Ancient Winters:
The Archaeology of the Flagg Swamp Rockshelter Marlborough, Massachusetts

Eric S. Johnson

Massachusetts Historical Commission
Boston, Massachusetts

TABLE OF CONTENTS

INTRODUCTION

It's a nor'easter! Sixteen inches of wet, wind-driven snow piles up in east-central Massachusetts. Traffic is a mess. Flights out of Logan are delayed or cancelled. Schools and businesses close. State officials urge citizens to stay at home. Children make snowmen, go sledding, and have snowball fights. The heavy snow brings powerlines down. People light candles, warm themselves by their fireplaces, and haul out their shovels and snowblowers. Some folks decide that next year they will spend the winter in Florida.

Two feet of fresh snow clog a Massachusetts driveway.

Sound familiar? Sure, to anyone who has experienced a few New England winters. Now imagine a similar storm 4,000 years ago. How would the people who lived here (yes, there were people living in Massachusetts in those days—the ancestors of today's Native Americans) have dealt with winter's cold and storms? How would they keep warm without modern houses, central heating, electricity, or polarfleece? How would they find food? It is certain that they would not have spent the winter in Florida. What was life like here in the winter 4,000 years ago?

Some interesting answers to that question came from the archaeological research project that is the subject of this book. In these pages, you will learn something about why and how archaeology is done, the kinds of questions about the past archaeologists try to answer, and what it is like to do archaeological research in the field and in the laboratory. At the end, you will get an idea of what archaeology can reveal about the past, and you will be encouraged to use that information to imagine what life might have been like in a place both familiar and strange, for people who lived very differently than we do today.

This research, like much of the archaeology that is done today, was done in advance of a major road construction project. Federal and state laws and regulations require that when public money is spent on a transportation project like road construction, the potential consequences of that project are evaluated. This is to make sure that public money is spent wisely, and that construction does not needlessly destroy important natural resources or historical sites, including buildings, landscapes and archaeological sites (see Laws and Regulations that Protect Archaeological Sites).

The archaeological research described in this book was done in several stages between 1978 and 1982 by a team of archaeologists from the Institute for Conservation Archaeology (ICA), a research institute that was affiliated with Harvard

University. The site that they discovered and excavated was the Flagg Swamp Rockshelter, in Marlborough, Massachusetts.

Marlborough, Massachusetts

Although it was small as sites go, the Flagg Swamp Rockshelter proved to be an extraordinary site. It contained artifacts dating back more than 4,000 years. Most of the material found at the site dated from about 4,000 to 3,000 years ago, with a scattering of more recent artifacts. But what really stood out about this site was the quality of preservation of animal bone. Identifying and studying the bones of mammals, reptiles, birds, and fish from the rockshelter gave the archaeologists important clues that allowed them to figure out what people were eating, how they found food in the surrounding area, and the time of year that the site was occupied. For the Flagg Swamp Rockshelter was not a year-round residence; it was a cold-season home. In New England, the cold-weather season is, of course, winter, but the period of cold weather also includes late fall and early spring, roughly November through April. By excavating and studying the Flagg Swamp Rockshelter, the archaeologists learned how people kept warm, dry, and well-fed through the coldest months of the year.

Laws and Regulations that Protect Archaeological Sites

Laws have protected archaeological sites on Federal land since the early 1900s. Beginning in the 1960s, new laws were passed to ensure that Federal projects, including road and railway construction, were reviewed to estimate their potential to damage or destroy archaeological sites (as well as other historic and natural resources) and that efforts were made to take those effects into account, perhaps by altering project to avoid an archaeological site, or having archaeologists excavate the site before the project went through it.

The most important of these laws are:

- *The National Historic Preservation Act (NHPA)*
- *The National Environmental Policy Act (NEPA)*
- *The Department of Transportation Act Section 4(f)*

A couple of important things to remember about The NHPA:

- *It does not require that archaeological sites, even the most important ones, be preserved, only that the effects of the project "be taken into account."*

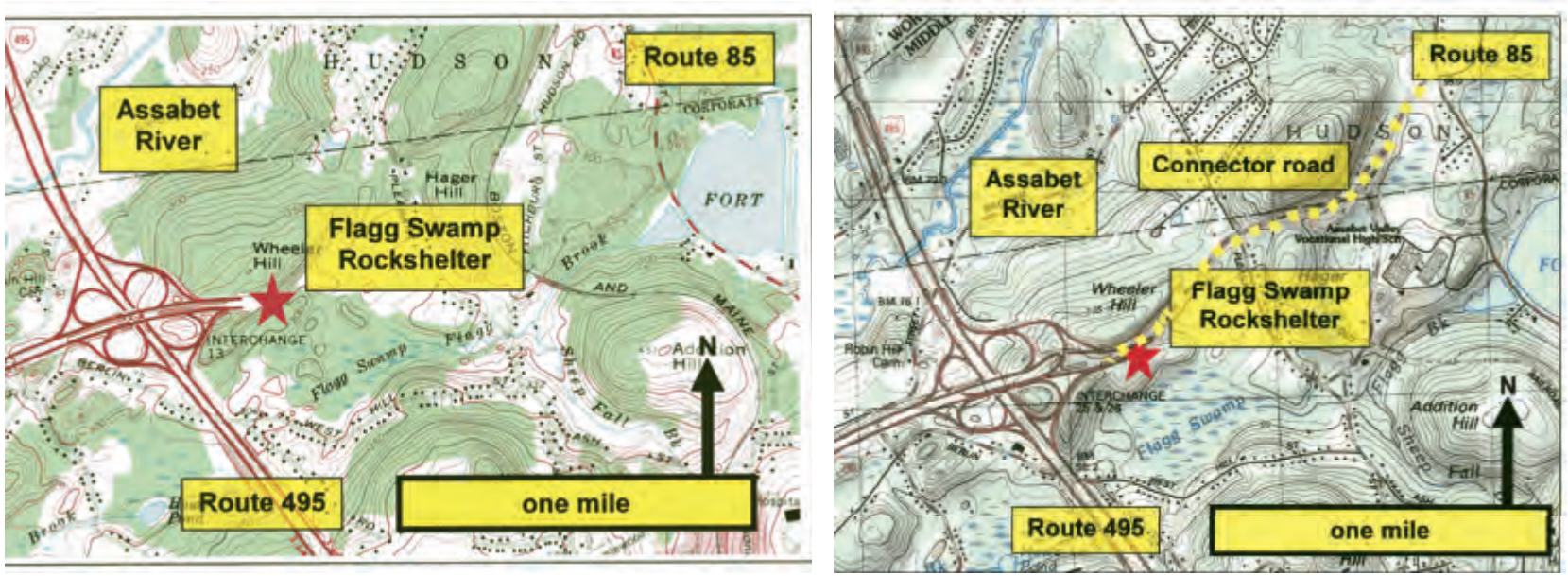
- *It gives states a chance to review and shape Federal projects proposed within their boundaries in order to protect important historic and archaeological sites.*

DISCOVERY OF THE FLAGG SWAMP ROCKSHELTER

In the late 1970s highway engineers began planning a road to connect MA Route 85 with Interstate Route 495 at its intersection with Route I-190 in the town of Marlborough. It was the beginning of the "high-tech" boom that brought new jobs and business to Massachusetts. This growth created a need for new construction, including new roads. This road was to be about 1¼ miles long, over rough, steep terrain. It would require building up a roadbed in some places, and removing as much as 60 feet of bedrock ledge in others. Necessary grading and landscaping around the edges of the road required a construction area as wide as 240 feet in places.

Like other road construction projects, the proposed connecting road was paid for in part by the Federal government, and therefore, had to comply with Federal preservation laws and regulations (see Laws and Regulations that protect archaeological sites). In this case, that included an archaeological study to find out whether there were any important archaeological sites along the route of the proposed new roadway. In September 1978 a team from Harvard University's Institute for Conservation Archaeology (ICA) set out to answer that question.

"How do you know where to dig?" Visitors to archaeological sites always ask this question, as well as "What are you finding?" For this type of archaeological research—looking for sites that might be affected by a construction



Maps from before and after the connector road show new industries and residences in the area.

project—archaeologists must figure out where archaeological sites are most likely to be found, and then go dig in those places to test whether sites are actually there. They identify where to dig by doing research. They study records of known archaeological sites. Sometimes someone has already found a site in the area and has reported it. They consult old maps and local histories; they contact local history buffs. What looks like uninhabited forest today might have once held farms, homes, roads, schools, even factories, all of which could leave behind archaeological sites. They study the landscape, its soils, slopes, streams, wetlands, rock outcrops, and other features, looking for locations similar to places where sites have been found before. That is how archaeologists know where to dig.

In this case, the archaeologists noticed some rock outcrops that looked promising for a certain kind of site: rockshelters. These are places where bedrock overhangs provided people with natural shelter from the elements. Because they are protected from wind and weather, rockshelters also sometimes preserve objects that would decay if they were left in the open. In Massachusetts, several rockshelter sites have been found and excavated over the years. Some of them contained traces of human activity dating back many thousands of years. But not all rock overhangs are suitable for people. Many are damp and uncomfortable; better for bats and bugs. Still others may look old, but have actually been exposed by recent erosion from logging or agriculture, and contain no traces of ancient habitation. And unfortunately, some rockshelters have been thoroughly dug over by people looking for artifacts to collect or sell, and in the process destroying the archaeological site without learning much of anything about the past or even reporting their finds. Was that the case with these rock outcrops? Were they too small or

An 1835 map of Marlborough shows very little activity in the area of the rockshelter.

poorly located to have been used in the past, or had their archaeological contents been looted? Only careful digging could answer that question.

Archaeologists dig in different ways when they want to find the answers to different questions. To answer the simple question, “Is there a site here?” the archaeologists used a simple method. They dug rows or clusters of small test holes, called “shovel test pits” (or STPs). As the name suggests, these square, small holes (about 50 centimeters or 20 inches on a side) are dug with shovels. More painstaking excavation with brushes and trowels was not necessary at this point. The

archaeologists sifted the excavated soil through a quarter-inch mesh metal screen, and looked for artifacts in the screen. If they found ancient artifacts, such as flakes of stone that are the byproducts of stone-tool making, bits of pottery, or rocks that have been reddened and cracked from being used to line a cooking fire, then they would know there was a site there and would have answered that important first question.

When the ICA field crew arrived at the Flagg Swamp Rockshelter for the first time, late in September of 1978, they immediately sensed its potential. The rock ledge formed a wall nearly 100 feet long, and as high as fifty feet. Part of it formed an overhang sheltering a level area of about 160 square feet. The rock wall faced south, offering protection from the northwest, north, and northeast. It only took a single STP dug

To test whether a place is a site archaeologists dig small shovel test pits, sift the soil through portable screens and pick out the artifacts.

The Flagg Swamp Rockshelter

into the level area under the overhang to verify that this was a site. Immediately a large quantity of animal bone fragments and a stone spearpoint came to light. This was a site!

Even at this early stage of research the Flagg Swamp Rockshelter site seemed especially promising. It was rich in artifacts. In just a few shovel test pits the archaeologists found four stone spearpoints, a "milling stone" (a fist-sized cobble used to crush or grind substances like nuts, seeds, or bones), and a large amount of animal bone, some charred and cut, and including three deer molars. Finding the animal bone was especially exciting. Bone is rarely preserved in ancient archaeological sites in Massachusetts. The exceptions to this are sites rich in discarded shells (see Bone Preservation in Massachusetts), but, not surprisingly, these are almost always found along the coast. It is almost unheard of to find a site in the interior parts of Massachusetts where bone is well-preserved.

Bone Preservation in Massachusetts

People discard or lose all kinds of things in day-to-day life. But not everything is preserved in the soil for archaeologists to find. While stone, pottery, certain metals, and plastic will last for thousands of years, organic materials may decay rapidly. These include things like meat and vegetable matter, wood, cloth (as long as it is made from natural fibers like wool or cotton, and not polyester), leather, and even bone.

Inorganic materials like stone and pottery preserve well in Massachusetts' soils, but organic materials like wood, other plant material, natural fiber, and bone decay rapidly.

