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The museum has extensive exhibits of stone implements, obtained for the most
part from central Massachusetts areas. They have been arranged in the four culture
periods identified in the Northeast that extended over the past 10,000 years;
diagnostic artifacts are shown in the culture to which they belong.

Beside seven large dioramas depicting scenes of aboriginal activities, many large
wall-case displays have been added. These contain impressive ceremonial remains of
cremated burials that exhibit probable mortuary rites of Late Archaic peoples,
who lived 4,200 to 4,700 years ago on the shores of Assawompsett Lake. The
museum has been developed so as to aid archaeological research for those interested
in gaining comprehensive information about the cultural development that took
place in New England throughout its four culture periods; Paleo, Early Archaic,
Late Archaic, and Ceramic-Woodland.
IN MEMORIAM
RIPLEY P. BULLEN, 1902 — 1976

MUSEUM CURATOR EMERITUS
RIPLEY P. BULLEN DIES

Ripley P. Bullen, curator emeritus at the Florida State Museum and a leading authority on the archeology of Florida and the Caribbean, died in Gainesville, Florida on December 25, 1976. He was 74.

Dr. Bullen was chairman of the social sciences department at the Florida State Museum for 17 years before his retirement in 1973. An energetic scientist, writer and editor, he continued working in his field virtually fulltime and brought out his latest publication only last month.

At University of Florida commencement exercises in March at which he was awarded an honorary Doctor of Science degree, the museum's director, Dr. J.C. Dickinson Jr., described Dr. Bullen as "one of the truly great men of new world archeology" and "the dean of Florida archeology."

"Ripley is known to hundreds of Floridians as the individual who most helped them participate in the uncovering of Florida's past," Dr. Dickinson said.

Born in Winthrop, Mass., in 1902, Ripley Pierce Bullen was graduated from Cornell University and worked for 15 years in engineering and sales for the General Electric Co. In 1940, changing careers, he joined the Robert S. Peabody Foundation for Archaeology in Andover, Mass., and attended Harvard University Graduate School to study anthropology.

Dr. Bullen came to Gainesville in 1948 as assistant archaeologist of the Florida Board of Parks and Historic Memorials. In 1952 he joined the Florida State Museum as the first curator of social sciences. He surveyed and excavated many archaeological sites in Florida, making major contributions to the delineation of the state's pre-history.

Since 1961 Dr. Bullen did extensive work in the Caribbean. He reorganized the International Congresses for the Study of Pre-Columbian Cultures of the Lesser Antilles, edited the proceedings of the last five international congresses and was elected honorary chairman for life.

He helped organize the Massachusetts Archaeology Society, was a founder, editor and president of the Florida Anthropological Society, and was author of more than 200 books, monographs and articles. The formation of the Crystal River Historical Memorial and Museum was largely due to his efforts.

Dr. Bullen leaves his wife, Adelaide, a research associate at the Florida State Museum; two sons, Dana Ripley and Pierce Kendall, both of Washington, D.C., and four grandchildren.

Burial was in Washington, D.C.

Gainsville, Fla. Sun
Dec. 26, 1976
FROM THE EDITOR'S NOTEPAD

DENA F. DINCAUZE

The Bulletin is growing and changing. We have been gratified to receive manuscripts from authors who have appeared frequently in the journal, and from many others not heard from before. Readers have been in touch, informally, to let us know that they have noticed the changes and to comment on them, pro and con. The Editorial Board earnestly solicits comments raised in the Bulletin; we would like to reinstate a Letters feature for the discussion of matters of interest and concern.

In this issue, there are elements of both the familiar and the novel, which we hope you will find stimulating. For instance, some of our authors measure metrically, others in English units. Whenever we anticipated problems of translation, we have added equivalents in parentheses. Comparison of the two systems should help us all as the country makes the transition from our old, familiar, somewhat irrational system to the scientifically regular system which serves the rest of the world.

Similarly, some of the authors use the MAS artifact classification; others use the “anthropological” taxonomy, with its abundance of type names. The latter system is frequently identified by MAS members with Dr. William A. Ritchie of New York, but in fact it is a system of nomenclature and description of artifacts used widely in North America. Although both systems appear on these pages, there will be no “translating” from one system to the other. The two artifact taxonomies, in fact, do not measure exactly the same qualities and, therefore, are not equivalent in the sense that an English inch equals 2.54 centimeters. The MAS classification has grown over the years as a device to facilitate the arrangement, inventorying, and discussion of collections of specimens. It is based on readily perceived contrasts of geometric forms and their principal modifications (e.g. side-notching). The “anthropological” system of nomenclature (which has no formal title) is a far more elaborate means to describe and measure spatial and temporal differences among artifact populations. The method emphasizes those characteristics (“attributes”) of artifacts which are differentially distributed in time and space. Particular combinations of these attributes, which characterize different populations of artifacts, are assumed to have cultural relevance. The artifact “types” which are defined are based on detailed analyses of artifact attributes within assemblages derived, ideally, from closed excavational contexts. The type names usually refer to the site or component from which a particular attribute combination was first, or best, defined.

The two classification systems sometimes overlap, and rarely coincide, but they are not closely comparable in their structure or in their applications. They are neither equivalent nor congruent, and so cannot readily be compared. Of course, artifacts may be classified in either or both systems. During the present editorship, either system will be acceptable for publication, so long as it is used consistently within an article. MAS members who learn both “languages” will find a wider range of publications available to them, and will be able to move comfortably among journals from other states and on into professional journals and books. The new referencing format in the Bulletin is intended to facilitate readers’ access to this literature.

Amherst, Mass. February 1977

DISCOVERY OF A NEW MAJOR ABORIGINAL LITHIC SOURCE

WILLIAM F. BOWMAN and GERALD D. ZEOLI

The discovery of a major lithic workshop in the metropolitan Boston area seems as unlikely as finding an undisturbed multi-component site in the middle of Boston Common. This newly-discovered stone source is easily as impressive as that discovered on the western slopes of the Blue Hills (Dincauze 1974:39), and its materials are represented at many eastern Massachusetts sites. Because this stone is especially abundant at sites along the coast, the writers had once believed that the source was restricted to some tidal marsh or mud flat, and was only periodically accessible to the aboriginal quarriers. However, most of the authors’ experience with archaeological sites has been coastal, and therefore their unfamiliarity with inland excavations limited their conceptions of the range and abundance of the source material on inland sites.
A later section of this report will deal with the idea of aboriginal use of the quarry through time. It seems that native peoples of different time periods quarried the area for various materials. The particular material desired at any time was obviously dictated by the type of tool intended to be made. At any rate, one observation previously made by the authors, which seems still valid, was stated in the published version of the Tillite Bluff report (Bowman & Zeoli 1973:27). "It is believed that the sandy tan patinated basalt from which the Corner-Notched point from Feature #3 was made — source unknown — may have been a late discovery in this area, where it was used for some projectiles of the Ceramic-Woodland period."

During Ceramic Woodland times, the quarry was worked primarily for Braintree Hornfels, a very fine, flinty, metamorphosed siltstone, which seems to be somewhat diagnostic of Ceramic period projectile points. In a survey of local collections conducted by the authors, projectiles made of Braintree Hornfels were found to be almost exclusively representative of the Woodland period. Besides purely Woodland styles, one Watertown Notched point was found. These findings have been questioned by many people in the field. However, the discovery of this lithic source has further strengthened this position.

**DISCOVERY**

Artifacts of this hornfels material have been known to the authors for some six years and over this period they have been baffled as to its source.

Although the material was a slate, recrystallized to hornfels, it was baked so hard, metamorphosed and indurated, that it was interpreted as a very fine-grained volcanic rock known as basalt. The authors consulted a number of professional as well as amateur geologists. The opinions on the identification of this material varied widely from felsite, dioritic basalt, basalt, to siltstone. Others suggested that this extremely fine-grained felsitic "basalt" came from the Connecticut River outcroppings. This hypothesis was finally rejected as quarry blocks and cores were collected from various South Shore sites weighing up to five pounds. It seems improbable that people would carry the roughest blocks of this size all the way from the Connecticut River. One Ceramic site near Weymouth Fore River contained such an abundance of projectile points and other artifacts made from this sandy patinated "basalt", really Braintree Hornfels, that it was postulated then that its source could be no further away than the Blue Hills. The authors were right but were hunting for the wrong material. The literature and hills were searched for igneous volcanic materials, not for an extremely metamorphosed siltstone. All of the glassy to aphanitic igneous rocks such as the Mattapan Volcanics were checked but of course the results were negative.

On May 1, 1974 William J. Casciottolo and Bowman decided to investigate the area of the new Wollaston Golf Course in Milton. The object was to locate and record any aboriginal sites and to observe the Braintree Slates for any fossil remains. Glaciated pieces of Braintree Slate were quickly found in the stone walls. It was noted that some of the slates here were much darker and metamorphosed to a considerable hardness. The pecked poll end of an adz of the same material was found nearby. It was now evident that the "Basalt" was really a hornfelsed Braintree Slate and the quarry site was in the immediate vicinity. As a result of this insight the authors, along with William Casciottolo, located a series of quarries just east of the Golf Course. At least five different variations of the Braintree slates have been discovered. For simplicity only two of the most obvious and meaningful variations are being defined in this report. These will be referred to as the Braintree Slate and the Braintree Hornfels.

**THE SITE**

The major part of the quarry site is located in Milton on the hill east of Randolph Avenue (Site #M35-17). To date, this hill remains nameless. The authors offer the name Massachusett Hill, in honor of the historic Indian community native to the Blue Hills. According to Josiah Cotton's Vocabulary, Massachusetts is defined as "an hill in the form of an arrowhead" (Cotton 1830:235). This information, along with the fact that Roger Williams stated "I have learnt that Massachusetts was called so from the Blew Hills" (Williams 1856:26) seems to indicate a hill associated with arrowheads in the Blue Hills range. Very likely the Massachusetts Indians utilized the material from the hill for their projectile points. This may be one of several "Arrowhead Hills" among the Blue Hills. Following the suggestion of Stinson Lord, Dena F. Dincauze also has used the term "Arrowhead Hills" in reference to the Blue Hills (Dincauze 1974:56).

Although the site is actually spread out over a large area of still undetermined size, concentrations of flakes and cores are found with every individual outcrop. They seem to occur intermittently throughout the area. It is quite evident that a good percentage of the site is already covered over by fill from the steadily encroaching Milton and Quincy town dumps. These are a threat to the natural, as well as cultural, history of the area.

The topography is typical of any granite-based New England terrain. Scrub oak and bull briar, wooded swamps, granite outcrops and glacial erratics make up the landscape. The soil, also typical of this type of environment, is composed of a black rooty duff underlain by a thin layer of yellow acid subsoil. This, with associated Pleistocene glacial deposits beneath, lies as a thin veneer over the granite bedrock immediately below. The abundant swamps in the area suggest the presence...
of glacial lakes formed from the melting glacial waters. One such glacial lake, now grown up to a cedar swamp, harbors at least one small Archaic site, presently being investigated by the authors. More detailed information concerning this site follows in a later section of this paper.

