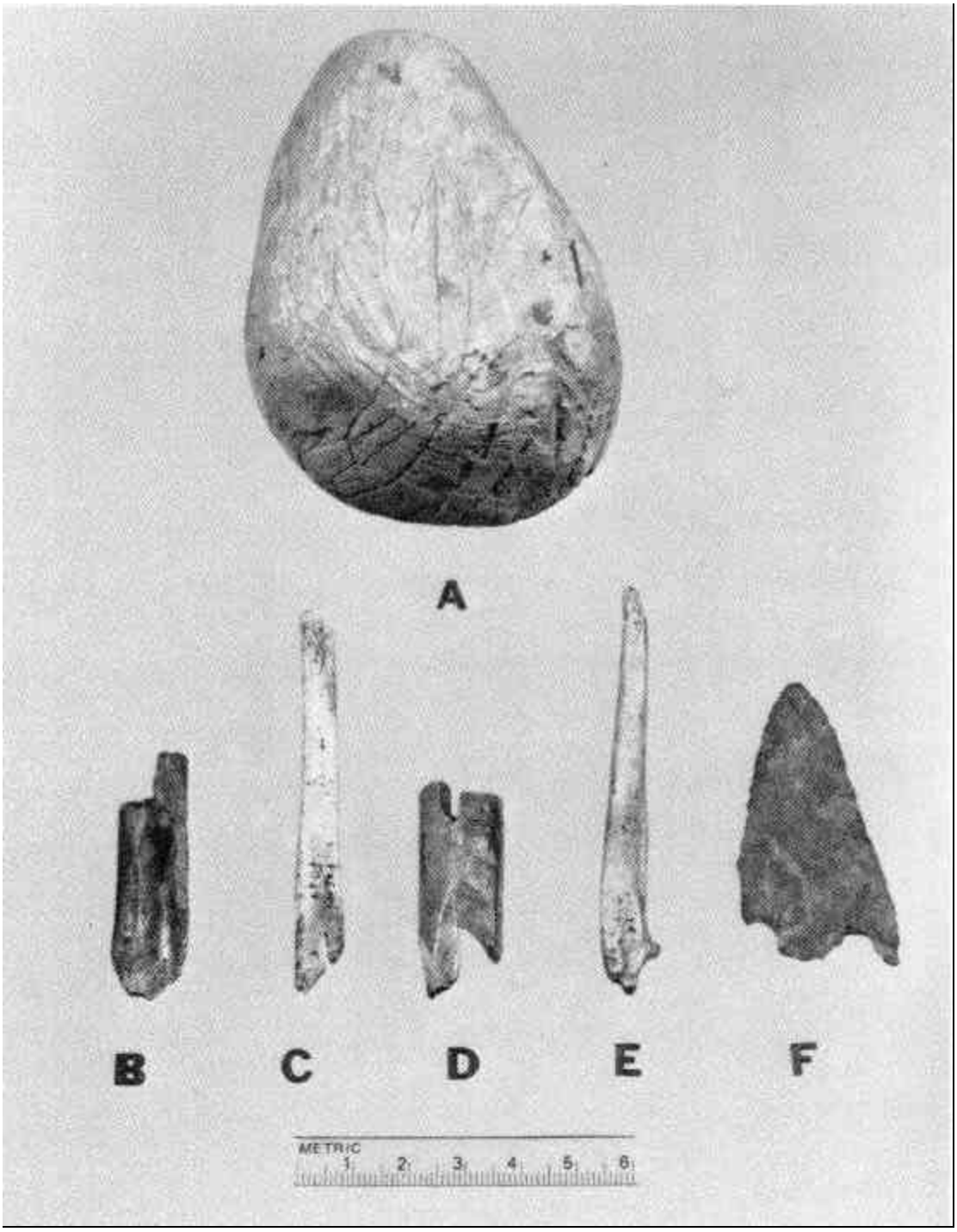


Plate III-Zone II Artifacts (letters A-F)

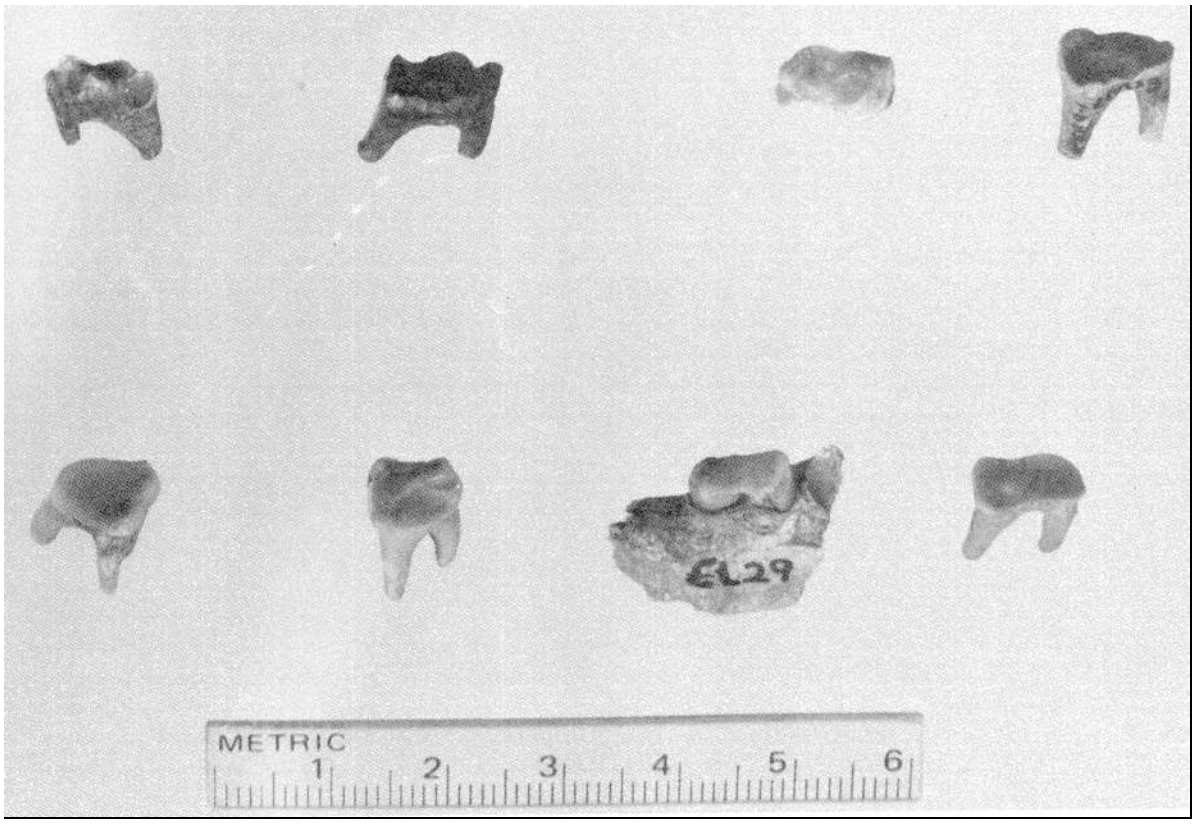
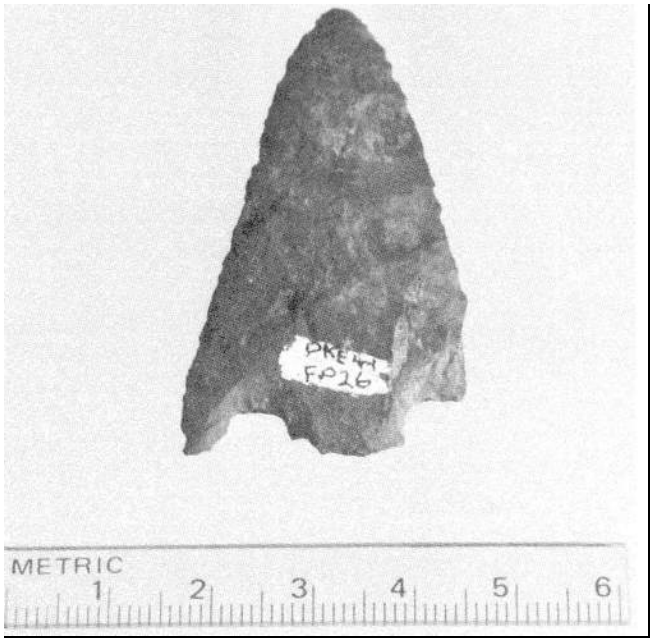