Massachusetts has a warm, moist climate (for part of the year, anyway), and soils here are acidic and rich in bacteria. The acidity and bacteria work together with insects and other animals to decay and dissolve organics quickly. Even hard bone usually does not last more than a few centuries in Massachusetts' soils, except under special conditions. One such condition is in sites called "shell middens." These are sites made from shells—the refuse from ancient meals of clams or oysters. Anyone who has prepared "steamers" knows that one serving makes a lot of shells to get rid of. The shells are made of calcite, a mineral that neutralizes the acidity of soils. Along New England's coast stand ancient mounds of shells, some so large they were mined, their shells spread over fields to make the soils less acidic so that crops would grow better. Gardeners often use pelletized lime for the same purpose.

The reduced soil acidity of shell midden sites make them some of the few places where bone may be preserved for hundreds, even thousands of years. Bones from animals that were eaten give archaeologists information on ancient foodways. Preserved tools made of bone including harpoons, beads, combs, and game pieces, give archaeologists a much more complete picture of the possessions, activities, and artistic styles of ancient people. But since shell middens are usually located on the coast, this material and the information it contains, is not ordinarily found at sites in the interior.

This 1886 photo of a shell heap in Maine shows a 30-feet thick deposit of oyster shells dating back more than 2,000 years.

The Flagg Swamp Rockshelter was a rare exception. The secret to its excellent preservation was calcite minerals in the rock. These dissolved into the soil and made it less acidic. That and the protection of the rock overhang made it possible for bone to preserve as well as it did. It was a lucky coincidence that it was also an excellent spot for people to live.

The first phase of testing at the rockshelter yielded promising results.

With such encouraging results, a second phase of archaeological testing was quickly approved and planned. This second phase is sometimes called "site evaluation." Now the archaeologists need to learn more than whether there is a site here, and they must return to the site to do a little more digging to learn some basic information about the site. When was it occupied? How big is it? Is it intact or have natural forces or people's activities (like plowing, building, or looting) churned up or removed its contents? What did people do at the site? What time(s) of the year were they there? With the answers to these kinds of questions, archaeologists can assess the site's research value, that is, how much we could learn from this site if it were thoroughly excavated. This information is also important for the Highway Department and the State Historic Preservation Officer so they can decide what to do next. If the site does have research value can it be avoided and protected, or does it make more sense to excavate it before it is destroyed by the road construction? If the site turns out not to have much research potential they may agree that no further archaeological research is needed.

The ICA archaeologists returned to the Flagg Swamp Rockshelter in October of 1978 filled with anticipation because of the promising results of the first testing. They dug more shovel test pits, rows of them extending out from the area under the overhang to see how widespread the artifact deposits were. They also dug one larger "excavation unit," a square measuring 1 meter (about 40 inches) on each side so they could get a better sense of the structure of the deposits. Were there distinct layers of artifacts? Were there fire hearths or pits for food storage or trash disposal?

Under the Rock Overhang

The results confirmed the archaeologists' expectations. This was a fantastic site! The bone preservation was astonishing, and the entire area under the overhang contained dense, layered deposits filled with bone, artifacts of stone and sherds of pottery. The artifacts from the site dated roughly between 3,000 and 5,000 years ago (how archaeologists dated the site will be explained in a later chapter), with possibly some more recent material too. They also found many ancient features buried beneath the ground surface. The features were firepits that were dug in to the soil, used for cooking, and later filled in with trash. These are a common type of feature in Massachusetts (and in many other parts of the world). The nice thing about features like these is that they are created over a fairly short period, perhaps a single day, or at most a few months. Therefore, the artifacts they contain should all date from about the same time.

The archaeologists also noticed that even when they dug in chilly October weather, the rockshelter was warm, dry, and comfortable. On sunny days, the south-facing rock ledge acted like a solar collector, and sheltered the crew from cold winds. On damp days they were able to stay dry. It seemed logical that people would have enjoyed this comfortable spot many thousands of years ago.

In cool weather the rockshelter was a warm spot.

How Archaeological Sites Are Created

To make an archaeological site you need people and things. The first step is when people do something that involves throwing away, losing, or deliberately burying or building some thing or things. Even thousands of years ago, when people created much less trash than we do today, they still discarded things. What people threw away and how they threw it away (did they just toss it out the back door, sweep it up and bury it in a pit, burn it, feed some parts of it to dogs or pigs?) created the starting point for most archaeological sites.

The next step happens between the time the site is first created and the time the archaeologists discover it. For however long a time this is, the site is subjected to forces of nature like weather, burial under new deposits of soil, animal burrowing, or root growth. Some materials decay, iron may rust away completely, while others (stone, pottery, glass, bronze, or gold) may last for thousands of years. People's actions can also alter the site. People may add new materials on top of a site, mix up its contents by digging into it, plowing it for growing crops, or building structures over or through it. People may dig into a site hunting for coins or bottles and selectively remove these while they leave other materials behind. By the time archaeologists dig a site, it is always different from when it was originally occupied. Part of the challenge, and the fun, of archaeology, is trying to figure out what went on at the site from what remains after hundreds or thousands of years of these changes.

Since the results of the second phase of testing showed that the Flagg Swamp Rockshelter was a very important site, an important decision had to be made. The Highway Department and State Historic Preservation Office had to decide whether the site should be preserved and built around, or excavated and built over. Rerouting the road was not going to be easy. On one site was Flagg Swamp. Building the road through the swamp would be expensive and would destroy the swamp, which was a valuable natural resource for water quality, flood control, and wildlife habitat. Moving the road to the north would bring it through even more rugged terrain, greatly increasing the cost of the project. Since the Flagg Swamp Rockshelter was a small site, thorough excavation would not be prohibitively expensive. Because the archaeological study was done early in the planning process, the final dig would not delay the building of the road. But building the road through the Rockshelter would mean the end of the site forever. In the end, it was agreed that the site would be excavated and its information retrieved before it was destroyed. Archaeologists have mixed feelings about this kind of decision. While they would prefer to save the site for future archaeologists, they are thrilled to have the chance to excavate it themselves.

What's the Most Important Part of Archaeological Research?

It's NOT *the digging! In fact, archaeologists try to avoid digging unless it is absolutely necessary. And digging a site is really only necessary when a site is threatened with destruction. If a site seems well-protected from construction, looting, and natural forces like floods, then archaeologists prefer to leave it alone. That is because archaeological excavation is destructive. Once a site has been excavated it is gone forever; you don't get to dig it over again. An archaeological dig can destroy a site just as thoroughly as dynamite, bulldozers, vandals, or tsunamis. The important difference is that when an archaeological dig destroys a site, it recovers information about the past. That is why archaeologists dig and record their findings so carefully. It's not like spading a garden. And that is also why archaeologists make sure that the records of the dig: the artifacts, notes, photographs, and samples, are carefully stored in a safe place like a museum. But although digging carefully and arranging for safe storage of artifacts and records are important, it is even more important that archaeologists* think *carefully before they go out there and dig. They need to think about what they want to learn, and what particular digging methods and laboratory studies can best retrieve that information. They have to come up with a* detailed plan *for digging and for studying what they have dug up. That plan is called an archaeological research design. Since the research design determines how the site will be dug, it is the most important part of archaeological research—even more important than the actual digging.*

Archaeologists must think and plan carefully before they dig. Imagine trying to excavate a site like this one without a plan.

THE SITE AND THE DIG

In May of 1980, the archaeologists, led by Fred Huntington, the project director, began the final phase of excavation at the Flagg Swamp Rockshelter. For some of the crew, this was their first visit to the site. They drove along a twisting dirt road, up and down steep slopes, to a dirt parking area. From there, they walked a short distance along a path into the woods through dappled sunlight. Then, turning to the right, they stared up at a high rock face, overgrown in places with shrubs and small trees. A level terrace extended about forty feet along the base of the rock. The terrace was about ten feet wide. Beyond the terrace, the ground sloped gently away into the forest, eventually meeting the marshy borders of Flagg Swamp some forty feet beyond.

The Flagg Swamp Rockshelter before the Dig

View toward Flagg Swamp from the Rockshelter

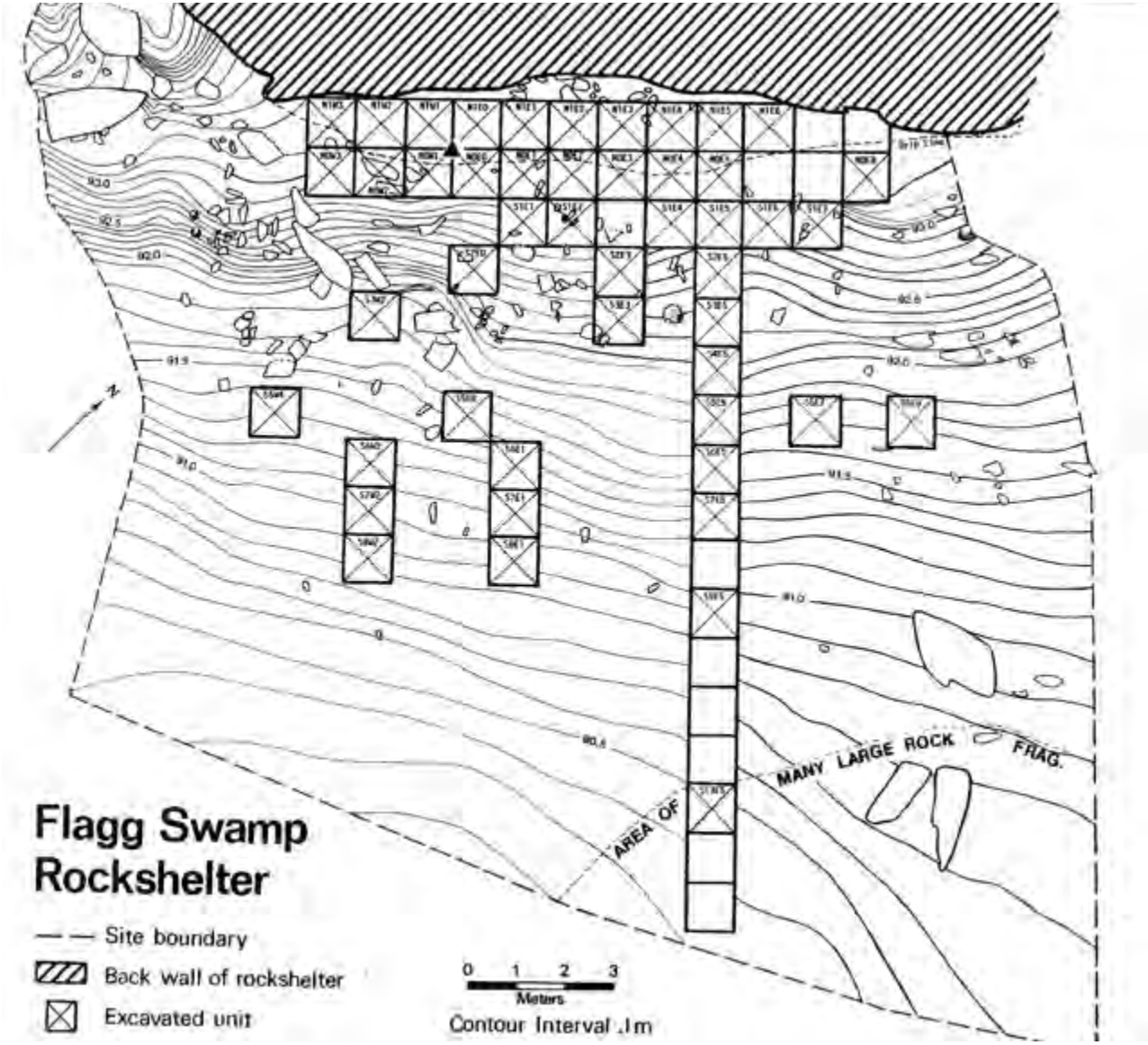
Project Director Fred Huntington

The terrace and the slope were covered with a luxuriant growth of poison ivy. This might explain why the site had never been dug over before. Digging through poison ivy roots is a sure fire way to get a terrible rash.

Poison ivy grew everywhere around the site.

The first thing the archaeologists did was set up a grid over the site using measuring tapes, stakes, and string. Each square of the grid measured 1 meter (40 inches) on a side. The research design called for excavation of most of the squares inside the rockshelter under the overhang, and a sample of squares outside the overhang, including a row of squares extending out toward the swamp. This would give them a cross-section of the layers of soils and sediments within and outside the rockshelter site.