Amazing as it seems, this immense site is relatively undisturbed except for the Quincy and Milton town dumps and a small natural gas plant, which is built on a mound of slate.

GEOLOGY

The area of study is made up principally of Quincy Granite with roof pendants or very large inclusions of Braintree Slate. The Braintree Slates of Middle Cambrian age, about 550 million years old, were surrounded and generally engulfed by the intruding Quincy Granite batholith of possibly Ordovician age (Chute 1969). The intrusion and contact of this once molten granite metamorphosed—baked and recrystallized—the Cambrian sedimentary deposits and super­saturated them with silica, producing a rather flinty hornfels.

Also of interest are several sills of diabase which cut the slate. This material was also quarried by the ancient peoples, mostly for the production of quarry tools.

The Braintree slates are already geologically famous in the area of Braintree, Quincy and Weymouth. Specifically, the Paradoxides beds at Haywards Quarry in East Braintree yield fossils of the giant trilobite Paradoxides harlani [Green] and its associated fauna. It is due to this famous index fossil, similar lithology and its occurrence as roof pendants in the Quincy Granite, that this material is generally called Braintree Slate and labeled as Middle Cambrian in age. However, since fossils are lacking here it must be realized that different Cambrian zones are probably present as well. Some of the lithology, in fact, appears more similar to the Weymouth Formation of Lower Cambrian age.

In general there are two grades of extremely indurated Braintree Slate here that need defining. The first is Braintree Hornfels—a very fine highly baked silicified siltstone. Its weathered surface reveals a sandy light tan to gray appearance. This is sometimes cut by fine black seams or sometimes black bands of stratification. On a fresh fracture it is very black, which is quite striking when compared to its light patinated surface. This material was utilized for chipped stone implements such as projectile points, etc. The second variety is Braintree Slate, which is also technically a hornfels. This seems to be a somewhat coarser, heavier and less brittle material than the Braintree Hornfels. It varies from a black to greenish-gray material. The most abundant and therefore most commonly used variety is dark gray to brownish in color. On a fresh fracture it is usually black. Axes, gouges and adzes are often made of this material, usually covered with white peck marks and the occasional iron oxide stains. This seems to be the one major material utilized for the production of large pecked and ground woodcutting implements in Eastern Massachusetts. Although the “Braintree Slate” is also indurated to a hornfels, it is called Braintree Slate to distinguish it from the hornfels utilized for projectile points.

FEATURES

Evidence of aboriginal quarrying can be seen at the site in the form of pits and trenches. These features are thought to be the results of the most recent excavations carried on by Ceramic Woodland peoples. The features are quite concentrated over a hillside of lithic debris. In the hornfels waste, blocks, cores, preforms and flakes have been found. These pits and trenches were formed when debris was cleared from the ledge in order to obtain fresh material. Some prehistoric people obviously desired the newly quarried material, for blocks of the stone sufficient in size and texture to fulfill any conceivable need could have been picked up anywhere on the hillside.

The circular pits vary in size with diameters averaging from 2 to 5 meters and an average of .5 to 1 meter. Diabase disks (diggers and hammers; Fig. 1) once used in the excavation of these pits were picked up immediately inside and around the features. Other artifacts associated with quarrying activities include quartzite hammerstones. They are often fractured and also can be found in the lithic talus. Judging from the size of each excavation, probably no more than one individual occupied the pit at any given time.

Trenches, the other form of excavation, are found along the sides of exposed outcrops. They are considerably larger than the pits and probably accommodated many individuals at a time. Like the pits, they were constructed inadvertently in an effort to clear the outcropping ledge. Some chipping took place around these features as evidenced by the number of fine flakes and occasional quarry blanks found in the litter. However, most of the chipping must have occurred away from the ledges. This would prevent the accumulation of undesirable waste, allow for a better working environment, and insure against the loss of finished items. All of these features have been undisturbed since prehistoric times. They add to the natural and historic value of the workshop.

HORNFELS QUARRY

ASSOCIATED QUARRY TOOLS

Diabase disks (Fig. 1) were quarried at the site from the heavy green to blackish diabase sills previously mentioned in the geology section. They are typically disk shaped, sometimes almost semi-lunar. The size of these tools varies. The smaller are approximately 10 cm in diameter with a thickness of about 2.5 cm. The larger specimens are about 30.5 cm in diameter with a thickness of 6 to 10 cm. These larger disks weigh up to
Fig. 1. GREEN DIABASE DISKS from the sandy patinated Braintree Hornfels quarry on Massachusetts Hill. Specimen at lower right weighs 22 pounds.
Preforms are infrequently recovered here. In our surface collection from the piles of lithic debitage only a small number of preforms were recovered. These are illustrated in Fig. 3 (#1,2,3,4). The items numbered 1-3 are quite typical—bifacially chipped, straight to rounded based preforms. Number 4, however, appears quite certainly to be a Fox Creek or Cony preform of the Middle Woodland period. From the rarity of preforms at the site, and the scatter of Braintree hornfels cores at habitation sites, it is evident that the quarriers in many cases were only manufacturing cores to transport to their living sites for later refinement.

**CULTURAL ASSOCIATIONS**

Probably one of the most important aspects of lithic study is the association of specific stone materials with certain cultures. Although most lithic sources are not culturally diagnostic, a few are. These can be of great value to the archaeologist trying to interpret finds.

At the Milton and Quincy hornfels quarries, none of the lithics present can be specified as being diagnostic of any one cultural phase. However, there are some meaningful lithic and cultural associations indicated.

The Braintree Hornfels seems to have been used extensively by the peoples of the Middle to Late Ceramic Woodland periods. Our review of the projectile points made from this material does seem to indicate a group of phases chronologically related. The evidence includes Middle Woodland Fox Creek or Cony, Jack’s Reef Corner Notched and Pentagonal projectile points along with the Middle to Late Woodland large triangular Levanna-like points (Ritchie 1971). Greene (leaf-shaped) projectile points are rarely made of the Braintree Hornfels, although they are often found associated with Fox Creek and other Middle Woodland points. This is hard to understand, and may be culturally significant.

The hornfels quarry site itself was unique in the area. This is the only quarry which was literally dotted with aboriginal pits and other quarry excavations. Other obvious differences included the presence of diabase disks, probably used for digging the pits, and many hammerstones, including coastal beach stones utilized as hammers.

Artifacts recovered there included numerous diabase disks, a large Cony stemmed preform, large triangular preforms and other U-shaped or rounded-base preforms.

**DISPERSAL OF BRAINTREE HORNFELS**

Cores, flakes and projectile points made of Braintree Hornfels are abundant on local sites. The authors are unaware of any major Woodland site in the area where the stone is not represented. So far as one can tell from a survey of local collections, and as might be expected, the material predominates at sites closest to the source. The farther one goes from the quarry the scarcer the rock becomes. This is less true of the other materials found at the workshop. Only a few specimens made of Braintree Hornfels were found in the Bronson Museum collections, which tend to be from the southeastern part.

**PRODUCTS**

**Biface Preforms** are infrequently recovered here. In our surface collection from the piles of lithic debitage only a small number of preforms were recovered. These are
Fig. 2. CRUDE ARTIFACTS OF GREEN DIABASE recovered beside aboriginal quarry pits on Massachusetts Hill. 1, chipped adze-like biface; 2, end pick.
Fig. 3. ARTIFACTS PICKED UP ON HORNFELS QUARRY SITE at Massachusetts Hill. All are of sandy patinated Braintree Hornfels unless otherwise stated. 1, 3, triangular preforms; 2, U-based preform; 4, Fox Creek/Cony preform; 5, quarry blank; 6, preform of Braintree Slate; 7, Neville point of felsite.
of the state. This leads the writers to conclude, maybe prematurely, that its distribution is fairly localized. Like the nearby Blue Hills felsite, its distribution is limited, although highly concentrated within the immediate area of the source.

A group of sites close to Weymouth Fore River have yielded a substantial quantity of the stone. Here, triangular and lanceolate preforms are found along with finished points diagnostic of several Middle and Late Woodland phases. From information gained at excavations in this area the authors have learned that native peoples relied heavily on Braintree Hornfels during Middle Woodland times. In Late Woodland times, the material was also used although at the same site, a shift in frequency to Blue Hills felsite occurred when large triangular shaped Levanna-like points became the established form. Projectile points made of Braintree Hornfels in the Weymouth Fore River area include Levanna, Fox Creek/Cony, one Greene and one untyped corner-notched, perhaps Jack's Reef (Fig. 4 #2), and the typical Jack's Reef Corner Notched and Pentagonal forms (Ritchie 1971). Braintree Hornfels was found at several locales along the coast and on the islands in Boston Harbor. Blanks and flakes are more common than associated Jack's Reef Corner Notched points.

No estimate can be made of the actual distance that this material was carried; it has been found at least as far as Kingston, Wrentham, Attleboro and into Rhode Island. More research needs to be done; one can only guess that its distribution is locally concentrated and distantly scattered.

**BRAINTREE SLATE QUARRY**

**QUARRY TOOLS AND PRODUCTS**

Quarry tools associated with the Braintree Slate were surprisingly rare. Two made of Braintree Slate consisted of one fist-sized chipped hammerstone and one large end pick, weighing about 10 pounds (4.54 kg). This tool also was chipped, bluntly pointed at one end while the other was pounded over. Two or three large glacial cobbles of quartzite were also found in a shattered condition. These must have averaged about 20 to 30 pounds.

The products recovered in a very crude, semi-finished state consisted of woodcutting implements such as adzes, gouges, and axes. These were chipped into shape with some minor pecking started.

Ulus of thinly bedded Braintree Slate were also found. All of the specimens of the bedded material were chipped into shape with some very minor pecking started in an attempt to reduce high spots. One specimen made of the dense, heavy slate was merely a flake of the right shape with limited chipping, slightly ground along the cutting edge. These ulus ranged in size from about 8 cm to 45 cm across.

**CULTURAL CORRELATIONS**

The Braintree Slate has a wider temporal distribution than the other stones and for this reason is not so culturally diagnostic. However, the writes have distinguished at least two grades of the slate which may indicate some age affiliation.

During Middle Archaic times a thinly bedded variety of the slate was used extensively for semi-lunar or ulu knives (Fig. 5). The ulu is usually regarded as an early tool and is often said to be associated with Stark and Neville points in this area, but might have persisted into later Archaic times, probably being a common trait in the Brewerton phase of the Laurentian Tradition. What is more important here is the association of a diagnostic artifact with a particular material at this quarry.

The other grade, a more massive unbedded variety was quarried simultaneously. Plain and channelled gouges (Fowler 1963:8,9), along with adze blades, were fabricated and used with semi-lunar knives. They appear in association at early sites such as Ponkapoag in Canton and along the Neponset River Valley. Although the use of the ulu material stopped when the knife became outdated, the other variety of stone continued to be quarried in the Middle to Late Archaics for plain gouges as well as for gouges of other types, and grooved axes. Its utilization for woodcutting implements extended through Ceramic Woodland and on to Contact times.

From the early Middle Archaic through the Ceramic periods this material was highly sought; it was admirably suited for the making of ax blades. It could be chipped and pecked into shape readily and with its high silica content would keep a fine edge (Fig. 6).