Plate IV-Extensive tooth wear suggesting senility (Raccoon species)



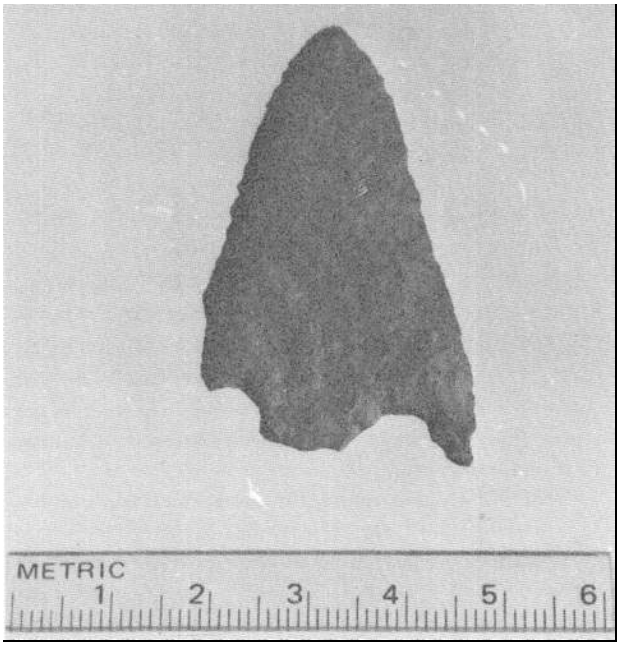


Plate V-Front and rear views of the double basal notched projectile point recovered from Zone II (Front view shows catalog number)

FORT INDEPENDENCE-REGIMENTAL DATA

Julius Lopez, NYSAAF *Metropolitan Chapter*

NOTE

This is a supplement to The History and Archeology of Fort Independence on Tetard's Hill, Bronx County, N.Y. (NYSAA Bulletin No. 73, July 1978). The original manuscript notes compiled by the late Julius Lopez lacked the portion referring to the regimental buttons found on the fort site. This material came to light recently among some of Lopez's literary portfolios.

The following addendum is an important part of the Fort Independence story inasmuch as it provides the program listing some of the players in that significant bit of our early American History.

Stanley Wisniewski, Metropolitan Chapter

MILITARY BUTTONS

Fort Independence produced a variety of buttons, mostly of pewter or "white metal," many of copper or brass, a few of bone and shell, and rarely, a gold or silver plated button. Some are of solid metal with a flat or slightly convex face, while others consist of a thin metal shell or repoussé with its edges crimped over a bone or metal back with paste filling the void.

The better buttons, such as the plated ones, were used by the officers. Their rank and the color of the uniforms determined the selection. Buttons of the baser metals, of course, were for the lower rank and file. The sizes of the buttons vary according to sleeve, coat, hat or vest requirements or decorations. Some of the small copper or brass buttons may have been for leggings.

The pewter buttons were cast in a mould. Many of the loops or shanks on the backs are broken or missing, but when present, they show that an iron wire was inserted into a boss or nipple on the back while the metal was still hot. Only one shank in the collection is made of pewter.

REGIMENTAL BUTTONS

From a military, historical viewpoint, the most interesting buttons are those which bear the numbers or designations of the troops which were at Fort Independence. These will be described first, followed by a brief history of the regiments.

According to Calver (Calver and Bolton 1950:95-97) numerical letters were bestowed on the regiments of the British Army in 1751, but it was not until 1767 that the British, following a practice started by the French five years earlier, decreed that uniform buttons should bear the numerical assignment of the regiment. The American Army followed suit, but not the Hessians whose buttons are plain. (The Hessian regiments were usually named after their titular chiefs such as the Musketeer Regiment von Donop from Colonel William Henry Augustine von Donop.) (Bolton 1916:60). This is unfortunate because it has seriously handicapped the archaeological identification of the German mercenaries in the area.

Significantly, all the numbered buttons found at Fort Independence are British. There may be several reasons for the absence of American buttons. First, the American occupation of the fort was brief, and during the early part of the war when most of the troops were not provided with regular uniforms. It is also possible that whatever few American buttons that may have been present, may have been found and kept as souvenirs or keepsakes 1y the British soldiers.

There were many British regiments present in Greater New York City during the war and certain regiments had several types of buttons. As a result, numerous examples have been recorded in many patterns. Most have numbers, Arabic or Roman, but some hear the initial letters of the name of the corps, or, a device such as an anchor, in the case of the British marines. A crown or thistle sometimes

hovers over the basic symbol of the button which may have a plain, milled, roped or floriated edge. The gem of all the buttons from Fort Independence is a silver button of the 44th regiment. It is of hollow construction and no doubt belonged to an officer. The rest of the numbered buttons are solid flat or slightly convex shape and made of pewter. Most of the pewter buttons are in very sad condition, no doubt because of unfavorable soil conditions. Some of the surfaces were badly scabbed and corroded, obliterating any markings which may have been originally present.

In *History Written* with Pick and Shovel Calver and Bolton (1950) have written excellent chapters on Revolutionary Buttons which are highly recommended to those eager to know more on this subject. The following is a list of Regimental buttons found at Fort Independence, with related data:

REG.	QTY.	TYPE	DIAM.	DESCRIPTION	COMMENTS
5th	1	Pewter, flat	11/16"	Raised Roman V	Shank missing
6th	2	Pewter, flat	1"	Sunken number	These most likely from the
or 9th					6th Reg. inasmuch as the 9th buttons sometimes used the Roman number IX or the letters "th" placed over the Arabic 9
17th	2	Pewter, flat	1"	Sunken 17	Shank missing
	1	Pewter, flat	7/8"	Raised 17	Iron loop insert
	2	Pewter, flat	13/16"	Sunken 17	Iron loop insert
23rd	1	Pewter, flat	5/8"	Raised 23 under a three plume emblem	Shank missing
35th	1	Pewter, flat	3/4"	Sunken 35	Iron loop insert
44th	1	Hollow silver plated	7/8"	Raised 44 with crown	
	7	Pewter, flat	15/16"	Raised 44 with crown	Iron loop insert
	3	Pewter, flat	5/8"	Raised 44 with crown	iron loop insert
	1	Pewter, flat	3/4"	Raised 44 with crown	iron loop insert
57th	4	Pewter, flat	7/8"	Raised 57	Iron loop insert
	1	Pewter, flat	13/16"	Raised 57	Iron loop insert
Total 27					

Most of the above mentioned buttons are illustrated in History *Written with Pick and Shovel* (Calver and Bolton 1950).