Above: Laying in the Grid
Below: String and Stakes Mark the Grid under the Rock Face



Plan of the Site Showing Grid and Excavated Squares

As you can see from the plan, the site was not large and most of the squares were clustered in a small area. Therefore, there really wasn't space for a large field crew; not more than eight people were digging at the site at any one time. Each archaeologist was responsible for a square. They dug carefully, using sharpened masons' trowels (the flat kind), brushes, and dustpans to collect the soil, looking for artifacts in the square, noticing changes in the color and texture of the soil, and trying to keep the floor of the square level and the walls straight. Digging was deliberately slow; five centimeters (two inches!) of soil were removed at a time. The goal was to carefully take the site apart from top to bottom, recording as they went how the pieces fit together. When the archaeologist found a large artifact such as a spearpoint, a big piece of animal bone, or even a large rock, he or she recorded the exact location, using a measuring tape to figure out the distance of the object below


ARTIFACT LABEL

Unit # S3E3 Zone

Artifact # 249 Absolute Provenience:

Feature # BK Depth B.D. 43

Strata # 10B E-W coord. 66

of cut N-S coord. 1

Initials ESJ

#95 on map Bone 3 pcs

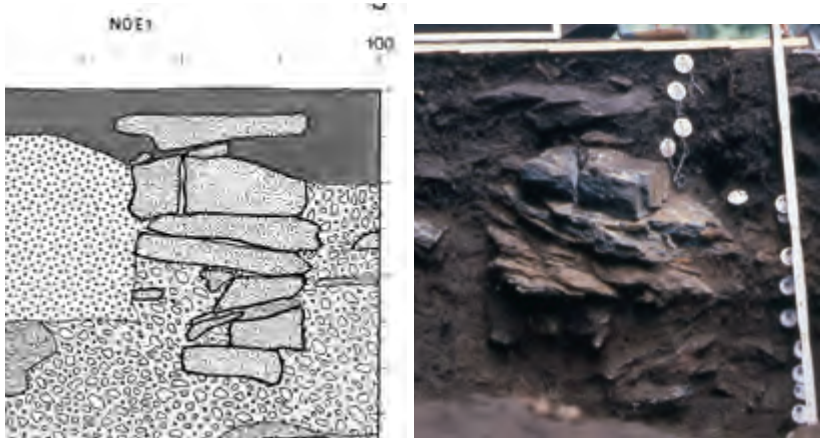
A label for a bag containing three pieces of bone gives their precise location: unit, depth, distance from west wall and north wall, feature, stratum, and number on a sketch map.

the ground surface, and in from the walls of the square. The archaeologist carefully dug around the object, leaving it in place if possible. After digging five centimeters, the archaeologist sketched a plan of the bottom or the "floor" of the square showing the locations of the finds, and any differences in soils in different parts of the floor. They took photographs of the square, and removed any artifacts, which were put in separate bags, labeled with the exact location where they were discovered. Then they began digging the next five centimeters.

Archaeologist Amy Gazin-Schwartz takes detailed notes.

As you can imagine, this was slow, careful work. As much time was spent sketching, and keeping records of artifacts, drawings, and photos, as was spent actually digging. This process was repeated until the archaeologist reached bedrock, which was about two to three feet below the surface under the overhang. Then the archaeologist carefully cleaned

The author prepares to draw a sketch map using the mapping grid on the right.



A drawn profile (left) and the corresponding photograph (right) show a cluster of rocks in the wall of a square.

the sides of the square by shaving them with the edge of a sharp trowel, made a measured drawing of the layers of soil (a drawing called a "profile") on each side, and took photos of the sides. Then it was on to another square.

What about the soil that was so carefully scraped and brushed into dustpans? The archaeologist collected it in buckets, which he or she carried down the slope a short distance away from the rockshelter, and poured into screens. The screens were wooden frames like shallow trays, about three feet on a side; the bottom of the tray was made of strong metal screening, with each square in the screen measuring ⅛ inch on a side. This was finer than the usual screening used in New England archaeology, which is ¼-inch mesh. The screens were hung in structures made of four poles (the archaeologists sometimes referred to these as "quadropods"), which suspended the screen at a comfortable height. When the archaeologist shook the screen, the fine soil fell through the wire mesh, leaving behind artifacts: stone flakes and tools, potsherds, animal bones, and nutshells. It was always exciting to give the screen that first shake and see artifacts emerging as the soil fell away. The next step was to pick the artifacts out of the screen and place them into bags. The different kinds of artifacts went into separate bags: one bag for bone, another for stone flakes, etc. Each bag had to be labeled with the square it came from, the depth (e.g., 10-15 cm below surface), and the type of artifact, as well as the date and the excavator's initials. This is the typical screening procedure in New England archaeology.

A hanging screen and a portable folding screen. Note the large pile of dirt that has accumulated under the screen.

Once all the artifacts have been picked out of the screen, there remained only a residue of pieces of root, pebbles, and other bits of rock that are not artifacts, and these are tipped out of the screen to make way for the next bucketful of soil. But things were done a little bit differently at the Flagg Swamp Rockshelter. Here there were plenty of roots (many of them from poison ivy) and rock fragments that had eroded from the rock ledge (these are sometimes called 'spalls'), but there were also so many artifacts, many of them very tiny, that picking through the screens until every artifact was removed would have taken far too much time. Therefore, instead of discarding the screen residue, it was carefully poured into a bag and labeled like the bags of artifacts. The screen residue samples would be processed later, in the laboratory.

What was it like to work on the dig? It was hot, dirty, tedious, and tiring, but also exhilarating, and fun! The heat-retaining property that made the rockshelter comfortable in cold weather for the ancient Native Americans made it HOT in June, July, and August for the archaeologists digging and screening. Being so near Flagg Swamp meant that mosquitoes and other bugs were relentless. Digging through poison ivy roots meant that everyone got poison ivy in addition to bug bites. The soil under the overhang was black, fine, and powdery. Sweating in the heat, and working in this black dirt, meant that many of the archaeologists looked like old-time chimney sweeps by the end of every day. There was, however, as there often is on digs, one archaeologist who wore light-colored pants and a white t-shirt nearly every day and, while working just as hard as everyone else, somehow never got dirty at all!

The dig in progress. The plastic tarps protect the excavated squares and the excavators from rain. Much of the vegetation in the foreground is poison ivy.

The two archaeologists in the foreground are digging (the one on the left is using a hand broom); the seated archaeologist is making a "letter board" for photography; the archaeologist standing on the left is using the mapping grid to draw a map of her floor.

Archaeology is not as dangerous or physically taxing as many other jobs. You do have to be careful lifting buckets full of dirt, and avoid falling into open squares. But archaeology requires focus and concentration to keep detailed notes, to fill out forms, tags, and bags, make accurate measurements, write legibly, and remember all the necessary steps in excavating and recording. If you forget to photograph a feature, or forget to put film in the camera (this was before digital photography), and dig on down to the next level, you can't fill it in again and do it over! Maintaining this kind of concentration while crouching or kneeling in dirt for hours in extreme heat, clouds of mosquitoes, and constant itching can be exhausting.

Yet, those who worked on the dig felt privileged to be part of the excavation of such a special site. Every day, sometimes every few minutes, someone would find an interesting artifact. The bones were like miniature sculptures, fine and delicate like the vertebrae of a fish or solid and dense like the knucklebones of a deer. The craftsmanship of some of the stone tools was beautiful, and even the plainest of them was unlike anything made today. There is nothing quite like the feeling of holding something in your hand that was made three or four thousand years ago, and had been buried in the ground for almost as long. Thinking about a newly unearthed ancient potsherd or flaked stone knife gives a feeling of connection with a real person whose ancient way of life, language, beliefs, and daily routines were very different from your own, but who once stood right where you stand now holding the very same object.

Visiting Archaeological Sites

Are you interested in visiting an archaeological dig in progress? There are many opportunities to visit archaeological sites here in Massachusetts. Your best time to visit a dig is in the summer or fall, when most fieldwork is done. October is Massachusetts Archaeology Month; and many sites are open to the public at that time. A schedule of events is available at the Massachusetts Historical Commission's website www.sec.state.ma.us/mhc.

Colleges and universities often run summer field schools, where students can learn archaeological field methods. Tours for visitors are sometimes offered. You can find out about these through the internet. The Archaeological Institute of America, publishers of Archaeology *magazine, maintains information on digs around the world that are open to the public, as well as opportunities to participate in fieldwork (www.archaeological.org). The Massachusetts Archaeological Society (www.massarchaeology.org) has information on how and where you can observe or participate in archaeology in Massachusetts. The Robbins Museum (in Middleboro) is dedicated to Massachusetts archaeology. Many other museums in Massachusetts offer archaeology programs such as Old Sturbridge Village (www.osv.org), Historic Deerfield (www.historic-deerfield.org), The Peabody Essex Museum in Salem (www.pem.org), the R.S. Peabody Museum of Archaeology in Andover (www.andover.edu/MUSEUMS/MUSEUMOFARCHAEOLOGY), and the Peabody Museum of Archaeology and Ethnology in Cambridge (www.peabody.harvard.edu) .*

Protecting the Site

To help keep the site secure, the Highway Department built a chain-link fence around the perimeter of the site. Also, members of the field crew occasionally spent the night camping out at the site to keep an eye on it. I love camping and volunteered for this duty, bringing my sleeping bag and tent, and my dog, Inky, an elderly black spaniel-lab mix who also loved camping. Late that night, I awoke to the sound of voices from above the rock face. They sounded like teenage boys climbing over the fence. They began to make their way in the pitch dark, crashing through the bushes toward the top of the rock face. I wasn't sure what to do, but I had to stop them before someone fell over the edge! Fortunately Inky came to the rescue with one great bark. Instantly, the crashing stopped.

Inky

"They've got attack dogs!" someone said in a hoarse whisper.

"Is that an attack dog?" called another nervous voice. I explained, calling up into the darkness, that the dog would not harm them, but that they were right near the edge of a cliff and would likely kill themselves if they kept going. I also mentioned that they were wading through poison ivy.

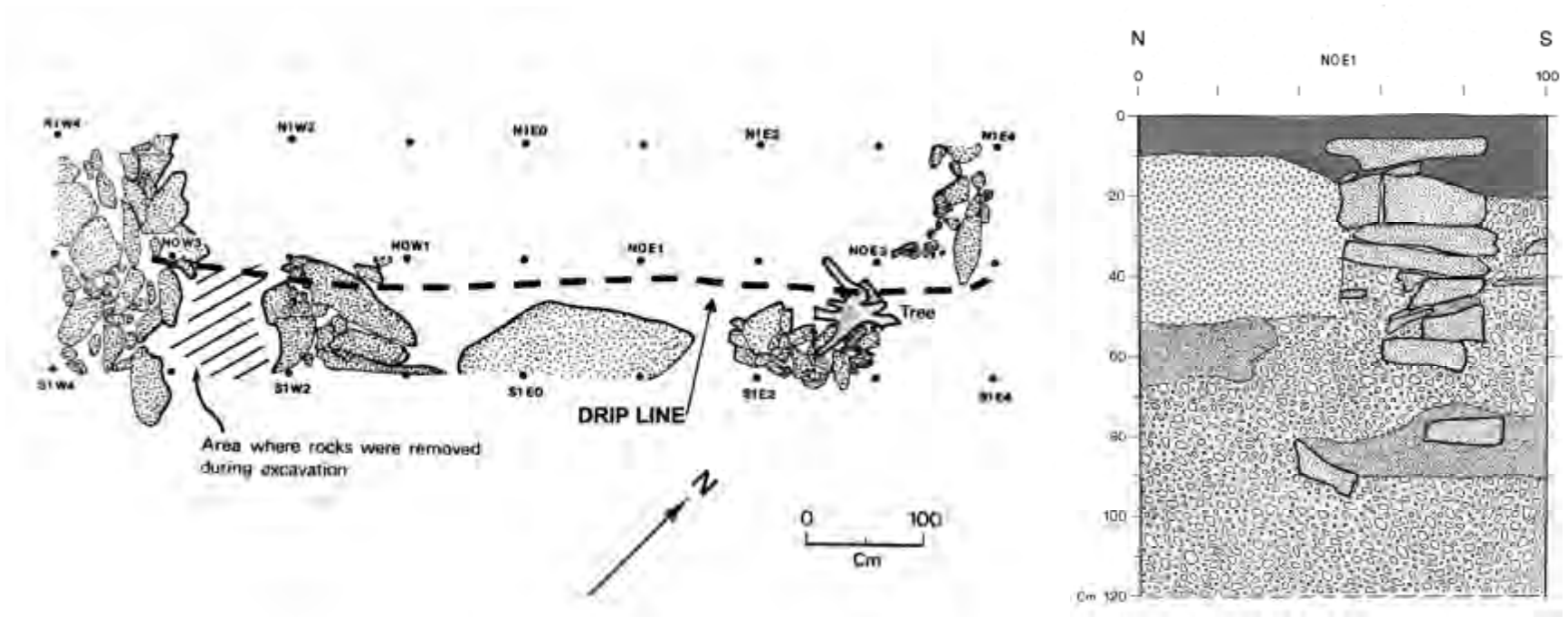
"Is this really an archaeological site?" asked one of the boys. I answered that yes, it was a site, and that if they wanted to see it we gave tours every day at such-and-such a time and that they would be welcome to visit the site in the daylight. They thanked me, and moved back through the bushes and over the fence. I heard a car start up and drive away. The next day, three teenage boys showed up for the daily tour. They didn't mention the previous night, and I didn't say anything to them either. I just smiled quietly to myself and went on sorting through my screen.

