

Vermont Archaeology Comes of Age: A Perspective on Vermont's Prehistoric Past

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Abstract

An estimated 200 archaeological surveys, site evaluations, and more extended excavations have been conducted in Vermont during the past 15 years. As a result, considerable information has been gathered about many aspects of Vermont's prehistory. This paper has two goals: to synthesize the information gained from these studies and to integrate this information into a context of what is currently known about Vermont's prehistoric past.

The text is divided into eight sections. The first provides an overview of changing plant and animal communities and the various climatic periods which affected peoples' lives during the past 12,000 years. Remaining sections summarize what we can currently infer about life during the Paleoindian, Archaic and Woodland periods. Each section addresses four specific topics: regional context (to provide an understanding of how Vermont sites relate to a wider area), technology, settlement and subsistence, and ideology. This text is an updated, but much abbreviated version of *Our Prehistoric Cultural Heritage*, the prehistoric context of the Vermont Historic Preservation Plan which I prepared for the Vermont Division for Historic Preservation in 1991.

PALEOENVIRONMENTS—AN OVERVIEW

Introduction

Throughout prehistory people had to adapt to the world around them. This is not to say that the environment forced people to make specific decisions, but the environment did place limits on the number of choices which could be made. Many of the inferences which archaeologists make about how people lived in the past are based heavily on reconstructions of regional and local environments. It is unclear when small communities of people first utilized the natural resources of Vermont or explored the more attractive areas. Based on current evidence, the first Native Americans probably arrived between 11,300 and 10,500 B.P.

Probably the most dramatic changes in the landscape closely followed glacial retreat. Between 12,500 and 10,200 B.P., the land rose as the pressure produced by the massive weight of the glacier was released; the surface topography was greatly modified as streams and rivers formed and cut deep channels; soils began to develop; various plant communities became established; a variety of animal, bird, and fish species spread into favorable habitats; an arctic climate became less severe; and, in the Champlain Valley, the salt water Champlain Sea drained and was replaced by Lake Champlain. At its inception, Lake Champlain was 15-20 feet lower in elevation than it is today, and, at its northern end, had a substantially different configuration (Fillon 1970:26-30). Since that time, resident groups of people have adapted to a slowly but constantly changing environment. The landscape continued to be reshaped; soils continued their development; various animals and plants spread into new territories or even disappeared as broad climatic changes occurred; the level of Lake Champlain gradually rose, and lake waters flooded former shore zones (Beblowski 1981:487).

One of the goals of future archaeological research in Vermont will be to greatly expand the types of environmental information which are currently available, but substantial gains in understanding various aspects of environmental change have been made in the past fifteen years. The following section on Vermont's changing forest environment, climate and animal communities provides a general overview which incorporates information from recent studies (Figure 1).

Changing Patterns

As an outgrowth of pollen and other studies from sites throughout the Northeast and broader continental United States, researchers have attempted to reconstruct the gross changes in general climatic patterns during the past 12,000 years. The underlying assumption has been that there is a positive correlation between climatic trends and changes

Figure 1. Generalized environmental change since 12,500 B. P.

YEARS B.P.	REGIONAL VEGETATION TYPE	CLIMATIC TRENDS	ALLUVIAL EPISODES ALONG RIVERS	FAUNA	MARINE/LAKE FAUNA	CULTURAL PERIODS
1000 2000	Oak-Chestnut Forest	Series of Warmer - Cooler, - Wetter - Drier Episodes	Cyclical Episodes of Rapid & Slower Alluviation			Historic Period
						Late Woodland
						Middle Woodland
						Early Woodland
3000 4000	Oak-Hickory Forest (Oak, Pine, Beech Maximum)	Warmest Dry	Alluviation Slow Infrequent Flooding	Modern Species	Modern Species	Late Archaic
5000						
6000 7000	Oak-Hemlock Forest (Hemlock Beech Maximum)	Warmer Moist Temperature Extremes Lessen	Major Flooding Rapid Alluviation	Deer Bear	Catfish	Middle Archaic
8000	Pine Dominated Forest (Oak, Hemlock, Elm, Ash, Poplar)	Dry, Warm Summers Dry, Cold Winters Seasonal Extremes	Alluviation Slow			
9000 10,000	Spruce - Fir Woodland	Subarctic	Modern Valley Bottoms Established Rapid Alluviation	Moose Beaver Martin Lynx	Whitefish Lake Trout Lake Champlain Formed	Paleoindian
11,000	Tundra				Massive Down Cutting of River Channels	
12,000	Barren Ground	Frigid Arctic Climate			Champlain Sea Formed	
13,000					VERMONT	COVERED

in regional vegetation patterns recorded in pollen cores, regional lake levels, cyclical changes in the earth's axis, atmospheric insolation, and other factors.

Vermont was dominated by glacial ice prior to 13,500 B.P. By roughly 12,600 B.P., the glacier had moved north of the St. Lawrence lowland, leaving behind a landscape of frozen ground for most of the year. A frigid arctic climate existed, with the prevailing winds coming out of the north and northeast, and both the summer and winter Arctic Frontal Zone of the continental air mass lying to the south of the Champlain Valley (Ogden 1977:19-20; Shafer and Hartshorn 1965:124). A tundra environment of mosses, lichens and stunted shrubs characterized the landscape. Between roughly 11,300 and 10,000 B.P., a subarctic climate dominated the region. Subsequently, a shift to a more temperate climate seems to have begun, but weather patterns were still greatly affected by the ice sheet to the north (COHMAP Members 1988; Ogden 1967; Webb and Clark 1977).

In Vermont, and particularly in northern Vermont and at higher elevations, this was generally a period of transition from a predominantly tundra environment of sparse vegetation to an open park-like woodland as spruce, fir and birch began to take hold. This is also the period when people first began to move into Vermont. A spruce-fir woodland was well established in Vermont's lowlands by 10,200 B.P. and had begun to expand into the mountains by at least 9500 B.P. Larch and alder were present in low percentages in the wet lowlands, and beech, oak, ash and maple began to appear on the better drained bottomland areas and low hills in the Champlain and Connecticut Valleys.

As the glacier receded after 12,500 B.P., wildlife adapted to a cold environment migrated to Vermont. Beginning with the establishment of a tundra environment and subsequently by the spread of open spruce parklands into the lowlands of Vermont, the region supported a population of woolly mammoths, mastodons, moose, elk, and herds of caribou. As recently as 1989, a mammoth tooth was recovered from a stream bed in Derby, Vermont. Muskox and smaller arctic animals, such as ptarmigan, arctic shrews and lemmings, may have also been present (Parren 1988). As stands of spruce, fir, aspen, alder, and birch grew up, moose, beaver, lynx, porcupine, snowshoe rabbit, spruce grouse, mice and voles probably migrated from the south. Beaver-gnawed wood has been recovered from early bog deposits near Stowe, and the remains of hare, eastern chipmunk and American marten have been recov-

ered from deposits in Canada which are older than 10,200 B.P. (Harrington 1977).

The Champlain Sea may have been of particular importance for people moving into northwestern Vermont. Prior to 10,200 B.P. when it finally drained, the Champlain Sea may have provided an abundance of food resources not available at a later time. The distribution of classic Paleoindian sites (ca. 11,000-10,000 B.P.) in areas close to the margins of the sea suggests that marine resources may once have been exploited (Loring 1981). The record of marine fossils from Champlain Sea deposits indicates the presence of large marine mammals between roughly 11,600 and 10,200 B.P. White, common finback, humpback and bowhead whales, possibly harbor porpoise, as well as harp, ringed, and hooded seals have been found at different locations, including the Champlain Valley. A convincing case has been made for the arrival of Atlantic salmon and two varieties of smelt in the Vermont arm of the Champlain Sea during its final phase. By about 10,300 B.P., with the establishment of near-fresh water conditions in the Champlain Valley, it appears likely that lake trout, whitefish and brook trout were also becoming established (Brooks and Deevey 1963:144-152).

It should be pointed out that archaeologists do not currently know whether Paleoindian populations ever found ways to utilize marine resources. If marine hunting and fishing strategies were adopted in New England, however, the only surviving evidence may be found in the archaeological record of the Champlain Lowland. On the Atlantic coast, contemporaneous sites which may have been the bases of such operations are now submerged some 30-90 miles off shore.

By approximately 9000 B.P., a sudden sharp increase in white pine, hemlock, oak, poplar, elm, ash, sweet gale and ferns in pollen profiles marks the establishment of a true forest environment. The establishment of a pine-dominated forest provides definite confirmation of a warming trend. Precipitation rates seem to have been fairly low, a characteristic which appears to be reflected by the presence of very thin alluvial beds which characterize some floodplains dating to this period (Thomas and Dillon 1983). A trend of dry, warm summers and dry, cold winters seems to be characteristic throughout the northern hemisphere at this time (Dincauze 1989). Seasonal temperature extremes may have been characteristic. Current estimates are that average solar radiation was 8° C higher in July and 8° C lower in January when compared to today's extremes. After 9000 B.P., these seasonal radi-

ation extremes decreased towards more modern values (COHMAP Members 1988).

With the establishment of a closed woodland around 9000 B.P., it has been presumed that with the lower carrying capacity of a coniferous woodland most of the large game animals disappeared and that the forest environment of Vermont and northern New England in general was impoverished. This assumption was once used to explain why few archaeological sites dating to this period had been identified (Fitting 1968; Ritchie 1965), but this position no longer seems tenable. Rather, it is likely that boreal animals, such as moose, beaver, lynx, porcupine, snowshoe rabbit and spruce grouse, were present in a number of favorable habitats throughout the state as early as 9500 B.P. There is also increasing evidence that people continued to live throughout northern New England at this time as well (Robinson, Petersen and Robinson 1992).

In sediments dated to 8000 B.P., the pollen complex indicates the presence of a temperate forest characterized by a high percentage of oak, beech, birch, sugar maple, elm and ash. Hemlock and white pine were the dominant conifers. Within this mixed deciduous-coniferous forest in the lowlands of eastern and western Vermont, deer, bear, wolf, raccoon, otter, fox, grey squirrel, wild turkey and passenger pigeon occupied favorable habitats. Moose, elk and perhaps even small herds of woodland caribou were probably more common in the spruce-fir-northern hardwood forests at higher elevations in the Piedmont and Green Mountains. Such upland and lowland game animals formed the foundation of a hunting-fishing-gathering economy which supported Native American communities in Vermont from the end of the Early Archaic period to the time of European exploration.

With the disappearance of the Champlain Sea and the establishment of a freshwater environment in Lake Champlain after 10,200 B.P., the types, densities and diversity of aquatic resources also changed. Species such as brook trout, perch, pike, chub and mullett expanded into the rivers, smaller streams and ponds. At least seasonally, fish may have been an important source of food for people living in the Champlain Valley, as well as in the Connecticut and Hudson River watersheds in eastern and southwestern Vermont, beginning some 8,000-10,000 years ago. A radiocarbon date of 8700 B.P. in association with fish bone at the WMECO site in the middle Connecticut Valley and the recovery of a pectoral spine from a catfish at the John's Bridge site on the

Missisquoi River in northwestern Vermont dated to 8100 B.P. support this inference (Curran and Thomas 1978; Thomas and Robinson 1980).

Based on changes in the percentages of various plant species, pollen cores reflect various periods of regional change in the forest environment. These periods have been termed oak-hemlock (8000-5000 B.P.), oak-hickory (5000-3100 B.P.) and oak-chestnut (3100 B.P. to the present). In culture history terms, these intervals correspond to periods which run from roughly the end of the Early Archaic to the early Late Archaic period, for the remainder of the Late Archaic period, and from the Early Woodland through the Late Woodland period. While pollen data are useful for understanding general trends in the environmental development of the region, the quantum leap between establishing regional profiles and defining the characteristics of local plant populations through time has not been made. These schemes do not reflect the dynamics within forests where any or all plant populations may grow, remain stable, or decline with time. Given the generally rugged topography of Vermont, the substantial changes in elevation from east to west, and the evolution of plant communities throughout the past 8,000 years, the term "patchy" most aptly describe the forested landscape of Vermont. This patchiness offered great opportunities for human exploitation. How people operated within various environmental settings will undoubtedly be reflected in Vermont's rich archaeological record.

By approximately 7500 B.P., or the beginning of the Middle Archaic period, the severe climatic conditions of the previous period began to ameliorate. Although the environmental data need to be considerably refined for the New England region, various peripheral sources suggest that the period from 7500 to roughly 5300 B.P. was one of fairly warm and moist conditions. Precipitation may have been as much as 25-30% higher than at present. Major flooding was common along a number of river systems. These trends are suggested by the occurrence of a hemlock and beech maxima in Vermont pollen profiles, as well as by evidence of rapid sedimentation and channel migration along stretches of the Missisquoi River between 6500 and 5400 B.P. and by the presence of beech, cedar, maple and hemlock logs entombed in the Missisquoi River floodplain in Highgate which date to the same period (Brakenridge, et al. 1988; COHMAP Members 1988; Thomas and Dillon 1983; Thompson and Bettis 1982). The subsequent period, dating from approximately 5300 to 2900 B.P., is marked by a climatic shift to drier condi-

tions. Recent studies suggest that average summer temperatures were from 2° to 4° C higher than at present, while temperature extremes during the winter relaxed (COHMAP Members 1988; Dincauze 1989). In the upper Midwest, Thompson and Bettis (1982) found this to be generally a period when major rivers entrenched and flooding was infrequent; prairies reached their maximum extent. The apparent lack of any substantial alluvial deposits dating to this period within the floodplains studied along the Missisquoi River seems to mirror this episode of limited flooding and channel entrenchment (Brakenridge et al. 1988; Thomas and Dillon 1983). A significant decrease in precipitation at this time is further suggested by a substantial drop in the water table of Shelburne Pond, located in the Champlain Lowland (Carr, Worley and Davis 1977). Cyclical fluctuations of climatic trends after 2800 B.P. seem to be better defined. The pollen record indicates that there were a series of warmer-to-cooler and wetter-to-drier episodes within the past 2,800 years (Bernabo 1981; Swain 1978; Wendlund and Bryson 1974). Voight and O'Brien (1982) summarize the sequence of climatic shifts as follows.

Between 2800 and 1680 B.P., much of the midcontinent witnessed a general relief from hotter and drier conditions. As annual temperatures dropped and precipitation increased in Vermont, a resurgence of spruce and fir occurred at higher elevations; pine began to increase in frequency in the lowlands. Between 1680 and 1200 B.P., warmer temperatures blanketed the central United States and oak-dominated forests maintained relatively stable distributions. Around 1200 B.P., precipitation levels increased throughout the Northeast. Temperatures were still warm.

With the onset of the next climatic episode at approximately 900 B.P., at the beginning of the Late Woodland period, increased penetration by pacific air masses during the summer months resulted in droughty conditions and higher temperatures. The period between 950 and 750 B.P. may have been the warmest time during the past 2,000 years. Changes in temperature and moisture regimes resulted in lowered water tables and a decrease in stream flow and frequency and duration of flooding. The peak of this episode occurred around 600 B.P. A shift to cooler and moister conditions began about four hundred years ago and continued until the late nineteenth century.

Substantial changes in regional climatic trends have occurred throughout the past 12,000 years. More subtle contrasts in temperature and precipitation undoubtedly

existed among Vermont's physiographic regions, as well. Both broad and small-scale climatic patterns are likely to have played important roles in the lives of Vermont's prehistoric inhabitants. Much research remains to be completed before more can be said about the first occurrences of various animals, their distributions and how the range and size of various populations fluctuated through time. Given the pronounced climatic swings and changes in forest types noted previously, substantial changes in mammal, reptile, amphibian, bird and fish populations must have also occurred since the forests first closed in on the Vermont landscape. We must recognize and understand such changes before we can gain a fuller appreciation of the lifeways of people who lived in Vermont during the past 10,500 years.

Within the past 200 years, climatic changes and human actions have substantially altered the landscape Native Americans once knew. Since the late nineteenth century, the climate has ameliorated and we are now faced with global warming and stunted forest growth due to industrial pollution. A number of animal species have been exterminated from Vermont and massive areas of forest land were cut over during the last century and projects undertaken throughout Vermont (Doherty, Kochan and Thomas 1992; Thomas 1985a, 1985b, 1989a, 1989b, 1991; Thomas and Bourassa 1985; Thomas, Clement and Doherty 1992).

Understanding the relationship between the natural environment and human cultures has been and will continue to be one of the fundamental goals of archeological research.

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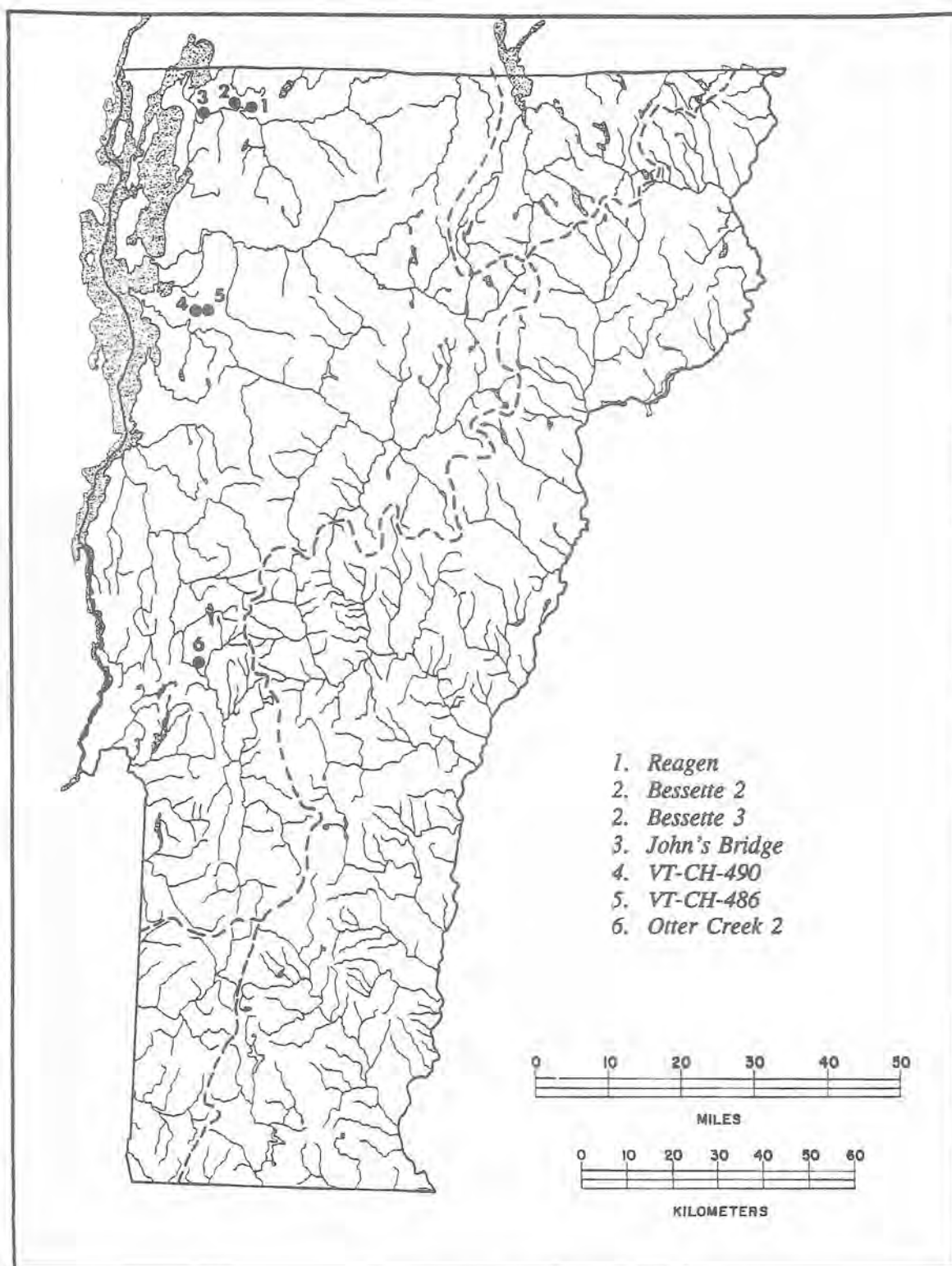
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PALEOINDIAN PERIOD (11,500-9,000 B.P.)

Regional Context

The waning of the last continental glacier ushered in the first human occupation of Vermont and the greater Northeast about 11,500 years ago. Archaeologists refer to this time as the Paleoindian period. Most of the Paleoindian sites throughout the Northeast remain undated. Current evidence does suggest that the fluted points found at such sites as Templeton, Whipple, Bull Brook, Vail, Michaud and Debert (located in Connecticut, New Hampshire, Massachusetts, Maine and Nova Scotia), as well as most of those recovered at unexcavated site in western Vermont, date between 10,000 and 11,000 years ago (Haynes et al. 1984). This is a period of mystery, and sites dating to this distant past have the mystique of being "the first" or "the earliest." From Pennsylvania and New Jersey on the south northward to the southern Great Lakes and eastward to Nova Scotia, substantive data about the Paleoindian period can be drawn from fewer than 25 well excavated archaeological sites. However, literally thousands of Paleoindian artifacts have been recovered, mostly as isolated surface finds, from hundreds of sites throughout the Northeast, and more are being encountered each year (Brennen 1982; Lantz 1984). These scattered finds strongly indicate a widespread and persistent occupation throughout the region on a far different scale than is suggested by the relatively few

Figure 2. Paleoindian and Early Archaic period sites cited in the text.



extended and detailed studies of Paleoindian sites which appear in the archaeological literature.

