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ROCK ART OF NEW ENGLAND

Barbara Anderson Calogero

> "In olden times there used to be an object that marked the bowlders at night. It could be seen, but its exact shape was indistinct. It would work making sounds like hammering and occasionally emit a light similar to that of a firefly. After finishing its work it would give one hearty laugh like a woman laughing and then disappear. The next morning the Indians would find another pictured bowlder in the vicinity where the object had been seen the night previous" (An Indian tale from Minnesota cited by Mallery 1893:32).

Pictographs, or paintings on rock, and petroglyphs, pecked or incised grooves in rock, have been found on boulders and the walls of cliffs and caves on every continent (Mallery 1893:31). In the United States, both petroglyphs and pictographs have been found in almost every state and are especially abundant in the Southwest. In New England, however, aside from one presumably historic pictograph in Salem, Massachusetts (Gramly 1979: 113), there are no reported pictographs and very few known petroglyphs (Mallery 1893; Tatum 1946; Grant 1967). This raises the problem of explaining the geography of rock art in North America. To answer the question of why rock art is commonly found throughout the United States and not in New England, we must first assess the nature of rock art distribution.

The author has a B.S. in Nursing from the University of Michigan and a Bachelor of Fine Arts from the University of Hartford. Her work as an artist led to the study of local history and prehistory in West Hartford. She has recently completed a M.A. in Anthropology at the University of Connecticut.

The Geography of Rock Art

Clusters of rock art sites have been found along major rivers and their drainage networks as well as along the coastlines of New England and southern California. Clusters are also noted at the confluence of the Mississippi and Missouri Rivers, with the greatest reported concentrations in southwest Texas, the Colorado Plateau, the Great Basin, and west into southern California (Grant 1967:17).

Some rock art has been found in isolated areas away from habitation sites while other markings are in the context of campsites, pueblos, and cliff dwellings. It is often difficult to determine how the artists might have climbed the rock walls to make marks 30 to 40 feet above the canyon floor or lake (Steward 1927-30:78). Kidder and Guernsey (1919:197) reported that some could only have been made if the artists had stood on the rooftops of the cliff-houses now long since collapsed into rubble. One site near Las Vegas, Nevada, was reported to be in a canyon with a 500 foot wall which the informant said was covered with inscriptions from top to bottom for two miles along the canyon (Lodwick 1924, cited by Steward 1927-30: 147).

Southwestern site reports indicate that the artists utilized the surfaces of most types of rock including sandstone, granite, basalt, quartz, and lava flows, with a preference for fine-grained rock (Steward 1927-30:74). However, in the Great Lakes region of Canada, where rock paintings predominate, there seems to be

no pattern of choice between rough or smooth-grained rock surfaces upon which the aboriginal pictographs are found (Dewdney and Kidd 1967: 16,141,157).

In the Southwest, petroglyphs were often made on oxidized rock which provided a brown-or black-stained surface known as "desert varnish." Pecking through the manganese and ferric oxides exposed a contrasting lighter surface underneath which the artists used to delineate the lines and forms (Grant 1967:43-44).

Rock Art Production

Aboriginal petroglyphs were made by pecking, scratching, or abrading into the host stone with a rock and, after European contact, with metal tools. Pictographs were made by daubing on paint with brushes probably made from bark or plant fibers or with the artist's fingertips. Some paint appears to have been blown or sprayed onto the rock walls where "stencils" of multiple handprints appear (Grant 1967:54).

For painting, red and yellow ochres, kaolin clay, charcoal and other pigments were mixed with binders such as fats (Mountford 1949:87), or possibly with fish glue or saliva (Dewdney and Kidd 1967:21,22). In Europe, in limestone caves, the fat binders believed to have been used apparently blocked the pores of the rock and preserved the paintings by preventing precipitates of calcium carbonate from forming on the painted surfaces (Burkitt 1963:186).

Comparative ethnography is of some help to us in understanding why people might have made marks on rocks. In Australia, Mountford found what he assumed to be a complete depiction of an emu hunt involving sympathetic magic on a cave wall at Ayers Rock. However, his aboriginal informant disagreed, saying that it was only a record of a successful hunt (Mountford 1949:89). According to the Aborigines no rock art is used for hunting magic (McCarthy 1965:90).

Elkin (1954:230) reported that in the Kimberly District of Western Australia, there were cave gallery paintings of tribal cult heroes called the "Wondjina" which are large figures with eyes and noses but no mouths because they are considered to be now lifeless and speechless. Each clan had its own "Wondjina" galleries with clan animal totems all of which are the responsibility of the clan to refurbish (Elkin 1964:15).

The Aborigines believe that the act of painting is more important than the visual result. Marking over another pictograph does not negate the power of the first. To retouch or refurbish a "Wondjina" figure is believed to bring rain and to repaint animal figures supposedly ensures the increase of the species (Elkin 1964:15).

Pictographs often recorded special events and remained as historical records. Silhouette paintings of men on camels and in jeeps recorded the invasion of foreigners into the territory of Western Australia. One wall drawing of a man walking beside a bicycle may have been the last record of an adventurer who had attempted to cycle across Australia shortly after World War I, but disappeared (Tindale 1972: 240,241).

In North America, Indian informants have interpreted rock markings as maps, notices of a group's location, the direction a group has gone, the condition of a group, a warning, or simply a record of a visit such as the Hopi clan inscriptions made on a particular rock each time a clan member visited the nearest salt source. In the Southwest, such marks were drawn on rock faces; however, in the East, similar markings were made on trees, bark rolls,

animal hides, and on the ground (Mallery 1893).

Around the Great Lakes Region of Ontario, Ojibwa informants related the numerous pictographs to shamanistic practices and to the belief in the rock monster, Maymaygwayshi, who they believed lived inside the crevasses of the rock walls along the waterways. Some shamans were believed to be so powerful that they were able to go inside the rocks to trade tobacco for "rock medicine" from the monster. At many pictograph sites Dewdney found offerings of clothing, tobacco, and "prayer sticks" left by Indians who still believe in the power of the pictures even though they claim not to know or will not admit to knowing who made them (Dewdney and Kidd 1967:14).

Dating Rock Art

Not only are we uncertain about the intended meaning of the rock marks and the identity of the artists but also we rarely can determine when they were made. European Paleolithic rock art has been dated by association with portable art found *in situ* with datable material. Also, comparable art styles are considered to be contemporaneous (Burkitt 1963:168,169). At the Lascaux Cave, charcoal found with stone lamps believed to have been used by the artists to illuminate the cave has been radiocarbon dated to ca. 15,000 B.C. (Leroi-Gourhan 1983:103).

There are other ways to estimate the age of the rock marks, but the only direct method is done on travertine lime deposits called tufa. In Southern California, petroglyphs were carved into the tufa along the shores of post-Pleistocene Lake Cahuilla now the remnant Salton Sea. When the water levels fluctuated, more tufa was deposited over the carvings. The tufa has a carbonate ion with organic carbon which has been radiocarbon dated to 9180 ± 135 B.P. (Smith and Turner 1975: 24-27).

American Rock Art

The cornerstone of American rock art research has been the Smithsonian Institution's 1893 publication of "Indian Picture-Writing" directed by Colonel Garrick Mallery. Another significant study was directed by Julian Steward in the 1920's in the southwestern United States (1927-30). His study was the first comparative analysis of rock art types and styles (Tatum 1946:122).

In the Northeast, it is quite likely that not all rock art has been reported, but a large body of published data does exist for this region. Research along Pennsylvania's three major rivers was begun in the 1930's by Cadzow (1934), and continued by Swauger (1961) of the Carnegie Museum. New England rock art researchers include Stiles (1789), Delabarre (1925), Turnbaugh (1977), Gramly (1979), Lenik (1980), and Snow (1980).

Robert Tatum (1946:122) reviewed American research in petrography and presented the most complete summary of rock art locations in the Northeast. He suggested that rock art was largely ignored in American anthropology because of lack of interest by researchers trained at eastern institutions where little local rock art existed. Tatum catalogued the number of sites in each of the then 48 states noting the following:

> ...the regions with the greatest number of rock exposures have the greatest number of petroglyphs.... The scarcity of sites in the east is no doubt due to the lack of suitable terrain, as we find numerous drawings on bone and other articles (Tatum 1946:123).

Tatum's table of rock art sites indi-

cated that there were indeed few reported in the Northeast. No rock art was reported for Delaware, New Jersey, Connecticut, or New Hampshire. Maine had 5, Massachusetts 20, Rhode Island 10, Vermont 3, New York 20, and Pennsylvania 35 (Tatum 1946:124). Many of these figures have since changed, but are still comparatively low.

The five Maine sites are in the North along rivers near river mouths, or along the coast where some sites are below the water line even at low tide (Mallery 1893:82). Snow (1970:7) believes that because of the slow isostatic rebound of the Maine coast following deglaciation, the petroglyphs are not more than 7000 years old.

According to Tatum (1946:124) New Hampshire had no recorded rock art nor could he find any on-going research or informants. This is extremely surprising for an area famous for its fine-grained granite.

Vermont has three reported petroglyphs. One is a pecked hand glyph in northern Vermont (Thomas 1983: pers.commun.). The second is along the Connecticut River in southern Vermont. Faces carved into the fine-grained granite bedrock just below Bellows Falls are about 15 feet above the rolling water known historically for its shad and salmon runs (Figures 1a,b).

The other site is in Brattleboro, at the confluence of the Connecticut and West Rivers (Hall, cited by Huden 1971:39). The latter previously known as the Wantastiquet was an important transportation route for the Abenaki Indians who traded beaver pelts with the Dutch and English colonists downriver along the Connecticut (Thomas 1973:27). The petroglyphs are located according to Hall (cited by Huden 1971: 39) on the southern side of the West River where the eddying waters might have provided a convenient and sheltered meeting place. The rock carvings are now submerged due to damming of the Connecticut River at Vernon.

In Massachusetts, the 20 petroglyphs noted by Tatum may have included marked rocks on Cape Cod which appear to have been used for grinding seeds and for honing tools (Torrey 1952:19-67). However, Dighton Rock, which was originally located just offshore in the Taunton River is, indeed, covered with inscriptions both historic and probably prehistoric (Delabarre 1925:51) (Figure 2).

Dighton Rock has been a source of controversy ever since its discovery. The earliest known drawing of the Dighton Rock inscriptions was made by John Danforth in 1680, followed by Cotton Mather's rendition in 1712 (Mallery 1893:86,763). The Bureau of American Ethnology published nine drawings by different people of the rock marks which clearly demonstrate great variety in perception and interpretation (Mallery 1893:Plate 54).

More than 600 books and articles about Dighton Rock have been written speculating on the significance of the inscriptions. Some have deciphered the name and date "Miguel Corte Real 1511" (Delabarre 1925:53,54). Real is believed to have been a Portuguese explorer who sailed for the New World to look for his lost brother. Neither returned to Portugal. This had led to speculation that the Portuguese were the first to settle the New World (da Silva 1971:55).

In 1886, Mallery (1893:87-88) found that the inscriptions were being worn away by the tourists who scrubbed off the daily tidal deposition of sand. The rock has since been moved ashore to a shelter.

Delabarre (1925:72) described 17 Rhode Island petroglyphs most of which were found along the shores of rivers and bays. Recently, Turnbaugh (1977: 117) reported a petroglyph (Figure 3) of a pecked hand on a large granite

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Figure 1a. Portions of the petroglyphs at Bellows Falls, Vermont. Others are obscured by snow and rockfalls. (2 meters across) (Photograph by B. Calogero)

Figure 1b. More faces from Bellows Falls

Figure 2. Dighton Rock, Massachusetts (redrawn from Mallery 1893:Figure 49)

Figure 3. Gardner Petroglyph, Kingston, Rhode Island - 20x21cm
(Photograph by B. Calogero)

glacial erratic north of the University of Rhode Island's campus in Kingston. He also reported (Turnbaugh 1983:pers.commun.) another petroglyph further inland on the property of the Yawgoog Boyscout Camp.

Although Tatum listed no rock art sites for Connecticut, two have been reported. Ezra Stiles (1789:333) found a petroglyph in New Preston, which he believed was an inscription in Hebrew. Recently, Edward Lenik (1978:9) and Rabbi Arthur Chiel (1981:75) examined the marks and concurred with Stiles' report. They believe that they were the Hebrew names of two local men staking mining claims in the 18th century.

Andrew Kowalsky (1982:pers.commun.) reported a petroglyph on the banks of the Salmon River in East Haddam. He believed it was made with a sharp metal tool and therefore was historic (Figure 4). The narrow incision lines of the small petroglyph form three "t" shaped components with some additional markings in the mica schist.

Similar symbols were found in pictographs in Ontario (Dewdney and Kidd 1967:61,64), and along the Susquehanna River in Pennsylvania (Cadzow 1934:Plate IV). Mallery (1886:220) noted the use of cruciform figures prehistorically in many contexts as indicating trade and direction, the four winds, mosquito hawks and dragonflies, and in shamanism (1893:725-728). The cross held by men appears frequently in Ontario pictographs (Dewdney and Kidd 1967:37,104). Even though the Haddam petroglyph probably was made during the post-Contact period, it may be aboriginal in origin. If this is true, then it would be the only aboriginal petroglyph in Connecticut thus far reported.

The Evidence and Its Implications

Why is rock art so uncommon in New England? I wish to suggest and examine the following hypotheses in an attempt to answer this question.

1. New England's rock types and rock faces did not lend themselves to rock art nor was the rock easily worked.
2. New England weather may have destroyed pictographs and most petroglyphs by rock exfoliation, and pigment and surface erosion.
3. Rock wall art may not have been part of the culture of the Algonkian-speaking Indians in the New England area. Instead, as Tatum (1946:123) suggested, the aborigines utilized available but ephemeral materials for their marking surfaces or marked transportable rock.
4. Migration patterns and cultural diffusion may be determined by typological similarities in southwestern rock art. Perhaps the migration of the Algonkian-speaking peoples can be traced by the infrequent occurrence of rock art and frequency of marked objects found where these people were living at the time of contact.
5. Pressure from the Mohawk, Mahican, and Pequot Indians upon the many small tribes of densely populated southern New England resulted in unstable territorial boundaries. This tension may have precluded the use of rock art at fixed sacred sites. The tribes may have just carried their sacred marked objects with them.

Hypothesis 1. There are indeed few exposed sheer rock walls and cavernous shelters in New England. Although there are also more coarse granites, schists, and basalts than there are upturned beds of fine-grained sandstone as in the Southwest, New England does have some fine-grained metamorphic rock. For example,

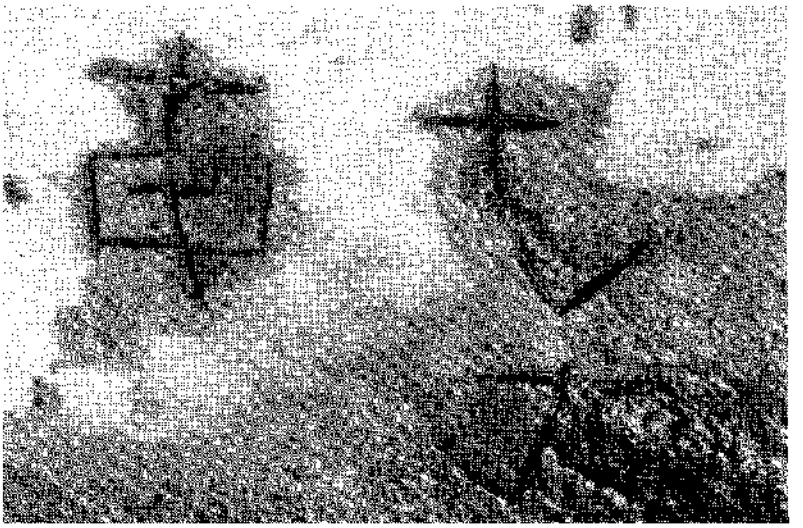

Figure 4. Blaschik Petroglyph, East Haddam, Connecticut - 13x15cm (Photograph by B. Calogero)

the Machias River petroglyph in Maine was carved into "schistose slate" (Mallery 1893:82). The Gardner "hand" petroglyph in Rhode Island, however, was pecked into grainy, eroding granite.

The host of lithic artifacts pecked and ground into axes, adzes, fetish figures, pipes, birdstones, stone heads, incised pebbles and pendants which have been found in New England demonstrates the skill with which the aboriginal inhabitants did utilize fine-grained native stone (Willoughby 1935:137). The inscribed and carved stones have been described as movable pictographs (Fowler 1966:44). The first hypothesis about the quality of the native stone seems to be inadequate as an explanation for the paucity of fixed rock art in New England.

Hypothesis 2. The second consideration is whether rock art could survive New England's rigorous climate. Lichen growth, weathering and exfoliation of the host rocks certainly could obscure or destroy paintings and make shallow marking indecipherable. However, in the Great Lakes region of Canada, hundreds of rock paintings have survived fairly well even when overgrown with lichen. In fact, when some lichen overgrowth was scrubbed off the host rock, the paintings underneath appeared brighter than those which had remained exposed (Dewdney and Kidd 1967:6,10). The red and yellow ochre pigments appeared to be completely bonded to the host rocks and have survived intact even when painted over with modern graffiti which is now wearing away (Dewdney and Kidd 1967:11).

Gramly (1979:113) reported an historic pictograph on a granite boulder near Salem Village, Massachusetts,

which had hematite traces in what appeared to be a "patchy black film or varnish." He wrote the following (Gramly 1979:113):

> Using a dental pick scrapings were collected and submitted to the Center for Conservation and Technical Studies at Fogg Museum, Harvard University. The pigment was identified as hematite by the Debeye-Scherrer X-ray pattern. Hematite was observed to be embedded in an organic binder, which when mounted, separated into tiny rod-like fragments sheathed in hematite. Quite possibly the binder is casein (milk) or albumin (egg-white), both of which are tenacious media capable of withstanding New England's punishing weather.

Hypothesis 3. The limited number of rock art sites in the Northeast may indicate that the marking of rock walls was just not part of the culture of the Eastern Algonkian-speaking Indians (Feder 1982:pers.commun.). To test this hypothesis, I superimposed Voeglin and Voeglin's (1966) map of post-Contact "North American Indian Languages" over Grant's (1967) map of rock art locations which I corrected to reflect the present number of sites reported in the Northeast (Figure 5). Most of the states with few or no rock art sites are in the Algonkian-speaking language areas of post-Contact time. Pre-Contact languages and locations are, of course, uncertain. Environmental regions with natural boundaries such as rivers and mountains when compared with Grant's corrected map of petroglyph sites demonstrates that the smallest number of sites are located in the following areas: the Atlantic coastal plain extending from New York to Texas, the Appalachian Piedmont, New England Province, and the Interior Plains areas of the contiguous 48 states (Bloom 1978: 18). This hypothesis, then, cannot be rejected outright. Rock art may indeed be lacking in New England because it was not part of the cultural tradition of Algonkian-speaking people.

Hypothesis 4. In addressing the fourth hypothesis, it is believed that the migrations of people and cultural diffusion may be traced in some instances by comparing topical and typological similarities in art. For example, the humped-back flute player known as "Kokopelli" has been found painted on rock walls in the Southwest at Basketmaker sites and later on Hohokam and Mimbres pottery. Today the Kokopelli image appears as a Kachina figure in Hopi dances (Grant 1967:61). Other familiar examples are depictions of horses, crosses, and cattle in pictographs recording the arrival of the Spanish and the introduction of another culture in the Southwest.