There is one other variety of Braintree Slate—hornfels—which deserves a brief mention in this preliminary study. It could be described as a basanite or lydian stone. It is very fine grained, pure black and weathers to a whitish gray chalky color. This material was used for large projectile points, knife blades, etc., and has appeared in a number of Archaic burials.

**DISPERSAL OF BRAINTREE SLATE**

Braintree Slate, sought by the native peoples for its fine quality and hardness, was used for the fabrication of heavy tools and ulus. Its distribution may be wider than that of the Braintree Hornfels. In fact, the authors believe it is the primary source of woodcutting tools in eastern Massachusetts.

Numerous examples of Braintree Slate tools have been found on sites from each of the major South Shore drainage systems. The material is especially abundant in the Neponset and Charles River Valleys. Semi-lunar knives constructed from the thinly bedded variety of the Braintree Slate at the quarry site are among the most common artifacts found at the nearby Ponkapoag site.
Fig. 4. ARTIFACTS OF BRAINTREE HORNFELS, from eastern Massachusetts sites. 1, Jack's Reef Corner-Notched, Hull; 2, untyped Corner Notched point, Braintree; 3, Jack's Reef Corner Notched, Weymouth; 4, Fox Creek/Cony lanceolate, Weymouth; 5, Levanna-like point showing black bands of stratification; 6, Levanna preform; 7, crescent drill; 8, 9, Levanna points; 10, Fox Creek Stemmed or Cony point; 11-13, Fox Creek/Cony preforms; 14, Greene point. Nos. 5-14 are from Braintree.
ABORIGINAL LITHIC SOURCE

More finished ulus and preforms have been found there than at any other site in eastern Massachusetts that the writers are aware of. Braintree Slate gouges are also plentiful at Ponkapoag and along the Neponset and Charles Rivers.

On display at the Bronson Museum in Attleboro are a number of Braintree Slate gouges and other tools. Many of these are said to be from C.C. Ferguson’s collection from the Heard Pond site in Wayland. Two of these have been illustrated in this journal (Fowler 1969:32; the gouge and ulu are of Braintree Slate).

ROCKSHELTERS AND OPEN AIR SITES

A number of giant glaciated boulders in the area have created several rockshelters. Each of these shelters has been investigated and tested. The test pits showed that all had been inhabited at one time or another.

Stony Brook Rockshelter, one of the more promising, seems to have been the most occupied and therefore a controlled excavation was conducted there. The results were rewarding. Much of what was learned has been incorporated into the general ideas of this paper. However, because of the large diversity of the material recovered at this shelter the authors feel that Stony Brook site warrants its own report and therefore have decided to publish those findings at a later date.

A few general statements can be made concerning these preliminary investigations. The writers feel that the shelters served as temporary living quarters for commuting quarriers. A variety of projectile point styles scattered among numerous Braintree slate and hornfels flakes shows that they were utilized mainly as chipping stations from the earliest of times periodically until the quarry was abandoned. The presence of Soft Shell clam refuse at Stony Brook also indicates planned trips from the nearby Atlantic Coast.

A small number of occupied areas referred to here as “open air sites” were located. They are situated away from the debris laden quarries. They did not afford the same protection as the rockshelters but like the shelters, the open air sites provided a living area where tool manufacture could be carried on. Although the authors discovered sites of both Woodland and Archaic horizons they chose to investigate only one site of the latter age. It was of interest to us to learn exactly how far the Archaic people were going towards the completion of their heavy tools (Woodcutting implements and ulus).

CEDAR SWAMP SITE

The site chosen was located on a small flat jetty of land which protrudes slightly into a wooded swamp. The swamp itself is probably the remnant of a glacial lake which even at this altitude must have covered a good percentage of the area. The site has an elevation of 15-20 feet above the water level and is well drained. Signs of occupation exist here in the form of flakes soil discoloration and charcoal flecks.

It is interesting to note that the site produced only a small variety of artifacts. In fact, besides quarry blanks, felsite cache blades and semi-finished ulu make up the assemblage.

One small Braintree Slate quarry blank (Fig. 7 #6) was recovered. The piece is characteristic of other blanks found about the quarry. It has been bifacially chipped into shape but no further methods were employed towards the formation of a cutting edge. The blank was intentionally unfinished and would then have been carried back to a more permanent residence for completion. Also of the same material was a small section of a wood-cutting tool (Fig. 7 #4). It has been chipped and pecked into a cylindrical shape.

Several ulu fragments along with one nearly complete specimen (Fig. 7 #5) were found. The smaller sections of the illustrated specimen have been flaked while the opposite shows signs of pecking of the higher edges. No ground ulu were recovered here.

The only other artifacts discovered at this site are white felsite cache blades. It is believed that the source of this material lies somewhere within the Neponset system, for it is plentiful on Middle Archaic sites there. Three examples were found (Fig. 7 #1-3). They are tear-drop in shape and resemble the Weir River Blades always found in association with Stark and Neville points and may sometimes be the preforms of those types (unpublished Sandy Court site, Eastern Massachusetts Archaeological and Geological Research Group).

This site further supports the idea that little finished work was conducted about the Braintree Slate quarries. Heavy tools were merely roughed out and transported back to larger base camps for completion. The pecked fragment illustrated in Fig. 7 #4, although incomplete, shows that nearly completed items do occur on the site and it is logical to assume that over the years some products were completed there. One can’t help but wonder if the ulu weren’t completed even in this rough chipped stage, when so many similar examples are found at the Ponkapoag site.

CONCLUSION

After our review of the evidence it is now very clear that the Blue Hills constituted a major lithic resource and were quarried extensively by the native inhabitants. These hills were probably considered sacred by the Indians, as they supplied material for all their essential stone tools, on which their very survival depended. From the earliest times, fluted, bifurcated and Neville points were chipped out of the Blue Hills felsite (apophyolite) which outcrops on Wampatuck Hill and vicinity, less than a mile from the Braintree Hornfels quarries. Early populations such as those of the Neville and Stark phases (Dincauze 1976) were working the Braintree Slate quarries for the production of ulu and heavy woodcutting implements. In fact, from the
Fig. 5. ULUS OF THINLY BEDDED BRAINTREE SLATE, from the Stony Brook rockshelter.
discovery of Blue Hills felsite quarry blades or preforms at the Braintree Slate quarries, and Braintree Slate blanks at the Blue Hills felsite quarries, it seems likely that the quarriers were making planned trips, visiting both quarries in one trip to replenish their needs. It makes one wonder if some of the early roads in this area of the Blue Hills were not in reality early “Quarry Trails.” The authors’ discovery of a small Paleo-Indian component just west of the quarry area seems to indicate an overnight stop, where some early hunters and quarriers of the Blue Hills felsite stopped for a night’s rest, and made a few fluted preforms before they left.

From the lack of finished products at the quarry it is obvious that the workers were not living there; at most, they had set up extremely temporary camps. It seems they were hurried and only spent as much time as it would take to quarry the necessary amount of stone, work it into transportable preforms or preform cores and be on their way. Perhaps they were afraid of hostile groups coming to the quarries? Much of the “quarrying” in the Middle Archaic period seems to have only involved smashing one boulder against another or a ledge. There is some evidence of aboriginal excavations but they are limited. With boulder smashing, large flakes could be detached in suitable shapes and sizes to be worked with the small hammerstones. This is the only conceivable way it could be accomplished as huge flakes and blocks are scattered everywhere, but there is no surface evidence of fire or fracturing by means of fire. Large, heavy hammerstones are quite rare and were perhaps not even practical for use on this dense, tough material. Little seems to have changed with the following Late Archaic phases.

With the coming of the Ceramic Period, a number of changes occur. For the first time the Braintree Hornfels is extensively quarried for the production of projectile points. People of the Fox Creek or Cony phase, Jack’s Reef Corner-Notched and the Levanna point makers seem to be the major quarriers. These people excavated the pits and trenches to obtain the desired material. Diabase disks seem to have been utilized as hoes or diggers. Planned trips to the quarry are indicated by the recovery of numerous coastal beach stones brought to the quarry to be used for hammerstones. A small amount of marine shell refuse located at the Stony Brook Rockshelter also indicated planned trips.

**RECOMMENDATIONS**

These aboriginal quarry sites situated in the Blue Hills must be preserved. They are a great archaeological, historical and educational resource for the state.

Areas such as the hornfels quarry with the numerous aboriginal pits and large diabase disks, that are visually instructive, should be fenced off to keep out vandals and be utilized for educational purposes. At this time these pits are literally just the way the quarriers left them, and we hope they will be preserved this way for future generations to enjoy. Archaeological excavation should be conducted nearby to learn more about aboriginal quarrying methods, cultures involved and other data. Aerial infrared photos of the area would be beneficial in showing the pits and other aboriginal diggings which otherwise may go unrecognized. Perhaps in the future the state will see fit to construct a museum similar to that at Flint Ridge in Ohio to display the many archaeological finds from the quarry area and related sites such as Ponkapoag and others. The quarry sites border the Blue Hills Reservation and could possibly be incorporated into it more fully or be preserved as an important part of our heritage under the auspices of the Massachusetts Historical Commission.

Much work needs to be done to obtain as much information as possible from this and other lithic sources. Lithic and cultural distributional maps could
Fig. 7. MIDDLE ARCHAIC ARTIFACTS FROM CEDAR SWAMP SITE. 1-3, cached blades of white felsite; 4, section of woodcutting tool, pecked; 5, ulu preform; 6, Braintree Slate preform.
be made to indicate direction of dispersal of particular lithics by peoples of several cultural complexes. In this way cultural areas, and migration routes of certain cultures, may become evident.

The Milton and Quincy town dumps should be stopped from encroaching any further into the quarry. Large areas of the quarry are already destroyed by the dump and some rockshelters are in immediate danger of being buried or bulldozed away.

The writers feel this quarry complex is as important as the famous Coxsackie Flint Mine Hill Quarry in New York State, which was purchased by the New York State Archaeological Association. However, the Coxsackie Flint Mine obviously was utilized as a factory only for the production of chipped stone tools such as projectile points, knives, scrapers, etc. whereas the Milton and Quincy quarries supplied material for a much wider range of stone implements, from "arrowhead factory to axe factory."

Eastern Massachusetts Archaeological and Geological Research Group, Inc.
Weymouth, Mass. 1975

The writers would like to thank their good friends and members of the group William J. Casciottolo, John Cotta and Paul Chebator—all members of M.A.S.—for their exploration and research, inexhaustible enthusiasm and encouragement in the writing of this paper.

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THE MT. JASPER LITHIC SOURCE AREA
RICHARD MICHAEL GRAMLY

In the Spring 1975 the writer in the company of S.L. Cox, then a graduate student at Harvard University, visited Berlin, New Hampshire, a small mill town with a large French-speaking population lying 15 miles north of Mt. Washington and the White Mountains, in search of a reputed “Indian Cave” located at the crest of a bold hill, locally known as Mt. Jasper. The existence of the “cave” had been brought to our attention by Professor M. Billings (Department of Geology, Harvard University) who had worked many years on geological problems in the district and who had visited the spot in the course of mapping rock units. Professor Billings was convinced that the “cave” was not a natural formation but, in fact, a mine (adit) excavated into a rhyolite dike. Berlin residents whom we questioned echoed Professor Billings opinion, and they asserted that the “cave” had been the haunt of Indians at some unknown date. Residents maintained, and upon examining the workings we wholeheartedly agreed, that the mine had no connection with early white prospectors or townsfolk.

