Depositional History and Tool Industries at the Winter Site: A Lake Forest Middle Woodland Cultural Manifestation

Jeffrey J. Richner
DEPOSITIONAL HISTORY AND TOOL INDUSTRIES AT THE WINTER SITE:
A LAKE FOREST MIDDLE WOODLAND CULTURAL MANIFESTATION

By

Jeffrey J. Richner

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Jeffrey J. Richner
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ENVIRONMENTAL SETTING

Location

The Winter site is located in the NW 1/4 of the NW 1/4 of section 28 Fairbanks Township, Delta County, in Michigan's Upper Peninsula. The site extends along a flat, stabilized sand dune on the east bank of the Valentine Creek. The site is on Mr. Roy Winter's property and is named accordingly. The small, quick flowing Valentine empties into the Big Bay De Noc of Lake Michigan less than one quarter of a mile downstream from the site. It will be demonstrated that the lake shore was further inland during the period of site occupation.

Topography

The terrain around the site is characterized by low rolling sand dunes which are stable and covered by a heavy forest. The lower areas in these woods are wet and boggy, even during the summer. North of the site, the forest cover is interrupted by swampy areas which extend two miles north along the lake shore. An underground stream reemerges in this area, adding to its wet swampy nature. In general, all of the area in this strip along the lake is poorly drained and is less than 590' above sea level. To the east, Jack's Bluff rises steeply 100' above the site, terminating in a large rolling area of the Manistique River State Forest. Most of the land north and east of the site is part of this state forest which is interrupted by many privately owned plots.

The Winter site, along with all the low rolling land west of Jack's Bluff, was covered by the waters of glacial Lake Algonquin and
post glacial lakes Nipissing and Algoma. A detailed survey of these glacial and post glacial beach terraces was conducted at Burnt Bluff, 20 miles south of the Winter site, by Prahl and Farrand (1968:4-19). The western coast of the Garden Peninsula is underlain by Niagaran limestone and dolomite bedrock known as the Burnt Bluff Group (Prahl and Farrand, 1968:Figure I). While these deposits outcrop along much of the coast, they are covered with glacial till and sand in the low rolling topography immediately around the Winter site.

Soil, Flora, Fauna and Climate

The cultural material at the Winter site lies between 584.5 and 591 feet above sea level in an undisturbed true podzol soil typical of Michigan's Upper Peninsula. The site has never been plowed or disturbed by other recent human activities. A small cabin stands in a clearing at the center of the site (Fig. I). This cabin was built by Mr. Winter, and he asserts that he did no digging or other surface alterations in preparation for building this cabin. An unimproved dirt road which is actually more like a path leads north from the cabin to another unimproved road which connects with county road 685 to the east. Apparently the second unimproved road formerly led to another cabin near the mouth of the Valentine. These two roads are no longer in use and are blocked by fallen trees.

Mr. Winter cut some timber around the site in the 1930s, but the land has been undisturbed since that time. Huge rotted cedar stumps still dot the woods, as further proof of the undisturbed nature
of the site. The immediate area around the site is heavily timbered with a mixed forest typical of the Canadian biotic province. The only clearing in this heavy cover is in front of Mr. Winter's cabin. More open marshy areas are encountered several hundred yards north of the site.

Potzger has called the floral assemblage of the Upper Great Lakes Lake Forest (Potzger 1946:213-250 cited in Janzen 1968:10). The predominant trees include sugar maple, yellow birch, northern white pine and eastern hemlock. In bogs and more poorly drained areas black spruce, tamarack and white cedar dominate along with white pines and eastern hemlocks (ibid). After the heavy logging activities of the 1870s, much of the Upper Peninsula was ravaged by fires which started in the huge piles of tinder dry sawdust and remnants of the pine forest. The land was so parched by these incredibly powerful fires that little would grow in the barren sands. Aspen, oak and jackpines were among the few trees hardy enough to take hold. Much of the area on Jack's Bluff is comprised of young growth of these trees. However, the land around the Winter site looks more like the pre-lumbering forest with large birches, cedars and other typical species in a mixed hardwood and deciduous forest. This forest cover has protected the Winter site from disturbance since its Middle Woodland inhabitants left the site. As one might guess, this forest cover also shaded the nature of excavations at the site.

The northern forests harbor a wide variety of mammals including: black bear, fisher, martin, lynx, muskrat, beaver, porcupine, raccoon, wolf, woodchuck, otter, skunk, red fox, gray fox, chipmunk, mink,
red squirrel, moose, elk, shrew, vole, rabbit, coyote and deer. Many of these animals were seen by crew members during six weeks of living near the Winter site. Among the animals not identified by tracks or actual sighting were gray fox, elk, moose, wolf, fisher and martin. These and other rather large mammals traditionally disappear as areas become settled. One moose was seen near the site about fifteen years ago, but their range is now far to the north. Black bears are not uncommon as several were sighted or identified by tracks not far from the site. This list of mammalian fauna was probably well represented during Middle Woodland occupations at the site and several mammals are present in the rather sparse faunal remains from the site. Mr. Winter built his cabin at the site location largely because of the abundance of animal life in the area.

Fish provided an integral part of the subsistence base for most of the Upper Great Lakes Middle Woodland sites which Fitting calls Lake Forest Middle Woodland (1970:98). White fish, lake trout, perch, pike, muskellunge, sauger, yellow walleye, burbot and sturgeon inhabit the clear cool waters of the Upper Great Lakes (Hubbs and Lagler 1961 cited in Brose 1970:13). Fishing is good at the mouth of the Valentine where perch were often caught by hungry crew members. During excavations at the site, occasional trout could be seen in the shallow water of Valentine Creek. Waterfowl including Canada goose, mallard, blackduck, woodduck, pintail and blue wing teal are commonly seen along with a wide variety of other avian fauna. Reptiles are not too common in these northern woods with green, garter and pine snakes the most common species that were
observed during the summer. The weedy Big Bay De Noc shores west of the site was home for many frogs and clams whose shells were often found on the beach as the remnants of a raccoon's dinner.

The climate of the Garden Peninsula is characterized by pleasant sunny summers and cold snowy winters.

Average Annual Temperature 40-45° F
Average Annual January Temperature 15-20° F
Average Annual July Temperature 60° F
Average Annual Minimal Temperature -20° F
Average Annual maximum Temperature 95° F
Lowest Temperature -40° F
Average Precipitation 25-30"
Average Snowfall 80"
Average Annual Days of Snow Cover 120-140
Average Annual Cloud Cover Days 140-160
Average Annual Frost Free Days 120-140

FIELD PROCEDURES AND TECHNIQUES

Five and one half weeks during the summer of 1972 were spent excavating the Winter site with a crew of fifteen students enrolled in Western Michigan University’s archaeology field school under the author’s direction. The site was initially discovered in 1967 by Mr. Thomas Bianchi. No cultural debris was visible on the surface, but Bianchi tested in the clearing north of Mr. Winter’s cabin and immediately uncovered chert detritus and ceramics. Subsequently, Bianchi excavated two units at the site, one north of the cabin in a black midden deposit and one south of the cabin near the creek. Bianchi later brought the site to the attention of the archaeologists at Western Michigan University. The author made preparations for the subsequent excavations with Mr. Winter.

Since future excavations are not planned for the Winter site at this time, the author attempted to arrange the five and one-half weeks of excavations in order to answer as many questions as possible. Rainy days further limited work on the site but a great deal was accomplished in the short time available. A 16' x 32' squad tent was pitched as a laboratory at the campsite and many evenings were spent squinting through the light of a Coleman lantern cataloging the growing artifact collection.

After clearing away the ferns and other undergrowth in the area around the cabin, an axis was laid out using a construction level, 100' tape, stadia rod and Brunton compass. Even laying out the axis became a problem because of the heavy forest cover that began close...
to the cabin. Our desire to maintain Mr. Winter's beautifully timbered woods often dictated the placement of excavation units. Five by five foot excavation units were the most compatible with the nature of the site. Techniques differed depending on the density of cultural deposits. In areas of low artifact density where cultural stratigraphy was absent, dirt was removed with flat shovels and sifted through one quarter inch mesh screen. Areas with compact, organically stained midden deposits and high artifact density were troweled. In units where cultural stratigraphy was lacking, arbitrary four inch levels were used in excavation. Soil color differences in non-midden areas of the site were due to natural leaching processes in the forest soil, so there was no point in excavating these "levels" separately. Where cultural stratigraphy was present, excavation followed these levels rather than arbitrary ones. When troweling in the denser midden deposits, the positions of all artifacts and fire cracked rock were plotted on floor maps. Soil color and texture were plotted on floor maps at the completion of each level in each square. Most midden deposits were wet screened through one eighth inch screen in hopes of recovering fish vertebrae and other materials which fall through one quarter inch mesh. Profile maps were drawn of all four walls of each completed excavation unit.

The elevations at the site were determined by shooting back to the site from a Geologic Survey benchmark south of the site on road 685. The cement front step of Mr. Winter's cabin lying at 589 feet above sea level, was used as the datum for site excavation. A topographic map of the area was constructed using a plane table,
Brunton compass, stadia rod and telescopic alidade. Heavy forest cover made this a difficult process.

Adequate sampling of the site was complicated by lack of surface features, heavy forest cover, low boggy areas between dunes, and limited time and equipment. Bianchi's testing indicated that the cleared area in front of the cabin was a heavy midden deposit. Units were initially opened in this area, confirming the presence of an undisturbed midden. During the five and one-half weeks spent investigating the site, 1350 square feet were opened. Approximately 3400 cubic feet were sifted, much of which was sterile aeolian or lacustrian sand.
DEPOSITIONAL HISTORY

The cultural and natural stratigraphy of the Winter site most closely parallels the Mero site on Wisconsin's Door Peninsula. The main depositional factors at the site were water, wind and man. The Niagaran bedrock underlying the Western Garden Peninsula was covered by the till of the Valder's glacial advance. This till was washed by post glacial lake waters, forming a lag concentrate on top of the till. Lacustrian sands cover the till.

Before detailing the exact nature of deposition at the site, the writer will present a short summary, based on information from several areas at the site. The first human occupation at the site took place on these stabilized lacustrian sands before the main flat dune had assumed its current shape (Fig. 4). After a short period of cultural deposition the occupation was interrupted by water which washed over the small midden which had built up. Many water rolled sherds attest to this disturbance. A thin sand layer built up over the midden from the water action. The rest of the depositional history at the site is characterized by aeolian sand deposits and human occupation. The main occupation of the site took place after several feet of wind blown sand built the dune to nearly its current dimensions. A long time span between occupations at the site is not suggested and all archaeological materials seem to fit well in a Middle Woodland context. After these Middle Woodland people left the site, a sod level built up and covered the debris that they left behind.

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In order to more fully explain depositional history, the site will be divided into several somewhat arbitrary areas. As seen in Figures 3 and 4, the lowest level encountered is red clay and lag concentrate of limestone cobbles which represent lacustrian washed Valders glacial deposits. Overlaying this thick wet deposit is a layer of sterile water-laid sands. A thin gray-brown lense on top of this sand is interpreted as an incipient paleosol, marking the surface level of the dune when the lower midden was deposited. The paleosol is capped by aeolian sand which contains the middle and upper middens. Soil color differences in the aeolian sand are due to cultural deposits and natural processes of soil development. These natural levels are: A1 horizon, the zone of accumulation of sod and organic material; A2, the light gray zone of leaching; B, the yellow zone of deposition of iron sesquioxides and other minerals; and C, the unaltered parent material, which in this case is sand. Natural soil levels are indicated on Figures 2, 3, and 4. In non-midden areas, artifacts cluster in the A2 horizon, with a few occurring in the B horizon.