In the Northeast there is evidence, as Tatum suggested, that the eastern Algonkian-speaking people used portable art and ceremonial objects. A few large sculptured stone heads and many small incised stone pendants and sculptures have been found. The Delaware Indians used effigy heads made of wood which they carried with them and set on posts during the Delaware Big House Ceremony (Brinton and Speck, cited by Willoughby 1935:162).

Kraft (1972:6) wrote of an incised stone face reportedly worn by a Delaware Indian:

> Pendant effigies were sometimes suspended right side up. Many, however, were suspended upside down, presumably to

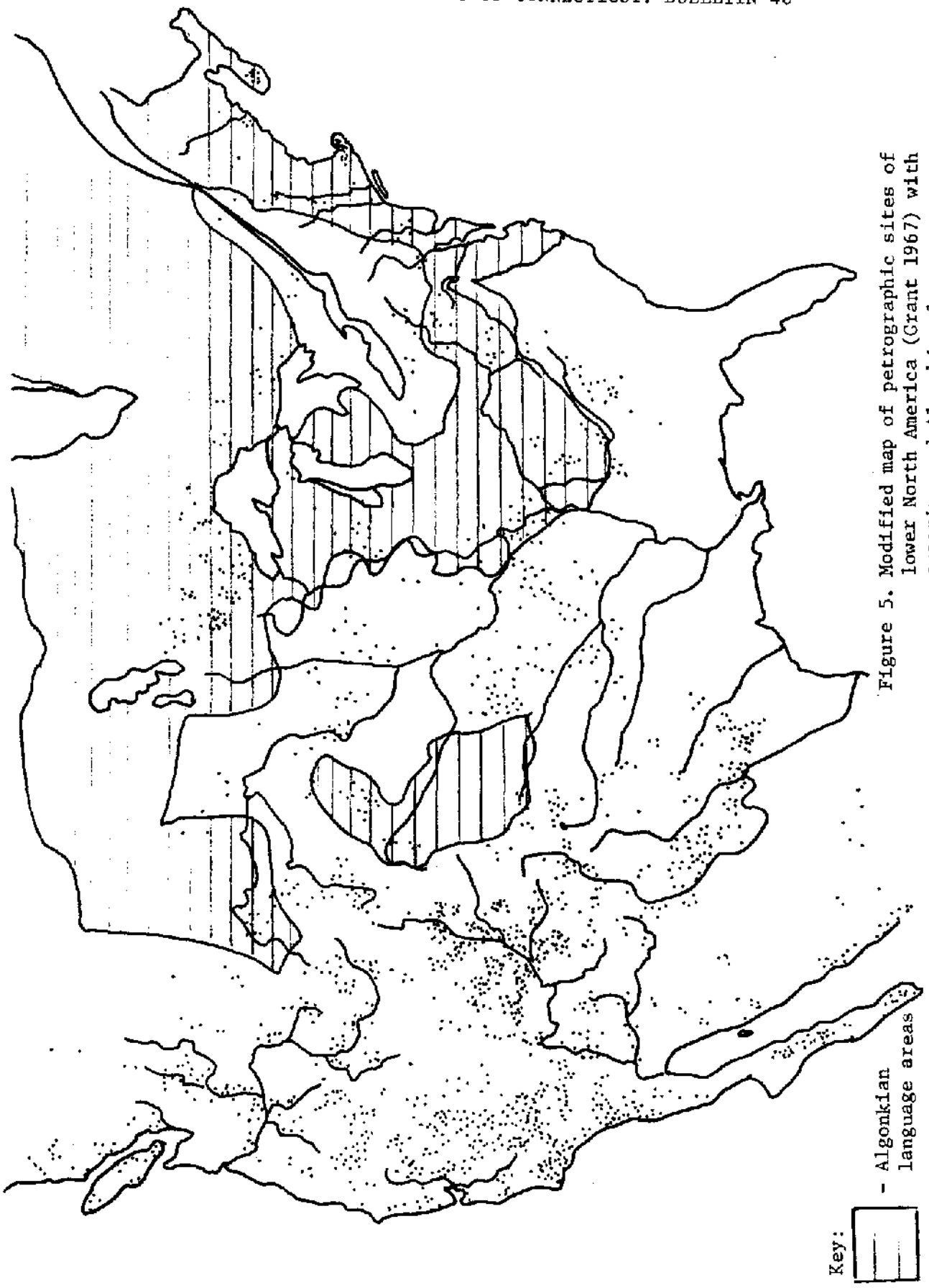

Figure 5. Modified map of petrographic sites of lower North America (Grant 1967) with superimposed Algonkian language areas (Voeglin and Voeglin 1966)

> affect a closer intimacy between the wearer as he looked down, and the image that constantly looked back at him.

Ephemeral materials were also used as surfaces for marks in the Northeast. Skin tatooing was practiced as well as animal hide painting. Trees along paths frequently had pieces of bark removed exposing fresh surfaces for painting of maps and directions. Mnemonic devices for ceremoial chants and also other sacred writings and notes were made by shamans on birch bark strips (Mallery 1893:202,213). Some bark rolls are still extant in museums.

Although it is always problematical to argue on the basis of negative evidence, the presence of portable art and the relative absence of fixed rock art seems to correspond with the presence of Algonkian speakers (see map, Figure 5).

Hypothesis 5. This final hypothesis is based upon the population estimates of the many tribes of New England and their interactions. Snow's (1980:33) population estimates around A.D.1600 indicate a greater density in southern New England than in the North. The pressure of the Mohawks upon the Mahicans, and later the Pequots upon the many small tribes of southern New England made territorial boundaries unstable. The only people to successfully hold the Pequot at bay were the Narragansett Indians in Rhode Island. They were the largest of the New England tribes and geographically quite stable (Hubbard 1815, cited by Soulsby 1981:20). Perhaps coincidentally, in Rhode Island, there are also a number of petroglyphs.

Since we cannot as yet date petroglyphs such as those in Rhode Island, we cannot determine if the glyphs were contemporaneous with or were made by the cohesive Narragansett, or date to Paleo-Indian or Archaic periods. I can only postulate that if the Narragansett Indians did make them, the relative security of their territory may have contributed to their inclination to mark fixed rocks whether sacred or not.

Conclusion

Making marks appears to be a universal human trait, not only on rock walls but on all kinds of surfaces. The marks are mute as we puzzle over their meaning and place in aboriginal lifeways. Why people chose to peck and paint marks on rock walls in much of the country and the world but rarely in New England remains an enigma.

It should be noted that, while I have employed a multiple working hypothesis strategy here, not all the possible explanations suggested for the low frequency of rock art in New England are mutually exclusive. Certainly, a combination of the lack of a strong cultural tradition of non-portable rock art, a tradition of portable rock art, and the instability of tribal boundaries all may have contributed to the rarity of petroglyphs and pictographs in this region.

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THE FASTENER SITE: A NEW LOOK AT THE ARCHAIC-WOODLAND TRANSITION IN THE LOWER HOUSATONIC VALLEY

Lucianne Lavin and Bert Salwen

The Fastener site (6-Fa-118) is a multi-component site located on a wooded knoll overlooking the Housatonic River in Shelton, Fairfield County, Connecticut (Figure 1). It appears to have been occupied during the Late Archaic, early Woodland, and Historic periods. The site is located on the property of the USM Corporation, Fastener Division. The authors tested the site with a crew from New York University during the fall of 1974 and the spring of 1975. At the time of excavation, all measuring instruments were based on the English system and are reported herein as such. Nine 5-ft. and 3 3-ft. squares were excavated, a total surface area of 252 ft.^{2} (Figure 2), yielding 1958 prehistoric artifacts - 1687 lithic artifacts and 271 potsherds; 72 historic artifacts were also recovered. The site is now covered by a rather dense growth of shrubs and trees.

STRATIGRAPHY

The natural stratigraphy of the knoll consists of sod and 6-9" of humus underlain to an indeterminate depth by an orange sandy soil. The stratigraphy of the occupied area is similar, except that the humus layer is much thicker:

Humus. This stratum was 11-18" thick and consisted of dark to medium brown silty organic soil containing many rootlets and worm holes, very few small pebbles, and some large cobbles. The stratum was originally excavated in arbitrary 3-in. levels. Wall profiles of the first few test squares excavated, however, indicated a darker brown zone in the lower humic level which proved to be an old humus line, beginning ca. 9" from the surface. Examination of the artifacts indicated that the prehistoric contents of the three uppermost levels (i.e., the first 9" of humus) were very similar. Most of the historic materials were recovered from these levels as well (55 or 7.9% of the total collection from the first 9"). To facilitate excavation, the uppermost 9" were removed as a single level. This upper humic level sometimes contained very dark brown or yellowish mottling.

The lower humic level (9-18") contained only 5 historic specimens (1.6% of the total collection from this level), at least one of which was found at the very top of the level. Diagnostic artifacts indicate early Woodland occupations in both humic levels, and ceramic analysis suggests two temporally distinct components (Table 1 and discussion below).

The presence of plow lines at the base of the humus in squares 40N20W and 25S25E indicates that at least part of the site was once under cultivation.

Junction. This zone between the humus and the orange subsoil below it was usually 1-3" thick, but ranged up to 5" thick. Because it was the physical

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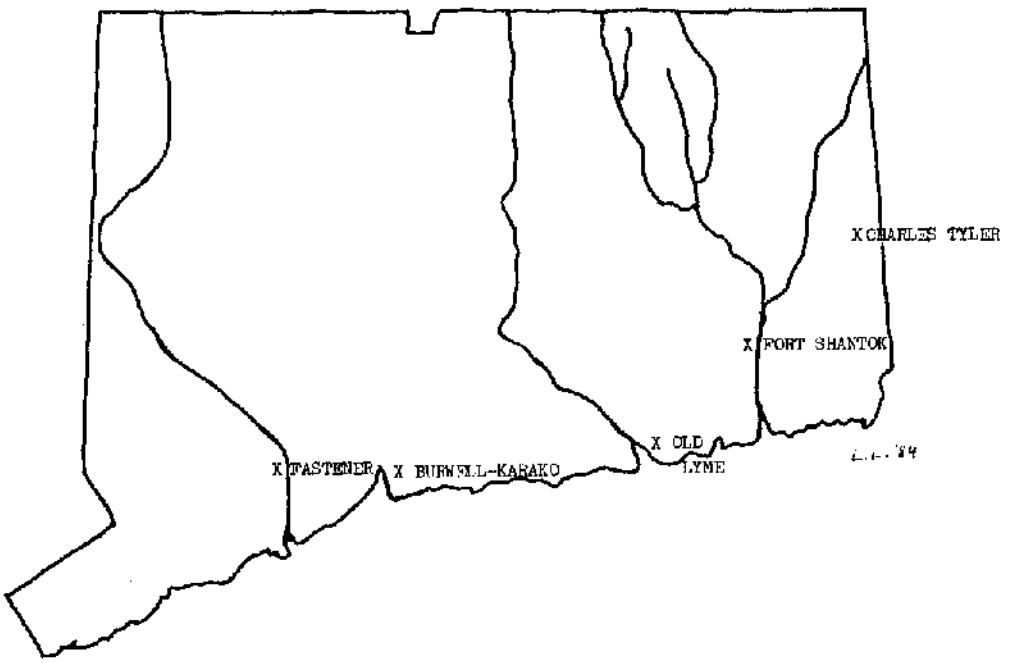

Figure 1. Location of Connecticut archaeological sites cited in text

juncture between two strata, it was a mottled admixture of dark or medium brown silty soil and orange sandy soil. It contained numerous rootlets, and became increasingly pebbly with increased depth. Its artifactual contents indicate that the junction was also an admixture of the Woodland and Archaic components that once occupied the humus and orange soil strata, respectively.

Orange Soil. The lower limit of the orange soil was not reached during this field project. It was excavated in 3-in. arbitrary levels to a depth of 1'. No artifactual materials were recovered in the fourth level (9-12") and excavations were terminated at this point. The stratum consisted of orange sandy soil and many small pebbles. Rootlets were present, but were not as numerous as in the preceding strata. A few rodent burrows were also present. Artifactual content indicates Late Archaic occupations of the site in this zone.

The above stratigraphic profile occurred throughout the excavated area, except in the extreme northwest corner of the site. As noted above, plow lines in square 40N20W indicate that this area had once been under cultivation; 2" of humus was underlain by 1½" of brown earth and 3½ to 5½" of sandy orange soil. Below the sandy orange soil, the northwest quadrant of the square contained 2½" of pebbly orange sand and a grayish white sand lens up to 3" thick. This sand lens ran from the northwest corner of the square to its southeast corner, cutting through a 4½ to 7-in. stratum of range loam that covered the

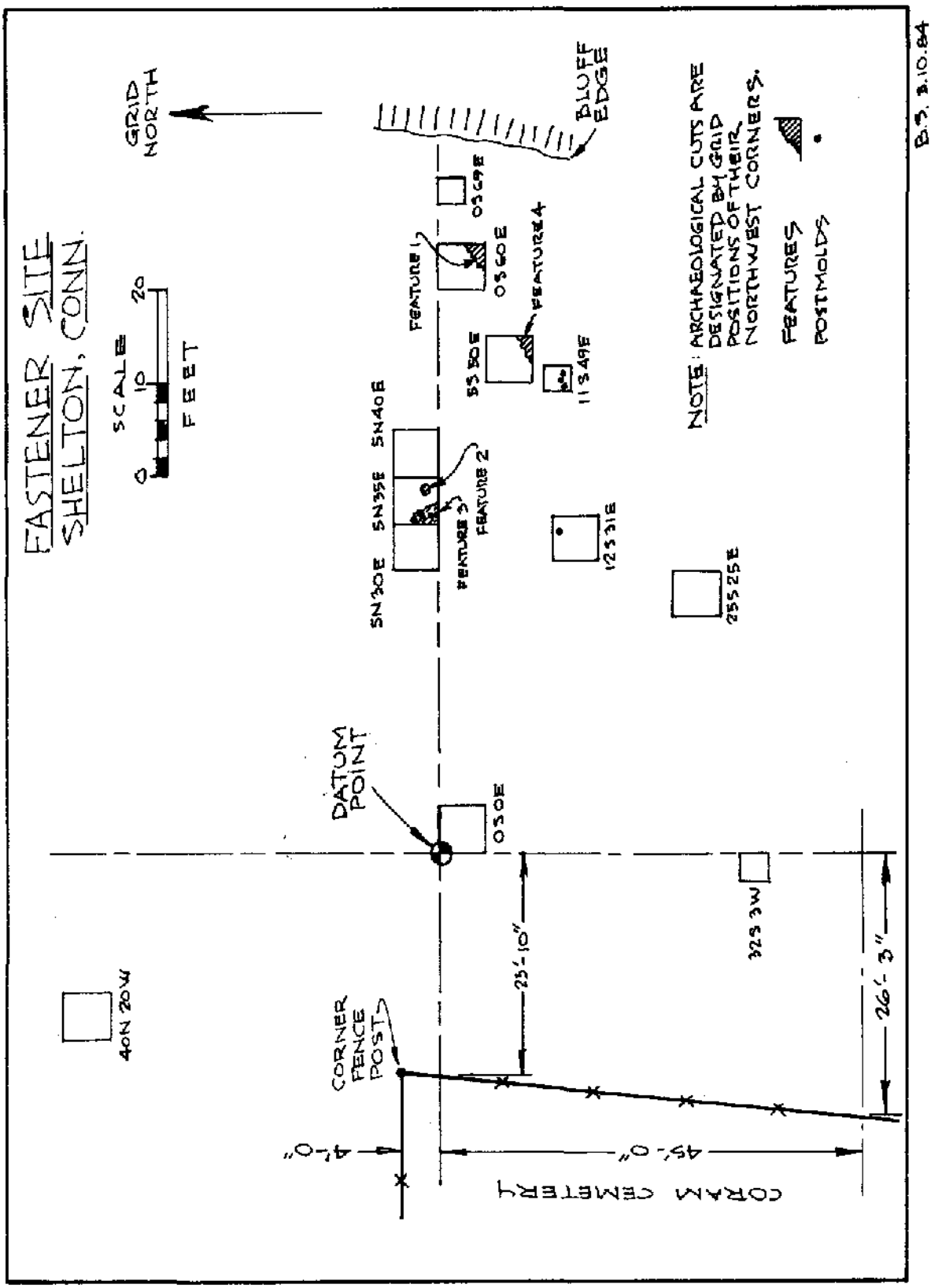

Figure 2. Plan view of Fastener site, Shelton, Connecticut

Table 1. Distribution of artifacts from the Fastener site, Shelton, Connecticut.

STRATA / ARTIFACTS	ZONE A	ZONE B	JUNCTION	ORANGE 1	ORANGE 2	ORANGE 3	FEATURES 1	FEATURES 2	FEATURES 3	FEATURES 4	40N20W--PLOWZONE ABOVE JUNCTION: HUMUS	BROWN EARTH	ORANGE SAND 3½-9"	ORANGE SAND 9-12"	LOAMY ORANGE	SAND LENS	BROWN LOAM	BROWN ORGANIC	BROWN MOTTLED	NO PROVEN. FLUFF	NO PROVEN. SURFACE	TOTALS
Projectile Points																						
Vosburg				2																		2
Brew. Eared-Ntch.				1																		1
Brew. Corner-N.			1																			1
Poss. Sylvan L.				1																		1
Wading River	1																					1
Squibnocket Stem	1			1																		2
Lamoka-like	1	2	1	1	1															1		7
Narrow preform				1																		1
Rossville	1	1																				2
Unidentifiable			1																		1	2
Unclassifiable			3																	1	1	5
Backed knife				1																		1
Stemmed knife	1																					1
Flake knife	3				1																1	5
Biface	1		1																			2
Flake scraper		1	4		1																	6
Denticulate					1																	1
"Worked" material			2																			2
Cores, Quartz	2		2		3								1									8
Quartzite	1			2																		3
Non-utilized Flakes																						
Quartz	371	186	429	118	56	40		2	1		1	4	5				2	4	5	8	23	1255
Quartzite	1												1								1	3
Chert	17	8	11	6					1												4	47
Jasper	10	9	6		1																2	28
Siltstone	113	32	50	10	1	2		2				1	1				1				2	215
Sandstone	2																					2
Hammerstone		2					?2															4
Grinding stone							1															1
Hammer/grinding	1						2															3
Hammer/grind/anvil		1																				1
Metate							1															1
Fired rock	6	9	16		17	6		1	2	15									1			73
Total Lithics	532	251	527	144	82	48	6	5	4	15	1	5	8	0	0	0	3	4	6	10	36	1687
Total Pottery	113	60	55	20	4	0	0	0	0	0	0	0	1	0	0	0	1	1	0	2	3	271
Historic Materials	55	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	72
TOTALS	700	316	601	164	86	48	6	5	4	15	1	5	9	0	0	0	4	7	6	12	41	2030

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southern half of the square. The northeast quadrant of the square contained 4½ to 8" of pebbly brown soil. Below the latter strata, a 3 to 4-in. layer of brown organic earth covered the entire square, followed by 2" of mottled brown earth. At this point, the plow line and junction zone were reached.

Features. Four features and 4 postmolds were uncovered (Figure 2). Feature 1 was 4 to 6" into the upper humus level in square 0S60E. It consisted of a cache of food processing equipment in the south end of the cut, including a slab metate, a grinding stone, 2 combination hammerstone/grinding stones, the shell of a hard-shell clam, and 2 problematic cobbles too eroded for unequivocal functional identification. The feature is associated with the uppermost Woodland component at the site.

Feature 2 was a large decomposing tree stump that was found 9" deep in the humus in square 5N35E. The stump mold contained 4 non-utilized flakes and 1 fire-cracked rock.