Technology

The most distinctive tool of the Paleoindian period is the Clovis-like fluted projectile point. This style of point, first identified in the American southwest in the 1920s and first identified in the Northeast at the Reagen site in northwestern Vermont, is found at roughly contemporaneous sites throughout North America in a wide variety of environmental settings (Ritchie 1953) (Figure 2). Tool assemblages at some Paleoindian sites are varied and extensive, while at others they are less diversified. Common to many sites are the characteristic fluted points, projectile point preforms, leaf-shaped and ovate knives, end scrapers (many with graver spurs), side scrapers, flake shavers, pieces esquillees (flake wedges), drills, gravers, hammerstones, anvil stones, choppers, and flaking debris from a variety of bedrock sources, almost all of which is of a superior quality for stone tool manufacture (Curran 1979; Gramly 1982; Grimes 1979; Spiess 1985). The presence of fluted points and spurred end scrapers made from high quality chert has been used to identify over twenty Paleoindian sites in western Vermont (Loring 1980; Thomas, Dillon and Doherty 1985:74-81, 179-185, 202-204; Dillon, Thomas and Doherty 1985:236-238).

The Reagen site in Highgate, Vermont, is the only substantively reported Paleoindian site in the state. However, interpretation is difficult because all artifacts were picked up on the surface by collectors after severe wind erosion had occurred. William Ritchie inventoried 179 stone artifacts which he arbitrarily divided into four major categories: scrapers, knives, a variety of projectile points, and a few chipped artifacts of indeterminate form. Thirteen talc pendants apparently comprise objects of personal adornment which are unique to the Reagen site (Ritchie 1953:251-254), although there are rumors that these pendants were planted by collectors to fool their competitors.

The diversity of projectile point styles at the Reagen site has fascinated archaeologists for several decades. Of the 47 points recovered, point forms include an eared triangular type, a small trianguloid type made on broad thin flakes, a probable lanceolate type made by using an oblique flaking technique, a lanceolate pentagonoid type with very thin fluting on one face or showing horizontal parallel flaking scars across the entire face of the point, a pentagonal form, and a stemmed type (Ritchie 1953).

Although similar pentagonal forms have apparently been encountered at other Paleoindian sites in the Northeast (Snow 1980:130-131), the variability in the Reagen assemblage is unusual and has led archaeologists to infer that the Reagen site dates to the end of the Paleoindian period.

A final phase of the Paleoindian period is recognizable in a broad arc extending from the Great Lakes across southern Canada and northern New England and as far east as the Gaspee peninsula by the presence of long, very thin lanceolate points which exhibit parallel flake scars from one edge to the other (Doyle et al. 1986; Benmouyal 1978). To date, the only evidence of this phase in Vermont is several parallel-flaked specimens from the Otter Creek 2 site in Rutland County and from a site in the Little Otter Creek drainage (Ritchie 1969; Doyle et al. 1986:14). Two observations are invariably made about Paleoindian artifact assemblages. The raw materials used are of very high quality and frequently derive from distant source areas. Such patterns exist at Paleoindian sites throughout New England where a variety of "exotic" cherts, jaspers, felsites, rhyolites and quartzites are often encountered and where source areas are often presumed to lie at distances of well over one hundred miles from the sites (Curran 1979; Grimes 1979; Grimes et al. 1984; Gramly 1982, 1984; Spiess 1985; Wilson and Spiess 1990).

At the Reagen site, a wide range of material is also represented, even when the total reported artifact assemblage consists of only 179 tools and 75 flakes. The most prominent raw material among the tools and flaking debris is a banded black and grayish brown chert, with other black and dark gray cherts being fairly common. Based on macroscopic characteristics alone, much of this chert is presumed to be derived from the Champlain Lowland, as are a few artifacts of grayish quartzite. Other raw materials consist of whitish, yellowish or reddish rhyolites or felsites, traprock, a mottled gray and brown chert, yellow and dark red jasper, green chert and gray chalcedony (Ritchie 1953:250-251). Although speculative, source areas for the rhyolites, felsites, mottled gray and brown chert, jasper and green chert could extend from eastern Massachusetts, central and eastern New York, and as far south as Pennsylvania.

Settlement and Subsistence

In Vermont, Paleoindian artifacts have been recovered in a variety of geographical settings—from old beach lines and delta tops left behind as the Champlain Sea

waned, from the Champlain Lowlands below the maximum limits of the Champlain Sea, and from high and nearly mountainous terrain in the upper Winooski River watershed. None have been recovered in modern river bottoms or along the shores of Lake Champlain, but for good reason. At that time, modern stream channels and adjacent floodplains had not yet formed, and Lake Champlain either did not exist or exhibited a lakeshore with a substantially different configuration during the early stages of its development.

The presence of "exotic" raw material from distant source areas at most Paleoindian sites has led many archaeologists to conclude that extended family groups or small bands moved over wide areas during the course of the year. Their ability to do this was in part due to their selection of very high quality stone for tool manufacture, their production of versatile tools and tool kits which could be used for a variety of functions, the heavy curation of stone artifacts, and the intensive use of even small flakes for cutting and scraping. Curation was accomplished by reworking broken tools into other tools or by creating smaller versions of the same tool. This strategy may partially explain the diminutive size of the projectile points found at the Reagen site (Grimes and Grimes 1985; Lowery 1989:161; Snow 1980:129; Ritchie 1953). An alternative model proposes that the movement of family groups was less wide ranging and that "exotic" stone was procured by specialized task groups who traveled to the quarries and brought necessary materials back to the home territory (Wilson and Spiess 1990). So little is known about the characteristics and evolution of Paleoindian settlement patterns that any definition of site types must be tentative at best. Habitation sites are the most readily observed. Because there is a substantial range in size range in size and artifact density among sites, however, large base camps and small residential camps are provisionally offered as site categories. The category of small residential camp might include such sites as Reagen in northwestern Vermont.

One pattern is characteristic of both types of sites: artifacts are typically concentrated in distinct clusters within a larger site area. This distributional pattern was noted as early as 1950 by William Ritchie at the Reagen site and has been confirmed at other sites since then (Ritchie 1953:249). For example, at the Whipple site located on a sandy terrace above the Ashuelot River in New Hampshire, Curran identified three distinct activity areas of 6-8 m diameter spaced 60-100 m apart. At the Bull Brook I in eastern Massachusetts, approximately 42 activity loci

of 5-10 m diameter were identified within an area of 8,000 m² (Grimes and Grimes 1985; Spiess et al. 1985). Given the fairly harsh climate which prevailed, such artifact concentrations could represent individual shelters within which people carried out a variety of activities. To date, however, the remnants of an actual shelter or house have not been identified. Clearly, much remains to be learned about the functional nature of Paleoindian sites, how various types of sites were integrated into a larger settlement system, and how such patterns may have changed through time.

The apparent evidence for long distance movements of people on an annual basis and the identification of Paleoindian sites in a variety of environmental settings have led to extended discussions and attempted explanations of Paleoindian subsistence patterns. What types of food resources were utilized? Were Paleoindians "specialists" or "generalists?" How did they organize?

In the western part of the United States, "Clovis adaptive patterns are heavily skewed towards task-specific activities of mammoth killing and processing" (Lahren 1974:148). This same theme, which tends to view Paleoindians as "specialists" who focused their attentions on one or two large game animals, was picked up in the East by various archaeologists (Ritchie 1957; Funk 1970, 1972; Dragoo 1979). This view has been challenged by other archaeologists who hypothesize that Paleoindians were "generalists" who were more likely to have utilized a wide variety of food resources rather than focusing on one specific type of game (Dincauze and Curran 1983; Curran 1984; Spiess, Curran and Grimes 1985:156). Today, the debate tends to be one of degree rather than kind. Paleoindians may have utilized both strategies, depending upon the season or other environmental factors. Faunal remains from Northeastern Paleoindian sites are rare, but where they have survived, a mixed diet is suggested, with caribou, beaver, fish, large bird, and charred hawthorn pits having survived at various sites (Spiess, Curran and Grimes 1985:146-148; Funk et al. 1969; Kooper, Funk and Dumont 1980; Eisenberg 1978). Until plant and animal remains are identified from a great many more early sites, characterizations of Paleoindian subsistence practices will remain problematic.

Ideology

Given the great antiquity of Paleoindian sites and the obvious lack of any modern cultural analogs which might be used to infer the nature of the spiritual beliefs of these

people, it seems safe only to say that they possessed a complex set of beliefs which we can never hope to understand. From widely scattered sites in North America, we see only fleeting glimpses of such beliefs which relate to the treatment of their dead comrades and relatives. At the Anzick site in Montana, for example, the first known Paleoindian burial was identified in a rock shelter in 1973. "The combination of ceremonial breaking [of stone and bone tools] and red ocher covering is probably the earliest evidence of New World religion" (Lahren and Bonnicksen 1974).

Closer to Vermont, in southwestern Ontario, Deller and Ellis (1984) make a convincing case for the presence of a cremation burial at the Crowfield site, despite the absence of identifiable human bone. A pit measuring approximately 1.5 m wide and roughly 45 cm deep was found to contain over 1,400 fire-shattered artifacts, including fluted points and other typical Paleoindian tools. These authors further note that a similar cremation was encountered at the late Paleoindian Renier site in Wisconsin, and that, based on stylistic similarities of points found at the Reagen site in northwestern Vermont, the Crowfield and Reagen sites may date to approximately the same period (Deller and Ellis 1984:50).

Although these glimpses into the distant past are tantalizing, it seems fair to say that human burials dating to the Paleoindian period will rarely be encountered in the future and that Paleoindian ideology is likely to remain firmly in the realm of speculation.

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EARLY ARCHAIC PERIOD (9000-7500 B.P.)

Regional Context

The identification of Early Archaic sites throughout New York, New England and the eastern Canadian provinces has been largely determined by the presence of a series of projectile point types first recovered from stratified alluvial sequences in the Southeast. As defined in the

Southeast, the basic typological sequence runs from early Hardaway-Dalton points, to Kirk Corner Notched, St. Albans Side-Notched, and Le Croy Bifurcate Stemmed, followed by Kanawha Stemmed and Kirk Stemmed (Broyles 1966, 1971; Chapman 1980; Coe 1964). In the Northeast, recognition has come slowly, and prior to 1966 "no Archaic assemblages in Pennsylvania, New York, New England, and the Upper Great Lakes could be confidently assigned an age as great as 3000 B.C." [5000 B.P.] (Funk 1978:20).

Among New England archaeologists, perceptions about the Early Archaic period have been evolving. The idea of a cultural hiatus in the Northeast between the Paleoindian period and a later Archaic period postdating 6000 B.P. was widely held (Fitting 1968; Ritchie 1969), but is now considered inaccurate (Robinson, Petersen and Robinson 1992). There is no clear consensus, however, on how to interpret the evidence of widely scattered Early Archaic period sites which have been defined primarily by the presence of the more easily identifiable variety of bifurcate base points in the New York, New England and southern Ontario area. Low site densities when compared to site densities of later periods have generally been taken to mean a low human population density throughout the region during the Early Archaic and subsequent Middle Archaic periods. The potential for a substantial sampling bias has been raised repeatedly (Dincauze and Mulholland 1977; Petersen et al. 1986; Thomas 1992), and Northeastern archaeologists may be well advised to consider the lessons learned in the Southeast. As Chapman (1980:129) noted a decade ago, "The perspective from eastern Tennessee concerning the Early and Middle Archaic periods suggests a greater population density than previously thought. In just over twenty years, we have moved from the position of little evidence for the Archaic period to the recognition of extensive occupation of the active alluvial terraces adjacent to the river margins. Upland ridge sites and deflated hill tops are now viewed as perhaps marginal and probably secondary to the flood plain sites."

As a result of archaeological projects conducted in New England during the past decade, it is clear that the existence of deeply buried Early and Middle Archaic period sites on riverine terraces is not unique to the Southeast. Cultural material recovered from the base of a number of flood-plain sites are clearly attributable to Early Archaic period occupations dating between 9000 and 7500 B.P. These include such sites as the Walnut Street site located on the Connecticut River just south of the Vermont border

in Gill, Massachusetts, Wadleigh Falls located on the Lamprey River in southeastern New Hampshire, the Shallow and the Cape and Wood Island sites located on the Piscataquis and Androscoggin Rivers in Maine, the Eddy site located at Amoskeag Falls on the Merrimac River in New Hampshire, and Bessette 3 and Bessette 2 located on the Missisquoi River in northwestern Vermont, and dated to 7970 ± 270 and 7730 ± 70 B.P., respectively (Curran and Thomas 1979; Robinson, Petersen and Robinson 1992; Figure 2).

Technology

Early Archaic period sites are likely to contain one or several varieties of corner-notched, stemmed and bifurcate base projectile points which are usually referred to by names used for their Southeastern analogs. These points have been found in association with bifaces in the process of being reduced to finished points, end-scrapers, side-scrapers, utilized flakes, and far less often with such items as hammerstones, milling slabs, abraising stones, pitted stones, notched pebble netsinkers, and ovate choppers with flaked edges. Expediency tools appear to dominate all artifact assemblages, even at large Early Archaic sites in the Southeast. As Chapman (1980:127) has noted for eastern Tennessee, "Within the Early and Middle Archaic lithic assemblages, it is important to note the large number of ad hoc implements representing only slightly modified flakes and blades; formalized chipped stone tool types are relatively infrequent."

Both parallels and differences occur in artifact assemblages from excavated Early Archaic period sites in Vermont. In 1980, the small, single component John's Bridge site was encountered on a bedrock-defended terrace above the Missisquoi River in Swanton, Vermont (Thomas and Robinson 1980). Three radiocarbon samples (7780 ± 225 , 8240 ± 240 , 8340 ± 245 B.P.) derived from a deep pit feature yielded a mean date of approximately 8100 B.P. Rather than some variety of bifurcate base point, the John's Bridge site contained a sample of eleven whole or partial points which are triangular or slightly ovate in outline, corner-notched, with straight or slightly indented bases which have usually been ground. Because this point exhibited a morphology unlike other recognized contemporaneous point forms in New York and New England, it was assigned the name Swanton Corner-Notched (Plate 1). Since that time, such points have been recognized at 13 additional sites in the Champlain Basin (Thomas and Robinson 1980; Thomas 1992; Frink 1989), and analogs may exist in western

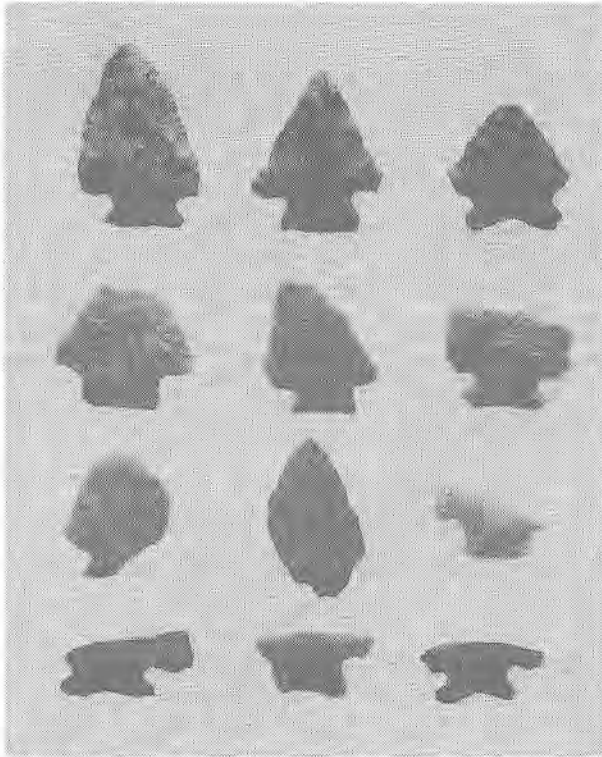


Plate 1. Swanton Corner-Notched points from the John's Bridge Site, Swanton, Vermont.

Maine (Spiess et al. 1983), at the Harrisena site (Snow 1977) located on the divide between the Hudson River and Lake George which drains north into Lake Champlain, and from Lake St. Francis on the upper St. Lawrence River (Plate 2).

In addition to the 23,165 chert (52.6%), quartzite (20.6%) and quartz (26.8%) flakes recovered in a large workshop/shelter area, artifacts related to the manufacture of points include chert and quartzite quarry blanks, broad ovate preforms, biface fragments, and an abraiding stone which may have been utilized to prepare striking platforms during various stages of biface reduction. In addition, a wide variety of cutting and scraping tools were recovered from the 33.5 m² area which was excavated. These include bifacial flake tools, including one perforator, several varieties of scrapers produced from thick chunks of chert or from thick flakes, utilized flakes which appear to have been employed as the primary cutting tools at the site, "nibbled" flakes, and large tabular blades. Six small nodules of graphite were also recovered, the largest of which was clearly ground on several sides. This assemblage contains nearly the full range of formalized and expedien-



Plate 2. Swanton Corner-Notched points from Leichester Flats: VT-AD-64 (upper left and center); and from the Ewing (upper right) and Auclair (others) sites on Shelburne Pond. Photo by James B. Petersen.

cy tools which might be expected at Early Archaic period sites. Evidence of both surface hearths (without fire-cracked rock) and several deep pits was also recovered.

Although the association is less clear, a drilled, rectangular-shaped bannerstone or atlatl made from banded slate and a notched pebble which may have been used as a netsinker were recovered in close proximity to Swanton coner-notched points during intensive surface surveys along the Lamoille and Missisquoi Rivers, respectively. In each instance, the site was small and appeared to be single component (Thomas et al. 1980:93; Thomas et al. 1981:139).

Partial data recovery has been undertaken at two Early Archaic sites in Highgate located on a high alluvial terrace along the Missisquoi River. Only 12 square meters have been excavated at Bessette 3. The recovery of portions of two bifurcate base points, less than 200 chert flakes and a shallow hearth would seem to indicate the presence of a small residential camp. A radiocarbon date of 7970 ± 270

B.P. was obtained from the hearth (Thomas 1992).

Bessette 2 is located some 130 m upstream. Based on the geomorphology and a radiocarbon date of 7730 ± 70 B.P. from charcoal stratified above a distinct layer of artifacts, the occupation of Bessette 2 must be older, probably by several hundred years. The four projectile points recovered from an area of 67 m² are difficult to place typologically. Two of the points have nearly parallel sides, small side notches and ground bases. They are similar to one notched point with a ground base recovered at the John's Bridge site, and thus may be fairly contemporaneous. In addition to the four points and a 15 m² workshop which contained over 10,000 chert flakes and biface fragments, the assemblage consisted predominantly of ovoid bifaces, flake knives, scrapers, large and fairly crude cutting and chopping tools, and two tabular knives or chopper with flaked edges which are similar to those recovered at the John's Bridge site downstream (Thomas 1992). At the John's Bridge site, as well as at Bessette 2 and 3, both a bifacial and unifacial lithic technology are well represented.

At several recently excavated sites in Vermont, including VT-CH-486 and VT-CH-490 located along Indian Brook in Essex, and in northern New England, unifacial scrapers made from angular pieces of quartz and quartzite and flakes with slightly modified edges were the dominant artifacts recovered; finished projectile points or even evidence of bifacial reduction are limited (Robinson, Petersen and Robinson 1992).

Comparisons of the artifact assemblages from these sites lead to several inferences. First, considerable variation may be expected from site to site depending upon the length of residence and the specific types of activities which the occupants carried out. Second, there is sufficient variability in projectile point forms so that site identification based on point morphology alone may not always prove reliable. Finally, virtually all of the lithic material recovered is thought to be derived from local sources of chert, quartzite or quartz. Except for the presence of a single piece of what appears to be Onondaga chert from western New York at the John's Bridge site, the use of "exotic" lithic materials from distant source areas for tool manufacture so characteristic of the earlier Paleoindian period is uncommon. This fact leads to the inference that people had settled into Vermont by this time and knew where to easily find workable stone.

Settlement and Subsistence

In Vermont, Early Archaic period sites have been identified in a variety of geographical settings within the Champlain Lowland of western Vermont, in the Vermont Valley situated between the Green and Taconic Mountains in southwestern Vermont and in the valley bottom along the Connecticut River in southeastern Vermont (Thomas 1992). It seems likely that by the end of the Early Archaic period bands were settling into the region and may have developed home territories. Movement within a territory could be fairly erratic or more highly scheduled on a seasonal or other basis depending upon resource predictability. Habitation sites probably include both base camps situated in high resource areas and smaller residential camps located in the surrounding territory.

One pattern is very likely to be characteristic of both types of sites: artifacts will be typically concentrated in discrete focal areas. Given the severe weather conditions during some seasons of the year, some focused artifact concentrations could reflect the presence of individual shelters within which people carried out a variety of activities. One such shelter was inferred based on the distribution of artifacts at the John's Bridge site (Thomas and Robinson 1980). To date, however, the physical remains of an actual shelter or house have not been encountered.

