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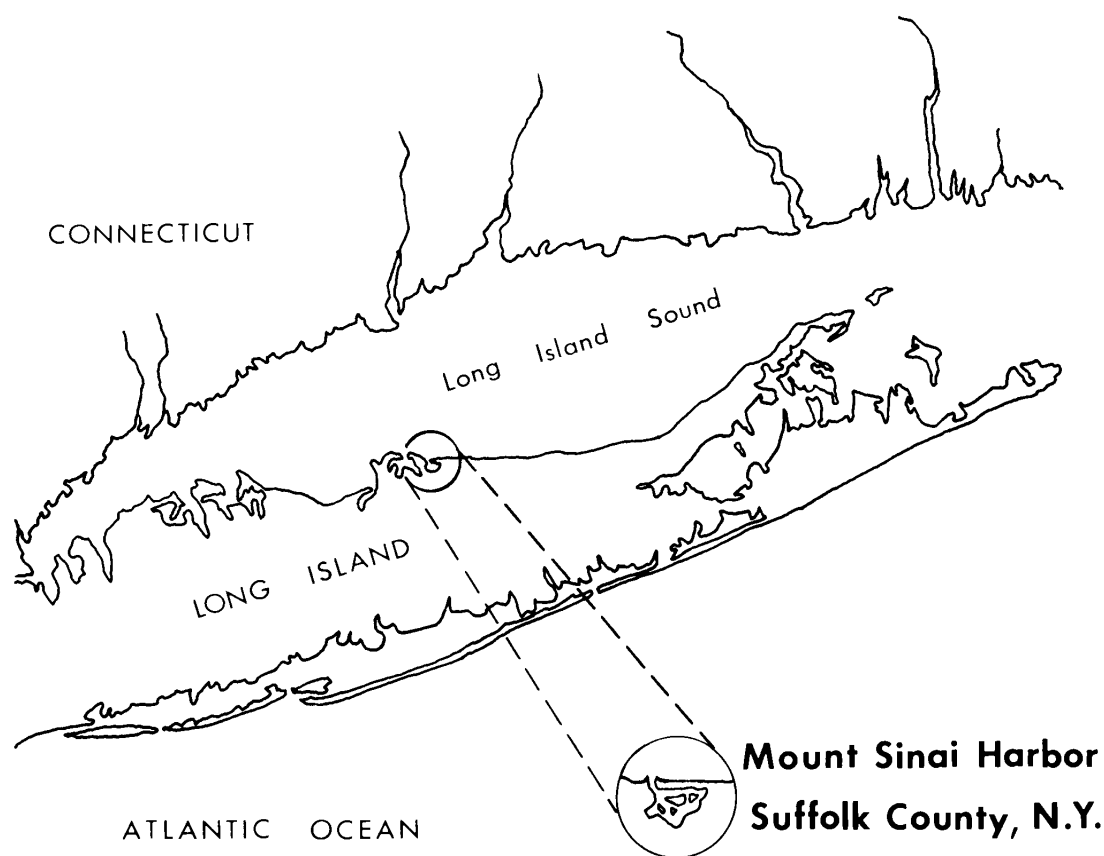
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THE PINE HILL SITE, ST. LAWRENCE COUNTY

Marie G. Cottrell

INTRODUCTION

The Pine Hill site is located in the township of Gouverneur, St. Lawrence County, New York. The site is 3.8 miles to the northwest of the village of Natural Dam and is 2.25 miles due north of the Oswegathchie River. The site is 1 mile to the west of Route 58 on Pine Hill Road. This dirt road runs through the center of the hill on which the site is located, bisecting the site area.

The site is Late Woodland, occupied by a group which has been reclassified as the St. Lawrence Iroquois (Pendergast 1972; Berger and Pratt 1973) to distinguish it from the Laurentian groups which occupied the area during the Archaic period. Prior to this reclassification, the Northern Iroquois were referred to as the Laurentian Iroquois. The date of the Pine Hill site has been estimated to fall between 1400 and 1450 A.D. (Peter Pratt and A. A. Dekin, Jr.; personal communication).

The Pine Hill site is located on a high hill, with its northwest and southeast faces cut by deep ravines. At the base of the northwest ravine there is a small marshy area which could have served as a source of swamp herbs and plants, some of which may have been used as medicinal plants (Isaacs, pers. comm.). The S.U.C. Potsdam field program appears to have also located a double rowed palisade in the excavated test units nearest to the road on the north section and in the southeast section of the site area. For many years good site reports on Late Woodland Period sites in New York State have contained lists of the identified species of animals which were recovered during archaeological investigations. However, except for this listing of represented species along with, in some cases, the minimal number of individuals per species, little analytical work has been done with faunal remains except perhaps some attempts to determine seasonality.

Since no previous faunal analysis has been done for the northern New York region and since the Pine Hill site yielded a sizeable sample of faunal material, it was decided that an analysis of the faunal remains from the Pine Hill site would yield invaluable information on the subsistence economy of the groups occupying northern New York during the Late Woodland Period. The purpose of this report is to (1) identify the mammalian faunal species found on the Pine Hill site, (2) estimate the minimum numbers of individuals represented by each species, (3) relate the identified species to the type of biotic community and biotic province with which they are associated so that an evaluation can be made concerning the ecological setting of the group occupying this region, (4) determine the seasonality of the site, (5) define the subsistence economy, and (6) establish a data base for future research on this area of Iroquois archaeology.

FAUNAL SAMPLE

The Pine Hill site yielded a large sample of faunal material which included mammalian, fish, avifaunal, amphibian, and reptilian remains. Due to the limited time period allotted for the completion of this project, it was not feasible to study all of this faunal material. The mammalian remains were selected to be the primary body of data for this report because an analysis of this sample could best answer the research questions of the study. Fish mandibles and maxillae were also separated so that the species of fish utilized at the site could be identified. No attempt was made to identify the avifaunal material since the scope of this undertaking was beyond the limits of this report. Although amphibian and reptilian (turtle carapaces) remains were separated and counted, only the snapping turtle (*Chelydra serpentina*) was identified to species.

The number of bones studied in this report was 2,633. These were primarily mammalian remains. However, a small number consisted of worked bone artifacts, fish mandibles and maxillae, domestic animal remains, frog, turtle, and bird bone. Of the 2,633 bones, 682 were identified as mammalian species, 55 were worked bone, 18 were turtle carapaces, and 54 were categorized as domestic animal, fish, frog, or bird bone (see Table 1).

Two methods were used to estimate the minimum number of individuals per species represented in the 682 mammal bones from the Pine Hill site. The first was the minimum distinction method (Grayson 1973) which has been used by archaeologists through the years. By this method, the entire sample of bone of a particular species is considered. The most abundant element of the species is separated into right and left components with the greater number being used as the calculation for the minimum number of individuals (see Table 2). The second method was to divide the site into discrete sections and then calculate the minimum numbers of individuals per species for each section. This method was defined by Flannery (1967) and assumes that the remains of individual animals will not be evenly distributed between the sections of a site. The Pine Hill site was divided into a number of sections. The first was the

TABLE 1

Data	
Total Bone	2,633
Total Identified	791
Total Identified to Mammalian Species	682
Total Worked Bone ¹	55
Turtle Carapices	18
Channel catfish	3
Domestic Pig ²	6
Sheep ²	8
Frog	3
Bird ³	16
Human ⁴	2

¹This count does not include the complete collection of worked bone from Oswego.

²There was an old log cabin on the site. It appears that the people living in this cabin raised pigs and sheep. The site area has not been plowed; therefore, it must have been cleared to accommodate these animals.

³This count does not include all the bird bone. Most of the bird bone was sorted out before the identification process started.

⁴The human bone included one newborn infant burial found in a pit within the palisade area on the northwest side of Pine Hill Road. Also, the count included one human frontal bone. This was a complete frontal bone which had been broken at the time of the site (or death). (Anderson, 1962)

TABLE 2

Minimal Numbers as Estimated from the Mammalian Remains of the Pine Hill Site

Scientific Name	Common name	# of Bones	% of Total Identified Bone	Indiv. by Section		Indiv. for site	
				Min #	%	Min #	%
<i>Odocoileus virginianus</i>	Whitetail deer	419	61.4	40	27.7%	18	30.5%
<i>Ursus americanus</i>	Black bear	30	4.4	15	10.4	3	5.08
<i>Canis lupus</i>	Grey wolf	18	2.9	7-9	5.5	2	3.4
<i>Castor canadensis</i>	Beaver	83	12.1	17	11.8	4	6.8
<i>Ondatra zibithica</i>	Muskrat	48	7.0	21	14.6	12	20.3
<i>Erethizon dorsatum</i>	Porcupine	5	.73	4	2.8	2	3.4
<i>Lepus americanus</i>	Snowshoe hare	13	1.9	9	6.25	2	3.4
<i>Tamias striatus</i>	Eastern chipmunk	20	2.9	9	6.25	6	10.6
<i>Tamiasciurus hudsonicus</i>	Red squirrel	17	2.4	6	4.2	4	6.8
<i>Marmota monax</i>	Woodchuck	22	3.2	10	6.9	2	3.4
<i>Mustela vison</i>	Mink	2	.29	2	1.4	1	1.69
<i>Mephitis mephitis</i>	Striped skunk	1	.14	1	.69	1	1.69
<i>Procyon lotor</i>	Raccoon	1	.14	1	.69	1	1.69
<i>Vulpes fulva</i>	Red fox	3	.44	1	.69	1	1.69
		682	99.9%	144	99.87%	59	100.4%

living area, the area found within the palisades. The next four sections were defined according to midden area. There were four discrete midden areas at the Pine Hill site and each was considered a separate unit for calculation. Minimum numbers were then calculated for each section using the same method as defined in the minimum distinction method (Table 2).

As Grayson (1973) has noted, the variation in the way the concept of minimum numbers has been applied brings with it variation in the values of the resultant minimum numbers of individuals. As observed in the two sets of minimum numbers calculated for the data from the Pine Hill site (Table 2), there is a large difference between the sets of minimum numbers. However, it is unknown whether the difference between the two sets of minimum numbers is "real" or is the result of methodological differences in the sampling of the same population. The possibility exists that the minimum distinction method provides a smaller sample of the same population than the "section" approach.

A Chi Square test was conducted on the sets of minimum numbers of all genera to determine whether they represent the same population or are significantly different, indicating that they represent different populations at the site. The resultant Chi Square was equal to 8 with 13° of freedom where the probability is equal to 0.8. This is not significant; therefore, there is no significant difference between the two sets of minimum numbers obtained from the two sampling methods. Instead the numerical differences are due to the differential sampling of the same population. This means that the same proportion of taxa is represented in each set of minimal numbers. For example, 30.6% of the minimum numbers as determined by the minimal distinction method represents deer and 27.7% as determined by section also represents deer. If the entire sample is expanded or contracted, the percentage of minimum numbers for deer should remain relatively the same (27-31% range). Therefore, in this case, both sets of minimum numbers are valid but represent a variation in method for sampling a population (see Appendix B).

ECOLOGICAL IMPLICATIONS

All species of animals inhabit specific ranges of ecological settings. By identifying a species and its habitat, the ecological setting of an area may be determined. At the Pine Hill site, three of the represented species reach their southern limit in the Canadian biotic province [the Snowshoe hare (*Lepus americanus*), the red squirrel (*Tamiosciurus hudsonicus*), and the red fox (*Vulpes fulva*)]. The remaining mammalian species represented at the Pine Hill site reach their northern limits in the Canadian biotic province.

The information concerning the ecological setting of the fauna recovered from the Pine Hill site indicates that this site falls within the Canadian-Carolinian ecotone. Since fauna typically associated with the Canadian biotic province such as the snowshoe hare, red squirrel, and red fox extend no farther south than the Canadian-Carolinian ecotone, the Pine Hill site could not be classified as falling within the Carolinian biotic province. However, maize agriculture in its northern limits can be successful only in the very southern limits of the Canadian province or within the Canadian-Carolinian ecotone. The presence of maize at the Pine Hill site and the reports of maize agriculture in both the ethnohistorical records (Trigger 1970) as well as archaeological reports (Trigger 1970) for this region indicate that this area could not fall within the Canadian biotic community.