Feature 3 was a tan sandy area in the western and southwestern part of square 5N35E. It was first recognized at the base of the junction, and was probably associated with a rodent burrow directly below it. The feature contained 2 non-utilized flakes and 2 fire-cracked rocks.

Feature 4 was a concentration of densely packed fire-cracked and reddened rock in the southeastern corner of square 5S50E. The feature originated in the junction zone and extended into the orange soil; it is probably associated with the Late Archaic Laurentian component at the site, as it was in the same square as two of the Laurentian points.

Three postmolds were found in square 11S49E and 1 in square 12S31E. All 4 postmolds were 2½" in diameter with converging bases. Three had pointed ends; 1 had a flattened end. The molds were first recognized at the top of the orange soil, extending 2½" into that stratum. The 3 postmolds in square 11S49E formed an arc ca. 2' long. All 4 appear to be associated with the Woodland level.

SPECIMENS

HISTORIC COMPONENT

All Euro-American artifactual materials at the Fastener site were recovered from the upper stratigraphic zones. Of the 72 specimens, 55 came from the topmost 9" of the humus layer; 13 were found in the lower part of the same layer or at the junction between the humus and the subsoil (Table 2).

Except for a fragment of white earthenware which was probably manufactured after 1820, all of the Euro-American specimens could have been made and used between ca. 1790 and 1820. The relatively large proportion of household objects, including many fragments of ceramic tableware and glass containers, and a 2-tined table fork, suggests that a residential structure was once located in the immediate vicinity. (We must admit that the documentary research necessary to confirm this suspicion has not yet been conducted.)

Metal Objects

Iron table fork (1) - this 2-tined forged fork is very similar in form to the one shown by Noël-Hume (1969: 182, fig. 63 (8)), who assigns the

Table 2. Distribution of historic materials from the Fastener site, Shelton, Connecticut

SPECIMENS	PROVENIENCE					TOTAL
	HUMUS		JUNCT.	PLOWZONE 40N20W	UNKNOWN	
	0-9"	BELOW 9"				
METAL						
Iron - Table Fork, Two-tined	1					1
- Nails & Fragments, Wrought?	2					2
- Nails & Fragments, Cut	2			2*		4
- Rusted, Unidentified	8	1				9
Brass - Stamping, Unidentified	1					1
Lead Ring - Weight?	1					1
TOTAL - METAL	15	1		2		18
CERAMICS						
Earthenware - Red, Unglazed	14	1				15
- Red, Unglazed, Brick	1		5			6
- Red, Tile					2	2
- Creamware, Undecorated	4		1			5
- Pearlware, Annular	3	1				4
- Pearlware, Edgeware, Blue			1			1
- Pearlware? Undecorated	4					4
- White, Undecorated			1			1
- Unidentifiable	2					2
Stoneware - Saltglazed, Crock Base		1				1
TOTAL - CERAMICS	28	3	8		2	41
GLASS						
Curved - Clear	1					1
- Pale Blue-Grn, Molded Bottle	1					1
- Amber	1					1
Flat - Clear	3					3
- Pale Blue-Green	6					6
Burned - Unidentifiable		1				1
TOTAL - GLASS	12	1				13
TOTAL	55	5	8	2	2	72

B.S. 84.

*One nail appears to have a hand-wrought head

general type to the period from the end of the 17th to the beginning of the 19th century. Noël-Hume also states that flat tangs, such as exhibited by this specimen, did not come into use until late in the 18th century. Thus, the fork most probably dates from the late 18th or very early 19th century.

Iron nails and fragments (4) - 2 of the nails are hand-forged; the remaining 2 are machine-cut. Cut nails began to replace wrought nails in the last decade of the 18th century, and they continued to be widely used until quite late in the 19th century (Nelson 1968: 4-7). The hand-hammered head on one of the cut nails suggests that it was made during the early part of this period.

Rusted iron fragments (8) - small fragments of iron were too badly rusted to be further identified.

Brass stamping (1) - the function of this artifact has not been identified.

Lead ring (1) - the artifact measures ca. 1.9cm high, with a maximum outside diameter of ca. 2.4cm at mid-section, curving to only ca. 1.9cm at top and bottom; inner diameter is ca. 1.25cm. Function has not been determined.

Ceramics

The ceramic collection consists of 40 earthenware sherds and 1 stoneware fragment from the base of a salt-glazed crock. Except for 6 pieces of red brick and 2 pieces of red tile, all of the earthenware specimens are almost certainly fragments of tableware. These include 15 pieces of unglazed red earthenware, 5 pieces of undecorated creamware, 9 pieces of pearlware (4 undecorated, 4 with handpainted annular decoration, and 1 blue-decorated edgeware fragment), 1 piece of undecorated white earthenware, and a burned unidentifiable fragment.

As with the metal specimens, all of the ceramic material could have been manufactured in the late 18th and early 19th centuries; only the single white earthenware sherd seems to be younger.

Glass

Of the 13 glass specimens, 9 are flat, probably window glass fragments. Three of these are clear; the other 6 are pale blue-green. The 3 curved specimens include 1 clear, 1 amber, and 1 pale blue-green fragment, which is part of a molded bottle. The remaining fragment is burned and fused and cannot be further identified.

It is difficult to make specific cultural or chronological statements based on this small and nondescript collection, but nothing in this group of glass specimens would be inconsistent with the conclusions reached through study of the metal and ceramic objects. Thus, the historic component at the Fastener site probably represents a residential occupation dating to the late 18th and early 19th centuries.

WOODLAND COMPONENTS

As noted previously, the Woodland occupations occurred within the humus stratum. We were able to divide the humus into 2 culturally distinct subzones, A and B, by the presence of an old duff line and differing artifactual contents, especially the distribution of ceramic attributes. In spite of these stylistic differences, functional

analysis of artifact assemblages indicates that the tool types from both components represent similar functional categories.

Lithics

All lithic artifacts were examined for signs of use under a binocular microscope at 7 to 30X magnification and classified according to their distinctive wear patterns. Classifications were based on well-known wear studies (Hayden 1979; Semenov 1970; Winters 1969; Winters, personal communication).

1. General utility tools

This category included tool types that could have been used in several activities. Present methods of evaluating use marks, however, do not allow us to distinguish among these various functions.

Flake knives (3) - 1 quartz, 2 brownish gray chert.

Stemmed knife (1) - biface of white quartz probably originally used as projectile point (Figure 3). The assymetry and alternate chipping pattern on this particular biface indicate that in its later stage the point had been reworked into a knife. It represents a Sylvan Lake Side-notched point/knife, a type first identified at the Sylvan Lake Rockshelter in eastern New York (Funk 1976), where it was found in a Late Archaic context with narrow-stemmed Wading River, Bare Island, and Lamoka points. The presence of a Sylvan Lake Side-notched point in a southern Connecticut site is not unusual. Wiegand (1983) found Sylvan Lake points at several sites in southwestern Connecticut. Over 200 Sylvan Lake notched points occur in the same stratigraphic levels and squares as narrow point types at the Burwell-Karako assemblage from New Haven in the lower Quinnipiac River Valley (Lavin and Russell, in press).

The cutting function of the knives discussed above is indicated by 1 or more of the following traits: alternate chipping pattern, sinuous edges, bifacial edge wear (in contrast to unifacial scraper wear), presence of hinge fractures.

Quartz flake scraper (1) - primary decortification flake with unifacial wear at one end (Figure 3).

Hammerstones (2) - cobbles used as hammerstones, indicated by their battered and scarred ends (Figure 3).

2. Knapping artifacts

Cores (3) - 1 quartzite (Figure 3) and 2 quartz cores.

Knapping hammerstone (1) - small sandstone cobble in the form of a broad oval with thin sides from the lower humic level (Figure 4). Scarring is in one small area along the narrow end. Replicative experiments indicate that morphologic attributes and consistent working area are characteristic of hammerstones used in knapping (Winters, personal communication 1978).

Non-utilized flakes (749) - 514 flakes from Zone A and 235 flakes from Zone B (Table 3). In A and B, ca. 72% and 79% of the flakes are quartz, 22% and 14% are siltstone, and 7% and 5% are chert, respectively; in Zone A, a few rare sandstone and quartzite flakes are present.

In Zone A, the ratio of quartz

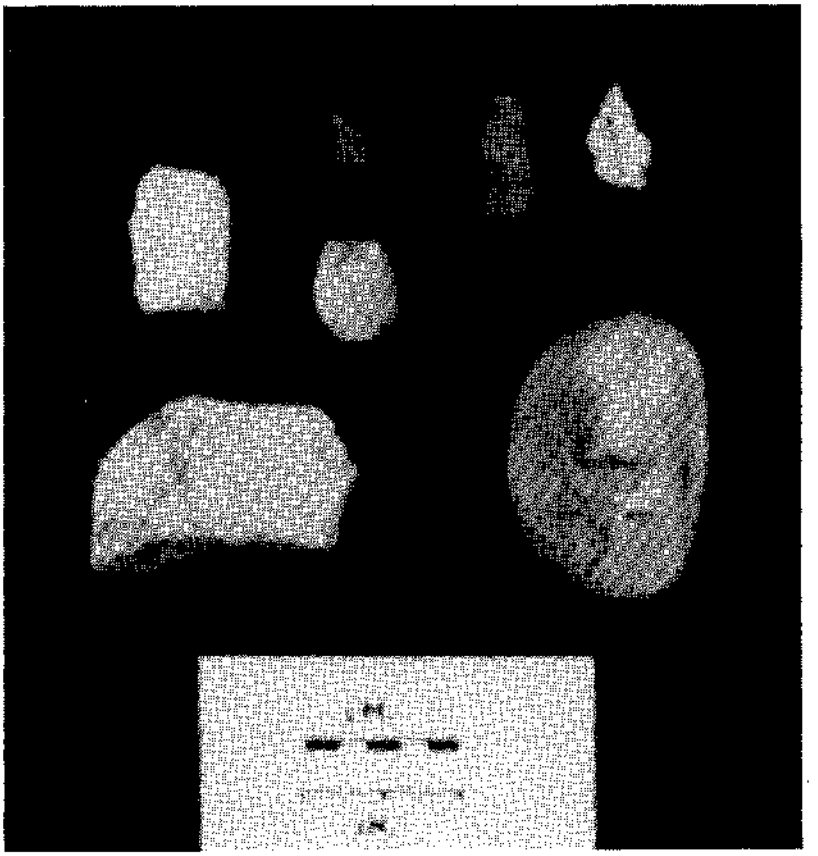

Figure 3. General utility tools and knapping equipment from the Woodland occupations at the Fastener site. Top row: chert preform or knife base; chert flake knife; quartz stemmed knife; middle row: quartz flake knife; quartz scraper; bottom row: quartzite core; hammerstone.

debitage to tools is 74.6:1; in Zone B, the ratio is 46.5:1 (Table 4). According to Wilmsen (1968:Table 2), these ratios indicate that knapping was a major site activity; Wilmsen calculated debitage:tool ratios of 19:1 and 25:1 at known quarry workshops, ratios well below those from the Woodland zones at Fastener. The high debitage:tool ratio, presence of cores, numerous primary decortification flakes, and specialized knapping hammer all indicate major use of the site for the production of quartz artifacts from cobbles locally available in the riverbed below the site. The debitage:tool ratios for siltstone flakes indicate that siltstone cobbles were knapped as well (in Zone A, the ratio is 113:0; in B, it is 32:0). The red and gray siltstone derives from the Triassic beds cropping out along the Quinnipiac and Connecticut River valleys, or the outlier cropping out in the Woodbury-Southbury area. Fastener appears to have been located too far east and west of these primary outcrop areas for the silt-

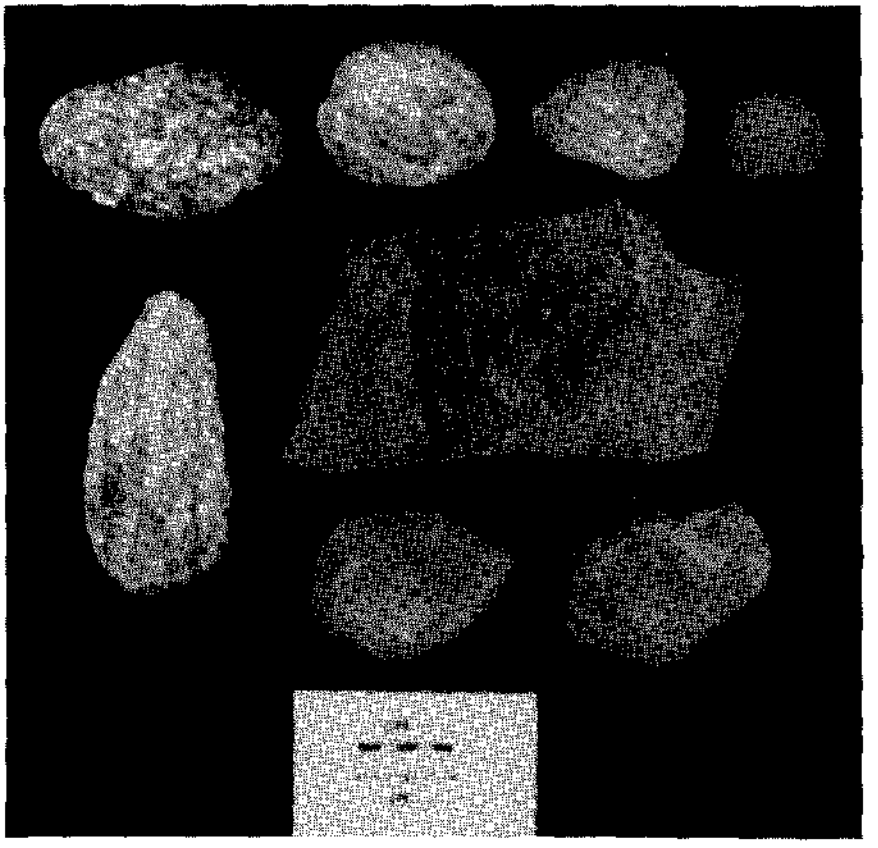

Figure 4. Knapping and domestic equipment from the Woodland occupations at the Fastener site. Top row: problematic (hammerstone?); hammerstone/grinding stone; hammerstone/grinding stone/anvil; knapping hammerstone; middle row: slab metate; bottom row: problematic (hammerstone?); quartzite grinding stone; hammerstone/grinding stone. All artifacts except the knapping hammer and hammer/grinding stone/anvil are from Feature 1.

stone to have been deposited locally by southerly glacial movement (Tracy, personal communication 1984). The small debitage:tool ratios for chert flakes (8:1 and 10:1 for Zones A and B, respectively) and their small number and size suggest secondary retouch of chert tools manufactured elsewhere.

3. Weapons and hunting equipment

Projectile points and fragments (7) - include 1 Wading River point and 2 Lamoka-like points (Figure 5) of quartz. The thick, narrow notched points are identical to the Lamoka points described by Funk (1976) and Ritchie (1969a; 1971). We choose to call these Lamoka-like points, to emphasize the identification of the Lamoka type point at Fastener and not the Lamoka culture per se.

Table 3. Distribution and lithology of non-utilized flakes per stratum, Fastener site

STRATUM / LITHIC TYPE	UPPER HUMUS ZONE A	LOWER HUMUS ZONE B	TOTAL HUMUS	JUNCTION ZONE	ORANGE 1	ORANGE 2	ORANGE 3	TOTAL ORANGE	TOTAL STRATA
QUARTZ	72.2% 371	79.2% 186	74.3% 557	86.5% 429	88.1% 118	96.6% 56	95.2% 40	91.4% 214	81.1% 1200
SILTSTONE	22.0% 113	13.6% 32	19.4% 145	10.1% 50	7.4% 10	1.7% 1	4.8% 2	5.6% 13	14.1% 208
CHERT AND JASPER	5.2% 27	7.2% 17	5.9% 44	3.4% 17	4.5% 6	1.7% 1	0 0	3.0% 7	4.6% 68
SANDSTONE	0.4% 2	0 0	0.3% 2	0 0	0 0	0 0	0 0	0 0	0.1% 2
QUARTZITE	0.2% 1	0 0	0.1% 1	0 0	0 0	0 0	0 0	0 0	0.1% 1
TOTAL FLAKES	514	235	749	496	134	58	42	234	1479

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Table 4. Ratio of lithic debitage to stone tools per stratum, Fastener site

LITHIC TYPE / STRATUM	QUARTZ	CHERT	JASPER	SILTSTONE
UPPER HUMUS ZONE A	74.6:1	8.5:1	10:1	113:0
LOWER HUMUS ZONE B	46.5:1	8:0	9:0	32:0
JUNCTION ZONE	61.6:1	11:0	6:1	25:1
ORANGE SOIL	21.7:1	6:1	1:0	6.5:1

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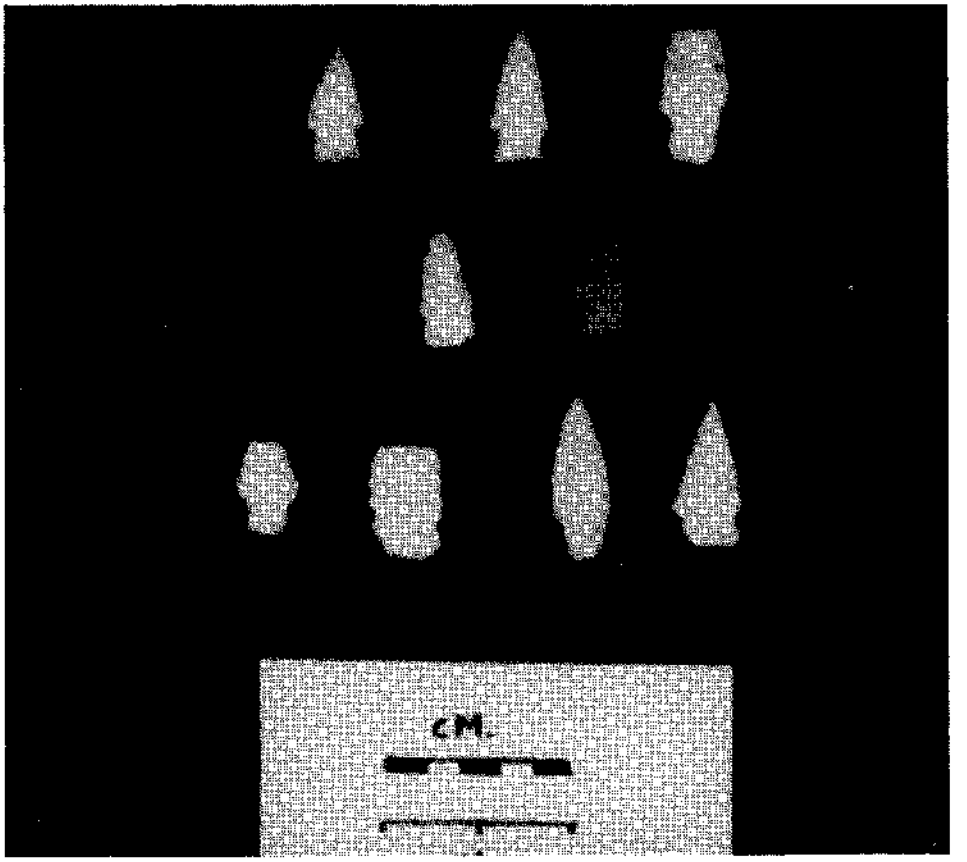

Figure 5 (above). Projectile points of the narrow point tradition, Fastener site. Top row: Woodland occupation - quartz Lamoka-like point; quartz Lamoka-like point; quartz Wading River point; middle row: Junction - quartz unidentifiable narrow notched point; siltstone Lamoka-like point; bottom row: Late Archaic occupation - quartz Lamoka-like point; quartz preform; quartz Squibnocket Stemmed point; quartz possible Sylvan Lake Side-notched point.