We subsequently learned that Mt. Jasper and its mine had been reported by Henry Haynes in 1888, who noted that it was discovered as early as 1861. The brevity of Haynes’ account, which attempted nothing in the way of analysis, and the relative remoteness of Mt. Jasper from population centers served to constrain interest in the site by prehistorians, and the locality received no further professional study until our visit. Mt. Jasper continues to be explored by generations of school children who are aware of its secrets, and an amateur excavator is reputed to have dug extensively through deposits in the main workings prior to the Second World War.

The configuration of the mine and a description of the glassy, flow-banded rhyolite which was sought there historically, has appeared elsewhere (Gramly and Cox 1976), and the intent here is to set forth fresh data about this lithic source area accumulated during three brief subsequent visits. On these occasions a large workshop for the manufacture of core-bifaces and other implements was sampled at the foot of Mt. Jasper along the Dead River (Fig. 8), and a sonda ge was made at the mouth of the prehistoric adit. Our excavations at the workshop recovered a small assemblage of completed tools, bifaces (biface-cores), and disc-shaped cores (Fig. 9); work in the mine yielded many large hammerstones (Fig. 10) and a quantity of debitage. In addition, the sondage enabled us to make revisions in our earlier estimate of the volume of quarried rhyolite.

Work at the Mt. Jasper lithic source area is continuing, and the search for culturally diagnostic artifacts among the workshop debris along the Dead River is the primary consideration.

Excavation at the Workshop Along the Dead River.

Two test-pits were excavated by students from SUNY Stony Brook in the debitage of the workshop at the base of Mt. Jasper. Both pits were sited along the northern edge of a small trackway that skirts the Dead River approximately 10m from it and 2m above present water level. Test-pit 1 (4m x 1 1/2 m) yielded 3233 objects of flaked stone weighing roughly 27 kg (59.54 lbs); while Test-pit 2 (2m x 1/2m) contained 1489 items weighing 7.6 kg (16.76 lbs). The soil of both pits was passed through a 5 mm mesh sieve, and all flakes were retained. The profile of a typical section of test-pit wall is shown in Figure 11.

The bulk of all artifacts was obtained from the base of the humus and throughout the reddish sand. Only small numbers were encountered in the underlying yellowish sand, and their positions can be best explained as the fill of root hollows. Neither flakes nor implements were noted in the pebble-rich, greyish-yellow sand, which is a water-laid deposit. Materials from each test-pit were initially saved by natural soil zones or stratigraphic unit; subsequently, however, units in each test-pit were lumped into a single assemblage for analysis as a result of the low yield from excavation units other than the reddish sand (the B zone of the podzol).

The assemblage of implements from Test-pit 1 consists of 27 bifaces or biface-cores, 2 scrapers, 1 perforator, 2 cores, and numerous biface thinning flakes (Fig. 9k is a typical example). All bifaces, except Fig. 9e which is made of a metasediment of undetermined type, are fashioned of Mt. Jasper rhyolite. The disc-shaped cores (1 and m) and scrapers (a and b) are the local rhyolite, but the perforator (c) appears to be black chert, similar in appearance to hand-specimens from the Mt. Independence, Vermont, lithic source area, shown to the writer by Stephen Loring of the Smithsonian Institution. This perforator was the sole tool excavated from the yellowish sand.

From Test-pit 2 came 2 biface fragments of Mt. Jasper rhyolite and a disc-core (not illustrated) also of this raw material. Neither test-pit produced recognizable hammerstones, but many were noted in exposed sections along the nearby trackway. Implements and waste flakes from both excavations exhibit various stages of weathering, and it is apparent that lightly weathered pieces are superior grade rhyolite, free of mixing with the country rock into which the rhyolite dike intruded.

The assemblage of implements from the test-pits is too small and too generalized to allow cultural attribution. It is to be noted, however, that two biface...
varieties, "straight-based" (Fig. 9 d-g) and "round-ended" (h and i-j?), were desired end-products of workshop activity. There are no examples of either type exhibiting convincing traces of edge-wear or damage as a result of use on-the-spot.

Presumably flakes struck from disc-cores (l and m) were suited for the production of scrapers with a broad working edge at one end (a and b), which may have been used by the ancient miners in preparing wooden, antler, or bone quarrying tools. Rough serviceable scrapers of this sort are known from other quarryworkshop sites (e.g. Holmes 1919:224; Gramly n.d.), and they, along with picks and cobble hammerstones, presumably were the nonperishable components of an industrial assemblage applied to mining and the reduction of raw material to transportable forms. To what use the perforator was put is difficult to guess, but extensive tip-wear reveals that it was discarded after long service.

![Contour Map of the Berlin, New Hampshire, Region](image_url)

Fig. 8. CONTOUR MAP OF THE BERLIN, NEW HAMPSHIRE, REGION. The position of the ancient workings on Mt. Jasper are shown circled, and the extent of the lithic workshop along the Dead River is blackened. Drawn after USGS Series V612, 7.5 minute quadrangle (1970).
Fig. 9. FLAKED STONE ARTIFACTS from the workshop along the Dead River, Mt. Jasper, Berlin, New Hampshire.
The density of debitage at the workshop along the Dead River as revealed in our test-pits is roughly 1000 items per square meter having a weight of approximately 6 kg (13.23 lbs). The size of the workshop can be estimated at 500 meters in length (along the Dead River) and 100 meters in width (from the edge of the Dead River). The entire workshop may contain the staggering total of 50 million ($5 \times 10^7$) items of flaked stone with a total weight of 300,000 kg (330.8 tons)! Calculations of the weight and volume of rhyolite extracted from the ancient workings (below) indicate that these estimates are reasonable.

**SONDAGE IN THE MT. JASPER ADIT**

Thirty meters below the crest of Mt. Jasper and 150 meters above the Dead River workshop are the main prehistoric workings consisting of an adit punched 9 meters deep into living rock and numerous open excavations leading off the adit. In the course of our tracing the rhyolite dike down the face of the hill we observed an ancient trench in the dike at the verge of a sheer cliff. Its dimensions are 1.2 m by 4.6 m with a depth of .5 m. The distance separating this newly discovered working and the adit is 44m, and there is a great likelihood that between the two points, buried under tons of scree, are additional workings. Major excavation would be necessary to establish this point.

In order to estimate the amount of fill in the adit and to recover iron-clad proof of the antiquity of the workings, a sondage with dimensions of 1.3 m by 1.25 m was sunk at the mouth of the mine. Within the adit itself the depth of fill was observed to be 50 cm, and the deposits were principally 20th century refuse, campfire remains, and charcoal-encrusted rock. No aboriginal artifacts were encountered. Outside the actual adit the depth to the rhyolite seam was found to be 1.7 m. The lower half-meter of fill contained numerous cobble hammerstones and a great amount of rhyolite debitage, through which we searched diligently for tools. Our efforts were but poorly rewarded with a single biface fragment. A sample of debitage (25% by volume) was saved totaling 321 items weighing 4.9 kilograms. Mottled soil in the sondage walls clearly indicated that some time in the past collectors (?) had dug through the uppermost meter of fill.
In our small sondage there were no traces of ancient firesetting to facilitate mining nor were there any indications on the faces of the rhyolite dike as to how quarrying had proceeded.

If one adds the total volume of fill in the adit as revealed by the sondage to the earlier estimate of rhyolite won from the mine (Gramly and Cox 1976), which was given as 110 cubic meters, the result is 123 cubic meters. The quantity removed from the stringers connected to the main dike is an additional 36 cubic meters, which together with small volume from the newly-discovered trench downslope (3 cu.m), gives a grand total of 162 cubic meters. This figure must be regarded as a minimum estimate of the amount of rhyolite extracted from Mt. Jasper in antiquity.

**SOME SPECULATIONS**

Assuming a specific gravity of 2.8 grams/cc for rhyolite, it can be shown that 162 cubic meters of rock weigh approximately 450,000 (4.5 x 10^5 kg: 496.1 tons). The projected figure for the weight of debitage at the workshop along the Dead River is 300,000 (3 x 10^5 kg: 330.8 tons), which leaves a deficit of 150,000 kg (165.3 tons). This is the amount of rhyolite that was removed from the Mt. Jasper lithic source area to workshops and occupation sites elsewhere for the production of tools. Still, as a starting point for future discussions, it is helpful to advance some speculations.

The average weight of rejected biface-cores from the workshop along the Dead River is 60-65 grams. The average weight of a projectile point in a series of projectile points of various ages made of diverse raw materials in the possession of the author was found to be 10-15 grams. Therefore, for the sake of argument let it be assumed that the weight loss in the course of converting biface-cores to projectile points was 80%. A proportion of the biface-cores, it can be expected, were converted not to projectile points but to knives, and the weight loss was considerably less, perhaps 40%. Biface thinning flakes and broken bifaces might also be employed as tools; therefore, the actual “efficiency” of flaked stone tool production probably lies within the range of 20-60%—let us assume 30%. At this rate, 150,000 kilograms of rhyolite, then, might yield 45,000 kg (49.6 tons) of tools, which is the quantity of Mt. Jasper rhyolite that can be expected in archaeological contexts everywhere the users of this raw material resided. Exchange networks may have had a role to play in the ultimate dispersion of Mt. Jasper rhyolite, but such considerations do not affect our estimate of total tool weight.

It is difficult to know if 45,000 kilograms of tools is a large or small quantity in the greater context of flaked stone tool production in the whole of New England and southern Quebec. Herein is a problem for archaeological research that entails distributional studies of better known lithic varieties and estimates of volumes of raw material won from previously reported source areas (e.g. Flint Ridge, Ohio, in the Mid-West). If it is a small quantity, then the rarity of Mt. Jasper rhyolite artifacts on archaeological sites along the middle and lower reaches of rivers draining the White Mountains is no mystery. On the other hand, if it is a large quantity, then scarcity of Mt. Jasper rhyolite in certain districts would force us to postulate ancient territorial or cultural boundaries. One is intrigued to know if the White Mountains in the past served to demarcate culture areas as this lofty, oftentimes frigid, region does to a slight degree in the modern era. Certainly, it would be a wonder if aboriginal groups living for part of the year along the Connecticut, Androscoggin, and tributaries of the St. Lawrence did not recognize the distinct character of the White Mountains in terms of biota and natural resources.

One can hardly presume to resolve such major questions on the basis of limited archaeological investigations of a single lithic source area. It should be apparent, however, that detailed studies of raw materials source areas including estimates of the type we have put forth for the ancient workings at Mt. Jasper, have a basic role to play in North American culture history. Although Mt. Jasper has been known for more than a century, work at this locality has only begun. Fuller documentation of all lithic source areas is
wanted, and the gathering of basic statistics is a realizable goal and a challenge to us all.