Within this framework of the Canadian-Carolinian ecotone, the faunal remains from the Pine Hill site indicate that the Indians here utilized three ecological zones which were in the immediate vicinity. The Pine Hill site was in close proximity to lakes, rivers and creeks. The muskrat, the raccoon, and the mink which were utilized at the site could have been obtained from the wetlands near water courses. A marsh was located at the base of the hill. This marsh area, which is now grown over, could have been a prehistoric source of fresh water, since the plants in this area are indicative of a bog situation or the destruction of a water source by the plant community. The second ecological zone exploited by the inhabitants of the site was the coniferous forest which is interspersed throughout the area in tracts of climax and subclimax species. The flanks and base of Pine Hill are covered with evergreens. The snowshoe hare, the red fox, the red squirrel and the porcupine, remains of which were found at the site, inhabit this ecological zone. The third ecological zone found in the area of the Pine Hill site is the deciduous forest. The top of Pine Hill has maple and oak trees. The whitetail deer, the woodchuck, the eastern chipmunk and the striped skunk, which were utilized at the site, live in the edges of the deciduous forest. The bear and wolf are not restricted as to habitat and are found in all ecological settings (see Appendix A).

SEASONALITY

It is difficult to determine the seasonality of any site solely on the basis of a faunal sample. The species of animals identified at the Pine Hill site were available to the Indians year round. However, it is unknown whether or not the group which occupied the Pine Hill site did so year round. Since there was a variety of resources available in close proximity to the site area, there is no reason to assume that the site was not occupied year round.

Charred maize kernels give definite evidence that maize was raised at the site, indicating that it was occupied in late May through June, when the planting of this food resource in this area would occur. The harvesting of the maize would occur August through September.

The ages estimated for the deer sample at the Pine Hill site indicate that they were taken from September through February. The majority of age estimates based on tooth eruption and wear patterns (Kelsey 1969) were N years, 6 months old (where $N = 1, 2, 3, \dots, N$). If the deer were born in April through June, then they would have had to have been taken in September through December to be consistent with the age estimate. A number of the age estimates were N years + 8 months, which indicates that these deer were taken in December through February.

Many fish remains were found at the site, including channel catfish (*Ictalurus punctatus*) and yellow walleye (*Stizostedion vitreum*), both of which are common in the Great Lakes drainage area. There is good reason to assume that fishing was a year round activity. First of all, there are three lakes within a 2.5 mile radius of the site which could be fished during the summer with nets and hooks and ice fished during the winter. The Oswegatchie River, 2.5 miles to the south, could be fished during the summer and winter months since it is a fast moving river and does not completely freeze during the winter. Fresh water clams were gathered during the summer from surrounding lakes. The only turtle which was identified as to species was the snapping turtle (*Chelydra serpentina*), an aquatic animal.

The beaver, the muskrat, and the raccoon are all aquatic mammals. The beaver and muskrat were generally caught by the Indians by breaking into their lodges in the winter (Witthoft 1957), but they also could have been taken during other times of the year. During September, 1535, Cartier, who was on his way to Hochelaga, observed a group of Indians catching muskrat, a species which the Indians considered delicious (Morrison 1971:411).

The site yielded a large quantity of avifaunal remains. These were not identified to species, but probably included a large number of migratory fowl. These, if they had been identified, could also have aided in determining the seasonality of the site by migratory habit.

HUNTING PATTERNS

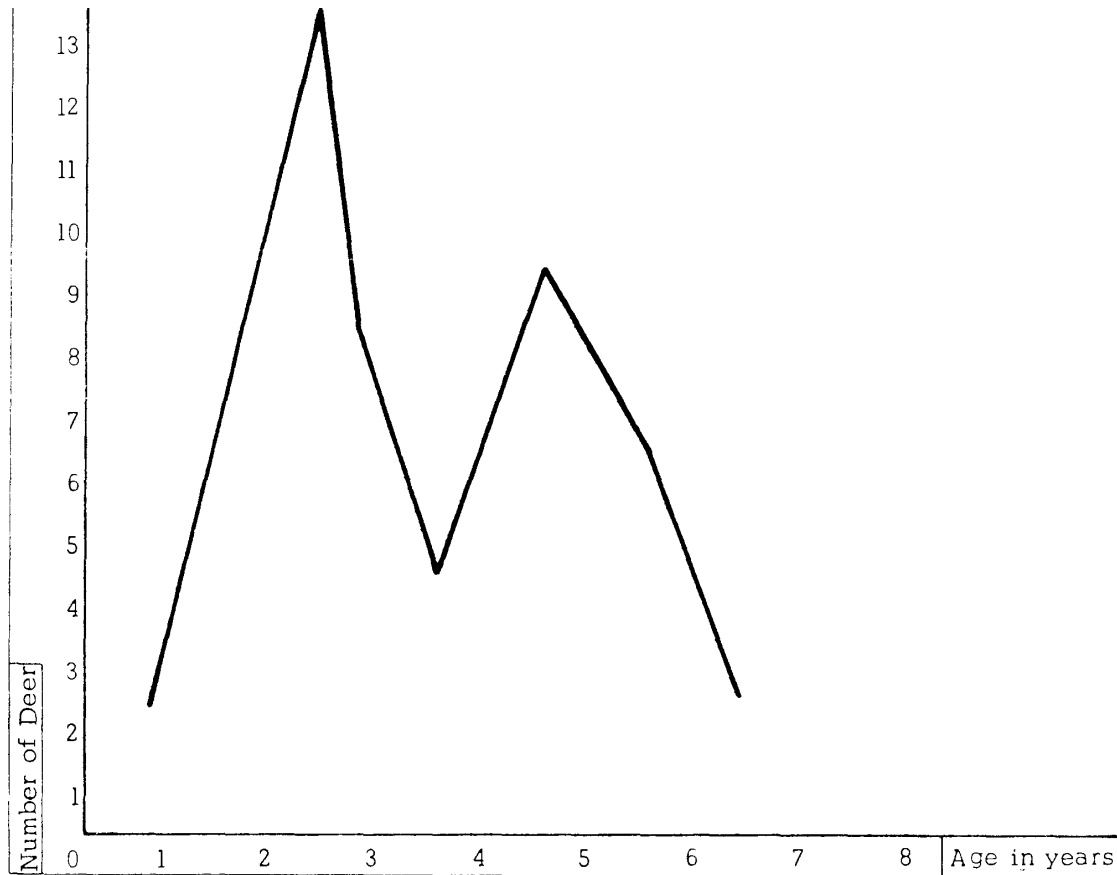
Since the Pine Hill site did not yield flint projectile points or flint debitage, it is questionable whether bow and arrow hunting was important to the subsistence economy at the site. Bone projectile points were reported but these have not been adequately described for use in this study. Whitetail deer was the single most important mammalian species to the Indians of Pine Hill. The deer remains yielded the largest percentage of individuals as well as the largest percentage of meat. Deer were taken by still hunting and stalking, by driving and by snares (Witthoft 1967). The lack of projectile points and the age distribution of the deer remains indicate that the Pine Hill group used the latter two methods of hunting. The ages for the deer were determined by noting tooth eruption and wear patterns (Kelsey 1969). Cleland (1966) notes that if the Indian groups were hunting by the bow and arrow method the distribution of ages should peak in the young age bracket and the old age bracket since these groups are more susceptible to individual hunting practices. The mature healthy deer in the middle range are difficult to take by this method because they are stronger and are more capable of escaping predators. If, on the other hand, the Indians were taking deer by deer drives and snares, a more random sample of ages would be represented. The curve at the Pine Hill site (Table 3) contains a representative sample from most of the age groups, indicating that although individual hunting was probably practiced, it was not preferred.

The black bear, which yielded the second largest percentage of meat, was still hunted during his winter sleep (Witthoft, 1967). Mention was also made in Ritchie (1965:318) that bear cubs were captured and raised until they became large and fat enough to slaughter.

TABLE 3

The Frequency of Occurrence in Each Age Bracket of the Deer at the Pine Hill Site

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The other small animals such as the raccoon, red squirrel, red fox, porcupine, woodchuck, chipmunk, snowshoe hare, mink, and skunk were all trapline animals (Witthoft 1967). The grey wolf was probably taken with a bow and arrow, although this is difficult to prove at this site. The beaver and the muskrat were sometimes trapped, but generally the Indians caught them by breaking into their lodges in the winter (Witthoft 1967).

DIETARY PERCENTAGES

In order to determine the actual importance of a particular species to a cultural group, it is important to know what percentage of their diet comes from that species (White 1953). Table 4 indicates that the whitetail deer was the single most important species to the Indians, yielding 1/2 to 2/3 of the meat diet. The black bear yielded 23% to 38% of the meat, making it the second most important species. The rest of the mammals contributed only a small percentage of meat to the diet of the Pine Hill Indians.

TABLE 4.
Percentages of Meat Represented by the Mammalian Remains at the Pine Hill Site

Species	Min. # of indiv. per section	Live weight/ individual	% of usable meat	Usable lbs./ individual	Usable lbs./ species	% of Total	Min. # for site	Usable lbs./ species	% of Total
Whitetail deer	40	200	50	100	4,000	48.7	18	1,800	66
Black bear	15	300	70	210	3,150	38.4	3	630	23
Grey wolf	7	60	50	30	210	2.5	2	60	2.2
Beaver	17	55	70	38.5	654.5	7.9	4	154	5.6
Muskrat	21	3	70	2	42	.5	12	24	.87
Porcupine	4	15	70	10	40	.4	2	20	.7
Snowshoe hare	9	4	50	2	18	.2	2	4	.16
Eastern chipmunk	9						6		
Red squirrel	6						4		
Woodchuck	10	8	70	5.6	56	.6	2	11.2	.41
Mink	2						1		
Striped skunk	1	7	70	5	5	.06	1	5	.18
Red fox	2	8	50	4	8	.09	1	2	.07
Raccoon	1	25	70	17.5	17.5	.2	1	17.5	.64

Cleland (1966:144) states that the increase in the quantity of big game associated with a decrease in small game and fishing is probably closely related to an agricultural way of life, with hunting and fishing being supplemental to the diet instead of a staple resource. Since there are no previous faunal analyses from the northern New York region, it is difficult to assess Cleland's statement in light of the evidence derived from the Pine Hill site. Agriculture, at least maize agriculture, was practiced in this region of northern New York. However, fishing and small game hunting as well as certain gathering activities, were still obviously being carried on. Without comparative data, particularly in the region in question, Cleland's (1966) statement can neither be proved nor disproved. It cannot be determined from the data presented in this report whether there actually was an economic shift in procurement patterns after the introduction of maize agriculture in this region. There can be no doubt that maize agriculture changed the character of the subsistence economy, since a new set of procurement activities would have to be evolved to handle this new resource. A change in the yearly round of subsistence activities could be expected; some less productive or less desirable food stuffs would be abandoned at least in part and new or old foodstuffs would be exploited for the first time or to a greater extent. However, there is no evidence for such a shift at the Pine Hill site.

Faunal analysis for sites in this region through time would be able to answer the questions concerning the shift in procurement habits after the introduction of maize into this area. Until such reports are forthcoming only hypotheses as to the nature of the economic pattern in this area can be proposed.

SUBSISTENCE ECONOMY

Cleland (1966:43-45) defined two types of subsistence economy.

"These are designated as focal and diffuse economies, or in terms of the whole cultural complex, focal and diffuse adaptations."

He states that:

"A focal subsistence economy is directed toward the procurement of one or a few similar kinds of food. These societies which practice focal economies are specialized ones, depending upon specific methods and techniques for the exploitation of an abundant resource. Specialized hunters, fishermen, as well as agriculturalists have focal economies.

The advantages of a focal economy is the cultural stability which it produces. Given the level of availability of a resource which is necessary to support a focal economy, and the degree of cultural specialization needed to exploit it, the rate of change in the technological, socio-political, and ideological

systems of culture will be slow. The fact that focal adaptations can develop only in the presence of a very reliable resource means that the economy is seldom threatened. To be sure occasional crop failures or game resources would be disastrous, but normally these would be only temporary setbacks. If such failures become too frequent, then the primary resource is no longer reliable and new subsistence resources must be found and new systems developed to exploit them.