Upper Midden

Midden deposits were encountered immediately below the sod in all the excavation units directly north and east of Winter's cabin (Figure 2). Thickness of the black midden deposit varied from .8 foot to only .1 foot. It was somewhat irregular, largely due to the sandy surface that was being occupied. Heaviest artifact concentrations were found in the block of excavation units from 0-30'.
south and 0-15' east. This midden continues east in areas that could not be excavated due to dense vegetation. Even in the "cleared" areas in front of the cabin, bow saws for cutting roots received almost as much use as trowels or shovels. Usually artifacts were not found much below one and one half feet under the surface in this area. Not all artifacts were confined to the organically stained midden, with many being recovered slightly below the staining. Most units were excavated to a depth of two feet where sterile aeolian sands were encountered. Finds in other areas of the site caused these units to be reopened and excavated to greater depths later in the summer.

Immediately south of the cabin in excavation block 10-25' west, 45-50' south (Fig. 1), a thin compact midden lense was directly below the sod. Concentrations of lithics, ceramics and fire cracked rock are in and below this black lense which is at the southern edge of the upper midden. The presence of continuous midden deposits in close proximity to Winter's cabin further reinforces the undisturbed nature of the site. Preservation was poor due to the action of water and frost on these near-surface artifacts. A scatter of artifacts continued south near the stream's edge in excavation block 80-110' south, 0-15' west. While no stained midden deposits are present, artifacts were near the surface and correlate with the upper midden. Artifact density in this southern edge of the site was less than one eighth as great as in the main upper midden area. Upper midden materials did not extend any further south or east as the dune is bordered by the stream and a cedar bog.
Upper midden staining ends at 0' north, although related artifacts are present. Artifact density was very low between 0-30' north, Density increases again starting at unit 55-60' north, 0-5' east. Cultural material was close to the sod zone with no midden staining present. Further north in excavation block 90-100' north, 40-50' east, dense artifact concentrations were again found in rather limited testing. Dark midden staining was near the sod and was similar to the upper midden shown in Figure 2. This midden was slightly thinner than the upper midden deposit near Winter's cabin. The two stained midden deposits were approximately 90' apart, although artifact scatter from the two were separated by about 50 feet. The scantily tested northern midden is probably contemporaneous with the main upper midden. Ceramic and lithic comparisons between the two areas will be made later.

Further north, limited testing indicated that cultural material extended another 100' and possibly farther. Artifacts did not extend west or east of the main dune which also delimited the more southerly cultural deposits. No midden lenses were seen in the northern edge of the site.

Middle Midden Lenses

Occasionally midden lenses and pockets were encountered beneath the upper midden, separated from it by wind blown sand (Fig. 3). Attempts to follow these lower lenses consistently failed as they usually ended abruptly. This situation clearly parallels the Mero site where,
"In several instances a sharply defined stratum was observed to terminate abruptly in the profile, either to be left hanging or to be picked up again several feet away" (Mason 1966:42).

At the Winter site this confusing situation only occurred below the upper midden which was fairly consistent in its make up. The thin disappearing lenses are mostly parallel to the upper midden and about a foot below it. They probably represent the seasonal occupations of people living on the dune while it was partially stabilized by vegetation. Artifacts in these fleeting middle midden lenses are sparse, but appear to be basically the same as those from the upper midden.

One larger, traceable middle midden lense occurs in excavation unit 15-17.5' south, 0-25' west (Fig. 3). It is a thin black lense below artifacts relating to the upper midden. This deposit is more clearcut and continuous than any other middle midden lense. Although artifacts are few in number, ceramic differences may exist between this and the upper midden. These differences will be examined in more detail later.

**Lower Midden**

In order to fully clarify the depositional history at the Winter site, an area on the sloping hill immediately west of the cabin was investigated. A thick sod covered this slope which terminates at the stream. No cultural material was recovered near the sod. Two thin midden layers of dark gray sand lying under a cap of aeolian sand are shown in Figure 4. Water rolled sherds are present in these thin lenses which lie upon lacustrian beach sands. The lenses correlate
with the paleosol indicated in Figure 3. The artifacts are included in the two dark lenses as well as in the lighter gray lacustrian sand which separates the lenses. The midden lenses merge and end at 40' west at an elevation of 584.4'. Included in the debris in these lenses are a rather large antler fragment and other mammal bones along with flakes and stone tools. As might be expected, cultural material in this level is rather sparse, with 18 ceramic vessels represented (Bianchi:nd). The profile at 25-30' west (Fig. 4) shows an area where water eroded the midden most heavily. From 30 to 40 feet west one can see the washing and deposition of beach sands in and on the midden.

Correlation of Lacustrian Deposits

Far to the northern edge of the site, a much coarser gravel layer underlies a sparse scatter of artifacts. This gravel layer also seems to be lacustrian in origin. It is not too surprising to see this water action on the cultural deposits since Mason had identified a similar situation for the Mero and Porte des Morts sites (Mason 1966, 1967). At these sites, Middle Woodland North Bay cultural deposits were washed by water and covered with lacustrian sands and gravels.

When Mason discovered a similar gravel beach deposit underlying Late Woodland artifacts at the Heins Creek site, he began speaking of an "heretofore unsuspected high water stage during a part of the Woodland cultural sequence on the Door Peninsula" (Mason 1966:8). These gravels were found at approximately 588 feet above sea level.
At the Mero site, the lacustrian deposit interrupted the North Bay I component at an elevation between 584.5-585.5 feet above sea level, thinning toward higher ground (Mason 1966:9). The sequence of depositional events at Mero are: 1) a layer of water deposited sands overlaying bedrock; 2) a build up of a midden and humus zone upon these sands; 3) a rise in lake level which eroded the midden and water rolled some sherds while building up a gravel beach and 4) a drop in water level with the next depositional factors being wind and man (Mason 1966:38). In characterizing the site history Mason says,

"These earliest people camped principally on the sandy elevation rising up and following the Bay Shore. The interval of high water persisted long enough to cut into the upper portions of the midden, water roll the artifacts it exposed, and incorporate them into the gravel beach it deposited atop the remaining midden" (Mason 1966:50).

Mason discovered another similar deposit at the Portes Des Morts site and dates the occupation below the beach gravel at A.D. 160 +100 (I 888). This high water is much too late to be associated with Lake Algoma water levels. The details of transition from Algoma levels to the modern lake level of 580' are poorly known. Mason suggests two alternate hypotheses to account for the gravel beaches--a seiche or other unusual storm, or a proposed intermediate lake stage between Algoma and the current lake Michigan level (Mason 1966:52). At his 1966 writing, Mason favored the lake stage hypothesis as the more likely. Recently he has reaffirmed this position (Mason 1973:personal communication).

At the Shultz site in the Saginaw Valley, lacustrian deposits not relating to flooding from current lake levels were encountered. Spath reviews the buried beaches at Mero, Heins Creek and Porte des Morts
and states that a higher lake stage must account for deposits at all those sites as well as the Shultz site (1972:72-73). The lake reached at least 586' by around 200 A.D., peaking for 50-100 years (Speth 1972:73). The general trend of rising base level may have spanned several hundred years. The reasons for a rise in lake level are not completely understood. At the Winter site the water reached at least 586' where it eroded the midden shown in Figure 4.

Depositional Summary

In summary, there were two distinct cultural deposits at the Winter site. One lies on lacustrian sands in excavation block 25-50' west, 20-40' south. This occupation took place when the area was several feet lower in elevation. The other distinct deposit is the main, upper midden immediately north and east of the cabin. Deposits further away from the cabin are less dense but are part of the same midden. These materials were deposited after the dune had reached its current shape. Other less well defined midden lenses lie in aeolian sand between the two distinct middens. Great time separation is not suggested between any of the occupations. Archaeological materials are quite similar in all the midden lenses and all can be placed in a Middle Woodland context. During the first site occupation, it appears that the people were living directly next to the water's edge on a low sod covered sandy area. Rising lake levels after 160 A.D. interrupted this midden. Subsequent occupation(s) took place as wind blown sand began building up over the earlier midden. The last and main occupation of the site took place after the dune was nearly at
its current shape and stabilized by vegetation. Grasses and rushes were probably growing in the lower more moist areas around the site, and it seems likely that the lake shore was near the edge of the dune.
LITHICS

From the lithics recovered it is apparent that a full range of tool manufacture took place at the site. All classes of artifacts from cores to pressure flakes are present. The first step in lithic analysis was to examine every flake which had been bagged by level and square. Since nearly 15,000 flakes and finished tools were investigated, analysis was a rather slow process. Although all recognized utilized flakes and chipped stone tools were bagged separately and catalogued in the field, many other less easily identifiable tools were found and labeled during level bag analysis.

Bianchi applied Semenov's (1964) staining and high powered magnification techniques to a sample of flakes and bifaces he recovered in testing the site. The author used low-powered magnification on samples of each of the identified artifact classes. These findings are described under the applicable artifact category descriptions.

Raw Material

With a few notable exceptions, the raw material for Winter site flint knappers was local chert available in tabular form from bedrock outcrops, and pebble chert deposited by glaciers. Pebble chert has better flaking properties than the coarser tabular chert and was the most important chert source for Winter site lithics. These pebbles were split via the bipolar technique which has been noted at many Middle and Late Woodland sites in Michigan's Upper Peninsula (McPherron 1967:137).
**Pebble chert**

This chert ranges in color from white to dark gray and is usually shiny, finely textured and therefore more easy to flake than the coarser textured tabular chert. Light gray or white areas of small inclusions are usually present in the finely grained pebble chert. This chert seems to correlate with Cleland and Peske’s type two chert identified from Burnt Bluff twenty miles south of the Winter site (1968:46). While most of the pebbles were smooth and regular in their interior, others had irregular, fissured interiors. Occasionally the pebble chert was coarse and grainy textured, overlapping with the coarse tabular chert. Irregular cortical surfaces on pebbles did not indicate that the interiors would be fissured.

**Tabular chert**

Niagaran dolomite and limestone was quarried from nearby outcrops and returned to the site in block form. These blocks contain pockets of coarse gray or tan chert which formed as concretions in the bedrock. Tabular chert is available in much larger size than pebble chert, but its coarse texture makes it less desirable for flaking than pebble chert. It represents the second most important raw material for artifact manufacture as seen in Tables 1 and 2. Occasionally the texture and color of this chert overlapped with pebble chert, although in most cases chert could easily be assigned to one or the other of these sources.

**Quartzite**

White and brown quartzites were a third local raw material used at the Winter site. This quartzite was obtained in pebble form,
likely from the same source as the chert pebbles. White quartzite was present in small pebbles which had fissured interiors. Brown quartzite pebbles had a larger upper size range than chert pebbles and were useful because of this large size. The brown quartzite was consistent in texture and did not have fissured interiors like the white quartzite. Bipolar chipping techniques were used to derive flakes from all the quartzite pebbles.

**Knife River Chalcedony**

Two chipped stone artifacts and 17 waste flakes were identified by the author as Knife River Chalcedony which originates in North Dakota. This material has not been identified on other nearby Middle Woodland sites, but has been found on Laurel sites in the Rainy River area of Minnesota and Manitoba (Mason 1969:300). No cores or block flakes of the chalcedony were recovered, suggesting the material was brought to the site in blank form, where it was processed into finished bifaces. The chalcedony is translucent brown with a smooth, fine texture. Concoidal fracture on this material is better than on the local cherts, with only a few pebbles approaching the fine texture of this chalcedony.

**Other exotic chert**

Additional exotic chert sources are suggested in two corner notched projectile points (Plate 8 B and C). These will be described in more detail later in the paper.