The wide distribution of Early Archaic sites in Vermont dating to approximately 8000 B.P. supports the interpretation of a resident population which had developed strategies to exploit a wide range of food resources in a number of settings. Swanton corner-notched points have, for example, been identified at fourteen sites in the Champlain Basin. These sites are situated on riverine terraces along Otter Creek and the Lamoille and Missisquoi Rivers, on the outlet of Shelburne Pond in the Winooski watershed, and on the high, sandy, outwash delta plains above the Lamoille and Winooski Rivers in Milton and Colchester. Sites containing bifurcate base points exhibit an even wider distribution, ranging from Bennington in the south to Highgate in the north. Site locations currently include one site on the shore of Lake Champlain, three sites on alluvial terraces adjacent to the Missisquoi River, Walloomsac River and Otter Creek, five sites on bedrock islands surrounded by wetlands along Otter Creek, four sites on the shore of Shelburne Pond, Lake Iroquois, Bristol Pond and Fletcher Beaver Pond, and four locations on rolling lake plains in the Indian Brook watershed and in the foothills of the Green Mountains (Thomas 1992). Site locations strongly suggest the use of at least

riverine, lacustrine/wetland and lowland forest resources.

Faunal remains from Early Archaic sites in New England are rare and generally consist of burned fragments of bone which have been heavily eroded by natural weathering in the soil. Where they have survived, however, a mixed diet is suggested. Faunal remains are particularly sparse at Early Archaic sites in Vermont. At the John's Bridge site, for example, 71 small fragments of calcined mammal bone and one fragment of antler cannot be identified as to species, but of the six pieces of fish bone, two are pectoral spines from either a bullhead or channel catfish. A fragment of charred nut shell, possibly hazelnut, was recovered in a deep pit (Thomas and Robinson 1980:51-54). Hearths were identified at both Bessette 2 and 3, located on a high riverine terrace farther upstream along the Missisquoi River. However, only small fragments of unidentifiable mammal bone were recovered, even after intensive flotation of feature soils. Distinct cultural features containing faunal remains were not identified at VT-CH-490 and VT-CH-486. All other Early Archaic sites in Vermont have been identified by either surface finds of Swanton corner-notched or bifurcate base points or at unstratified, multicomponent sites where faunal remains cannot be clearly associated with a specific period of occupation.

Fundamental questions remain about temporal sequences, the representativeness of current site data, and the nature and variability of the early Holocene environment. There no longer seems to be a question of a continuous occupation of New England following the Paleoindian period. What remains, however, is a very poor understanding of the factors which may affect site discovery, the cultural systems which were active during this period, and the complex natural environment to which people had adapted. Detailed analyses and descriptions of Early Archaic period tool assemblages from other sites are clearly needed in order to increase the possibility of site recognition, evaluate the extent of cultural affinity and/or contemporaneity of identified sites throughout Vermont and the Northeast, and to address the issue of potential site function.

Much remains to be learned about the functional and seasonal nature of Early Archaic sites, how various types of sites were integrated into a larger settlement system, and how such patterns may have changed through time. One thing is clear. The presence of Early Archaic sites in deep alluvial deposits along the state's major rivers, in areas currently submerged beneath Lake Champlain or in

environments which are not usually surveyed, as well as the highly focused distribution of artifacts within individual sites even where soils are fairly shallow means that Early Archaic sites will continue to be very difficult to locate.

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MIDDLE ARCHAIC PERIOD (7500-6000 B.P.)

Regional Context

The identification of Middle Archaic sites throughout southeastern New York, New England and the eastern Canadian maritime provinces has been largely determined by the presence of three projectile point types first described by Dincauze from the base of the stratified Neville site on the Merrimack River in Manchester, New Hampshire. Like those in the Early Archaic sequence, these points, designated Neville, Neville variant and Stark points, have their analogs in the Southeast where they are generally referred to as Stanly and Morrow Mountain II (Coe 1964; Dincauze 1971).

At the Neville site, dates of $7,015 \pm 160$, $7,210 \pm 140$, $7,650 \pm 400$, and $7,740 \pm 280$ B.P. recovered from Stratum 5 which contained the Neville and Stark points provide a rough age bracket for this complex. At the Neville site, as well as at the stratified WMECO site on the Connecticut River in Gill, Massachusetts, a layer containing virtually no artifacts marks a pronounced stratigraphic break above the Middle Archaic horizon. This stratigraphic hiatus is dated by two radiocarbon sample, $5,910 \pm 180$ and $6,060 \pm 130$ B.P., at the Neville site. At both sites, Neville and Stark points were found below; Otter Creek, Vosburg and Brewerton points dating to the Late Archaic period were recovered above (Dincauze 1976; Thomas 1980). Radiocarbon dates from features with clearly associated Neville or Stark points are lacking from other sites in New England.

For many New England archaeologists, substantial increases in the number of Neville and Stark points in collections and at excavated sites relative to Early Archaic

types signal a significant population increase throughout the region (Dincauze and Mulholland 1977; Spiess, Bourque and Gramly 1983; Starbuck 1982; Cassedy 1983; Yesner, Hamilton and Doyle 1983). With a comparable resource base and complex of rivers, lakes, ponds and wetlands in the Champlain Lowland and in the Connecticut Valley to the east, it seems highly unlikely that the archaeological record of the Middle Archaic period in Vermont would not in some ways mirror the trend for increased site density, as well as the settlement and subsistence patterns documented at sites in Massachusetts, New Hampshire and Maine. To date, however, such sites have gone virtually undocumented in the entire state and in areas to the west — a pattern which has perplexed archaeologists working in the upper St. Lawrence and Great Lakes region for over a decade.

Technology

As noted previously, Middle Archaic period sites are likely to contain one or several varieties of stemmed projectile points which are usually referred as Neville, Neville variant and Stark. In addition to the projectile points, artifact assemblages from various sites include preforms, unhafted flake scrapers, tiny quartz scrapers, flake knives, perforators, winged atlatl weights, bifacial chipped knives, plummet, adzes, gouges, full grooved axes, pebble and cobble hammers and heavy flaked choppers (Dincauze 1976). As during the preceding Early Archaic period, expediency tools appear to dominate most if not all Middle Archaic period artifact assemblages.

In Vermont, the occurrence of Neville and Stark points is rare, and the number of associated sites is far lower than for the preceding Early Archaic period. After an extended review of over 5,000 projectile points in the Fleming Museum collection at the University of Vermont, only three Neville points were identified, all from Chittenden County; no Stark points were located (Thomas 1992). A review of the state site inventory led to the recognition of only six possible Middle Archaic sites. Finally, in over 100 surveys conducted throughout the state by UVM's Consulting Archaeology Program since 1978, no Neville and only one Stark projectile point has ever been identified. The latter point was recovered as an isolated find on an old alluvial terrace next to Otter Creek in Rutland (Thomas et al. 1983:66, Appendix B). Based on this evidence, or lack of it, can we draw the conclusion that few people were living in Vermont between 7500 and 6000 years B.P.? It seems highly unlikely, and resolving this question is a primary research goal.

The low frequency of recognized Middle Archaic sites may stem from the fact that Neville and Stark points are not typical forms in the artifact assemblages of this period in the Champlain Basin. The weak representation of Neville and Stark points in the Champlain Lowland, south into the upper Hudson River drainage, as well as to the west in the upper St. Lawrence and around Lake Ontario, suggests the probability that other Middle Archaic point styles, or even a different technology, existed in this entire region. If such styles or technologies can be identified, it may imply that people living in the Champlain Basin and other communities located throughout the upper St. Lawrence-Great Lakes drainage at this time had closer cultural tie with one another than they did with the Atlantic coastal communities.

Settlement and Subsistence

Recognition of Middle Archaic period sites in Vermont is so limited at this time that little can be said about settlement patterns. Furthermore, no subsistence data have been recovered from any Middle Archaic period site in Vermont. Site location provides the best clue to resource exploitation at this time. One Neville point has been reported near the outflow for Shelburne Pond (Petersen et al. 1985:59, 65). Two possible Neville points have been reported from a site on the shore of Lake Champlain in Ferrisburg. Two Neville points were collected by James Petersen on a high terrace adjacent to the Leicester River in the Otter Creek watershed. In southwestern Vermont, one Neville point is present in the Benford collection of artifacts from Lake Bomoseen and a second is present in the Lathrop collection, presumably from a site on the Batten Kill in Sunderland. In southeastern Vermont, one Stark point is reported in the Coane collection from the Salmon Hole along the upper West River which drains into the Connecticut River. This site distribution suggests a strong riverine, pond and lake orientation with a mixed economy based on fishing, hunting and gathering. Faunal remains from Middle Archaic sites in New England are fairly uncommon. However, where components are buried in deep alluvium and where flotation techniques have been intensively employed, faunal remains indicate a very diversified diet. In some cases, the variety of species recovered from Middle Archaic period sites is greater than that recovered from sites of all later periods. At the WMECO site on the Connecticut River, for example, bones from shad or alewife, muskrat, bird, turtle and snake were recovered (Thomas 1980). At Wadleigh Falls on the Lamprey River

in southern New Hampshire, turtle and snake bones dominate the assemblage, but beaver, shad, muskrat, deer, cat and unidentified bird are also present, while at the Lund site, near the outlet of Lake Cobbosseecontee in Maine, beaver and muskrat dominate the assemblage, with low occurrences of bear, deer, fisher, otter, mink, fox, loon, cormorant, gull, snake, turtle, shad, trout and sucker (Spiess 1992; Spiess, Bourque and Gramly 1983). Based on a number of lines of evidence, it is apparent that groups during the Middle Archaic period had settled into the region, that a number of physiographic and micro-environmental settings were utilized, and that subsistence was based on a wide range of food resources. A great deal of variability may actually exist among sites at this time. In the final analysis, such factors as seasonality of site occupation, the environmental characteristics of the territory surrounding any specific site, the chronological placement of a site within this 1,500 year period, and the specific types of strategies which people used to hunt, fish, gather, consume and possibly store various food items, as well as the site specific conditions of organic preservation, will have a great deal to do with the types of food resources which might be represented.

Ideology

Given the antiquity of Middle Archaic sites, it seems highly unlikely that archaeologists will ever be able to infer the nature of the spiritual beliefs of these people. Even evidence of burial ceremonialism which might reflect beliefs related to the treatment of deceased friends and relatives is currently lacking in all non-coastal areas of the entire Northeast.

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LATE ARCHAIC PERIOD (6000-2800 B.P.)

Regional Context

The Late Archaic has been called "one of our most fascinating and most confusing periods" in prehistory. It is "a period in which prehistory takes on many local expressions, and developmental themes interact as a series of confusing cross currents" (Snow 1980:187, 216). In broadest detail, four major traditions are recognized in the region of New England-New York-southern Quebec during the Late Archaic period: the Laurentian tradition; the Narrow Point tradition; the Susquehanna tradition; and the Maritime Archaic tradition. Although there is some temporal overlap during periods of transition, these traditions are chronologically separated in time. Each tradition persists for roughly a thousand years, between approximately 6000 and 2800 B.P. The first three are clearly represented in the archaeological record of Vermont, while the Maritime Archaic tradition was focused along the northern Atlantic coast from Maine to Labrador. Based on often subtle changes in artifact assemblages over time and in different geographical areas, traditions are frequently subdivided into phases.

Because archaeologists have dealt more often with artifacts from individual sites or from small numbers of sites and not with whole cultural systems, these traditions and phases are defined almost exclusively on the basis of perceived differences in technologies and artifact assemblages. There is an often implied assumption that such differences reflect culturally distinct groups of people, but there are strong arguments against such a simplistic interpretation.

Laurentian Tradition

Regional Context

The Laurentian tradition, dated between 6000 and 4400 B.P., is a complex of artifact traits in chipped stone, ground stone and bone which first appeared among populations centered in the St. Lawrence Valley, including western Vermont. Particularly diagnostic are Otter Creek, Brewerton and Vosburg projectile points and ground slate blades and ulus. It has been proposed that the use of ground slate tools by people in Vermont derived from contacts with Maritime Archaic peoples who lived along the north Atlantic coast, and even that the presence of such tools in Vermont represents an actual intrusion of Maritime Archaic peoples into the Lake Champlain drainage (Haviland and Power 1981). Given the occurrence of ground slate points and groundstone celts and gouges at the Sharrow site in interior Maine as early as 8300 B.P., before the Maritime Archaic cultures developed, the migration hypothesis of coastal peoples from eastern Canada requires a reevaluation (Petersen 1989:166-179).

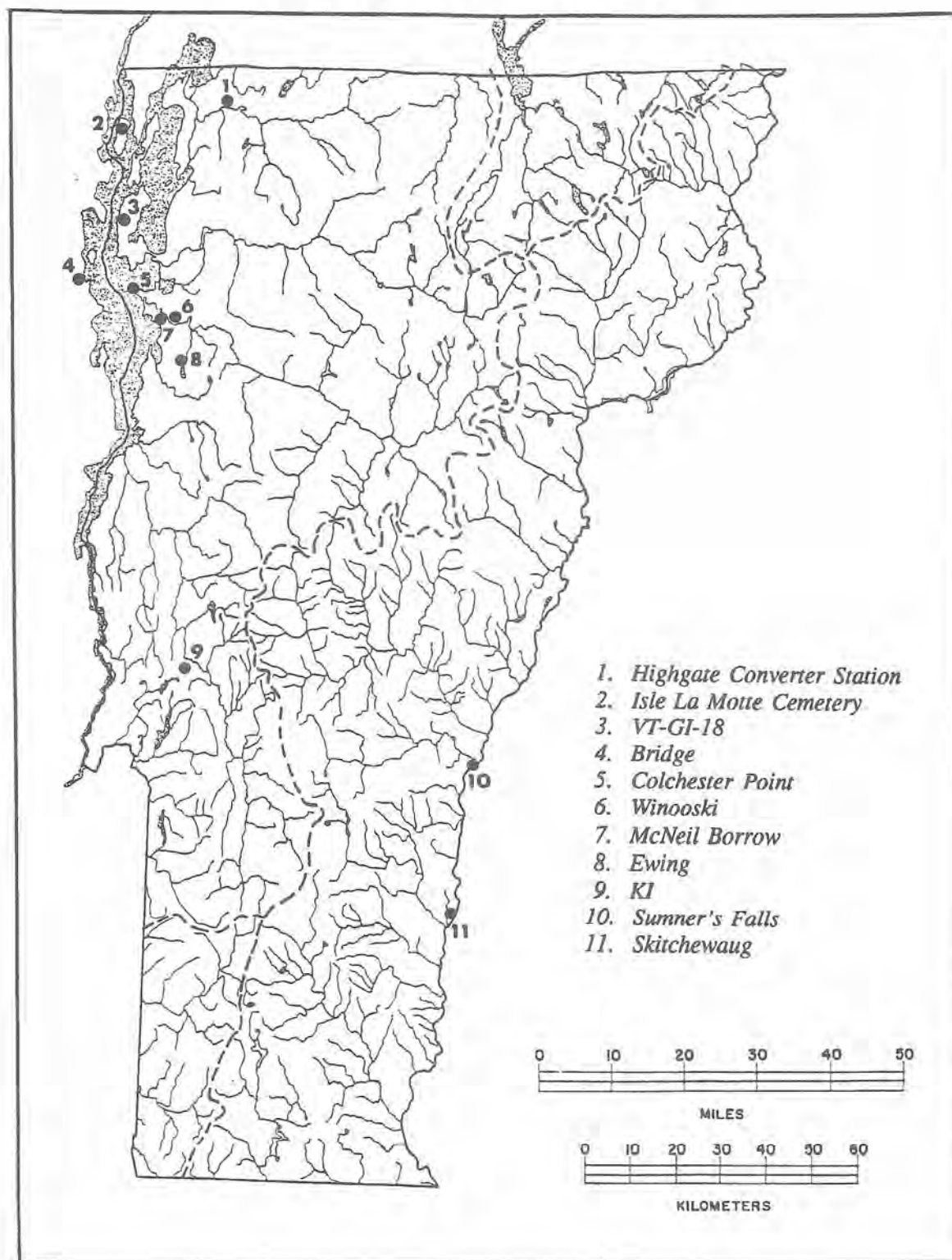
Within the New York-southern Ontario-southern Quebec-northern New England region, three sub-regional variants of the Laurentian tradition have been identified. These three phases, called the Vergennes, Brewerton and Vosburg, overlap in time and space. The Vergennes phase is the oldest and is believed to be the base from which the Brewerton and Vosburg phases developed. The Brewerton phase developed and remained focused in central New York and in the upper St. Lawrence valley around Montreal. The Vosburg phase developed in the upper Hudson valley of eastern New York where it apparently succeeded the Vergennes phase by about 4800 B.P. (Funk 1976:240; Ritchie 1969a:83).

Technology

Three sites in the Champlain Basin, Otter Creek No. 2 and KI (Ketchum Island) located along the middle reaches of Otter Creek, and the Bridge Site, located near the mouth of the Little Ausable River on the west side of Lake Champlain, provide the best representation of Vergennes phase materials anywhere in the Northeast, and in a very real sense, these sites are the type sites for this phase (Figure 3). All sites contained a similar broad array of hunting, fishing, woodworking and other processing tools (Ritchie 1979:8-17; Ritchie 1969a:86; Ritchie 1968:3).

From a roughly 130 m² sample from Otter Creek No. 2,

Figure 3. Late Archaic period sites cited in the text.



dated to 5070 ± 210 B.P., flaked stone hunting and processing tools consist of Otter Creek and Vosburg projectile points, knives, drills, heavy chopping tools, and five types of scrapers (Plate 3). Flaked stone tools were complimented by a bone spear point and by a number of ground slate projectile points or knives and crescent-shaped knives (ulus). Spears or lances were apparently used with spear throwers, as the assemblage also includes an atlatl weight. Fishing equipment includes plummets, gorges made from native copper or bone, and bone points which have multiple barbs along one edge. Woodworking tools consist of a variety of celts (ungrooved axes), adzes, gouges, and rod-shaped abrading stones which were apparently used to resharpen the working edges or bits. Other items include hammerstones, mullers (possibly for grinding plant foods), a graphite paint stone, bone awls, and deer antler tines which were probably used as flakers to make stone tools. Artifact assemblages indicate that by roughly 5100 B.P. communities living in the Champlain basin utilized a diversified tool kit to perform a wide range of day-to-day activities including hunting, line, spear and probably net fishing, the processing of plant foods and fibers, and various types of woodworking. The common occurrence of gouges suggests that dugout canoes, made by hollowing out large tree trunks, were frequently employed to take advantage of the food resources in various river, pond and wetland systems, and possibly for long-distance travel. There is also a notable concentration of sites along navigable rivers, ponds and lakes.

Until recently, it was unclear whether a transition in

Vergennes phase artifact assemblages occurred in the Champlain Lowland of western Vermont or whether Vergennes phase assemblages persisted here for over a thousand years. Funk (1988) had suggested a transition, and such an evolution seemed to be reflected at the Ewing site on Shelburne Pond in Shelburne, Vermont. Excavations at VT-GI-18 on South Hero Island, which produced an artifact assemblage of Vosburg-like points, but which lacked Otter Creek and Brewerton points, ground slate and copper artifacts, indicate that such a transition to a Vosburg phase did occur (Thomas, Kochan and Doherty 1992).

Based on a 63 m^2 sample from two small residential areas in the southern portion of VT-GI-18, the artifact assemblage consists of finished stone tools, including Vosburg-like projectile points, drills, and prepared scrapers; expediency tools, such as modified flake scrapers and shavers, large flakes used for cutting or shaving, and pebble hammerstones; a groundstone celt; portions of flaked tools broken during manufacture; and nearly 1,700 quartzite or chert flakes (Thomas, Kochan and Doherty 1992:52-78).

Settlement and Subsistence

Little is known about Vergennes and Vosburg phase settlement and subsistence patterns, but long-term climatic changes are likely to have brought about some cultural responses. Beginning at roughly 5000 B.P., at the start of the Late Archaic period, and lasting until approximately 3600 B.P., the climate was characterized by warm

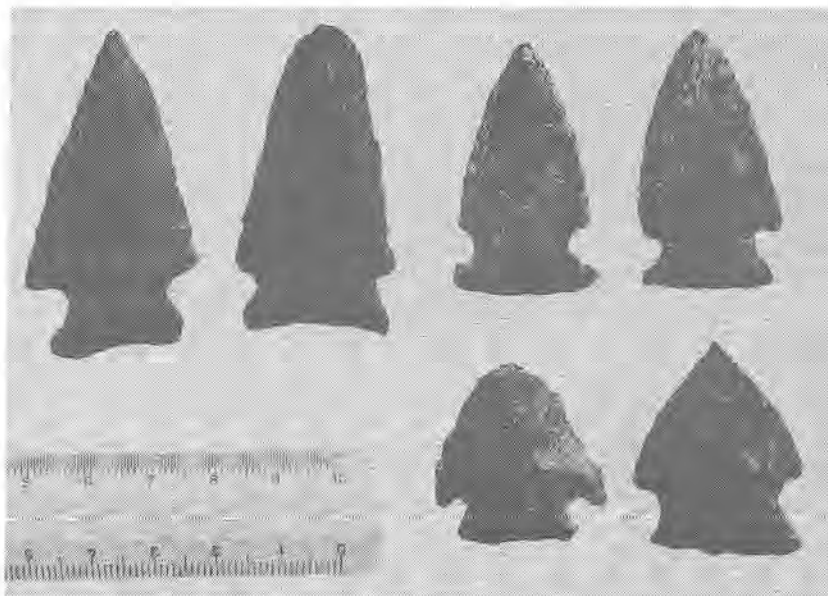


Plate 3. Vosburg-like projectile points in the Watson Collection from Chimney Point, Addison, Vermont. Photo by Stephen Loring.

summers and less intense winter temperature extremes than during the preceding 1,500 years (Brackenridge et al. 1988; Dincauze 1989). In Vermont, this warming trend allowed the gradual expansion of an oak-hemlock and then an oak-hickory forest from the south. Nut trees and fruit shrubs became increasingly plentiful. Although people probably concentrated on resources in the lower reaches of the major river valleys during the winter, the increased floral productivity throughout the region provided greater seasonal flexibility in site location and exploitation of animal and plant foods. As a result, settlements spread into all physiographic regions of Vermont, encompassing all of the Champlain Lowland, as well as more favorable habitats in the Piedmont, Taconic and Green Mountains.