The second type of economic pattern, the diffuse economy, is based not upon the reliability of one resource but on an ability to exploit a variety of resources. Societies with diffuse adaptations are not specialized ones in the strict sense of the word, since they depend upon many specialized skills and techniques to exploit a number of different kinds of resources. No one of these resources is abundant enough or reliable enough to support the population level which is achieved by the systematic exploitation of them all."

Few societies can be defined in terms of their subsistence economy as belonging exclusively to either type of subsistence economy as defined by Cleland (1966). Most societies fall along a continuum somewhere between the two and can be defined according to degree, particularly in relationship to other societies.

Cleland (1966:69) states that groups occupying the Canadian-Carolinian ecotone by necessity practiced a diffuse subsistence economy. According to his definition, groups occupying this zone continuously moved about in a defined area to exploit available resources. They had unstable villages which were large during the summer and which broke up into smaller groups in the winter for hunting purposes.

Although it is located within the Canadian-Carolinian ecotone, the Pine Hill site does not fit Cleland's definition entirely. It can be stated that the group occupying this site practiced a diffuse subsistence economy, but the analysis of the seasonality of the available resources indicates that there is good reason to assume the village was occupied a large portion of the year.

A look at the range of resources exploited by the Pine Hill group gives ample evidence that they were taking advantage of a large proportion of the resources available to them. They grew maize, hunted large and small mammals, fished, gathered freshwater mussels, took fowl, and probably gathered many wild plants for food and medicinal purposes. The range and quantity of foodstuffs utilized by the inhabitants of the Pine Hill site, as indicated by the remains recovered during excavation, implies that the subsistence economy of this group tended toward the diffuse end of the continuum.

Although the residents of Pine Hill had a diffuse economy, they do not appear to have moved around as much as Cleland indicated. Since they practiced maize agriculture, they had to be at the site during late spring and early summer for planting and late summer-early fall for harvesting. Also, the age distribution of the deer found at the Pine Hill site indicates that the site was occupied during the months of September through February. Beaver and muskrat were primarily taken during the winter, providing more evidence for winter occupation. Therefore, the material remains at the site indicate that the Pine Hill group was in residence during the late spring to late winter period. They may have been absent from the site for short periods of time, but the site itself was occupied most of the year. Early spring and mid summer are the only seasons which have no definable activities associated with them. Spring and summer fishing could have taken the group away from the site, but apparently not for prolonged periods of time.

The location of the Pine Hill site is advantageous in that there are a number of ecozones within close proximity which could be readily exploited. The site was surrounded by lakes, creeks, and rivers, as well as coniferous and deciduous forests. Each of these ecozones has a large variety of exploitable resources which could have been utilized at different times of the year or year round. The need to move to obtain exploitable resources was not necessary for the Pine Hill group since they were in an optimum position to exploit a variety of resources from one place. Although all movement need not be ruled out, it could be minimized for the practice of a diffuse economy at this site.

CONCLUSION

The first written records concerning the Indian populations inhabiting the St. Lawrence region were recorded during the three expeditions made to this area by Jacques Cartier in A.D. 1534, 1535-36, and 1541-42 respectively. During the first voyage Cartier made contact with a group of Indians whose home

was located at Stadacona. This group was on a summer fishing expedition at the Bay of Gaspé on their first meeting with Cartier. The next expedition brought Cartier up the St. Lawrence River to the village of Stadacona which was located at the present site of Quebec City. Cartier noted that this group practiced maize agriculture and fished as primary means of subsistence. It was during this second voyage that Cartier continued up the St. Lawrence River to the village of Hochelaga which was located at the present site of Montreal. Here he found a large palisaded village. He noted that this village was larger than the one at Stadacona. The Indians here also raised maize and fished. On his third voyage, Cartier again visited Stadacona and Hochelaga. The groups were still at the same location. However, at this time the Indians were no longer friendly and attacked the members of the expedition (Morrison 1971).

Thus, in 1542, Iroquoian-speaking groups still occupied the St. Lawrence region. However, in 1603, when Samuel de Champlain revisited this region, he found no sedentary villages of the Iroquoian speakers, but hunting and gathering bands of the Algonquin speakers. Thus, in the 61 years during which no written record exists, the Iroquois groups that occupied the St. Lawrence area disappeared and were replaced by Algonquin speakers with a different type of subsistence economy.

The problems of the ethnic identity of these groups, of where they went, and of what caused them to move, have puzzled archaeologists, ethnologists, and linguists for many years. The Cartier vocabularies as well as the ethnohistorical data indicate that Iroquoian speakers differed quite radically from the Algonquin speakers who later occupied the St. Lawrence region.

The question of where these groups relocated during the 61 year period between the Cartier and Champlain visits has not been completely resolved. Some of the researchers in this area state that the archaeological evidence suggests that the St. Lawrence Iroquoians had been dispersed via the Trent and Humber River waterways to points as far distant as Huronia before 1600 (Pendergast 1972). Burger and Pratt (1973) have noted similarities between the sites they have investigated in northern New York area and sites of the Trent Waterway. Before these statements can be finalized, further research must be completed in the northern New York area. Earl Sidler III is now in the process of completing his researches on the Jefferson County group(s) and perhaps his work will shed light on the disappearance of the northern New York Iroquois groups. As yet there is insufficient evidence on the St. Lawrence County group(s) to make any definite statements. No village movement pattern has of yet been discerned and no comparisons to other groups have been made. Dekin (pers. comm., 1973) has recorded a number of late Woodland sites in St. Lawrence County which have not yet been investigated.

A faunal analysis cannot of course answer the question of where the groups migrated. However, it may lend some information as to why they moved. If the hypothesis that these groups migrated to the areas of the Trent and Humber River Waterways as far as Huronia is correct, the question still remains as to why they moved.

Pendergast (1972) has suggested that a combination of war and the introduction of European diseases by Cartier decimated the St. Lawrence Iroquoians. Burger and Pratt (1973) cite this explanation as well as the climatic findings of Charles Martijen indicating that there may have been a climatic shift in the St. Lawrence Valley from 1550 to 1880 to a much colder (Neo Boreal) climate which would have militated against the growing of maize, the staple in prehistoric times. To the above I would like to add the information derived from the Pine Hill site faunal analysis and the possible explanations which could be inferred from this information.

The group which occupied the Pine Hill site tended to practice a diffuse subsistence economy. This fact becomes meaningful only when it can be compared to the subsistence economy of other Iroquoian groups. Since Sidler has not published his data on the Jefferson County Iroquois a comparison of this group with that at the Pine Hill site is not possible. However, there are some ethnohistorical data on the groups along the St. Lawrence River and there are both ethnohistorical and archaeological data on the Five Nation Iroquois.

A comparison of the climatic conditions among the various Iroquois areas will provide evidence on the various economies which could have been practiced. The Pine Hill site has already been defined as existing in the Canadian-Carolinian ecotone where the average growing season falls between 135 to 150 growing days per year (Cline 1955). In Jefferson County the growing season averages between 150 and 165 growing days per year depending on the proximity to Lake Ontario, which has a tempering effect on the adjacent land areas. The Erie Ontario Plain region has an average growing season of greater than 165 days, and the Mohawk Valley averages between 150 and 165 growing days per year.

In order to insure a successful corn crop, a period of 140 frost free days is required (Yarnell 1964:136). The figures for frost free days per year in the different Iroquoian areas indicate a difference between areas in their capabilities for ensuring a successful maize crop each year.

In St. Lawrence County where the growing season averages between 135 to 150 frost free days, the maize crop cannot be depended upon yearly. Therefore, a diffuse subsistence economy would be necessary to ensure an adequate food supply. Thus, if the maize crop failed to mature, other resources could be utilized. The St. Lawrence Valley has a growing season averaging 140-150 days per year. The range over a period of years to produce an average of 140-150 days would also include some years of lean growth periods. Along the Erie Ontario Plain successful maize crops should be reliable to a greater degree than in any of the other regions. Unless other factors militate against a successful crop, the growing season here is adequate. The Mohawk Valley region also includes enough frost free days to ensure successful crop yields.

By using a model based on Cleland's (1966) definitions of focal and diffuse subsistence economy, the Iroquoian areas can be ranked along a continuum between the two economies. The area where maize agriculture could be practiced the most successfully would support societies which tended to have a focal economy. The areas which are less conducive to maize agriculture would tend to support societies which practice a diffuse form of subsistence economy.

The region can thus be ranked in the following order from focal economy to diffuse economy:

1. Erie Ontario Plain
2. Mohawk Valley
3. Jefferson County
4. St. Lawrence Valley
5. Transition zone between Adirondack Highlands and St. Lawrence Valley (location of Pine Hill).

While the Erie Ontario Plain would support groups which are most likely to tend toward the focal economy end of the continuum, in the transitional zone the groups would most likely tend to practice a diffuse subsistence economy. Other factors such as soil and rainfall will locally affect the capability for growing maize, but the number of frost free days will affect large areas at a time.

During the 61 year period between the visits of Cartier and Champlain, a number of factors could have been acting upon the groups occupying the St. Lawrence region which could have motivated migration from this area. The first is disease. The introduction of European diseases, for which the native Americans had no immunities, decimated many Indian populations. Since the Indian populations along the St. Lawrence were among the first in the Northeast to have contact with the Europeans, it follows that they would be the first to suffer population decrease as a result.

The second factor which may have caused the migration of the St. Lawrence Iroquois is warfare. Cartier recorded seeing scalps of "Toudamans" at Stadacona shown to him by Donnacona, the chief at Stadacona. Donnacona stated that these were taken in revenge for a raid on a fishing party at Gaspé where all but 5 people out of 200 were killed (Morrison 1972). Which group the Toudaman represent is questionable, but the evidence for warfare with neighboring tribes is evident. The ethnic group(s) at Stadacona and Hochelaga which were the first to suffer from European diseases would be in a weaker position to defend themselves against the pressures of outside groups, be they Algonkian-speakers, Five Nation Iroquois, or Huron.

Also, the formation of the league of the Iroquois is believed to have occurred sometime during the early contact period. By the early decades of the 17th century, ethnohistorical records contain references to the confederacy of the Iroquois (White 1971). Although there was no evidence of warfare among the confederacies in the western New York region prior to the 1630's (White 1971), it cannot be stated with certainty that there was no warfare between one or more of the Five Nation Iroquois tribes and the groups occupying the St. Lawrence region.

Two explanations have been proposed for the Iroquois expansion policies following contact: 1) the quest for new beaver territory and 2) the jockeying for the middleman position in the trade network between the Indians and the Europeans. Since the St. Lawrence Iroquois were some of the first to be displaced, the first explanation has to be at least in part rejected. Therefore, if there was an increase in warfare, explanations will have to be looked for in the prime position with respect to European trade occupied by the northern Iroquois groups.

The third factor concerns the forced change in adaptive patterns caused by the first two factors. The groups occupying the St. Lawrence region probably tended to practice a more diffuse form of subsistence economy than the Five Nation Iroquois groups. The reduction in population and the pressure from other groups (note: this external pressure of warfare need not necessarily increase but the reduction in population could reduce the ability to defend) would also reduce the ability of these groups to practice this form of economy. As noted in the text, the people at Pine Hill probably trapped the majority of their game. Pressures from other groups would reduce this capability in two ways. First, if other groups were exerting pressure by forcing the population into a defensive position, traplines could not be watched as carefully, thus reducing the amount of game to be actually taken. Second, other groups could exert pressure by taking needed game which would reduce the game population. Also, as noted, maize could be grown, but not always successfully for storage. All the above factors could lead to a reduction in food resources and lessen the ability of the groups to exploit their environment. Therefore, a third factor can be added to the factors of disease and warfare, which would have added to the pressures for migration to an area of less stress.

Until further research is accomplished in the areas of ecological adaptation and migration patterns, no definitive statements can be made. It is hoped that this report will stimulate further research into ecological adaptation patterns and the implications thereof.