**Obsidian**

Of special interest was the recovery of five tiny pressure
flakes of obsidian. These were included in sand and rootlets brushed off a small plain sherd during level bag analysis. The flakes have been submitted to Dr. Griffin at the University of Michigan with hopes of determining their exact source through neutron activation analysis. Obsidian is known from the Riverside site (Hruska 1967) in the Western Upper Peninsula, from Laurel sites in Minnesota, and from Naomikong Point (Janzen 1968:57). A core was recovered at the Riverside site while six waste flakes were found at Naomikong Point. An obsidian scraper was recovered at Heron Bay on the north shore of Lake Superior (Fig. 5). It is likely that Winter site obsidian is from the same source as other Middle Woodland obsidian. This is the Obsidian Cliff 150 Group in Yellowstone Park (Janzen 1968:58).

Bipolar Flaking Technique

In the bipolar flaking technique the pebble is set on an anvil stone, usually with its longest axis perpendicular to the face of the anvil. Hammerstone blows are directed at the top of the pebble resulting in a variety of flakes being detached. McPherron has shown that as many as eight separate pieces could be obtained from only one hammerstone blow (1967:137). He used a cement floor as an anvil, while beach stones were utilized by prehistoric chert knappers. The author's experiment with this technique on small pebbles suggest that results vary depending on the nature and impurities of the pebble being worked as well as the amount of force involved. Usually a fairly sharp blow is required to detach any flakes, especially fairly long ones. McPherron's unyielding cement anvil probably gave less control than smaller anvils.
presumably absorbing more of the blow while sitting on the sands of the Winter site. While some cores appear to be simply smashed between hammer and anvil, more carefully planned flakes were drawn from many of the pebbles. It also appears likely that the blows were varied slightly in angle to work particular platforms and faces of the pebble.

Bipolar debitage

Debitage from working bipolar cores can be placed in three rather consistent categories: 1) flat flakes, often showing permanent bulbs of percussion and deep ripple marks; 2) shatter, including a variety of odd wedge shaped flakes; and 3) decortication flakes from the outer "skin" of the pebble. All waste flakes of shiny, smooth textured cherts assignable to chert pebbles were sorted into these three categories (Table 1). No attempt was made to sort flakes of bifacial retouch or soft hammer percussion from the bipolar flat flakes, so that category is a catch-all. Flakes of scraper retouch were not recovered over most of the site, where one quarter inch mesh screen was used. Over 70% of the flat flakes were from hard hammer bipolar percussion. These flakes often showed heavy battering near the striking platform which is typical of the bipolar technique. While decortication flakes were sorted separately, this does not indicate that the cortex was being removed only to get into the smoother textured interior of the pebble. Decortication flakes were commonly utilized or retouched as end scrapers. Obviously the shape of the flake was a more important factor in its subsequent use than the presence or absence of cortex. The category of shatter includes a wide variety of forms which are best thought of as accidents in working the bipolar cores.
**Bipolar cores**

Bipolar chipping techniques were used on at least 280 chert and quartzite pebbles ranging in length from 1.5 cm. to 7.0 cm. with most falling between 2.0 and 4.0 cm. (Plate 1 and Table 2). The few in the upper size range are quartzite or minimally utilized chert pebbles with fissured or sugary interiors. Cores with smooth glassy textures were usually less than 4.0 cm. in length, and often were worked to exhaustion. Since many projectile points of the same gray chert are over 5 cm. in length, it may be that larger smooth pebbles were reduced in size on the site through use. They might have been worked elsewhere, possibly at a site like Point Detour Bay where Binford and Quimby located cores and shatter while flat flakes were absent (1963:303-304). No finished tools, flat flakes, chips or pottery were found at this site which is on the south-eastern shore of Garden Peninsula.

Since McPherron has written an excellent section on bipolar cores, his terminology will be used in this report:

"Three terms serve to define the geometry of a cylindrical core: "top", that portion against which the majority of blows to detach flakes were directed; "bottom", opposite of top; and "faces", referring to the roughly parallel flake scars forming the periphery of the core. For flat cores, in addition to "top" and "bottom", the terms "working face", or "front", "back", and edge are employed in this report" (McPherron 1967:236).

If both faces are working faces, then back and front do not apply.

Some pebbles were turned end for end and battered on the bottom pole while others were struck from only the top platform. At
least one flake is detached per blow with small hinging recoil flakes being detached at the anvil from the shock wave of the blow. All of the Winter site bipolar cores exhibit heavy battering with hinge flakes being a common characteristic. Bipolar cores were found in all stages of exhaustion ranging from two or three detached flakes to tiny battered fragments. Counting and separating fragmentary cores from more complete ones was a somewhat difficult task. Several divisions were made to include bipolar cores and fragments. Both poles had to be present to be counted as a complete core. A total of 147 complete bipolar cores were identified along with thirty others which were struck from two perpendicular axes and were called quadripolar cores. Any core fragment less than one-half of a complete core broken along the axis with both poles present was called a split core.

"One recurrent feature of split cores, however, that appears to mark them off from the usually thinner flakes, is the frequent presence on the broad face of cleavage, first, of parts of a genuine cone of percussion toward the tip, leaving no doubt from which direction the force was applied; second, marked concentric ripples, evidencing heavy force." (McPherron 1967:138).

Eighty-five split cores were identified. It is uncertain how many total cores are represented by these split core fragments as reconstruction was usually impossible. Two split core fragments from unit 0-5'south, 0-5'east were fitted together to form a complete core. It seems likely that forty to eighty-five cores are represented by the eighty-five split core fragments. Fifty-six battered top and bottom core ends were also remnants of bipolar cores which broke
across the axis rather than along it. None of these could be pieced together and they seem to represent at least 50 additional cores.

**Wedge and gouge-like cores**

It is often assumed that bipolar cores represent wedges or gouge-like tools for working bone and wood (McPherron 1967:140). Eleven bipolar cores could be identified as gouge-end following McPherron's category (1967:141).

"Most have a convex outer face, with an average of three to four parallel flake scars, and a flat or concave inner face, generally with one long and broad flake scar, showing that these pieces themselves may be regarded either as rather thick flakes or as rather thin longitudinally-split segments of a cylindrical or flat core. At one or both ends a kind of chipping in fine, abrupt multiple hinge-fractures has produced a hollowed-out or dished area on the flat face of the piece, so that the ridge forming the end of the piece presents a formal similarity to the cutting edge of a wood gouge" (McPherron 1967:141).

Many Winter site gouge-end cores are thicker than those defined by McPherron, and at least one gouge-end is seen on a cylindrical core from which very few long flakes have been detached.

On two examples, small flakes could be seen extending from the gouge area along the striking platform. None of the gouge-end cores showed striae from use under twenty power microscopic examination. Most had wide, rather flat ends near the gouged-out portion making it unlikely that these cores were actually utilized as tools. The gouged-out portion of the core and the small backing flakes present on two of the cores are better interpreted as merely a variation in the removal of flakes from the core, or attempts at preparing the striking platform. If force from hammer blows was concentrated on
a slight angle, only one side of the core was worked. Repeated blows would tend to give the striking platform a gouged appearance.

From Shan Koba, Semenov notes,

"Splintering is a normal occurrence on almost all cores, but what is noteworthy is the persistence of the craftsman, who after one unsuccessful attempt to detach the flake, repeated it numerous times, still without result. When the edge was splintered and broken he moved the end of the presser back and exerted it several times in the center, before he finally threw the core away" (Semenov 1964:140).

Six distinctively wedge-shaped bipolar cores were also identified, but their shape is again attributed more to accident than design. No striations were seen on several wedge-shaped cores when viewed under high magnification by Bianchi. More than likely, the flat ridge which seems to be the "bit" was reduced to a ridge by hammerstone blows, removing flakes off both faces. The thicker battered end represents the bottom end which rested on the anvil. No striations were observed on any gouge-end or wedge-like cores, yet striations were obvious on whittling knives. Since using wedges or gouging tools to work wood should leave striations, the author suggests that they are not tools. While retouch at the ends of two gouge-end cores could be for tool use, it probably represents trimming of the platform to detach more long flakes along the axis of the core.

The 177 complete bipolar and quadripolar cores, along with the 141 split and core end fragments, covered the whole range of cores identified by Binford and Quimby (1963). McPherron uses only two categories—flat and cylindrical (1967:135). While most of the
147 of the complete Winter site cores could be placed in the flat category, thirty could be considered cylindrical. Actually, a gradation between these categories could be seen. Final core shape depends mostly upon the shape of the original pebble and the amount of battering at each pole. It appears as though the knappers usually tried to remove flakes from both faces of the pebbles which were often naturally flat. The smallest cores seem almost too small to have been of any use in detaching flakes, but tiny endscrapers (as small as 1.1 cm.) could come from even the smallest bipolar cores. While it would be possible to subdivide the Winter site bipolar cores into a variety of categories based on shape, this is unnecessary, especially considering the large degree of error common in this technique (McPherron 1967:135). The flint knapper worked the core in an attempt to detach as many usable flakes as possible and by the large number of shatter, core ends and split cores, one might guess that they were only partially successful.

Other Cores

Block cores

Winter site block cores were flaked with the more typical direct freehand percussion techniques where vectors of force are applied at sharp angles to the striking platforms (Plate 2). This force is usually more perpendicular to the long axis of the core, whereas bipolar flaking is characterized by vectors of force more parallel to the long axis of the core. Occasionally, hinge flake
scars and heavily battered areas were observed on block cores. This suggests that they were sometimes held at rest on an anvil and struck similarly to the bipolar cores. These cores are much larger than any bipolar cores, but were relatively infrequent (Table 2).

Debitage from block cores was separated into flat, decortication and block flakes. Except for slight overlap, texture of block core flat flakes made easy separation from bipolar core flakes. Flat block core flakes were also somewhat larger and did not exhibit the heavy battering common on bipolar flakes. Block flakes included a variety of rather thick flakes that represent trimming the cores into desired shape for the subsequent removal of flat flakes. These rough trimming block flakes were also removed to get at pockets of more finely textured chert sometimes present in the block cores. Decortication flakes were counted as a separate category, but this is an arbitrary division of the flat flake category.

**Plano-convex cores**

Six plano-convex cores were identified from the site. The flat side of the core faced the knapper who detached flakes around the core's edge by direct percussion. Chert in these cores ranged between smooth and coarse, with most being toward the coarse end of the spectrum. This chert might come from large pebbles or from tabular chert. Fitting (1972:193) illustrates several similar ones from the Shultz site.
Unifacial Tools

Scrapers

Unifacial scrapers are often the most common lithic tool in Upper Great Lakes archaeological sites. Retouch on scrapers is steep and most commonly occurs on the distal edge of the flake, opposite the bulb of percussion. When retouch is confined to an area perpendicular to the axis of the flake, it is usually called an endscraper. The term thumbnail scraper is sometimes applied to these steep edged unifaces. At the Late Woodland Juntunen site, McPherron describes the shape of scrapers--

"The main working edge (distal end) is usually straight to gently convex, with very few (5 cases) truly rounded ends. The junction of main working edge with sides is generally pronounced, often with a slight suggestion of ears" (1967:158).

This description fits the Winter site scrapers quite well (Plate 3).

Unifacial scrapers from the Winter site consistently have prominent bulbs of percussion, and often show deep flake scars with prominent ripple marks on their dorsal face. Also common on this dorsal face and occasionally on the ventral face near the striking platform are bruised and battered surfaces and hinge flake scars. Nearly all the scrapers at the Winter site are made on smooth textured flakes overlapping perfectly in color and texture with bipolar cores recovered at the site. While McPherron suggests that scrapers from Juntunen are too large to have been derived from bipolar cores worked at the site, this is not the case at the Winter site. The largest smooth textured scraper at the Winter site is
3.5 cm. along its axis while the smallest is 1.0 cm. The average length is 2.19 cm. with many examples less than 1.5 cm. Width was usually greatest near the distal or working edge with an average of 1.90 cm. (Table 3). These flakes fall well within the range of bipolar cores from Winter.