5th Regiment: According to the Royal United Service Institution, it became the 1st Battalion Royal Northumberland Fusiliers, now part of the recently formed Fusilier Brigade. It left Boston for New York in 1774, and in 1778 left New York for the West Indies. Their buttons are not very common, but are known from the British fort on Crocheron's Hill, Staten Island; Fort Independence; Fort Erie on the Niagara opposite Buffalo; and from the American encampment at the "Camp Robinson's Farm" in Putnam Co., New York. As Calver (1950:94) explains, the buttons of the 5th in an American camp may have been worn by British prisoners or captured British uniforms may have been worn in camp by poverty stricken American troops.

The regiment went to Canada in 1787, and served at various places principally along the Niagara frontier until 1797, when it returned home. (Calver 1950:102).

6th Regiment: It became the lst Battalion Royal Warwickshire Regiment, now part of Midland Brigade. Having contracted a disease in the West Indies, it was shipped to New York City for recuperation in 1776. It sailed for England in 1777. Thus, its stay was rather short and the buttons found are indicative of their presence during the early part of the war.

According to Bolton (1916:97) the Sixth was commanded by Colonel Gisborne.

Buttons of the regiment are known from the Hessian Camp, east of Broadway and between 194th St, and Dyckman St, and Prescott Avenue and from the Fort Washington Garrison site (Bolton 1916:138, 143).

9th Regiment: It was part of Burgoyne's Army. According to Calver (1950:107) buttons of this army have been found within New York City camps and may be attributed to men who were temporarily absent from their regiments at the time of the surrender at Saratoga, or to prisoners of war who managed to elude their American guards and succeeded in joining Sir Henry Clinton's forces in New York. An officer's button of the 9th has been found at 182nd St. West of Broadway where there had been a dumping place for refuse from a barrack or the hut camps at Fort Washington. (Calver 1950:115, 117).

The 9th returned home to England in 1781.

17th Regiment: Came from Philadelphia to New York in late June, 1778. After winter, the corps went to Stony Point where it was surprised at midnight and captured by the Americans under General Wayne on 15-16 July, 1779. Also taken prisoner at the time were a grenadier company of the 71st Regiment, a company of the Tory regiment of Royal Americans and a detachment of artillery.

Apparently there was an exchange of prisoners after which the 17th was once more in New York they occupied an extensive hut camp along the east slope of Inwood Hill on what is today Prescott Avenue in upper Manhattan. While buttons of other troops (including the 71st) were found on the site, it is generally referred to as that of the l7th since most of the buttons were from that regiment. Also in a view of a panoramic sketch of the northern fortifications and encampments made in 1779 by Von Krafft, a young Hessian officer, the camp at Prescott Avenue is designated "Camp of the 17th English Regiment which had been taken prisoners."

In 1780, the regiment moved out of New York, only to surrender again at Yorktown with the army of Cornwallis on Oct. 19, 1781. Two hundred and forty-five men from the regiment had to lay down their arms.

In 1782, the Seventeenth also acquired the territorial title of the Leicestershire Regiment, now part of the Midland Brigade. It returned to New York in January of 1783. On August 19th, they were ordered to be ready to sail for Nova Scotia. During 1784 and 1785 they were quartered there and in Newfoundland, and sailed for England in 1786, where they arrived in August of that year.

Buttons of the 17th are known, not only from the Prescott Avenue and Fort Independence site, but from Fort Washington, Fort Tryon, the British fort on Staten Island, "Fort No. 4" on Fordham Heights opposite Kingsbridge, Dyckman Farm site, a British camp at 201st Street and Ninth Avenue (directly east of the Prescott site), the Holland's Ferry Camp, and from Yorktown.

The regimental buttons of the 17th from the Seventeenth camp at Inwood are of four kinds-two variations for the private soldiers and two for the officers. The privates' buttons are made of pewter and have the usual iron shanks cast into the white metal. Some specimens have the number 17 in figures raised upon their face, enclosed in a border design of a raised cord or rope, but the larger number found have the numerical designation incised or depressed into the face and the face of the buttons stands somewhat higher than the milled border. The officers buttons of the 17th found in the 17th camp as well as others found in "Fort No. 4" opposite Kingsbridge, are made in two pieces, the backs of the buttons being of a fine quality of bone or ivory, and the faces of thin repoussé silver bearing a unique octagonal design, with the regimental number in small figures within a circle. Such officers buttons were provided with loops of cord or gut, which were passed thru four perforations in the bone or ivory backs, by which they were secured to the garments. Another type is a flat copper button, silver plated, of precisely the same design as those just described.

The officers buttons of the 17th are described in the "Inspection returns" of the period as being of silver on the occasion when the regiment was inspected at Cork, Sept., 1775, prior to its departure for America (Bolton 1916:145-146).

23 Regiment of Foot: Also known as the "Royal Welsh Fusiliers," formerly part of the 1st Brigade, it participated in the events of Lexington and Concord at the beginning of the war (Commager-Morris 1958:74-87). Their buttons are distinctive in that they bear the three feathers or plumes of their principality. The regiment left England for New York in 1773. Three years later it participated in the reduction of Fort Washington (Pers. corrs. R.U.S.I. 1/28/59). However, none of their buttons have been excavated from there. The only ones found were at the Fort George camp on Laurel Hill, the British fort on Crocheron's Hill Staten Island, Fort Independence, and at the Holland's Ferry camp and Nagel Homestead sites, both on the hanks of the Harlem River in the upper part of New York City.

On Sept. 8, 1779 Von Krafft wrote in his journal that the 23rd Foot had been encamped on Spuyten Duyvil Hill and departed by ship to New York (Bolton 147).

They also participated in the southern campaign with General Cornwallis during the closing periods of the war. At Yorktown they stacked their arms in surrender to the combined forces of America and France. They were released in 1783 and stayed in New York until evacuation (Commager and Morris 1958:1164-65, 1206, 1235-38).

35th Regiment: According to the Royal United Service Institution in London (Corres. 1/28/59), the 35th became the lst Battalion of the Royal Sussex Regiment, now hart of the Home Counties Brigade; it left Halifax for New York in 1776, and two years later departed for the West Indies.

Buttons of the 35th seem to be scarce in the Greater New York City area, and would seem to indicate that the main body of men were stationed elsewhere. The buttons known are: the single specimen from Fort Independence, and a few from the Barracks site of the Fort Washington garrison, the Prescott Avenue sites, a site at Nagel Avenue and Broadway, and from the Military Hut camp on the Dyckman Farm, Manhattan. One was also found at the West Point redoubts (Bolton 1916:99, 147) (Calver and Bolton 1950:10, 113).

44th Regiment: Left for America in May. 1775. It fought at Bunker Hill, and later, took part in the Battle of Long Island, Fort Washington and White plains. Thereafter, the corps served in Harlem and at one time was scattered with one company at New York, seven at Hell Gate, and two at New Brunswick. It participated in the Philadelphia campaign at the Brandywine, at Germantown and at Monmouth.

Once more in New York, towards the end of 1778, it had one company at Fort Knyphausen, seven at Laurel Hill (Fort George) where it was encamped for an extended period, and another at Jamaica, Long Island. The same year, a sub-officer and 25 men joined a larger group from the 57th regiment and helped build "the line of circumvallation." This being a chain of zigzagged breastworks and redoubts connecting Fort Washington and Fort Tryon to the east and Fort George on the west. This barrier in effect extended across upper Manhattan.

In September of 1770 it boarded some ships for Quebec, but a hurricane scattered the fleet. Some of the ships were lost with all hands or captured by privateers; one such ship "as the "Empress" aboard which were several officers of the regiment. On the return of the unfortunate expedition, the regiment “very much injured," was sent to Paulus Hook in New Jersey and at that time had been reduced to 539 rank and file, with 30 sergeants and 18 drummers. These figures appeared in a report which Bolton (1916:114-115) explains he found among General Robertson's papers in the Record Office in London under date "15 May, 1780.”