APPENDIX A

A List of Mammals Found at the Pine Hill Site, Their Distribution and Habits

In order to comprehend more fully the subsistence economy of the northern Iroquois, it is necessary to know the mammals that occurred in the ecological zones of the area and how their habits would make them available to the Iroquois. Although the Indians of the Pine Hill site did not utilize all the available mammals in the region, it is important to know which mammals were utilized in order to determine hunting patterns, seasonality of the site, and food yield.

Whitetail deer-*Odocoileus virginianus*

The whitetail deer occurs throughout the southern deciduous forests and reaches its northern limit at the northern margin of the Canadian province. This species is typically associated with edge situations between forests and open areas. Deer are solitary animals, but they do band together where food is abundant. Deer also tend to establish a range of approximately one square mile.

Black bear-*Ursus americanus*

The black bear once roamed over most of the North American continent in a wide range of habitats. However, he does prefer heavily wooded areas. The black bear is a solitary creature with established trails along which he could be hunted. He does not truly hibernate during the winter, but does sleep through the worst part, January through March.

Grey wolf-*Canis lupus*

At one time the wolf inhabited all temperate and arctic regions of North America. He, like the black bear, occurred in a wide range of habitats. The wolf is not a solitary animal, but travels in a family unit. Several family units may band together during severe weather to form a "wolf pack." Wolves prefer broken country with highlands or plateaus cut by ravines and canyons with some wooded cover.

Beaver-*Castor canadensis*

The beaver once ranged over most of North America where there were lakes and streams with wooded shores. Beaver was hunted in all seasons of the year, but probably most frequently during the winter and early spring.

Muskrat-*Ondatra zibithica*

This aquatic species has a wide range covering almost all of North America and is always found in association with water courses and wet places with abundant marsh vegetation.

Porcupine-*Erethizon dorsatum*

Although the porcupine is now almost exclusively a resident of the northern coniferous forests, there is some evidence that its range formerly extended farther south into the deciduous forests. The porcupine is a woodland animal. He prefers areas with conifers and aspens. These animals are slow, easy to capture, and were available throughout the year.

Snowshoe hare-*Lepus americanus*

The snowshoe hare has a vast range which crosses northern New York and southward through the Adirondack and Catskill Mountains. Individual hares may have a range of one to two miles. The species extends southward to the southern limits of the Canadian province. Throughout its range this species prefers dense conifer swamps and thickets.

Eastern chipmunk-*Tamias striatus*

The eastern chipmunk ranges eastward from the Great Plains through the Canadian and Carolinian provinces. It inhabits hardwood forest and forest edges. It is uncommon in swampy woodlands. It is a terrestrial animal and rarely climbs. Chipmunks are true hibernators and are not found in winter.

Red squirrel-*Tamiasciurus hudsonicus*

The red squirrel is found all over Canada far to the north. His range in the United States includes New England and the Great Lakes region. To a large extent the red squirrel inhabits evergreen forests, but can sometimes be found in deciduous forests.

Woodchuck-*Marmota monax*

The woodchuck prefers forested and brushy areas near open clearings. Woodchucks are diurnal and hibernate during the winter.

Mink-*Mustela vison*

The mink originally ranged over most of North America. It is most frequently found near water during the summer months and in woods during the winter.

Striped skunk-*Mephitis mephitis*

The striped skunk is found throughout North America except in northern Canada and southern Florida. It occupies a wide range of habitats.

Raccoon-*Procyon lotor*

The raccoon range encompasses the southern portion of the Canadian provinces south to Mexico. It prefers partially cleared land near broad-leaf trees which are close to streams and lakes. The raccoon is common in most woody and swampy areas. Raccoons are nocturnal and sleep through part of the winter. The Indians took many raccoons during the winter for their fur as well as their meat.

Red fox-*Vulpes fulva*

The red fox is found throughout most of Canada and the United States. The red fox appears to prefer partially cleared land near forest cover. It is active throughout the year, both during the day and the night.

Note: All of the above information was derived from Cleland (1966) and Caras (1967).

APPENDIX B

Chi Square test comparing the two sets of minimum numbers calculated for the Pine-Hill site.

	Minimum # by Section	Minimum # for site	Total
Whitetail deer	40	18	58
Black Bear	15	3	18
Grey wolf	8	2	10
Beaver	17	4	21
Muskrat	21	12	33
Porcupine	4	2	6
Snowshoe hare	9	2	11
Eastern chipmunk	9	6	15
Red squirrel	6	4	10
Woodchuck	10	2	12
Mink	2	1	3
Striped Skunk	1	1	2
Raccoon	1	1	2
Red fox	1	1	2
	144	59	203

d.f. = (column-1) (row-1)

d.f. = (14-1) (2-1)

d.f. = 13

F_o	F_e	$(F_o - F_e)^2$	$\frac{(F_o - F_e)^2}{F_e}$
40	41.1	1.21	.0294
15	12.8	4.84	.3781
8	7.1	0.81	.1140
17	14.9	4.41	.2959
21	23.4	5.76	.2461
4	4.3	0.09	.0209
9	7.8	1.44	.1846
9	10.6	2.56	.2415
6	7.1	1.21	.1704
10	2.1	2.25	.2647
2	2.1	0.01	.0047
1	1.4	0.16	.1142
1	1.4	0.16	.1142
1	1.4	0.16	.1142
18	16.9	1.21	.0715
3	5.2	4.84	.9307
2	2.9	0.81	.2793
4	6.1	4.41	.7229
12	9.6	5.76	.6000
2	1.7	0.09	.0529
2	3.2	1.44	.4500
6	4.4	2.56	.5818
4	2.9	1.21	.4172
2	3.5	2.25	.6428
1	0.9	0.01	.0111

APPENDIX B (continued)			
F_o	F_e	$(F_o - F_e)^2$	$\frac{(F_o - F_e)^2}{F_e}$
1	0.6	0.16	.2666
1	0.6	0.16	.2666
1	0.6	0.16	.2666
			7.8529
$X^2 = \frac{(F_o - F_e)^2}{F_e}$			
$X^2 = 7.8529$			
$P = .85$			

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PREHISTORIC ARCHAEOLOGY AT MOUNT SINAI HARBOR,
SUFFOLK COUNTY, NEW YORK

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INTRODUCTION

Between Mount Misery (now Belle Terre) and Miller Place on the soundward shore of central Long Island, New York, lies Mount Sinai Harbor (lat. 40°57'30", long. 73°02'00"), the easternmost protected harbor on the north shore (see cover). A culturally complex prehistoric habitation zone rings the harbor, for the area was and still is one of great natural riches. Archaeological inquiry in this promising area is well underway, but there is insufficient evidence at the present time to propose with any confidence models of prehistoric subsistence and settlement for Mount Sinai Harbor. It is toward this end that the present essay, a preliminary analysis of the ways in which archaeologically-recovered information articulates with environmental data for the Mount Sinai Harbor area, provides a beginning. Its aim is fourfold: (1) to describe the geology and microenvironments of Mount Sinai Harbor; (2) to review briefly



Fig. 1

the available record of prehistoric occupation at the harbor and to add to it some observations based on my recent participation in archaeological investigations there; (3) to suggest how documented changes in middens at Mount Sinai Harbor might be reflections of ancient changes in its configuration; and (4) to discuss the theoretical possibility of year-round aboriginal occupation at the harbor.

I.

Mount Sinai Harbor itself is shallow, small (only about $\frac{3}{4}$ km²), and is bounded on three sides by an intertidal marsh in which the dominant vegetation is cord grass (*Spartina alterniflora*). The somewhat reduced salinity of water entering the harbor from Long Island Sound (sound water in this area is 28 ppm saline) is lowered further within the confines of the estuary to about 27 ppm. This mixing is largely due to continuous spring sapping around the marsh perimeter. Although a wide variety of edible shellfish species is found in the harbor, the dominant contemporary epifaunal and intrafaunal bivalves are, respectively, the blue mussel (*Mytilus edulis*) and softshell clam (*Mya arenaria*).

A long barrier bar (Cedar Beach, Fig. 2) of coarse sand and gravel projects in a westerly direction from the eastern side of the harbor, creating a narrow access channel to the Sound. Although this bar has experienced many changes in configuration, both natural and man-made, over the years (a map made in 1931 shows two channels cut through it, whereas 1836 and 1977 maps show only one) there is no indication that the harbor was not always open in some degree to Long Island Sound. A number of ever-changing inter-tidal "islands" are present within the harbor, and although the possibility exists that they were created by sedimentation from storm washover or breaching of the barrier bar, the chief source of the sediment that shapes and reshapes these islands is probably tidal input from the Sound (Flessa *et al.* 1975:106).

Glacial recession from Long Island was probably complete by about 16,000 years B.C., leaving two terminal moraines and deposits of glacial till and outwash and lacustrine sediments, mostly coarse gravels (Sirkin 1974; Sirkin and Mills 1975). A post-glacial conifer cover consisting mainly of spruce and pine was beginning to be augmented by hardwoods such as oak and hickory at that time (Sirkin 1971; Thomas *et al.* 1975)-trees which, because of their food value, have much greater utility for man than conifers. A global warming trend about 12,000 B.C. encouraged Paleoindian settlement of the Northeast. By 8,000 B.C., when Paleoindians may well have been present in coastal New York, deciduous species dominated forests all along the eastern seaboard; the Pleistocene megafauna were rapidly becoming extinct, perhaps with the help of aboriginal hunters, and were being replaced by the temperate-climate fauna that are indigenous today (Thomas *et al.* 1975:37). By about 5,000 B.C. the modern distributions of both flora and fauna had been achieved.

Thermal maximum was reached by early Late Archaic times at ca. 3,000 B.C.; temperatures then dropped until ca. 500 B.C. A second warming trend, beginning in the early Late Woodland period, followed and there was another drop ca. 1600 A.D. (*Ibid.*). It is interesting to note that each of the two major periods of Holocene climatic amelioration appears to have coincided with a cultural florescence. The question of sea level rise in the Holocene in Eastern North America, of particular interest to coastal archaeologists, has been debated in the literature for years (Salwen 1962; Bloom and Stuiver 1963; Stuiver and Daddario 1963; Shepard 1964; Redfield 1967; Snow 1972; Braun 1974; Edwards and Merrill 1977; and others). Salwen (1962) following Fairbridge (1961) originally proposed fluctuations within a generally rising trend for Long Island (and elsewhere), but Bloom and Stuiver (1963), working with radiocarbon dates obtained from peat samples in coastal Connecticut, postulated a steadier rise. Stuiver and Daddario (1963), on the basis of peat samples from the New Jersey coast, subsequently demonstrated a rapid rise in sea level of 3 m/1000 years between 4,000 and 600 B.C., followed by a much slower rise at the rate of 1.2 to 1.4 m/1000 years. Their findings were substantiated by Shepard (1964) and Redfield (1967), who proposed local subsidence of the eastern coast of the American continent in conjunction with slow eustatic rise for the slightly more rapid than average advance in sea level in this area; Shepard (1964:574) explicitly denied the possibility of dramatic fluctuations in the Holocene.