Steep unifacial retouch was usually applied to either mostly round or expanding flakes which typically have a ridge along the axis on the dorsal face. This ridge is the result of two previous flakes being removed from the core. Because of overlap in size, texture, color, and the presence of battering, it appears obvious that flakes of shiny fine textured chert used for scrapers were selected from flakes derived by working bipolar cores.

While the greatest number of Winter site scrapers have retouch only on the distal edge, it also occurred on other portions of flakes (Table 3).

Retouch on unifacial scrapers may be the result of either pressure or light percussion flaking. The author has used both techniques to effectively replicate unifacial retouch similar to that seen on Winter site scrapers. The small flakes of scraper retouch were not caught by the one-quarter inch mesh screen used over most of the site. Where one-eighth inch mesh screen was used in heavy midden deposits, many small flakes of scraper and bifacial retouch were recovered.

Although only two end scrapers were notched to facilitate hafting, it seems likely that most end scrapers from the site were hafted. The sides of many scrapers show nibbling or light grinding.
When breaks occur, they are nearly always near the base or working edge across the width of the scrapers (perpendicular to the flake's axis), suggesting that the scrapers were put to rather heavy use. While some of the larger end scrapers could have been hand held, it is difficult to imagine holding onto scrapers only slightly over 1 cm. in length.

**Scraper wear and function**

Nearly all of the Winter site scrapers show heavy nibbling and step flaking on the working edges. This does not extend onto the unretouched ventral face of the scrapers. At Naomikong Point--

"A sample of end and side scrapers was subjected to microscopic examination to see if there were any usage patterns. The results indicate a series of small flake scars along the basal portion of the retouched edge which may be the consequence of usage. The rear portion of several end scrapers show minute flake fractures as if the artifact had been hafted. The extremely small size of some end scrapers implies that hafting may have been the only way they could be utilized" (Janzen 1968:66).

Several end scrapers at Summer Island showed "battered and crushed edges" interpreted as the consequence of heavy scraping activity (Brose 1970:113). At the Juntunen site--

"The rest [of the scrapers] displayed minute step-flaking at the working edges, suggesting that these artifacts were used on hard materials and discarded (or resharpened) after only relatively minor wear. This coupled with the already mentioned strong selection for dense shiny cherts, suggests an application for which scrapers had to be very sharp; making bone tools was apparently a major use for them, judging from the many striations, scratches and chatter marks on bone artifacts" (McPherron 1967:158).

In determining the function of scrapers, Taggert suggested that a high uniface to biface ratio might imply a fishing economy (Taggert
Fitting has since expanded on this thesis and applied it to several Upper Great Lakes sites. At the Shultz site, Fitting states,

"One of the things which I first noticed was the close correlation between changes in the frequency of mammal bone (more specifically, the percentage of total meat represented by animal bone for any particular level) and the frequency of bifacial artifacts. In those Middle Woodland horizons where fishing, clamming and, indirectly, gathering of plant food species became more important, there was an increase in the percentage of unifacial tools. The use of this biface to uniface ratio as a rough index of the relative importance of hunting to other activities has been extended to a number of sites in Michigan with fairly consistent results. The trend follows for the Spring Creek site (Fitting 1968b) and the Goodwin Gresham site (Fitting, Brose, Wright & Dinerstein 1969) where they can be checked against the actual bone refuse recovered from the sites. It also seems to hold true for Summer Island (Brose 1969) and several sites where fishing was inferentially important. Bone preservation was poor or sampling slight at the following sites, but all are located in areas more satisfactory for fishing than hunting; Naomikong Point (Janzen 1968a), Berquist, Riverview Cemetery and Bear Creek (Fitting 1968a)" (Fitting 1972:219).

Taggert suggests that while unifaces could be used for scaling fish, processing wood and plants is another possible use (1967:164). As will be shown, the author favors the latter interpretation, especially considering heavy wear patterns described earlier.

At Naomikong Point, 1882 unifacial scrapers were recovered along with 300 netsinkers (Janzen 1968:63). Only 49 projectile points were recovered from the site. The site's location on Lake Superior's shore makes it a likely area for fishing. At Mero, only 28 end scrapers were recovered (Mason 1966:55). This site shows faunal remains of both fish and mammal with the latter being more important. Thirty-three end scrapers, 21 other scrapers, and 14
net sinkers may be compared with sixty-one bifaces at Summer Island, where fishing was of obvious importance to the subsistence of people living in summer occupations on the island. At Winter, a total of 284 unifacial scrapers, 78 bifaces and no net sinkers were recovered.

Clearly there are many differences between the lithic assemblages at these sites. Summer Island is in a poor location for hunting, yet shows more bifaces than unifaces.

Semenov's work adds more clarity to the situation. End scrapers examined by Semenov showed gloss or polish on the retouched edges, and he suggested that they were used in working hides (1964:87). These are larger than typical Upper Great Lakes scrapers and not necessarily for the same function as Winter site scrapers. In examining a group of blades from Fatmakoba, Murzak-Koba and Shan-Koba, Semenov states:

"In all cases the polishing occurred on both faces of the blade, upper and lower, while there was a variable degree of blunting on the edge. In each case the striations were at right-angles to the working edge.

The decipherment of these traces give rise to great difficulties. It was quite obvious that they were not used for cutting, but for some kind of scraping, and yet the material worked had affected both faces of the blade. It was also clear that the tool's movement was 'on himself' and the tool was undoubtedly used without a handle, as indicated by the weak polishing on the surface of non-working parts. All that was known about methods of working stone, bone, wood, skin or cutting meat, or sawing different hard materials had no relevance to the wear traces on the mesolithic blades from the Crimea. The only possible use at that period which could have been responsible for such traces would be the scaling of fish" (Semenov 1964:107).

This rather lengthy quote strongly suggests that unifaces in the Upper Great Lakes may be used for other purposes than scaling fish,
such as cutting-up or skinning fish. More likely, from the nature of the observed use-wear patterns, the Winter site unifaces are scrapers used to work wood and plant fibers and/or bone. The use of the scrapers may lie in preparing fibers for basketry, working projectile shafts, or scraping wood and plants for fibers used in traps, snares, etc. In this secondary way, the scrapers may still be functionally related to a fishing economy. It seems reasonable to assume that fish could have been skinned, rather than scaled, and sharp blades or even bifaces would be most effective.

**Utilized flakes**

One hundred and fifty-four utilized flakes and blades were identified in the lithic analysis. These artifacts often receive slight or no notice in site reports. The number identified at the site is, of course, a very conservative estimate of the total utilized flakes at the site. In order to be included in this category, a flake had to show obvious chip wear on its edge. Many other sharp flakes could have received short use and then been discarded before any coarse signs of wear became visible. It was impossible to subject all flat flakes to microscopic analysis, so many such artifacts were undoubtedly unrecognized. This point is brought out because utilized flakes were probably used for a number of purposes in day to day life at the site. No specific function other than cutting is suggested by the flakes, although they were another important part of the people's tool kit.
Whittling knives

Twenty-two other utilized flakes from the site were distinctive and have been tentatively classified as whittling knives (Plate 4). Since the author has taken this tool type from Semenov (1964), his description of the knife will be quoted:

"Work with this knife gives rise to wear on one side of the blade only. This is produced at a working angle of 25-35 degrees to the worked face, and as a result the side of the knife facing the object suffers attrition, but the opposite face only suffers wear from parings. The greater the angle of the cutting edge, the smaller the paring is, and conversely a reduction of this angle gives a larger paring. Whittling of wood or bone can be done in two ways. In the first the working movement is backwards ('toward himself) and in the second forwards ('away from himself'). Yet paleolithic man rarely used both edges for whittling; most commonly he blunted the second edge with retouch or took it off with a burin blow, for resting his finger on, and worked with one edge.

If the working edge of a whittling knife has undergone slight retouch, the latter is on the dorsal side and not on the underside, as retouch makes the working edge too rough, increasing its resistance to the material worked. During use the blade of the whittling knife may be chipped, shown by tiny scars on the under face, but these are unevenly distributed and so cannot be regarded as intentional retouch" (Semenov 1964:20).

"The worn side must always be the ventral side of the blade, as the smooth side always faced the material. The marks just enumerated of paleolithic whittling knives are general traits for stone whittling knives of all periods" (Semenov 1964:109).

The 22 flakes identified as whittling knives at the Winter site fit Semenov's descriptions almost perfectly. The working edge is not retouched, is usually straight and shows a slightly irregular surface as small chips have broken away. These were detached through use. Striations are visible under magnification and are found only on the ventral face. The striae angle toward the striking platform from the working edge. All have an edge which is backed either by
fine unifacial retouch, grinding, or burin blow. When viewed from the dorsal side, fourteen Winter site whittling knives are dulled or backed on the left edge, six on the right edge. These knives were probably used in shaping wood or bone and a variety of likely uses could be postulated. Other whittling knives probably exist from Lake Forest Middle Woodland sites, but are included in utilized flake or unifacial scraper categories.

**Bipolar cores retouched as scrapers**

Twenty-three bipolar cores exhibit unifacial chipping which usually occurs along side of the core parallel to the main axis. In a few examples, retouch occurs at one or both ends of the core. This retouch could represent platform trimming for facilitating the removal of additional flakes from the core, but all these cores are fairly flat and appear to be mostly spent. Since the retouched areas show the same nibbling wear which has been described for Winter site end scrapers, it is likely that these retouched cores were used as scrapers on resistant materials. Since bipolar cores were apparently worked in order to obtain small, thick flakes used for end scrapers, it is not too surprising that mostly spent, fairly flat bipolar cores would be retouched for use as scrapers.

**Projectile Points**

Projectile points are the most numerous category of Winter site bifaces with 22 nearly complete points and 22 fragments represented (Plates 5-8 and Table 4). Included in the broken
points are 11 tip fragments, eight base fragments and three midsections. All of the identifiable points are corner and side-notched (23) or contracting stemmed (6). Local pebble chert, quartzite or tabular chert is utilized on 40 of the broken and complete examples. Care and symmetry in workmanship varies greatly on the points. A range along a continuum from asymmetrical, crudely chipped, thick points to symmetrical, finely flaked thin points was recognized. Type of raw material is partially responsible for this difference as the coarse tabular chert is more difficult to straighten and thin than the shiny pebble cherts. However, the range from crude to finely made can also be seen within the points made on glassy cherts. None of the points of tabular chert are as finely made as the most carefully made ones on pebble chert. Further divisions under the categories of stemmed and notched are made on the combined attributes of care, amount and placement of finishing retouch, thickness, cross section, basal treatment, shape of blade, raw material, and length.

The type names Cleland and Peske (1968) applied to the projectile points at Burnt Bluff have been applied to the Winter site projectile points with a fair degree of success. While the types may not represent functional types, they are formal types. The author hesitates to add any further names to the already expansive list of projectile point types. Also, Cleland and Peske's types, which are well defined and pictured in the Burnt Bluff report helps in describing the Winter site points so that other
writers may more fully utilize the data. Differences between the
types seem to reflect differences in the mental templates of the
flint knappers, but the Winter site points probably represent too
small a sample to prove this assertion. Differences in function
might also account for the variation in the projectile point styles,
but this is also impossible to prove. A wide range of projectile
point styles is seen on other Upper Great Lakes Middle Woodland
sites, but Summer Island and Naomikong Point show less variation
than the Winter site points. Metric data for projectile points
is shown in Table 4 and points of each type are shown in Plates 5-8.