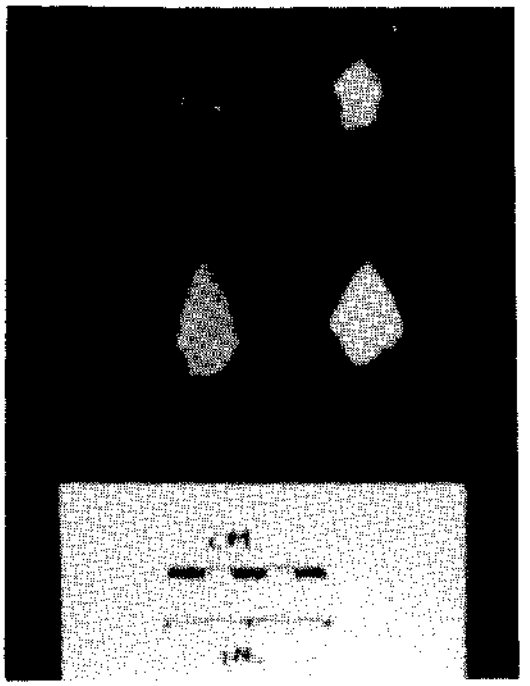

Figure 6 (left). Projectile points from the Woodland and Junction levels. Top row: siltstone point base; quartz reworked Lamoka-like (?) point; bottom row: jasper Rossville; quartz Rossville.

Based on present archaeological data, there is absolutely no evidence for the extension of the central New York-based Lamoka culture described by Ritchie (1969a) into coastal New York or southern New England. Funk (1976; personal communication 1983) reports that this is also true for eastern New York. All we observe here is the same narrow point tradition involving virtually identical point types. This is graphically demonstrated by Funk (1976:Plate 81), when he matches specific narrow point specimens from the Sylvan Lake Rockshelter to morphologically identical "Lamoka" points from the Lamoka Lake site.

A rather narrow-bladed, thick, corner-notched point was recovered from humic Zone A (Figure 6), exhibiting crushing in its notches and along its base. Its form and dimensions do not conform to any known types. It appears to be a reworked Lamoka-like point, but the Lamoka point type is not described as exhibiting basal or notch grinding (Ritchie 1969a:50; 1971:29-30).

Two points appear to be Rossvilles; both are broken at the base, however, making identification difficult. The jasper point was found 6½" into the humus (Figure 6), the quartz point from the 9-in. level (Figure 6). A grayish brown chert biface fragment may be part of a preform or a knife (Figure 3).

4. Domestic equipment

This category includes all artifacts, both lithic and ceramic, used in the processing of food (Figures 4,7,9). We have adopted the criteria of Winters (1969:61) for the identification of manos, or grinding stones: (1) battered ends or edges; (2) uniform breaking or erosion of the cortex over a flat or slightly convex surface; (3) erosion of the edges of minute natural pits on the surface of the cobble, which causes the naturally rounded edges of the pits to become square; (4) striations along the surface caused by abrasion against a metate.

Several grinding stones or combination hammerstone/grinding stones were recovered from Zones A and B, and from Feature 1. As noted above, Feature 1 occurred 4 to 6" into Zone A, and consisted of a single hard clam shell and a cache of plant processing equipment - 1 slab metate, 1 grinding stone, 2 combination hammerstone/grinding stones, and 2 problematic cobbles too eroded for unequivocal functional identification. Their form and location within the cache suggests, however, that they were probably used as hammerstones.

Metate (1) - gloss and erosive wear in its central area, forming a slight concavity, identify it as a slab metate (Figure 4).

Grinding stone (1) - quartzite, from Feature 1 (Figure 4); even abrasion evident.

Hammerstone/grinding stone (2) - ends show heavy scarring and pitting; sides exhibit large patches of even abrasion, and sometimes, striations (Figures 4 & 9).

Combination hammer/grinding stone/anvil (1) - cobble from Zone B contains heavy pitting and scarring in one area, indicating hammer use, and uniform erosion of its cortex on one side, indicating use as a mano. Also, there is an uneven, irregular depression on one face indicating its use as an anvil in

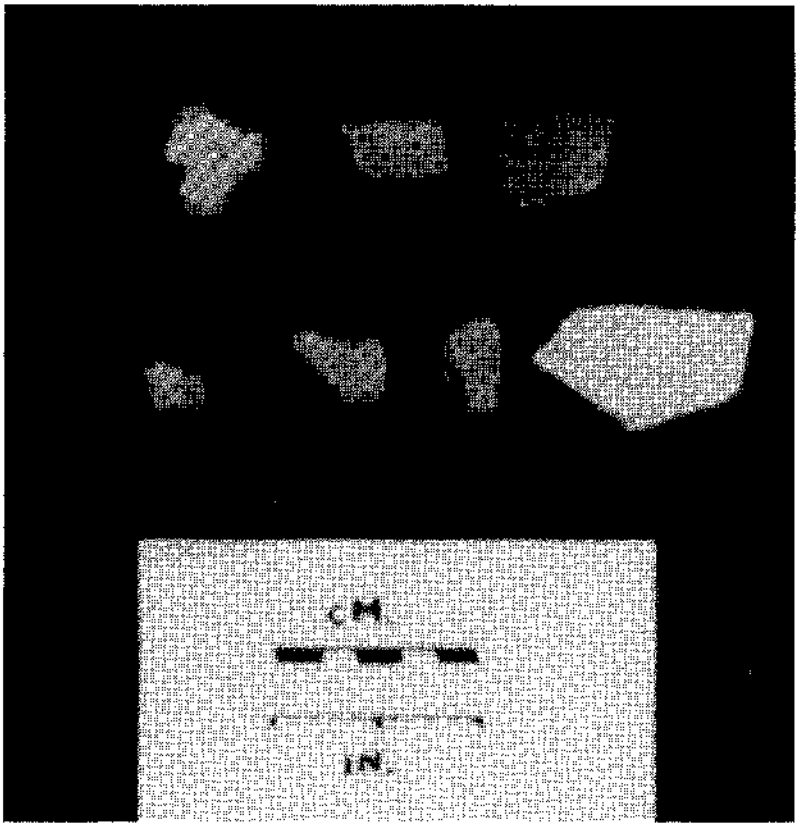

Figure 7. Prehistoric pottery from the Fastener site. Top row: miscellaneous cord-wrapped stick stamped; Modified Vinette Interior (showing cord-wrapped stick stamping); punctated and cord-wrapped stick stamped rimsherd; bottom row: miscellaneous dentate stamped; Clearview Stamped; Clearview Stamped; Matinecock Point Stamped.

lithic manufacture (Figure 4). Anvils can be differentiated from "nutting stones" by their distinctive depressions. Nutting stones have smooth, symmetrical, well-defined depressions (Ritchie 1928; Winters, personal communication 1978).

Fired rocks (15) - fire-cracked and reddened rocks indicated the presence of a hearth and/or use of "pot-boiling."

Ceramics (Figure 7)

In all, 271 sherds were recovered. Although a small number were recovered from the orange sand zones, all were probably originally associated with the humus layers. Undecorated sherds number 243 (89.7%) and decorated sherds 28 (10.3%). Almost half (135 or 49.8%) of the undecorated sherds are too eroded for identification. Both the undecorated and decorated sherds have been classified into categories according to Smith (1950), whose typology was chosen for its criteria of paste, surface treatment, vessel form, and decorative technique,

which allow the typologist to classify all non-eroded sherds.

Undecorated sherds

There is one problem with this system - undecorated body sherds and decorated sherds from a single vessel may be placed within separate pottery types. Thus, we believe that only undecorated sherd categories containing rim sherds may be assigned to types. Since none of our undecorated sherd categories meet this criterion, they have been classified into "sherd groups." A "sherd group" may be defined as a category, the members of which share a combination of attributes distinct from those of other groups in a ceramic collection (see Lavin 1980; Rothschild and Lavin 1977; Salwen 1968). Sherd groups should not be regarded as pottery "types." Table 5 summarizes the stratigraphic locations of the sherds.

1) Cordmarked Exterior/Cordmarked Interior (20) - heavily corded interior and exterior surfaces; grit-tempered.

2) Fabricmarked Exterior/Cord- or Fabricmarked Interior (3) - exterior surfaces heavily fabricmarked; 1 sherd has heavily fabricmarked interior surface; 2nd sherd has heavily cordmarked interior surface; interior surface treatment of 3rd sherd is uncertain; all grit-tempered.

3) Smoothed or Smoothed-over Cordmarked Interior (10) - exterior surfaces either smoothed or smoothed-over cordmarking; interior surfaces heavily cordmarked; all grit-tempered.

4) Smoothed-over Cordmarked or Smoothed-over Fabricmarked Exterior/ Cordmarked Interior (5) - interior surfaces heavily cordmarked; it is uncertain whether exterior surfaces are cordmarked or fabricmarked; all grit-tempered.

5) Smoothed-over Cordmarked Exterior/ Smoothed-over Cordmarked Interior (5) - the cordmarked surface treatment of exterior and interior surfaces partially smoothed-over; all grit-tempered.

6) Smoothed-over Cordmarked or Smoothed-over Fabricmarked Exterior/ Smoothed-over Cordmarked Interior (1) - it is uncertain whether exterior surface was originally cordmarked or fabricmarked; both it and cordmarked interior surface partially smoothed-over; grit-tempered.

7) Smoothed-over Fabricmarked Exterior/ Smoothed and Smoothed-over Cordmarked Interior (5) - 4 sherds fit together to form part of body wall of 1 vessel; fabricmarked exterior surfaces partially smoothed over; most interior cordmarking completely smoothed over; remainder partially smoothed over; all grit-tempered.

8) Smoothed-over Cordmarked Exterior/ Brushed Interior (1) - exterior cordmarkings partially smoothed over; interior surface brushed, possibly with a twig; grit-tempered.

9) Cordmarked Exterior/Smoothed Interior (3) - exterior surfaces distinctly cordmarked; interior surfaces completely smoothed; all grit-tempered.

10) Smoothed-over Cordmarked or Smoothed-over Fabricmarked Exterior/ Smoothed Interior (15) - exterior surfaces either cord or fabric im-

Table 5. Stratigraphic distribution of prehistoric ceramics from the Fastener site

STRATA / SHERDS	ZONE A	ZONE B	JUNCTION	ORANGE SOIL LEVEL 1	ORANGE SOIL LEVEL 2	ORANGE SOIL LEVEL 3	PLOWZONE - 40N 20W OR. SAND	PLOWZONE - 40N 20W BROWN LOAM	PLOWZONE - 40N 20W BROWN ORGANC	BLUFF	UNK. PROV.	TOTAL
EXT/INT SURF.	UNDECORATED SHERDS											
CM/CM	4 / 4.00	2 / 3.57	11 / 17.74	3 / 17.65*								20
FAB/CM or FAB				2 / 3.23						1		3
SM or/CM SM CM	3 / 3.00		6 / 9.68	1 / 1.61								10
SM CM or/CM FAB		2 / 3.57	2 / 3.23		1 / 33.33							5
SM CM/SM CM	3 / 3.00		1 / 1.61	1 / 5.88								5
SM CM or/SM FAB CM	1 / 1.00											1
SM /SM CM & FAB SM			5 / 8.06									5
SM CM/BRUSHD					1 / 33.33							1
CM/SM		1 / 1.785					1	1				3
SM CM or/SM SM FAB	8 / 8.00	1 / 1.785	4 / 6.45	1 / 5.88					1			15
SM/SM GRIT	25 /	7 /	6 /								1	39
SM/SM SHELL			1 / 1.61									1
ERODED	56 / 56.0	43 / 76.79	24 / 38.71	11 / 64.71	1 / 33.33							135
UNDECORATED TOTALS	100	56	62	17	3	0	1	1	1	1	1	243
	DECORATED SHERDS											
DENTATE	11 / 84.62	2 / 50.0	3 / 75.0	1 / 33.3						1	1	19
CORDED STICK	2 / 15.38	2 / 50.0		2 / 66.7	1 / 100.0						1	8
PUNCTATED & CORDED STICK			1 / 25.0									1
DECORATED TOTALS	13	4	4	3	1	0	0	0	0	1	2	28
TOTAL POTTERY	113	60	66	20	4	0	1	1	1	2	3	271

L.L. 23.

*Percentages are percentages of different sherd groups in each stratum.

pressed and partially smoothed-over, identification equivocal; interior surfaces completely smoothed; all grit-tempered.

11) Smoothed Exterior/Smoothed Interior Grit-tempered (39) - completely smoothed on both surfaces; all grit-tempered.

12) Smoothed Exterior/Smoothed Interior Shell-tempered (1) - completely smoothed exterior and interior surfaces; shell-tempered.

In sum, 12 undecorated sherd groups are represented at Fastener. All are grit-tempered except for 1 shell-tempered sherd with smoothed exterior and interior surfaces. Seven of the groups (49 sherds) share cordmarked interior surfaces. Exterior surfaces are either cordmarked, fabricmarked, or smoothed, or smoothed-over cordmarking or fabric impressions. The 8th sherd group (1 sherd) has a smoothed-over cordmarked exterior and a brushed interior. The 9th and 10th sherd groups (18 sherds) have smoothed interiors and cordmarked, or smoothed-over cordmarked or fabricmarked exterior surfaces. The 11th group (39 sherds) exhibits completely smoothed interior and exterior surfaces. The 12th sherd group (1 sherd) is similar except that it is shell-tempered rather than grit-tempered.

Decorated sherds

The 28 decorated sherds represent 23 vessels and fall into 6 categories, 3 representing pottery types and 3 representing "sherd groups" (Table 6).

Table 6. Stratigraphic distribution of decorated sherd categories from the Fastener site

STRATA / DECORATED SHERD CATEGORIES	ZONE A	ZONE B	JUNCTION	ORANGE SOIL LEVEL 1	ORANGE SOIL LEVEL 2	NO PROVENANCE	TOTALS
MODIFIED VINETTE INTERIOR CORDMARKED	1			1	1	1	4
MISCELLANEOUS CORD-WRAPPED STICK STAMPED	1	2		1			4
PUNCTATED AND CORD-WRAPPED STICK STAMPED			1				1
MATINECOCK POINT STAMPED			1			1	2
CLEARVIEW STAMPED	5	2	1				8
MISCELLANEOUS DENTATE STAMPED	8			1			9
TOTALS	15	4	3	3	1	2	28

L.L.83.

1) Matinecock Point Stamped[1] (2 sherds - 2 vessels) - interior surfaces are distinctly cordmarked; 1 sherd derived from junction zone, its exterior surface completely smoothed prior to decoration of dentate stamping in a design of parallel and opposed lines; medium-fine grit temper. The 2nd sherd was eroding from bluff area at eastern edge of site; exterior surface of smoothed-over cordmarking; decoration was parallel rows of dentate stamping; mostly coarse quartz temper (Figure 7). Decoration and surface treatment of these sherds fit the Matinecock Point Stamped type (Smith 1950:196).

2) Clearview Stamped (8 sherds - 7 vessels; Figure 7) - 5 sherds have smoothed exterior surfaces; 3 sherds (2 of which fit together) have smoothed-over cordmarked exterior surfaces; all have smoothed interior surfaces and quartz temper; 2 smoothed exterior sherds derived from lower humic Zone B; 1 smoothed cordmarked exterior sherd derived from junction zone; the remainder were excavated from upper humic Zone A; sherds most closely represent Clearview Stamped type (Rouse 1947:19).

3) Miscellaneous Dentate Stamped (9 sherds - 5 vessels; Figure 7) - smoothed exterior surfaces below and/or under decoration; eroded interior surfaces; except for 1 sherd with no discernible temper, all had coarse quartz temper. 1 sherd was located 1½-2" into top of orange soil; remainder were from upper humic Zone A; eroded interiors prevented type identification.

4) Modified Vinette Interior Cordmarked (4 sherds - 4 vessels; Figure 7) - cordmarked interior surfaces; 2 sherds have smoothed exterior surfaces and corded paddle-impressed interior surfaces; 1 sherd has smoothed exterior surface and cord-wrapped stick-impressed interior surface; 4th sherd has smoothed-over cordmarked exterior and interior surfaces; all grit-tempered, mainly quartz, and cord-wrapped stick-stamped decoration. Grit temper and surface treatment of these sherds fit the Modified (Vinette) Interior Cordmarked type (Salwen 1968:326). In southern New England (Lavin 1980:8) representative vessels of this normally undecorated pottery type often show simple cord-wrapped stick decorative motifs.

5) Miscellaneous Cord-wrapped Stick Stamped (4 sherds - 4 vessels; Figure 7) - includes cord-wrapped stick-stamped sherds too small for type identification; 3 sherds have smoothed

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[1] There are basically 3 dentate-stamped collarless pottery types - Matinecock Point Stamped, Vinette Dentate, and Clearview Stamped. As Lavin (1980:20-21) noted in her analysis of pottery from the Ben Hollister site in Glastonbury, Connecticut, the types are very similar in attributes. In fact, the type descriptions of Vinette Dentate and Clearview Stamped are virtually identical (Ritchie and MacNeish 1949:100; Rouse 1974:18-19; Smith 1950:195). Matinecock Point Stamped may be distinguished by interior cordmarked surface treatment (Smith 1950:196). The 7 Clearview Stamped vessels could be ascribed to either Clearview Stamped or Vinette Dentate. We have chosen to type them as Clearview Stamped because it is a southern Connecticut pottery type. The Miscellaneous Dentate Stamped sherds have eroded interior surfaces, which prevent type identification as either Matinecock Stamped or Clearview Stamped.

exterior surfaces below and/or under decoration, and smoothed interior surfaces; 4th sherd has cordmarked or fabricmarked exterior and eroded interior; all grit-tempered, mainly quartz.

6) Punctated and Cord-wrapped Stick Stamped (1 rim sherd) - from junction zone (Figure 7); smoothed exterior surface prior to decoration, and smoothed interior surface; medium-to-coarse grit temper; below slightly rounded lip is a row of punctates on both interior and exterior surfaces of the upper rim; below punctates are 3 horizontal rows of cord-wrapped stick impressions; sherd fits none of regional pottery types.

As noted earlier, stratigraphic changes in ceramic attributes suggest the presence of 2 temporarily distinct Woodland occupations. Cordmarked interior surface treatment and cord-wrapped stick decoration are most abundant in the lower humic Zone B. Smoothed interior and exterior surface treatment, and dentate-stamped decoration seem to increase through time, and are most abundant in the upper humic Zone A (Table 5). Salwen (1968) has suggested that Modified Interior Cordmarked pottery may have appeared earlier than Vinette I pottery. Table 7 shows the stratigraphic distribution of the sherd groups of unsmoothed and partially smoothed cord- or fabricmarked interior pottery at Fastener. The data indicate no significant difference in the distribution of the unsmoothed and partially smoothed interior cordmarked pottery at the site.