As the dig progressed, new and exciting finds came to light every day. The archaeologists began to distinguish overall patterns and features of the site. The area sheltered by the overhang contained the highest density of artifacts and features in its black soil. It was defined by a rough arc known as the "drip line," because that is where the rain dripped off the overhang.

Just beneath the ground surface, the archaeologists encountered a stone wall. The wall followed the drip line from the western end of the rockshelter east about twenty feet, where it turned north to meet the rear wall of bedrock. It therefore enclosed the most protected area of the shelter. If your image of a stone wall is a retaining wall built by a landscaper or an old field wall built by some Yankee farmer, this is not that kind

of stone wall. For one thing, the wall turned out to be, at most, only about two feet high. Another difference was that it was made not of fieldstones, but from large rock spalls. Spalls are pieces that split off the rock face when water seeps into cracks and freezes and expands, breaking off pieces of rock. This is the same way potholes form in roads over the winter.

The archaeologists figured out that the stone wall was built after the shelter had been used for some time. They figured this out by excavating beneath the wall and finding features and artifacts there. That meant that those features had been created and the artifacts had been used and deposited *before* the wall was built. Based on the kinds of artifacts, the archaeologists estimated that the wall was built around 4,000 years ago, not too long after people first began to use the rockshelter. This is the earliest known stone structure in Massachusetts.



Plan (Left) and Cross-Section (Right) through the Stone Wall. The plan shows that the wall was functional rather than ornamental. In the cross-section the area inside the drip line (where people lived) is to the left. This shows that as sediments built up on either side of the wall, new pieces were added to maintain the wall as a footing for an adjustable shelter.

So why did people build this wall? Why not just toss all the large rock spalls farther away from the protected area (as most of them were)? Why build the wall so low? Why not build a higher wall to make the rockshelter more weather-tight? The most likely answer is that the wall served as a foundation. Wooden poles cut from saplings could be set securely against the base of the wall. The wall wouldn't have to be particularly high for this. In fact, the reason the wall was as high as two feet was that as sediment accumulated inside the wall (and outside too), people added new rocks to the top of the wall to keep it above ground. The tops of the poles were leaned against the rock ledge at the rear of the protected area. These poles formed a framework over which people attached a covering of bark slabs, hides, or woven mats. The Native people of southern New England used bark slabs or woven reed mats secured to a framework of poles to make a *wetu* (dwelling). With bedrock shielding the northwest, north, and northeast, and a weathertight shelter wall to the south, people could be warm and cozy even during the worst weather of winter.

A practical feature of this shelter was that it was adjustable. When the weather was relatively mild and sunny, the people could easily remove and set aside the mats and poles to take advantage of the rockshelter's natural solar collecting properties. If the weather changed (as it famously always does here in New England), they could quickly reassemble the shelter to keep out the wind, rain, snow, and sleet that have always challenged New Englanders.

Inside the stone wall the archaeologists found dark brown or black soils rich in organic material. Within this living area were a wide variety of artifacts including dozens of stone tools and hundreds of stone flakes, the waste products of stone tool making. The tools included several varieties of spearpoints, knives, scrapers, drills or awls, hammerstones, and

Jeff Kalim, a Native American artist and craftsman, made this* wetu *by covering a frame of flexible poles with large pieces of bark secured with more poles on the outside.

a fishing line sinker. There was pottery (broken pieces called 'sherds'), and hundreds of animal bones, whole and fragmented. There were items made of shell, including a fishhook and a bead, and pieces of what might have been a shell spoon or an ornament. There were hundreds of fragments of nut shells, many of which were charred. There were many other bits of charcoal, left from cooking fires, and evidence of the hearths in which those fires were kindled.

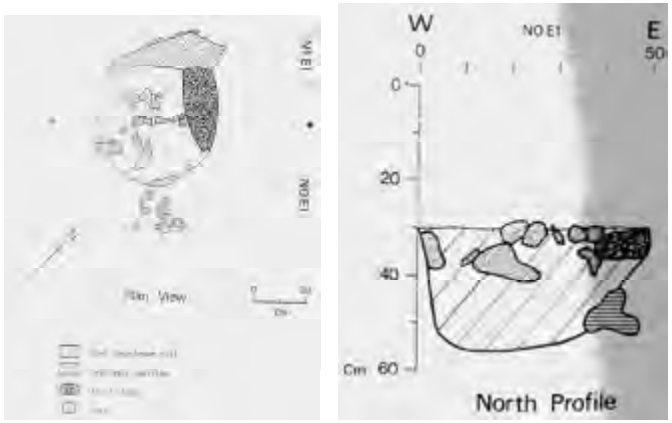
Inside the shelter the archaeologists identified about a dozen hearth features. These were pits, roughly circular or oval in plan. They were of modest size; most were two to two-and-

a-half feet in diameter and anywhere from eight to twenty inches deep. The archaeologists were able to recognize the features because their soil (which the archaeologists call "feature fill") differs in color and texture from the surrounding soil. Remember that features are especially important because they were created over a relatively short period and their contents date from about the same time.

Because of their special importance, features were excavated very carefully. As soon as the archaeologist recognized an area of different colored soil that might be a feature, it was mapped and photographed. Then it was divided into quarters and the archaeologist excavated each quarter separately. After finishing each quarter, the archaeologist drew the cross-section of the feature. Soils from the feature were saved and brought back to the laboratory for special processing (see the next chapter: "In the Lab").

To give an idea of what these features were like, let's look at one example. Feature BA was found just inside the stone wall. It was first identified at a depth of about twelve inches below the surface and extended about ten inches down. In cross section it was shaped like a bowl or basin. At the top of the feature was a smear of ash and charcoal extending to the northwest, which appeared to be an overflow from when the pit was filled. Next to this was a large cobble that had been used as an anvil stone: a hard surface on which objects like nuts were set so they could be cracked or crushed by a hand-held hammerstone.

Inside the top of the feature were small pieces of "fire-cracked rock": rock that has been heated so much that it reddens and cracks. You can easily see fire-cracked rock today if you go to a camping site and look at the stones in a campfire ring. The pit also contained ash and charcoal—suggesting that



Plan and Cross Section of Feature BA, a Fire-Trash Pit

This photo of Feature BA shows the large anvil stone and fire-cracked rock found at the top of the feature.

it had been originally been used as a firepit, and had eventually been filled in with trash That trash included nut fragments (hickory, hazelnuts, and acorns were identified), two small hammerstones (maybe these had been used with the anvil stone to crack the nuts), bones including deer, turtle, and fish, stone flakes, a piece of quartz that had been flaked into a rough triangular shape (possibly discarded because of its poor quality), and a large stone blade, which may have been lost rather than purposely discarded. The stone blade was a style archaeologists call "Atlantic" that is common in Massachusetts. It has a wide triangular blade with a square stem at the base, and is made of a type of stone called felsite or rhyolite which is widely available in eastern Massachusetts.

Of the many pieces of charcoal in Feature BA some of the largest were collected for radiocarbon dating, a commonly-used dating method (see *Radiocarbon Dating*). The results gave a date of a little over 4,000 years ago.

The story that Feature BA tells is that sometime more than 4,000 years ago, someone dug a firepit, maybe lining it with stones to better reflect the heat, and cooked and prepared food here, probably including nuts and meat. Later, someone filled the pit with trash to tidy up the floor of the shelter. This process was repeated about a dozen times in different areas of the shelter over the years it was occupied.

This Atlantic blade was found in Feature BA.

Maybe the most exciting find of the dig was a nearly complete bear skull, found just outside the stone wall. The jaw bone had been placed on top of the skull. The skull had been damaged by a blow from a large, sharp blade. It seemed clear that the skull was not just discarded casually, but had been deliberately placed in this position, possibly as a way of showing appreciation for the bear.

A bear skull was found just outside the stone wall.

The skull was from a young adult bear (about 5-6 years old). This bear was unusually large, almost certainly male, and would have weighed well over 300 pounds! The hunter(s) who brought in a bear like this would have provided a great benefit to the people.

The jaw of the bear had been deliberately placed on top of the skull.

The bear was certainly an important animal for its large quantity of meat, which would have fed a family for a long time, its thick fur for clothing or blankets, and its claws for ornaments. Bears have been celebrated in story and ritual by the Native people of North America, and in many other parts of the world (see *Legends of the Bear*).

Black Bear

Legends of the Bear

The Bear—Maske *in the Wampanoag language—features prominently in Native American legend and lore. That should not be surprising, since the bear is a very large, intelligent, impressive, and dangerous animal that sometimes walks upright in a very human-like way. Wherever bears are found they have been an important element in ritual, symbolism, and oral and written literature, and still are today (for example:* Shardik *by Richard Adams,* The Bear *by William Faulkner, and* The Hotel New Hampshire *by John Irving).*

The Mohawk people of New York State tell the story of a giant bear that killed off all the game so that the people were in danger of starving. Many hunting parties tried but failed to kill the bear. Then, three brothers dreamt that they chased and killed the great bear. Encouraged by their dream, they set out with their dog, tracked the bear, and chased it to the edge of the earth, where the giant bear leapt into the sky. Undaunted, the brothers and their dog followed. There they remain to this day. Every fall, the brothers shoot arrows at the bear and wound it. The blood from the bear's wounds turns the leaves red and yellow. The bear is the rectangle of stars that form the bowl of the Big Dipper, the three brothers are the stars of the handle, and the dog is the North Star.

A stone carved in the shape of a seated bear (the photo above is of a replica) was found in Salem, Massachusetts in the early 1800s

In September, as summer turned to fall, the archaeologists finished the fieldwork. A large portion of the site had been excavated—almost all of the area under the overhang and much of the immediate surroundings. Because the rockshelter was so small and was slated for demolition, it was feasible to excavate a large part of it. That fall, as highway construction began, the Flagg Swamp Rockshelter was dynamited.

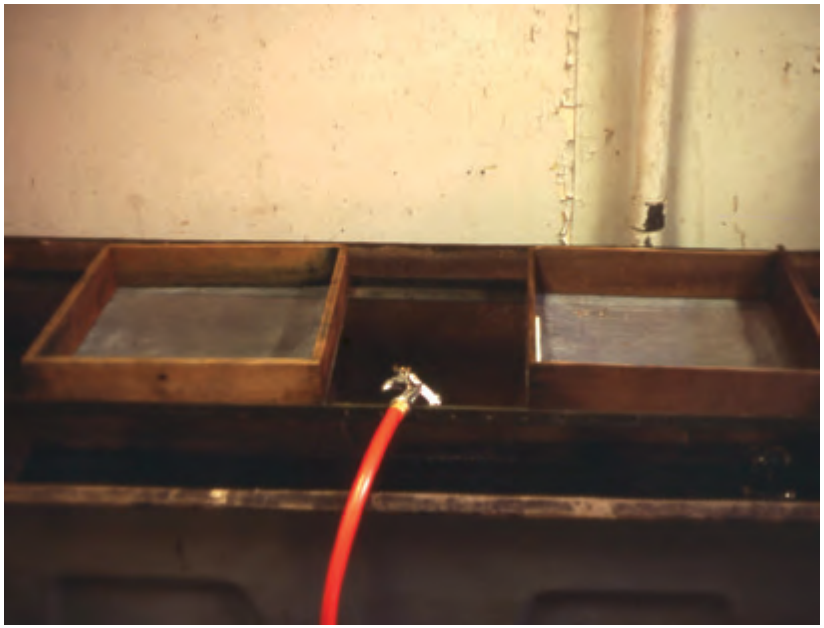
October 1980, The Flagg Swamp Rockshelter is destroyed with explosives.