Presently it is thought that although maximum eustatic low occurred sometime between 16,000 and 12,000 years B.C., there may have been substantial submergence of the Long Island area about 13,000 B.C. due to local isostatic adjustments (Edwards and Merrill 1977:3). The model of subsequent rapid sea level rise (13,000 to 5,000 B.C.) followed by a period of slowdown (4,000 to 600 B.C.) and yet another

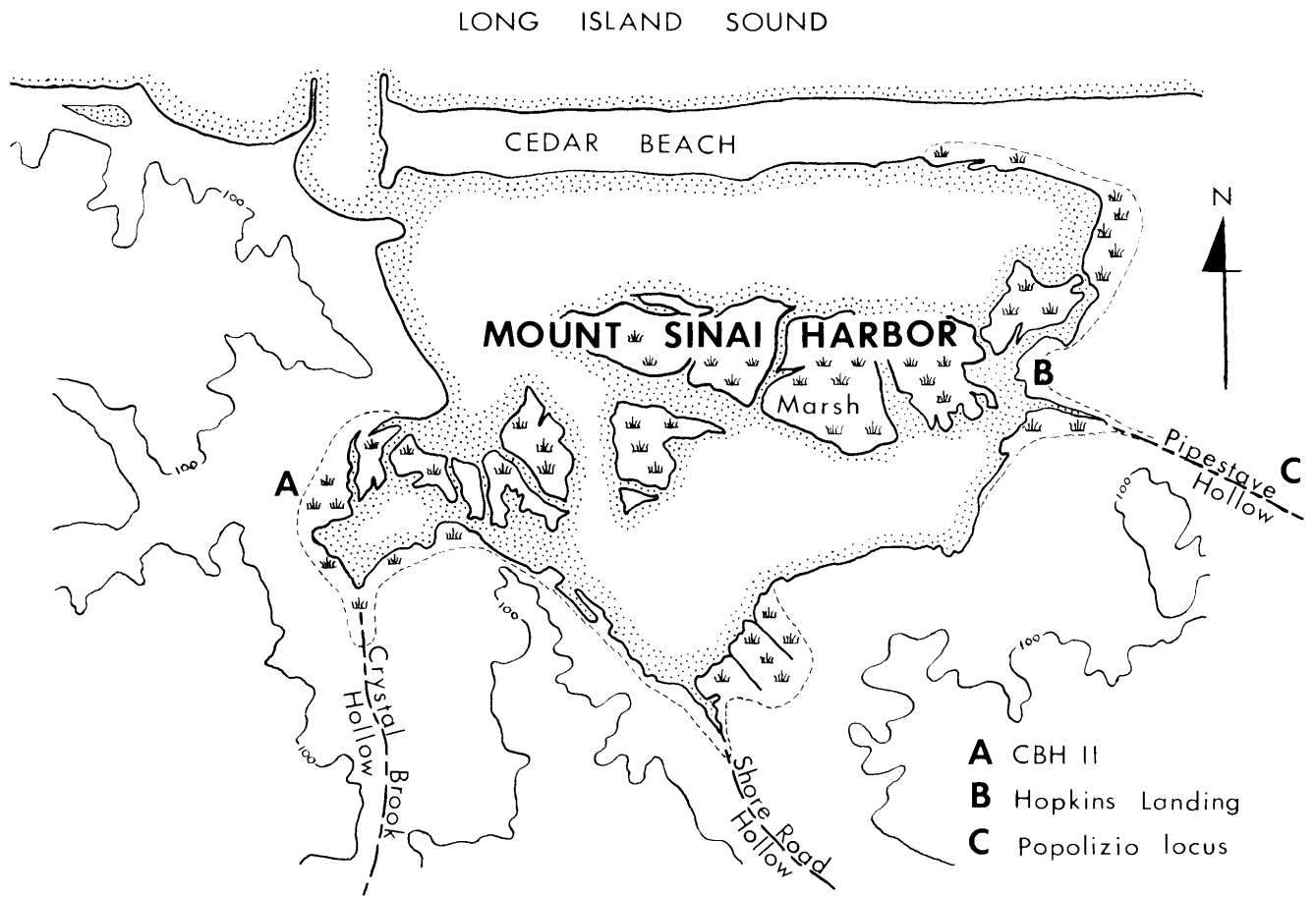


Fig. 2

slowdown (to the present time) is generally accepted. The Paleoindian, Early Archaic and Middle Archaic cultural periods thus are poorly represented in coastal areas of the Northeast, but by Late Archaic times sea level was so close to present levels that its subsequent small rise has failed to obliterate much of what remains on Long Island from that period.

Prehistoric Long Island falls into the general cultural purview of the Northeastern Woodlands, but cannot be viewed as typical of the Northeast environmentally because of its more temperate climate and coastal setting. The milder, more even climate caused the biota to be quite different, both in species concentration and distribution, from that of inland Northeastern areas, and it would be reasonable to deduce that this had an effect on aboriginal occupants. Precipitation is ample, averaging about 46 in. a year on the north shore, which amounts to two million gallons per day per square mile. Periods of extended drought are rare. There are approximately 207 frost-free days in the average year in Setauket, the site closest to Mount Sinai Harbor for which this information is available (Taylor 1927). Prevailing winds are from the southwest in summer, northwest in winter.

The microenvironmental approach works well for the archaeology of Long Island because of the relatively small size of the island and the proximity of several such environments to each other. Mount Sinai Harbor has three distinct microenvironments within a 1 km radius of any point along its shores, and within them all subsistence necessities and all cultural necessities except for steatite and clay, used for cooking and storage utensils in the Transitional and Woodland periods, are available. (Steatite is not native to Long Island but is found in quantity in Connecticut, Rhode Island and Massachusetts. I know of no closer clay source to Mount Sinai Harbor than Nissequogue ["clay place," in Algonkian], some thirteen miles to the west.) These are: (1) the marine environment of sound and harbor; (2) the marsh and estuarine environment along the shores of the harbor; and (3) the woodlands environment surrounding the area.

1) The marine environment. Faunal remains from the Pipestave Hollow and Crystal Brook Hollow archaeological sites (Fig. 2) indicate that this micro-environment was being systematically exploited as a food source in every cultural period from the Late Archaic onward. Additionally, the prehistoric use of the harbor and the Sound for transportation, and as a source of seaweeds and lithic raw materials, while not archaeologically documented, is possible.

2) The marsh environment. In the past, three freshwater streams flowed into Mount Sinai Harbor: Pipestave Hollow Brook, Crystal Brook, and a third, unnamed stream which flowed in the hollow containing present-day Shore Road. Due to deforestation, erosion and silting-down from the higher ground adjacent to all three hollows, and due possibly also to the overall lowering of the water table in this century, none of these contains surface flow now. Although the time at which they ceased to flow is not known, the archaeological evidence suggests that both Pipestave Hollow and Crystal Brooks were active freshwater streams in both Late Archaic and Woodland times. The tidal estuaries of these two streams, and the marsh into which they emptied, provided prehistoric man with an environment of astounding natural richness. (An estuarine/marsh area will produce 5 to 10 tons of biomass per acre per year, as compared to 1 ½ to 5 tons per acre per year for the most productive, irrigated farmland [F. Turano 1977: pers. comm.].) Shellfish remains of at least five edible genera—clam, both *Venus mercenaria* and *Mya arenaria*; oyster, *Crassostrea virginica*; scallop, *Pecten irradians*; mussel, both *Mytilus edulis* and *Modiolus demissus*; and whelk, *Busycon canaliculatum*—were available all year round, and have been identified in the middens. Varieties of reeds and shrubs also thrive here; some are edible (for instance, the beach plum, *Prunus maritima*), and others have great utility to man for construction of matting, basketry and thatch. The dominant ones are cord grass (*Spartina alterniflora*) and salt hay (*S. patens*); together they comprise about 75% of the marsh flora on the north shore of Long Island.

Into this environment in prehistoric times came year-round or seasonal populations of birds and mammals, attracted by the presence of marsh flora and fauna. Salt hay, for instance, is sometimes sought as a winter food source by deer, although it is not their first choice; raccoons sometimes take crab and mussel. Ducks, geese, the white-tailed deer (*Odocoileus virginianus*) and small mammals such as the Eastern cottontail rabbit (*Sylvilagus floridanus*) and the raccoon (*Procyon lotor*) are recorded archaeologically. In addition, two out of three local species of fish are somehow tied into the salt marsh, either because they breed there, or because they feed on something that breeds or lives there (F. Turano: pers. comm.).

3) The woodlands environment. Wooded areas adjacent to Mount Sinai Harbor contained floral resources (nuts, seeds, berries, fruits, roots) as well as non-edible resources such as wood and stones. Oak

dominates these wooded areas now, but until the blight of the 1890's the nut-bearing chestnut (*Castanea dentata*) was the dominant species. Hickories of several kinds (*Carya glabra* and *C. cordiformis*) are also present. Except for a few charred hickory-nut fragments, these perishable resources have left no trace in the archaeological record, but their presence and utilization are strongly suggested by a boulder mortar recovered from the Hopkins Landing locus of the Pipestave Hollow site. Tree-dwelling birds and mammals, especially the gray squirrel (*Sciurus carolinensis*) were yet another woodlands resource.

In addition to these three nearby microenvironments, one other Long Island habitat may have been exploited by human populations of Mount Sinai Harbor. This is the pine barrens area south of the Harbor Hill moraine, 10 km. Its lack of water and the fact that this is a fire climax environment surely prevented human occupation in the prehistoric period, but the high permeability of the sandy soil in this area is conducive to vegetation sought by deer and birds, especially the heath hen (*Tympanuchus cupido*), an eastern variant of the prairie chicken, which was abundant here as late as the 1870's.

II.

No evidence presently exists for Paleoindians at Mount Sinai Harbor. MacDonald (1971), Funk (1972), and Dragoo (1976) present recent overviews of the well-documented, thriving Paleoindian culture in Northeastern North America, but to date no remains of Pleistocene megafauna have been reported from Long Island; the closest finds have been those of mastodon remains from Brooklyn and Manhattan (Kraft 1977:3). But a sprinkling of Paleoindian artifacts has turned up on Long Island. Fourteen fluted projectile points, all from collections, were studied and reported by Saxon (1973), and although provenience was imprecise for all, Paleoindian exploitation of the area is clearly indicated. Further, although lengthy occupations cannot be demonstrated, "the use of a local material (quartz) for three of the specimens might indicate that the Paleo-Indian was on the island long enough to experiment with and adopt ... the local raw materials . . ." (Saxon 1973:9).

Significant Paleoindian finds *have* been made close to Long Island; see for instance the work of Witthoft (1952) at Pennsylvania's Shoop site; Funk (1972) at the West Athens Hill and Kings Road sites in Greene County, New York; Funk, Fisher and Reilly (1970) at Dutchess Quarry Cave in Orange County, New York; and Kraft (1977) at the several loci of the Port Mobil site on Staten Island. On the basis of these, together with the scatter of artifacts reported by Saxon, it must be assumed that the faunal and marine resources of Long Island, possibly including the present-day Mount Sinai Harbor area, Sound floor, and large areas of the continental shelf east of the island, were being exploited by man in the Paleoindian period.

The slow but dramatic cultural reorientation signaling the Early Archaic period in the Northeast, which lasted until perhaps 6,000 B.C., has left no trace on Long Island. Funk and Lord (1972) and Dincauze (1971) have most recently documented the presence of Early Archaic adaptations for the Northeast; presumably sites from this period do exist on Long Island but are now submerged because of their (former) littoral locations.

For the same reason, relatively little is known about the Middle Archaic period (6,000-1,000 B.C.) in its Northeast coastal manifestation, as the relatively rapid rise in sea level continued until Late Archaic times. In other areas of the Northeast, low population density and cultural innovations such as grinding and polishing of stone tools are the hallmarks of the Middle Archaic. Brennan (1974) has documented the presence of Middle Archaic shellfish gatherers in the lower Hudson estuary from approximately 4,950 B.C.; Ritchie (1959) has proposed a Middle Archaic date for Midden B at the Stony Brook site on Long Island, although one radio-carbon date from this midden—on possibly intrusive charcoal—corresponds closely with that obtained from Midden A, representing the Transitional period Orient cultural complex. No Middle Archaic site has been excavated at Mount Sinai Harbor to date.

The Late Archaic period, beginning about 4,000 or 3,000 B.C. and lasting until approximately 1000 B.C., is generally distinguished from the preceding period in the Northeast by a burgeoning population, a proliferation of clearly distinguishable regional adaptations, and the documented interareal exchange of raw materials (see Griffin 1967:178). Slowing of the rate of sea level rise, and stabilization of climate, had been achieved. Along Long Island shores, enormous populations of shellfish had become well established.