**Adena or Waubesa contracting stemmed (Plate 5B)**

One contracting stemmed point with a slightly excursive blade
and biconvex cross section fits Cleland and Peske’s description
of Adena Points perfectly (Cleland and Peske 1968:24). Ritchie
(1968:12) places this style in both Early and Middle Woodland
contexts. Ritzenthaler pictures the same point under his Waubesa
contracting stem category (Ritzenthaler 1967:27). He feels it ex­tends from late Archaic through Middle Woodland. Besides this
point form at Burnt Bluff, Cleland and Peske also cite another example
from the Northern Middle Woodland Donaldson site (Fig. 5).

**Spider Stemmed (Plate 5C)**

Two weakly shouldered, short stemmed points seem to correspond
to Cleland and Peske’s Spider Stemmed type (1968:39-40, fig. 14).
The bases of these points may very well be reworked after breaking
as Cleland suggests. Spider Stemmed points from the Winter site differ from those at Burnt Bluff in being slightly more carefully worked, especially by having more marginal retouch. Cleland and Peske cite two similar points from the Mero site (Mason 1966:Plate 9).

Garden Stemmed (Plate 5B)

Three contracting stemmed points are rather poorly made, especially one example which is very asymmetrical. All are on coarse, tabular chert. The shortest of the Winter site points of this type fits Cleland and Peske's metric data perfectly, while the other two are slightly longer (1968:32). Shoulders are asymmetrical and weakly developed. Stems are fairly long and thick with remnants of a striking platform at each rather straight base. Blades are fairly long, narrow and slightly excurvate. Similar points are described by Fitting (1972:195) at the Shultz site. Most of the stemmed points at the Shultz site are found in an Early Woodland level, with some others in the Middle Woodland levels at that stratified site.

Dustin-Lamoka (Plate 5A)

One narrow, asymmetrical, expanding stemmed point looks like the Dustin or Lamoka points which have been found throughout New York and Michigan. Usually it is placed in an Archaic context, but Fitting has identified this point form from both the Late Middle Woodland and Late Woodland levels at the Shultz site (Fitting 1972:203). This typifies the problems of affixing an exact age to
any projectile point out of context. It was found with Middle Woodland ceramics and more typical Middle Woodland projectile point forms in an undisturbed midden at the Winter site. The single specimen from the Winter site is one of the most crudely made points at the site and exhibits many hinge flake scars.

**Lang Corner Notched (Plate 6A)**

These rather large, heavy points show fair workmanship with a medium amount of marginal retouch. Four are on glassy gray pebble chert while four are on tabular chert. Three of the pebble chert examples are the smallest points of the eight represented, again pointing to the smaller flake size available in finely textured cherts. Two of the points show large flute-like flakes extending from a flat base which is the remnant of the original striking platform.

"The blades of these corner-notched points are usually triangular but occasionally excursive. The cross section may be either planoconvex or biconvex. The shoulders are sharp, usually forming a right or slightly acute angle with the lateral margins of the blade. Notches are usually wide, producing a short expanding stem. Bases are straight but often irregular as a result of basal bifacial thinning" (Cleland and Peske 1968:35-36).

Mason pictures similar points from the North Bay levels at the Mero site (1966:Plate IX, number 1). Lang Corner Notch, variety 1, are somewhat similar to Fitting's large expanding stem point type from the Shultz site (1972:200).
Bay de Noc side-notched (Plate 7)

Four side-notched points of this type show medium to fine workmanship and have markedly convex bases. The bases on all four are thinned by bifacial chipping. While marginal retouch is minimal on one, the other three are more carefully finished than their counterparts from Burnt Bluff. Two are on tabular chert.

"Blades are almost always parallel-ovate. Shoulders are prominent, stems are long and expanding and the bases are convex" (Cleland and Peske 1968:26).

An endscraper from Heron Bay on the north shore of Lake Superior exhibits a similar haft element to the Bay de Noc side-notched points (Wright 1967:Plate IV, Fig. 13). These points are also quite similar to the side-notched points from Naomikong Point (Janzen 1968:Plate XVIII). Janzen points to similarities between Naomikong Point's side-notched points and MacNeish's Stott corner notched from Laurel sites to the northwest (Janzen 1968:62).

Two corner-notched points on smooth gray chert are very similar to the Bay de Noc side-notched points just described. These are both thinned at the base and in one case a large basal flake extends up the stem and blade. Although the tips of both points are missing, they were undoubtedly rather long and narrow bladed like the Bay de Noc notched. Some of the side-notched points pictured from Naomikong Point (Janzen 1968:Plate XVIII C-O) might be called corner-notched or expanding-stemmed by other authors. Therefore, one could include these two Winter site corner-notched points in the same type as
Cleland's Bay de Noc side-notched. The word "side" could be dropped from the definition in order to avoid confusion.

Snyders and other points (Plate 8)

Three thin, carefully worked, corner-notched points stand apart from the rest of the Winter site points. The largest of these, A, is made on smooth local chert, with an excursive blade form and a small broken convex base. It is quite thin (.4 cm.), especially considering its length. It is highly symmetrical with wide flake scars and very careful marginal retouch. Corner-notched point B exhibits basal thinning through multiple small flakes rather than the larger flakes used on the Lang Corner-notched points. It is very carefully flaked with over twice as many flakes of finishing retouch as any other Winter site projectile point all over its surface. These are small flakes and all appear to be derived through pressure flaking. This also differs from the other points from the site which are mainly shaped through percussion and only finished along the edges with pressure or light percussion flaking. The blade is excursive. The chert flake is shiny gray, but lacks the white, cloudy inclusions of the local pebble chert and may represent an exotic type. Corner-notched point (Plate 8C) exhibits workmanship intermediate to points a and b. It differs chiefly in raw material which is widely banded gray chert. The darker gray bands angle obliquely across the blade. The base is a distinctive pink color. The author is not aware of the source of this chert, but assumes it
is of more southerly origin. The point is similar in shape to a point labeled as miscellaneous by Cleland and Peske (1968:Fig. 15F). The three corner notched points just described find no counterparts at Mero, Summer Island or other nearby Middle Woodland sites.

One broken base is on an exotic honey-brown colored translucent chert identified as Knife River Chaledony. This base fragment is well made with a deep corner notch and large convex base. Although it is quite fragmentary, it appears to be a Snyders Point, well known from the Hopewell sphere of influence to the south of the Winter site. One Snyders Point was found at Burnt Bluff (Cleland & Peske 1968:Fig. 15C). Another example is pictured by Janzen at Naomikong Point (1968:Plate XVII a).

The 11 projectile point tips found at the site show similar materials and workmanship to the rest of the Winter site points. They vary in size and shape to fit into several of the projectile point types already outlined.

Five broken projectile point bases and three projectile point mid-sections could not be classified as to type.

Other Bifacial Tools

While bifaces are less common at the site than unifacial tools, a fairly wide range is represented. Local pebble and tabular chert are used for the majority of bifaces, with a few notable exceptions. Workmanship varies considerably. Coarse chert or quartzite is used for all the larger bifaces, probably because fine textured, shiny chert was not present in sufficiently large size.
Thick ovate bifaces

Three large ovate bifaces on coarse tabular chert have a formal resemblance to old world hand axes (Plate 9B and Table 5). Direct percussion appears to be the only flaking technique used in shaping these thick "choppers" which are pointed on one end and mostly round on the other. Mason describes a similar artifact from the Mero site and suggests that the biface was used as a heavy duty chopper (Mason 1966:65). Describing similar artifacts from Summer Island, Brose suggests that they are hand held chopping tools (Brose 1970:106). It is possible that these ovate bifaces are blanks in the first stages of shaping, since no striations were observed under low powered microscopic examination. More likely they were finished stone tools used in some method of chopping.

Blanks or preforms

Coarse tabular chert was used in all three of the complete Winter site preforms (Table 5 and Plate 10B). One has a pointed tip and rounded base with a generally ovate shape. A second preform is more triangular in shape, while a third will be described in more detail shortly. These preforms are all shaped mostly by direct percussion, with some finer retouch along the tip and edges of one. Attempts at thinning the base were made on the three blanks. No striations were observed and of course none were expected. While it is possible that these artifacts actually functioned as knives, it is unlikely. Three additional broken bifaces may represent blanks, but they are too fragmentary for positive identification. The complete blanks seem to be
in a latter stage of production, ready for finishing into projectile points. All that separates the blanks from finished points is the addition of edge retouch and basal shaping. Metric attributes are summarized in Table 5. The Winter site blanks seem to correlate most closely with Mason's intermediate grouping of blanks (1966:61). Brose had identified several blanks from Summer Island that are very similar to the Winter site preforms (1970:108). Other similar ones are identified from Naomikong Point (Janzen 1968:62).

One interesting biface, which was probably a blank, was found in three pieces within a radius of five feet. This biface most likely represents breakage during intermediate stages in shaping a blank. Although the three pieces fit together, it is easily seen that the tip is much wider than the two pieces which make up the midsection and base of the blank (Plates 11 and 12). Apparently the tip snapped off during shaping when the blank was wider than it is now. More retouch was attempted along the side of the remaining piece, resulting in yet another break across the width of the blade. Originally the biface had a pointed tip, flat base and slightly excursive blade.

**Quartzite bifacial knives**

This category of bifaces is represented by one complete and two broken examples (Plate 9A). Brown quartzite was used in all three. Several large bipolar cores of quartzite were recovered during excavation. These were undoubtedly the raw material for production of these bifaces. Since the complete knife is over 12 cm. long, it is apparent that quartzite pebbles were much larger than chert ones. This quartzite has better flaking qualities than the white quartzites or the
most coarse examples of tabular chert used at the site. The quartzite is uniform and consistent in its texture, which can not be said for the local tabular chert.

Percussion flaking appears to be the only knapping technique used in shaping the quartzite bifaces, resulting in many hinge fracture scars toward the center of the blades. The bifaces have a generally lanceolate shape. The only complete one is 12.3 cm. x 4.5 cm. x 1.5 cm. Edges are fairly straight and are surprisingly sharp except near the base where they are heavily ground. Grinding extends around the base and 3.2 cm. up the sides, suggesting that this biface was mounted in some sort of a handle or was hafted like a projectile point. No striations were observed under low magnification, possibly due to the grainy texture of the quartzite. At any rate, this biface would have been a very effective cutting tool when the handle was attached. Probably it was a knife-like butchering tool since its large size seems to preclude use as a projectile point. One of the other quartzite bifaces is a tip fragment appearing to match the complete one. The third is a midsection fragment and is wider and thicker than the complete example.

**Partially retouched bifaces**

Three minimally retouched bifaces were identified in the lithic assemblage (Plate 10A, Table 5). Not all areas on the bifaces are retouched, as large primary flake scars or areas of cortex remain on all three. All three are planoconvex in cross section. Retouch is most careful near the tip and on one edge. One is corner notched, one has a convex base and the third shows a flat base with remnants of
batterering and the original striking platform. The notched and one unnotched example have excurvate blades while the third is straight. Although no striations were seen under low magnification all three were probably hafted knives. Bases are thinned on each. All could have functioned as projectile points but since the 44 identified points from the site are shaped differently and completely retouched bifacially, these bifaces have been called knives.

**Bifacial hafted scrapers (Plate 6B)**

Two corner-notched, steep-edged bifacial scrapers showing typical heavy wear were recovered. One is widely notched while the other has more narrow notches. Both are plano-convex and find exact look alikes in form with Lang Corner Notched, variety I. Attempts at thinning the bases have resulted in single large flakes extending up the center of the stem 1.9 cm. on both scrapers. It seems likely that the scrapers were originally Lang Corner Notched points which have been retouched into scrapers, perhaps after the tips had broken away.