The fact that sherds with cordmarked interior surfaces occur throughout the ceramic levels suggests that both components date to earlier Woodland times. The presence of decorated pottery suggests early Middle Woodland occupations. The evidence is very tentative (based as it is on such a small sherd sample), but the data do not clearly support a Connecticut sequence paralleling Smith's (1950) chronologic scheme of a North Beach focus superseded by the Clearview focus during earlier Woodland times in coastal New York. Smith's North Beach focus is represented by Vinette Interior Cordmarked, Matinecock Point Stamped, Matinecock Point Incised, North Beach Incised, North Beach Brushed, and North Beach Net-marked pottery types. The subsequent Clearview focus is characterized by Clearview Stamped, Windsor Fabricmarked, Windsor Brushed, and North Beach Netmarked pottery types.

The evidence at Fastener is more equivocal. It is true that 75% (16) of the sherds with cordmarked interiors were recovered from the lower levels, as were 2 of the 3 Modified Vinette Interior Cordmarked sherds of known provenience. Smith's sequence is also supported by the recovery of the single Matinecock Point Stamped sherd of known provenience from the junction zone, while 7 of the 8 Clearview Stamped sherds occurred stratigraphically above the Matinecock Point Stamped sherd, 5 of them in the upper humic level.

There are, however, several significant differences between the ceramics of Smith's coastal components and this site. At Fastener, all but one of the sherds are grit-tempered. Netmarked and incised pottery are absent, and brushed ware virtually so. As noted above, interior cordmarked sherds occur within all ceramic levels, and are thus representative of both components. Fabric-marked sherds occur in the lower levels, but "possible"

Table 7. Stratigraphic distribution of sherd groups representing Interior Cord- or Fabricmarked pottery

STRATA / CERAMIC CATEGORIES	ZONE A	ZONE B	JUNCTION	ORANGE SOIL			TOTALS	NO PROVENANCE
				LEVEL 1	LEVEL 2	LEVEL 3		
Fabricmarked or Cordmarked Exterior and Interior Surfaces	4 36.35% (18.2%)	2 50.0% (9.1%)	13 48.2% (59.1%)	3 60.0% (13.6%)	0 0	0 0	22	1
Smoothed or Smoothed Cordmarked Exterior Surface/ Cordmarked Interior Surface	3 27.3% (20.0%)	2 50.0% (13.3%)	8 29.6% (53.3%)	1 20.0% (6.7%)	1 100.0% (6.7%)	0 0	15	0
Fabricmarked or Cordmarked Exterior Surface/ Smoothed Cordmarked Interior Surface	4 36.35% (36.4%)	0 0	6 22.2% (54.5%)	1 20.0% (9.1%)	0 0	0 0	11	0
TOTALS	11 100.0%	4 100.0%	27 100.0%	5 100.0%	1 100.0%	0 0	48 100.0%	1

L.L. 83.

Note: Percentages are of different sherd groups in each stratum.
Percentages in parentheses are of each sherd group within the site strata.

smoothed-over fabricmarked sherds occur in the upper humic level as well (the impressions may be smoothed-over cordmarkings; the small sherd size and faintly visible markings make identification equivocal). Unlike the Windsor Fabricmarked pottery type, which Smith includes in his Clearview focus, the interior surfaces are not brushed.

The virtual absence of shell-tempered pottery at Fastener may be a function of its rather inland location. Lavin's (1980) analysis of the pottery from the Ben Hollister site and ceramic survey of southern New England indicate a strong correlation between temper type and geographic location. Smith's (1950) study of coastal components indicates that the earliest pottery was mainly grit-tempered, Middle Woodland pottery was increasingly shell-tempered, and Late Wood-

land pottery was virtually all shell-tempered. The significant amount of shell-tempered pottery during Late Woodland, and its virtual absence in Early Woodland pottery suggests that there is an underlying historical cause for the predominance of shell-tempering during the later Woodland periods. But the adoption of shell-tempering is not nearly so complete on inland Connecticut sites. At Ben Hollister, only 50% of the Final Woodland Niantic vessels were shell-tempered; the high percentage of grit-tempered Late Woodland pottery at other inland sites strongly suggest that site location was an important criterion in temper choice (Lavin 1980:25-26,32-33).

The absence of other coastal elements at Fastener (e.g., net impression, brushing) may reflect temporal distinctions among the sites in question, but the recovery of a single sherd with a brushed interior surface at a low level in the site suggests this is not so. An alternative hypothesis is that the Fastener site was located on the peripheries of the early Windsor tradition, and so its ceramic contents are a combination of coastal Windsor and inland non-Windsor attributes. This theory is supported by the fact that Woodland sites in northwestern Connecticut appear to have been occupied by groups influenced by the Point Peninsula pottery tradition (Lavin 1980). Near the coast, the Housatonic River appears to have been the western boundary for Late Windsor groups (Rouse 1947).

Woodland Summary

The major activities of the Woodland occupants of Fastener were lithic manufacture, plant processing, and probably hunting. The small number of functional categories (4), small number of lithic tools (20) and pottery vessels (23), and small number of features indicate temporary occupation by small groups of people. The cache of grinding implements suggests a small seasonal camp in a restricted or central-based wandering system which was used repeatedly by the same social unit.

LATE ARCHAIC COMPONENTS

The Late Archaic components were concentrated in the orange sandy soil. At least 2 major occupations can be hyopthesized through projectile point typology: a narrow point and a Laurentian component. Since they occur in the same stratigraphic levels, and sometimes in the same square, it is usually impossible to isolate non-diagnostic artifacts and activity sets representing each component.

1. Weapons and hunting implements

Projectile points (9) - 8 points from orange soil levels. 4 quartz specimens belong to narrow point tradition (Figure 5) - 2 Lamoka-like, 1 Squibnocket Stemmed, and 1 narrow point preform. One medium-bladed quartz point with very shallow side-notches was also recovered; it does not fit easily into any regional typology; it may, however, represent the Sylvan Lake Side-notched type.

The remaining 3 points from the orange soil represent the Laurentian tradition (Figure 8): a Brewerton Eared-notched quartz point, and 2 Vosburg points, 1 of quartz and 1 of baked siltstone (Tracy, personal communication 1984). A Brewerton Corner-notched point of smoky quartz reworked

into a knife came from the Junction.

Brewerton and Vosburg components have been radiocarbon-dated between 3400 B.C. and 2050 B.C. in New York and southern New England (Funk 1976; Ritchie 1969a, b; Thompson 1969). Ritchie (1971) suggests that the Brewerton Corner-notched point may have appeared later in the Laurentian sequence. The single Brewerton Corner-notched point from Fastener was, in fact, excavated from the junction zone while the Brewerton Eared-notched and Vosburg points were all from the orange soil. The Brewerton Eared-notched point occurred in the same square as the corner-notched point but 3 to 4" below it. Thus, the Brewerton Corner-notched point may represent a second later Laurentian occupation of Fastener. Alternatively, it may represent a Sylvan Lake notched point associated with the narrow point occupation! Sylvan Lake corner-notched points were found in Hudson Valley and southern Connecticut sites (Funk 1976; Lavin and Russell, in press). The possible Sylvan Lake Side-notched point described above was recovered from the orange soil in the same square as this corner-notched point. Ritchie (1971) notes that there is "some morphological overlap" between Sylvan Lake Side-notched points and Brewerton Side-notched points; logically, the morphological similarity should extend to the Sylvan Lake and Brewerton corner-notched points.

2. General utility tools

Flake scraper (1) - quartz, from 2nd level of orange soil (Figure 9).

Flake knife (1) - red siltstone, from 2nd level of orange soil (Figure 9).

Backed knife (1) - quartz biface; edge opposite cutting edge was unthinned; microscopic analysis suggests some crushing of edge to provide better gripping surface (Figure 9); knife is probably associated with Laurentian component, as it was recovered from same test square (5S50E) as the 2 Vosburg points; square also contained Feature 4, densely packed concentration of fire-cracked and reddened rocks, suggesting a hearth.

3. Hideworking equipment

Flake denticulate (1) - quartz, with "teeth" along one edge demonstrating wear; from second level of orange soil (Figure 9). Ethnographic and replicative data suggest that denticulates may have been used to scale fish, work wood, dress hides, and process plant foods (Winters n.d.). Fishing equipment was absent from Fastener, suggesting that fish scaling was probably not a site activity. Winters (n.d.; personal communication 1984) reports that plant processing produces "plant gloss," or a mirror-like finish along the working edge of the tool; woodworking produces only a "matte"-like finish, due to its low phytolith content. Since neither of these finishes were noted on the (albeit quartz) specimen from Fastener, it is hypothesized that the denticulate was a hideworking tool.

4. Domestic equipment

Fired rocks (23) - fire-cracked and reddened rocks from orange soil levels, suggesting a hearth.

5. Knapping artifacts

Cores (5) - 3 quartz and 2 quartzite,

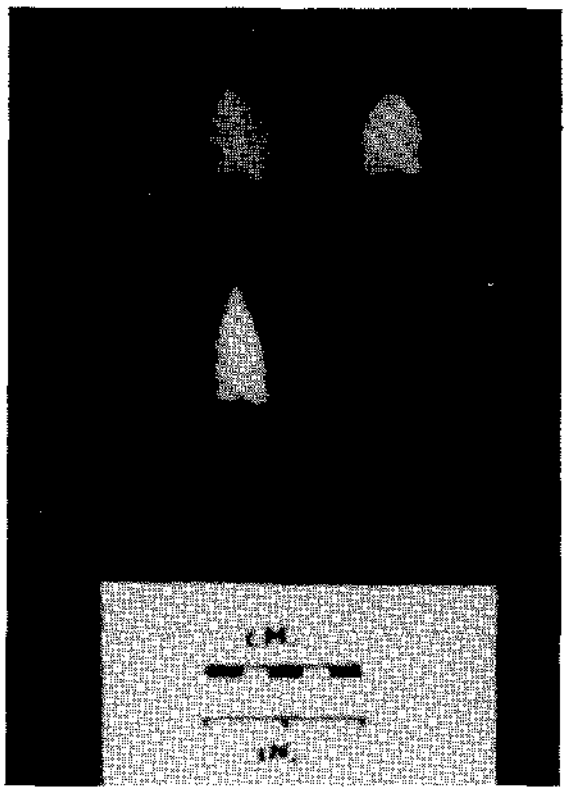

Figure 8. Projectile points of the Laurentian tradition, Fastener site. Top row: quartz Brewerton or Sylvan Lake Corner-notched; quartz Vosburg; bottom row: quartz Brewerton Eared-notched; siltstone Vosburg.

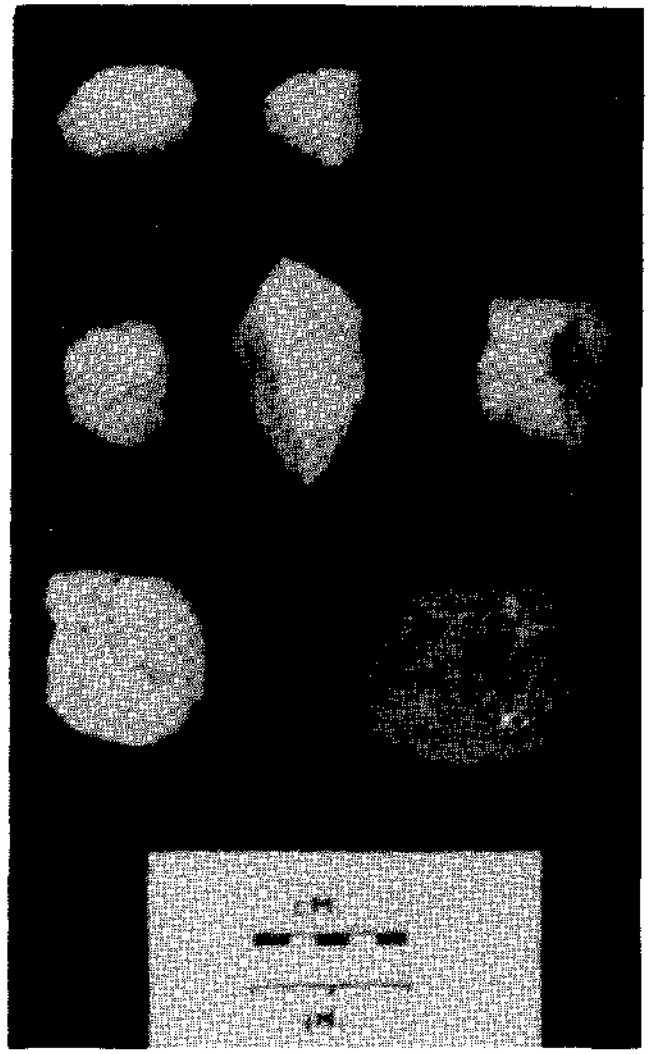

Figure 9. General utility and hide-working tools from the Late Archaic occupations; domestic equipment from the Woodland occupations, Fastener site. Top row: quartz scraper; quartz denticulate, siltstone flake knife; middle row: quartz cores; bottom row: quartz backed knife; hammerstone/grinding stone from Woodland level..

from 2nd and 1st levels of orange soil, respectively (Figure 9).

Non-utilized flakes (234) - from orange soil levels; 91.4% of flakes are quartz; 5.6% are siltstone; 3% are chert (Table 3). The ratio of quartz debitage to tools is 21.7:1. The high ratio plus the presence of cores and primary decortification flakes indicate that knapping was an important activity for the Late Archaic occupants at Fastener.

As in the Woodland occupations, the chert debitage consists of a few small flakes; the debitage/tool ratio is quite low -- 6.1 (Table 4). The flakes are most probably the results of minor repair and reworking of artifacts manufactured elsewhere.

Late Archaic Summary

The small number of tools (13), small number of functional categories (4), and virtual absence of features indicate temporary occupation by small groups of people. The Late Archaic components are very similar to the subsequent early Woodland components. Both are small temporary occupations at which a limited number of similar activities occurred.

Functional categories represented by artifacts from both cultural periods indicate that the major activity was lithic manufacture by the quartz cobble reduction technique; most tools are made of quartz. The percentage of quartz flakes increases with depth (Table 3), while the percentage of siltstone flakes decreases with depth; percentages of chert and jasper flakes remain stable. Chert is rare; chipping was restricted to minor retouch and repair of tools manufactured elsewhere.

Hunting was probably another activity. Thick, narrow points representing the narrow point tradition were produced and used during both the Late Archaic and Woodland occupations. The only major distinction between the Archaic and Woodland occupations at Fastener was the presence of grinding equipment in the Woodland levels and feature. This does not necessarily mean that plant grinding activities were not a part of the subsistence activities of Late Archaic narrow point groups. It merely indicates that the occupants were not grinding foods at the Fastener site. Seed collecting by a Late Archaic narrow point group was suggested from the flotation analysis of a hearth from the Athena site in Pound Ridge, New York (Wiegand 1983). The hearth, which was radiocarbon-dated to 2170 B.C., contained a narrow stemmed point, seeds, and nuts.

JUNCTION ZONE

As noted above, the junction zone is an admixture of both the natural and archaeological strata at the Fastener site. Culturally diagnostic artifacts from the junction represent both the Woodland and the Archaic components at the site; non-diagnostic artifacts cannot be assigned to a discrete component with any certainty. There are 527 non-diagnostic artifacts -- all lithic materials -- representing 5 functional categories.

1. General utility tools

Flake scrapers (4) - unmodified flakes of white and yellowish white quartz with unifacial wear patterns indicative of scraper use.

Biface (1) - basal fragment of white quartz.

2. Weapons and hunting equipment

Projectile points (2) - 1 Lamoka-like point of dark gray siltstone and 1 unidentifiable narrow-bladed quartz point with very shallow side-notches (Figure 5).

Unclassifiable point fragments (3) - point base of brownish siltstone (Figure 6), a medial fragment of brown chert, and a tip fragment of gray shale.

3. Knapping artifacts

Cores (2) - quartz.

Non-utilized flakes (496) - 86.5% are quartz, 10.1% are siltstone, and 3.4% are chert and jasper (Table 3). The ratio of quartz debitage to tools is 61.6:1, indicating the importance of quartz tool manufacture (Table 4). The high siltstone debitage:tool ratio of 25:1 also indicates the importance of siltstone tool manufacture. In contrast, small debitage:tool ratios for chert (11:0) and jasper (6:1) suggest secondary retouch of tools manufactured elsewhere.

4. Domestic equipment

Fired stones (16) - fire-cracked and reddened, indicating hearth and/or "pot-boiling."

5. Miscellaneous

Unclassifiable "worked" white quartz flakes (2) - worked along at least one edge. In each case, however, unfamiliar wear patterns precluded their placement in any general functional categories.

UNKNOWN PROVENIENCE

This category includes 46 non-diagnostic lithic artifacts and 5 potsherds, found either on the surface or eroding from the bluff area at the eastern end of the site (Table 1). The sherds were included in the ceramic section of the Woodland components.

1. General utility tools

Flake knife (1) - unmodified quartz, from the surface.

2. Weapons and hunting equipment

Projectile point (1) - Lamoka-like point of mottled light and dark gray chert eroding from bluff at eastern edge of site.

Unidentifiable point (1) - white quartz broad-bladed point with side-notches, from the surface.

Unclassifiable point fragments (2) - quartz tip fragments; 1 from the surface and 1 eroding from bluff area.

3. Knapping artifacts

Non-utilized flakes (40) - 31 quartz, 1 quartzite, 2 siltstone, 4 chert, and 2 jasper.

SQUARE 40N20W

As noted above, test square 40N20W showed unusual strata above the junction zone. For this reason, its artifactual contents are listed separately (Table 1). The historic artifacts are discussed in the Historic component. The sherds are included in the ceramic section of the Woodland components. The 27 lithic artifacts are described below.

1. Knapping artifacts

Core (1) - quartz.

Non-utilized flakes (25) - 21 quartz, 1 quartzite, and 3 siltstone.

2. Domestic equipment

Fired rock (1) - fire-cracked and reddened.

BIOTIC REMAINS

Twelve hard clam shell fragments, 7 oyster shell fragments, 7 nut shell fragments, 1 acorn cap, and 2 bones were recovered but cannot be assigned

to a cultural component with any certainty. One quahog shell was recovered from Feature 1, within plowzone. The remaining shell, bone, and 1 nut fragment were recovered from the upper part of Zone A, and may be post-contact in origin. The acorn cap and 2 nut fragments were from Zone B, 2 nut fragments were from the Junction zone, and 2 more were from the first level of orange soil. Oak and hickory trees, however, are located within and close to the site. This may have been the case in prehistoric times as well, and so the presence of acorn and nuts within the site may be a natural occurrence rather than the result of human endeavor.

CONCLUSIONS

Not only does the Fastener site contribute to our knowledge of prehistoric cultural sequences and settlement patterns, but it also demonstrates the cultural continuity between the Archaic and Woodland periods in southern New England. Not only does the site represent functional and technological continuity, indicated by similar tool types and subsistence activities, but also stylistic continuity in the continued production of narrow-stemmed points by the quartz cobble reduction technique.

The evidence for the continuation of the narrow-stemmed point tradition into the Woodland period is not new. Ritchie (1969b) reported on the contemporaneity of points of the Squibnocket complex with those of the Susquehanna tradition at the Peterson and Hornblower sites on Martha's Vineyard. Dincauze (1971:197) reported similar findings at the Neville site in New Hampshire. Ritchie (1969) also found narrow-stemmed points in the same levels as Early Woodland Vinette I pottery at the Pratt and Peterson sites on Martha's Vineyard; he suggested that Vinette pottery was introduced into a Terminal Archaic assemblage in which the Wading River point type was a survivor.