Gramly (1977) has reported the presence of a "major locus" of the Late Archaic Squibnocket Complex on the eastern shore of Mount Sinai Harbor. One of the largest excavations of a Late Archaic coastal site

in the Northeast, the Archaic component of the Pipestave Hollow site is dated, on the basis of charcoal recovered from one of its many cooking features, to 2015 ± 140 years B.C. (Two more recently-obtained radio-carbon dates substantiate this one [Gramly 1978: pers. comm.].) While a great range of faunal remains was recovered and identified, the inhabitants were, above all, shellfishermen. Remains of bay scallop and oyster significantly dominate the faunal remains, and Gramly speculates that a difference in the configuration of the harbor in the Late Archaic may have resulted in a more bay-like environment favorable to these species (*Ibid.*:24), a point to which I will return. Striking features of the Hopkins Landing and Hopkins Point (Late Archaic) loci of the site include numerous implements of bone flaked much as stone implements of the period, and an assemblage strongly reminiscent of the Lamoka Complex. (The results of Gramly's research on the Pipestave Hollow site will be published as a monograph. Preliminary analyses are found in Gramly [1977] and Gramly and Gwynne [1978].) Several of the features contained the articulated remains of dogs in purposeful interments, indicating that these animals were kept as pets, or at least as hunting aids for whom some affection was felt at death. No sure indications of structures dating from this period were recovered.

The period of cultural transition from preceramic Late Archaic to ceramic-using Woodland adaptations was documented for Long Island by Ritchie (1959) on the basis of his work at the double-component Stony Brook site, a few miles west of Mount Sinai Harbor on the north shore of the island. In this short period, dated from around 1300 B.C. to 1000 or 900 B.C., new material cultural manifestations such as the introduction of Connecticut steatite or soapstone-actually amphibole-talc schist-like rock-for cooking vessels, and the Orient Fishtail diagnostic projectile point type, appear to be superimposed on the Late Archaic settlement-subsistence pattern (Ritchie 1959:10). No securely-dated Transitional period site has as yet been reported for Mount Sinai Harbor. However, on the basis of material cultural evidence, in combination with economic subsistence indicators, I suggest that a Transitional period component of a multi-component site has already been excavated at the harbor.

On the west side of Mount Sinai Harbor, the Crystal Brook Hollow II site, located and excavated by E. Johannemann in 1973, yielded a wide range of cultural materials, including quartz bifaces, hammerstones and drills, and hematite paintstones, apparently of the Archaic through Woodland periods, from a thin midden lying 4 to 6 in. beneath the present surface (Fig. 2). No radiocarbon determinations have yet been made, but possible occupation in Archaic times is hinted at by numerous Wading River type projectile points. Beekman Triangle-like and Snook Kill types were also represented; the former is typically associated with the Laurentian tradition in the earliest part of the Late Archaic, and the latter with the intrusion into the Squibnocket complex of Susquehanna tradition influences in the terminal Late Archaic (Ritchie 1969a:219 and elsewhere). A classic Orient Fishtail point and a Susquehanna Broadpoint of Coxsackie chert, plus the presence of steatite fragments in association with hearth platforms, suggest that the site was occupied in Transitional times.

The occupants of the CBH II site were primarily marine-oriented; deer bone was present in the midden but in limited quantity. Although no fish bones except sturgeon were recovered, the presence of sturgeon plate, harpoons and netsinkers in the assemblage indicates that the inhabitants were fishermen, who probably used weirs. The bulk of the subsistence detritus in this midden, however, consisted of the shells of hard and soft clam. Few oyster and no scallop shells were reported. This is puzzling, for scallop and oyster shell predominate in the Late Archaic Pipestave Hollow site on the east side of Mount Sinai Harbor, and the intensive gathering of hard and soft clam is strongly associated in coastal New York with middens dating to the Woodland period. Although the site is not well stratified, the implications are that the occupation dates to Transitional times, and that the Wading River point type cannot reliably be used as a horizon marker for Long Island sites. The relatively early Archaic Beekman Triangle projectile point recovered from the CBH II site could be an anomalous intrusion or perhaps a misidentified Levanna (Woodland) triangle type.

Ritchie concludes, on the basis of his work at the Hornblower II site, that the ubiquitous quartz "small stemmed point," to which the Wading River type is analogous, "had a long temporal range and a wide geographical spread" (1969a:54). The CBH II excavation tends to confirm this conclusion. The shellfish evidence and the unreliability of the Wading River point type as a diagnostic type together force the conclusion that the CBH II midden was deposited in Transitional to Early Woodland times. It remains for datable samples, removed from the midden, to be submitted for radiocarbon analysis to prove or disprove this suggestion. (Data from the Crystal Brook Hollow II site are currently being studied by E. Johannemann, and the results are being prepared for publication.)

The Woodland period is well documented for much of the Northeast (cf. Ritchie and Funk 1973 for the most definitive recent review) but its published archaeological record in the environs of Mount Sinai Harbor is scanty. In 1976 and 1977, at the southernmost end of the Pipestave Hollow site, Gramly investigated a midden of mixed Archaic and Woodland cultural materials. Numerous sherds of grit-tempered interior and exterior cord-malleated pottery were recovered; some appeared to be of Early Woodland Vinette I type, although the fragments recovered were too small to determine whether or not these represented coil made pots with conoidal bases, as is typical of Vinette I. Woodland projectile point types ranged in age from the Early Woodland Lagoon type to the classic Late Woodland Levanna Triangle. Late Woodland materials, however, dominate the assemblage. Basin-shaped hearths in association with 29 postmolds, strongly suggesting the presence of a dwelling structure oval in shape, provided the only clue to aboriginal house form yet recovered from the Mount Sinai Harbor area (Gramly 1977:25; Gramly and Gwynne 1979). A radio-carbon determination of 1240 ± 121 years A.D. (uncorrected) was obtained from charred nut fragments from a hearth located within the presumed dwelling, securely dating it to the Late Woodland period.

The relatively high proportion of deer bone to other food remains at this locus, as well as the presence of numerous fragments of charred nuts, probably hickory, suggest that this higher and more protected area of the site may have been occupied, both in Archaic and Woodland times, in the fall and winter. Porgy (*Pagrus pagrus*), blackfish (*Dallia pectoralis*), sturgeon (*Acipenser sturio*), and shark (*Carcharodon carcharias*) have been identified from the site, as well as black duck (*Anas rubripes*), typically a winter visitor to Long Island shores.

The CBH II site, excavated by Johannemann in 1973, contained the only other Woodland period cultural remains from Mount Sinai Harbor to which I was able to gain access. Like the Popolizio locus of the Pipestave Hollow site, this was a culturally mixed midden, although in the case of CBH II, Woodland period materials were in the minority, suggesting that it does not represent a significant habitation site of the Woodland period.

The moist, fertile soils of the Mount Sinai Harbor area have been cultivated intensively in the post-contact period, but no evidence of cultigens has yet been recovered from prehistoric archaeological sites here, although flotation was performed at various loci of the Pipestave Hollow site and at Crystal Brook Hollow II. However, during the 1978 field season a number of stone tools akin to the so-called "discs" which Ritchie and Funk (1973) have identified as agricultural implements at several upstate New York aboriginal sites were recovered at Mount Sinai Harbor, as well as two chipped-stone implements which have all the characteristics of hoes. These, in conjunction with the suitability for agriculture of the area in which they were found (a gently-rising terrace, near fresh water, with an eastern exposure) and the absence of features, have led me to the tentative interpretation of this site as a prehistoric or proto-historic agricultural terrace, the first discovered in this area.

To my knowledge, no ethnographic account of aboriginal peoples at Mount Sinai Harbor in the immediate post-contact period exists.

III.

There is a dramatic changeover at Mount Sinai Harbor from a Late Archaic predominance of oyster and scallop to hard and especially softshell clam in middens dating from the Woodland period. For example, two features from the Late Archaic Hopkins Landing locus of the Pipestave Hollow site yielded 53% bay scallop and 70% oyster remains respectively, while an Early or Middle Woodland feature at the Popolizio (southernmost) locus of the site contained 8517c softshell clam shells (Gramly 1977:22-23; *Ibid.*:25). Cultural dietary preference, over-collection, predation from another species, or a change in the regime of the harbor can be postulated to explain these temporal differences in shellfish remains. Substantiation of the first postulate must be based on ethnographic analogy and hence is indirect and very subjective, but technologically primitive peoples today do of course have food taboos and preferences. It must be remembered further that prehistoric Long Island was an extraordinarily beneficent area in which Late Archaic peoples, at least, were able to keep-and presumably feed-dogs, suggesting that food was plentiful enough to allow for some choices. The second postulate, over-collection, is equally difficult to substantiate; it can be noted only that individual shellfish too small to have provided much nutritional value were systematically being taken from the harbor along with specimens of mature size; in other

words, aboriginal people there were making no attempt at species preservation by size selection. Unusual reduction of oyster and scallop populations by predation from other marine species can be ruled out immediately since *both* oyster and clam shells show, in approximately equal amounts, evidence of boring by the predatory oyster drill and moon snail. Whelk is also a major predator upon bivalves, and is present in both the Late Archaic and Woodland features.

The fourth postulate, that changes in the harbor itself during the Early Woodland period favored hard and softshell clam populations at the expense of scallops and to some extent oysters, seems most likely. Changes in climate, sea level or the configuration of the harbor's barrier bar, or a combination of these, could result in changes in the biological regime of the harbor. Braun (1974:593), in an essay arguing that ecological factors related to postglacial sea level rise, rather than the cultural factors presented by Ritchie (1969) and Snow (1972), are responsible for the rapid spread of shellfishing in terminal Late Archaic and Woodland times, points out that the change in composition of east coast shell middens is a least partly attributable to cooler water temperatures in the Labrador Current until about A.D. 400. Scallops and oysters are warm water species, while softshell clam prefers cooler temperatures. However, this explanation does not account for the relatively high incidence in Mount Sinai Harbor's Woodland period middens of the hard clam or quahog, also a warm water species.

Another consequence of rising sea level has been a gradual narrowing through the years of the marshy area at the border of the harbor. Oysters, prevalent in Archaic times, are particularly well adapted to high-sediment, estuarine conditions, where the animal's ability to eject large quantities of silt from its body adapts it for life in this highly stressful but nutritious environment. I think it likely, therefore, that the presence of very large quantities of oyster shells—for instance, 70% of the shellfish contents of one feature reported by Gramly—suggests the Late Archaic presence of a much greater expanse of oyster-supporting marsh at the mouth of Pipestave Hollow Brook than exists today. This concurs with what is known about deforestation, erosion and the gradual silting-in of brooks and hollows elsewhere on Long Island's north shore and marsh formation in times of rising sea level. ("The salt marshes of the East coast of the United States are the product of a distinctive interaction between the rate of rise of sea level, the rate of mineral sediment input, the rate of production of organic detritus and the rate at which the marsh grasses are able to trap and stabilize the sediment" [Flessa *et al.* 1975:115].) As the three brooks became, over the millenia since the Archaic period, progressively less free-flowing, the estuarine areas at their mouths, where fresh water meets salt, became smaller. This interface, which is particularly conducive to large oyster populations, must have been pushed upwards somewhat into the mouths of these brooks with rising sea level, but the brooks' relatively rapid rate of descent from surrounding high points of the Harbor Hill moraine means that the estuarine areas could not be extended inland very far. With the gradual reduction of this type of marsh-fringe area, one would expect a concomitant reduction in the population of oysters, which thrive in this environment.

Changes in Mount Sinai Harbor's barrier bar would also result in changes in the regime of the harbor. A more extensive bar across the harbor mouth would result in a slower rate of circulation of intra-harbor waters. Dramatic changes in barrier bars have been recorded for various points along Long Island's shores; it is not unusual for a major storm to alter the shape of a barrier bar entirely, and thereby to constrict or enlarge the inlet. Slower circulation of water within the harbor contributes to increased rates of siltation, creating precisely the harbor-bottom conditions most conducive to the expansion of populations of burrowing animals which prefer a soft mud and sand environment, and the corresponding reduction of populations of scallop, which prefers a clean, sand bottom.

IV.