Places where buttons of the 44th have been found are: The "Old Fort" on Crocheron's Hill, at Richmond, Staten Island; Fort Independence, and within the quadrangular earthwork of "Fort No. 4" at Kingsbridge. This fortification was demolished by the British, Sept. 18, 1779. Numbered buttons from the same regiment have also been found at the West Point redoubts and at Fort Haldimand, Carleton Island, St. Lawrence River.

"The regimental buttons of this corps are pewter of two sizes, coat and sleeve. The buttons have an elaborate design, consisting of the number "44" surmounted by the royal crown and surrounded by a floral border. The pattern on the face of the "44" button is the most neatly executed amongst the great variety of designs shown on the military buttons of the period" (Bolton 1916:115).

57th Regiment: Later became the lst Battalion of the Middlesex Regiment and is now part of the Home Counties Brigade. The Regiment left Ireland for New York in 1776, and was in America till 1782. On May 15, 1776 it disembarked at Cape Fear, in the Carolinas. Two months later, the corps left for Staten Island. Subsequently it fought in the Battle of Long Island and served in the British occupation of York Island from September 1776.

In October of 1777, it participated in the capture of Forts Clinton and Montgomery. In June of the following year they were quartered in Bloomingdale. In December 1778, the regiment was at Fort Knyphausen (previously Fort Washington). They were also on garrison duty there in 1779 and 1780.

In July, 1781 General Washington noted, during the expedition of the "Grand Reconnaissance", that there was an encampment of about 45 tents and huts near Laurel Hill "which appears," he says, ..to be inhabited by it is said, the `Fifty-seventh Regiment."' The troop was on the hill the following

month when they were replaced by two companies of the Hessian Regiment, the Jung Lossberg, previously known as the Mirbach. From Laurel Hill the 57th went to Staten Island.

At the beginning of 1783, the regiment was stationed at Bedford Heights, from where they sailed for Halifax, Nova Scotia.

Most of the regiment's history during the Revolution was in and around New York City. In May of 1779, it furnished men for the construction of the "line of circumvallation."

It is little wonder, then, that the regiment's buttons have reappeared at so many places: Forts Washington, Tryon (where an officer's gold button was discovered) and George; at Prescott Avenue in the Inwood section of New York where the regiment spent much of its time under canvas, at "Fort No. 4" at Kingsbridge, and at Fort Independence. A pewter button of a private soldier of the 57th was also found on the estate of Roger Morris, whose mansion, which still stands on 160th Street, intermittently served as headquarters for General Washington and the enemy including Knyphausen.

According to Bolton (1916:106), "The buttons of this corps are larger and carry the old-fashioned script number surrounded by a thin loop open at the top, with a point or dot above the opening."

Part of the regiment seems to have seen service elsewhere in 1779. According to the Royal United Service Institution, in London, the 57th left New York for South Carolina in 1779.

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ERRATA

In Edward L. Bell's article in the *Bulletin #86* ("The O'Neal-Forshee Iron Mining Settlement") the shaded areas in Fig. 10 represent areas enlarged in Figures 11 through 14.

MINUTES OF THE 67TH ANNUAL MEETING
NEW YORK STATE ARCHEOLOGICAL ASSOCIATION
FOR 1983 QUEENSBURY HOTEL, GLENS FALLS, NEW YORK 12801
APRIL 15, 16, 17, 1983

EXECUTIVE COMMITTEE MEETING

The meeting of the Executive Committee of the New York State Archeological Association was held on Friday, April 15, 1983, at the Queensbury Hotel in Glens Falls, New York. President Charles E. Gillette called the meeting to order at 7:31 P.M. After a brief welcoming address, the secretary was directed to call the roll. The following voting members, including state officers, chapter presidents and secretaries or their alternates were present:

President: Charles E. Gillette
Vice-President: Gordon C. DeAngelo
Secretary: John H. McCashion
Treasurer: Carolyn O. Weatherwax

Auringer-Seeyle:
President: James Walsh
Secretary: Beulah Rice

William Beauchamp:
President: Gordon DeAngelo (alternate)

Chenango:
President: Richard Bennett (alternate)
Secretary: Earla Burton

Frederick M. Houghton:
President: Dr. Jonah Margulis
Secretary: Dr. Vivian Cody

Incorporated Long Island:
President: William E. Golder
Secretary: David Elliston (alternate)

Incorporated Orange County:
President: Elizabeth Dumont (alternate)
Secretary: William F. Ehlers

Lewis Henry Morgan:
President: Reverend John K. Lee
Secretary: Robert J. Gorall

Lower Hudson:
President: Roberta Wingerson (alternate)

Metropolitan:
President: Stanley Wisniewski (alternate)
Secretary: Margaret Wisniewski (alternate)

Mid-Hudson:
President: Gladys Gilbert
Secretary: Alvin Wanzer (alternate)

Triple Cities:
President: Richard Jackson
Secretary: Dolores Elliott

Upper Susquehanna:
President: Richard Wakeman (alternate)
Secretary: Ruth Wakeman

Van Epps-Hartley:
President: Gwyneth Gillette (alternate)
Secretary: Kingston Larner, MD

	Committee Chairpersons	
l.	Awards and Fellowships	Peter P. Pratt
2.	Nominating	Richard Bennett
3.	Local Program	Gordon C. DeAngelo
4.	Certification	Charles E. Gillette
5.	Constitution	Charles E. Gillette
6.	Education	Vacant
7.	Public Archeology	Dolores Elliott
8.	NYSAA/NYAC Liaison	Dolores Elliott
9.	Finance	Dolores Elliott
10.	Legislative	Paul Huey
ll.	Chapters and Memberships	Gloria Miller
12.	ESAF Representative	Roberta Wingerson (Alt.)
13.	Publications	Vacant

Roll call having been taken and the required quorum (11) being present, the next order of business was the reading of the previous executive committee minutes from the 1982 NYSAA annual meeting at Buffalo. Since these had already been printed. mailed and included in the chapter packets at this meeting, Delores Elliott made the motion to suspend the reading and accept them as printed. Richard Bennett seconded the motion which went to the floor being accepted unanimously. The Association then proceeded to the next order of business.

Report of the Officers

President: Charles F. Gillette happily reported that the membership had again increased and that the State Association had begun to show its vitality. Very few problems had come to the attention of the office of the president. Therefore, no mid-year meeting of the executive committee was deemed necessary. President Gillette sadly reported the loss of our editor, Louis A. Brennan and commented briefly on their relationship over the years. Richard Bennett was asked to lead a search for a new editor and report at this meeting. Bert Wingerson was asked to report for Lou. Report accepted as read.

Vice-President: Gordon C. DeAngelo reported that there was no need to assume the responsibilities of the president. He expressed his pleasure with the results of this year's program and thanked all those who helped make it a success. Report accepted as read.

Secretary: John H. McCashion read the long Secretary's report. The minutes of the 1982 executive committee meeting at Buffalo were printed and mailed October 9th and 10th to the appropriate officers and chapters. All correspondence reaching the secretary was answered. The First Call for Papers were mailed between December 8th and 28th. The Second call, Final Call, Registrations and hotel reservations, and 1983 green membership cards were mailed between February 22 and 27th. By March 25, ten of the thirteen chapters had sent in their Annual Reports. Twelve out of thirteen chapters had submitted up-to-date membership lists. As of April l, 1983 the amended paid membership totals were around 546 with total members hovering around 612. Most noticeable were the increases in the Incorporated Long Island Chapter and the Incorporated Orange County Chapter. Fiscal year 1982 (December to December) ended with 700 paid memberships with 1034 members. Secretary's expenses were $300.00 mostly for postage and replacing exhausted supplies. The Secretary promised to cut the expenses by half or more in the next fiscal year. The report concluded with a tribute to editor Louis A. Brennan who died March 8, 1983. Copies of this report were reproduced and included in the chapter packets. Report accepted as read.