The functional characteristics of sites dating to this period and their distributions are poorly understood. One possible circular house has been identified at the KI site in the Otter Creek valley, but house forms are otherwise unknown. Although most sites may have been fairly small and occupied primarily by extended families, much like Otter Creek No. 2, KI and VT-GI-18, it is clear that people utilized a wide range of environments during the course of their seasonal rounds. Sites containing Otter Creek, Vosburg and Brewerton-like projectile points have been identified in all major watersheds in the Champlain Lowland and along stretches of the Hoosic and Walloomsac Rivers in southwestern Vermont. Vergennes and Vosburg phase sites are particularly prominent around the extensive wetlands which border Otter Creek and its major tributaries, Little Otter Creek and Lewis Creek. They are also common around lakes and ponds, such as Lake St. Catherine, Lake Bomoseen, and Shelburne Pond, and have been recovered at sites on the shore of Lake Champlain south of the mouth of Otter Creek. There is currently little evidence of occupations in the upper ends of the major watersheds of western Vermont, along the Connecticut River or in the valleys of the Connecticut River's major tributaries in eastern Vermont.

Although the distribution of sites suggests that people were taking advantage of a wide range of food resources, food remains have been recovered at very few sites dating to this period. The Otter Creek No. 2 site located near Brandon provides the best representative sample. Here, deer was the dominant species identified; all ages were represented. At least some of the kills were brought to the site for butchering, so hunting within a short distance from the camp was apparently common. Bear, beaver, muskrat, turkey, great blue heron, and an occasional wood turtle were also taken. Most identifiable bone fragments were

probably derived from large mammals, the long bones having been broken open for marrow extraction. No fish bones were recovered, but the presence of gorges, plummets, and barbed bone points clearly indicates that fish were a regular part of the spring-fall diet. The processing and use of some plant foods are also suggested by the presence of a muller (Ritchie 1979:17). Deer, bear, turtle and fish bones have also been identified from a small hearth containing a Vosburg point at the Ewing site. Copper gorges used for fishing have been found here as well (Petersen et al. 1985). Excavations at VT-GI-18 produced only a few fragments of deer bone, but its location strongly suggests that the site's occupants also undertook fishing.

It has been suggested that people at this time followed a "central-based wandering community pattern," in which a group spent a substantial portion of each year in one or several large base camps. The full community may have been composed of several hundred band members, the band itself being the major social and political unit with rights to use a particular territory. During the warmer seasons the band may have assembled where food resources were particularly prolific; small task groups may have ranged out from the base camp to acquire specific resources. VT-GI-18 may represent such a small residential camp occupied by a multi-family task group. The Ewing site on Shelburne Pond, which is characterized by thick midden deposits, may fall within the category of base camp. Because other sites apparently contain a very narrow range of artifacts, particularly projectile points, a more focused subsistence pattern based primarily on small group hunting may have been undertaken during late fall and winter.

Ideology

We may assume that people during the Late Archaic period had a rich complex of spiritual beliefs. We are unlikely to encounter much evidence of such beliefs in the surviving archaeological record, except for limited information about how families may have treated the deceased.

Burials have been encountered at two Vergennes phase sites in Vermont. At Otter Creek No. 2, Ritchie (1979:18-19) uncovered six very fragmentary skeletons which he attributed to this period of occupation. (Recent skeletal analyses have raised questions about this interpretation, but the issue remains unresolved at this time.) The orientation of the bones of some individuals suggested to Ritchie that these were secondary or bundle interments,

i.e., that after the bodies had decomposed elsewhere, most of the bones were collected, then brought to this site for burial. Definite grave goods were lacking, but a middle aged man was clearly buried with a large dog. Reports of a burial at the KI site are more sketchy. During the 1950s, Tom Daniels uncovered what he took to be a structure defined by a rough circle of post molds. Within this circle and under a covering of quartzite cobbles, Daniels found a single decayed human skeleton, lightly sprinkled with red ochre. Daniels also observed that the presumed house was overlain by a low earthen mound (Ritchie 1969a:86). It is possible that the low mound underlain by a layer of cobbles and the ochre-covered skeleton are all parts of the same burial. Given the lack of adequate site documentation, we will never know, but it is intriguing that similar burial customs are known from areas on the coast far to the northeast (Tuck and McGhee 1976; Tuck 1977).

Narrow Point Tradition

Regional Context

The Narrow Point tradition, dated from roughly 4400 to 3400 B.P., is represented by a number of complexes which extend along the East Coast from North Carolina to Maine and as far north as the upper St. Lawrence River near Montreal. From observed variations in artifact assemblages in different geographical areas, a number of phases have also been introduced into the archaeological literature. Based on data from the Sylvan Lake Rockshelter and other sites in the Hudson River watershed which extends into southwestern Vermont, Funk postulates a Sylvan Lake complex or phase, dated between approximately 4400 and 3900 B.P. in the upper Hudson and Lake George area. Between 3900 and 3400 B.P., artifact assemblages at some sites seem to reflect a transition in which Normanskill points become the dominant projectile point type, although Sylvan Stemmed and Sylvan Side-Notched points are present. Funk proposes the term River phase for these sites which he believes date from approximately 3900 to 3350 B.P., thus overlapping with the Susquehanna tradition on the coast (Funk 1976:247-251).

Technology

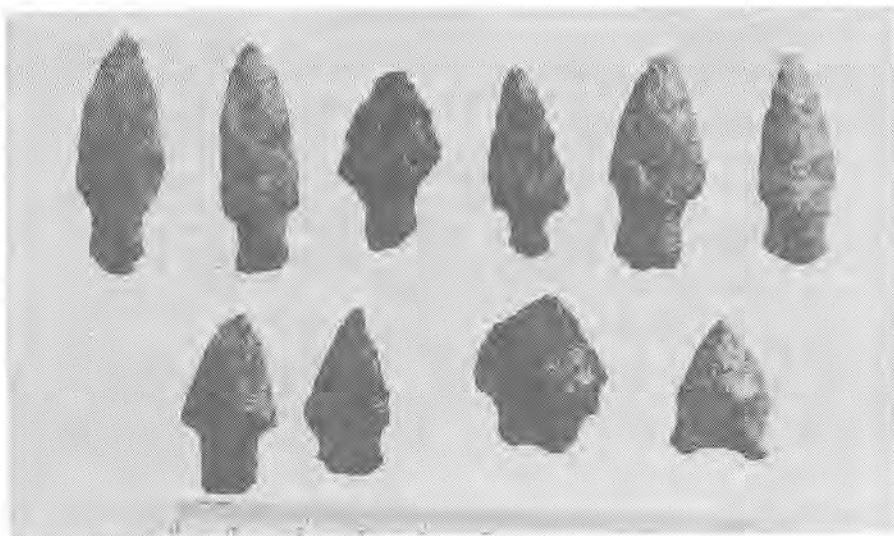
A variety of projectile points with relatively long and narrow blades, generally weak shoulders, and straight, expanding and side- or corner-notched stems are the primary diagnostic feature of the Narrow Point tradition. In Vermont, well-documented assemblages of artifacts related

solely to the Narrow Point tradition are virtually unknown. While this tradition is well represented in at least one discrete portion of the Ewing site on Shelburne Pond in Shelburne, Vermont, no single component site has ever been excavated (Figure 3). Based on extensive surface collections of artifacts from throughout western Vermont, however, this tradition is clearly represented in all major watersheds by a variety of projectile point forms typical of northeastern New York and the upper St. Lawrence drainage (Ritchie 1961).

There are also a number of narrow stemmed and notched points in Vermont collections which do not fall easily into any formal type (Squire 1977; Mills 1984). This may be explained in part by Funk's observations at the deeply stratified Sylvan Lake Rockshelter in the Hudson Valley. Funk concluded that all the narrow stemmed points in this stratum fell into a single series of intergrading varieties, that both stemmed and side-notched points were contemporaneous, and that they had been made and used by a single people. Rather than attempting to define various point types, "the evident unity in basic characteristics of the stemmed points seemed to require the postulation of one inclusive, synthetic group, Sylvan Stemmed, a stylistic continuum from which could be selected specimens bearing correspondences to types previously isolated in other parts of the Northeast; Lamoka, Bare Island, and the sizeable residue of "Lamoka-like" points" (Funk 1976:247-248). Narrow stemmed points and slightly broader side-notched points found in Vermont are likely to reflect the same type of variability as parts of single artifact assemblages, and may or may not be chronologically distinct (Plate 4).

Identified sites of this period appear to have a more limited range of artifact types than earlier Laurentian sites. "On excavated components, projectile points outnumber other individual trait categories, sometimes predominating over all other items combined" (Funk 1976:251-252). In addition to a variety of small projectile points, recovered artifacts include thick bifacial knives, retouched flake knives, drills, retouched flake side and end scrapers, pestles, possible choppers, netsinkers, pebble hammerstones, whetstones, anvilstones, graphite paint stones, and antler flaking tools. Large, groundstone woodworking tools are rare, which suggests a shift from dugouts to bark canoes, although dugouts were never entirely replaced. A few groundstone tools have been found on River phase sites and a few atlatl weights or bannerstones have also been recovered (Funk 1976:247-256).

Plate 4. *Narrow Point tradition stemmed projectile points in the Watson Collection from Chimney Point, Addison, Vermont. Photo by Stephen Loring.*



Whether sites dating between roughly 4400 and 3350 B.P. in western Vermont contain similar or different artifact assemblages remains to be determined. It is possible that sites of this period in eastern Vermont may be more closely related to the contemporaneous Squibnocket complex or phase of southern New England (Ritchie 1969b).

In southern New England, Dincauze (1973, 1974) has noted a tendency for communities to use only immediately available stone for tool manufacture, thus suggesting that little regional exchange of raw materials or finished products took place. At a regional level, we see a substantial shift from southern New England and coastal New York where points are made almost entirely of quartz to the Champlain Valley where contemporaneous points are made predominantly from quartzite and chert. Further research may define even greater subregionalism in the use of raw materials among watersheds in Vermont.

Settlement and Subsistence

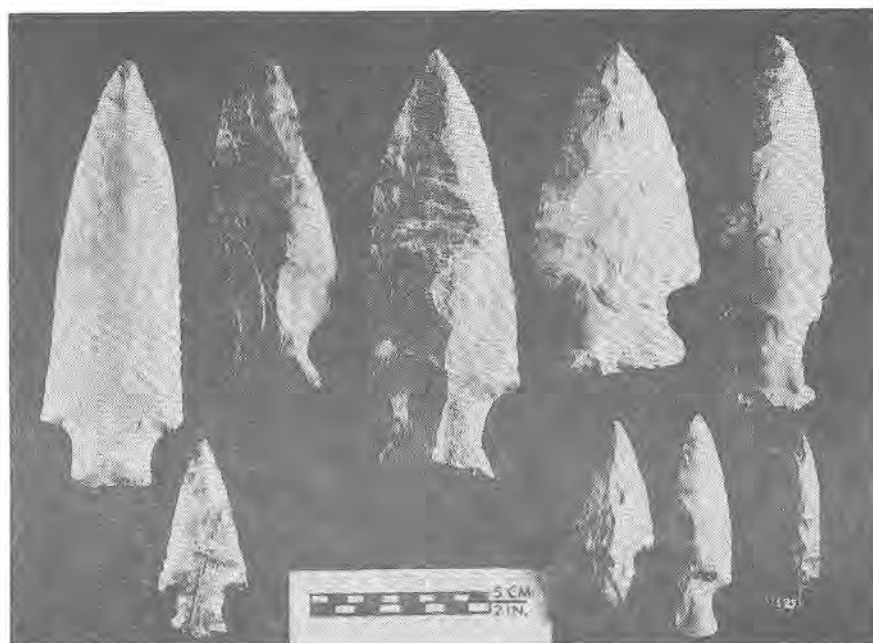
During the period characterized by the Narrow Point tradition, a repetitive pattern in the general characteristics and distributions of sites has been observed throughout southern New England and New York. Sites, and therefore community sizes, are generally not large, but they are numerous and occur in a wide variety of local settings. In southern New England, Dincauze (1975:25) interprets a largely similar pattern as indicating a very diffuse subsistence adaptation, a relatively dense population, and a complex pattern of seasonal movement.

Close parallels may exist in western and probably in east-

ern Vermont. Artifact assemblages from multicomponent sites occupied throughout the Late Archaic period are often dominated by narrow stemmed points. For example, 118 projectile points were collected by Levi Pratt from 15 sites located on Lake St. Catherine and along Wells Brook which connects the lake to the Mettawee River. Of these points, four Otter Creek and seven Brewerton Side-Notched points represent Laurentian occupations, while 73 narrow stemmed and side-notched varieties represent a quantum jump in point frequency at Narrow Point tradition occupations. Susquehanna tradition occupations are represented by 11 Snook Kill points. Not until the late Middle-Late Woodland periods are re points again encountered at sites in this area (Thomas and Bayreuther 1980:14). A parallel jump in the number of narrow stemmed points versus earlier Laurentian and later Susquehanna tradition points is evident at sites along portions of the Walloomsac, Hoosic, Lemon Fair Rivers and Dead Creek as well (Thomas, Campoli and Doherty 1979:60, 85; Thomas and Doherty 1980:62-63; Thomas and Doherty 1982:36-38).

As during the preceding period, all major stream valleys where food resources were particularly dense and/or diversified were intensively occupied, but new patterns emerged and old patterns intensified. Once marginal upland areas were now exploited on a more persistent basis. Sites containing small-stemmed points appear for the first time in the upper White River valley, along the Passumpsic River and on its major tributary streams, on the shore of Lake Memphremagog, and in the upper Black River watershed on Amherst Lake (Doherty, Kochan and Thomas 1990:7; Thomas, Doherty and Warren 1982:37;

Plate 5. *Cache blades from Colchester Point in the R.S. Peabody Foundation Collection. Photo by Bruce Bourque.*



Thomas et al. 1981:65; Thomas and Torrence 1987:11-12). Sites also appear in new settings, including upland ridges located well above the valley in the Winooski and possibly the Wells River watersheds (Thomas 1989:11; Thomas and Torrence 1987:12). In the lowlands, secondary and even minor stream valleys contain numerous sites dating to this period (Thomas, Dillon and Doherty 1985). In short, this period is characterized by the most varied and complex settlement pattern during the entire Archaic and most of the subsequent Woodland period.

Subsistence data from Narrow Point tradition sites in Vermont are virtually unknown. Presumably, many of the basic Vergennes patterns persisted, since components of all three traditions are commonly encountered at the same sites. The only dated food remains for this period were recovered at a depth of 2.75 m (9 ft) from a hearth at the McNeil Borrow site on the lower Winooski River floodplain. Well over 1,000 pieces of burned mammal bone, including deer, were found in this feature dated to 3670 \pm 150 B.P. (Thomas and Robinson 1981). Deer, bear, turtle and fish bones were also apparently associated with a feature containing small-stemmed points at a site on Shelburne Pond (Petersen et al. 1985).

Ideology

Only one possible Narrow Point tradition burial has been identified in Vermont, and this is inferred only by the presence of a unique cache of about 25 blades found in the

1920s in a small pit on Colchester Point (Plate 5). These large blades, characterized by long straight stems and flared bases, are rare in Vermont. However, points of very similar form appear almost exclusively in mortuary contexts in Maine where they date to approximately 3950 B.P. and are attributed to the Moorehead phase. Notably, some of the Bradley points from Colchester Point may be made from Kineo rhyolite from Maine and various Bradley points found in Maine are clearly made from Cheshire quartzite from Vermont (Bourque 1971:91-93).

Susquehanna Tradition

Regional Context

The Susquehanna tradition, dating from roughly 3800 to 2800 B.P., is represented in the archaeological record by a number of related cultural complexes which have also been termed the Broadspear tradition, or the "Transitional" or "Terminal Archaic" stages (Funk 1976; Ritchie 1969a). It now seems clear that the Susquehanna tradition originated in the Southeastern Piedmont as early as 4500 B.P. and diffused northward as far as the coast of central Maine and into the upper St. Lawrence valley of southern Quebec by approximately 3600 B.P. (Bourque 1971; Clermont and Chapdelaine 1982:35-41; Coe 1964). The ultimate demise of the Susquehanna tradition, or of the intrusive peoples who some believe actually brought this artifact tradition with them as they moved into north-

ern New England, occurred about 2800 B.P. (Bourque 1975; Dincauze 1968, 1975; Sanger 1975). Little is known, however, about the circumstances leading to the disappearance of this cultural complex or the nature of changes giving rise to the subsequent Woodland way of life.

Technology

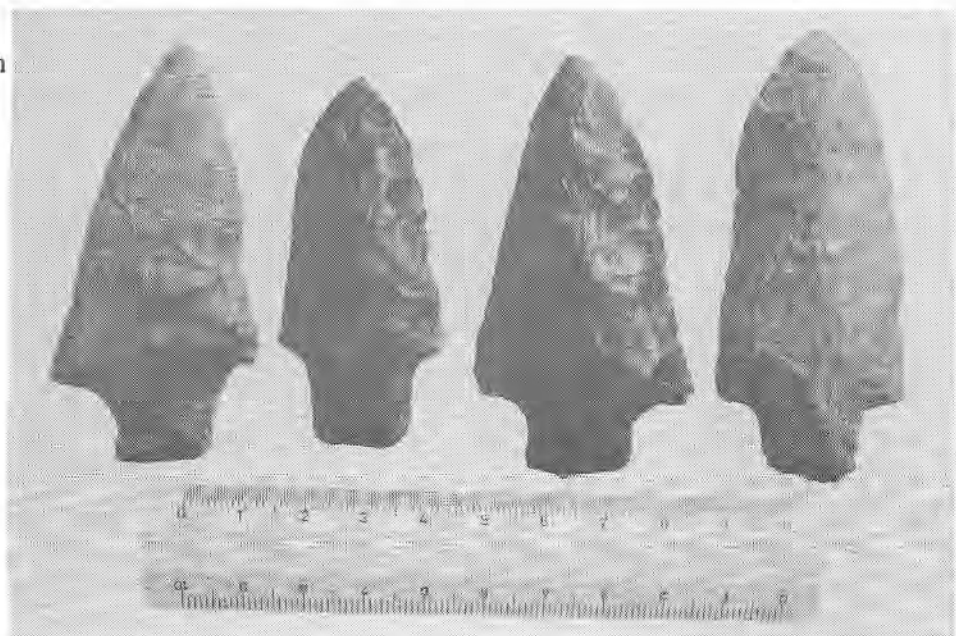
Based on radiocarbon dates, the Susquehanna tradition in New England persisted for approximately 900 years, between roughly 3650 and 2800 B.P. Projectile points are again the most diagnostic items in the artifact assemblages (Plate 6). A variety of generally large, broad-bladed points with straight to slightly contracting stems are typical and are known variously as Atlantic, Snook Kill, Batten Kill, Perkiomen, Genesee and Susquehanna Broad. Snook Kill points appear earliest, while a smaller point, known as Orient Fishtail, is characteristic of the end of the tradition, ca. 3050-2800 B.P. (Funk 1976:252-263).

Beginning about 3250 B.P., carved soapstone or steatite pots occur at sites in association with Susquehanna Broad points, and later with Orient projectile points. By roughly 2850 B.P., the first pottery was being made in the Northeast, a type commonly referred to as Vinette 1 (Belcher 1989). In addition to these new types of vessels, habitation sites of this period have produced a range of artifacts including atlatl weights, end and side scrapers, drills, bifacial knives, flake knives, utilized flakes, ham-

mer-anvilstones, abrading stones, whetstones, pestles and notched netsinkers. Although their presence has not been documented in dated contexts in the Hudson Valley and in Vermont, grooved axes, celts, adzes, gouges and paintstones are associated with Orient phase sites on Long Island (Funk 1976:261-267; Ritchie 1969a:175-177).

In Vermont, similar broad-bladed and Orient Fishtail-like points of the Susquehanna tradition have been recovered during surveys of plowed fields and at multicomponent sites throughout western Vermont; burials are unknown (Squire 1977; Mills 1984). Except for one focal area at the Highgate Converter Station site on the Missisquoi River, however, single component sites dating to this period have not been excavated and artifact assemblages are poorly defined (Figure 3). In Highgate, a 22 m² block sample from what appears to be a small hunting camp exposed a shallow hearth dated to approximately 3200 B.P. Nine flake tools utilized for cutting, shaving and scraping, several tool manufacturing areas containing over 750 chert flakes, the tip of a broken projectile point and a chert preform were found in close association. Unfortunately, no complete projectile points were recovered which could be used as dated type samples (Thomas and Dillon 1985:59-83).