In Connecticut, Swigart (1974) reported Early Woodland radiocarbon dates for 3 narrow point components: 850 B.C. at Naugatuck, 585 B.C. at New Haven, and 400 B.C. from South Kent. Until recently, these dates would have been considered erroneous, the results of contamination. But additional, independent data precludes their dismissal on these grounds: narrow-stemmed points have been associated with Early Woodland Vinette I pottery in adjacent coastal New York (Kaeser 1974; Rothschild and Lavin 1977) and in the upper Delaware Valley (Werner 1972). Further south, Stephenson (1971) reported the association of narrow-stemmed Bare Island and Vernon points with Marcy Creek Plain ware at the Accokeek Creek site in the Chesapeake Bay region. Re-analysis of the Charles Tyler site in eastern Connecticut indicates that it is a single component, Early Woodland camp characterized by narrow-stemmed points and Vinette I pottery (Lavin 1984). Preliminary re-analysis of the Old Lyme site (Praus 1942) indicates two major occupations -- a Terminal Archaic Orient occupation and a Late Woodland Sebonac occupation. Wading River, and Squibnocket Stemmed and Triangle points occur throughout both occupations, and within a Late Woodland burial (Lavin 1984). Wading River points were also found in features radiocarbon-dated to the Middle Woodland (A.D. 785) and Late Woodland (A.D. 1385) on Long Island (Wyatt 1977: 404,406).

Salwen found Wading River points in the pits at Fort Shantok, an early historic Mohegan fort on the Thames River (Williams 1972)! Salwen's excavation area contained no prehistoric levels. Perhaps the historic Mohegan were collecting the more ancient narrow points as "heirlooms," but the preceding evidence suggests the alternate hypothesis -- that narrow-stemmed points were being used throughout the entire Woodland period.

The data suggest that we need to rethink our present models of culture history and culture change. In the Northeast, culture history has often been perceived as a series of complete, or almost complete, replacements, each culture with its own pottery and point types, totally superseding the preceding one. The data from Fastener and other sites indicate, however, that in southern New England and coastal New York, at least, the traditional equation of one point or pottery type with one culture is no longer viable. A more appropriate model of culture change might be that of gradual material culture replacement proposed by Hatch (1983) for the Late and Final Woodland periods in Pennsylvania.

Discussing the Late Archaic groups in the Hudson Basin, Salwen (1975:54) notes that settlement pattern appears to have been "an extremely successful adaptive response" to the regional environment. A subsistence system based on the utilization of a wide range of seasonally restricted foodstuffs prevented extensive population growth, and "insured the survival of local groups against possible resource failures during the seasonal round." Salwen concludes that "it is possible that the Archaic societies would have continued relatively unchanged in balance with their environment, for an indefinitely long period," if not for the influx of "new cultural stimuli" from the south, archaeologically indicated by the broad-bladed point types and steatite bowls of the Terminal Archaic.

The archaeological evidence from New England and coastal New York suggests that this did indeed happen here, except that in these areas the "new cultural stimuli" had relatively little effect on the indigenous narrow point culture groups. Evidence from the Fastener, Charles Tyler, Old Lyme, and Fort Shantok sites indicates that, except for the introduction of pottery, the cultural lifeways remained relatively unchanged throughout the Late Archaic and Woodland periods.

ACKNOWLEDGMENTS

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BASHAN LAKE: 4500 YEARS OF PREHISTORY

John E. Pfeiffer

INTRODUCTION

Bashan Lake in the town of East Haddam, Connecticut (Figure 1) covered an area of approximately 260 acres prior to October 1982, when the lake level was lowered by 6 to 7m to repair flood damage to a state-owned dam at the northeastern end of the lake. This draining caused the lake to be decreased in size by 100 acres. Adjacent to the drained lake was exposed a lake bed that had not been dry for over a century when the dam had first been constructed. (The lake had been partially drained to 2.5m approximately 35 years ago).

I inspected the formerly submerged shoreline in late November and saw evidence of aboriginal fish weirs, hearths, and expansive midden deposits. With winter approaching, an excavation was not planned but an aerial photographic survey was undertaken by the Archaeological Society of Southeastern Connecticut, under my direction.

The first of two missions was undertaken in early January in clear, cold weather at an elevation which varied from 1000 to 2000 feet. Our first run proved the utility of black and white, color, and color infrared film to reveal prehistoric features, however, the resolution of our photographic images was not optimal. We therefore planned a second series of aerial photographs but before we could schedule the pilot and plane, a winter storm buried the shoreline in 18 inches of snow.

Early in February, after the January thaw, the second flight was made. This time we used lenses of 50 to 160mm which greatly improved our photos. Surface and some sub-surface features could be discerned. Weirs, hearths, and house outlines were plainly visible. At this time repairs to the dam had been completed and the lake level began to rise.

AERIAL, SURFACE, AND INFORMANT SURVEYS

The exposed shoreline of Bashan Lake has many distinct loci of prehistoric activity. The series of aerial photographs coupled with informant and surface survey data help establish the probable temporal and cultural affinities of several of these loci (Figure 2).

Careful examination of the aerial photographs shows that the northern shoreline known as Brownell's Beach (Figure 3A) appears to have large quantities of cultural features and artifactual material (Figure 3). The site is located on a 250m knoll running northeast to southwest. It is dotted with fire-reddened stone piles, black soil, and much surface debitage. Two distinct stone fish weirs cross an inlet and incoming stream. Coffin (1947: 37) described such stone fish weirs in the Housatonic River:

> Where the bottom was loose with sand and rocks, stakes would not stand up. To overcome this difficulty, the Indians built stone walls out from the shore, extending out into the river for almost 30 to 40 feet.

Besides the fish weirs, a dark circular ring pattern (Figure 4) ca. 10m in diameter was located at the western end of the knoll. It appears on all three types of film that were used and, according to informants, has yielded several large stone tools.

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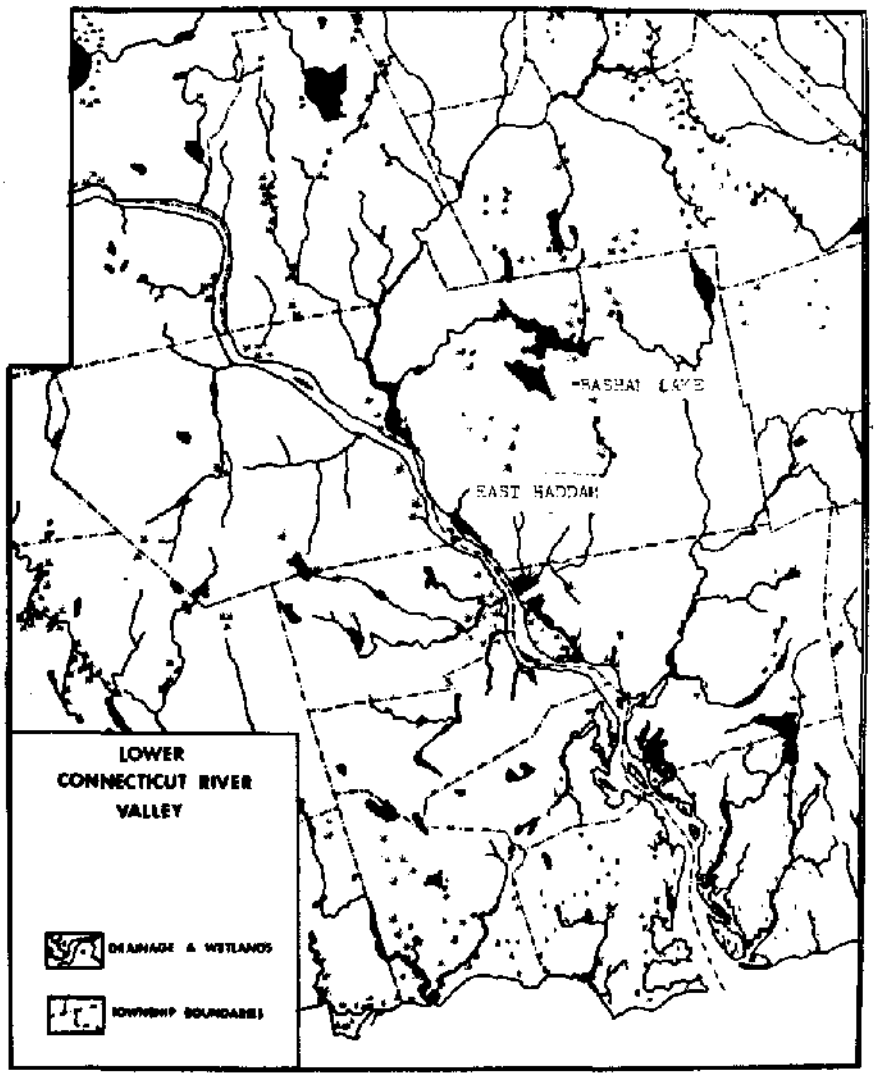

Figure 1. Map of Lower Connecticut River Valley and Bashan Lake

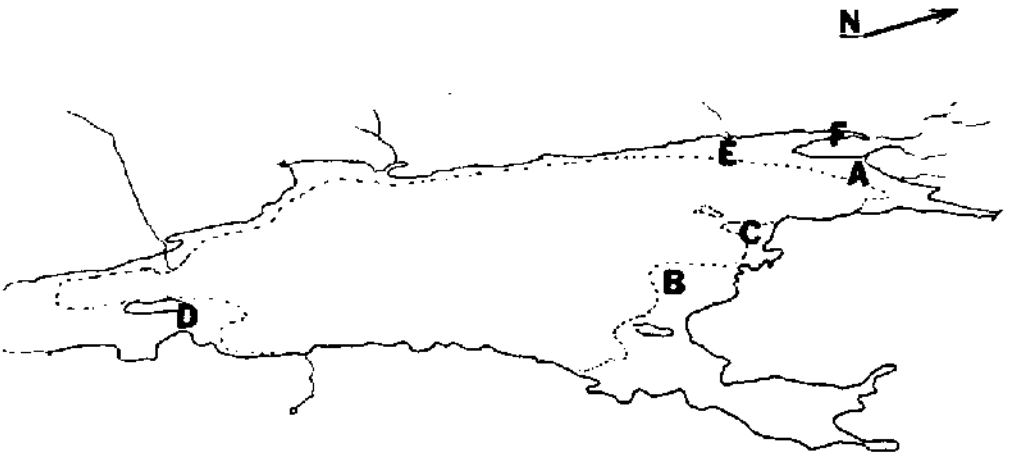

Figure 2. Map of Bashan Lake showing discrete loci of habitation

Figure 3. Locus A - Brownell's Beach: stone fish weir (arrow), black soil and hearths (arrow)

Figure 4. Circular ring pattern

A hearth lies within the ring within which a large flint point was found by a collector.

On the knoll, point types from Woodland Levanna to Archaic Brewerton are represented in private collections (Ritchie, 1971). Also within these collections are several reworked European gunflints. We found fragments of aboriginal pottery during our walking survey. These were poorly preserved, probably due to water wear and chemical weathering. Thus, we suspect there is a component of the Contact period on the surface of the knoll. Local oral tradition relates that when this portion of the lake was first occupied by whites, the native population relocated to the southern end of the lake. For years afterward it was the responsibility of the white settlers to provide corn to the Indians.

The eastern shore (Figure 2) has several smaller sites which probably date to Middle to Late Woodland periods. Some deposits were still under water when the dam was completely open, suggesting that the lake level has been lower and that it fluctuated during aboriginal times. Several hearths are reported for this area as well as a stone fish weir. Two flint knives and an antler pipe were also found as well as heavy concentrations of flint debitage.

Locus C (Figure 2) yielded debitage from a quartz cobble industry. Many small-stemmed points were found by collectors. As this locus was no more than 0.5m above the lowest level of the lake, it was already submerged after the January thaw and we were unable to view it.

Locus D (Figure 2), at the sound end of the lake, is not well known but hearths are wedged in among the large boulders. Several small-stemmed points have come from this area. The usual characteristic of a cobble surface at the base is not evident. Instead, the base shows a slight indentation.

Locus E, known as Bailey's Beach, revealed many hearths and was apparently an active area for production of stone tools. Native quarried quartz as well as quartz cobbles were worked in this area. Large hammerstones, pitted stones, and debitage cover the surface. A cache of five net sinkers was found in direct association with a stone fish weir. This supports our interpretation of the stone piles as being fish weirs, and also suggests that nets were used in conjunction with these.

Locus F, Brook's Cove, is within the northwestern inlet of Bashan Lake and is made up of hearths nestled amongst boulders, midden deposits, and several small hummocks which have fire-cracked stone, charcoal-stained soil, and concentrations of chips. Late Woodland or Historic Woodland ceramics, a mortar and pestle, Levanna points, and bone have all come from this locus. A small rock shelter may be associated with these surface finds.

Informant data are sometimes biased in such a way that certain portions of the archaeological record are over-represented (as is the case with projectile points). Other artifacts, such as hammerstones, pitted stones, scrapers, and utilized flakes, are often not recognized or at least collected. Thus, it is difficult to determine range of activities at a site solely from informant sources.

Our surface survey demonstrated a preponderance of small scrapers at Loci A, E, and F (these were the only sites which we were able to view in late February and March). Only a few collectors had shown me such artifacts from Bashan Lake. These "thumbnail" scrapers appeared to be a very important constituent of the assemblage and probably represented a specific activity. Willoughby (1935) suggests that these were important in the manufacture of dugout canoes. It is also possible

that the scrapers were used to process fish or scrape hides. I have seen as many finely flaked scrapers at only one other site in the Lower Connecticut Valley. This site, Hubbard Brook, is on the banks of the Connecticut River in Middletown. The relationship of these scrapers to a body of water is probably significant to the interpretation of activity in which such artifacts were employed.

EXCAVATIONS AT LOCUS A

The aerial, informant, and surface surveys show clearly that Bashan Lake has tremendous archaeological potential. Information on settlement, subsistence, and technology was provided by this part of the study. Before the lake reclaimed the cultural deposits, it was important to establish site size and time depth. Since our data suggested that Locus A was the oldest and most complex, we proceeded to test this area.

Early in March, as the waters rose rapidly, already drowning Loci B, C, and D, we initiated a sample excavation on the knoll feature of Locus A. A test trench 0.5 by 15m was laid out on a north-south axis across the knoll. The trench was positioned in such a way that its north end would also test the fish weir. A second test unit 2m on a side was placed at the western end of the knoll to verify the circular ring feature and hearth (Figure 4).

The trench was excavated in 2m units at 10cm levels. As excavation continued, a white-gray layer of dry sand (Stratum A) 5 to 7cm thick gave way to a black cultural stratum (Stratum B). This black layer with triangular and stemmed points varied in depth from 5 to 10cm. At ca 15 to 17cm below surface, we encountered a sandy chestnut soil which was relatively sterile (Stratum C). At 25 to 30cm, a second very black stratum (Stratum D) became apparent. This thick cultural layer extended down to 65 to 75cm and had many flakes, hammerstones, scrapers, and projectile points. A sterile yellow sand (Stratum E) continued to an unknown depth. The water table was rising rapidly and was at the 70cm level when we completed the three-day excavation (Figure 5).

Two hearths were intersected by our test trench. Feature A, a hearth in Squares 4 and 5, was characterized by large stones of 15 to 45cm which were heavily burned, reddened, and fragmented. Feature A's matrix was black gritty charcoal-laden soil. Flakes of cobble quartz, small cubes of bone, artifacts, and a Brewerton drill (Ritchie 1969) were found within this hearth. A second hearth was partially intersected and, in fact, almost missed by the test trench. Apparently most of this feature lay to the east of our test trench. Its profile revealed a depth of 55cm in Squares 9 and 10. The fire pit was stratigraphically covered by Stratum C; however, the distinction between the overlying stratum and the matrix into which it was dug was very unclear. Without further horizontal definition, the stratigraphic relationship shall remain unknown.

Several extensions were made on the western side of the trench to further clarify features and stratigraphy. The NW and SW quadrants of Squares 4 and 5 as well as Squares 3, 22, 23, and 24 were excavated to reveal hearth Feature A. An east-west trench running west out of Square 6 verified the stratigraphy and demonstrated the small-stemmed and Levanna triangular points at the same depth and, therefore, were directly associated. A more important aspect of the area of the excavation was a thin gravelly layer within Stratum D at 35 to 40cm. This may have been a living floor within a large structure. The living floor

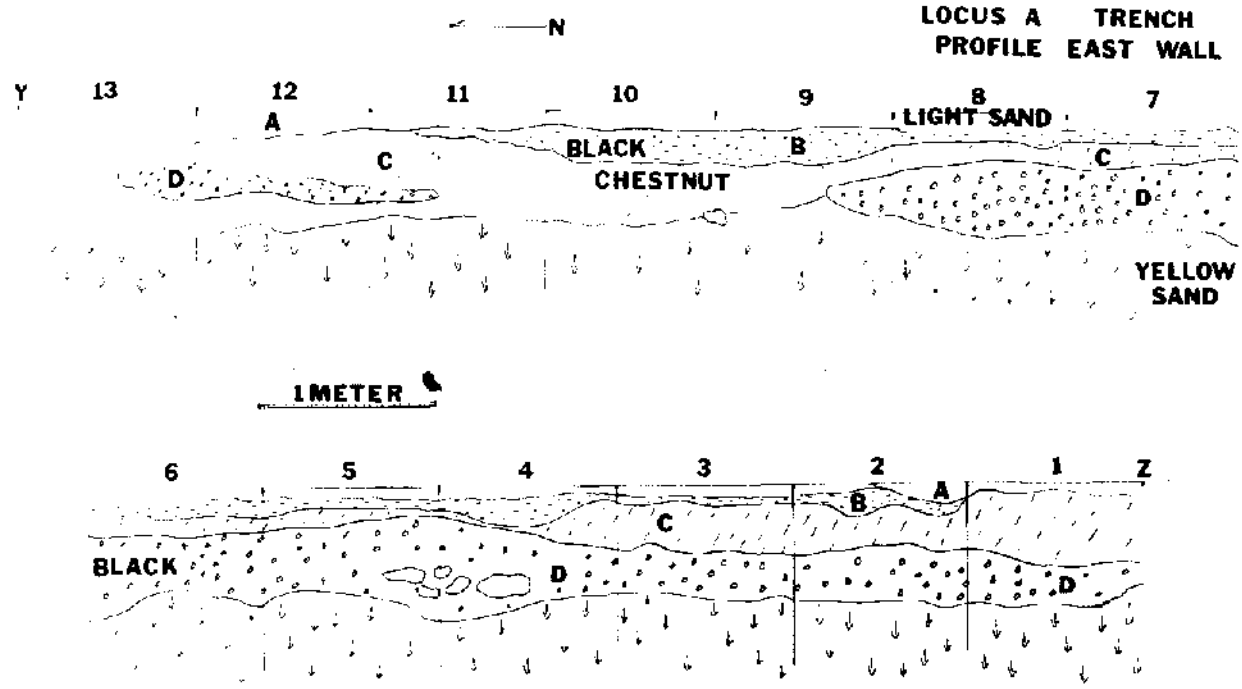

Figure 5. Cultural stratigraphy

which was more compact than other regions of the excavation yielded a serrated Brewerton projectile point (Figure 6) very similar to the type of points identified at the Bliss Site in Old Lyme (Pfeiffer 1983a), a shallow gouge (Figure 7), a basalt hammerstone, and many hickory nut fragments which were collected and sent for radiometric dating. By analogy to the Bliss Site which dated to ca 4700 BP, I expected a similar age (Pfeiffer 1983b). Below the living floor was a recurrence of the black matrix of Stratum D overlying sterile sand. Stratigraphically, the living floor was associated to the hearth feature (A) and the post molds in Square 75.