Treasurer: Carolyn Weatherwax read the Treasurer’s report which indicated that the Association was in good financial health. The report in its entirety was to be attached to the executive committee minutes. Dolores Elliott brought up a question concerning dues for ESAF. Treasurer Weatherwax responded by stating that ESAF dues were based on NYSAA membership totals, for example, twenty dollars for the first hundred memberships, fifteen dollars for every hundred memberships or portion thereof, and two dollars assessed per chapter. Dolores Elliott entertained the motion that the Treasurer's report be accepted. Richard Bennett seconded and the motion passed unanimously.

April 10, 1983
NEW YORK STATE ARCHEOLOGICAL ASSOCIATION
REPORT OF THE TREASURER

	12/31/81		6/25/82
Savings Acc't. #48-1907 (Ulster Savings)	$ 4,250.25	Int. '82 ($115.18)	$ 4,365.43
Life Membership Acc't. #4-753	1,000.00		1,000.00
Balance NOW Ck. Acc't.*(ATC) #2945406	6,411.21		
	$11,661.46		
Savings Dep. ATC Acc't. #7922385			4/01/83 10,427.53
Initial Dep. from Ulster Savings Acc't. #48-1907 & 4-753		$5,000.00	
Interest Investment Certificate ATC		256.24	
Interest Savings Dep. Acc't. #7922385		171.29	
Transfer funds 1/24 & 4/1/83 from NOW Acc't. #2945406		5,000.00	
NOW Checking Acc't. #2945406 (ATC) (4/10/83)			2,653.01
TOTAL ASSETS (4/10/83)			$13,080.54

CASH RECEIPTS 1982–83		DISBURSEMENTS 1982–83	
Dues	$5,488.50	ESAF dues 1982	196.00
Publication Sales	786.15	Bulletin #82–85	4,370.67
(Annual meeting 262.11)		Storage Neg. Flats (Braun-Brumfield)	30.00
Profits Houghton 82 meeting	100.00	Secretary Expenses	300.00
Transfer funds Ulster Savings	365.43	RSMC (4/81–12/82) Postage	400.65
Int. NOW Acc't. #2945406	267.59	RSMC (handling)	400.00
Int. Ulster Savings Life Membership	18.46	Postage, printing, telephone, etc.	62.76
		Membership Award 1981 (Long Island)	25.00
TOTAL	$7,026.13		$ 5,785.08
		Trans. funds to Acc't. #7922385	5,000.00
		TOTAL	$10,785.08

Total Receipts 1982–83	$ 7,026.13
Bal. Ck. Acc't. (4–20/82)	6,411.96
TOTAL	13,438.09
Disbursements 1982–83	10,785.08
Bal. Ck. Acc't. 4/10/83	$ 2,653.01

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Committee Reports

Awards and Fellowships: Peter P. Pratt reported that the awards and fellowship had met and the presentations would be made at the banquet. Accepted.

Nominating: Richard Bennett reported that he had received a communique from President Gillette concerning the replacement for our deceased editor Louis A. Brennan. He stated that he was ready to put forth the nomination under "new business." Report was accepted as read.

Local Program: Gordon C. DeAngelo reported that all the arrangements had been completed at the least possible cost and he hoped that the variety of the programs would be meaningful to everyone. Credit was given to all those from they Auringer-Seeyle chapter who assisted him. Report was accepted as read.

Certification: Charles E. Gillette reported that no action was necessary.

Constitution: Charles E. Gillette reported that there were no proposals to change the constitution.

Education: Vacant. No report.

Public Archeology: Delores Elliott reported that there was a the public concerning which possibly would general lack of appreciation on the part of archeology. Plans were being made to put together a traveling exhibit be ready by 1984. Report accepted as read.

NYSAA/NYAC Liaison: Delores Elliott stated that there was no formal report to be given at this time but that a mailing would be sent to each of the chapter secretaries later this year. Report accepted as read.

Finance: Delores Lalock deferred her report financial situation of the Association was healthy deferred due to some misunderstandings but stated that because the no formal report was necessary. Report deferred.

Legislative: At 8:10 P.M., Paul Huey began his excellent report on legislation pending at both State and Federal levels. Upon conclusion of the report there was a considerable amount of discussion on the parts of Dr. Jonah Margulis, Dr. Larner and Bill Golder. Such discussion prompted the secretary to ask Mr. Huey for a copy of the report which would be added to the executive committee minutes and distributed to all concerned. This was done and the report was accepted as read and as printed.

Chapters and Memberships: Gloria Miller reported that there were still some inequities in the membership totals due to the lack of records and that problem would be alleviated in a month or so. She reported that memberships had increased and most of that information contained in her report could be found in the Secretary and Treasurer reports. Report accepted as given.

ESAF Representative and NYSAA Editor: Assistant Editor, Roberta Wingerson, reported for Louis A. Brennan, deceased. A call to Braun-Brumfield stated that Bulletin and Journal number 85 had been printed, distributed and that the bill had been posted for $886.65. Bert made it painfully obvious that the reserve of papers for another Bulletin and Journal was low; two to be exact, one from the Requa site and another from Long Island. President Gillette gave special thanks to Bert for her report which was accepted as given.

Publications: Vacant, no report forthcoming.

With the conclusion of the committee reports, President Gillette moved to Old Business.

Old Business

Under Old Business Vivian Cody brought up two points of inquiry, the first of which dealt with Dolores Lalock's request for the life membership list to be sent to the chapter secretaries and the other regarding last years “postcard campaign."

On the first point raised by Dr. Cody, the Secretary responded by stating that a numerical list of life memberships broken down by chapters and members-at-large were included in the chapter packets distributed at this meeting. It was thought unwise, however, to include the names and address of these members in the best interests of the Association and the privacy acts. The Secretary then inquired as to the initial proposal for the lists. Delores Lalock replied by stating that she was unaware that she still headed-up the financial committee but that the initial reason was probably on the tapes from the Buffalo meeting in the possession of Richard Jackson, President of the Triple-Cities chapter. President Jackson stated that he would send the tapes to the Secretary which ought to clear up the matter forever.

On the second point regarding the "postcard campaign" President Gillette directed the Secretary to read a portion from page eight of the Society for Historical Archaeology Newsletter, Volume 16, Number 1, March 1983. Under Legislative Affairs reported by Marjorie Ingle and Ronald Anzalone, it was stated that:

> "For the second consecutive year, Historic Preservation (including Historic Archeology, of course) has survived the Reagan Administration's attempts to commit budgetary (and thus, program) homicide. Funding for the Federal Fiscal Year 1983 (Oct. 1, '82 to Oct. 1, '83) came out at or near last year's levels, despite the Administration's hard fight for zero funding for State Historic Preservation Officer's programs and the National Trust for Historic Preservation and a 40% budget and staff cut for the Advisory Council on Historic Preservation. Preservation Action, a national lobbyist group for Historic Preservation, and the National Trust report the following appropriations for FY '83: National Historic Preservation Fund-same as last year, $26 Million (of that $21.5 million goes to the State Historic Preservation Officers and $4.5 million goes to the National Trust for Historic Preservation); Advisory Council on Historic Preservation6% decrease over last year, 81.5 million; National Endowment of the Arts-$145,875 million; National Endowment of the Humanities-5130,560 million; Institute of Museum Services-$10.8 million; Land and Water Conservation Fund-96226,893 million. Again, we Historic Preservationists presented ourselves as a formidable political lobby and offered convincing arguments as to our contributions to the public. All SHA'ers who contacted their Congressmen and made other contributions are to be commended . . . etc." (end of quote).