SUNY, Stony Brook
December, 1976

The writer thanks Professor Dena F. Dineauze, University of Massachusetts, Amherst, for pointing out the Haynes reference.

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THE PONKAPOAG SITE: M-35-7

ROBERT A. MARTIN

It was on a dismal, rainy day in late October of 1962 that several members of the South Shore Chapter of the M.A.S. began an intensive surface reconnaissance at the northern edge of Ponkapoag Pond. Attention centered on an area from which occasional surface recoveries had been made. Careful scraping below the dense blanket of pine needles, and along a recently improved trail, yielded a significant amount of flaking debris. Within a short time, permission to excavate was obtained from the Metropolitan District Commission, and test squares were laid out. The excavated contents of these squares proved so prolific that a grid was laid out.

From 1962 until 1966, when the Green Hill site was discovered, a small group of South Shore Chapter members excavated at Ponkapoag throughout the year, in even the deepest winter snow. From 1966 until about 1972, chapter members usually excavated at Green Hill during the spring, summer and early fall, moving to Ponkapoag about mid-autumn, where excavation continued during the winter months. In 1973 a small class from Boston College, under the direction of Professor John Rosser, excavated at Ponkapoag. From 1973 to 1975, classes from the Cambridge Center for Adult Education excavated at Ponkapoag under the direction of Doctor Curtis Hoffman. Since 1975, when the South Shore Chapter decided to concentrate its efforts on the Green Hill site, excavation at Ponkapoag has virtually ceased.

INTRODUCTION

THE LOCATION OF THE SITE

M-35-7 is the designation for the Ponkapoag site on the M.A.S. survey maps. The site is located at the northwestern edge of Ponkapoag Pond between the Y.M.C.A. Camp Dorchester and the M.D.C. Ponkapoag golf course. The site is accessible from Route 128 by means of a dirt road called the Redman Farm path. The road runs along the northwestern edge of the pond to a flat area just above the edge of the Ponkapoag bog, where the site is situated. The site itself, located in Canton, just southwest of Great Blue Hill, had tremendous archaeological potential until about 1938 when serious inroads were made by the M.D.C. Ponkapoag golf course. What is now termed the Ponkapoag site includes only about four acres, some of the only undeveloped land around a pond which may have been extensively inhabited in prehistoric times.

The site is located on a glacial outwash plain some twelve feet above the present surface of the bog. The pond itself was created by glacial activity, reminders of
which lie in the many glacial erratics strewn around the pond, some of them quite large. At present, the bog has encroached upon about two-thirds of the original pond area, which had more open water in the past. In the few years since excavations began at Ponkapoag, open water channels through the bog have slowly been choked by swamp flora, perhaps as a result of nearby road construction and the efforts of M.D.C. engineers to control water drainage to and from the pond.

The bog extends about 2100 feet out into the pond, whose water surface is at 151 feet above sea level. About a decade ago, Alexandra S. Bartlett conducted several test corings of this bog for the Blue Hills Trailside Museum, and produced a pollen diagram. The Ponkapoag palynological analysis confirms the expected, namely that during most of the postglacial period from 9000 years ago to colonial times, forest has dominated over nonforest vegetation. The Middle Archaic period in southeastern Massachusetts (ca. 8000-6000 years ago) was a time of mixed pine-deciduous forest, the Late Archaic a period of oak-hickory forest. The hickory reached a peak around 5000-5500 years before present (Bartlett n.d.; Dincauze 1974:45-47).

Today white and red pine predominate at the site, interspersed with oak, maple and birch. This woods seasonally deposits a heavy leaf cover over the terrain, providing from four to six inches of excellent insulation above the loam. It is the availability of this ground insulation, as well as the insulation provided by winter clothing, tarps and campfires which enabled excavation at Ponkapoag to proceed throughout the winter months.

HISTORY OF THE SITE
The written history of the Ponkapoag area, even the spelling of the name Ponkapoag, is extremely unreliable. The spelling of Ponkapoag fluctuated until 1965, when the present usage became more widespread. A reliable body of data about the site has been gleaned by cross-checking available town records, written reports and maps. Those records begin in 1657 when the Rev. John Elliott gathered many of the local Indians together to form bands of "Praying Indians," which Rev. Elliott hoped to Christianize. With Elliot's guidance, a portion of the Neponsett Community was settled on 6000 acres of land called Ponkapoag Plantation for the purpose of learning the ways of God. Thereafter these Indians were known as the Ponkapoag Indians. The term Ponkapoag means "sweet water," or "a spring that riseth out of the red earth" (Gookin 1970:71).

The Ponkapoags supported themselves by farming and by making cedar shingles and clapboards.
Relations with neighboring white settlers were friendly except during King Philip’s War, when the Ponkapoag group was interned on islands in Boston Harbor. During the war, some Ponkapoags even enlisted as spies and soldiers against King Philip. Nevertheless, the numbers of Ponkapoags steadily declined. By the early 19th century the number of Ponkapoags was less than a hundred. The last of the Ponkapoags’ land passed into the hands of the white man in 1827, through the shrewd bargaining and manipulation of the latter.

SOIL STRATIGRAPHY

Some disturbances were noted in the soil, caused by root growth, modern day campers, rodents and hurricanes. Of particular interest were some large deposits of yellow gravel which were nearer the surface than usually found. Upon consulting the master grid plan and data cards, we noticed a possible explanation. Extending in a north to south direction, toward the bog, were several ancient stream beds, varying in width from 3 to 9 feet. Further investigation of these postulated stream beds disclosed that the pebble concentrations had a hardened clay-like deposit adhering to the underside of each pebble. This condition can be observed in many present day rivers and streams.

Basically the soil stratigraphy at Ponkapoag can be divided into four zones. The labels given to these zones are those normally used by M.A.S. members. The depth of these zones varies throughout the site. The uppermost zone is humus, a dense black to dark brown loam interlaced with roots. It varies in depth from 7 to 10 inches, and often contains colonial artifacts in its upper part and Woodland artifacts further down toward the junction. The junction is the interface between humus and yellow sand. It is usually about 2 to 3 inches thick and results from a gradual leaching out of soil from the humus layer above. Below the junction is yellow sand, which fluctuates in color from light yellow to dark orange. The depth of this zone varies more than those preceding, namely anywhere from 13”-20,” more rarely as deep as 31.” Within this zone are the root systems of older trees, which makes excavation both tedious and difficult. Below the upper zones is

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Fig. 13. ENLARGEMENT OF AREA A On Figure 12.
unmodified white sand, a natural deposit for this part of the Blue Hills. It varies in texture from fine to coarse, occasionally even having a packed consistency. The color ranges from white to gray-black, even speckled.

**EXCAVATION PROCEDURES**
The grid system used at Ponkapoag was a quadrant type, the basic unit being a five foot square. Squares were staked out along an east-west base line (Fig. 1). Each square received both a numerical and compass designation.

Excavation proceeded in the following manner. First the duff, usually 3"-5" thick and lightly compacted, was rolled up and placed aside. Once excavation had begun, all artifacts were recorded horizontally by triangulation from any two pegs in the square, and vertically by measurements taken from the ground surface, and from the junction. This information, along with other pertinent information (type of material, type of soil, a tracing of the artifact, etc.) was recorded on data cards provided for this purpose. After the artifact was cleaned, and labeled according to square number, the previously recorded information was rechecked for accuracy. This information was then plotted by the site director on data sheets, and finally on a master grid chart.

Over 400 slides of artifacts and features from Ponkapoag were taken.

**FEATURES**
1203 five foot squares have been excavated at Ponkapoag as of this writing. From these squares 156 features were recovered. The features can be divided into the following categories: scattered charcoal, charcoal pits, hearths, and postmolds.

Charcoal was found throughout the excavated area at all levels, usually in copious quantities. The size of individual pieces ranged from about 1/4" to 1," the smaller diameters usually appearing last, in the lower levels. It was not uncommon for streaky, sometimes ill-defined charcoal to appear on an excavator's shelf just prior to the appearance of a pit or hearth. Such streaking may have been caused in prehistoric times by the wind scattering the charcoal about.
To date 84 charcoal pits have been recovered at Ponkapoag. All charcoal pits contained moderate to heavy concentrations of charcoal and varied in size from 9"-27" in diameter, being generally round or oval in shape. Depths ranged from 3"-7." A few charcoal pits extended to greater depths, to a maximum of 19." If a feature began as an ill-defined disturbance, then the depth of the feature was recorded from the point where the disturbance was first noticed. Sometimes, however, features were so disturbed as to make correct depth measurements difficult. In most features, calcined bone was found in varying quantities, but individual pieces were so small as to be unidentifiable. One exception was in a pit which contained part of a human mastoid.

Of the 11 hearths recovered at Ponkapoag, 4 showed considerable disturbance due to their location near junction. Of these hearths found at junction, all had bottoms lined with stone, as well as burnt and cracked stones loosely scattered at the top. A fifth feature was most interesting, although the chapter was reluctant to call it a hearth because of its size and manner of construction (Fig. 14). It was located at junction, and consisted of a rectangle 49" wide by 108" long, and 9" deep. Excavation was interrupted by the presence of a large tree, but the following observations were made.

The pit was paved with roughly shaped, flat pieces of red sandstone and slate, and contained a large amount of charcoal in small pieces up to about 1" in diameter. No bone was found in this pit, but in its center was recovered, standing upright, a well made argillite pestle about 11" long.

Five other hearths were found at varying depths from 11"-13" below junction in yellow sand. They were oval in shape and ranged in width from 18"-31." Their depths varied from 3"-8." All five hearths were paved with burnt red sandstone and had a windbreak or wall of stone constructed in the back, oriented toward the northwest. In each of these hearths there was a heavy concentration of charcoal, indicating in each a prolonged use.

During the excavation of each of these hearths, white streaking appeared where the hoe scraped during excavation. This streaking may have been the remnants of calcined bone, but no recognizable pieces of the latter appeared to confirm this hypothesis. Artifacts recovered in close association with these hearths included a Corner-Removed #8 projectile point, two large fragments of pecked/chipped ulus and one felsite stem scraper. This horizon may be attributed to the Early Archaic of Fowler.

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**Fig. 15. FREQUENCIES OF ARTIFACTS by depth at the Ponkapoag Site.**
The last hearth proved somewhat different in construction. Instead of the more typical red sandstone, thirteen large granitic cobbles were used for the hearth’s base, which also served as a wind-break. This feature was excuted 5" below the junction in yellow sand. It was 22” x 27” wide, and extended to a depth of 19.”)

Just outside the hearth opening was found a heavy concentration of charcoal, while in the floor of the hearth were scattered pieces of charcoal. Perhaps the inhabitants cleaned out this abundant accumulation inside the hearth to make room for subsequent fires. Great quantities of felsite and quartz flaking were found throughout the hearth. A broken felsite drill tip was found amid charcoal outside the hearth, as well as a large fragment of a white sandstone knife. Associated with this hearth at the same level was a worked flint blade and a well smoothed flat faced stone 3” in diameter and 1” thick, made of a fine grade sandstone. A small amount of calcined bone was recovered from this hearth, but the size of the individual pieces was so small as to make identification impossible.