**Other bifaces**

This is a catch all category for broken bifaces that could not be identified as to form or function. Thirteen are represented with one being significant because of being made of Knife River Chalcedony.

**Gravers (Plate 13)**

Two small retouched flakes have been identified as gravers. One is retouched along a point-like projection off its distal edge, isolating a sharp tip. The second graver has a small hook like projection,
isolated by a lot of fine pressure flake retouch. The isolated point
extends off one end of a small (1.7 cm. x .7 cm.) rectangular blade.
Retouch extends along both edges of the blade, detached by pressure
applied from the dorsal face. Retouch along the top of the blade is
even more delicate and is carried out from the ventral face. The
hook-like projection at the end is not retouched. While the exact
function of these small tools is not certain, one can be sure that they
were not put to very heavy use. Their delicate working edges would
snap off if much pressure were applied.

Other chipped stone

The problems encountered when working pebble chert with irregular
cortexes are seen in one unfinished biface. This artifact has a plano
convex cross section and is bifacially worked via percussion flaking over
much of its surface. A large highly irregular extension of cortex off
one edge apparently defied thinning attempts. Although the chert is
finely textured, it was probably discarded because of the cortical
irregularity.

Hammerstones and Anvils (Plate 14)

Only five hammer or anvil stones were identified, all on beach
pebbles. It is difficult to determine whether the artifacts are hammers
or anvils, as the areas of heavy pecking could result from either use.

Two show pecking use at one end. One of these is long and its
flattened sides show small pecking areas, suggesting the tool may have
been turned in the hand during use. The heaviest pecking wear is at the
tip.
One egg shaped hammer stone shows pecking in several different areas, with one end ground flat and the other slightly indented. Brose pictures a similar hammerstone from Summer Island (1970:Plate 23a). This tool could easily have functioned as a hammer or anvil in breaking up pebbles via the bipolar flaking technique.

Two other beach stones seem to have functioned mainly as anvils as the pecked areas are on opposite, relatively flat sides. They are fairly large and the pecking is confined to small circular areas. These anvil stones are very similar to ones the author has been surrounded by quartzite detritus washing out of the beach sands of Lake Superior at the Late Woodland Sand Point site. Bipolar chipping was the obvious reason for these large amounts of chipping around large anvils which had small pecking areas.

Hematite and Limonite (Plate 15)

Fifteen pieces of unworked hematite and limonite fragments were located in the Winter site middens. One fragment is ground flat on one side, while another is ground to a plummet-like shape. The top of this artifact is flat, while the other end is pointed. It is somewhat square in cross section, with rounded edges. No function for this artifact is obvious. Fitting has identified several fire starting kits from the Shultz site which are composed of limonite or hematite fragments (1972:140). Small chert chips imbeded in the surface of these fragments reinforced Fittings estimation of the use of the material. The author struck a variety of glossy cherts against the
limonite and hematite fragments from the Winter site, but was unsuccessful in getting much of a spark. An alternate use might be based on the orange to red color of the streak of the fragments.
Since Bianchi is preparing a detailed analysis of Winter site ceramics, only a short summary will be presented here. Several hundred hours were spent by the author in attempts to reconstruct vessels, with a partial degree of success. The close proximity of most ceramic remains to the current sod level has taken a heavy toll on ceramic preservation due to water and frost. Only two or three vessels could be reconstructed to any great degree, but the presence of fairly large sections of others allows a fair glimpse at vessel size and shape.

Local glacial clay was apparently the only clay used in the Winter site, and could have been obtained immediately around the site, as it underlies the aeolian sand occupied by the people. Very likely, it was quarried near what was then the Lake Michigan beach. The clay is red and dries to a medium brown. Granite grit temper is the most common at the site, with sand used on some vessels along with granite grit. Coiling appears to be the main shaping technique with several vessels breaking along what appear to be coil junctures.

Ceramics were made on the site, as evidenced by a variety of unfired ceramic waste lumps and coils, many of which show evidence of being squeezed in the hand. Firing differed somewhat from vessel to vessel, with resultant split sherds from thicker vessels suggesting that firing was often rather incomplete. Vessels had conoidal bases, with profile and vessel size varying greatly, largely correlating with surface treatment. Many Winter site sherds exhibit the friable nature described by Mason for North Bay Wares 1 and 2 (1966:90). Many vessels are not
carefully smoothed and finished, while others were more compact and carefully finished.

A wide variety of decorative styles are present in the assemblage, several of which have no direct counterparts on other local Middle Woodland sites. Dentate and pseudo-scallop shell stamps account for most decorated vessels, with minority styles including various punctates, incised, cord impressed and composite designs (Table 8). Bianchi has been able to delineate two major wares at the site, Dane and Winter. Winter ware is further divided into Winter I and Winter II which correlate to the beach and main upper midden site occupations, respectively.

Examples of Dane wear are found in both Winter site occupations. Represented are several vessels, one of which is nearly complete. Incising and stamping over a paddle cord surface treatment characterizes this ware, which is also set off from Winter ware by the addition of sand to its paste. The nearly complete vessel is surprisingly thin walled with widely spaced obliquely incised lines extending down from the rim. A similar unreconstructable vessel represented by several hundred sherds was recovered 20' from the complete one. Split and eroded sherds from these vessels are not the result of careless construction, but are due to proximity to the current sod surface. Vessels have mostly straight walls and rim profiles and are large.

Winter I ware is characterized by dentate designs, usually in horizontal bands around the rim and neck. Since sherds of this ware have been heavily water rolled, the grit temper often protrudes through
the surface, and edges are rounded making reconstruction nearly impossible. Bianchi finds pseudo-scallop shell to be minority variety of Winter I, accounting for only 5% of the vessels present. One problem in dealing with Winter I is the small sample size where only 18 vessels are present. A larger sample could make apparent differences between Bianchi's Winter I and II disappear as 127 vessels make up the sample from the upper or main site occupation.

Winter II consists of several varieties with dentates and pseudo-scalloped shell accounting for 60% of all vessels. A wide range of designs are present within the pseudo-scalloped and dentate varieties. Since Bianchi will deal with these designs the author will only add a few salient points of description here. Dentate designs are in oblique stamps, horizontal bands and composite designs in a variety of combinations. Dentate stamps are usually put over smooth surfaces, with lower areas on vessels being smooth or paddle cord. While some Winter site dentates look similar to North Bay dentates from Mero and Porte de Morts, most are distinctive and find no clear parallels in other local Middle Woodland sites. Stamps are also different from Summer Island where only a few similarities in design elements are seen. First hand observation of the Summer Island materials reinforces this statement. Since Dane Incised is found at North Bay sites excavated by Mason (1966, 1967) a closer ceramic overlap is seen with this material. Bianchi feels confident that Winter site dentates are different from North Bay dentates and has defined them separately. The author feels the dentates are fairly similar to North Bay although a wider variety is present at the Winter site. However, other important differences in
the ceramic assemblage justify Bianchi's formation of the Winter ware category.

Divergence is seen from North Bay in pseudo-scallop stamps which are 30% of all Winter site vessels. A few Winter site stab and drag vessels are decorated on the upper one third to one fifth of the vessels, which are straight walled and thinner than other Winter site ceramics. Surfaces on these pseudo scallop shell vessels are more carefully smoothed although one has paddle cord below the stamp. Several others have a similar shape but have pseudo-scallop shell in horizontal bands and banks near the neck and rim. None of these Winter site vessels show similarity to Naomikong Point pseudo-scallop vessels and do not have any direct counterparts at North Bay sites.

Several other Winter site pseudo-scallop vessels are very distinctive. They have delicate pseudo scallop stamps obliquely applied around strongly excursive rim profiles. These more carefully executed vessels are a radical departure in shape as well as design execution from other Winter site vessels. Undecorated surfaces are smooth. Bossing, an element very common on Laurel pseudo-scallop vessels is absent on Winter site vessels. The outflaring pseudo-scallop vessels show some similarity to vessels from Cameron Point (Fig. 5). No other similar vessels are known to the author.

As Bianchi's report will make clear, Winter site ceramics show echoes of styles not only to the east and nearby Door Peninsula but also to the Havana tradition. Two zoned punctate vessels are locally made, but represent contact with Havana. In order to carry out the
designs, the potter must have been quite familiar with Havana ceramics. A Havana trade vessel has been recovered from the North Bay Porte des Morts site (Mason 1967). Mason has suggested that North Bay and Havana are related, as North Bay ceramics have been found in the Fox River area on Havana sites (1969:301). Recently, Mason informed the author that Laurel vessels are being recovered from another North Bay tradition site on an Island North of Mero and Porte des Morts (Mason 1973:personal communication). Ceramic origins and diffusion is not completely clear in the Upper Great Lakes Middle Woodland, but widespread geographical styles and design elements suggest rather mobile groups. At the Winter site, generic ceramic similarities are seen with North Bay, and geologic similarities in site location and deposition are present, but specific ceramic divergences are strong. Winter site ceramics suggest the site is another in a series of Lake Forest Middle Woodland sites which have been shown to reflect recurrent themes of dentate, plain and pseudo-scallop stamps, which vary in execution and design motif from site to site. Most clear ceramic ties are the Dane Incised sherds which are minority types in North Bay. Cord impressed designs, common at North Bay, are absent at the Winter site. Quite likely, ceramic divergences (in percent and design) from North Bay and other local Middle Woodland sites are mostly due to local styles made by a rather small group.
OTHER ARTIFACTS

Copper

Seventeen copper tools are present in the Winter site assemblage along with five small lumps of pounded copper. While the copper tools may have been made on the site, one would expect to find more lumps of pounded copper if this were the case. Copper artifacts are commonly found in Upper Michigan archaeological sites, with their number increasing greatly as one approaches the Copper Range in the northwest corner of the Peninsula.

Awls (Plate 16)

Awls represent the most common Winter site copper tool with three complete and eight fragmentary awls present. Workmanship on these awls varies greatly, with several being very well made. Average length of the complete awls is 8.0 cm. One very carefully made awl is square in cross section over most of its length, with one tip being round and very sharply pointed. This awl is very well made and is quite symmetrical. On the other extreme, a thick awl is much less carefully made. This awl is rectangular in cross section and has one flat rounded end. A similarly shaped awl was recovered from the Middle Woodland component at the Mero site (Mason 1966:68). This awl was obviously manufactured through hammering and folding sheet copper into a finished rectangular shape. In this particular example, one can see the thin individual sheets remaining separate, as the awl was not pounded together very carefully. The Winter site awls are square to rectangular
in cross section and tend to be more round near the tip. The eight awl fragments are represented by five tips and three midsection fragments. These fragments may represent fewer than 8 complete awls, but corrosion around the broken ends make any reconstruction impossible. Leather working is a likely function of the awls.

Pins (Plate 17C)

Two small "pins" of copper show one end flattened from heavy pounding. The unpounded ends are relatively blunt and round. The function of these pins is not certain, but the flattened ends suggest they were put to some rather heavy use. Fitting (1972:Fig. 82F) shows a similar artifact from the Early Middle Woodland level from the Shultz site.

Blank (Plate 17B)

One heavy bar of copper seems to be a blank of preform rather than a finished tool. This object has a rhomboidal cross section and has slightly rounded ends. Edges along its length are sharp.

Beads

Two small rolled copper beads represent the only items of personal adornment recovered from the Winter site. These were made from small flat copper sheets that were rolled and "pinched" together. Little care was taken in their manufacture.

Point (Plate 17D)

One large conical copper point was recovered in unit 55-60' north 0-5' east which was close to the water's edge during site occupation. The
tip of this point is square in cross section and is solid. This square cross section extends approximately 5 cm. from the tip, gradually becoming more rounded. The base of the point is round. The hollow socket extends 3.8 cm. deep from the base. The tip of this projectile is still quite sharp and it must have been highly effective. The point was found outside the areas of heaviest artifact concentrations and its function is uncertain. It may have functioned as a sturgeon harpoon, but this is only a guess.