The eastern side of a harbor on Long Island's north shore, because of its vulnerability to the prevailing winter wind, would seem an unlikely place for winter habitation, but Gramly (1977:22) has raised the interesting possibility of year-round occupation of the Pipestave Hollow site on the basis of the presence, in archaeologically-recovered remains, of markers for all seasons of the year. While this hypothesis can be neither proven nor disproven on the basis of information we now have, the possibility of year-round occupation at Mount Sinai Harbor can be amply demonstrated if a list of edible faunal and floral species represented archaeologically at the site is combined with a list of those (perishable) species not represented in the remains but indigenous to the Mount Sinai Harbor area today. Though academic, it

seems nevertheless a worthwhile exercise, in view of the importance of this hypothesis for Late Archaic studies in the coastal Northeast. It must be borne in mind, however, that "the presence of animal remains at a particular location does not, in itself, necessarily mean that the animal was taken for, or eaten as, food" (Warner 1972:29).

Oysters can be taken from Mount Sinai Harbor the year round; other shellfish are available but more difficult to retrieve in the winter. Fish can be taken all year as well; species represented in the Archaic period material from the Pipestave Hollow site are the striped bass, also called the rockfish (*Roccus saxatilis*), sea or black bass (*Centropomus striatus*), angler (*Lophius piscatorius*), blackfish (*Dallia pectoralis*), and, most common, the porgy (*Pagrus pagrus*). Roots may be dug all year, although they are most nutritious in fall, winter and spring when they contain the highest proportion of starch. Many varieties are edible; the roots of the cattail (*Typha latifolia*) and evening primrose (*Oenothera biennis*) are widely found on Long Island today. In addition, several species of birds remain on Long Island all year; remains of mallard duck (*Anas platyrhynchos*) and herring gull (*Larus argentatus*) have been identified from the site. Ring-billed gull (*L. delawarensis*) is also a common year-round inhabitant now. The remains of several small mammals which are available all year, such as the Eastern cottontail rabbit (*Sylvilagus floridanus*) and the raccoon (*Procyon lotor*), were identified at the site, along with the remains of a number of individuals of striped skunk (*Mephitis mephitis*). Indian dog (*Canis familiaris*), now extinct, was also recovered, but from the nature of the finds, in purposeful interments, it is doubtful that this represents a food source. Deer (*Odocoileus virginianus*) are available all year and represented the largest prehistoric protein source other than shellfish.

In summer, the occupants of the Pipestave Hollow site must have taken widely available shellfish, fish, seeds, berries, grasses and fruits, although evidence for only the first two has been recovered. Edible fruit species native to Long Island include the blackberry (*Rubus argutus*), beach plum (*Prunus maritima*), American elderberry (*Sambucus canadensis*), and blueberry, both in its low bush and high bush forms (*Vaccinium angustifolium* and *V. Corymbosum*). Pods of milkweed (*Aesclepius syriaca*), available in late summer, are edible, as are seeds and stalks of the common reed grass (*Phragmites communis*). The remains of several land birds—bobwhite (*Colinus virginianus*), ruffed grouse (*Bonasa umbellus*), and turkey (*Meleagris gallopavo*)—have been identified from the site; although these birds winter over on Long Island, they are most subject to predation by man in the summer months. Numerous other birds are available in summer today, but one must assume that with the ready availability of other seasonal foods, and the difficulty of catching birds, the inhabitants of the Pipestave Hollow site found their summer subsistence elsewhere (see Thomas *et al.* 1975 for a thorough discussion of assumptions about subsistence scheduling). An exception to the assumption is the presence of remains of the American oystercatcher (*Haematopus palliatus*), a migrating species present on Long Island only in summer, which have been identified at the site. Numerous varieties of fish have been identified, as has been mentioned, but only one, the sting ray (*Dasyatidae*; species unknown), which enters harbors and bays in spring and retreats to deeper water in the fall, is a seasonal indicator. Deer are available in summer but are more elusive than they are in the fall.

In the early fall, edible seeds of the indigenous wild sunflower (*Helianthus giganteus*) can be collected, and scallops (now unknown from Mount Sinai Harbor but present in abundance in the Archaic period) are more plentiful and available in shallower water than at other times of the year. The young of anadromous fish return downstream from their spawning grounds; fragments of the bony plates of sturgeon (*Acipenser sturio*) have been identified from the site. Nuts—indigenous species probably available in the Late Archaic include the presently plentiful white oak (*Quercus alba*), black walnut (*Juglans nigra*), and pignut and butternut hickories (*Carya glabra* and *C. cordiformis*)—are ready for harvesting. We can also assume the presence of American chestnut (*Astanea dentata*), plentiful on Long Island until the 1890's. A large intact mortar recovered from the Pipestave Hollow site during the 1977 field season may have been used in the preparation of nut meats. The edible berries of the wintergreen (*Caultheria procumbens*) ripen locally in October; the berries remain on the stem and are harvestable throughout the winter. The deer population reaches its peak number of mature animals in the fall. The Late Archaic presence of land fowl remaining on the island all year has already been mentioned; to these species must be added the broad-winged hawk (*Buteo platypterus*), a migratory bird available here only in mid-September and mid-April.

In the winter, with shellfish still available, deer populations revert to a daytime browsing pattern and are more visible and hence more available than at other times of the year, and waterfowl enroute to

winter habitats may pass through the area as late as December. Many species of birds winter over on Long Island; those identified at the Pipestave Hollow site are the common loon (*Gavia immer*), greater and lesser scaup (*Aythya marila* and *A. affinis*), canvasback duck (*Aythya valisineriu*), common crow (*Corvus brachyrhynchos*), red-necked grebe (*Podiceps grisegena*), goshawk (*Accipiter gentilis*), and barred owl (*Strix aaria*). Small mammals such as mink and weasel, often fish feeders, may have been present but have left no archaeological record. Remains of chipmunk (*Tamias striatus*), woodchuck (*Marmota monax*), and gray squirrel (*Sciurus carolinensis*) have been identified at the site, but as these animals are burrowers it is by no means clear that their remains are contemporary with the site.

Skunk cabbage (*Symplocarpus foetidus*), which comes into leaf in February and March, is abundant in Pipestave Hollow, and is edible. It may have provided a welcome change from a late-winter aboriginal diet of shellfish, waterfowl, roots and stored foodstuffs. Migratory waterfowl are plentiful again in February and March, on their way back to summer breeding grounds. In the late spring, anadromous fish travel from salt to fresh water to spawn, and are more easily procured at this time of the year, with weirs, than at any other. Fragments of sturgeon plate, already mentioned, indicate that this species was sought at the Pipestave Hollow site.

It can thus be demonstrated that, using seasonally-available food resources in conjunction with stored foods (dried fish, dried shellfish, and nuts), prehistoric people might have remained at Mount Sinai Harbor year round. Non-edible resources (stone, grasses, wood) were available; tools for both food procurement and processing show that both these activities were carried out at the site; and a year-round food supply appears, on the basis of the archaeological record in combination with a list of perishable species present today, to have been available. But traces of houses, documented for the Woodland period, are lacking for the Late Archaic in the harbor area. One would expect postmolds from substantial structures either of the longhouse or wigwam variety; none were clearly in evidence, although three suspected postmolds were encountered at the Hopkins Point locus of the Pipestave Hollow site. (Occasional storm washover of much of the site has left deposits of coarse sand and gravel in which postmold identification would be virtually impossible.) And, in considering the possibility of year-round occupation, one would have to add to the lack of postmolds the lack of precedent for year-round occupation at Archaic period sites in the coastal northeast. Hopefully, further archaeological work at Mount Sinai Harbor will resolve the important question of seasonality of occupation.

The young Robert Cushman Murphy (later to become Long Island's most famous naturalist), like many another schoolboy, delighted in the collection of "arrowheads." Fortunately, Murphy made drawings of his collection-and with considerable accuracy (Murphy 1964:27). A page of sixteen projectile points, "found by me in Mount Sinai cornfields, near the harbor" and illustrated by Murphy about 1900, contains, in addition to several untyped specimens, Lagoon, Squibnocket Stemmed, Snook Kill, Bare Island, Lamoka and Levanna point types-a small collection, to be sure, but representative, in its variety, of the long culture history of the environmentally beneficent harbor area, which has provided both substantial and aesthetic rewards to man for many thousands of years.

Acknowledgements

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THE KRAUKLIS SITE, VILLAGE OF MCGRAW
CORTLAND COUNTY, NEW YORK

Ellis McDowell-Loudan

Van Epps-Hartley Chapter

SITE LOCATION

The Krauklis Site is located on the west side of South Street, behind the Krauklis house, in the Village of McGraw, Town of Cortlandville, County of Cortland, Central New York. The house itself is on top of a slight terrace which slopes westward and slightly southward from the house. The area of the site is at an elevation 3-5' lower than the house, a logical position for placement of septic tanks, cesspools, and drainage tiles for private sanitary facilities. Just northeast of the site area, still behind the house itself, is the current cesspool for the Krauklis house. Troubles with this septic system resulted in the excavations which revealed the structure to be discussed in this report.

The land continues to slope westward into a relatively flat field which extends to the west. To the north of the Krauklis property is a raised railroad bed which is now abandoned. About 200 ft. west of the site is the old Underground Railroad tunnel which runs north-south across the open field.

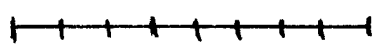
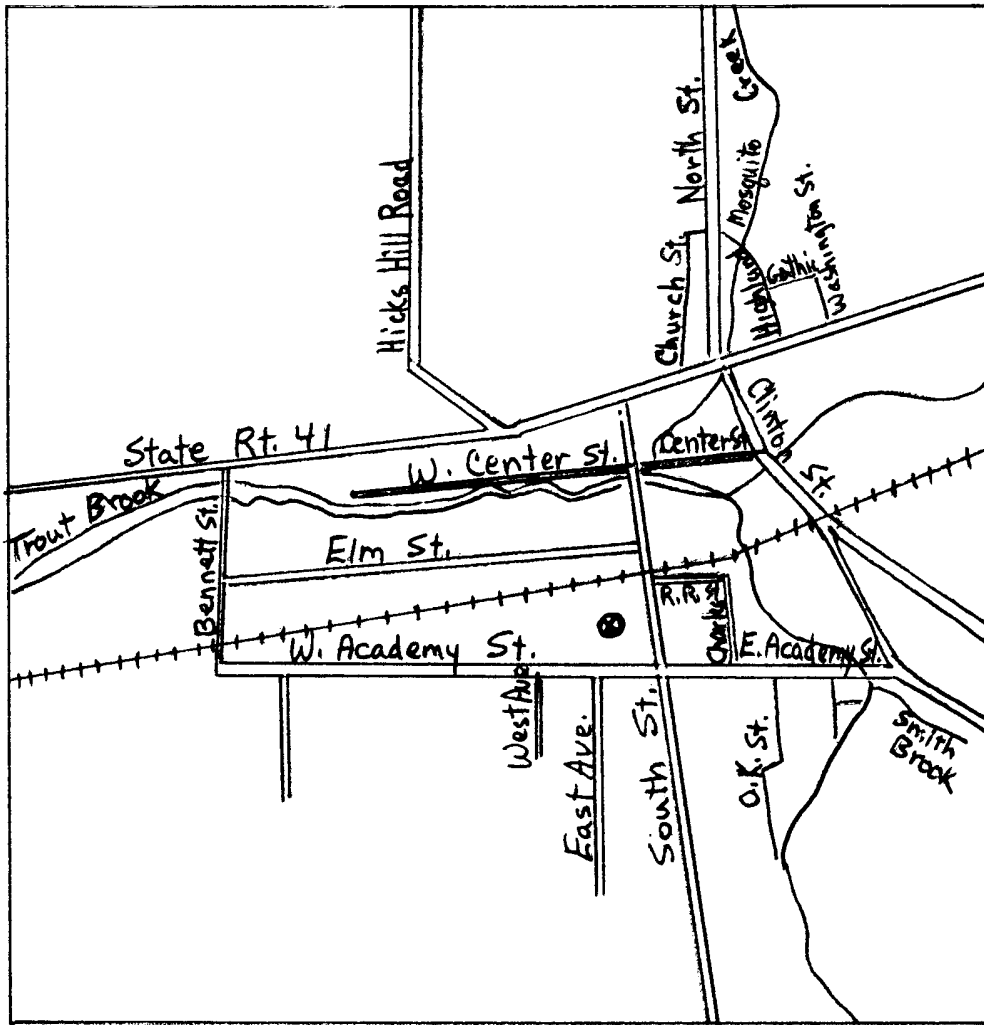
Despite the high rainfall of the Cortlandville area drainage in this area is quite satisfactory. This is due, in part, to the rocky soils. Also, there are various streams that cross the area: Trout Brook to the north, Smith Brook to the east, and other smaller streams that feed these brooks elsewhere (Everts, Ensign, and Everts 1973: Atlas Map of McGrawville, 1876). As a result, subsurface features do not remain saturated, nor do all holes fill with water if left open.