It has been the practice of the chapter to excavate at least a foot into what is considered sterile, coarse white sand before considering a square completed. This practice demonstrated its usefulness in the square of the above-mentioned hearth. In the coarse white sand, 11” below the hearth which was just discussed, was excavated an oval charcoal pit, 19” x 31.” It extended down 23” through coarse white sand, the last 4” actually entering into a very fine white sand. Excavation of this feature 5 1/2 feet deep required the use of a stepladder. No artifacts rewarded our efforts. The large quantity of charcoal recovered from this fire-reddened area was of minute granules and well mixed with sand.

In no instance was powdered red ochre found in any charcoal pit or hearth. This was certainly not due to any lack of hematite, since many well abraded pieces were found throughout the site. In fact a cache of red ochre was found in three small pits, each in close proximity to the others. Each of these pits measured about 4”-6” in diameter and extended 4’-10” deep. The red ochre in these pits was not in concentrated form, as reported at other New England sites, but rather appeared blended with the yellow sand in which they were found. These deposits are no doubt Late Archaic, due to the Late Archaic artifact recovery elsewhere in the same horizon. Seldom were artifacts recovered from such pits, except for a single charcoal pit which contained two Corner-Removed #7 projectile points, the broken half of a wing atlatl weight, and a fragmentary worked piece of felsite. The atlatl weight showed some signs of burning, and the felsite fragment had one side which appeared to have been rubbed with red ochre. No calcined bone was found in this pit. All of the pits exhibited some degree of fire-reddened sand.

Only 57 post molds have been excavated at Ponkapoag thus far. All of them were recovered below the topsoil, and had diameters from 2”-5.” In section, all of the post molds terminated in a sharp end, and were of a dark brown color, resembling the color of the topsoil. In one instance only did pairs of post molds appear, indicating perhaps a lodge floor. Five sets, each consisting of two post molds side by side, were excavated, approximating an arc 13” in diameter. Because of the presence of three large trees which our excavation agreement prohibited us from disturbing, we were unable to follow the indicated arc. Adjacent to this feature were found two horizontal post molds (Fig. 13) two of which were 5’ long, the other 5 1/2’ long, all pointed at the ends. No hard lenses of soil were encountered in this area, to indicate a packed floor.

**ARTIFACTS**

The following is an inventory and commentary on the approximately 3000 identified artifacts from the Ponkapoag excavations. The basis for this inventory is the M.A.S. Classification of Stone Implements of the Northeast (Fowler 1963). The raw materials represented in the inventory, in order of prehistoric preference, include felsite, quartz, shale, argillite, basalt, sandstone, and jasper.

**Large Triangles (Fig. 16s)**

Of the 32 projectile points recovered, 6 were of a well made variety, ranging in size from 2” - 2 5/16” long and 1/4” thick. The broad points exhibit incurvate, smooth edges and a marked thin V-shaped basal concavity. The remainder of these points have a lesser degree of basal concavity and tend to be shaped more like isosceles triangles. This latter group exhibits poor workmanship, and is exclusively of felsite. Lengths range from 3 3/4” - 1 5/8.” Thickness ranges from 3/8” - 7/10.”

**Small Triangles. (Fig. 16 m-r, t-v)**

Most of the 261 small triangular points recovered were manufactured from quartz with a minimum of felsite and argillite. Ninety-five fall into Fowler’s #1, #3 and #4 categories, exhibiting the usual retouched concave bases which vary in depth and have excurvate sides. The #5 category comprises only 28 recoveries at Ponkapoag. This latter group has equilateral sides, although a few have elongated sides. Most show little evidence of basal thinning. A few have bases which are centrally chipped, producing a slight channeling effect. All were manufactured from quartz. Of the 138 small triangular #6 points recovered, most were made of felsite, with only a minority of quartz and argillite. The #6 type is generally well made, of isosceles form with narrow thinned bases.

**Small Stemmed (Fig. 16 g-j; Fig. 17 c-d)**

Most of the 46 recoveries were of felsite, although some were of quartz and argillite. The felsite points exhibit better workmanship than the quartz and argillite
Fig. 16. LATE ARCHAIC TO WOODLAND PROJECTILE POINTS from the Ponkapoag Site. The black bar is a one-inch scale indicator.
Fig. 17. ARCHAIC PROJECTILE POINTS from the Ponkapoag site. The black bar indicates one inch.
points, which are quite crude. Small Stemmed points are difficult to identify in the field due to their range in length and variance in basal shape. For consistency of reference, the chapter decided to limit the maximum length of such points to 1 1/2". The majority have thick bases and the remainder thin bases. Such variance we assume to have been due to the individual preference of the manufacturers. Small Stemmed points we have assigned to the Late Archaic and Ceramic horizons because of their association with other diagnostic artifacts of these periods.

**Long Eared.** (Fig. 16 e,f)

Only 3 projectile points of this type were recovered at Ponkapoag. Made of felsite, they exhibit a distinctive outflaring of the basal ears, due to the deep side-notching. The concave bases have been thinned by secondary retouching. These blades were located in close proximity to a few ulus.

**Eared.** Total: 71 (48 felsite, 23 argillite) Fig. 16 k

These projectile points vary in length from 1 1/2" - 2 1/4" and are from 7/8" - 1 1/4" wide. They have excursive, or in some cases straight sides. The ears are well pronounced due to deep side-notching. Some ears exhibit a tendency toward sharpness, but the majority are snubbed. The sides exhibit excellent workmanship through secondary flaking. The depth of basal concavity varies slightly.

**Truncated.** Total: 13 (all felsite) Fig. 16 i

These projectile points are of inferior workmanship, with quite irregular flaking from base to tip. They vary in length from 1 1/2" - 2 1/2" and are from 7/8" wide. No effort seems to have been made to improve the truncated base by thinning. The parallel sides, which extend half the length, taper to meet at the point.

**Leaf.** Total: 22 (20 felsite, 2 slate) Fig. 17 e,f

All of these well made projectile points were recovered from a comparatively small area of the site. They all are of a type which have convex sides and converging shoulders. At Ponkapoag, such projectile points are diagnostic of the Ceramic period.

**Tapered Stem.** Total 83 (68 quartz, 13 felsite) Fig. 16 a,d

All of these points average 1 1/2" in length and 1/2" - 5/8" in width. The quartz points, perhaps due to the difficulty in working the material, are crudely manufactured. The felsite points, however, demonstrate excellent secondary flaking and conformity. Most of these points have straight sides and stems; a few are excursive. The bases might be called square, but appear to have been intentionally snapped off; it is certainly possible that this truncation is a remnant of the rind of the pebble from which they were made.

**Corner Notched.** Total 4 (all felsite) Fig. 17 r

These well made projectile points were found in close proximity to each other at Ponkapoag. They are from 1" - 5/8" long and 3/16" thick. The edges are excursive and the stems are deeply corner notched. Bases are straight, exhibit thinning, and have basal flaring with large, thin barbs.

**Corner Removed #1.** Total: 6 (all felsite)

This type measures 3 1/4" - 5 1/8" long and from 1 1/4" - 1 3/4" wide. Maximum thickness is 5/8." All such points exhibit a rough flaking with minor retouching. In all cases, the stem has distinctly removed basal corners which result in a rather thin, sloping base.

**Corner Removed #3.** Total: 100 (61 felsite, 23 quartz, 11 argillite, 5 quartzite) Fig. 17 j-l

These projectile points vary in length from 1 3/4" - 2 4/5" and are 5/8" wide. Being quite narrow and excursive, they tend to be oval and thick in cross section. The parallel stem is quite short and sharp-sided in comparison to its length. In most cases, there is a slight thinning of the base. The felsite points are well proportioned and show more skillful working than those of other materials. These points were scarce in the lower horizons, but increased in quantity at the Ceramic period levels. Of interest is the increased blade length and improved workmanship from the later cultural periods.

Among three Corner Removed #3 points at Ponkapoag there is a rare deviation from the general form. Each of these three projectile points (one is of felsite, one of quartz, and one of argillite) are "Mono-shouldered." The base is inset or side-notched on one excursive side only. The other side forms a straight line from base to tip. Small in size (1 1/4" - 1 3/4" in length) and diamond-shaped in cross section, two of these bifaces have straight bases, the other a convex base. There is no basal thinning evident. The retouching of each specimen and the choice of the finest quality lithic material demonstrate the workmanship of a superior artisan.

**Corner Removed #7 (?).** Total: 108 (63 felsite, 31 argillite, 14 quartzite) Fig. 17 m-t

At Ponkapoag, this type of projectile point showed the greatest variation from the description in Fowler's classification of any projectile point type. The Ponkapoag Corner Removed #5 varies in length from 1 1/2" - 3 5/8," and is from 1 1/8" - 1 7/8" in width. The thickness is a rather consistent 3/16". Smaller sizes are triangular in shape with straight sides and sharp shoulders which taper to a straight base. A slight bifurcation is always present. In the larger sizes, the sides are incurvate and deeply serrated. The basal bifurcation is deep and shows some evidence of thinning.

**Corner Removed #7 (?).** Total: 108 (63 felsite, 31 argillite, 14 quartzite) Fig. 17 m-t

With few exceptions, these points are roughly flaked ranging in length from 1 1/2" - 2 1/2." Widths range from 7/8" to 1 3/8." Thickness varies noticeably. Most
Corner Removed #8. Total: 39 (29 argillite, 13 felsite) Fig. 17 g-i

In this type, the blade forms an isosceles triangle. A few specimens have excعرvate sides. Lengths range from 1 3/4" - 2 3/4." Widths are from 3/4" - 1." The stems have long sloping curves which terminates in stubby bases. Some retouching is evident.

Corner Removed #9. Total: 29 (16 felsite, 13 argillite) Fig. 17 a,b

This type is similar to the type immediately preceding, except that the base terminates in a rounded end which is slightly retouched.

Bifurcated. Total: 6 (all felsite) Fig. 18 b, c

The few recovered specimens of this type were from 2" - 2 1/4" long and from 1 1/4" - 1 5/8" wide. The flaking on four blades was very rough, undoubtedly due to the composition of the material, which limited the artisan’s chipping process. Two blades were well made from a fine quality felsite. Edges are straight and terminate in well defined corner notching which results in sharper barbs. The base is deeply notched, producing two rounded tangs. At Ponkapoag this blade is associated with the Early Archaic.

Side Notched #1. Total: 16 (10 felsite, 6 quartz) Fig. 18 d, f

This type of projectile point is triangular and averages 2" in length and 1 1/8" in width. The stem is gently sloped inward, then flares slightly outward to form a straight base. Other blades of this type, although irregular, exhibit a deep undercut which results in definite barbs. The stem has a minor flaring, terminating in a straight base.

Side Notched #5. Total: 19 (9 felsite, 9 quartzite, 1 flint) Fig. 18 h

These projectile points are smaller than the type immediately above, are triangular in shape, and exhibit a pronounced side notching which produces a base somewhat wider than the blade. Much thinner than #1, ten of these specimens have delicate retouching of the edges, as well as truncated bases with slight thinning.