The results of the radiometric dating from Bashan Lake Locus A indicate that there was, indeed, an Archaic component. The hickory nuts from this living floor where the Brewerton point, gouge, and hammerstone were found dated to 4730± 280 BP (Beta #6723). Several more dates from the site would, of course, strengthen its chronologic sequence.

The excavation at the west end of the knoll in the area of the 10m circular ring showed a thin 2 to 3cm white-gray sand layer, a darker matrix extending to 15cm, and a yellow subsoil. Within the darker matrix was a large hearth, several post molds, and many chips. One broken black flint point came from the hearth area.

The excavation was left incomplete as time and funds were unavailable. The hearth was left intact, a plastic sheet laid over the square, and backfilled.

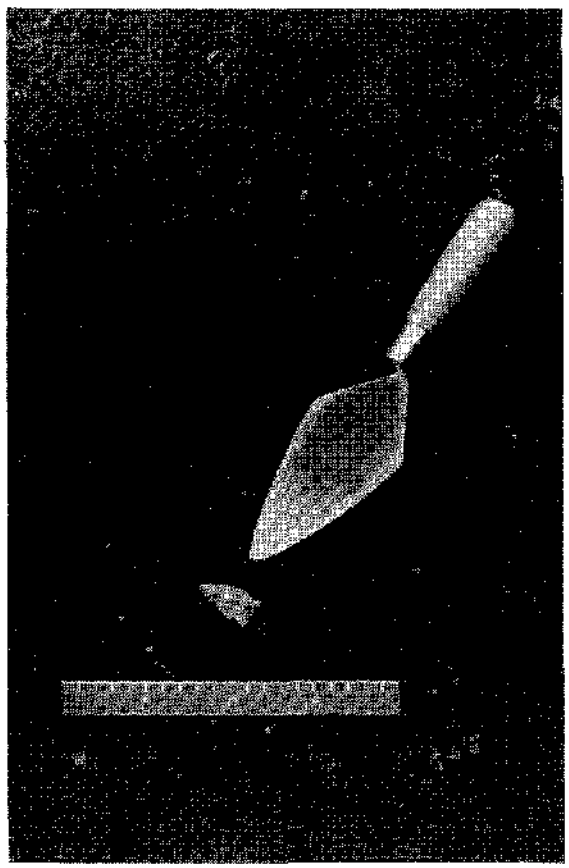

Figure 6. Brewerton point from Stratum D

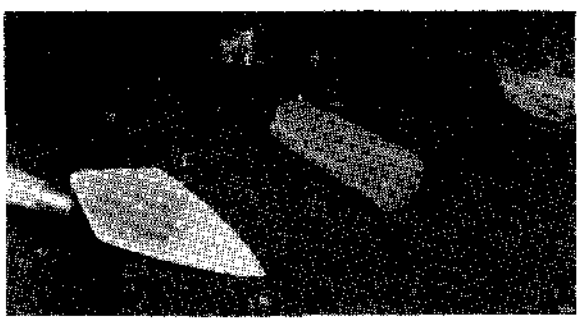

Figure 7. Gouge from Stratum D

The test in this region of the knoll confirmed the existence of the circular ring and strongly suggested that the aerial photographs documented an aboriginal structure. A charcoal sample was taken from the hearth for eventual radiocarbon dating. This will determine the age of the hearth, which, based on typology and stratigraphy, I estimate to be from the Woodland period.

Several 1x1m test units were laid out to the east and west of the trench in order to establish the site size. One test unit of the trench 10m east of Square 10 showed the identical stratigraphy as in the trench. We found a pit covered by slab rock within Stratum D at 30cm. Within the feature was a cache of quartz cobbles in various stages of reduction. Two small-stemmed points were within this cache. Another 5m to the east, another test unit again verified the stratigraphy and cultural content of the trench. Shovel-test-pitting farther east showed that the site continued to the outlet of the brook 90m east of our test trench.

To the west, shovel-test-pitting revealed cultural deposits in an area over 150m; 15 to 20m seems very likely for the measurement of the site.

ARTIFACTS OF THE TEST TRENCH

Sixty-three artifacts were recovered from the test trench and extensions. Stratum B yielded 3 Levanna points, 4 small-stemmed points, 1 drill, 7 thumbnail scrapers, 1 hammerstone, and 3 bifaces. Debitage was heavy from this level where predominantly quartz cobbles were being worked.

Stratum C consisted of 5 artifacts which were quartz bifaces and scrapers. Debitage was very sparse.

Stratum D had 3 small-stemmed points, 6 Brewerton and 6 Squibnocket triangles (Ritchie, 1971), 3 drills, 13 thumbnail scrapers, 1 gouge, 1 hammerstone, and several fragmented and untyped arti-

facts. Quartz cobble debitage was very heavy.

Activities as indicated by artifacts within Stratum B were: stone tool manufacture (a quartz cobble industry), hunting, cooking (based on surface hearths and bone fragments[1]), wood or bone working (based upon drills, scrapers, and bifaces which were found in the assemblage), possibly hide scraping, and fishing (based on fish weirs and net sinkers).

Activities indicated for Stratum D were: stone tool production (quartz cobble industry), hunting, cooking, heavy wood working (gouge), wood and bone working (drills, scrapers, and bifaces), and nut processing.

A comparison between the two strata reveals little significant difference. This may well imply that a similar, if not identical, mode of adaptation existed for both components. The Woodland period in this case can be viewed as a direct descendant of the Archaic period and as an example of cultural continuity.

CONCLUSIONS

The Bashan Lake study has demonstrated intense prehistoric utilization of this freshwater body in southeastern Connecticut. Six discrete loci of activity were identified through the use of aerial photography, informant sources, surface survey, and limited excavation. Temporal and spatial parameters were established for this site which was occupied during Archaic and Woodland times.

[1]A sample of this bone was sent for collagen dating; however, no date could be generated since almost all of the collagen had been boiled out through aboriginal cooking.

ACKNOWLEDGMENTS

I wish to thank the Archaeological Society of Southeastern Connecticut for their interest and support of this project. Without their assistance, the site would have remained undocumented. Several enthusiastic amateurs, Oscar and Dan Dill, Gaspar Ingui, and Rick Todzia, informed me of the site. The professional photographic expertise of Cynthia Richmond is greatly appreciated and adds a powerful component to this research. Finally, the radiometric date funded by the Public Archaeological Survey Team has been integral to the chronological assignment of the test excavation of Locus A.

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TERMINAL ARCHAIC SETTLEMENT-SUBSISTENCE PATTERNS IN THE LOWER CONNECTICUT RIVER VALLEY: A SET OF TESTABLE HYPOTHESES

Peter Pagoulatos

INTRODUCTION

The Terminal Archaic period is not well known in the Northeast. The following paper briefly summarizes current research on this period in southern New England. Data on the chronological setting of the Terminal Archaic are presented, and the temporal relationship of this period to other Late Archaic cultural traditions is discussed. A set of hypotheses concerning Terminal Archaic settlement-subsistence patterns is presented that will be tested in future research.

The Terminal Archaic period in Connecticut is identified by a variety of broad blade projectile point forms which date from 3600 to 2700 B.P. (Dincauze 1968, 1975; Ritchie 1969; Snow 1980). Broad blade projectile point forms are distributed on the eastern slope of the Appalachians from Georgia to Maine. Broad blade sites date to 4000 B.P. along the Savannah River, Georgia (Claflin 1931) and the Carolina Piedmont (Coe 1964). Early broad blade point types include the Lehigh in the Susquehanna Valley (Witthoft 1949, 1953), the Coens-Crispin variety in the Delaware drainage (Kinsey 1972), the Snook Kill in eastern New York and western New New England (Ritchie 1951, 1969), the Atlantic and Wayland-Notched varieties of eastern New England (Dincauze 1972), and the Genesee in the Hudson drainage (Snow 1980). These broad blade point types have been classified as part of the Susquehanna tradition (Witthoft 1953, Snow 1980). In Connecticut, this tradition is characterized by assemblages which include wing-shaped atlatl weights, grooved axes, adzes, gouges, whetstones, steatite bowls, occasionally steatite-tempered ceramics, hammerstones, large knives, spears, dart points, scrapers, and bifacially flaked ceremonial blades commonly associated with cremation burials (Dincauze 1972; Turnbaugh 1975; Cook 1976; Snow 1980; Pfeiffer 1983a).

LATE ARCHAIC-TERMINAL ARCHAIC (4700-2700 B.P.) SETTLEMENT-SUBSISTENCE PATTERNS IN THE LOWER CONNECTICUT RIVER VALLEY

For the purposes of this paper, the lower Connecticut River Valley is confined to the area extending from South Windsor to the Long Island Sound (Figure 1). The lower valley is divided into a series of parallel ecoregions based on land forms, climate, and biota. The North-Central Lowlands of Glastonbury and South Windsor (3B) are characterized by extensive floodplain and terrace zones adjacent to the Connecticut River. The Southeast Hills (4C) and Eastern Coastal ecoregions (5B) incorporate the towns of Lyme, Haddam, East Haddam, and Old Lyme. The former is a near coastal upland; the latter consists of tidal marshes and estuaries along the Long Island

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Sound (Dowhan and Craig 1976; McBride, ms. in preparation).

The Late Archaic period in the lower Connecticut River Valley consists of the Laurentian and Narrow-stemmed cultural traditions (4700-2900 B.P.). The Laurentian tradition is the earlier, dated between 4700 and 4200 B.P., and includes Brewerton and Vosburg projectile point types. The Narrow-stemmed tradition is dated between 4200 and 2900 B.P., and is identified by triangular and small-stemmed quartz projectile points (Ritchie 1969; Dincauze 1972; Snow 1980; McBride, n.d.).

Woodchuck Knoll, a multi-component Late Archaic Narrow-stemmed occupation on the Connecticut River flood plain in South Windsor, provides specific information on seasonality and subsistence (McBride 1978). Stratigraphically, a thin Laurentian occupation underlies a Narrow-stemmed component. The presence of hearths and possible storage facilities indicates a long, localized sequence of occupation. Macrobotanical remains such as nuts, lotus seeds, and chenopodium sp. indicate a summer-fall occupation for at least part of the time. Early spring occupancy of the flood plain can be ruled out due to annual flooding; terrace zone sites probably represent occupations during other seasons (McBride 1978).

The Narrow-stemmed tradition is well represented in the North-Central Lowlands ecoregion (Figure 1). Large sites are predominantly on the flood plain; medium and small sites are on terraces and uplands (McBride and Dewar 1981). The associated settlement pattern was probably characterized by hunters and gatherers operating out of base camps in the floodplain and terrace zones, with task-specific sites or seasonal camps in the uplands (Dewar and McBride n.d. ; McBride and Dewar 1981; McBride and Pagoulatos 1983).

Terminal Archaic settlement-subsistence patterns (3600-2700 B.P.) contrast strongly with those of the Late Archaic, with settlement patterns clearly oriented toward the river and terrace edges, perhaps indicating a riverine economy (McBride and Dewar 1981). In the North Central Lowland ecoregion, Terminal Archaic occupations are predominantly on the river edge of the terrace, adjacent to the flood plain. The limited number of small sites found suggest that floodplain and upland zones were used infrequently for specialized activities, although larger occupations have been found in upland areas, which may indicate exploitation of seasonally available resources (McBride n.d.). Settlement pattern and site size distribution of Terminal Archaic sites suggest fewer residential moves than in the preceding Narrow-stemmed tradition (Dewar and McBride n.d.). This pattern is characterized by larger occupations along the river and a reduction of seasonal and task-specific sites in floodplain and upland zones (McBride and Dewar 1981). The reduction of flood plain and upland sites suggests either year-round or seasonal occupation along the river edge of the terrace zone. Seasonal occupation of only the terrace zone might indicate that the annual subsistence range included areas outside of the study region.

TERMINAL ARCHAIC SETTLEMENT-SUBSISTENCE PATTERNS: A SET OF HYPOTHESES

Two competing hypotheses have been proposed to explain the nature of the Susquehanna tradition in southern New England: 1) the specialized maritime-

riverine economic subsystem hypothesis (Cook 1976), and 2) the complete cultural system hypothesis (Turnbaugh 1975; Pfeiffer 1983a; Dewar and McBride n.d.). Studies of Terminal Archaic sites in the Northeast have generally focused on cremation burial complexes (Dincauze 1968; Snow 1980; Pfeiffer 1983a). Sites yielding evidence of occupation and associated stone tool industries have not yet been systematically tested to determine function, seasonality, and duration of occupation. Analysis of artifact variability within and between occupation sites should indicate the spatial and temporal distribution of activities and allow for evaluation of the explanatory hypotheses. This would be a significant contribution to our understanding of Terminal Archaic settlement-subsistence patterns in the lower Connecticut River Valley. Each of the hypotheses is discussed below.

1) The Specialized Maritime-Riverine Hypothesis

The specialized maritime-riverine hypothesis proposes that the presence of broad blade elements indicates a technological subsystem of the Narrow-stemmed tradition in the lower Connecticut River Valley. Broad blade point types may only reflect a minor technological innovation adopted by local Late Archaic cultures possessing Narrow-stemmed point types in the lower Connecticut River Valley. The distribution of broad blade point types along rivers may imply a specialized function, possibly associated with fishing, while Narrow-stemmed point types found at a distance from rivers may suggest hunting or related activities. Presumably sites showing evidence of both projectile point forms should exist during certain times of the year.

Settlement patterns should be detected through evidence of a clear separation of specialized activities of people using broad blade and narrow-stemmed points during specific times of the year. Broad blade tools might represent specialized activities such as fishing; narrow-stemmed tools representing hunting. Both fishing and hunting would take place in the spring. Seasonal camps with fishing, hunting, and collecting activities should possess both point types in winter, summer, and fall. Therefore, except for special purpose activities at certain times of the year, both point types should be found together in association in the lower Connecticut River Valley.

2) The Complete Cultural System Hypothesis

This hypothesis proposes that the Susquehanna tradition represents a complete cultural system in the lower Connecticut River Valley, i.e., a full range of site types in terms of function and seasonality. The need to exploit seasonal resources might necessitate the use of seasonal camps, as well as smaller temporary camps and task-specific sites at different times of the year. All 12 months of the annual cycle should be accounted for.

Turnbaugh (1975) proposes that the Susquehanna tradition represents a culture focused on a maritime-riverine economy in the lower Connecticut River Valley. A maritime-riverine economy is characterized by riverside base camps, an emphasis on the exploitation of anadromous fish species, and a maritime technology.

Storage facilities would have been essential for short-term surpluses of anadromous shad, salmon, and alewife fish runs. Anadromous fish remains from riverside base camps might imply springtime occupation. The short duration of fish runs would require alternative resources such as deer, bird, nut, and vegetable foods during other seasons. The need for these resources might but need not necessitate movements to other resource zones and the establishment of hunting and collecting camps (Binford 1980). The settlement pattern of a maritime-riverine economy might be represented by populations operating out of riverside base camps along streams in the spring, with use of interior hunting and collecting stations in the fall and winter, and riverine hunting, fishing, and collecting encampments in the summer months.

Pfeiffer (1983a) proposes that the Susquehanna tradition in the lower Connecticut River Valley is characterized by a generalized gathering-hunting economy which depends heavily upon vegetable foods supplemented by hunting. Aquatic resources appear to be of minor importance (Pfeiffer 1983a). Seasonally available plant and animal resources would necessitate frequent group movements to specific resource zones. Settlement patterns would include hunter-gatherers operating out of riverine base camps to collect plant foods and hunt small game in the spring and summer. Interior fall and winter camps would have been necessary to hunt deer and collect nuts.

Dewar and McBride (n.d.) also argue that the Susquehanna tradition represents a complete cultural system, but question whether Terminal Archaic occupation along the terrace edge zone was year-round or seasonal in the lower Connecticut River Valley. Dewar and McBride propose that terrace edge Terminal Archaic occupation may have been year-round in the Glastonbury area, with seasonal movement within the terrace zones. There is very little evidence for seasonal occupation either in the floodplain or terrace zones. Year-round occupation of the terrace zone might be indicated by preserved remains of plant and animal that were available in all seasons, superimposed occupations, substantial residential construction, and evidence of re-usable storage facilities (Flannery 1972; Dewar and McBride n.d.). This settlement pattern should include permanent base camps in the terrace zones, with task-specific sites located in floodplain and upland zones. Evidence for semi-permanent occupations as early as the Terminal Archaic period might imply highly efficient food gathering strategies and storage. Grain storage during the Late Archaic period has been identified at Woodchuck Knoll (McBride 1978).

In contrast, seasonal or temporary occupation along the terrace edge zone could be implied by the recovery of plant, animal, and fish remains which are available only at certain times of the year. In the Glastonbury area, nearly all Terminal Archaic occupation was in the terrace zone. Despite this fact, Dewar and McBride (n.d.) state that terrace zone occupation may have been limited to seasonal activities such as fishing. Further, they suggest that Terminal Archaic occupations shifted to the terrace zone to allow residence close to the river earlier in the year than would have been possible on the floodplain knolls. The Connecticut River had important runs of Atlantic salmon and shad. Netting

anadromous fish in the lower Connecticut River would have yielded high returns.

The absence of floodplain and upland zone sites might indicate that the annual subsistence range may have extended beyond the Glastonbury area (Dewar and McBride n.d.). Orient phase components from the Hudson drainage and Long Island indicate that populations may have moved to the coast to exploit shellfish during the summer months. Seasonal movements also took people to the hinterlands to hunt and collect in the fall and winter; migratory fish were harvested along major tributary streams in the spring. There is no evidence for fishing equipment at coastal sites, probably indicating a clear separation of activities by season and by site location (Ritchie and Funk 1973; Snow 1980).

The lower Connecticut River Valley settlement pattern should indicate terrace zone fishing camps in the spring, the presence of upland hunting and collecting camps in the fall and winter, and the movement of groups to the coast to collect shellfish, hunt, and gather in summer. With the exception of the Grannis Island site in New Haven, which provided evidence for an Orient phase shellfish midden, no other occupations dating to the Terminal Archaic period have yet been identified in Connecticut.

DISCUSSION

Future field research will focus on the town of Glastonbury and surrounding areas (Figure 1). A survey of Glastonbury was undertaken by the Public Archaeology Survey Team, Inc. in 1979. The survey included the location of sites through subsurface testing a stratified systematic unaligned sampling design (McBride and Dewar 1981). Terminal Archaic occupation sites from this survey will be tested by systematic, controlled excavation to determine site function, seasonality, and duration of occupation. Site function will be interpreted primarily through artifact variability and lithic use-wear analysis. Seasonality and length of occupation will be based on preserved faunal and floral remains.

Riverside fishing camps should provide evidence for the taking of fishing by means of weirs, nets, traps, and lines. Other fishing equipment may include pronged fish spears, harpoons, and net sinkers. Adzes, axes, and gouges might imply canoe building (Turnbaugh 1975; Snow 1980). Collecting camps might be suggested by the presence of grinding implements such as mortars, mullers, and nutting stones to process plant, seed, and nut resources. Hunting camps might be indicated by knives and scraping tools, which are required to process deer and other animals. Larger base camps might include hunting, gathering, and fishing activities.

CONCLUSION

Despite accumulating evidence, the Terminal Archaic period of southern New England is still poorly understood. The expansion of the Susquehanna tradition has been one of the most perplexing problems in New England prehistory. Does the Susquehanna tradition represent a specialized maritime-riverine adaptation or a complete cultural system? The establishment of a specialized maritime-riverine economy would indicate the development of a technological subsystem adopted by local Narrow-stemmed cultures. If the Susquehanna

tradition was a complete cultural system, what type of settlement-subsistence pattern is it characterized by in the lower Connecticut River Valley? If future data do not conform to any previously mentioned settlement-subsistence pattern, will they hint at yet a new model?