IN THE LAB

The fieldwork was finished; the rockshelter was no more. But the archaeological project continued for many months. Now the archaeologists worked in the laboratory, processing the screen residues and soil samples, carefully organizing, cataloging and studying the finds, and preparing a written report of their findings. Although most people think that archaeology is mainly digging, archaeologists actually spend many more hours in the laboratory than they spend in the field. This time is well spent because the lab is where archaeologists make sense of what they have found in the field.

Two of the lab procedures—water screening and flotation—were really extensions of the fieldwork in that they were ways of extracting more artifacts from the dirt. The screen residues that were saved in the field because they were full of small artifacts were water screened in the lab. Each bag of screen residue was emptied into a fine-mesh screen. The screen was set in a rack over a large trough, and water was sprayed over the sample until all the soil was washed through and the cleaned artifacts (as well as pebbles, rock spalls, and bits of root) remained. The screen was then set aside to dry. Once dry, the sample was painstakingly sorted into artifact categories: bone, stone flakes, potsherds, seeds and nut fragments, and shell.

To extract small artifacts from the feature fill soil, the archaeologists put the soil samples through another procedure called flotation. In this method, tiny organic materials like charred seeds can be separated from the soil based on the fact that the seeds are light and float in water and the soil is heavy and sinks. Flotation is a fairly recent innovation in archaeology, but it has become standard practice because it is the best way to find seeds, which are too small to be found reliably with traditional digging and sifting methods. Today, archaeologists can purchase a variety of sophisticated flotation machines, but in the late 1970s, the ICA archaeologists had to make their own. And what they created back then was the state of the art for flotation in New England archaeology.



These water screens are ready to receive screen residue samples.

The flotation machine was made from a 12-gallon tub from an old washing machine. A hole was cut in the side near the top, and a spout was attached so that water with floating material could pour out into a large bucket.

Under the spout and over the bucket, they set a stack of five screens set in small, round frames made of brass, which were stacked one on top of another. The screen with the largest size mesh was set on top to catch the larger pieces, and the mesh size got smaller with each screen below until the bottom screen with the finest mesh captured the smallest particles. The water poured through the screens into the bucket, where a pump sucked it out through a hose and circulated it back into the tub.

The Flotation Machine

The Flotation Machine in Action. Water with floating material pours off the top through a series of progressively finer screens.

Inside the tub, it was important to keep the water gently agitated so that lightweight seeds with heavy dirt stuck to them could be washed free to float up and out of the tank. The archaeologists also wanted to save the heavier material (called the “heavy fraction”), which often contained stone flakes and other artifacts that sink in water. To accomplish this, the archaeologists set up air stones, the kind you see in aquariums, in the bottom of the tub. The air bubbles helped to keep the water moving and break up any clods of soil. In the middle of the tub they set a metal stand with a screen. Once the tank had filled with water, a one-liter sample of feature soil, which had to be thoroughly dried so that the lightweight organic particles weren’t waterlogged, was poured into the screen. This screen captured the heavy fraction. Once the water pump and air stones were switched on, the water began to circulate and carry

the lightweight floating material out of the tank into the stack of screens. It took about 20-40 minutes to complete the flotation process. Once the material in the screens was dried, nuts and seeds could be sorted out.

A view inside the flotation tub shows the air stones (blue) and the central screen for capturing the heavy fraction.

The tub is full; the pump and air stones are running, and we're ready to add the soil sample.

Water screening the screen residues from the field and floating the soil samples from the features proved very successful. These samples produced large numbers of bone, stone, and ceramic artifacts, as well as seeds and nut fragments that would have otherwise been missed. Actually doing these procedures was fun. The first spraying over a waterscreen instantly transformed a box of dull dirt into a glistening array of artifacts: tan-colored bone fragments, shiny stone flakes, and on at least one occasion a dazzling white quartz spearpoint that had been overlooked in the field. Preparing and running the flotation samples was less immediately rewarding, but the equipment was so ingenious that it still felt very special to be working with it.

Once water-screened or floated, the artifact samples were dried again, then sorted by artifact type. Since the artifacts, especially those from flotation, were often very small, sorting was done using magnifying lights to view the artifacts and tweezers or even fine artists' brushes to move the tiny fragments into separate piles for bone, seed/nut, shell, stone, etc. This could also be fun, since many of the small bones are quite interesting, and there were people in the lab who could tell you what kind of animal a particular bone belonged to, but it was a strain on the eyes and took two to three hours to sort through a typical sample.

The ICA Laboratory: the table on the right is set up for sorting small artifacts.

When the sorting was completed, the animal bone and plant specialists began their studies. From the bones, shells, and nuts they identified what people ate at the rockshelter, and what times of year they had stayed there. Those findings are discussed in another chapter.

Another important analysis is radiocarbon dating (also called Carbon-14 dating). Archaeologists select appropriate samples of charcoal and send them to special laboratories for analysis. The results can give the archaeologists a good idea of when the site was occupied.

More than a dozen charcoal samples were radiocarbon dated. Most of these were from features or layers of soil inside the shelter; a few were from the area outside. When the results came in they results showed that the site was occupied between about 4,800 and 1,200 years ago, with occasional use afterward. Most of the activity here dated from roughly 3,000 to 4,500 years ago.

These dates fit with the kinds of artifacts found at the rockshelter. Archaeologists have been able to radiocarbon date charcoal from features that also contain specific kinds of artifacts at other sites in southern New England. Once there are a few dates for an artifact style, the archaeologists have a good idea of the time period during which that type of artifact was made and used. If that kind if artifact is found at another site, they can be fairly certain that it dates from the same period. We'll look at some of these artifacts in the next two chapters.

Radiocarbon dating

Radiocarbon, or carbon-14 dating was developed in the late 1940s and revolutionized archaeology, because it answers the question "How old is it?" and gives a result in years.

Here's how radiocarbon dating works. Carbon is one of the most common elements in the earth. It is found in the air (carbon dioxide) in the earth (carbonate minerals, coal, and petroleum) and in all living things. A tiny amount of the world's carbon is of a variety called carbon 14. Carbon 14 is unstable and weakly radioactive. It forms high in the upper atmosphere where cosmic rays hit atoms of nitrogen gas and change them into radioactive carbon 14. Like all radioactive materials, carbon 14 decays, giving off a small amount of radiation in the process, turning back into a more stable element (unstable carbon 14 becomes stable nitrogen).

Living things take in carbon (including carbon 14) into their bodies by eating or by photosynthesis. When a living thing dies, it stops taking in new carbon, and its radioactive carbon 14 decays. The important thing is that carbon 14 decays at a known rate. This rate, known as a half-life, is the amount of time it takes for half of the carbon 14 to decay. All radioactive materials have a half-life. For some it is measured in seconds; for others, it takes millions of years. The half-life of carbon 14 is 5,730 years. Scientists use this known, constant rate of decay like a clock. By measuring the amount of carbon 14 remaining in a sample of charcoal or other once-living material, they can accurately estimate when that material stopped living.

Some time after archaeologists started routinely using radiocarbon dating, someone had the bright idea to compare it with another dating technique: tree-ring dating or "dendrochronology." Tree-ring dating is based on counting the annual rings of trees. Scientists find patterns of thick and thin rings, reflecting good or bad growing seasons. Then, starting with trees of known age, they try to match the ring patterns with older pieces of trees, like old wooden beams in houses. In many parts of the world, these tree-ring sequences go back several thousand years.

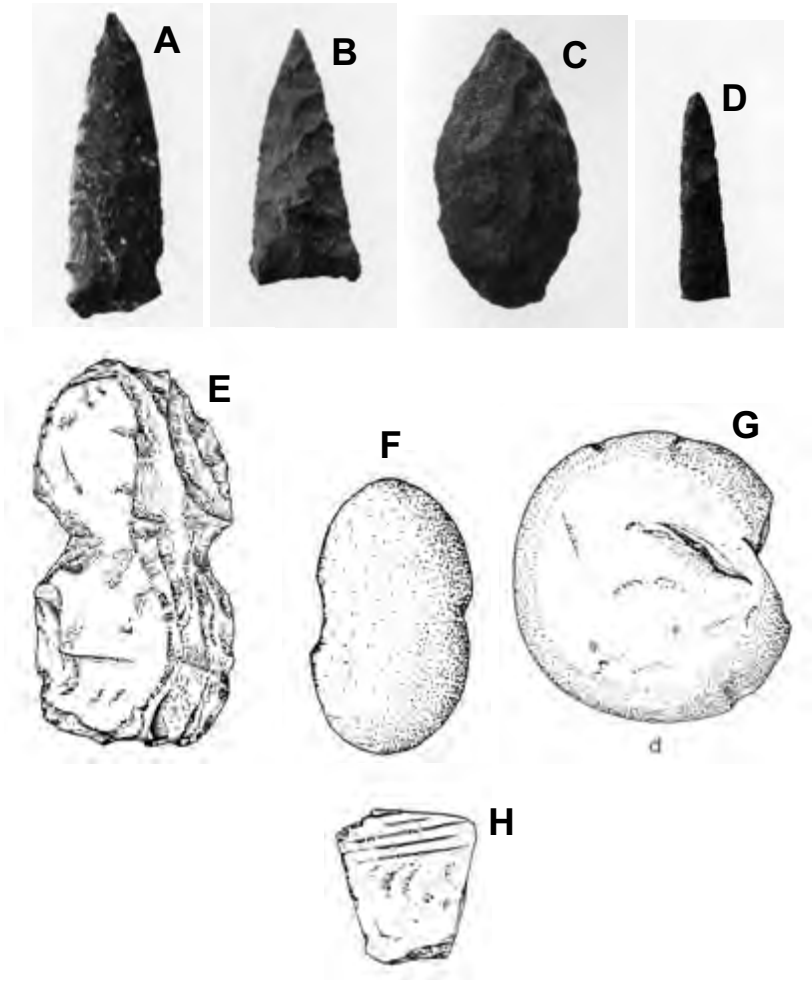
When radiocarbon and tree ring dates were compared, the results were discouraging. The radiocarbon dates were all wrong! Some were off by hundreds of years. The reason was that the cosmic rays that create carbon 14 don't occur at a constant rate, sometimes there are more and sometimes less; so the amount of carbon 14 in the atmosphere fluctuates and makes radiocarbon dates either more recent or older than calendar dates. Fortunately, there was a solution to this problem. All radiocarbon dates are now corrected based on information from tree-ring dating, and archaeologists can make a much more accurate estimate of the actual age of a radiocarbon-dated object.

When an archaeologist uses radiocarbon dating he or she must select pieces of charcoal (or other organic material) that are clearly connected with what the archaeologist wants to date. Since charcoal from a feature like a trash pit is most closely connected with the other stuff in the pit, a radiocarbon date for that piece of charcoal is probably also the date for everything else—including other artifacts—that was found in the pit. But a radiocarbon date from a random piece of charcoal that is not clearly associated with artifacts or features at a site is worthless. So archaeologists must be very cautious in saying what their radiocarbon dates are actually dating.

FROM THE ROCKSHELTER: STONE TOOLS

Among the many artifacts found at the rockshelter were a variety of stone tools. Most of these were flaked stone tools, shaped by skillfully striking or pressing a stone with another tool to drive off small flakes. This is an ancient technology, once commonly used worldwide, but rarely practiced today. The archaeologists were especially interested in the spearpoint styles they found. Since many styles were made during fairly short periods of time, they could show when the rockshelter was occupied. These results were compared with the results of the radiocarbon dating and proved to be generally consistent.

In addition to the spearpoints, there were many other flaked-stone tools for other tasks: knives for cutting, scrapers for preparing hides (see: The Life Cycle of a Stone Tool), awls for making holes in leather or wood, and a large axe. A flattish pebble with shallow notches chipped into the sides served as a simple sinker for a fishing line. Other stone tools were made with very little modification, like the anvil and milling stone found with Feature BA. A small stone with narrow grooves cut into it was probably an abrading stone. Pieces of wood, bone, or antler could be sharpened or smoothed in the grooves.



Stone tools from the site included spearpoints (A, B), knives (C), scrapers, awls (D), an axe (E), a fishing line sinker (F), a milling stone (G), and an abrading stone (H).

Stone Tips for Thrown Spears.