Untyped Blades of Indigenous Material

There are several untyped blades which find no parallels in Fowler’s 1963 classification. The first (Fig. 22b) is a large lanceolate blade of felsite, 4" long, 1 1/2" wide and 3/8" thick. From the tip, its ovate edges extend to a thinned, truncated base 3/4" wide. In cross section it is lenticular and exhibits collateral edge flaking. This blade, found in two pieces, was evidently broken in manufacture due to an obvious flaw in the material. It is Plano-like, and was recovered from the same square and level as a dime-sized thumbnail scraper of jasper, and an expanded base drill.

Another untyped blade is of felsite, Eden-like in outline, with its tip missing (Fig. 22c). The recovered portion is 3 1/2" long, 7/8" wide, and 1/2" thick. The straight sides have crude secondary flaking which terminate in an abruptly thinned, truncated base. Another Eden-like broken quartzite base, 3/4" wide and 3/16" thick, has excellent collateral flaking and terminates in a well thinned, truncated base (Fig. 22d).

Several untyped broken bases are best described as fragments of very broad eared projectile points (Fig. 18a). The fragments are about 2" long, 1 1/4" wide and 1/4" thick. The existing parallel sides have secondary flaking and the fine grained argillite faces show considerable wear. These fragmentary bases have a pronounced out-flaring which produces ears that project 1/8" from the stem. The well thinned bases are here described as Cheveron-like, because of their extreme concavity. One base was recovered in association with a stemmed scraper of marine flint.

The last untyped blade may have had some ceremonial function. It is 7" long, 1 3/8" wide and 5/16" thick (Fig. 22b). Produced from a fine grained felsite, it has a slight lanceolate shape with some facial wear and a well defined retouching of the edges. The stem is side notched, tapering to a steeply thinned, truncated base of 5/8" in width. The horizon level could not be determined, since it was recovered from a disturbed area.

Stemless Knife. Total: 945. (Fig. 19 a-e)

These knives are predominantly from various types of felsite, although a minority were of other materials, e.g. quartz, red sandstone, argillite, as well as one blade of flint. In this category were recovered blades having the classical straight edge, with the opposite edge convex and serrated. The bases are either straight or expanded, or exhibit varying degrees of roundness. Quite often the rough point shows the rind of the cobble from which it was struck. Often both sides are excurved, with one edge roughly flaked and the other finely serrated. The quality of flaking is from crude to fine. Possibly the crude flaked specimens were intended for immediate use, and the more finely flaked for continued use. It is probable that these blades had multiple functions.

Stem Knife. Total: 31 (Fig. 19 f-h)

The majority of these blades are of felsite. All of the bases of this type of knife have some resemblance to projectile point bases. Usually they are crudely made with snubbed points, although a few were better made and of a finer grained material. Perhaps, in the latter case, the artisan wanted to create a blade which would become more or less a permanent part of his equipment.

Leaf Knife. Total: 6. (Fig. 19 i)

This type of knife is well proportioned, broad and long, with detailed serrated edges meeting in a rounded or truncated end. All such knives are quite thin, and are created from a fine grained felsite, usually called "blonde" for lack of a better descriptive term.
Fig. 18. ARTIFACTS from Ponkapoag. The black bar represents one inch.
Ulu. Total: 183 (168 slate, 13 shale, 1 sandstone, 1 basalt) Fig. 18 g,k,m

The majority of such ulus are slate knives, found widely scattered throughout the site, generally in fragmentary condition. These ulus have a semi-lunar cutting edge and a straight back. The majority are crudely chipped and have what the South Shore Chapter refers to as a "plain back." Among such ulus with plain back, there are some specimens with pronounced pecking, and a few with both pecking and polishing. Occasionally a plain backed ulu was recovered with one raised end (Fig. 18 k). This may have been used as an aid in either handling or hafting. This type of raised end ulu has minor recoveries recorded in the Cochato River Valley site in Randolph and at the Green Hill site in Milton. Size ranges from 3" - 12" in length (the latter length being unusual) and from 1 1/4" - 6" in width. Examining the crude, rough cutting edges of these slate ulus makes one wonder about their usefulness. A publication of the Life Nature Library entitled "Early Man" provides an analogy (Howell 1965:120-1). A photograph shows two Africans using ulu-like implements to skillfully skin and dismember an antelope with comparative ease.

An unusual type of ulu was found during the early stages of the Ponkapoag excavations. Its shape is that of an elongated oval, 8 3/4" long and 4" wide at its widest part. It is composed of a dense green sandstone, and exhibits a well-used flaked edge which extends along the entire perimeter of the blade. There is no evidence of either pecking or polishing. This specimen was in the same horizon of a square in which was recovered an ulu made of basalt, of a comb-backed type with polished and pecking on both sides of the blade. Both recoveries were associated with Corner Removed projectile points of the #8 and #9 varieties.

The comb-backed variety of slate ulu exhibits both rough chipping and deep pecking, but on a back of expanded thickness. A few such slate knives have polished backs and minor polishing on the blade. All of the slate blades display a dull reddish oxidation due to the ferrous content of the material. The thirteen ulus made of shale were all of the comb-back variety and are well polished. They are of much smaller size (2 3/4" - 5 3/4") and have fine honed edges.

Drills. Total: 48

These well fashioned implements are of felsite, shist, basalt and red sandstone. On the basis of basal shapes, these drills have been classified as follows: Expanded Base (26; Fig. 18b), Plain Base (9; Fig. 18j), Cross Base (5; Fig. 18e), Eared Base (4), T-Base (2; Fig. 18i), Tapered Base (1), and Side Notched (1). The use of schist and red sandstone in the making of perforators seems puzzling, because of their lack of durability and their softness. In their favor might be the abrasive quality of each material. All of these tools conform closely to the M.A.S. classification (Fowler 1963:7), with the exception of the Expanded Base type, which deviates from the type in 14 of the excavated specimens. This deviant type of Expanded Base at Ponkapoag has the form of an inverted letter "L," or might be better described as missing one expanded lobe (Fig. 18i). Early in the course of the excavation it was thought that such deviants had in fact a broken lobe with the edge subsequently reworked. This hypothesis became more precarious as the number of specimens increased. These and all expanded base perforators were recovered from scattered areas around the site, in association with Early Archaic artifacts.

Gouges. Total: 19 (17 basalt, 2 felsite)

Only one channeled gouge was recovered (Fig. 20b). It is of felsite, and has a wide, polished and shallow bit end. It could not be associated with any horizon, since it was found in an area disturbed by road building. This artifact is presently on display at the Blue Hills Trailside Museum in Milton.

Twelve Plain Gouges (Fig. 20 a,c), all made of basalt, were recovered at Ponkapoag. They vary in length and thickness. Most show signs of extreme wear, though not enough to hide their plain backs and hollowed-out faces, which extend from the bit to half or three quarters of their length.

Of the Grooved Gouges recovered at Ponkapoag, five were made of basalt and one of felsite. These gouges were comparatively short, with a pronounced groove across the backs. The bit ends exhibit a minimum of hollowing and polishing.

Adzes. Total: 4 (all basalt)

These are all roughly made artifacts with slight polishing evident at the bit, and with some minor pecking. All have crudely flattened faces and a distinct hump on the back.

Axe, Celt, Hatchet Blades

One specimen of a Full Grooved axe was found at Ponkapoag. It measures 4 1/4" in length and 2 3/4" in width, and is of roughly pecked felsite with a well ground blade.

Six hatchet blades were recovered, all averaging 4-1/2" in length and 2-1/4" in width. (Fig. 20e). They are made of felsite or of varied colored sandstone, and all are roughly chipped with no polishing. At Ponkapoag, such hatchets are associated with the Ceramic period horizon.

Of the 56 excavated celts, 37 were of basalt, 10 of felsite and 9 of red sandstone. The celts made of basalt and felsite are of excellent workmanship, having smoothly ground cutting edges and straight sides which are meticulously pecked. Those celts made of red sandstone show how difficult such artifacts are to make with this unpredictable stone. The pecked parallel sides are rough and knobby, although the cutting edges are well honed.
Fig. 19. BIFACES from Ponkapoag. The black bar represents one inch.
**Classic Plummet. Total: 1**

This plummet is of felsite, well proportioned and ground into a smooth, diamond shape. It terminates in a small grooved knob at the top. It is 3 5/8" long and 1 1/4" at its widest point.

**Side Notched Weights. Total: 5 (all sandstone) Fig. 21e.**

These weights are made of flat pieces of red sandstone, roughly chipped or pecked so as to leave deep indentations on opposite sides. They vary in size from 2 3/4" - 3 5/8."

**Grooved Weight. Total: 1 (Fig. 21c)**

This granite weight has a deeply abraded groove running the length of the stone. It is 1 1/2" x 2."

**Atlatl Weights.**

At Ponkapoag, a single broken piece of a winged atlatl weight was recovered. Breakage occurred at mid-point. Half of the central perforation is exposed, showing the circular scoring. This weight is made from a fine grained shale; it has straight sides and exhibits a high degree of polishing.

Fragments of one oval atlatl weight were found at Ponkapoag (Fig. 21a). These fragments were some 65' apart and happened to be excavated by the same chapter member. They were made from a fine-grained, oval sandstone pebble. When put together, the fragments constituted about three quarters of the complete artifact. The central perforation at one end was noticable larger in diameter from the perforation at the other end. This fragmentary oval atlatl weight is slightly flattened on one face, and has an incised line perpendicular to the perforation with two lines parallel to it, circumscribing the artifact. Because of the association of these fragments with two Corner Removed #9 projectile points, we have dated this fragmentary oval atlatl weight as "Early Archaic."

**Hammerstones. Total: 95 (Fig. 21b)**

These artifacts were recovered from all occupation levels at Ponkapoag. They are of felsite, quartz, quartzite and granite. Sizes are from 1" - 5" in diameter with weights of up to 3 lbs. In most instances, hammerstones were found in workshop areas amid copious flaking. Many hammerstones showed hard wear, while other showed only the most minute indication of use.

**Whetstones. Total: 12 (Fig. 21d)**

All whetstones are made from a fine-grained, textured gray sandstone. Eleven are elongated pebbles measuring from 4 3/4" - 6 1/2" long. They show different degrees of wear. One of these whetstones is 1 7/4" long and 3/4" at its widest part. It has four well-worn sides extending the entire length. One end having become worn and thin, the artisan simply reversed the tool to take advantage of the unworn end. This reversal offered a 30° pitch from mid-point to each end. The faceted sides would approximate a rectangle in cross section. All were recovered from the Late Archaic horizon.

**Abradingstones. Total: 7**

The size of these red sandstone artifacts is usually large, and weights vary from 3/4 lb. to 23 1/2 lbs. The reader can appreciate the care which must be taken in checking for signs of manufacture and use. One large specimen was used as an anvil and as an abratingstone. Two of the largest pieces have expansive, well-worked concavities. Possibly these were used in producing the cutting edges of woodworking tools. The smaller sizes were possibly used to sharpen the concave cutting edges of gouges.