Further, the expansion of broad blade groups may indicate population pressure along the Atlantic seaboard. Funk and Rippeteau (1977) report a sharp increase in the number of components per century for the Terminal Archaic in the Susquehanna Valley. Funk (1976) and Dincauze (1971) report similar patterns for the Hudson River drainage and Massachusetts. It should be noted that an increase in components through time is not necessarily an accurate indicator of population size. Curtin (1979) argues that an increase in components could indicate an increase in the number of special-purpose sites and not population growth. But if population growth were the case, why did it occur? Reasons could include improved storage of plant foods (McBride 1978), the exploitation of new harvestable resources such as anadromous fish (Turnbaugh 1975), and appropriate processing and storage (Testart 1982).

This discussion is only a preliminary attempt to address the problems of the Terminal Archaic period. Future field research and the subsequent development of a settlement-subsistence model from the lower Connecticut River Valley will hopefully also help to explain annual cycles of movement of Terminal Archaic populations in other river drainages and valleys in southern New England, as well as the nature of the Susquehanna tradition in eastern North America.

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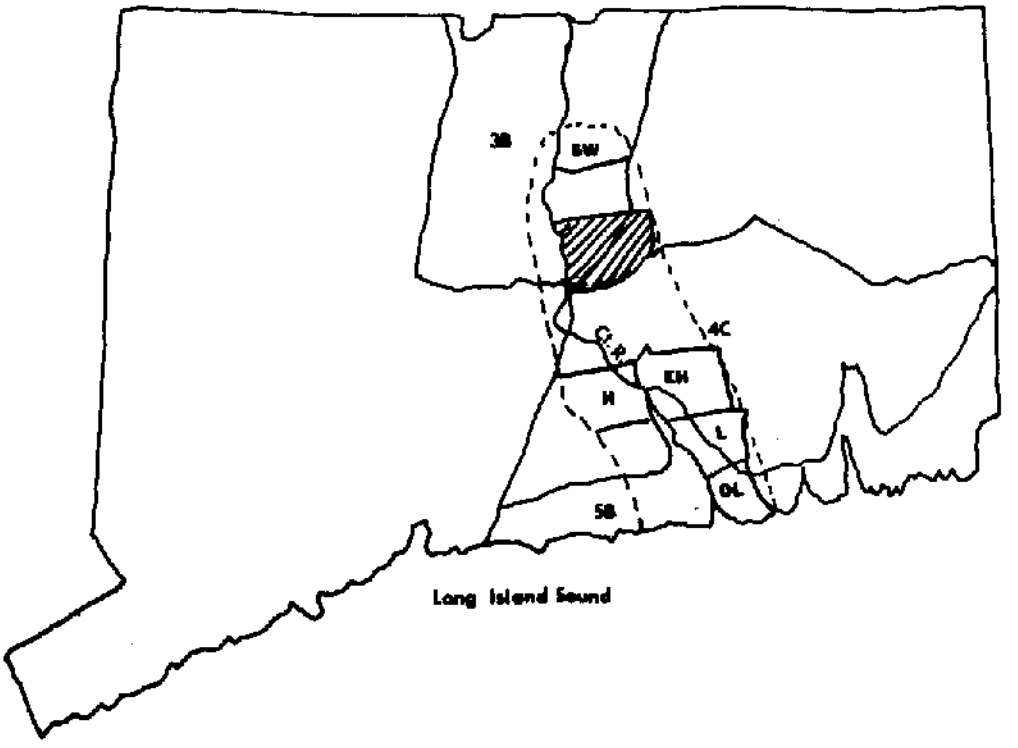

key:

----	Lower Connecticut River Valley
//////	North-Central Lowland Survey (Glastonbury)
3B	North-Central Lowlands ecoregion
4C	Southeast Hills ecoregion
5B	Eastern Coastal ecoregion
SW	South Windsor
H	Haddam
EH	East Haddam
L	Lyme
OL	Old Lyme

Figure 1. Ecoregions of the Connecticut River Valley. Taken from Dowhan and Craig (1976)

Gramly, Richard Michael
1981 The Vail Site: A Palaeo-Indian Encampment in Maine, Bulletin of the Buffalo Society of Natural Sciences Number 30, Buffalo.

To truly appreciate the significance of this book, one must realize the primary audience for which it is intended: lay archaeologists who are interested in Paleo-Indian studies. Non-Paleo-Indian specialists also will be able to broaden their horizons and enjoy Dr. Gramly's lucid, narrative style. Paleo-Indian specialists, who have excavated sites elsewhere or intensively studied collections, will have a detailed outline of what was present at the site and its potential for explicating many of the persistent problems of early man and his adaptation. However, those looking for a detailed analysis of each artifact class and a thorough intra- and intersite comparative interpretation will have to wait. This is a preliminary statement appearing only two years after the excavation was completed.

The six chapters contain (1) a discussion of the setting and vegetational history of the site and its environs, (2) its discovery and excavation, (3) descriptions of the tools, (4) their distribution at the habitation site and associated killing ground, (5) a narrative of the lifeways practices, and (6) the cultural context of Vail vis-a-vis several other Paleo-Indian sites in the northeastern United States and Canada. Each of the chapters is well written and easy to follow for anyone with some background in archaeological terminology.

The two appendices are more technical. The first is the results of the magnetic survey conducted across the entire habitation area in search of previously undiscovered features. The second discussed the collecting and analysis of phytoliths (silica bodies from plant tissues, especially leaves and roots) found adhering to the working surfaces of stone tools. While no identifications had been made at the time of publication, the process itself will be of interest to all serious researchers.

Because this is a pioneering work in extreme northwestern Maine, the absence of a strong archaeological data base for many of the interpretations cannot be faulted too strenuously. One must also keep in mind that the excavation was taking place in Aziscohos Lake during a very dry period. Time was of the essence lest the lake waters rise suddenly and inundate their work. Any week may have been their last, and the potential for not achieving sufficient exposure to define what was present was being weighted daily against maximum recovery of all possible types of environmental and artifactual data. With perfect 20/20 hindsight one could always say what should have been done and what it would have meant, but that is neither possible nor fair. However, the potential does exist for getting more from the existing information and for presenting certain interpretations with some qualifications and caveats.

Given the previous considerations, I will discuss what Gramly has done and attempted to do in light of current Paleo-Indian studies in the Northeast. He learned of the site during a general door knocker survey in Bethel, Maine where he met the owner of a rock and mineral shop, Reginald Bachelder, who introduced him to Francis Vail, who had a huge collection of Paleo-Indian artifacts from a single site. After seventeen years of hearing "Boy, do I have a site for you!" from excited collectors only to find that the materials are

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out of context in a trucked-in plow zone, I readily appreciate Gramly's amazing good fortune.

A brief survey in 1979 convinced him that excavation would be highly rewarding if only the lake level were to drop. The next summer it did. His research plan evolved gradually in the field rather than in the optimal sequence of systematic surface collection, cores, test pits, and large block excavations. There simply was not enough time.

A vivid account of the site's present setting is a fine advertisement to the outdoor minded, but it cannot be the basis for building paleo-ecological models. The only identified ecofact from the site is a piece of charcoal from an unknown species of conifer (p.60). The absence of even pollen cores from the immediate vicinity makes any effort at paleo-environmental reconstruction flawed at the outset. However, the ongoing analysis of phytoliths promises to provide the necessary direct evidence of what the environment was like at the site at the time the people were actually there.

Since the opportunity for future excavation may never present itself, the record of what has been found and the circumstances of its recovery must be as detailed as possible. The absence of much of the raw data in the current volume will upset only the handful of Paleo-Indian specialists who have data comparable to those from Vail. However, the curation of the data in public museums will facilitate this study. The potential for future productive study is clearly evident given the meticulous mapping of cultural and natural features with their associated artifacts.

The description of the tool classes present is general and somewhat difficult to follow. Tables with metric attributes of some or all examples (depending upon their relative frequencies at the site and in Francis Vail's collection) from each class are in the text, but the plates are at the back of the book. The absence of cross referencing from tables to plates to text makes finding individual specimens time consuming. The insertion of color fold-out maps throughout the book is very nice, but flipping through the book to match tables to plates to text is awkward because of it.

The fact that an incredible number of artifacts may be present in a single cluster in any of the eight excavation loci necessitated two significant compromises. It was impossible to indicate which artifact on a map corresponded to one pictured on a plate or described in a table or text. The second is the creation of the term "cutter." Since it was frequently difficult to assign tools to individual functional categories, and there would have been so many additional tool classes to differentiate on the fold-out maps, the generalized term was used.

The first compromise is a source of concern to the few Paleo-Indian specialists who have worked with single component sites or with a lithic scatter associated with a single tool manufacturing episode. Gramly interprets the artifacts in discrete loci as being from individual family living areas at either single or successive occupation camps, depending upon the quantity present. The reason given for the tools and debitage remaining tightly clustered is that they were discarded within a single house or multiple, overlapping ones established during different visits. Aside from the fact that there is not even a single post mold or other direct evidence for any form of structure (let alone a(semi-)permanent one implied by the use of the term "house"), there is no objective evidence from this site that artifacts from a single cluster are more similar to one another than to those from another cluster. The reader should have been given more evidence

to evaluate the interpretation that artifact clusters represent no longer extant houses, or at least discrete activity areas.

The second point is more germane to understanding the function of the artifacts themselves. The term "cutter" is employed to encompass the functions served by gravers, graving spurs, knives, denticulates, awls, and minimally retouched/utilized flakes. While this lumping does preclude some confusion which may have occurred with so many additional symbols on the maps, it obscures inherent functional distinctions. Although it may be difficult to classify the Paleo-Indian version of a Swiss Army knife with a graver tip, scraping edge, the denticulate notch, the fact of multiple functions on a single tool is important in itself. The obvious re-shaping of a tool no longer useful as a graver for other functions is also of importance.

In contrast to the numbers of fluted points, drills, scrapers, "cutters," pieces esquillees, debitage, channel flakes, bifaces, and hammer-anvils at the habitation site, the (so called) killing ground located 250 m away has only whole or fragmentary fluted points. At least four tips found at the killing ground fit bases found at the habitation area, but two fits were found among fragments found at different habitation loci. The fact that only fluted points were found there is the only direct evidence for designating the area a killing ground. Coupled with this is research that migrating herds of caribou would have selected a route through this area that would have taken them across the killing ground, rather than somewhere else. While the presence of a killing ground is sufficient reason to establish and revisit a camp, direct proof that it was actually used as such is lacking.

While the people certainly had motive, opportunity, and appropriate weaponry, and their alleged victims were known to frequent the area, they cannot be convicted without a corpus delicti or "smoking atlatl" as it were. Gramly compares Vail to three other Paleo-Indian sites yielding caribou bones: Whipple in New Hampshire (Curran 1979), Bull Brook in Massachusetts (Grimes 1979), and Dutchess Quarry Cave in New York (Funk, Walters, and Ehlers 1969). But in each case the problem of irrefutable association looms large. For me the circumstantial evidence is very convincing, but the jury is still out.

The narrative of a day in the life of a Vail caribou hunter is an interesting amalgam of archaeological, paleoenvironmental, and ethnographic data and interpretation. The only flaw is that it is difficult to separate the data from the interpretation and the hypothesis from the facts. It is an explanation for the distribution of the artifacts which will probably change only in detail.

The last chapter on the cultural context of Vail vis-a-vis other New England Paleo-Indian sites is very illuminating and interesting more for what is implied. Most of the comparison is to the Debert site in Nova Scotia because of the similarity of deeply incurvated-base fluted points and the apparent habitation loci (MacDonald 1968). Other strongly similar sites, according to Gramly, are Whipple and Bull Brook for reasons cited above.

Of the many parallels among these sites the multi-occupational nature and inferred association to caribou hunting are the most interesting. There are no sites in the region north and east of these that have nearly the quantity of artifacts. The only sites south and west that come close are quarry sites--West Athens Hill and Kings Road in the Hudson Valley--until one reaches

Plenge in New Jersey and Williamson and Thunderbird in Virginia (Funk 1976; Weinman and Weinman 1969; Kraft 1973; McCary 1975; Gardner 1977). For whatever combination of reasons the linkages to Vail are real and seem to be related to procurement patterns not operating further south or west. Time is also a factor, and the early date at Vail exceeding 11,000 years B.P. overlaps some of the Debert dates. The site older by about 1,000 years that is close to New England is Dutchess Quarry Cave, but comparing a rockshelter to an open site may have some bearing.

I would find it very interesting to couple Gramly's observations comparing northernmost sites to a study of the contexts of fluted points reported in a recently conducted archival survey (Brennan 1982). On first inspection there seems to be many common traits among the northernmost Paleo-Indian sites not shared with the more southerly ones, and it is reasonable to concentrate on these. However, I was disappointed for a very selfish, immodest reason that 6LF21 was not used to make a case for individual loci having implements from a single occupation (Moeller 1980). Although there were no structures evidenced at 6LF21 or its extension, Templeton, the comparison would have been warranted on the basis of limited variation occurring in tool manufacturing techniques and styles at a single point in time. Were the loci actually sites of individual structures or even discrete activity areas, then each artifact class recovered there should have very similar members. If more than one structure is suggested for a given locus, then more than a single set should appear for each class. This hypothesis still would be applicable if the interval between successive habitations was very short or even by the same set of inhabitants returning to an old camp site the next year.

The book has very few typographical errors, but the layout does leave a lot of blank space among the plates and the index. Most of the artifact photographs were good, but the chipping detail was obscured in many instances. Just about the only way to get maximum clarity of each face is to photograph each specimen separately and arrange them on the page. But this creates a whole variety of new problems.

I found the book very stimulating and filled with new avenues of research linking Paleo-Indian sites specifically in New England, but also more generally throughout the Eastern United States. The lay archaeologist will be interested in the interpretations as presented, but should be aware of their biases and alternative possibilities. The Paleo-Indian specialist will start with the data given and see the future of the past more clearly.

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Barber, Russell J. (editor)
1981 Quartz Technology in Prehistoric New England. Institute for Conservation Archaeology, Peabody Museum, Harvard University, Cambridge.

As the title suggests, this monograph is a study of prehistoric quartz technology in New England. The volume consists of ten articles, most of which are papers presented at several regional conferences. The papers cover three main areas: experimental studies (Boudreau, Leveillee and Souza); case studies (Barber, Luedtke, Callanan); and regional studies (Gramly, Ritchie, Nicholas).

In the paper entitled, "Replicating Quartz Squibnocket Small-stemmed and Triangular Projectile Points," Boudreau describes the quartz production techniques for replicating Squibnocket triangular projectile points. In addition to a detailed description of the knapping principles and techniques used, Boudreau also analyzes the quartz debitage produced. This paper is of general interest to students of lithic replication procedures and methods, and also has some important implications for the interpretation of prehistoric lithic technology. It is interesting to compare Boudreau's results from replicating Squibnocket triangles with Barber's analysis of the Sassafras site, a prehistoric lithic workshop which produced Squibnocket triangular projectile points. Barber analyzes the quartz assemblage from the site, outlining the production sequence from quarry extraction to production of bifaces and Squibnocket triangle projectile points. This article provides important information on the nature of the "quarry workshops" that are so commonly cited in the literature.

Leveillee and Souza's paper, "Heat Treating Quartz: A Controlled Experiment," details experimental procedures for examining the effects of applied heat on the fracture properties of quartz. While methodologically sound, the study fails to demonstrate that this technique may have been used prehistorically.

Luedtke's paper, "Quartz Technology on Prudence and Patience Island, Rhode Island," is an innovative approach to the study of quartz assemblages. Her attribute analysis of quartz debitage from three sites in Narragansett Bay was intended to determine the temporal relationship between the sites with respect to lithic technology. Luedtke demonstrates that the properties of the quartz being used may have had an effect on the specific production techniques, a factor which should be taken into account when assessing the relative similarities of quartz lithic technologies.

Callanan's paper, "Quartz Technology within the Narragansett Basis Region: A Challenge in Lithic Analysis," illustrates the kinds of questions that can be asked on a regional level through the analysis of quartz assemblages. Callanan uses differences in lithic assemblages to discuss movement of lithic raw materials as well as lithic technology. By focusing on differential exploitation of lithic raw materials, as well as the composition of debitage through time, Callanan suggests that broader questions on lithic technology can be raised, to help solve problems on regional procurement strategies and settlement patterns. Unfortunately, Callanan determined site type on the basis of technological differences only, because he believes that quartz "does not lend itself well to functional or microwear studies." A regional analysis necessitates a determina-

tion of site function. It is a shame that the new interest in quartz technology does not extend to the functional interpretation of use-wear analysis of quartz artifacts.

Gramly's paper, "Flaked Quartz Industries: Problems of Recognition," is an excellent discussion of some of the false assumptions and biases many New England archaeologists have when analyzing quartz assemblages. Gramly points out that archaeologists should be aware of the effect different raw materials have on tool frequencies and artifact recognition. He also suggests ways in which recognition of technological differences between lithic assemblages can aid in recognizing similarities between cultural assemblages. Discrepancies that appear to exist between lithic assemblages may be the result of different technology and/or tool types due more to differential use of raw materials than to any major cultural differences.

In "Quartz Reduction Sequences from Small Point Contexts in the Taunton Basis, Southeastern Massachusetts," Duncan Ritchie examines Late Archaic regional variability with respect to lithic resource utilization and technology. Ritchie measures the technological variation within well-defined spatial and temporal limits in southeastern Massachusetts. His analysis suggests that observed differences may be due in part to differences related to the properties of the local raw materials used. This work has broad implications for regional analysis of lithic assemblages.

Nicholas, in "Crystal Quartz as a Northern New England Lithic Resource," discusses the use of quartz crystal in tool manufacture. His research suggests that the use of quartz crystal may be related to the manufacture of specific tool types (e.g., scrapers). Nicholas also suggests that the raw material preference of prehistoric populations may have been a factor contributing to the curation of artifacts, and that this should be taken into account when comparing different, though contemporaneous, lithic assemblages.

The articles indicate the increasing concern among New England archaeologists about the role of quartz in prehistoric technology. As a raw material, quartz is not only the most abundant lithic source found in southern New England, but found in varying quantities in sites from Paleo-Indian through Contact periods. The authors emphasize that quartz cannot be treated as merely a poor quality chert, but that it has its own attributes and qualities. Traditionally, the understanding of the role quartz played in prehistoric technologies has been limited to the identification of easily recognizable tool types. How many of us have simply compiled "chip counts" or "primary flake" percentages in a quartz assemblage on the assumption that nothing more could be done, or because the prospect of systematically analyzing thousands of quartz flakes and shatter was more than anyone could reasonably bear? The assumption that quartz is not amenable to most kinds of lithic studies due to its physical properties has been effectively dispelled in this monograph.

Barber introduces the collection of essays by stating that New England archaeologists have been under four major misconceptions about quartz technology: 1) quartz is difficult to work and difficult to control, 2) quartz is extremely common; easy to find and obtain, 3) quartz can be worked with the same techniques and methods as chert, 4) it is impossible to analyze wear patterns on

quartz tools. The papers presented in this monograph effectively dispel the first three myths about quartz. Unfortunately, the fourth misconception has not been laid to rest here and in fact is supported by some of the papers. Barber recognizes that a major shortcoming of the monograph is that it fails to address the problem of wear on quartz tools. In general, however, the volume makes a very important contribution to our general understanding of quartz technology and will be of use to New England archaeologists for some time to come.

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