**Manufacture and source**

Four small lumps of copper might represent raw material for tool making or fragmentary tools. The recovery of one flat, thin copper sheet points to the typical form of manufacture used on copper tools at the site. Most of the tools were made by pounding and folding thin sheets over upon themselves, then hammering this mass into final shape. A few of the tools may have been pounded out from a solid lump of copper. Since the ductile condition of copper is quickly lost, it is certain that copper was annealed frequently during manufacture to make the copper more plastic.

The source for the copper utilized in these tools is either from the Keweenaw Copper Range or from Isle Royal. The people may have obtained the copper by trading, but they could have easily quarried the copper themselves. The amount of copper artifacts at the site fits Brose's idea that:

"the number of functional copper artifacts in Middle Woodland sites seems to be inversely proportional to the distance from Lake Superior" (Brose 1970:136).
Comparisons

The copper tool inventory at Winter is typical of other local sites, with the possible exception of the conical point. Copper awls are similar from Archaic sites to Late Woodland in Upper Michigan. In Middle Woodland, similar awls are seen at Summer Island, Naomikong Point, Heron Bay and other sites. A wide range of copper tools at the Late Woodland Sand Point site on Keweenaw Bay mirrors the Winter site ones and shows many other types in a large total number.

Bone and Wood

No bone or wood tools were recovered during excavation at the Winter site. The poor preservation of the forest soil probably accounts for the lack of wood artifacts, however the lack of bone tools is quite surprising. Actually one piece of wood was preserved in the socket of a conical copper point. It is in a poor state of preservation and awaits species identification. The lack of bone tools is more surprising, especially considering that some rather large faunal remains were uncovered. Incomplete sampling might account for the lack of bone tools in the assemblage but this seems unlikely.

The occupants of the Winter site probably utilized bone for pressure flaking tools, awls and other purposes. A variety of bone tools was recovered at Summer Island, Burnt Bluff, and many other Lake Forest Middle Woodland sites. Several wooden tools from the caves of Burnt Bluff point to a much wider range of tool types and functions that is currently understood for the Lake Forest Middle Woodland. It
seems quite clear that the lithic, copper, and ceramic artifacts from the Winter site represent only the rudest exoskeleton of a Middle Woodland cultural system.

Recent Artifacts

Recent materials excavated at the Winter site include: twenty-three shell casings, three nails, one washer, two bottle caps, one tin can fragment, and one small fragment of cement. A surprising discovery was the recovery of Mr. Winter's high school class ring which he had lost 15 years earlier. All of these recent artifacts were recovered from excavation units near the cabin. None were found below the current sod zone, further reinforcing the undisturbed nature of the cultural deposits.

Summary of Winter Site Tool Industries

The lithic and copper industries at the Winter site have been shown to be similar in many particulars to other local Middle Woodland assemblages. Industrial activities where all stages of tool manufacture were present took place all over the site, with densities of over 1000 flakes per five by five seen in midden deposits. No obvious male segregated workshop areas have been identified, as wherever flakes are present, so are ceramics. This, plus apparent lack of clusters of different functional artifacts might be due to seasonal occupations depositing artifacts for several years. During analysis all chipped and other stone tools, rim sherds and all decorated body sherds were laid out as they were excavated from the site. While ceramic differences
between levels and different areas apparently exist, no divisions were seen in placement of stone tools. Although artifacts were seen in widely varying numbers around the site, this was due to the differing thickness of the cultural deposit being excavated. No bifaces were recovered from excavation block 25-50' west, 20-40' south where beach gravels cut and washed the cultural deposits. Several mammal remains were located in this area but lithic artifacts are only represented by flakes, five bipolar cores and five endscrapers, one of which is the largest scraper at the site and does not show the heavy nibbling wear on its edge typical of other Winter site scrapers.

While the great majority of artifacts are made on local materials, the presence of exotic chert, chalcedony and obsidian in the lithic assemblage shows clear ties to areas outlying the Upper Great Lakes. Relationship between Havana and the more northern North Bay Middle Woodland has been explored by Mason (1969). At the Winter site Havana influences are present in the lithic and ceramic assemblages. Ties between the Winter site and other Middle Woodland groups will be examined more closely later in this paper.
FEATURES

Features were surprisingly uncommon at the site, with only two types being present. The most common were features made up of a tight concentration of fire cracked rocks. Throughout the densest midden deposits all firecracked rock, and all other artifacts except unretouched flakes and plain sherds, were plotted on floor maps. These maps tend to show that the fire cracked rock is scattered, with counts becoming higher in areas where other artifacts become more numerous.

Four similar concentrations of fire cracked rock were given feature numbers and were excavated and bagged separately from the midden deposits surrounding them. Two of these features were roughly circular in shape. One was located south of Winter's cabin and was quite shallow, containing about 50 fire cracked rocks. The feature itself contained no diagnostic artifacts. This feature was surrounded by a 5 x 10' area of gray compact sand which certainly represents a living floor. Two heavy concentrations of pottery were very near this stone feature. These were very close to the present sod level and their preservation suffered accordingly. Although no charcoal was obtained from the feature, the cracked rock suggests that it was some type of cooking pit.

Another roughly circular concentration of fire cracked rocks was seen in unit 8.3-13.3' south. Associated with this feature were two endscrapers, several plain sherds and a small amount of charcoal. A few blocks of limestone and 20 beach pebbles make up this feature, which could be interpreted as another cooking pit. One rectangular
grouping of ten fire cracked and blackened beach pebbles in excavation unit 0-5 south-0-5 east was directly associated with only a few flakes. A few dentate sherds and endscrapers were found in the 5' x 5' unit around the feature. A second rectangular fire cracked rock concentration in 5 x 5 unit 30-35 south 0-5 west contained 200 fire cracked rocks in a 1.5' x 3.5' x 2.0' shape. Six scrapers were found near the ends of the feature. The sand around the feature was rather compact and gray in color. Over 200 pieces of a thin walled, coarse tempered vessel which has broad incised lines over a paddle cord surface were scattered throughout the feature. The rather sandy surface texture suggests that this is a Dane Incised vessel, similar to sherds from the Mero site (Mason 1966:Plate 8). Another similar pot was recovered only a few feet away intact except for an eroded base. The feature apparently interrupted the vessel and broke it apart. Since the sherds are mostly around the outside of the feature it appears that a rectangular area of sand was scooped out and filled in with beach pebbles. Fire scorched sand along with the cracked rock attests to the fire pit use of feature. No charcoal was found. Six chokecherry pits were found near the top of the feature, but they show no evidence of being charred. Although no chokecherry trees were seen nearby, the seeds may have been dropped by birds, and their association with the Middle Woodland feature is tenuous.

The last fire cracked rock feature is also rectangular in shape, 3' x 1' x .5' deep. It is rather shallow and is made up of 48 of fire cracked rocks. Like the other Winter site features it was quite sparse
in artifacts, this one containing only a few chert flakes and some calcined mammal bone fragments which are too tiny to allow identification. This feature differs from the other fire cracked rock features in its close association with three post molds which appeared as dark roughly circular stains in the light colored sand of the floor around the base of the feature. Two post molds of .6' in diameter were located on either side of the feature near the middle of the feature. Another post mold with similar dimensions appeared 2 1/2' east of the feature and is probably related to it. Since post molds were not found in any other excavation unit one can not be sure of the structure that these three outline. Their close proximity to the feature suggests that they were feature-related rather than outlining a dwelling. Perhaps they are the remnants of a rack which was extended over the feature for the purpose of drying meat or fish.

The only other Winter site feature was a small basin lined with gray clay. The basin contained typical, dense black midden deposit with small fragments of burned mammal bone and a few small fish vertebra. Chert chips, some unfired lumps of red clay and a ceramic coil represent the only artifacts in the feature, but the 5' x 5' unit was in one of the densest midden areas of the site. Many artifacts were found in the rest of the unit, with an even mixture between lithics and ceramics.
Summarizing the Lake Forest Middle Woodland, Fitting suggests,

"Within this forest association there are a number of Middle Woodland cultural complexes which show a great deal of stylistic similarity and reflect a similar pattern of pre-historic cultural adaptation. These have been given a number of regional designations such as Laurel, North Bay, Saugeen and Point Peninsula but I think that the widespread similarity permits a comprehensive term to be used for the entire group" (Fitting 1970:129).

"The pattern of cultural contact to the south is more complex than to the north, where the Lake Forest borders the extremely low population density area of the boreal forest. To the south the population density and cultural influence was greater. Though the more Northern Laurel Point Peninsula distribution shows a great deal of similarity, there is quite a bit of variation along the southern boundary, including such materials as those excavated by Robert Salzer in northern Wisconsin, Ronald Mason's North Bay complex on the Door Peninsula, and the Saugeen Focus in Ontario" (Fitting 1970:131).

The Winter site may be added to the list of more southerly sites where variation is seen. Dispite this variety Fitting says,

"I am not disturbed by the stylistic syncretisms in these areas for it is exactly what would be expected along a cultural and ecological transition area. I am more impressed by the integrity of the adaptive pattern and, inspite of differences in the ceramics, I would group such sites as Mero and Summer Island together to examine the adaptive pattern in the area" (Fitting 1970:131).

Brose also holds this view and suggests that Summer Island and North Bay are probably occupied at different seasons, utilizing slightly different food sources. Before placing the Winter site more carefully, the author will review the major traditions that have been put forth in the Upper Great Lakes--Laurel (Minnesota), Point Peninsula, North Bay, and Saugeen. These have been reviewed in some detail by Janzen (1968), Brose (1970), Mason (1966 & 1969), Fitting (1970) and others.
Laurel

This term was first applied to define a Middle Woodland focus in Northern Minnesota. Sites called Laurel extend over 400 miles across the northern shore of Lake Superior. Many of the sites are small, especially across the north shore of Superior. Ceramics are often the main defining factor as pseudo-scallop shell, dentates, and bossing are the most common elements. Ceramics are well made and represented by 22,000 sherds from Laurel components in Minnesota, Manitoba, and Northern Ontario (Janzen 1968:100). At Naomikong Point, around 17,000 sherds 1 inch and greater in diameter were recovered, nearly equalling all other Laurel site ceramics in number. Many of these sites are known from burial mounds, rather than occupation sites. All sites are adjacent to either lakes or rivers. Although a reliance on fish is suggested, faunal remains are often sparse, due to highly acid soils. The Anderson focus exhibits balanced hunting and fishing, while fishing is much more important at other Laurel sites (Janzen 1968:101). An important characteristic of Laurel sites is the high frequency of side and end scrapers. Vessels are conoidal-based and decoration is confined to the upper one-half to one-third of the vessel. The undecorated portion is smooth and never cord marked. Toggle head harpoons are another common Laurel artifact.

Most artifact manufacture takes place on the sites with local materials being utilized.

"One inconsistent feature of the Laurel culture is the variability in size of the sites. Some sites cover a considerable area and produce an artifact assemblage that numbers in the
thousands, while other sites yield only a few sherds, one or two scrapers and some chipping debris. If site size can be correlated with group size, then the smaller sites may represent single family units while the larger ones correspond to larger groups which may be unrelated. Such a situation is suggestive of a seasonally-based economy where the population is dispersed during part of the year, operating in small one or two family units" (Janzen 1968:102).

Fishing is seen as the only cohesive force that could bring people together, as mammal hunting is not seen as a likely catalyst for formation of large villages.