President Gillette concluded that although the postcard campaign had been a success as partial funding had been restored, an eternal vigilance must be maintained and it was so ordered to re-institute the campaign. The secretary was ordered to procure 150 postcards which were made available through the efforts of the local program committee of the Auringer-Seeyle chapter.

Dr. Pratt brought up a point of information. He reminded us that all the award nominations submitted by the chapter secretaries be confirmed after this meeting in the event that some nominations were not received. The secretary went on record as having received only one set of nominations from the Incorporated Long Island chapter.

Dr. Cody brought up the point that she had not received the name of the person to whom to submit the nominations for the awards. The secretary pointed out that the information was contained in the executive committee minutes from the Buffalo meeting.

After a lively discussion on life memberships, investments, financial committees, etc. led by Bill Golder President of the Incorporated Long Island chapter and Richard McCracken, speaking on behalf of the Pennsylvania Society, Old Business was concluded at 8:31 P.M.

New Business

The first order of New Business began with President Gillette turning over the floor to Richard Bennett, chairperson of the nominating committee. Mr. Bennett had been asked to seek a replacement for editor of the Bulletin and Journal and report at this meeting. At 8:39 P.M., Mr. Bennett nominated Charles F. Hayes, III for the position. Charles Hayes stated that he would accept the position. The

Reverend John Lee seconded the nomination and the motion was brought to the floor for the vote, which, needless to say was passed unanimously followed by a round of applause.

Bert Wingerson then requested that she be relieved as assistant editor due to the distance between herself and the new editor. So ordered. An assistant to editor Hayes was suggested and was stated that it would be taken under advisement. Editor Hayes suggested that the position be considered a "term" rather than a permanent position.

The next order of New Business was in the form of a resolution brought up by Dr. Dumont, to wit:

> RESOLUTION 83-1: Considering the healthy financial condition of NYSAA a memorial volume in tribute to the memory of Louis A. Brennan be published consisting of his Lower Hudson material and that someone be appointed editor of this particular volume and someone, appointed to write the memorial preface.

In the ensuing discussion, the secretary suggested that Herb Kraft, then in South America, be contacted upon his return. The Secretary was charged with this task. Resolution 83-1 would be brought up before the entire membership at the general business meeting Saturday morning.

The executive committee then moved to the business of hosting the 1984 Annual Meeting. Bill Golder opened the discussion. He stated that the Incorporated Long Island chapter might be willing to host the 1985 meeting but hosting the 1984 meeting would be impossible due to the extensive renovations needed at the museum. Since there were no volunteers, President Gillette directed the Secretary to send out requests to each individual chapter secretary as soon as possible. The Secretary suggested that a little politicking during the soon-to-follow wine and cheese reception would probably solve the problem.

The next order of business concerned the updating of the by-laws, not changing them per se, but rewriting some of the effete phrases. President Gillette, chairperson of the Constitution committee, stated that he would study the by-laws requesting that all members of the executive committee reread them and suggest changes or amendments which would then be proposed three months in advance of the 1984 Annual Meeting. The proposals would be sent with the ballots in the 1984 election year. There was no discussion of this point and it was deferred to the general business meeting on Saturday.

The subject of the Sebonac chapter was brought up before the executive committee upon request. The Secretary quoted page six, Chapter VI (CHAPTERS) paragraph wherein, "the Association at its annual meeting upon recommendation of the executive committee and with due notice to the chapter, may declare inactive any chapter which has not communicated with the Secretary of the Association during the preceding twelve months." Bill Golder brought up some interesting points of information which prompted President Gillette to inquire of the Secretary whether the procedures previously quoted had been followed. The Secretary went on record stating that both verbal and written communications had been sent to both the president and secretary of the Sebonac chapter. No dues had been forthcoming for two years. Elizabeth Dumont made the motion to declare the Sebonac chapter inactive. The motion was seconded by Richard Bennett. The floor vote was unanimous and the Sebonac chapter was declared inactive.

Good and Welfare

Bill Golder discussed Long Island plans and proposals which were read partially by Gordon DeAngelo and President Gillette.

Louise Basa presented a list of NYAC persons on the "burial policy committee" and discussed the 1972 burial moratorium policy. Ms. Basa presented a list which the Secretary considered important enough to be included in the next informational handbook.

Charles Gillette read a letter from Jim Bradley concerning the State plan for archeology in Massachusetts. He then included part of Bruce Fullem's plan for archeology for the State of New York. Jim's letter would be circulated and Bruce Fullem would give ills presentation in more detail at the Saturday morning session.

In passing, the Secretary reminded all those interested of the forthcoming Pennsylvania Archeological Society meeting to be held at Wilkes-Barre, May 6, 7, and 8. Also, the most important 50th ESAF meeting would he held at Salem, Massachusetts, November 4, 5 and 6 with its main theme on the Paleo-Indian.

Bill Golder asked about the remittal of the 57.50 dues. President Gillette stated that was the amount sent to the Association.

A round of applause was given to our hosts, the Auringer-Seeyle chapter.

Upon the completion of "good and welfare" Richard Jackson made the motion to adjourn which was immediately seconded by Delores Elliott and the 1983 executive committee meeting adjourned at 9:14 P. M.

General Business Meeting

Precisely, at 9:00 A.M., April 16, 1983. Auringer-Seeyle President James Walsh gave the formal welcome which opened the general business meeting. After this presentation, President Gillette assumed the podium and called the meeting to order.

Dolores Elliott entertained the motion that the previous Secretary's minutes be suspended. This motion was seconded by Elizabeth Dumont and the floor vote was unanimous.

The Treasurer's report, as protocol dictates had to be read. Carolyn Weatherwax was present and read the report. This report would now be included with the executive committee minutes when published and distributed. Since all discussion of the treasurer's report was completed at the executive committee meeting the previous night Gwyneth Gillette made the motion to accept the report as read and Richard Jackson seconded. Motion carried unanimously.

Charles Gillette called for the Secretary to give a synopsis of what had occurred at the Friday evening executive committee. The secretary ran the gamut of committee reports, old business and new business and good and welfare in what must have been record time.

Backing up a bit, President Gillette stated that there was no old business to be voted on. Turning to "new business" the postcard campaign was brought up. Because of its success, it seemed necessary to reinstitute the campaign and postcards were again made available to all members. In conjunction with this, Paul Huey's excellent legislative report was placed in the publications room and a copy was given to the secretary who would include part of it in the executive committee minutes when published and distributed.

RESOLUTION 83-1, was then introduced again by Dr. Elizabeth Dumont who brought it to the floor in the form of a motion. "whereas, due to the healthy financial condition of NYSAA, be it revolved that a memorial volume in tribute to the memory of Louis A. Brennan be published consisting of his Lower Hudson material with someone to be appointed as editor and someone to write the memorial preface." Bert Wingerson seconded the motion and the floor vote was absolutely unanimous. Bert Wingerson then brought up a point of information to clarify her position as assistant editor. Due to the distance between the new editor, Charles F. Hayes, III and herself, it was no longer in the good interests of the Association for her to serve as assistant editor but stated she would continue, pro tem, as ESAF representative. So ordered.