One of the most frequently found flaked stone tool is the spearpoint. Although they are commonly known as 'arrowheads', most points from Massachusetts are actually not from arrows. Bow-and-arrow technology was introduced sometime after 1000 AD. Flaked stone points any older than that were used to tip spears that were either thrust or thrown using a throwing stick (nowadays usually called by its name in the Aztec language: atlatl*). Here's how a throwing stick works. One end is held in the throwing hand; the other has a hook that fits into a notch or socket in the end of a spear. With a little practice, you can throw a spear with great force and accuracy. It's like having an extra-long arm, which enables you to throw much harder (that's why baseball pitchers are so often tall guys with long arms).*

How a Throwing Stick (Atlatl) Works

Spears that are to be thrown must be well balanced so that they fly straight and don't tumble end-over-end. The points should be sharp, symmetrical, and not too heavy. The points illustrated below, called "Small Stemmed points" would seem to be perfect tips for throwing spears. They were the single most common type of point found at the rockshelter (more than 50). Most were made of quartz or other locally available stone. Dates for Small Stemmed points cover a long period, several thousand years, including the time when the rockshelter was occupied.

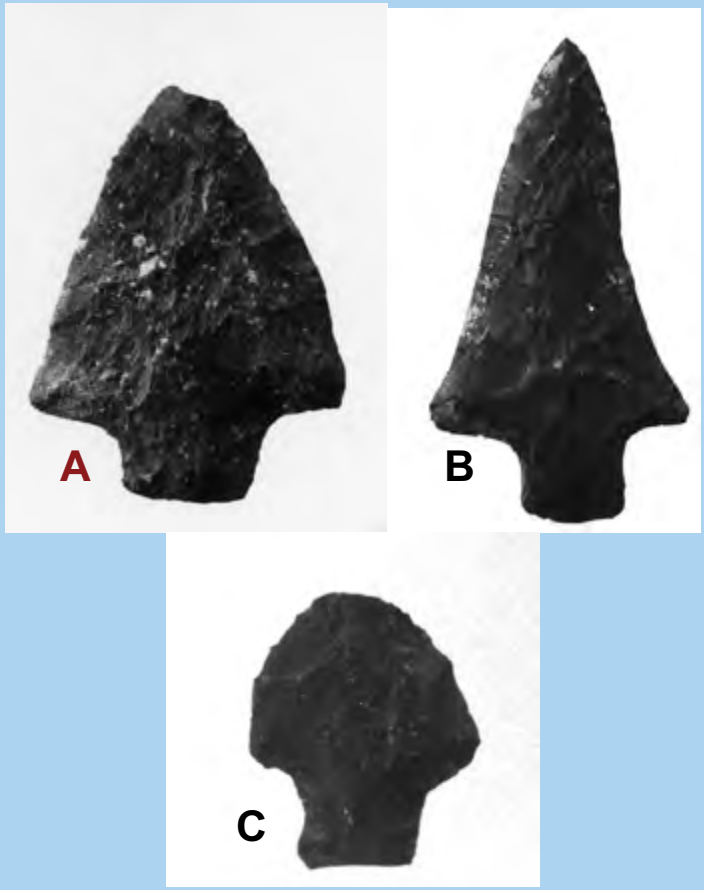
Some of the Small Stemmed Points Found at the Rockshelter

Life-Cycle of a Stone Tool

Another kind of point found at the rockshelter was made and used during the same time as the Small Stemmed point, but has a very different shape and size, and is often made of different stone. This style, called "Atlantic" is broader, flatter, and usually longer than the Small Stemmed. The Atlantic points from the Flagg Swamp Rockshelter also nicely illustrate how some kinds of stone tools were reshaped to perform new tasks. Atlantic points have a broad blade, shaped like an isosceles triangle, and are thin in cross-section. This broad blade with its long, sharp edges, is better suited for cutting than the Small Stemmed point, which is better for penetrating. At the base of the triangle is a square or rectangular stem, which is used in attaching the tool to a shaft or handle.

What would such a tool have been used for? Actually, just about anything. It could be used with a heavy throwing spear, as the business end of a thrusting spear, or it could be mounted into a short handle and used as a knife. All knives grow dull, and stone knives break and chip more easily than the metal knives we are familiar with. A stone knife can be resharpened by carefully removing small flakes along the edge. This reduces the size of the blade, and resharpening one side makes the blade less symmetrical. In fact, many Atlantic points are noticeably lop-sided. One such example was found at the rockshelter (B in the illustration). Note how different the blades are of the points in the illustration, but also notice that the bases are all very similar.

Another common type of stone tool is the scraper. The scraper is used to prepare the inside of animal hides so they can be used as warm fur clothing or blankets (and, if leather is desired, to scrape the fur off the outside too). The edge of a scraper needs to be strong, but not too sharp or pointed or it will damage the hide. If the tip of a knife broke, or if someone really needed a scraper, the Atlantic spearpoint-knife could be reshaped into a scraper. Example C in the illustration is just such a tool; the rounded tip is highly polished from being scraped against animal hides.



Three Atlantic points from the site show different ways of modifying the blade.

FROM THE ROCKSHELTER: POTTERY

All of the pottery from the site consisted of small pieces (sherds). Complete ceramic pots are very rare finds. The simple reason for this is that pots break, and with rare exceptions they are only discarded after they break. So for every complete pot that somehow finds its way into an archaeological site, there are many, many broken ones. Archaeologists like ceramics, and not just because they break into many pieces and preserve for thousands of years. They like ceramics because they contain so much information. Ceramics contain evidence of what they were used for and how they were made. The potsherds from Flagg Swamp rockshelter were typical for their time period, and represent some of the earliest ceramics in New England. Most of the sherds were found inside the stone wall, in or near the firepit features, and many were blackened with soot on the outside. This indicates they were used for cooking rather than, say, storage.

How did people make clay cooking pots back then? The sherds themselves preserve evidence of how they were made. Potters (both ancient and present-day) often treat their clay by mixing in coarser material, called temper. This strengthens the clay so it can be better shaped, fired, and used. These sherds contained temper of coarse crushed rock (called 'grit'). The vessels were not "wheel-thrown," as is much of today's hand-made pottery, but were built from coils, another technique familiar to most of us. We know this by looking at the edges of the sherds. When coil-made pottery breaks, it often breaks along the seams between the coils, and you can easily see the rounded shape of the original coil along the break along the edge of the sherd. As the layers of coils are built up, they have to be securely stuck together. This was done by pressing and striking the walls of the vessel with a paddle wrapped in cord or fabric. The result is a thick-walled pot with a rough surface that made it easier to handle without dropping the pot. By pressing the edges of the paddle into the wet clay, the potters gave their pots some added decoration. Once finished and dried, the pots were fired, probably in an open fire.

Pottery sherds from the Rockshelter
The photo above shows the typical colors and sizes of the sherds; the drawings below emphasize the surface treatments and decoration of the bottom row of sherds in the photo.

Although no complete vessels were found here, a few whole, or nearly whole pots of this type of pottery have been found at other sites. Interestingly, they were usually large vessels with straight, thick walls and pointed bases. This may seem odd at first. Wouldn't they fall over and spill? But the shape makes sense if you think about how they were used. Unlike today's pots which sit on a flat-topped stove to cook, these would have been stuck into the coals of a fire pit, so a pointed or rounded bottom actually worked very well.

Pots with pointed bottoms can be securely stuck into the hot coals of a firepit. These elegant pots from southeastern New England were beautifully drawn by William S. Fowler and published in a work titled "Ceremonial and Domestic Products of Aboriginal New England," published in the Bulletin of the Massachusetts Archaeological Society, Volume 27, Nos. 3 and 4, 1966.

FROM THE ROCKSHELTER: ANIMAL AND PLANT REMAINS

The many bones found at the site helped to answer questions about what animals people ate at the rockshelter and what seasons of the year they lived there. The bones found in the soil, in the screens in the field, and in the water-screening and flotation done in the laboratory were examined by specialists who can take a bone, or even a small piece of a bone, and figure out what kind of animal it belonged to. To do this they consult identification manuals (books full of drawings and photographs of every bone from every species of a certain type, such as hoofed animals), and even scientific reference collections of the skeletons of various animals. When their analysis was complete there were some surprising results.

These are just a few of the many pieces of animal bone, including a piece of turtle shell at lower left.

One of the most unexpected results was that some bones were from elk. This was the first time elk bones had been found in an archaeological site in Massachusetts. We don't think of elk as being native to Massachusetts; today they are largely confined to the Rocky Mountain region of the United States and Canada. But elk ranged over the entire North American continent until the 1800s, when they were hunted to extinction east of the Mississippi River. Still, finding evidence of elk in eastern Massachusetts was an exciting surprise. Elk are very large animals (500-1,000 pounds) and a single animal would have provided the people of the rockshelter an abundant supply of meat, as well as tough sinews, thick, warm fur, and useful antler if it was a male elk.

You won't find elk in Massachusetts today, but people once hunted them here.

The specialists also identified bones of two other animals that are or had been extinct in Massachusetts: turkey and heath hen. At the time of European settlement, turkeys were common through most of Massachusetts. Hunting and habitat destruction wiped them out by the 1850s. The turkeys that today are often seen in rural and suburban Massachusetts are descended from a group that was reintroduced from New York State in the early 1970s.

The bones of turkey (above) and heath hen (below) were found at the site.

This is one of the heath hen bones.

Unlike the turkey, the heath hen is permanently extinct. These small to medium-sized ground dwelling birds, similar in appearance to the prairie chicken, were once abundant in the scattered areas of open country within the eastern forests. The heath hen's habit of freezing to avoid detection made it easy prey for early European settlers, who quickly hunted the birds to near extinction. The species survived for a time on Martha's Vineyard, where the last one was seen in 1932. The finding of these species evokes an image of an ancient Massachusetts with vast tracts of old-growth forests and other unspoiled natural habitats. Bird remains are rarely found in Massachusetts archaeological sites because the bones of birds are hollow and thin, and birds have no teeth, which are the hardest and most decay-resistant bones, for those animals that have them.

Another interesting find was the wing bone of a saw-whet owl. The saw-whet is a tame little owl, known to stick its head out of its tree den when a person knocks on the trunk. This tiny (about seven inches tall) owl was probably not a food item, or at least not much of one. Cut marks on the bone indicate that the bird might have been sought for its feathers.

Saw-Whet Owl

Other animals whose bones were found at the rockshelter include white-tailed deer, beaver, muskrat, woodchuck, rabbit, raccoon, dog, grey fox (possibly red fox too; it is very difficult to tell them apart by the bones alone), bobcat, and skunk.

Reptiles included four varieties of turtle, represented by more than 1,000 pieces of shell, many pieces of which were charred. Most abundant were spotted turtle and painted turtle, aquatic species that inhabit ponds, streams, and swamps. There were also a few pieces of wood turtle and box turtle, which are more terrestrial species.

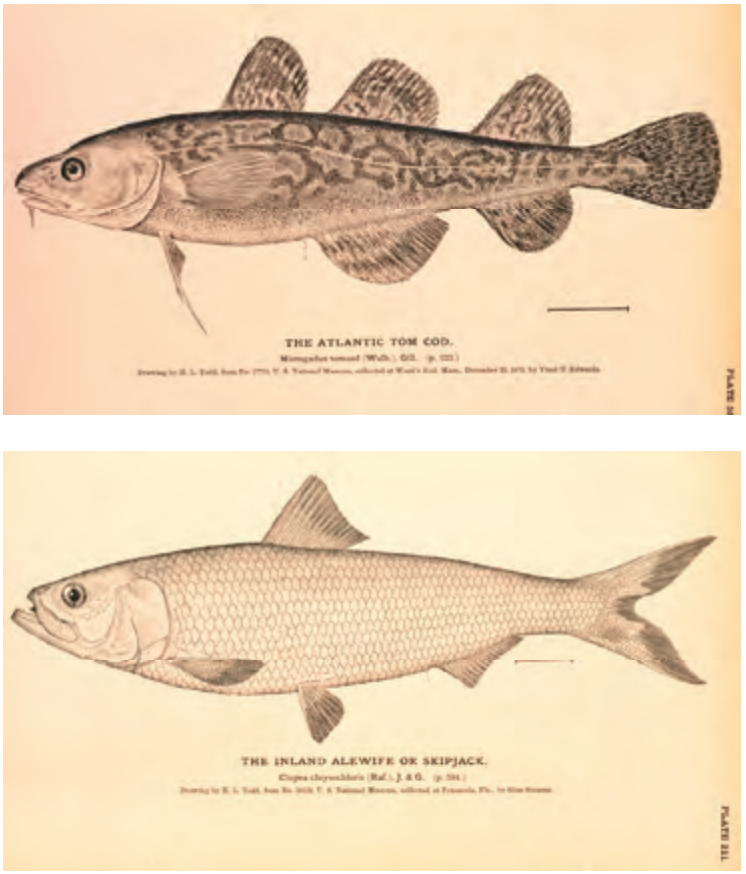
Among the excavated bones, scientists identified (clockwise from upper left) Spotted Turtle, Painted Turtle, Wood Turtle, and Box Turtle.