**Shaft Abraders. Total: 2**

Produced from red sandstone, one shaft abrader exhibits a single groove of 3/8" in width extending across the longer dimension. This piece has a smooth flat surface, both on the top and bottom. The perimeter shows evidence of having been roughly broken away from a much larger slab.

The second specimen is of red sandstone and is constructed much the same as the first, the exception being two 3/8" grooves extending across the flat surface (Fig. 20d). Both artifacts are 1 1/2" thick and of such weight and size as to prohibit their use in the hand. It is the chapter’s opinion that wooden shafts were drawn across the grooves during manufacturing. There is some evidence that the grooves were initially pecked out. Their cultural association is from the Ceramic period at Ponkapoag. The twin grooved specimen is on display at the Blue Hills Trailside Museum.

**Mano-and-Metate. Total: 1 set**

These large implements were found in situ, with the mano resting in an upright position on the shallow depression of the metate. The granite metate is 6 1/2" thick and 11" in its rough width. Both top and bottom have pecked concave surfaces. The mano is of a light green sandstone, 6 3/4" long and 4 5/8" thick. The top part is broken, so how much of the total length is missing is difficult to say. The entire surface was smoothed and shows no pecking. A cross section view would resemble a square, with a pronounced rounding at the corners. It was associated with artifacts of the Late Archaic period.

**Pestles. Total:31**

Six of these pestles are made of shale, having varying degrees of breakage or delamination due to the material which happened to be used. Produced from elongated stones, they measure 8 1/2" - 10 1/2" in length, with diameters of from 1 3/4" - 2 3/8."

They are pecked and well-polished. Nineteen are made from elongated sandstone material, ranging in size from 6 3/4" - 8" in length and 2 1/4" - 2 1/2" in diameter. These specimens are very rough and show that very little pecking was attempted to round them off.

Two pestles were located within 3" of each other, and show definite signs of ingrained red ochre in their well used ends. One of these pestles has pieces of hematite imbedded on two sides, due possibly to the implement having been used as a hammer for...
fragmenting larger pieces of red ochre, in preparation for grinding.

Six long, broken pieces of red sandstone were recovered from Ponkapoag, which caused the chapter a great deal of concern with regard to their classification. During one of the many workshop sessions, chapter members matched two of these pieces. The result was a roughly made pestle 17 1/4" long X 3 3/4" wide. Lozenge in cross section, this pestle weighs 7 3/4 lbs. The pestle has deep pecking over the entire surface. The working end is fractured, possibly through use. The other four pieces exhibit the same method of manufacture, with the same type of fractured end. No polishing is evident. Culturally, these artifacts are associated with the Ceramic period at Ponkapoag.

**Stem Scrapers.** Total: 23 (12 felsite, 9 quartz 2 marine flint) Fig. 22e,g,j,l,p

With the exception of those scrapers made of quartz, this type exhibits excellent chipping technique through pressure flaking. The blades have different degrees of flaring, which terminate in tapering, slightly rounded ends. The two specimens of marine flint are centrally thinned by the removal of a single flake from the top face. Only one scraper of felsite shows pronounced signs of wear.

**Steepedge Scrapers.** Total: 47 (24 felsite, 21 quartz, 2 flint) (Fig. 22n,o)

These scrapers are somewhat circular in shape, with a raised top center section. The degree of bevel to the face varies in acuteness, as well as in the amount of flaking removed from the wider face. The two steepedge scrapers made of flint have a high humping or raising of the center section, as well as an almost perpendicular scraping edge.

**Oval Scrapers.** Total: 8 (all red sandstone)

At Ponkapoag these scrapers average 4" in length, 1 3/4" in width, and 3/8" in thickness. Because of the comparatively soft material, they all exhibit extreme wear about their edges.

**Flake Scrapers.** Total: 2 (both flint) Fig. 22f

These are very thin and small blades referred to by chapter members as "thumbnail scrapers. All have acute flaking on the thickest part of the flake.

**Scraper/Shaft Abrader.** (Fig. 22h)

Only one such combination tool was found. It is of felsite and has an outflaring cutting edge, similar to a stemmed scraper. As the stem tapers back from the edge, it curves around, somewhat like a ram's horn. The chipped inner curve, thus created, measures 1/2" and would accommodate a shaft, which the artisan might have been shaping. Its provenience is late. This artifact is on display at the Blue Hills Trailside Museum.

**Large Scrapers.** Total: 33 (28 felsite, 5 quartz)

These scrapers were not localized in any particular excavated area at Ponkapoag. Each is crudely flaked to form a partial cutting edge. They are circular in form, with the top center portion steeply raised as a result of flaking. The underfaces show the removal of several large flakes, lending a concavity to the specimens. In describing the size, which is quite uniform, suffice it to say that each fits conveniently into the user's hand.

**Graver.** (Fig. 22m)

The scarcity of flint at Ponkapoag caused us to scrutinize each recovered flint fragment. One graver was recovered from the Early Archaic horizon. It has a single nipple and in outline generally resembles a steep-edge scraper, from which the artisan had skillfully chipped out a small but prominent nipple from the beveled edge.

**Hematite**

Thirty-eight pieces of this material were recovered. All have varying degrees of abrading evident, with the exception of one piece, which resembles bog iron. Only three artifacts, as previously mentioned, showed any contact with hematite or red ochre. Most pieces of hematite are small pebbles or fine-grained, thin slabs which were possible baked, thus producing the deep reddish-brown coloration.
Graphite.
Twenty-six pieces of graphite were excavated, all of which exhibit well abraded surfaces. This material was undoubtedly scarce in this region, since even the smallest pieces were used.

Stem Spade
One spade-shaped artifact of red sandstone was found. It has a rounded blade 3/4" thick which was roughly chipped to thin the working edge. The large stem is slightly notched on both sides and terminates in a truncated end. This artifact is on display at the Trailside Museum.

Soapstone
Two fragments of this material were recovered at Ponkapoag. A small section of what is possibly a rim sherd is 1/4" thick and has both smooth inner and outer surfaces. These surfaces bear the markings of a shaver or scraper. Nine thin grooves are drawn across from a gorget. It has a rounded edge and increases in thickness toward what was possibly the center. It is highly polished and has a pictograph drawn on one side. Its size is quite small, 3/4" x 1".

Pottery
Six half-inch pieces of ceramic pottery were excavated at Ponkapoag. Two were identified as rim sherds. All are of the coarse, grit-tempered variety, making use of a quartz temper.

Effigy (Fig. 22a)
This artifact is of a dense gray sandstone, and resembles a flying squirrel. The squirrel, if that is what it is, lacks a tail and has its outstretched legs in a flying position. Certainly the head is of a small animal, in any case. The artifact has a slightly polished surface.

HISTORIC PERIOD
There have been several artifacts from the historic period recovered at Ponkapoag. No historic structures of any sort have thus far been discovered, although future excavation may in fact reveal such foundations. The following artifacts are nevertheless an indication that the site was hardly devoid of human activity during the colonial period and beyond. With the exception of metal objects, all other artifacts are in fragmentary condition.

Pipes (Fig. 22q,r)
Hundreds of bowl and stem fragments were found at Ponkapoag. Most of the bowl fragments show discoloration and occasionally a stem fragment reveals the imprint of the smoker's teeth.

During the initial stage of excavation, every fragment was dutifully recorded, cleaned and assembly with other fragments was attempted. This soon became impossible due to the large number of excavated fragments. However, notation was made as to square designation for every fragment, and when possible bowl identification was made. In this manner the entire area of what must have been an historic dump was plotted. The pipe remains are from the 18th, 19th and 20th centuries. Of special interest is an almost complete red clay pipe (Fig. 22r) with a short stem. The bowl is decorated with an indented design about the rim. The stem is short and thick, and arranged so that replaceable wooden stems could be used. A pipe of similar make and design was seen by the writer in a showcase at Fort Ticonderoga, circa 1750.

Ironware
These include pieces of a cast iron pot, a shoe horn, used hand-wrought iron nails, and table cutlery (minus handles).

Brass and Copper
These recoveries include a hawk bell, small axe wedges and a brass thimble.

Clay Bricks
Many clay brick fragments were found. Often such fragments were heavily coated with a salt glaze. One complete specimen has a vivid footprint of a fox on its surface.
Fig. 22. MISCELLANEOUS ARTIFACTS from Ponkapoag. The black bar represents one inch.
**SUMMARY AND CONCLUSIONS**

Only one C-14 date has been funded from Ponkapoag. This Late Archaic period date of 4960 + 75 BP (3010 BC) came from a deep feature with copious charcoal, but no artifacts. Diagnostic artifact recoveries, however, indicate that Ponkapoag was inhabited in the Early and Middle Late Archaic periods, as well as in the Ceramic period. The site was ideally suited, with ample water, game and lithic supplies nearby. No doubt the site was occupied for 5,000 or more years. That the occupation may not have been year-round, but rather seasonal is indicated by the absence of lodge floors, stone bowls and pottery. Certainly with the excavation of 30,000 square feet and with the recovery of a representative quantity of features and artifacts, one would have expected to find structures by now if in fact the site had something more than a seasonal occupation.

The use of charcoal pits is interesting to speculate upon. At Ponkapoag, all charcoal pits contained varying amounts of charcoal and, in most cases, calcined bone. Whether or not some pits were used as secondary burials is undetermined. Some were obviously used as campfires, but the absence of red ochre in the Ponkapoag charcoal pits and hearths would seem to exclude burials. The presence of red ochre, especially in powdered form, along with ceremonial artifacts strongly suggest in Archaic times a belief in an afterlife, and that a ceremonial burial accompanied the bones of the deceased. There still remains the possibility, however, that at some remote corner of the site such a burial will be found. It is hoped that the M.D.C. Ponkapoag Golf Course has not in fact already encroached upon such burials.

The preponderance of projectile points and knives at this site would indicate that the Archaic and Ceramic period peoples were foraging hunters and gatherers who found this area productive of the necessities of life. In our years excavating at the site, we have been greatly impressed by the variance of craftsmanship in the manufacture of artifacts. A well proportioned, skillfully flaked specimen is recovered within the same square as a blade of the same type whose surface is rough and shows a definite lack of talent in its manufacture. The cruder artifacts—might not they be the work of unskilled adolescents, attempting to produce the fine work of an adult artisan? It is further proposed that many of the broken artifacts which were excavated and later assembled by chapter members were examples of the artisan’s disgust at producing an inferior product. Many times while excavating at Ponkapoag a point or knife tip would be found with its base excavated at some distance away. As an example of this, who among the readers has never cast away in anger an item which suddenly breaks in the making? People, whether they lived thousands of years ago or just yesterday, have much in common.

In conclusion, it should be mentioned that within a six mile radius of Ponkapoag there are several variants in point types, with regard to length, width, choice of materials and workmanship. For example, the Corner Removed #8 and #9 points from the Cochato River Valley site (unpublished; from the author’s private collection) are much longer and narrower than those from Ponkapoag. Those from another unpublished site, which chapter members called the Airport Site, are shorter and broader than those from Ponkapoag. We interpret these variations as representing different ways of manufacturing for achieving the same function, without necessarily altering the efficiency of the artifact.

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