To the south of the property is a row of houses that face on West Academy Street. Portions of these houses have been in existence since the mid- to late 1800's. These older structures were, in most cases, related to the New York Central College facilities that were in existence in the 1860's. Many outbuildings that were part of this complex, or neighbors to it, have been removed. In some cases, their stone foundations remain as reminders of their earlier presence; in other cases, even these have been concealed or removed since their destruction. As is so often the case, records of the uses of some of the outbuildings are not extensive and leave questions unanswered. Thus, it is not surprising that the Krauklis Site area is not fully documented as to all construction activities there may have been over the years.

THE SITE

On April 10, 1978, the writer received a telephone call from Dr. Zenta Krauklis of South Street in McGraw, in which she was informed that excavations in the Krauklis yard had uncovered some old stone foundations. The writer was asked to investigate and see whether it could be determined that these

VILLAGE OF MCGRAW



abandoned railroad



Krauklis Site Location

Scale: 1 inch equals 1000 feet

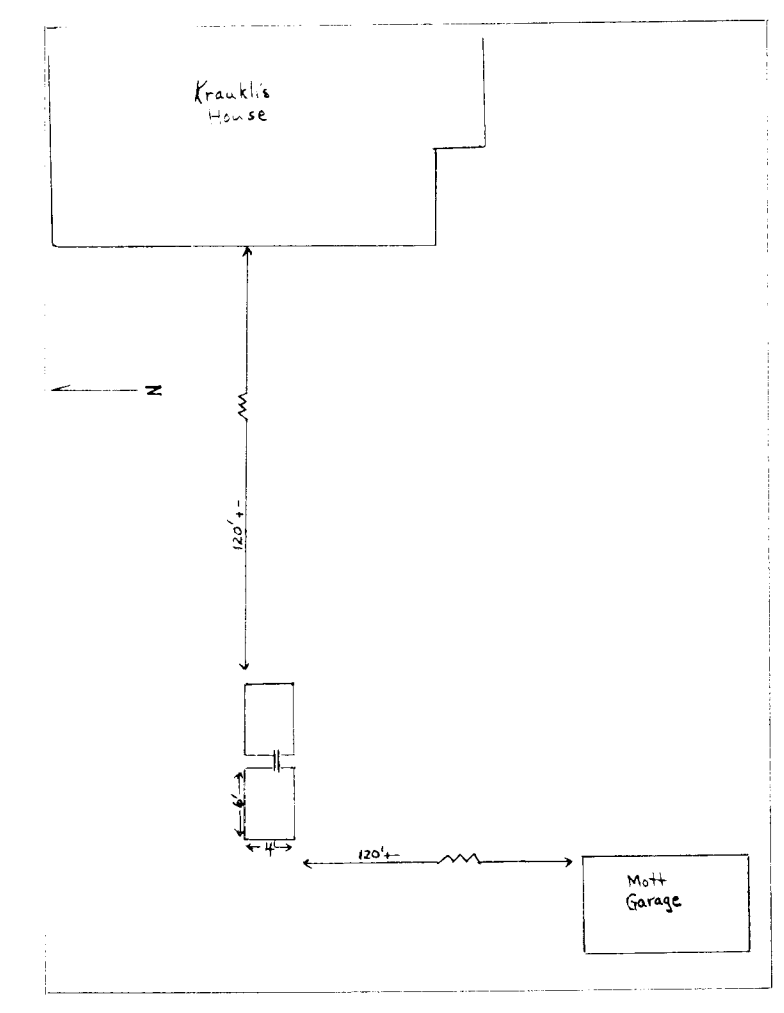
foundations were part of the Underground Railroad tunnel nearby, or the remains of some other structure.

Mr. Gary Loudan investigated immediately, taking a series of photographs (see appendices) and making notes, and talking with the septic tank contractors and the Krauklis family. He made a set of measurements from which the scale drawing of the structure has been made. Further, he carried out some trowel and shovel inspections of the structure to determine its extent and depth.

The writer reached the site in the evening after further excavations had been carried out nearby to determine whether there were other vestiges of the structure 20-30 ft. west of the existing structure. These excavations yielded different soils but no sign of the cut stone and large stone slab materials found in the earlier excavations. Nor did added excavations just northeast of the structural materials found initially yield more of this type.

Essentially, the structure consisted of two stone-walled compartments with fairly straight and uniform walls, with a smaller unevenly-stoned, narrower passage leading toward a cesspool presently in use. The wall begins 2 ft. below today's ground surface and is about 1 ft. thick. The walls of each of the two compartments are 4 ft. north-south, and 6 ft. east-west. The depth determined by excavations in the southwestern corner of the western chamber was 44 in. below the top of the stone walls. Overlaying the stone walls were large stone slabs. They appear to have been well fitted to cover the chambers snugly. The second chamber was similar to the first in dimensions and construction, except for the opening to the north leading toward the cesspool currently in use.

According to the contractor, Mr. Richard Ellis, the structure was not a dry well because its stone walls were rust-colored. The well walls would have been gray from usage. This would have been the case, he seemed certain, even if it had been abandoned many years previously.



Mr. Loudan and the writer continued excavations, inspections and interviews that evening and on April 11. These inspections revealed a notched, drilled half-circle on one of the large stone slabs. The other half of this slab was not found. It is not known whether this hole had a purpose in the location in which it was found or had been made for some previous purpose and then was utilized for a cover or roof for the stone-walled chamber.

The narrower aperture, possibly 18 in. in diameter, contained a piece of broken drainage pipe of galvanized iron. A similar section of this pipe crossed over a stone slab wall which separated the east and west chambers of the structure, and stopped abruptly just beyond the east chamber on the northern side of this chamber. Due to the nature of the initial excavations with the backhoe, and the fact that Mr. Ellis had no way of knowing that there might be anything of significance in the excavations, portions of this segment of the chamber had been gouged out before he stopped to inspect the situation. For this reason, it is unclear to us whether the section of the wall between the east and west chambers, over which the pipe ran, had had its stone slab wall altered to permit this pipe to be inserted, or whether the pipe was part of the original structure.

Inquiries of personnel from the Cortland County Historical Society (Mrs. Shirley Heppell, Miss Mary Dexter, Mrs. Pauline Strong), as well as faculty at SUNY Cortland (Dr. James Bugh, Mr. Delmar Palm, Dr. Roger Heppell), have not added to our clarifications as to the actual purposes of the two-chambered structure. The information of Mr. Ellis and his colleagues in the septic tank business, has not suggested that this structure was ever used as a septic tank or drywell. Two brass keys, some china fragments, old glass, and rusted metal were found within the chamber fill dirt. It is possible that these were intrusive from the loose excavated soil of the initial backhoe work and the crumbling, backsliding materials along the sides of the excavations. It did appear that the majority of the glass and metal were located within the confines of the eastern chamber well below the top of its walls, where intrusion could be predicted.

The Krauklis house, historically known as the A. P. McGraw home and the S. K. Brown home, is just south of the abandoned railroad track and just west of South Street. Its grounds have a long and varied history. A small cement block structure houses the opening of an old artesian well; a large stone fireplace and chimney mark the site of a community picnic pavilion west of the house and west and south of the stone chambers discussed in this report (Mr. William Mott, Jr., personal communication). According to the Sanborne Fire Insurance maps of 1908 and 1915, this structure was (originally) a 1-shaped wooden building with a glass roof, used as a greenhouse or conservatory. In 1915, it had been faced in stone (Mrs. Shirley Heppell, personal communication). West and south of this chimney, there are the remains of an old cement fish pond (rectangular) and watering trough which were used as a water source for cattle grazing farther to the west.

About 200 ft. west of the stone chamber site, lies the tunnel, running north-south, from the Hubert Widger home on West Academy Street, with interruptions for the railroad bed (today) to the Trout Brook Shore, where its opening has been blocked with stone. It was due to the 1700 ft. tunnel's existence that the earlier suggestion that the structures on the Krauklis property was made. It had been a possibility that this set of stone chambers might have provided concealment for escaping slaves during the pre-Civil War days (McGrawville Centennial 1969:16-17).

Other suggestions were that this might have been part of a drainage system which was never utilized. The main house has been in use long enough to have had several changes in cesspool and septic systems. However, the information is not clear and does not rule out the use of this set of compartments for other purposes. There appears to be little indication that there have been similar structures found in the McGraw area during the various kinds of excavations that have occurred for construction and repairs. If this had been a common format for sewage disposal, it would seem that there would be similar structures elsewhere. Further, Mr. Ellis was convinced that this structure could not have been used, even briefly, for sewage or wastewater disposal and have had the rusty coloring that it possesses.

It is hoped that his report will stimulate discussion and provide some added information about this kind of construction from the past.

GUIDE TO THE KRAUKLIS SITE PHOTOGRAPHIC RECORD

1. View facing northwest: Right edge of photograph is the location of the stone structure; beyond this, on the right side of the picture, is the stone fireplace; in the background, is the abandoned railroad bed

and a factory which faces onto Elm Street to the north of the Krauklis Property. The pile of earth in the center of the picture is the test excavation 20-30' west of the buried stone structure.

2. View facing south: Further clearing of rubble in the western chamber of the stone structure by Mr. Gary Loudan exposed more rough-hewn stones near the base of the walls. These stones are slightly larger than those toward the top of the wall.

3. View facing the southeast corner of the western chamber: The rusty color is less clear on the deeply-buried stones due to the moist soil and overcast skies when the photograph was taken. Note the drill hole in the foreground on the left in this photo and photo #2.



Plate 1



Plate 2

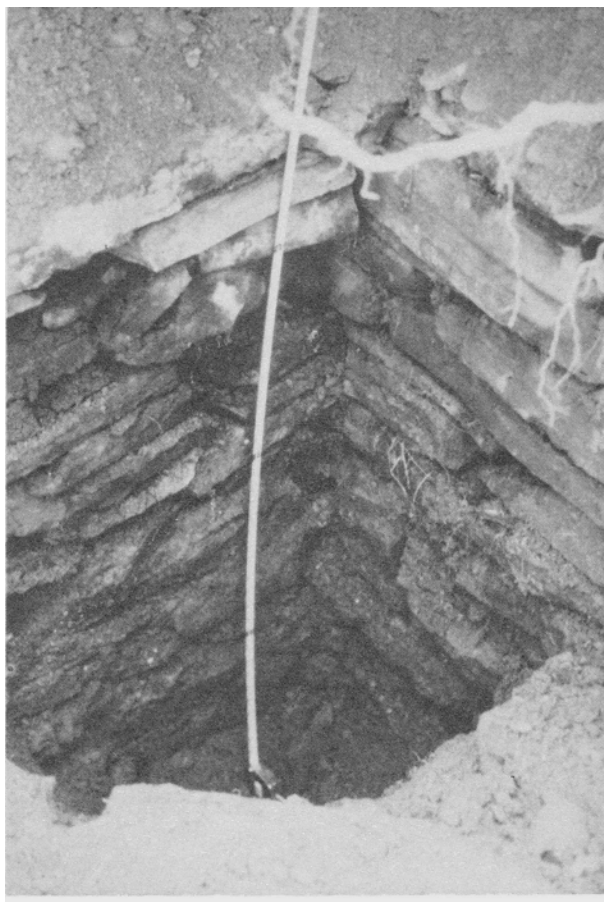


Plate 3

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