Fish bones were found from several species including tomcod, alewife, eel, brook trout, and perch. Compared to mammals, fish bones are tiny and easily overlooked in excavation or lost through the mesh of screens in the field. Nearly 90% of the fish bones were found in the water screened samples.

In addition to bones, there were a couple of fish scales, and many fish otoliths. The otolith (the name means “ear stone”) is not a true bone, but a small bit of calcium carbonate that grows in the inner ear of a fish, and helps the fish to sense its body position in the water. More than thirty of these minute structures were recovered. Tiny as they are, you can learn a lot from fish bones, scales, and otoliths.

Despite their small size (the scale is in millimeters), fish otoliths are loaded with information. The photos show the two distinct sides of one otolith.

For one thing, you can learn what species of fish were caught and eaten, and how important the different kinds were. At the Flagg Swamp rockshelter, almost all the fish bones that could be identified, were from tomcod and alewife. Eels, brook trout, and perch combined were represented by only a handful of bones and scales.



Atlantic tomcod (above) and alewife (below) would have been the “catch of the day” 4,000 years ago at the rockshelter.

The size of the bones and otoliths can also give an idea of the size of the fish (information that has always been important to fishermen). Most of the tomcod and alewife were small fish; there were only a few big ones. This probably means that they brought home all their catch rather than selecting only the largest; there was no minimum size for a "keeper" in those days.

Fish vertebra, scales and otoliths show annual growth rings, kind of like tree rings but much harder to see. The rings form because these structures grow faster in the summer and more slowly in the winter (just like tree rings). If you can get a good look at the outermost growth ring you can figure out what time of year the fish was caught (and stopped growing). This analysis requires a microscope. Otoliths have to be embedded in epoxy resin, after which a wafer-thin slice is cut, mounted on a microscope slide, and carefully examined. The results: the fish were caught in the winter.

In the field excavation and laboratory water screening the archaeologists were able to recover a few pieces of shellfish, mostly freshwater mussels and clams. Most of these had been partially burned; they had probably been baked. All were found at the eastern end of the shelter and might represent the remains of just one or two meals A few pieces of marine shell were also found, carried far from their place of origin. But these were not food remains; all had been shaped in some way. Two pieces of surf clam and a piece of quahog had been made into spoons or scoops, and a bit of marine snail had been fashioned into a bead. One of the freshwater clams had also been shaped into a fishhook.

More than 200 fragments of nuts were found in the field. Many more were collected from the water-screened screen residues and from the flotation of feature soils in the laboratory. Hickory nuts were by far the most abundant by weight. Much smaller quantities of hazelnuts and acorns were also recovered. Nuts are harvested in the fall, and can be stored and eaten through the winter, as long as you can keep squirrels and other rodents away. Perhaps dogs might have helped with this.

Nutshell fragments found at the site include (clockwise from upper left) hickory, hazelnuts, and acorns.

Nuts

Nuts have many uses apart from fattening up squirrels. Hickory and hazelnuts can be eaten raw or roasted, or they can be boiled to separate the delicious and nutritious oil, which can be skimmed and saved. Nut oil is a valuable food for people who do not have a surplus of readily available high-fat foods. Once the oil has been skimmed the remaining liquid can be drunk. The boiled nutmeats (now with reduced fat) can then be dried and ground into flour and baked like cakes. The remaining shells may have additional uses. Walnut shells can also be used to make a rich brown dye, and any dry nutshells can be used as fuel. This probably was the source of at least some of the charred nutshell fragments found in the pit features.

Acorns are perhaps the most abundant type of nut in the New England forest. Oaks are the dominant tree in southern New England's woodlands and have been for thousands of years. A mature oak can produce as much as 90,000 acorns in one year, so they are potentially an important food for people (as they are for squirrels, birds, deer, and other animals. But acorns are full of bitter and toxic chemicals called tannins, and they require a bit of processing before people can eat them. After crushing the acorns to break open the shells, the nutmeats can be boiled, soaked, or roasted. Sometimes they are ground into flour and mixed with ashes as part of this processing. After the tannins have been removed, acorn meal or flour can be formed into cakes and baked. Half of all the acorns at the site came from a single feature, which probably served as a roasting pit for acorn processing.

Almost all of these animals and plants could have been hunted or collected from within a mile of the rockshelter. In Flagg Swamp, literally at the shelter's front door, people could have trapped beaver or muskrat, and collected turtles. Turtles can be gathered in all but the coldest parts of the year. They spend the winter months dug into the mud at the bottoms and sides of marshes or streams, and could have been collected in late fall by probing along muddy watersides and digging out the turtles, which would be at their meatiest, having fattened themselves for the coming hibernation months.

Turtles were an important menu item at the rockshelter.

The hills surrounding the rockshelter were covered in forest, broken by a few small fields or clearings created by storms or floods. In these habitats the people could have hunted and trapped all the other fur and feather-bearing animals

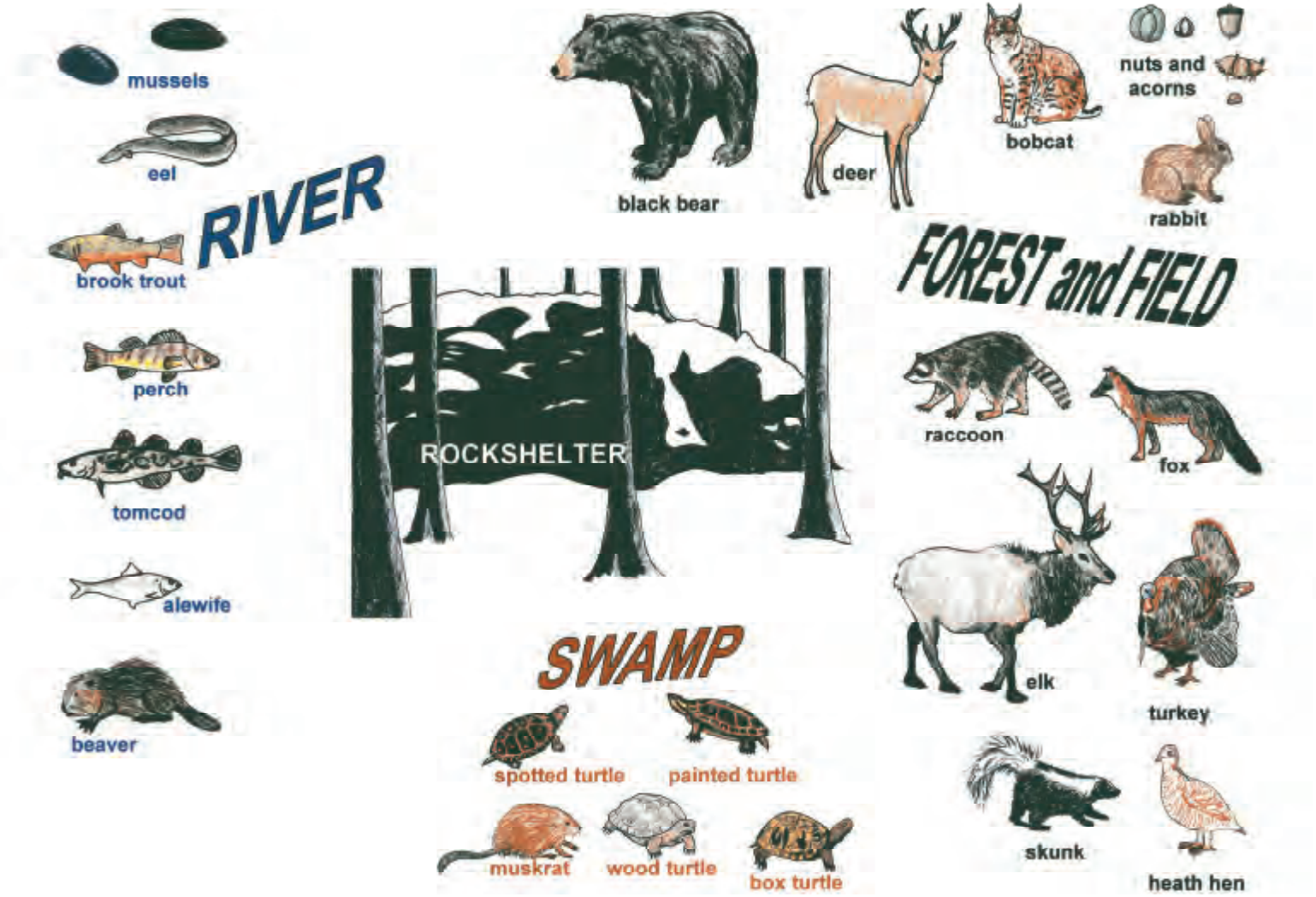
including deer, bear, elk, and birds. Some of these might also have been found in or around the swamp, or perhaps driven into its muddy ground or shallow waters, where they could more easily be speared. People would have gathered nuts and other plant foods in the forest during in the fall.

Less than a mile to the north of the rockshelter, the Assabet River winds through a marshy floodplain. The marshes surrounding the river held some of the same animals that live in Flagg Swamp: turtles and muskrats for instance. The river also holds freshwater mussels. The eel, perch and brook trout could be caught in the river or its tributaries. But what about tomcod and alewife? These are saltwater fish. How did they end up regularly on the menu at Flagg Swamp Rockshelter, more than thirty miles from the Atlantic coast?

The answer lies in the life cycle of these fish. Both species spend most of their time in shallow salt water off the coast. But, like salmon and other so-called “anadromous” fish, they swim up into freshwater streams to spawn. However, unlike salmon, which spawn in the springtime, tomcod swim upstream in the winter and spawn under the ice. Alewives spawn later, but may begin as early as February. Also unlike salmon, which don’t eat during their spawning run, tomcod feed voraciously in the chilly fresh waters. People could have caught them with hook and line through holes cut in the ice in the winter or with nets in the spring. Occasional perch, brook trout, or eels, would not have been thrown back either. The shell fishhook and stone line sinker found at the site were probably tackle for ice fishing. It isn’t really surprising that more fishing tackle was not found at the rockshelter. As today’s fishermen know, most fishing tackle ends up at the bottoms of rivers and lakes. Archaeologists usually find large quantities of fishing gear only at sites located right next to the water.

The fresh water clams and mussels were probably collected along the shores of the Assabet River. They are easy to find, and children could have collected them in baskets. Freshwater shellfish can still be found there today. You can see small heaps of the open shells on muddy riverbanks, sometimes surrounded by the tiny handprints of the raccoons or webbed feet of the muskrats who have dined on them. But you are not a raccoon or a muskrat, so please don’t eat them! They are not safe to eat in even the cleaner streams of Massachusetts; in particular, eating them raw can have swift and very unpleasant consequences. But four thousand years ago, water pollution was not a big problem.

Freshwater mussels like these were an occasional menu item at the rockshelter. They can still be found in many Massachusetts rivers and streams. These were collected from the Connecticut River.



From the rockshelter people went out to hunt, fish, and gather in river, swamp, forest, and field; each habitat had its own animals and plants. Animals with more than one habitat are shown where they were most likely to have been found in winter.

An Ancient Winter Home

Ice coats the branches of trees in a Massachusetts forest.

You have already read about some of the evidence that the Flagg Swamp Rockshelter was a cold-season home. When the results of all the specialist studies came in, the archaeologists looked at some different lines of evidence to see if they could make a strong case for whether the rockshelter was used only in winter, or at various times of year including winter.

The first piece of evidence that this was a cold-season site was its location and position. This was something the archaeologists noticed right away, when, digging in chilly fall weather, they felt comfortably warm in the rockshelter. Its south-facing ledges reflected the sun's heat and protected people from the cold northerly winds. With a little help from some poles, woven mats, and the stones arranged along the drip line, the shelter could be made very snug against winter weather. Of course, this doesn't mean that the rockshelter *couldn't* have also been used during the warmer months.