Plate 6. Broad bladed points in the Watson Collection from Chimney Point, Addison, Vermont. Photo by Stephen Loring.



Settlement and Subsistence

Susquehanna tradition sites appear to be less numerous than the earlier Laurentian and Narrow Point tradition sites and generally contain lower artifact densities. Rarely are more than a few points recovered at an individual site in Vermont. Susquehanna tradition sites are also more common in southwestern Vermont in the upper Hudson drainage than they are in the north. Recorded Susquehanna tradition sites relative to all sites of known age in the state site files range from a high of 6.3% in Bennington County to a low of only 1.3% in Franklin County (Thomas and Dillon 1985:82-83).

Contemporaneous sites in the Connecticut River valley are rare, but confirmation of their presence was recovered from a high alluvial terrace at Sumner's Falls on the Connecticut River in Hartland. In the deepest stratum excavated, artifacts consisted of four Orient-like projectile points and a small cooking pit from which the charcoal was dated to 2750 ± 80 B.P. Additional evidence of Susquehanna tradition sites comes from surface finds of tools and fragments of steatite pots from the area of Skitchewaug along the Connecticut River in Springfield (Haviland and Power 1981:81-82; Heckenberger and Petersen 1988:86). Based on current evidence, little can be said of the social system characteristic of the Susquehanna tradition populations in Vermont. The continuation of a central-based wandering system of the preceding period seems likely. The household unit probably continued to be the single nuclear or small extended family, and the settlement units probably continued to be small but numerous (Snow 1980:249). However, some shift in the distribution of sites is evident.

At about 3000 B.P., the climate began a reversion to noticeably cooler and moister conditions. The percentages of deciduous trees such as oak, beech and maple dropped, while hemlock, pine and birch increased in general proportion. Perhaps the density and diversity of game species was also somewhat constricted. The ubiquitous resources of the previous 1,500 years were, therefore, becoming less available. Although riverine, lakeshore and wetland sites in the major valleys of the Champlain Lowland, Vermont Valley, upper Hudson Lowland and Connecticut Valley continued to be occupied, there is a noticeable drop in the number of sites and density of artifacts at upland sites throughout Vermont as the Susquehanna tradition period wound to a close. Seemingly, throughout Vermont, the upland regions were nearly abandoned by people after roughly 2800 B.P.

Ideology

From southern New England to the central Maine coast, the Susquehanna tradition is associated with an elaborate pattern of mortuary ceremonialism which emphasized the practice of cremation, the ritual use of red ochre, and the often lavish inclusion of grave goods, including atlatl weights, projectile points of very high quality material, and woodworking tools. Evidence for elaborate burial ceremonialism is not reflected at Susquehanna tradition sites in Vermont.

Glacial Kame Burials

At the very end of the Late Archaic period, but unrelated to the Susquehanna tradition, burial ceremonialism is represented by a unique cemetery located on a gravel ridge on Isle La Motte (Figure 3). Two in situ burials were found in shallow pits containing burned and unburned bone stained with red ochre. Six and possibly 12 additional graves may have existed before gravel operations destroyed the site. Three distinctive sandal sole gorgets made from marine shell were found at Isle La Motte. These are diagnostic of the Glacial Kame burial complex which is focused in the south central Great Lakes region of Michigan, Ohio, Indiana and the Province of Ontario. Radiocarbon dates of 2930 ± 80 B.P. from Isle La Motte and 2975 ± 75 and 2920 ± 170 B.P. for Glacial Kame burials at the Hind site far to the west are nearly identical. In addition to the sandal sole gorgets, other exotic goods drawn from hundreds of mile away were added as grave offerings, including copper adzes, rolled copper beads strung on a cord made from either milkweed or Indian hemp fibers, lumps of unworked galena, discoidal shell beads, a circular three-hole gorget of marine shell, a rectangular gorget of walrus tusk, fragments of a possible leather shroud, and the tip and midsection of a Meadowood projectile point (Haviland and Power 1981:83-85; Power 1989; Ritchie 1969a:132-135).

The Isle La Motte cemetery marks the far eastern fringe of the known distribution of Glacial Kame burial practices. It is an enigma of sorts, as a number of the burial practices are similar to those represented at earlier Moorehead phase (Red paint) cemeteries of Maine and in only slightly later Meadowood-Middlesex phase burials in the Champlain Lowland of Vermont. Who these people were and how this cemetery relates to the development of cultural systems in the Champlain Valley will probably remain a mystery, because it seems unlikely that other Glacial Kame cemeteries will ever be discovered.

Conclusions

A great deal of variability probably exists among Laurentian, Narrow Point and Susquehanna tradition sites of the Late Archaic period; change within this 3,300 year period seems likely. Factors such as seasonality of site occupation, the types of resources which could be exploited from a particular setting, and the specific types of strategies which people used to hunt, fish, gather, consume and possibly store various food items would all affect the types of archaeological remains which are likely to have been left at specific sites.

Obviously, much remains to be learned about how various types of Late Archaic sites were integrated into larger settlement systems and how such systems may have changed through time. Sites in a number of environments will be difficult to locate. Excavations at the Winooski and McNeil Borrow sites and an extensive survey conducted along the levee at the lower end of the Missisquoi River, for example, confirm that Late Archaic sites in such settings are likely to be deeply buried. At the Winooski site, occupations dating to 3450 ± 175 B.P. and 4260 ± 235 B.P. were identified at depths of 1.7 m (5.6 ft) and 2.3 m (7.5 ft), respectively. At the McNeil Borrow site, a hearth dated to 3670 ± 150 B.P. was found at a depth of 2.75 m (9 ft). Based on the presence of deeply stratified but relatively young sites on the floodplains along the lower Missisquoi and Connecticut Rivers, many Late Archaic period sites here may be buried below 2 m or more of flood deposits. One deep stratigraphic unit dated to ca. 3050 B.P. at the Skitchewaug site on the Connecticut River supports this contention (Heckenberger and Petersen 1988; Petersen and Power 1983; Thomas and Robinson 1979, 1981). Other sites may have been submerged beneath Lake Champlain. Detailed and extensive research at sites in all physiographic areas will be required before more than a general outline of technological changes and settlement and subsistence patterns can be reconstructed.

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EARLY WOODLAND PERIOD (2800 - 1850 B.P.)

Regional Context

A number of salient features have been recognized for the Early Woodland period. Beginning around 2950 B.P. in the Mid-Atlantic and about 2800 B.P. in the New England area, the first significant use of pottery can be documented (Belcher 1989; Petersen and Hamilton 1984). Long-distance exchange networks were well established on a scale rarely if ever exceeded before or after in the region (Ritchie 1969). Unlike areas in the upper Mississippi and Ohio valleys where domesticated crops and food production began to play an increasingly important role between 2500 and 1750 B.P. (Smith 1989), there appear to have been no significant shifts in annual subsistence patterns in the Northeast where the food economy continued to be based on hunting, fishing and gathering during the Early Woodland period. And, unlike preceding Late Archaic settlement patterns in which sites are present in a wide variety of physiographic settings, general use of the regional landscape seems to have been more restricted (Funk 1976:278; Ritchie 1969:179-181, 190).

It is ironic that while burial sites dating to most periods in prehistory are uncommon, the Early Woodland period is best known and almost totally defined on the basis of data recovered from complex cemeteries. One of the major features of the Early Woodland period is the continuation and elaboration of a well-developed mortuary ceremonialism which had strong roots in the cultures of the preceding Late Archaic period.

William Ritchie identified two Early Woodland phases in

New York: the Meadowood phase and the Middlesex phase. In areas outside of New York, attempts to adopt Ritchie's terminology have caused considerable confusion in the archaeological literature, largely because the concepts are so ill defined and because more recent radiocarbon dates do not support a chronological sequence from Meadowood to Middlesex. Based on current evidence, it seems reasonable to use the term Middlesex to refer not to a wider cultural system, but exclusively to a mortuary complex found throughout the far Northeast, including east-central and eastern New York, New England, Quebec and the Maritime Provinces of eastern Canada. Based on 24 radiocarbon dates ranging from 2835 to about 2050 B.P. (and possibly later) from the Boucher cemetery (Vermont) and six dates ranging from 2950 to 2330 B.P. at Augustine Mound (New Brunswick), the Middlesex mortuary complex apparently characterized the entire Early Woodland period in the far Northeast and must have been contemporaneous with the Meadowood phase in New York (Heckenberger, Petersen and Basa 1990). Strong similarities also exist between many aspects of the Middlesex mortuary complex and slightly earlier Glacial Kame burials encountered on Isle La Motte.

Technology

Early Woodland period residential sites are likely to contain stemmed or side-notched projectile points which are usually referred to as Adena and Meadowood, respectively. Thin, side-notched Meadowood points occur in western Vermont, as well as at a few sites in the Connecticut watershed, but only one or two specimens are generally recovered from any one site or found in individual artifact collections. In western Vermont, the occurrence of lobate-stemmed Adena points in artifact collections from all watersheds is uncommon; Adena points are rare in the Connecticut valley of eastern Vermont. A third type of projectile point, called a Lagoon point, has been recovered in western Vermont. This style is far more typically encountered at coastal sites in southern New England.

In the Champlain valley, portions of two small residential sites have been excavated: VT-FR-161 and VT-CH-234 (Thomas and Dillon 1985; Petersen, Heckenberger and Thomas 1988). Two Vermont sites located on the Connecticut River floodplain are also known to contain Early Woodland occupations: Skitchewaug in Springfield and the Canaan Bridge site in Canaan (Figure 4). A radiocarbon date of 2670 ± 70 B.P. from deep in the stratigraphic sequence undoubtedly defines an Early Woodland occupation at the

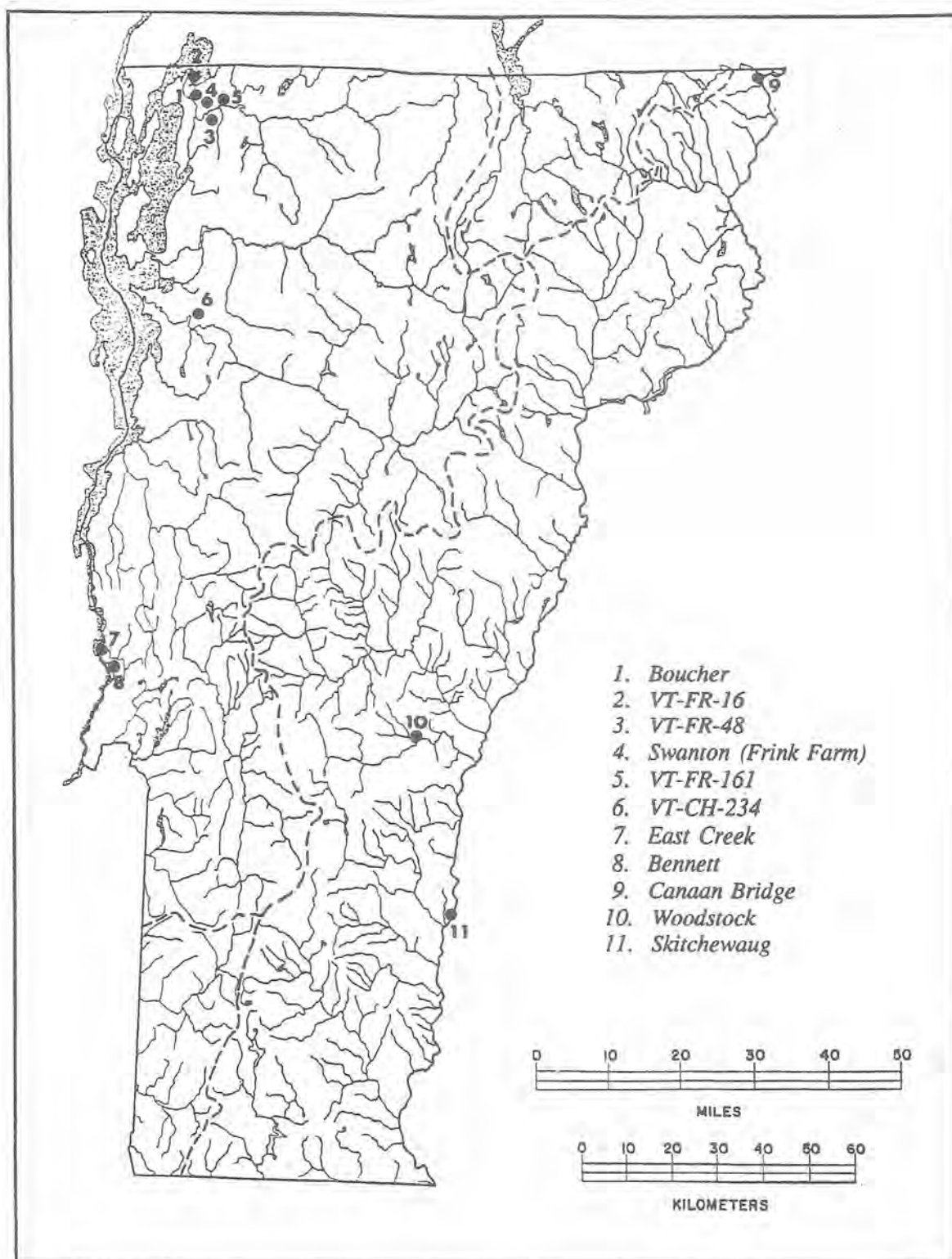
Skitchewaug site. Related materials include several Meadowood projectile points, a broken Meadowood cache blade, a possible Meadowood scraper, and a heavily reworked lobate-stemmed Adena-like projectile point, along with Vinette I ceramics (Heckenberger and Petersen 1988:86).

Excavations at the Canaan Bridge site farther upstream on the Connecticut River provide the most detailed information yet on an Early Woodland habitation site in Vermont (Bolian and Gengras 1991). Ten cultural features, mostly shallow hearths characterized by fire reddened and charcoal infused soil and fire shattered rock; appear to be related to several occupations. Ten associated radiocarbon dates range from 2320 to 2860 B.P. Given the standard deviations related to these radiocarbon dates, most of the occupational events could have occurred between about 2500 and 2650 B.P.

The artifact assemblage from a 59 m² area may be fairly typical for small residential camps where hunting, fishing and gathering activities appear to be represented. Overall, the artifact density is low. Fragments from three ceramic vessels were recovered; all have classic Vinette I characteristics. Lithic artifacts include: one reworked Meadowood projectile point; part of a possible chert cache blade; eight chert and two rhyolite scrapers; 16 chert flakes utilized for either scraping or cutting; one graver; two hand grinding stones; one grinding slab; one polishing stone; one pebble hammerstone; one hafted hammer; and a gouge-like pebble with one large flake removed. The only decorative item recovered is part of a highly polished, ground stone pendant.

The vast majority of lithic debitage consists of small, soft hammer or pressure flakes related to tool refurbishment or edge maintenance. Nearly all of the tools and 96.4% of the flakes derive from some type of chert, the most common being red, red with black bands or red mottled with green. Bolian and Gengras (1991) suggest two possible sources, the Jim Pond Formation of west central Maine and Quebec, and the Munsungun Lake Formation in northern Maine. Other cherts could derive from western Vermont or eastern New York. The remaining flakes are volcanics, probably rhyolites derived from various source areas to the south and east. This exclusive use of non-local stone by the Early Woodland period occupants of the Canaan Bridge site reinforces the notion that both short and long distance exchange networks which insured the acquisition of elaborate mortuary goods at this time also operated to insure the distribution of more mundane materials

Figure 4. *Early Woodland sites cited in the text.*



for everyday use.

The Early Woodland period in Vermont and throughout New England is best known from mortuary sites. Middlesex burials often contain rather spectacular artifacts, many of which could have been acquired only through interregional exchange. Typical stone artifacts include blocked-end tubes of Ohio fireclay or steatite, lobate-stemmed Adena and side-notched Meadowood projectile points, bifacial scrapers, graters, trianguloid leaf-shaped Meadowood cache blades, gorgets, pendants, paintstones, boatstones, birdstones, discoidal stones ("chunkey stones"), bar amulets, plummets, celts, whetstones, sinewstones, and nodules of iron and iron pyrite. While the non-local nature of the raw materials encountered is often noted, including grey and brown mottled Onondaga chert (New York), Mistassini quartzite (central Quebec), and Harrison County (Indiana) and Flint Ridge (Ohio) cherts, the use of local quartzite and chert materials should not be overlooked.

Vinette I vessels with smoothed-over interior and exterior surfaces and an incised triangular design about mid-body were recovered at both the Boucher and East Creek cemeteries. Bone artifacts include needles, punches, awls, fishhooks, antler tine flakers and hafted beaver incisors. Tubular and disc shell beads derived from *Olivella*, *Marginella*, quahog and whelk, all marine species, were frequently added as grave goods, while shell pendants were less common. Copper items include awls, celts and chisels, but a common characteristic of many Middlesex burials is the extensive use of rolled and tubular copper beads, some of which had been strung on twisted vegetable fiber cordage or on spun and unspun thongs (Haviland and Power 1981; Heckenberger, Petersen and Basa 1990; Loring 1985).

The inclusion of copper beads and the subsequent production of copper salts through oxidation created very favorable conditions for the preservation of bone and organic artifacts in a number of graves. "In fact, the extant assemblage from [the Boucher] cemetery constitutes one of the largest collections of perishable artifacts of this antiquity known from anywhere in eastern North America" (Heckenberger, Petersen and Basa 1990:180). Hide artifacts include knotted thongs, "medicine" bags containing snake and animal skeletons, and a tailored hide shirt. Fragments of single, two, three and four ply cordage made from milkweed, Indian hemp, basswood bast fiber and nettle have survived. Shrouds or cowls, mats and bags were made from twined textiles of plant fibers and

animal hair (Heckenberger, Petersen and Basa 1990). This assemblage of perishable items from the Boucher site has, for the first time, provided solid evidence of the complicated manufacturing techniques involved and a rare glimpse at the broad range of sophisticated hide and textile items used by people in the Champlain basin some 3,000 years ago.

Settlement and Subsistence

At about 2950 B.P., as the Early Woodland period began, pollen cores recovered from bogs throughout Vermont and adjacent areas indicate that a climatic shift occurred. The percentages of deciduous trees such as oak, beech and maple dropped. Hemlock, pine and birch increased in general proportion. The return of spruce and fir at higher elevations and on north-facing slopes indicates that a cooler climate prevailed. Deciduous trees such as oak became restricted to lower elevations, particularly in the valley bottoms and on south and west-facing hillsides. Nut bearing species of trees became more isolated.

Although archaeological data related to Early Woodland period sites in Vermont are very limited, a pond-lake-riverine orientation of the few known residential sites is apparent. There is certainly evidence that groups during the Early Woodland period exploited the lower reaches of a number of major river drainages, including the Missisquoi, Lamoille, Winooski, Otter Creek, Lemon Fair and East Creek (Petersen, Heckenberger and Thomas 1988; Ritchie 1970:10; Thomas and Bayreuther 1979; Thomas and Dillon 1985; Thomas, Doherty and Dillon 1983; Thomas et al. 1981). Residential camps are also present on the Connecticut River floodplain from Springfield to as far north as Canaan just south of the Canadian border (Bolian and Gengras 1991; Heckenberger and Petersen 1988). With the possible exception of a poorly excavated, multicomponent site on East Creek, substantial habitation sites which might represent large base camps have not been recognized anywhere. On the basis of current information, upland regions throughout Vermont were nearly abandoned by people after about 2950 B.P., with groups tending to remain in the relatively more prolific lowlands. There may even have been a concurrent drop in the region's human population.

Site locations provide at least one clue to resource exploitation at this time. Such settings include the shore of Lake Champlain, floodplains along major rivers, bluffs above major rivers with adjacent tributaries, alluvial terraces adjacent to major falls, lowland ponds and secondary

lowland streams. Such site locations tend to reinforce the hypothesis that subsistence patterns involved the integration of hunting, fishing and gathering activities.

Stable isotope analyses of carbon and nitrogen from human bone indicate a strong emphasis on hunting and fishing, with less emphasis on gathered plant foods which were more characteristically eaten by people during the earlier Late Archaic and later Middle-Late Woodland periods (Krigbaum 1989). At the site specific level, data derived from VT-CH-234 in Essex suggest that some sites were utilized as small residential camps by perhaps 5-15 individuals pursuing subsistence practices based on foraging. Within Area 5, a small roasting pit was found to contain 1,987 pieces of calcined bone, including cranial and long bone fragments, and phalanges from one or more deer; and an ulna, fibula and carpals of a beaver. Deer and probably snapping turtle carapace recovered in Area 4 may also be related to Early Woodland period occupations (Petersen, Heckenberger and Thomas 1988:129-134). Hunting, particularly for deer or bear, also appears to have been the dominant subsistence activity at VT-FR-161 in Highgate (Thomas and Dillon 1985). In addition, some of the faunal remains included in burials at the Boucher cemetery on the lower Missisquoi River were undoubtedly foods placed in the graves. Animals represented include moose, deer, bear, raccoon, beaver and wild turkey (Heckenberger, Petersen and Basa 1990).