President Charles E. Gillette announced the selection of the new editor of the Bulletin and Journal, Charles F. Hayes, III. There was a standing ovation. Editor Hayes stated that he would consider the idea of an assistant editor in the future and thanked those who selected him.

After negotiations at the wine-and-cheese bash following Friday evening's executive committee meeting, the subject of hosting the 1984 Annual Meeting was again brought up. With great magnanimity, Secretary William F. Ehlers announced that the Incorporated Orange County chapter would be the hosts for the 68th Annual Meeting. President Gillette appointed Lewis Dumont and Ray Decker as local program chairpersons. Again, there was another round of applause.

RESOLUTION 83-2. Gwenyth Gillette presented the following resolution in the form of a motion, whereas, "that NYSAA extend its most profound thanks and appreciation to all the members of the Auringer-Seeyle chapter for their superb management of the 1983 Annual Meeting. Special thanks are

due to Carolyn Weatherwax, General Chairperson, Gordon C. DeAngelo, Program Chairperson, and. committee members, Beverly Roach, Virginia Stiles, Beulah Rice, Gloria Miller and Lee Shaw."

This resolution in the form of a motion was seconded by Richard Jackson with the floor accepting it unanimously with resounding applause."

At 9:18 A.M., Richard Bennett made the motion to adjourn which was immediately seconded by Richard Jackson, President, Triple-Cities chapter. Thus ended the general business meeting and the program commenced.

Awards Presentations

Deferred until the banquet, the awards presentations were made by the chairperson of the Awards and Fellowships committee, Dr. Peter P. Pratt. The recipients of awards were:

1. 1982 Membership Award: Incorporated Orange County Chapter.
2. Meritorious Service Award:
    A. Kingston Larner, MD-Van Epps-Hartley Chapter
    B. Charles E. Gillette, Van Epps-Hartley Chapter
    C. David Elliston, Incorporated Long Island Chapter
    D. Margarete Sepenoski, Incorporated Long Island Chapter
    E. Mary Hawkins, Incorporated Long Island Chapter
    F. David Detrich, Incorporated Long Island Chapter
    G. Dr. Frank J. Clune, Jr., Lewis Henry Morgan Chapter
3. Certificate of Merit: A1 LaFrance, Beauchamp Chapter
4. Fellowship Award: Monte Bennett, Chenango Chapter
5. Royal Order of the Pipe: John H. McCashion, Van Epps-Hartley-Chenango.

Respectfully submitted,

John H. McCashion
Secretary, NYSAA

REPORT ON LEGISLATION

New York State Archeological Association
April 15, 1983
Paul R. Huey, Van Epps-Hartley Chapter

STATE

Religious Properties Landmark Exemption

It is expected a bill will be introduced in the New York State legislature in 1983 to exclude religious properties from protection as landmarks under local landmark or historic district laws. Such a law would weaken local preservation legislation. The Preservation League of New York State recommends that preservationists oppose such a bill.

Easements Legislation

Under the New York State Real Property Tax Law, article 49, it is now possible for non-profit tax exempt organizations to acquire open space, archeological sites, natural areas, historic structures, or other cultural resources on adjoining property and to avoid paying any taxes on such adjoining property by imposing protective easements on it. in effect, the easement devalues the property. It is an effective way of preserving an archeological site, but the controversy is over the loss of tax revenue. The present law requires property that is so protected to be adjacent to other property owned by the holder. A new bill now being considered is A.2323 and 5.1997. This new bill, if passed, would remove the requirement that land protected by an easement be adjacent to other property of the holder. This bill would allow greater flexibility and more effective preservation of sites. Sponsors are J. Rolison in the Senate and Maurice Hinchley in the Assembly. The Preservation League favors this bill. More information can be obtained by calling Judith Enck, Executive Director of the Environmental Planning Lobby at (518) 462-5526.

FEDERAL

Federal Jobs Bill

President Reagan signed the Jobs Bill into law early in March. The bill included 9625 million for historic preservation development grants. New York State's share is $716,056.

The Department of Interior is expected to issue guidelines on April 15 on administration of the funds. Criteria for eligibility include listing on the National Register and a 50% match from the project sponsor. Grants cannot be used for acquisition costs.

The purpose of the bill is to create employment quickly. Sponsors of projects must be able to obligate funds by October 1 and begin work by January 1. All work must be completed by October l, 1984. One would hope that the costs of mitigating adverse impact on archeological resources at project sites will be included in the grants.

Historic Shipwrecks Preservation

Congress is considering two different bills on this subject. One bill is H.R. 132. The other is a revised version proposed by the Texas State Antiquities Committee. H. R. 132 proposed by Representative Bennett of Florida would call for shipwrecks to become property of the United States. Upon each state's adoption of a program that would adequately protect underwater shipwrecks, the federal government would transfer title back to the state. Texas feels that such a law would violate states' rights. The Texas bill would place custody of all historic shipwrecks in state waters with each state. The

Texas bill would be beneficial for states that already have strong, successful programs in protecting their underwater shipwrecks, but it could hurt states without such programs. New York State has legislation to protect underwater sites, but our law has been difficult to enforce. Bill H.R. 132 might provide the weaker states with federal support.

Either way, the current problem is the routine favoritism in the admiralty courts toward profit-motivated salvage firms rather than toward historic preservation or archeology. Attached is some additional explanatory material.

Historic Preservation Fund

Archeologists and historic preservationists nationwide rallied last year, and by writing letters in response to the threat of "zero" funding we were a key element in the reinstatement of money for the Historic Preservation Fund in the Fiscal Year 1983 budget. This has guaranteed the continuation of the New York State historic preservation program, which includes our means of nominating sites to the National Register as well as the review of construction projects that could impact archeological sites.

However, this funding for historic preservation continues only until September 30. In Washington, the Fiscal Year 1984 budget is now under discussion. Again the Interior Department under Secretary Watt has recommended zero funding for the Historic Preservation Fund for the states. Until the negative attitudes of the current administration toward historic preservation change, it will be necessary for us to continue writing letters to our Congressmen or Congresswomen to preserve our historic preservation and National Register programs.

NEW YORK DELEGATION

NEW YORK		CITY	WASH. OFFICE	(AREA CODE 202)
	*Sen. Daniel Patrick Moynihan (D)	Oneonta	442RSOB	224-4451
	Sen. Alfonse M. D'Amato (R)	Is. Park	321RSOB	224-6542
**1.	William Carney (R)	Hauppauge	113LHOB	225-3826
2.	Thomas J. Downey (D)	West Islip	303GHOB	225-3335
3.	Gregory W. Carmen (R)	Farmingdale	1729LHOB	225-3865
4.	Norman F. Lent (R)	Baldwin	2228RHOB	225-7896
5.	Raymond McGrath (R)	Valley Spring	506CHOB	225-5516
6.	John Le Boutillier (R)	Westbury	417CHOB	225-5956
***7.	Joseph P. Addabbo (D)	Ozone Park	2256RHOB	225-3461
8.	Benjamin S. Rosenthal (D)	Flushing	2372RHOB	225-2601
9.	Geraldine A. Ferraro (D)	Forest Hills	312CHOB	225-3965
10.	Mario Biaggi (D)	Bronx	2428RHOB	225-2464
11.	James H. Scheuer (D)	Neponsit	2402RHOB	225-5471
12.	Shirley Chisholm (D)	Brooklyn	2182RHOB	225-6231
13.	Stephen J. Solarz (D)	Brooklyn	1536LHOB	225-2361
14.	Frederick W. Richmond (D)	Brooklyn	1707LHOB	225-5936
15.	Leo C. Zeferetti (D)	Brooklyn	2436RHOB	225-4105
16.	Charles Schumer (D)	Brooklyn	126CHOB	225-6616
17.	Guy V. Molinari (R)	Staten Island	501CHOB	225-3371
18.	S. William Green (R)	New York	1417LHOB	225-2436
19.	Charles B. Rangel (D)	New York	2432RHOB	225-4365
20.	Theodore 5. Weiss (D)	New York	132CHOB	225-5635
21.	Robert Garcia (D)	New York	223CHOB	225-4361
22.	Jonathan B. Bingham (D)	Bronx	2262RHOB	225-4411

NEW YORK DELEGATION Continued.