North Bay

The North Bay sites of the Door Peninsula show ties with the more northerly Laurel sites, mainly in site location and certain ceramic similarities. North Bay ceramics are not as thin or carefully made as Laurel vessels and pseudo-scallop shell is present in reduced frequency (Table 7). Also important is the presence of paddle corded vessels which are absent on Laurel sites. These are a tie with Havana. End scrapers are less common on North Bay sites where the uniface to biface ratio is nearly one to one. Mason points to ceramic and lithic similarities to the Havana tradition as well as to Point Peninsula (1966:188). North Bay is, however, a product of a separate local history, rather than a simple borrowing of other traits. Similarities to Point Peninsula are strong, especially in ceramics where dentate stamped and pseudo-scalloped shell designs look very similar. A probable Point Peninsula sherd (Wickham Insised) is known from a North-Bay-Havana component in Fox Valley south of Green Bay (Mason 1969:301). At the Ferry Road site in the Fox Valley Mason excavated an undoubted Point Peninsula component.
"A tight locus at the site yielded over 500 Point Peninsula sherds, many with sharply defined interior channeling and with incised, punctuated, and rocker-stamped decoration" (Mason 1969:301).

"It has been apparent since the excavation of the Mero site that the North Bay Culture has connections with Hopewelian (Havana tradition) in the southern and western portions of Wisconsin and in Illinois. North Bay by no means represents a northern variety of Hopewelian, but there are enough correspondences between North Bay ware and Havana ware as well as between certain components of the associated chipped stone industries—notably projectile points—to establish some sharing of cultural antecedents in addition to the maintenance of some kind of contact" (Mason 1967:330).

Mason finds North Bay I and II cord-marked pottery to be northern relatives of Havana ware (Mason 1966:121). North Bay dentates are compared to various Illinois Hopewell dentates along with cord wrapped stick sherds fitting some late Hopewell types. Mason feels that most North Bay projectile points would be at home in Illinois late Hopewell sites like Steuben. Since burial mounds are not yet known from North Bay, connections of a religious nature between Hopewell and North Bay remain unknown.

Saugeen Focus

The interaction of Laurel in southern Ontario has been termed Saugeen. Radio carbon dates are contradictory with several rather early dates being discounted by most authors. Pseudo-scallop shell motif is one of the most commonly occurring decorations, with dentate stamps also common. The presence of rocker stamping suggests ties with Hopewell, and "thus Saugeen ceramics appear to be an amalgamation of Laurel, Hopewell,...and Point Peninsula" (Janzen 1968:106). Faunal remains from the Donaldson site are dominated by fish, with sturgeon being the
most important. Two small houses are represented by 300 post molds (Wright & Anderson, 1963:11-15).

Point Peninsula

Sites of this tradition extend from small finds in Wisconsin to the Atlantic coast. Sites are very numerous in New York state. Similarities to North Bay have already been presented, but ceramic similarities are also seen with Laurel and Saugeen. "The presence of pseudo-scallop shell decorated pottery indicated ties with Laurel to the southwest, while rocker-stamped pottery is a characteristic of Hopewell to the southeast" (Janzen 1968:108). The presence of burial mounds shows more ties to Hopewell. Serpent Mounds (Johnston 1968) and Cameron's Point (Spence and Harper 1968) appear to be a blend of Hopewelian and Point Peninsula cultural elements. Point Peninsula probably derived elements of Hopewell from Ohio, while North Bay is tied more to Illinois Hopewell traditions.

Garden Peninsula

The ceremonial cave sites along Burnt Bluff have been called North Bay, although no ceramics have been recovered (Cleland and Peske 1968). Summer Island is different ceramically and in other ways from either Minnesota Laurel, Point Peninsula, Saugeen or North Bay, yet Brose feels that Mero and Summer Island are probably closely related (1970:148). The situation appears quite confusing as,

"The other Northern Middle Woodland cultures, North Bay, Saugeen, and Point Peninsula all seem to be interacting with
Laurel as well as with each other...All these cultures appear to be participating in an intraregional ceramic complex, and pottery is the basic common denominator which ties together the Northern Middle Woodland cultures. Even though the archeologist has speciated these cultures it may prove advantageous to think in terms of one large cultural unit rather than several smaller ones. The unifying feature of Northern Middle Woodland groups may be the particular ecological conditions of the Lake Forest area" (Janzen 1968:109).

Lake Forest Middle Woodland Subsistence Patterns

Focal economies (Cleland 1966) are suggested from most of the larger Middle Woodland sites, where groups apparently coalesced for fishing. Summer Island is considered to be a spring sturgeon catching site. Mammal remains are present, but the focus of subsistence is based more heavily upon fish (Brose, 1970:148). According to Brose, Mero with its more nearly balanced fish and mammal remains represents a later summer occupation. Autumn wild rice gathering sites are reported from Point Peninsula in Ontario and Upper New York (Ritchie 1965), and are suggested by Brose to likely occur around inland lakes in the southern Upper Peninsula although none are yet known. According to Brose,

"Winter sites would probably be quite small and located along rivers and interior lakes. The major subsistence resources at these sites would most likely be mammals, probably the moose and beaver characteristic of the Canadian Biotic Province" (Brose 1970:149).

Many small sites like this are seen in southern Ontario (Wright 1967:94). If Brose's postulated seasonal round is accurate, the total cultural adaptive pattern would be diffuse in Cleland's terms, while any single site would show a focal pattern. Since a diffuse pattern
requires mobility, Brose suggests this as a likely reason for widespread distribution of sites with similar ceramics. Unfortunately, reconstruction of subsistence base is not all that well defined by actual faunal or floral remains, even at large sites like Naomikong where faunal remains are sparse.

Lake Forest Middle Woodland Social Patterns

At Summer Island Brose has reconstructed the likely social pattern as a patrilocal band with two extended and two nuclear families occupying four structures (1970:165). He suggests that band exogamous marriage patterns were in effect. He uses band exogamy to suggest that wives would likely be selected from areas 50 miles distant or more (1970:168). Movement of females would tend to lead to a standardized ceramic design repertoire over a large area. The only movement of people would be "the seasonal movement of the exogamous patrilocal band to utilize the available resources of the Lake Forest Formation, and the postnuptial movement of women within that area" (1970:68). Lithic styles would then develop along more local lines.
LIFE AT THE WINTER SITE

Brose's (1970) reconstructions of social and subsistence patterns in the Lake Forest Middle Woodland are admittedly speculative, but seem reasonable on many counts. It would be premature to apply his observations directly to the Winter site, as no house patterns were observed. One can be relatively certain that the site's inhabitants were fairly mobile and had rather obvious ties to other cultures.

The presence of obsidian, Knife River Chalcedony, other exotic chert points and Havana ceramic similarities suggests that Winter site people had some direct contact with more southerly Hopewell people, probably in the Fox Valley. Site occupation is presumed to be roughly contemporaneous with Mero and Port des Morts (circa. 160-200 A.D.), where a limestone tempered Havana pot was found in a North Bay midden. Likewise, similarities have been shown to exist with Laurel and Point Peninsula, both of which were influential on North Bay culture. The Middle Woodland people camping at the Winter site were in a large Lake Forest environment that harbored many other small groups making generically similar ceramics and lithics. The author pictures these groups as rather mobile, utilizing lake shores and inland waterways as travelling routes. All one sees of their life at the Winter site is the debitage of their non-parishable material culture which they left behind. Quite likely, they were among the groups that canoed by the eroded limestone cliffs of Burnt Bluff and cast their projectiles into the rocks, perhaps in hopes of insuring success in forthcoming hunts.
Since the Upper Peninsula remains scantily tested archaeologically, one might suppose that other similar and functionally dissimilar Middle Woodland sites are common. Certainly recent fieldwork by Fitting and Buckmaster suggest even more ceramic divergences around the same themes of dentate and pseudo-scallop stamping. The most important discoveries will be the associations between season, type of tools and faunal and floral remains, as gaps seem to blur the interpretations of Brose and others. The Winter site is another in a growing list of widespread Lake Forest Middle Woodland sites which existed around 200 A.D.

The presence of six miniature ceramic vessels suggests that children were living at the site. The two areally separate upper midden deposits might well represent separate dwelling and workshop areas, perhaps for two extended families. Faunal analysis is currently being conducted by Charles Cleland. Mammals are more common at the site than fish. Sampling and excavation procedures might account for the relatively small amount of fish remains, but this is unlikely. Although a three to one ratio of scrapers to bifaces exists, this is due to use of scrapers for working wood and bone and does not accurately represent importance placed on hunting versus fishing.

The people gathered local raw materials for on-the-site lithic and ceramic manufacture, fished, hunted and certainly collected various plants. This small integrative group is like the North Bay culture to the south, but had its own distinctive ceramic tradition. Lithics are similar to North Bay, with a difference in ratio of artifacts likely to do with site function.
### Table 1--Debitage

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Total--14,298 flakes

### Table 2--Cores

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### Table 3—Unifaces

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<th>Average width—1.90 cm.</th>
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<tr>
<td>One side</td>
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<td>Notched</td>
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<td>Whittling knives</td>
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### Table 4

**Projectile Point Metrics in Centimeters**

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<th>Garden Stemmed</th>
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<th>Bay de Noc</th>
<th>Lang Corner-Notched</th>
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<td>4.4</td>
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<td>6.7</td>
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Table 5—Other Bifaces

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<td>Conical point</td>
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Table 7
Lake Forest Middle Woodland Ceramic Trends
(from Brose 1970) (in %)

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<thead>
<tr>
<th>Location</th>
<th>Pseudopolop</th>
<th>Banked stamp</th>
<th>Plain</th>
<th>Drag stamp</th>
<th>Cord</th>
<th>Impressed</th>
<th>Punctate or bossed</th>
<th>Linear dentate</th>
<th>Rocker stamp</th>
<th>Cord marked surface</th>
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Table 8
Ceramic Types at Winter
(from Bianchi:nd)

Middle and Upper Middens  Lower Midden

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<th>Winter Ware</th>
<th>Middle and Upper Middens</th>
<th>Lower Midden</th>
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The Site

Valentine Creek
Figure 3 - Stratigraphy at 15' south
Figure 4: Stratigraphy at 27°5', south
Plate 5--Stemmed Points
A. Dustin-Lamoka
B. Adena or Waubesa Contracting Stemmed
C. Spider Stemmed
D. Garden Stemmed
Plate 6--A. Lang Corner-Notched Points

B. Bifacial Hafted Scrapers

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Plate 7--Bay de Noc Notched Points

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Plate 8: A-C Corner Notched Points
D Snyders Point

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Plate 9--A. Quartzite Knives
B. Ovate Bifaces

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Plate 10--A. Bifacial Knives
B. Blanks
Plate 11--Broken Blank
Plate 12--Broken Blank
Plate 15: Hematite and Limonite
Sources Cited

Binford, Lewis R. & George I. Quimby

Brose, David S.

Cleland, Charles E.

Cleland, Charles E. & G. Richard Peske

Fitting, James E.


Hruska, Robert

Hubbs, Carl L. and Karl F. Lagler

Janzen, Donald R.
Johnson, Richard B.

MacNeish, Richard S.

McPherron, Alan

Mason, Ronald J.
1965 "Wisconsin Middle Woodland Toggle Head Harpoons". Michigan Archaeologist, Vol. II, Nos. 3-4, pp. 156-64, Ann Arbor.

Potzger, J. E.

Prahl, Earl J. and W. R. Farrand
1968 "The Geology of Burnt Bluff". Anthropological Papers, Museum of Anthropology, University of Michigan, No. 34, pp. 4-20, Ann Arbor.

Ritchie, William A.

Seminov, S. A. (trans M. W. Thompson)
Spence, Michael W. and J. Russel Harper

Speth, John D.

Taggert, David W.

Wright, J. V.