In eastern Vermont, a mixed food economy is again indicated at what is presumed to have been multiple fall occupations at the Canaan Bridge site on the upper Connecticut River floodplain. Beaver, deer, moose and unidentified bird bone were recovered from several Early Woodland hearths. Grinding stones, as well as burned butternut or walnut shells, strongly suggest the use of a variety of plant foods (Bolian and Gengras 1991).

A great deal of variability undoubtedly existed in the focus of subsistence activities at Early Woodland residential sites. The season of site occupation and the environmental characteristics of the territory surrounding any specific site undoubtedly had a great deal to do with the types of foods which were available. In addition, the strategies which people used to hunt, fish, gather wild plants, consume and possibly store various food items, as well as the site specific conditions of organic preservation will affect the types of food remains which might have survived at Early woodland residential sites. Much remains to be learned.

Ideology and Mortuary Practices

The Early Woodland period in Vermont is best known from mortuary sites, most of which were accidentally encountered in the nineteenth or early twentieth century while quarrying for sand and gravel or by construction related activities. Early Woodland burials may consist of individual graves, but burials are recognized more commonly when larger Middlesex cemeteries are encountered, due to the presence of red ochre, copper beads and other burial items. There are four mortuary centers or cemeteries in the Champlain lowland attributable to the Middlesex mortuary complex: Boucher (VT-FR-26), Swanton, also known as the Frink Farm or the Hemp Yard (VT-FR-1), East Creek (VT-AD-26) and Bennett (VT-AD-298). Based on the reported presence of one or more items found almost exclusively in burial contexts, particularly blocked-end tubular pipes and birdstones, at least two more sites at the lower end of the Missisquoi River (VT-FR-16 and VT-FR-48), one site in the lower Winooski watershed in Burlington, and a site in Woodstock in the Connecticut watershed in eastern Vermont may have also contained individual burials or small Middlesex cemeteries (Crisman 1981:10, 81; Gifford 1948; Haviland and Power 1981; Loring 1985; Perkins 1873; Perry 1868).

Of the four better recorded cemeteries, the Boucher site is the most completely documented (Heckenberger, Petersen and Basa 1990). Discovered by accident in 1973, the Boucher site contained 84 pit features which were clearly burials (based on the presence of human bone and/or artifacts) and 18 additional pits which are presumed to have contained human remains which have totally disintegrated. Graves varied from basin-shaped pits less than one meter in depth to conical-shaped pits over two meters deep. In all, the cemetery is believed to have contained over 100 individuals. Based on a series of 24 radiocarbon dates ranging between 2835 and 2050 B.P., it is clear that the Boucher cemetery was used throughout the Early Woodland period. The Swanton, East Creek and Bennett sites are undated.

Burials included both burned and unburned skeletal remains of all ages and both sexes. Most graves contained single individuals, but in some cases, several people were buried together. Some individuals were buried shortly after death in flexed positions on their sides. In other instances, the flesh was removed from the bones, either intentionally or through natural decay, and the disarticulated bones were buried in bundles or bags, in bark con-

tainers or laid on bark mats. Some cremations were also wrapped in bundles, while others were not. Over half of the skeletons were covered with red ochre, while yellow ochre was used occasionally. This variability in burial practices is typical of other cemeteries throughout the Northeast attributable to the Middlesex complex.

It is not known why such variability exists, but it has been suggested that individuals who died locally during the warmer seasons of the year were buried in the flesh, while bundle burials and cremations may be the result of having to transport the deceased to the cemetery from a considerable distance or of having to wait until the ground thawed in the spring before burial (Heckenberger, Petersen and Basa 1990:211-212). The presence of a crematory at the actual site of the cemetery on East Creek suggests that other considerations may have also been involved (Loring 1985:100).

Due to the presence of copper salts in many burials, human skeletal remains are sometimes well preserved. As with the perishable hide, textile and fiber artifacts in these graves, human remains can provide a rare look at the conditions of human life which cannot be derived in any other way. For example, limited analyses of the human remains from the Boucher cemetery suggest that infant mortality was as high as 25% and that it was unusual for individuals to live much beyond the age of 50. While there was a low incidence of cavities, the crowns of peoples' teeth were often ground flat by middle age and bone surrounding some teeth became abscessed due to infection. Broken bones were not always reset properly causing subsequent malformation of limbs and joints. Osteoarthritis produced back problems for some middle aged individuals. Possible examples of bone cancer or infection and evidence of systemic osteomyelitis which suggests a general infection throughout the body confirms that life for some individuals was not easy (Krigbaum 1990).

For all the study which has occurred, little is known about the specific spiritual beliefs underlying the Middlesex burial complex. The inclusion of "medicine" bags and other unusual remains such as animal feet in several graves strongly suggests a belief in spirit helpers during one's lifetime, and perhaps during an afterlife. Artifacts such as pots and blocked-end tubes were intentionally broken or ritually "killed" at the time of burial, suggesting that inanimate objects contained spirits or souls which could be released to accompany the dead individual. It is unclear whether people in Vermont shared

a singular belief system with communities throughout the Northeast, but widespread communication among contemporaneous Early Woodland populations seems likely. The broad regional exchange patterns which funneled copper, shell and other artifacts into Vermont would have provided at least one mechanism for the frequent exchange of ideas. Clearly, much remains to be learned, but any future studies must be done in close consultation with Vermont's Abenaki community which has very strong feelings about the disturbance of any burials, inadvertent or otherwise.

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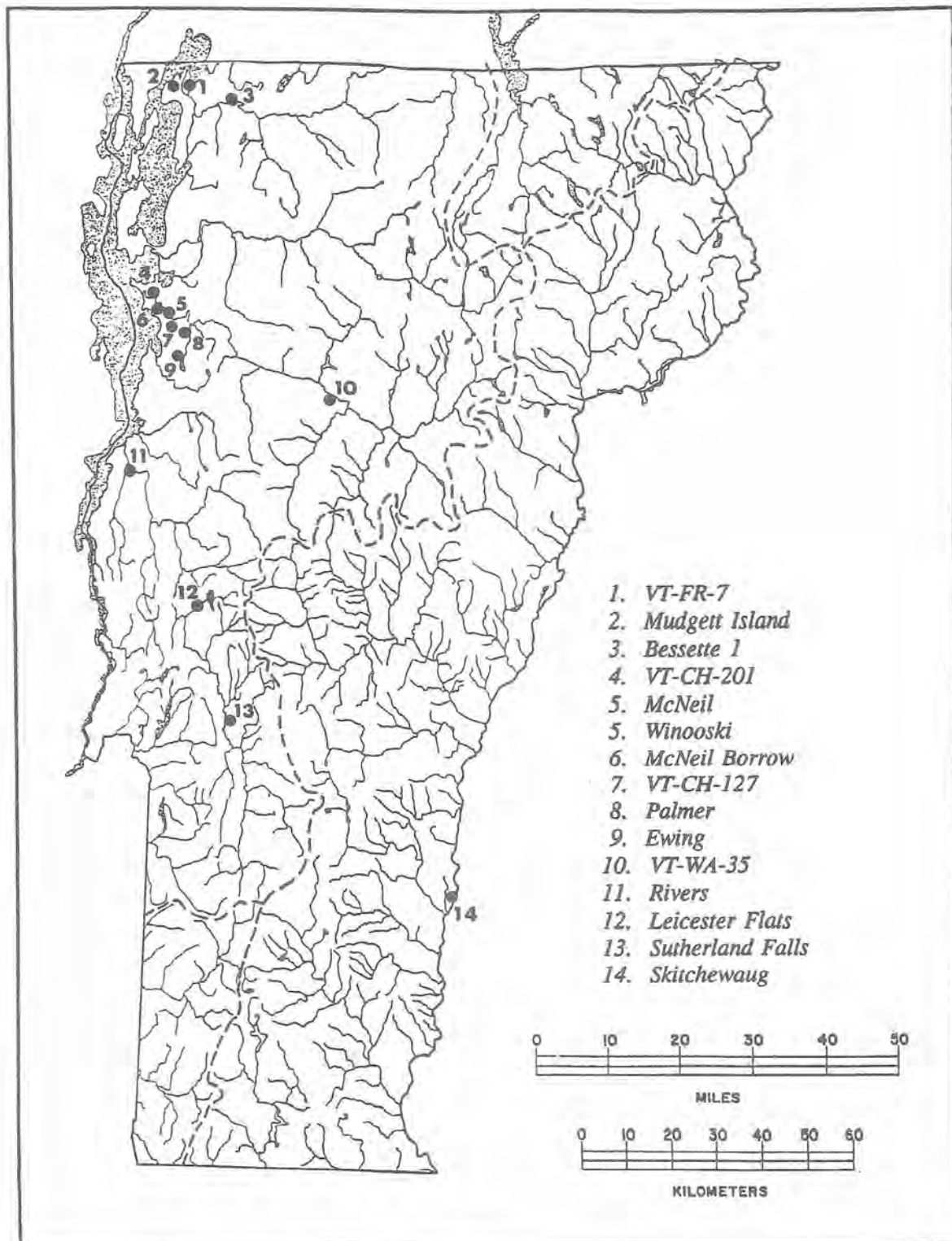
MIDDLE WOODLAND PERIOD (2050-900 B.P.)

Regional Context

In Vermont, Middle Woodland period sites are fairly common and radiocarbon dates help to anchor various components in time. Due to excavations within several large sites in the Champlain Lowland, some aspects of the Middle Woodland cultural system are better documented than they are for all other periods of prehistory.

The Winooski site, located on the east bank of the Winooski River about a half mile downstream from the first falls and rapids, has become the type site for understanding the Middle Woodland sequence and artifact assemblages in western Vermont (Petersen and Power 1983; Figure 5). Occupation components dating after the first century of the Christian era were encountered in a series of stratified alluvial deposits, allowing discrete assemblages of artifacts from different periods to be identified and analyzed. Based on detailed studies, particularly of the technological and stylistic changes in

Figure 5. *Middle Woodland period sites cited in the text.*



ceramic vessels, Petersen defined three distinct Middle Woodland phases between approximately 2050 and 900 B.P.: the Winooski phase, the Intervale phase, and the Colchester phase. A stratigraphic gap existed between the Winooski and Intervale phase components at the Winooski site.

Close analogs to all these phases occur at sites to the north in the upper St. Lawrence drainage of southern Quebec, to the west in the Lake Ontario drainage of New York and the Province of Ontario, and to the south in the Hudson drainage of eastern New York (Clermont and Chapdelaine 1978; Ritchie 1969; Ritchie and Funk 1973). Because of the broad regional cultural continuity reflected in the archaeological record during the entire Middle Woodland period, the concept of the Point Peninsula tradition has been adopted to reflect this commonality. The Point Peninsula tradition has been subdivided into phases to account for changes in technology and other aspects of the cultural systems during this 1,000 year period. In New York, these include in chronological order the Canoe Point phase; the Fox Creek, Kipp Island and Burnt Hill phases; and the Hunter's Home phase (Petersen and Power 1983:407-438).

Technology

Winooski Phase

The Winooski phase is defined at the Winooski site by ceramics recovered from Cultural Level III, with associated dates of 1790 ± 130 and 1780 ± 155 B.P. Its equivalent to the north and west is the Canoe Point phase, which, based on a number of radiocarbon samples, is estimated to date between roughly 2050 and 1650 B.P. This period is poorly known in the Hudson valley and farther south. The Winooski phase assemblage of flaked stone artifacts is fairly limited at the Winooski site. A single projectile point described elsewhere as Oxbow Type A is perhaps diagnostic of this period. These points are typically made from flakes which have been bifacially reduced to form an elongated blade with weak shoulders and a contracting stem. Other tools consist of retouched flakes, end scrapers and a wedge. Ground stone artifacts include an abrading stone, a celt, and an unfinished celt-shaped implement of greenstone. Two small, rolled copper beads are apparently associated with this assemblage (Petersen and Power 1983:376-377, 380).

Predominantly non-local materials were used for the manufacture of flaked stone artifacts. In the Winooski site

assemblage, 75% of the tools are "exotic grey chert, with lesser amounts of local black chert, exotic grey mottled chert and exotic green chert." Of the flakes, 61% are "exotic grey chert, with lesser amounts of [local] grey quartzite, red jasper [probably Colchester jasper] and white quartz" (Petersen and Power 1983). These high frequencies of non-local materials, in addition to the presence of copper beads, provide strong evidence for the existence of long distance exchange networks extending far to the west and south. Ceramic vessels were made with a clay containing grit temper using a coiling technique. Vessels are cylindrical, surfaces are generally smoothed, and the firing technique is generally of high quality and is superior to that of later phases of the Middle Woodland period. Body decoration was produced with a number of stamps and possibly incising tools which were pressed into the clay at different angles. There was a clear preference for all-over decoration extending from the lip to the base. Pseudo scallop shell decoration is present on all vessels.

Fox Creek Phase

At the Winooski site, there was no evidence of an occupation dating between ca. 1650 and 1450 B.P., although this period may be represented at VT-CH-201 located a few miles downstream on a small tributary of the Winooski River. In eastern New York, this period would generally be equivalent to the Fox Creek phase of the Point Peninsula tradition.

At VT-CH-201 the artifact assemblage is similar to but not as extensive as that recovered at Fox Creek-related sites in the Hudson drainage. Flaked tools consist of a Fox Creek Stemmed projectile point, a chert preform, fragments of two chert drills and two utilized chert flakes. All ceramic vessels are grit-tempered and exhibit a fairly wide range of decorative motifs and applications. Dentate decoration is most common and was applied with simple, drag and rocker stamping techniques. Decoration produced with a pseudo-scallop shell tool is also well represented (Dillon, Thomas and Doherty 1985:38-53).

Intervale Phase

The Intervale phase was identified at the Winooski site by ceramics recovered from Cultural Level II, with associated dates of 1295 ± 150 , 1225 ± 135 and 1200 ± 130 B.P. Based on similarities in ceramic assemblages from other sites, it appears to be contemporaneous with the Fourmile phase of the central Hudson drainage and the

Burnt Hill phase in the northern Hudson River and Lake George area. The Intervale phase has clear analogs with the Kipp Island phase in the upper St. Lawrence, Lake Ontario and upper Susquehanna drainages. From radiocarbon dates obtained from a few sites, the temporal range is estimated to be roughly 1450-1150 B.P.

The Intervale phase is characterized at the Winooski site by a relatively large and diverse flaked stone assemblage. Jack's Reef corner-notched projectile points and point fragments were the most common (83%), although lanceolate Jack's Reef pentagonal, triangular Levanna, and side-notched points categorized as Long Bay were also recovered. Flake tools are a dominant artifact category which consists predominantly of flakes with prepared cutting edges, end scrapers, bifacial scrapers, wedges, and an expanding base drill. Non-chipped artifacts include a pendant fragment and possibly a barbed bone point. At the nearby McNeil site, a contemporaneous assemblage includes Jack's Reef Corner-Notched points, a corner-notched point reworked into a drill, a small chert end scraper, a large utilized chert flake, and two fragments of a clay pipe bowl.

At the Winooski site, raw materials are varied and derive from both non-local and local sources. A similar pattern is evident at the McNeil site across the Winooski River where the lithic debitage associated with an Intervale phase assemblage consists almost exclusively of over 1,900 exotic grey chert and 79 brown jasper flakes (Thomas and Bourassa 1978). The long-distance exchange of raw materials brought in via networks extending to the south and west and to the east into northern New Hampshire and northeastern Maine may have facilitated cultural interaction among peoples living throughout a wide geographical area.

Ceramic vessels were probably cylindrical. Most vessels exhibit a very poor quality of firing and have disintegrated badly at most sites. Body decoration was produced with wavy line, dentate, punctate, a variety of perishable fiber stamps, and trailing/incising tools. The presence of distinctive wavy line decoration may be an especially diagnostic marker for sites of the Intervale phase.

Colchester Phase

The Colchester phase was identified at the Winooski site by ceramics recovered from Cultural Level I, dated to 1100 ± 135 , 1050 ± 125 , and 885 ± 130 B.P. Based on comparisons with ceramic and other assemblages sites in both

the Hudson, as well as the upper St. Lawrence and Lake Ontario drainages, this phase has clear analogs with the Hunter's Home phase in this region. Radiocarbon dates related to Hunter's Home phase components in the Northeast generally range between 1100 and 950 B.P.

The Colchester phase assemblage of flaked stone tools at the Winooski site contains a fairly narrow range of artifacts. The sole projectile point form is represented by 38 triangular Levanna points. Other flaked tools include 70 retouched flakes or prepared end scrapers, one pentagonal biface, one drill and four wedges. A sandstone abrading stone was the only recovered tool related to a ground stone industry. A more widely varied tool assemblage at the multicomponent Rivers site at the mouth of Dead Creek in the Otter Creek valley includes bone or antler fishhooks, gorges, awls and needles (Bailey 1939; Basa 1975).

Unlike earlier phases, lithic raw materials used for flaked tools were predominantly local in origin. At the Winooski site, local quartzite and black chert are represented by approximately 85% of both the tools and waste flakes. Across the Winooski River at both the McNeil site and the McNeil Borrow site, the latter dated to 1010 ± 110 B.P., a similar pattern is evident. Here, the Colchester phase assemblages reflect the exclusive use of local quartzite and Champlain valley chert (Thomas and Bourassa 1978; Thomas and Robinson 1981). This shift from non-local to local raw materials appears to reflect a significant breakdown in long-distance exchange networks, and possibly the establishment of a cultural boundary between local populations and those of the Hudson drainage and farther west (Petersen and Power 1983:453).

Ceramic vessels were cylindrical and bulbous with slightly pointed to rounded bases. The principal form of decorative application was simple vertical stamping which was restricted to the upper neck, rim, lip and upper interior portions of each vessel. The vast majority of the assemblage is decorated with oblique or horizontal cord-wrapped stick or complex cordage impressions. Circular punctations are also a common decorative technique. A small number of vessels are entirely undecorated.

In sum, the general characteristics of flaked stone and ceramic assemblages dating to the Middle Woodland period are reasonably well known, with the exception of the early Middle Woodland period, which is represented at only a few sites. Intervale and/or Colchester phase

assemblages at other sites on the Winooski interval, on the Missisquoi delta and upstream along the Missisquoi River in Highgate, on Shelburne Pond and at the mouth of Dead Creek all tend to mirror similar patterns with respect to the types of projectile points encountered, changes in the use of various types of raw materials, and the techniques used to decorate ceramic vessels (Bailey 1939; Petersen et al. 1983; Thomas 1989; Thomas and Dillon 1983; Thomas and Robinson 1979). Roughly comparable Middle Woodland period assemblages are also likely to be present in the Connecticut River watershed of eastern Vermont (Heckenberger and Petersen 1988:90-113).

Settlement and Subsistence

After a thousand years of deteriorating conditions, the climate seems to have stabilized somewhat about 1800 B.P. Subsequently, a slight warming trend occurred. It is suggested that this stabilization led to a chain of events which had direct implications for the nature of human settlement and subsistence patterns adopted during the Middle and early Late Woodland periods. A much higher incidence of Middle Woodland period sites relative to the Early Woodland period may also signal a significant population growth throughout the region during this thousand year period.

Beginning about 1650 B.P., the Champlain Lowland apparently experienced a gradual population increase. Based on current information, sites of this period are located exclusively in the Champlain valley and along the Connecticut River. By 1200 B.P., extensive settlements could be found in the lower reaches of all major rivers (Power, Cowan and Petersen 1980; Thomas and Doherty 1981). It is suggested that such an apparent population growth would have been sufficient to have overtaxed the natural resources had these groups remained exclusively in the lowlands. A new diversified settlement pattern gradually evolved. During some seasons, groups may have congregated in lowland areas where fish, plant and game species were dense and varied. At other seasons, fairly large communities may have broken up into small bands or employed specialized task groups to better exploit dispersed food resources, including those in the uplands. By roughly 1000 B.P., groups are likely to have consistently utilized portions of all of Vermont's watersheds as lowland populations once again intensively used the uplands of Vermont, at least on a seasonal basis. With some variation, including the introduction of agriculture during the Late Woodland period, this expanded pattern

probably continued until the arrival of European colonists in the seventeenth century.

Winooski Phase

The settlement pattern of the Winooski phase can be inferred only in part from a small but varied sample of site locations. A variety of riverine and lacustrine associations occurs, in many cases in close proximity to extensive wetlands. Precise settlement data, including the spatial extent of occupation, are very limited. The configuration of house structures is unknown. Initial estimates of settlement size, which are merely probable maximum extents of site utilization, range from a maximum size of 405 square meters for the Weinman site on Lake George and 400 square meters for the Ewing site on Shelburne Pond to 135 square meters for the Otter Creek No. 2 site on Otter Creek. Along with the data from the Winooski site, these estimates help to confirm the small size of residential sites of the Winooski phase. Presumably, sites of this phase reflect the presence of a restricted wandering community pattern in the Lake Champlain drainage during the period (Petersen and Power 1983:396).