NEW YORK		CITY	WASH. OFFICE	(AREA CODE 202)
23.	Peter A. Peyser (D)	Irvington	301CHOB	225-5536
24.	Richard h. Ottinger (D)	Pleasantville	2241RHOB	225-6506
25.	Hamilton Fish Jr. (R)	Milbrook	2227RHOB	225-5441
26.	Benjamin A. Gilman (R)	Middletown	2160RHOB	225-3776
27.	Matthew F. McHugh (D)	Ithaca	306CHOB	225-6335
28.	Samuel S. Stratton (D)	Amsterdam	2205RHOB	225-5076
29.	Gerald B. Solomon (R)	Glens Falls	323CHOB	225-5614
30.	David O. B. Martin (R)	Canton	502CHOB	225-4611
31.	Donald J. Mitchell (R)	Herkimer	2305RHOB	225-3665
32.	George C. Wortley (R)	Fayetteville	508CHOB	225-3701
33.	Gary A. Lee (R)	Ithaca	322CHOB	225-3333
34.	Frank Horton (R)	Rochester	2229RHOB	225-4916
35.	Barber B. Conable, Jr. (R)	Alexander	237CHOB	225-3615
36.	John J. LaFalce (D)	Kenmore	2447RHOB	225-3231
37.	Henry J. Nowak (D)	Buffalo	1514LHOB	225-3306
38.	Jack F. Kemp (R)	Hamburg	2235RHOB	225-5265
39.	Stanley N. Lundine (D)	Jamestown	231CHOB	225-3161

*U.S. Senate, Russell Senate Office Building, Washington, D.C. 20510

**House of Representatives: LHOB-Longworth House Office Building
CHOB-Cannon House Office Building
RHOB-Rayburn House Office Building
Washington, D.C., 20515

***Districts 7-22 are in New York City

PROGRAM
SIXTY-SEVENTH ANNUAL MEETING
NEW YORK STATE ARCHEOLOGICAL ASSOCIATION

April 15, 16, 17, 1983
Queensbury Hotel
Glens Falls, N.Y.

Host: Auringer-Seelye Chapter-NYSAA

FRIDAY, APRIL 15, 1983
1:30 P.M. NYAC Business Meeting
Champlain Room 121-2nd Floor

4-8:00 P.M. REGISTRATION (Fee $8.00)-Hotel Lobby

7:00 P.M. EXECUTIVE COMMITTEE MEETING
Champlain Room 121-2nd Floor

9:00 P.M. WINE & CHEESE PARTY-Mezzanine 2nd Floor
PUBLICATIONS SALES-Glen Room-2nd Floor
EXHIBITS-Mohawk Room-2nd Floor

SATURDAY, APRIL 16, 1983
8:00 A.M.-Noon REGISTRATION-Hotel Lobby

8:50 A. M. BUSINESS MEETING-Queens Charles Gillette, Pres., NYSAA
Ballroom

MORNING SESSION-QUEENS BALLROOM
Chaired by: Louise Basa Auringer-Seelye Chapter

9:30 A. M. Ellis McDowell Loudan
Wm. L. Beauchamp Chapter & SUNY at Cortland
"WHERE IS THAT FORT? 1982 EXCAVATIONS AT ERIE CANAL VILLAGE, ROME, N.Y,"

9:50 A.M. Thomas P. Weinman
Fellow NYSSA, Wm. L. Beauchamp Chapter
"THE SWEZEY SITE, COX-45, 1100AD-4000BC

10:20 A.M.
Diane Dallal
Hunter College
"ENGLISH CLAY PIPES FOR NIEW AMSTERDAM/DUTCH CLAY PIPES TO NEW YORK"

10:50 A.M. COFFEE BREAK

11:05 A.M. Mima Kapches, Assistant Curator
Royal Ontario Museum
"EARLY IROQUOIS MANIFESTATIONS IN SOUTHEASTERN ONTARIO & UPSTATE NEW YORK"

11:25 A.M. Mark Aldenderfer
F. M. Houghton Chapter & SUNY Buffalo
"WHAT TO DO WITH WASTE FLAKES:"

11:45 A.M. Bruce Fullem, Senior Scientist
State Historic Preservation Office
"STATE-WIDE PLANNING EFFORT FOR ARCHEOLOGICAL SITES"

12:00-1:15 LUNCH

AFTERNOON SESSION-QUEENS BALLROOM Chaired by: James P. Walsh Auringer- Seelye Chapter

1:15 P. M. Gilbert W. Hagerty
Chenango & Van Epps-Hartley Chapters
"ALCOHOLICS UNANIMOUS"

1:55 P.M. James P. Whittall
Member-at-Large NYSAA
"ARCHAIC CREMATIONAL BURIAL, EAGLE BRIDGE, N.Y."

2:25 P. M. Michael Gramly
Buffalo Museum of Science
"TOOLS AND DEBITAGE MADE BY FLAKING BONE: EXPERIMENTS AND ARCHEOLOGICAL EVIDENCE"

2:45 P.M. COFFEE BREAK

3:00 P.M. Robert E. Funk
New York State Museum
"A MAJOR NEW ONONDAGA CHERT QUARRY & WORKSHOP NEAR SHARON SPRINGS, N.Y."

and

"SOME ALTERNATE TEMPORAL MODELS FOR THE NORTHEAST"

3:35 P. M. Edward J. Lenik
HCI, Inc., Newton, N.J.
"THE STATEN ISLAND INDUSTRIAL PARK SURVEY: PROBLEMS AND CHALLENGES IN URBAN ARCHEOLOGY"

EVENING

6:00 P.M. COCKTAIL HOUR-Hotel Lobby

7:00 P.M. ANNUAL BANQUET -Queens Ballroom
Presentation of Awards-Dr. Peter P. Pratt
Keynote Address: "THE HOUSE ON MOUND 44-A PREHISTORIC DISASTER"
Dr. Albert A. Dekin Jr.
SUNY Binghamton, N.Y.

SUNDAY, APRIL 16, 1983

MORNING SESSION
Chaired by: John McCashion Van-Epps Hartley Chapter

9:30 A.M. James W. Bradley
Wm. Beauchamp Chapter & Massachusetts Historical Commission
"ARCHEOLOGY OF THE BOSTONIAN HOTEL - SALVAGING BOSTON'S PAST"

9:50 A.M. Larry Hansen & Ray Decker
Orange County Chapter
"SHOULD WE INVESTIGATE MORE TALUS SLOPES?"

10:15 A.M. COFFEE BREAK

10:35 A.M. Beth Wellman
New York State Museum
"JOHNSON II, A MIDDLE ARCHAIC SITE AT WELLS RIDGE, N.Y."

10:55 A.M. John A. Strong, Professor of History
Southampton College of L. I. University
"DOG CEREMONIALISM IN SEBONAC BURIALS: THE COMPARATIVE AND TEMPORAL CONTEXT"

ACKNOWLEDGEMENTS

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