At the Winooski site, food remains were recovered from 13 hearths associated with probable late summer to fall occupations during the early Winooski phase. Animal and plant remains include deer, domestic dog, numerous fragments of unidentified mammal bone, a fragment of bird bone, unidentifiable fish bone, as well as butternut, pigweed, fire cherry and bedstraw. Faunal and floral remains recovered at other sites cannot be reliably associated with the Winooski phase. Similarly, no estimates of seasonality are available (Petersen and Power 1983).

Fox Creek Phase

Settlement data for the tentative Fox Creek phase are sparse, as only a few sites are known. Residential site locations include VT-FR-7 on the lower Missisquoi River and VT-CH-201 situated on a delta terrace above the Winooski River several miles up stream from Lake Champlain, while a small activity site may be represented by VT-CH-127 located on a narrow terrace below the Winooski Falls. A radiocarbon date of 1570 \pm 70 B.P. suggests a roughly contemporaneous residential occupation at the Skitchewaug site on the Connecticut River in Springfield (Crisman 1980:23-34; Dillon, Thomas and Doherty 1985:38-53; Heckenberger and Petersen 1988; Thomas and Bayreuther 1979).

Site size is unknown and can only be approximated at VT-CH-201. Here, a Fox Creek point and associated ceramics were recovered from a focal activity area estimated to be approximately 400 m². House types are unknown. It seems reasonable to assume that the settlement pattern characteristic of the Fox Creek phase was not substantially different from that of the earlier Winooski phase.

Subsistence data related to the tentatively assigned Fox Creek phase are uncommon from excavated sites. Suspected site locations, such as the alluvial terraces above the Salmon Hole below Winooski Falls, Leicester Flats, Mudgett Island and at Sutherland Falls, would seem to indicate a focus on riverine and wetland resources during at least part of the year. Bones recovered in association with several hearths at VT-CH-201 located above the floodplain in the lower Winooski watershed are cliderved from both the lower legs and skull of one or more deer, while a tooth fragment may derive from black bear. Deer antler was also identified (Dillon, Thomas and Doherty 1985:49-50). The season of occupation is unknown.

Intervale Phase

The settlement pattern of the Intervale phase can be partially reconstructed, based on the association of over twenty sites with a variety of environmental settings. In common with the earlier Winooski and Fox Creek phases, small residential camps or base camps are located in a number of riverine and lacustrine microenvironments, often in close proximity to a wetland. Most known sites are located on floodplains along the lower 25 miles of the Missisquoi, Lamoille and Winooski Rivers and Otter Creek, but other sites are situated on the shores of Lake Champlain and Lake George, on Bristol Pond and Shelburne Pond, and on smaller rivers such as the Leicester River. What is probably a small stop-over site, VT-WA-35, is situated on a narrow terrace along the Winooski River in Moretown. A single hearth containing a few fragments of burned bone dates to 1450 \pm 90 B.P. This sample of sites undoubtedly reflects a variety of seasonally occupied stations within an annual settlement system which might be characterized as a restricted wandering or central based wandering community pattern (Petersen and Power 1983: 402-403; Thomas 1989).

Estimates of settlement size can be made from a limited sample of Intervale phase sites. Estimates for very small to small residential camps range between approximately 56

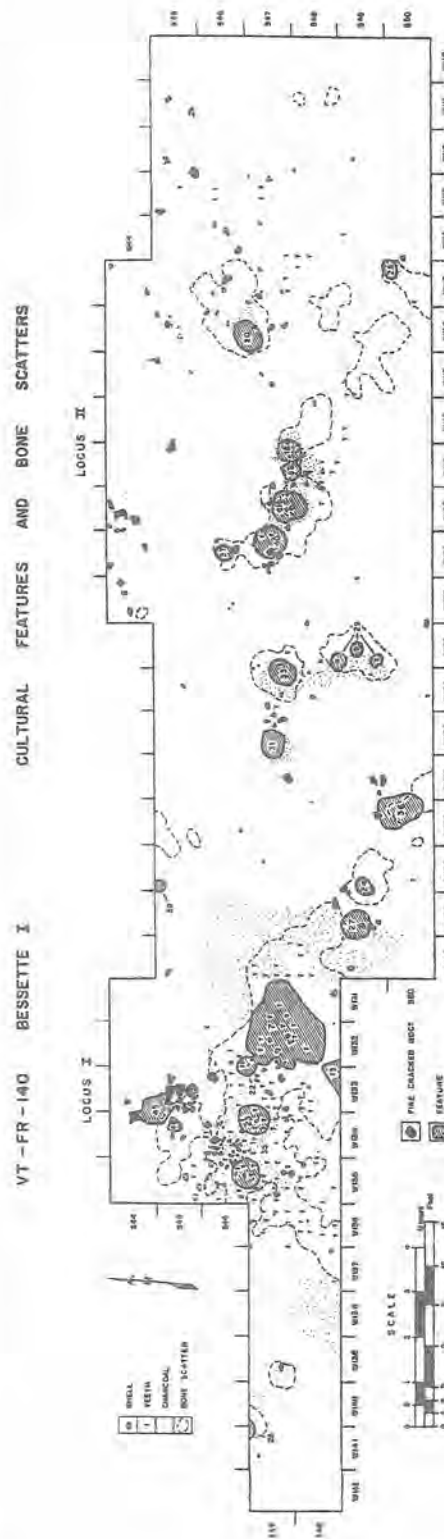


Figure 6. Hearths and bone scatters within an Intervale Phase component at Besette 1 on the Missisquoi River.

and 500 square meters. Several of these camps presumably represent small extractive or processing stations within the settlement system. Estimates of very large residential areas which probably represent recurrently occupied, summer-fall base camps range between roughly 5,400 square meters for the Reynolds site on the Missisquoi River up to 9000 square meters at sites located in the Missisquoi delta. These estimates, along with those for Locus 1 and possibly Locus 5 at the Winooski site, substantiate the existence of variably sized settlements during the Intervale phase. Such variation presumably reflects the seasonal aggregations and dispersal of families in a central based wandering community pattern (Petersen and Power 1983:403).

Food remains have been recovered at a number of sites which contain components related to the Intervale phase. At the Winooski site, a wide spectrum of plants and animals were utilized during the summer and into the fall. Animal remains include burned bone derived from 33 hearths, including deer, beaver, muskrat, woodchuck, chipmunk, domestic dog, lake sturgeon, bullhead, as well as many fragments of unidentifiable mammal, fish and bird bone. Plant remains include butternut, black walnut, hickory nut, hazelnut, pigweed, blackberry, staghorn sumac, mustard, hog peanut, chairmaker's rush, snowberry, elderberry, sassafras, buckwheat, and bedstraw. At the McNeil site across the river, nearly 7,000 fragments of burned bone, mostly shattered long bone, were recovered from a large hearth. Identifiable species include woodchuck, squirrel and deer (cranial and leg bones). Both sites appear to represent warm season occupations. Upstream, the presence of butternut at VT-CH-127, located near the Winooski Falls, provides evidence of an autumn occupation (Petersen and Power 1983; Thomas and Bayreuther 1979; Thomas and Bourassa 1979).

A diversified food base is also suggested by data collected from sites along the Missisquoi River to the north. Bullhead was identified in a hearth at what is probably a large base camp at the lower end of the river. Farther upstream in Highgate at the Bessette 1 site, a large hearth, associated with both Jack's Reef Pentagonal and Levanna projectile points and dated to 1180 +/-90 B.P., contained almost 2,000 fragments of burned bone (Figure 6). Deer is the most common animal represented. Bones are predominantly from the lower legs, although fragments of upper leg, vertebrae, scapulas and teeth are also present. Other species include squirrel, bear, beaver, and possibly fox or raccoon. Nut fragments were also recovered (Thomas and Dillon 1983; Thomas and

Robinson 1979).

Data on seasonality and subsistence systems seem heavily weighted towards summer-fall periods of occupation at Intervale phase sites which produced subsistence remains, although an extended spring-late fall occupation may be represented at the Bessette 1 site on the Missisquoi River. Sample size bias and the lack of cold season indicators may well account for this impression. From what is currently known, a relatively diffuse subsistence economy based on hunting, fishing and gathering seems apparent for the Intervale phase.

Colchester Phase

The settlement pattern of the Colchester phase is hypothesized on the basis of the environmental settings of numerous but mostly undated sites assigned to this period. Sites are present in a wide variety of settings. Large sites are generally situated on the floodplains along the lower Winooski, Lamoille and Missisquoi Rivers and along the lower stretches of Otter Creek. Other sites occur along the middle and upper reaches of these rivers, along numerous interior streams, such as the Leicester, Hoosic and Walloomsac Rivers, on even smaller streams, such as Muddy, Potash and Sunderland Brooks, on bluffs overlooking the valley bottom, and around the shores of Shelburne Pond, Lake St. Catherine and Lake Bomoseen. This sample of sites represents some portion of one or more annual settlement systems, with seasonal occupation clearly indicated in some instances (Petersen, Heckenberger and Thomas 1988:129-134; Petersen and Power 1983:405-406; Thomas and Bayreuther 1980; Thomas, Campoli and Doherty 1979; Thomas and Dillon 1985; Thomas and Kochan 1987; Thomas and Matthews 1986).

Settlement size can be approximated for sites of the Colchester phase in some cases. Estimates range from a maximum area of 400 m² at the Ewing and Palmer sites on Shelburne Pond and Potash Brook to at least 6,500 m² at the McNeil site on the Winooski Intervale. These estimates, used in conjunction with data from the Winooski site, substantiate the presence of three kinds of sites: large aggregated settlements, undoubtedly occupied during the warmer seasons; smaller, possibly cold weather residential camps; and what appear to be primarily extractive (hunting, fishing or gathering) camps located around inland ponds and small streams. These data indicate the continued existence of a central based wandering community pattern, but with the use of a greatly expanded territo-

ry as exploitation of the uplands became increasingly common. By the end of the Middle Woodland period in the Champlain drainage, the settlement pattern may have begun a shift to a semipermanent sedentary community pattern. Such a trend remains to be demonstrated (Petersen and Power 1983:406).

Faunal and floral samples recovered from 13 Colchester phase hearths at the Winooski site indicate a fairly wide summer to fall subsistence base, including deer, fox, lake sturgeon, bullhead, unidentified bird and turtle, butternut, acorn, pigweed, rose, mustard, buckwheat and bedstraw. At the nearby McNeil site, enamel from a beaver incisor, a fragmentary bird bone and unidentifiable burned mammal bone were recovered from a feature, with possible warm season implications. Although of more equivocal association, a wide variety of subsistence remains have been recovered from the Rivers site at the junction of Dead and Otter Creeks. Represented species include deer, bear, moose, elk, beaver, muskrat, porcupine, dog, fisher, perch, bullhead, and unspecified mammal, bird, fish and turtle. These remains seemingly indicate varied seasons of occupation, presumably centered on the warm summer/autumn months. A comparable admixture of subsistence remains was obtained from the Ewing site, including deer, bear, moose, beaver, muskrat, fisher, snapping turtle, bullhead, and unspecified mammal, bird, fish and turtle, as well as butternuts and acorns. Again, these suggest several seasons of occupation in the warm months of the year.

Subsistence and seasonality data suggest a series of warm season occupations for components of the Colchester phase. However, the wide range of subsistence remains recovered and the likely bias produced by a lack of cold season indicators prevents assignment of these sites to solely warm season occupations. A diffuse pattern of hunting and gathering, on the other hand, is well documented for the Colchester phase.

A great deal of variability may actually exist in the types of food remains which are likely to be encountered at Middle Woodland period sites. The presence of broad or narrow ranges of plant and animal remains may result from such factors as seasonality of site occupation, the environmental characteristics of the territory surrounding any specific site, and the specific types of techniques which people used to hunt, fish, gather, consume and possibly store various food items. There is still much to be learned.

Ideology

Little evidence related to the spiritual beliefs of people during the Middle Woodland period has been discovered at sites in Vermont. Although evidence of elaborate burial ceremonialism is evident to the west in central and western New York, particularly during the Squawkie Hill and Kipp Island phases, there is no evidence to suggest such practices here.

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LATE WOODLAND PERIOD (900-350 B.P.)

Regional Context

The Late Woodland period was a time of significant change in cultural systems throughout New England. This was both a period of population growth and territorial expansion in the entire north Atlantic region. Norse adventurers sailed westward from the Old World to Iceland, Greenland and the coast of North America. Closer to Vermont, Iroquoian-speaking communities from the Lake Ontario region apparently moved north-eastward into the lower St. Lawrence drainage. These communities were the precursors of the St. Lawrence Iroquois encountered by Jacques Cartier around Montreal in 1534. Although people who spoke one or more Western Abenaki dialects resided along the eastern shore of Lake Champlain and throughout Vermont, outlying St. Lawrence Iroquoian communities may have taken up residence in areas along the western shore of Lake Champlain as well during at least part of the Late Woodland period. By 1607, however, all St. Lawrence Iroquoian villages had mysteriously disappeared from the entire St. Lawrence watershed (Chapdelaine 1989; Martijn 1990; Pendergast 1990; Petersen 1990; Snow 1980; Wright 1979).

In central and western New York, Ritchie (1969) and MacNeish (1952) have documented two, well-developed, sequential traditions defined primarily on the basis of stylistic changes in ceramic vessels. The Owasco tradition, ca. 950-650 B.P., has been subdivided into the Carpenter Brook, Canandaigua and Castle Creek phases. The Iroquois tradition, ca. 650-350 B.P., has been subdivided into the Oak Hill, Chance and Garoga phases. Each phase lasted for approximately 100 years.

The Owasco-Iroquois sequence of central and western New York apparently has its analogs in the Hudson Valley of eastern New York, although major Owasco components have not been identified here. Owasco-like ceramics in the middle and upper Hudson Valley are on occasion accompanied by other artifacts found at Owasco sites to the west; e.g., Levanna projectile points, strike-a-lights, sinewstones, scrapers, incised or punctate clay pipes, large storage pits, flexed burials without grave goods, and maize cultivation (Funk 1976:300). Artifact assemblages at sites dating after 650 B.P. also resemble those at Iroquois sites to the west, although differences in various attributes are evident in some of the pottery.

Despite many similarities in the material culture between sites in the Hudson valley and sites in the Mohawk valley and farther west, there is good reason for not using "Iroquois" as a descriptive term for sites in the Hudson Valley which are less than 650 years old, because culturally unrelated, Algonkian-speaking Mahicans occupied this valley throughout the Late Woodland period (Funk 1976:302).

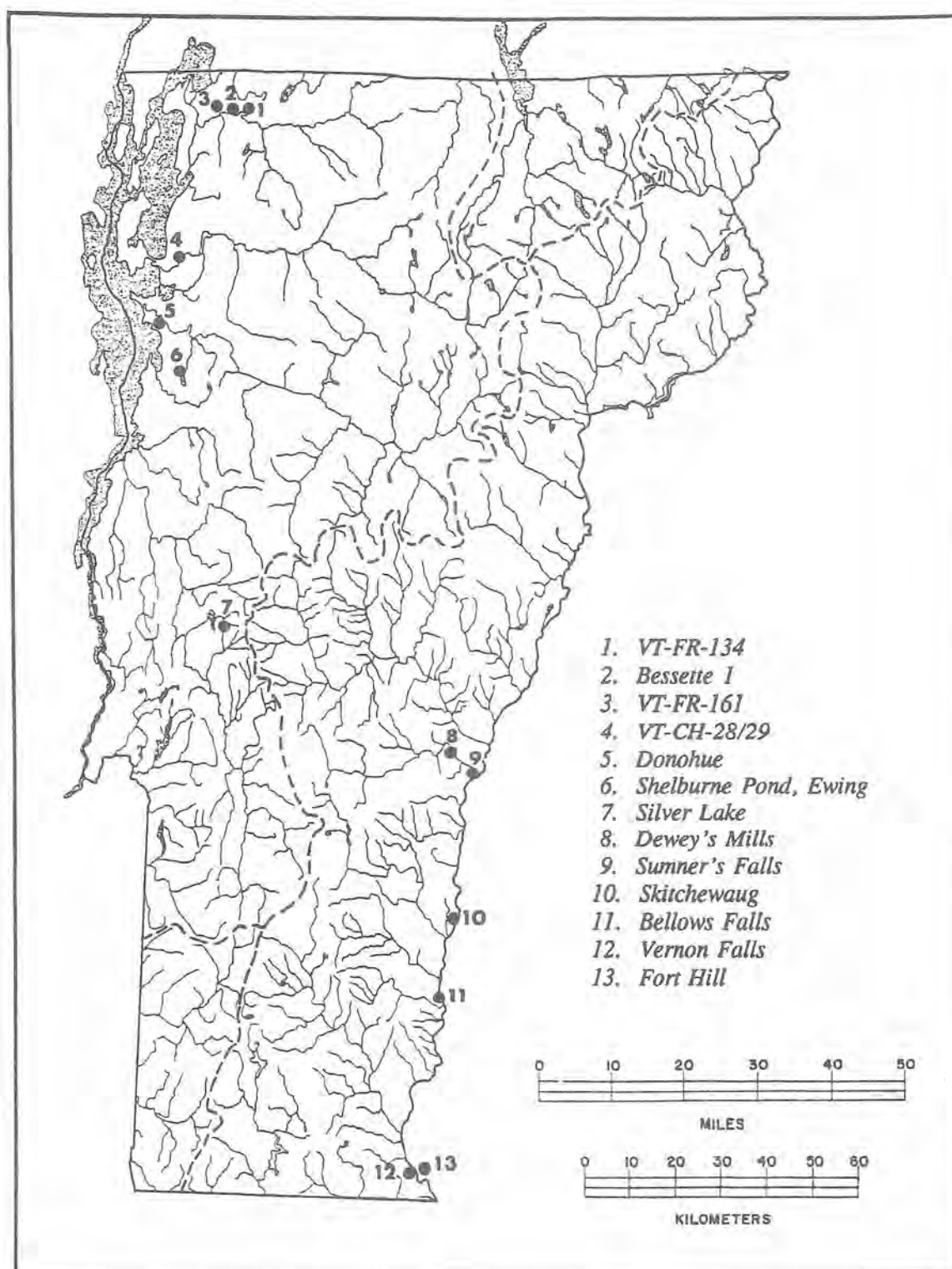
North of Vermont, the cultural chronology is less clear, but substantial strides have been made within the past decade in understanding the St. Lawrence Iroquois. In 1979, Wright proposed, "About A.D. 1400, some of the St. Lawrence Iroquois groups probably expanded farther downstream to become the ancestors of the historic Stadaconans [in the region around Quebec City]" (Wright 1979:69). More recent work in the Province of Quebec has challenged the older idea that St. Lawrence Iroquois development occurred exclusively west of Montreal. Chapdelaine and others have hypothesized the presence of Iroquoian groups in the region around Quebec City as early as the Middle Woodland period and on the lower St. Lawrence at the time of European contact. The details are still far from being worked out, however (Chapdelaine 1989, 1993).

Analogues of both Owasco and Iroquois/St. Lawrence Iroquois tradition ceramic vessels are apparently present in the Champlain and Connecticut River drainages and elsewhere in New England. Regional diversity and a shortage of thoroughly studied and dated sites in northern New England attributed to the Late Woodland period makes it difficult to relate materials from this area to specific phases to the north and west. Most likely, developments in the Champlain and Connecticut River drainages, while related to defined phases in surrounding areas, are unique and warrant more local definition (Heckenberger and Petersen 1988).

Technology

Sites dating to the Late Woodland period occur throughout Vermont, but the actual time of their occupation has been very difficult to determine. Radiocarbon dates exist for only six sites: Sumner's Falls (800 ± 80 B.P.), Skitchewaug (850 ± 50 to 580 ± 60 B.P.), Dewey's Mills (490 ± 120 B.P.), VT-FR-134 (510 ± 90 B.P.), VT-FR-140—Bessette 1 (510 ± 80 B.P.) and Donohue (510 ± 125 and 250 ± 115 B.P.) (Figure 7). Temporally diagnostic stone tools which could be used to subdivide this period do

Figure 7. Late Woodland period sites cited in the text.



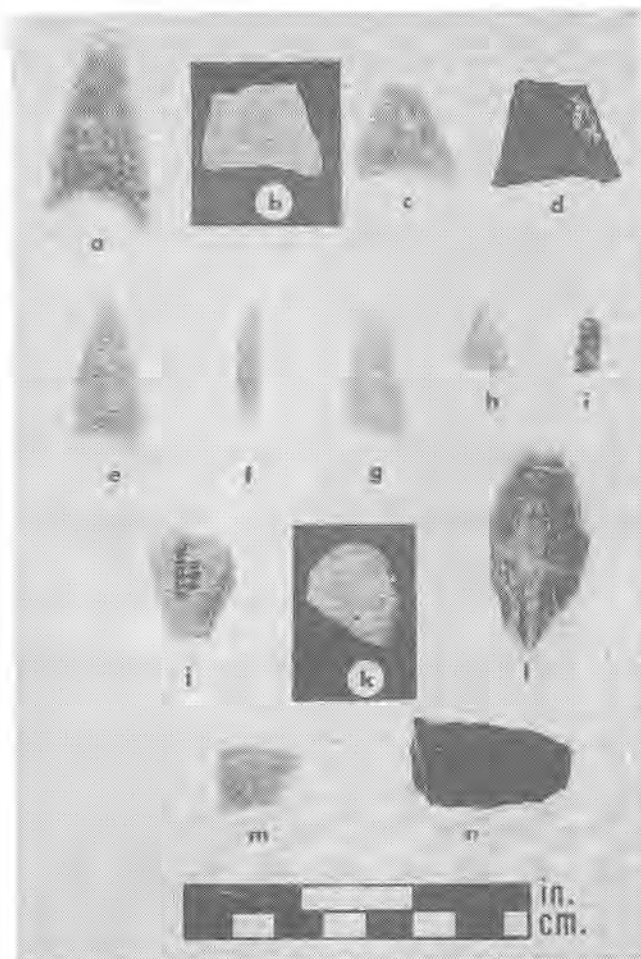


Plate 7. Some artifacts from the Donohue site (VT-CH-94). a-d: Levanna points; e-h: broken bifaces; i: drill tip; j-l: end scrapers; m-n: side scrapers.

not exist, as triangular Levanna projectile points were used from the late Middle Woodland throughout the Late Woodland period. Other stone tools show no apparent change in form. Stylistic changes in ceramic vessels might provide finer chronological control, but pottery has not been recovered at the vast majority of Late Woodland sites and a ceramic typology based on detailed attribute analyses has not been developed.

The range of lithic tool types at dated Late Woodland sites is relatively narrow. For example, from a recurrently occupied base camp (VT-FR-134) on the Missisquoi River, recovered lithic artifacts include Levanna projectile points, unifacial scrapers with steep bits, a drill, and chert flakes utilized as expediency tools for cutting (Thomas and Dillon 1985). At the Donohue site (VT-CH-

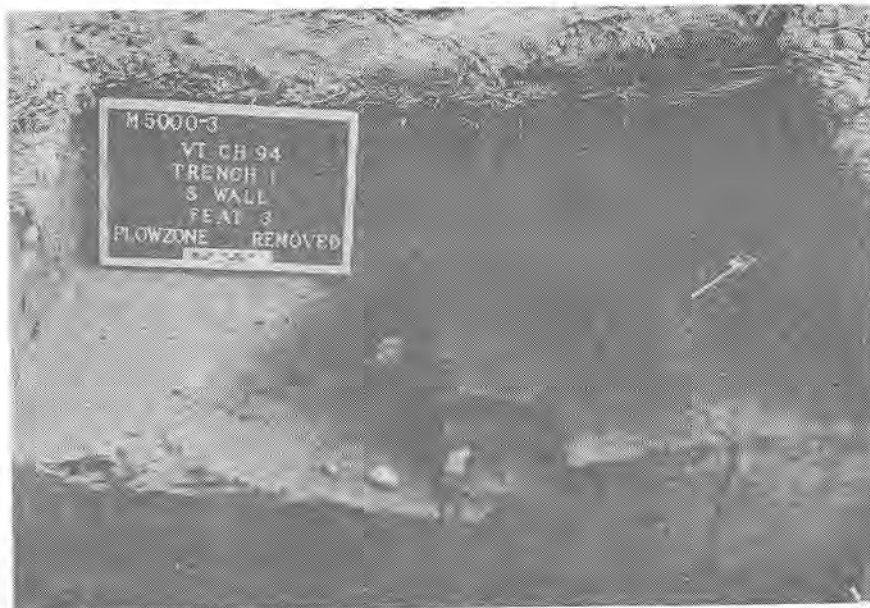
94), a semipermanent residential village on the lower Winooski River floodplain, a similar range of lithic artifacts was found, including Levanna points, a drill tip, end and side scrapers, a bifacial punch or reamer, a broken knife, a tabular stone rod, pieces of graphite and hematite, and a large piece of crystal quartz (Thomas and Bumsted 1979; Plate 7). Although not recovered from dated contexts, additional Late Woodland artifacts include ground-stone hoes, celts, adzes, pestles, hammerstones, mullers and grindstones.

During the first few centuries of the Late Woodland period, ceramic vessels exhibit considerable stylistic continuity with the preceding period. Vessels are characteristically decorated by stamping or impressed with cord-wrapped sticks. Circular punctation, incision and linear punctation are all employed to some extent. In the Connecticut River valley, there appears to have been a significant shift from grit to shell temper (Heckenberger and Petersen 1988). By about 650 B.P., substantial changes occurred in vessel form and the types of decorative techniques employed. Globular vessels replaced the earlier pointed-base forms. The configuration of vessel rims became more elaborate. This is particularly evident on vessels similar to those of the Owasco-Iroquois tradition where wide collars were invariably decorated with incised complex geometric motifs. Punctations were also applied to collars with either fingernails or tools. Vessels are commonly thin, relatively small (ca. 1.5 gal), and very well fired (Petersen and Sanger 1990).

In addition to analogous Iroquois-like vessels in the Champlain Valley, examples of distinctive Iroquois vessels with wide castellated rims, elaborate geometric designs produced by incision and dentate stamping, hollow punctate impressions, and smoothed or checker-stamped bodies have also been found. All of these elements, but particularly the dentate stamped linear designs and checker-stamped bodies, are particularly characteristics of ceramics found at St. Lawrence Iroquoian sites on the lower Richelieu River which drains Lake Champlain, and at sites in the vicinity of Montreal. Thus, some researchers have proposed that a cluster of St. Lawrence Iroquois villages existed in the Champlain valley (Pendergast 1990). With distinct St. Lawrence Iroquois ceramic vessels present at sites as far east as western Maine, others have suggested trade as an equally likely source of origin for St. Lawrence Iroquois pottery in the Champlain valley (Petersen 1990).

Artifacts manufactured from perishable materials are rarely found in Vermont. A notable exception has been the

Plate 8. A shallow cooking hearth at the Donohue site (VT-CH-94). A carbonized corn cob was recovered in this hearth.



recovery of at least six dugout canoes from both the lowlands and uplands. The extensive distribution and associated radiocarbon dates, ranging from 510 ± 100 to 380 ± 60 B.P., for dugouts in Shelburne Pond and Silver Lake indicate that dugouts, in addition to historically reported birch bark canoes, were frequently used in ponds and marshes well into the Late Woodland period.

Settlement and Subsistence

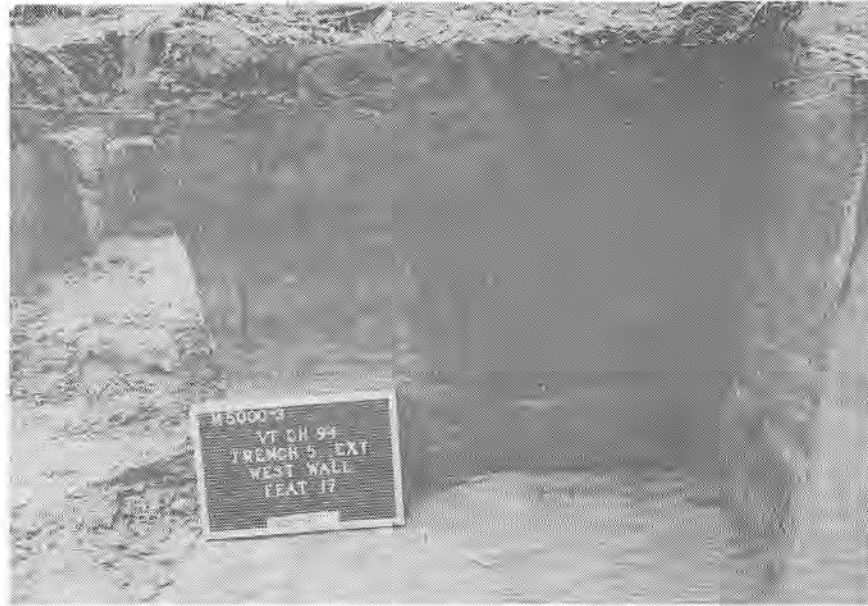
In Vermont, the first evidence of cultivation of non-indigenous plants occurred between 850 and 500 B.P. during this period. Corn and bean cultivation is firmly dated to about 510 B.P. at the Donohue site on the lower Winooski River, to roughly 585 B.P. at the Hunter site, and as early as 850 B.P. at the Skitchewaug site on the Connecticut River. The introduction of horticulture seems to have promoted population growth and to have hastened or at least facilitated the already established developmental pattern toward larger, seasonal sedentary settlements.

It is perplexing that sites dating more recently than 500 years ago, in contrast to those dating to the preceding three centuries, are either uncommon or have not been generally recognized. For example, with the onset of the Late Woodland period, ca. 900 B.P., aboriginal utilization and occupation of the Shelburne Pond locality increased rather

dramatically. At least 15 sites, including the Ewing site, date to this period. Little evidence of utilization of the pond after ca. 500 B.P. exists, however. Several radiocarbon dates and a few ceramic sherds from the Ewing site provide the only current evidence for one possible later occupation (Petersen et al. 1984).

Even in the lower Missisquoi River valley where Abenaki communities are known to have been present during the seventeenth century, an extensive review of site data led to the identification of numerous Middle Woodland sites along the river, but provided little indication of occupations dated to the last three centuries of the Late Woodland period (Crisman 1980:119). A similar trend is characteristic of the lower Winooski valley. Dean Snow has gone so far as to suggest that the movement of Iroquoians into the lower St. Lawrence valley during this period cut off the Champlain valley inhabitants from their northern connections, leaving the Champlain drainage a depopulated backwater and the Hudson-Champlain corridor a buffer zone between the St. Lawrence and Hudson Rivers (Snow 1980: 308). On the other hand, Abenaki oral tradition and the presence in older artifact collections of castellated ceramic vessels with incised and hollow-punctate designs indicate the existence of sites dating between 500 and 350 B.P. Research is clearly needed to determine whether the poor visibility of such sites today resulted from a substantial shift in settlement focus to areas which are not commonly surveyed, from major

Plate 9. Cross section of a small storage pit at the Donohue site (VT-CH-94).



regional demographic changes, from site loss due to historic plowing and pilfering, or from other causes.

Although archaeological data related to Late Woodland period sites in Vermont are very limited, a riverine-pond-lake focus apparently continued from an earlier period. Seasonal mobility was characteristic. At a general level, semipermanent settlements, base camps, small residential camps and extractive camps are likely site types.

By 850 B.P., it seems likely that a horticultural settlement was active at Skitchewaung on the Connecticut River in Springfield. What appear to be shallow pit houses with associated storage pits were identified during salvage excavations along slumping river banks. Carbonized corn has been recovered from six features dated between 850 and 630 B.P.; carbonized beans were retrieved from three pits dated between 850 and 760 B.P.; squash remains were recovered from one feature dated to 830 B.P. (Heckenberger and Petersen 1988).

Archaeological remains of part of an apparent small residential hamlet dating to ca. 510 B.P. were also encountered during excavations at the Donohue site (VT-CH-94) on the Winooski Intervale in Burlington (Thomas and Bumsted 1979:105-158). The Donohue site encompasses an area of at least 152 x 75 m (500 x 250 ft) along the western edge of a relict river channel. It is likely that VT-CH-95, located along the eastern margin of the same relict

channel, is contemporaneous. If so, the larger zone of prehistoric settlement would cover an area of roughly 110 x 287 m (360 x 940 ft), or nearly eight acres.

Twenty-two cultural features and a roughly 3 x 3.5 m lithic workshop were exposed in a limited sample area within the Donohue site. Six hearths containing charcoal, burned bone, carbonized plant remains, some artifacts and fire-reddened soil were identified (Plate 8). Other features included bell-shaped pits which probably served as storage pits (Plate 9). Possible post molds of about 7.5 cm in diameter were encountered in one excavation unit and may indicate the presence of structural remains.

Corn in the form of both carbonized kernels and portions of three carbonized cobs was encountered in a number of pits, confirming the importance of domesticated crops to the site's occupants (Plate 10). (No carbonized beans were present as originally indicated in the report.) In addition to the corn, carbonized butternut shells were commonly encountered. Other food items include acorn, grape and unidentifiable fish. Fragments of mammal bone probably resulted from bones being broken to extract marrow. One unburned deer mandible may have been utilized to scrap the kernels from corn cobs (Bumsted 1980; Thomas and Bumsted 1979:105-158). Given the presence of both carbonized butternut and corn and the probability that at least two of the storage pits were emp-



Plate 10. Organic food remains recovered from hearths at the Donohue site (VT-CH-94). a: butternut shells; b: carbonized grape pits; c-e: carbonized corn kernel; f: acorn shell; g: burned fish bone.

tied before they were reused for cooking, a fall-winter occupation seems likely.

Seasonal base camps may have been located near the falls at Vernon and Bellows Falls on the Connecticut River, at prime fishing sites along the rivers which drain into Lake Champlain, on lowland ponds and along the shores of Lake Champlain (e.g., Bailey 1937, 1939). VT-CH-28 and VT-CH-29, located close to the first falls above the mouth of the Lamoille River, may represent primary fishing stations. Sites dating to the early Late Woodland period (ca. 850-650 B.P.) around Shelburne Pond which contain extensive concentrations of fire-cracked rock and black midden soils and the Skitchewaung site on the Connecticut River floodplain may represent other types of base camps (Heckenberger and Petersen 1988; Petersen et al. 1984). During the Shelburne phase (ca. 950-

650 B.P.) at the Ewing site, a wide array of animal foods was consumed: immature and mature deer, elk or wapiti, bear, dog, beaver and muskrat, as well as bullhead, possibly perch, northern pike, bass, snapping turtle, unidentified birds and mollusks. Although hickory nuts and butternuts are present, no evidence of cultigens has been recovered (Petersen et al. 1985). Small residential camps may be the most numerous type of site. They may occur in a wide variety of settings and may be functionally very different. In the Champlain lowland, early Late Woodland period sites around Shelburne Pond and near the headwaters of Sunderland Brook in Essex may be typical of camps from which foraging activities were carried out. Such sites contain a fairly narrow range of artifacts (Petersen et al. 1984; Petersen, Heckenberger and Thomas 1988). The Chipman's Point rockshelter along the lakeshore may represent a travel site (Bailey 1940). Other sites in the Hoosic, Walloomsac and Jewett Brook valleys around Bennington, at the Salmon Hole on the West River in Jamaica in the uplands of eastern Vermont, and around such upland ponds as Lake St. Catherine may represent small family residences in the uplands where hunting and trapping occurred during the fall and winter (Thomas and Bayreuther 1980; Thomas, Campoli and Doherty 1979; Thomas, Doherty and Warren 1982:37; Thomas and Warren 1984:24-30).

Extractive camps, particularly in the lowlands, may have been established by specialized task groups moving out from villages or base camps. Low artifact densities are expected at such sites because few people were involved and virtually all activities were focused on the acquisition and processing of a single major resource which could be brought back to the main settlement for consumption and possible storage. Components within VT-FR-161 and VT-FR-140 on the Missisquoi River which contained one or two broken Levanna points, limited evidence of tool maintenance, and small basin-shaped hearths may represent short-term extractive camps where a task group focused on hunting. At VT-FR-161, flotation samples from two hearths produced three pieces of shagbark hickory nut and about 150 small fragments of unidentifiable mammal bone. Most is probably from deer bone broken for marrow extraction (Thomas and Dillon 1985).

Excavations at a seventeenth-century fortified Sokoki or Squakheag village provide the only detailed artifactual, settlement and subsistence information for the end of the Late Woodland period anywhere in or near Vermont. At the Fort Hill site, located just across the Connecticut River from Vernon, Vermont, large quantities of animal and plant

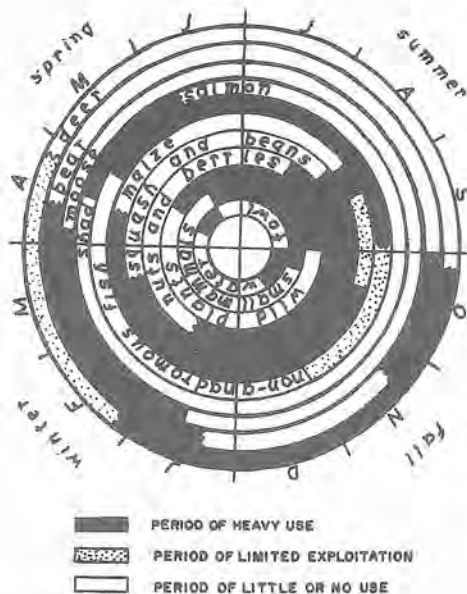


Figure 8. Reconstruction of major dietary constituents in the seventeenth-century Abenaki subsistence cycle in the Connecticut Valley.

remains were recovered from numerous refuse pits which had once been used for storing food. Historic documents indicate that this site was occupied from September, 1663 to perhaps the following April or May, 1664. Although meat from large mammals was regularly eaten, a very diversified diet is also indicated. Animal remains include those of moose, bear, deer, dog, porcupine, rabbit, bobcat, fox, beaver, muskrat, skunk, woodchuck, raccoon, squirrel, chipmunk, mouse, shrew, turtle and one or more varieties of bird. Riverine resources include fresh water mussel, shad, salmon, alewife, sucker, carp, perch, sunfish, catfish, bass and dace. Based on both the actual remains recovered and English documents of the period, corn, beans and squash were stored in large quantity, but were supplemented by such other plant foods as blueberry, butternut, chokecherry, grape, elderberry, raspberry and/or blackberry, and staghorn sumac (Thomas 1990).

By the fourteenth or fifteenth century, the subsistence base of all communities living in Vermont probably combined a mix of plants and animals acquired through traditional hunting, fishing and gathering activities with the recently introduced domestic crops of corn, beans and squash (Figure 8). A generalized reconstruction of the seasonal exploitation practices of Indians living in the middle and upper Connecticut River valley during the sev-

enteenth century follows.

In April, when the large spawning runs of alewives, shad and salmon began, families gathered by one of the large falls on the Connecticut River. The Abenaki lunar calendar recorded in 1641 by John Pynchon in Springfield, Massachusetts, suggests that at this time fish was heavily consumed to the relative exclusion of other types of meat. By early to mid May, corn fields were prepared and seeds planted. Fishing continued throughout this period, although some hunting of migrating waterfowl and some mammals occurred. By summer, families were centered around the family planting fields where corn, beans and squash were tended. Throughout the summer, a wider variety of fish could probably be taken in the rivers, tributary streams and ponds. While crops were maturing in summer, wild plant foods, medicinal herbs and plant fibers were gathered.

By late August or September, horticultural produce was edible. The collection, drying and storage of corn, beans, squash, nuts and berries were undertaken during early fall. Once these activities were completed, a major deer hunting period began. Although a number of the elderly and young children stayed behind in lowland hamlets, small bands or single families established hunting lodges in the uplands where they remained isolated until late December. Here they hunted, dried or smoked deer and perhaps bear meat for late winter consumption. From December until mid-April, lowland settlements again reached their maximum populations. Stored foods were relied upon heavily and supplemented by local hunting, particularly for moose when heavy snows retarded their escape. Winter ice fishing may have added variety to the diet. During at least the latter part of the Late Woodland period, then, communities were anchored to the lands adjacent to their planting fields in summer and winter, but also utilized both riverine and upland sites as they focused on spring fishing runs or the fall hunt. With some variation, such a subsistence/settlement pattern probably characterized all Abenaki communities in the Connecticut valley between Vernon and Newbury, Vermont (Thomas 1976).

Employing similar techniques, in conjunction with the major fisheries and extensive wetlands along Lake Champlain, Indians in the Missisquoi, Lamoille, Winooski and Otter Creek valleys of western Vermont probably used the uplands to the east much as communities in the middle Connecticut Valley used the uplands of eastern Vermont and western New Hampshire. It seems likely that the Hoosic, Walloomsac and Batten Kill watersheds of south-

western Vermont were persistently used by Mahican or other non-Iroquoian communities whose horticultural settlements were located in the middle and upper Hudson valley.

Much remains to be learned about how different Late Woodland sites functioned, how various types of sites were integrated into larger settlement systems, and how such systems may have changed through time, particularly as communities shifted to an increasing use of horticulture.

Ideology

Few artifacts or features related to the spiritual beliefs of the Abenaki people of Vermont during the Late Woodland period have been identified. Mudstone concretions which have been notched and/or etched, shell figurines and other items may be tangible reminders that the Abenaki cosmology was substantially different than that of the Western world (Thomas 1990). Given the continent-wide distribution of sweat lodges for ritual purification at the time of European contact, sweat lodges are likely to be present in Vermont. One was apparently encountered during excavations at an isolated site on a small terrace along Otter Creek, but its age is unknown (Thomas and Bumsted 1980).

Elaborate burial ceremonialism seems to have become a practice of the past. During the sixteenth and seventeenth centuries, and probably for at least several centuries before, individuals were frequently buried in flexed positions in shallow graves. The body was generally oriented on its side, with the head facing south and the face to the east. Alternative orientations are also known, particularly in the Connecticut Valley where individuals have reportedly been found in a sitting position. Burial inclusions were rare prior to the arrival of Europeans and the incorporation of metal and cloth items of English, French and Dutch origin into Native American exchange systems. Graves of single individuals have been accidentally encountered throughout the Champlain Lowland and along the Connecticut River; clusters of graves have been identified in some areas which may represent family or community cemeteries (e.g., Bailey 1939). It has been suggested that burial practices actually shifted from rather random interments at the beginning of the Late Woodland period to a return to specific burial places and even ossuaries towards the end of this period, but this inference remains speculative (Heckenberger and Petersen 1988:24).

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