The south-facing wall of rock was like a solar collector, holding the sun's heat in the chilly days of winter.

Another important piece of evidence that this was a special cold-season home was in the kinds of plants and animals found here and the times of year in which they would have been available. Traditionally, mammals were hunted or trapped when they were at their fattest and when their fur was

at its thickest. That time of year is the late fall and early winter. Today's hunting seasons for deer and other game mammals follow this tradition; all are in fall and winter, apart from a part of the bear season in late summer. By spring, most mammals are less desirable prey; they are at their thinnest, and as the weather warms, they shed their thick winter coats. Although bears retire to dens for the winter, they can be active into early December and be hunted then, or attacked in their dens in early winter while they are drowsy but still fat. Of all the other mammals found at the site (elk, white-tailed deer, beaver, muskrat, woodchuck, rabbit, raccoon, fox, bobcat, and skunk) most are active through the cold seasons. Raccoons and skunks den up like bears, but only during the coldest part of winter; they are often active when there is a thaw. Only the woodchuck is a true hibernator, but they are available through the fall and are at their fattest just before hibernation (have you ever seen a woodchuck that *didn't* look fat?). All of these animals could have been hunted or trapped during the cold part of the year.

Bear and raccoon may be active during winter thaws.

The turkey and heath hen were not migratory birds and would have been active and available for hunting or trapping through the winter. Today, turkeys are often spotted in the cold months picking up spilled birdseed at backyard feeders. They are certainly also active and available during the rest of the year.

A turkey visits a Massachusetts backyard for some cracked corn.

Turtles can be collected in swamps, ponds, streams, and rivers from spring through fall. They do hibernate during the winter, and can be dug out of their hibernation burrows in muddy banks. This might be most feasible during the fall, just after the turtles dig in, when they are fatter and the ground above them is not yet frozen and snow-covered.

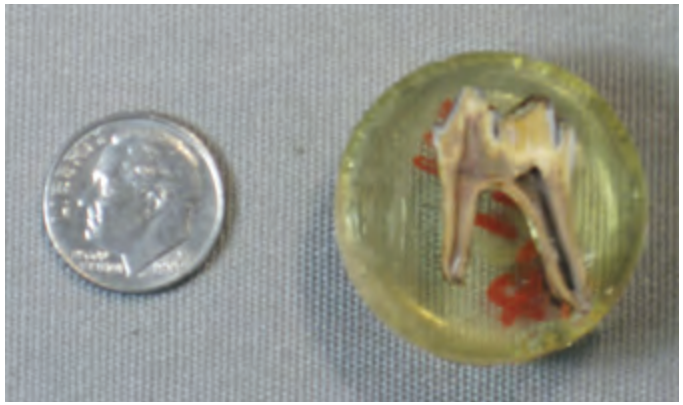
The fish are particularly good evidence of a winter occupation. The tomcod and alewives that made up the bulk of the fish remains are only available during the winter and early spring, when people can catch them through holes in the ice, or with nets once the ice has broken up in the early spring. The perch, trout, and eel could also have been caught while angling for tomcod and alewife and would have been added to the pot.

So the kinds of animals represented here strongly suggest that the site was occupied during the cold weather. That is the only possible time for catching tomcod in this area. The other animals are all cold-weather available to varying degrees, but are also around during the warm-weather months.

Careful analysis of the animal bones gave even stronger evidence that they were hunted during the winter. One of the bones was a piece of leg bone from an unborn deer. Deer mate in the late fall or early winter and the fetus grows and develops through the winter and early spring. The fawns are born in the late spring or early summer. The state of development of the fetal bone indicated that its mother was hunted sometime between midwinter and early spring.

Another of the deer bones was a lower jaw or mandible. Like humans (and other mammals) deer have baby teeth that are gradually replaced with adult teeth as the deer matures. Just like human children, who typically lose their front teeth at age six or seven, young deer lose certain teeth at certain ages. By examining the jaw and figuring out where the deer was in the tooth replacement sequence, the scientist can estimate the age of a young deer. This particular mandible was from a deer who was about six months old, which means that it was hunted sometime between October and January. Another deer was represented by a single tooth, a baby molar. But this was a well-worn baby tooth, which suggested that this deer was a bit older than the first and would most likely have been hunted between November and March.

Most of the deer represented by their bones at the site were not young deer. In fact they were judged (by the size of their bones) to have been somewhat larger than the average deer of today. Large adult deer don't have baby teeth, but their adult teeth do contain annual rings, something like those of trees. If the tooth is well preserved so that the outermost part is not eroded, the analyst can figure out the season of death. Two of the deer teeth from the rockshelter were suitable for this kind of analysis. One indicated a late winter-early spring kill, the other a spring kill, most likely late in the season. In summary, with one exception, all the skeletal evidence pointed to a cold-weather occupation.



This deer tooth is embedded in plastic resin and has had a thin section cut off for microscopic analysis of annual growth rings.

The fish remains also indicate cold-season activity. As already mentioned, the kinds of fish, and the analysis of the growth rings on bones, scales and otoliths all point to their being caught in the winter. The nut shells also indicate cold season, since these are harvested in the fall.

But if the rockshelter was occupied during the cold months, how, exactly was it used? What size group lived there? This wasn't too difficult to answer; it was not a very large living space. Really, there was only space for one or at most two families (even in a society where each child didn't have his/her own room!). These might have been extended families: married couples, their children, and one or more grandparents or other close relations, so it might have been a rather tight squeeze at times. That might not have been a bad thing in the winter; it would have been cozier. Since the potential living area was so small, the archaeologists wondered whether it

might have been used only as a hunting blind (where one or two hunters temporarily sheltered while they pursued game) rather than a family home. But the range of artifacts, the high density of features, and quantities of bones, indicated that the site contained the traces of a full range of activities representing all the members of the social group rather than just a couple of hunters.

If the Flagg Swamp Rockshelter was the home of a family for the cold season, then that raises some further questions. Like, where was the family the rest of the year? Where would other families stay during those long-ago winters?

Four thousand years ago in New England, people lived by hunting, gathering, and fishing. The environment of Massachusetts then, as now, is called a 'temperate forest.' To those of us who actually live here, it often seems more like the arctic in winter and a tropical forest in the summer, with occasional beautiful 'temperate' days in spring and fall, that help us forget about the extremes. These extremes of temperature and climate are reflected by the plants and animals which are abundant at times and scarce at others. People have lived in Massachusetts for more than 12,000 years, so by 4,000 years ago, they had developed an excellent system of coping with New England's seasons. In the spring of the year, people gathered in large numbers around waterfalls and other places where salmon, shad, and other fish could be gathered from rivers as they swam upstream to spawn. No need to cast a line; these fish could be dipped out by the net-full or trapped by the thousands in weirs: fences built into streams that channeled the fish into holding pens where they could be scooped out with nets. The quantities of fish would astound us if we could witness them today. People preserved fish by drying them over smoky fires so they could eat them for a long time after the fish runs ended.

In the spring, salmon (shown here) and other fish could be caught as they swam upstream to spawn.

Hypothesis Testing in Archaeology

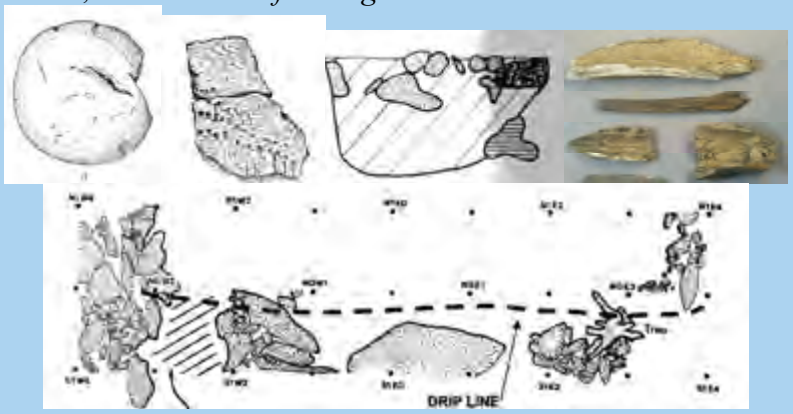
What makes archaeology a science is not high-tech methods like radiocarbon dating (much of archaeology is distinctly low-tech anyway; think shovels, trowels, wood-framed screens, and a flotation tank made from an old washing machine). It is the way archaeologists think up hypotheses (informed guesses) about the past and test them through careful observation and study of what they have unearthed. That in a nutshell is the scientific method. For example, the archaeologists wondered whether the Flagg Swamp Rockshelter was used as a hunting blind or a family home. They set up two hypotheses to test:

Hypothesis A: The shelter was a hunting blind

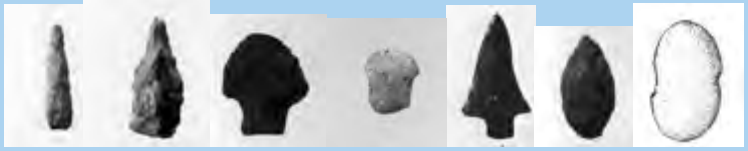
Hypothesis B: The shelter was a family home

Next, they thought about what they should expect to find and observe if each hypothesis were true, and what they should find or observe if the hypothesis were false.

If Hypothesis A were true they should have found only hunting-related artifacts, because it was only used by one or two people who were focused on one thing: hunting. Maybe they would have found some flakes from resharpening spearpoints or knives, maybe the remains of a fire or a meal from an overnight stay. If Hypothesis A were false, they should have found evidence for the activities of many people other than hunters, and evidence for long-term habitation.



If Hypothesis B were true they should have found evidence of the whole range of daily activities carried out by an entire family: men, women, and children. They should have found evidence of food preparation, food processing artifacts like milling stones, cooking pots, even facilities like firepits. They should have found more effort put into a longer-term shelter like the setting out of a row of stones along the drip line. They should have found a wide variety of tools including awls, scrapers, knives, and fishing tackle. If Hypothesis B were false, they should have found only a few types of artifacts reflecting only the activities of one or two hunters waiting to ambush prey, or at most, spending a night or two here: a smear of charcoal and ash rather than a carefully dug and refilled firepit, a thin deposit containing perhaps a few bones and stone flakes, rather than a thick organic-rich deposit containing a wide variety of bones, nuts, tools, and features.



Which hypothesis does the evidence support?

In fall, mammal hunting began in earnest. People sometimes got together in larger groups to hold game drives. They also gathered vital plant foods like hickory, chestnut, hazelnut, and acorns. Hunting and trapping continued into the winter, but people again had to spread out. This time they sought places that were protected from the worst of winter weather, like sheltered valleys, the lower slopes of sunlit, south-facing hillsides, and rockshelters. That's where the Flagg Swamp Rockshelter fit in the yearly cycle of movement and settlement. It probably wouldn't have been occupied every year (that might have made turtles or other important food animals or plants become too scarce), but it was probably considered a prime location for a small group.

The French explorer Samuel de Champlain illustrated a game drive by the Wendat (Huron) of Canada in the early 1600s.

Another question: if the shelter was so great, why wasn't it used as much after about 3,000 years ago? That is a good question, and we can't be sure of the answer. There is some evidence for use of the shelter after that time, just not very much. One possible explanation is that new foods became available that allowed people to stay together in larger numbers during the winters. People are sociable (most of us, anyway) and if we can, we prefer to live in larger groups (up to a point). After 3,000 years, great beds of soft-shell clams ("steamers") developed along the coast, and these could be harvested in huge quantities and preserved by smoking. This might have allowed people to spend the winter in bigger groups, but nearer to the coast. They might still have visited the rockshelter, but only to use it as a short-term hunting camp. Later, sometime after about 1,000 years ago, people in Massachusetts also began farming corn and other crops, which gave them even more kinds of storable foods and allowed them to live together in larger groups through the cold months of the year.

Champlain's map of Patuxet (now Plymouth) in 1605 shows dwellings surrounded by cultivated fields.

Archaeology + Imagination = Stories of the Past

Let's return to the question asked at the beginning of this book: What was life like here in the winter 4,000 years ago? Now that archaeology has given us some answers, we can really start to imagine life in Massachusetts 4,000 years ago. Archaeology is like a time machine in that way. It can be fun to try to tell a story about a winter's day in ancient Massachusetts, based on the archaeology, and your own imagination…

Little Owl awoke to the smell of roasting acorn cakes. He opened his eyes and peered out from his heavy bearskin blanket. Through the gloom of the shelter interior he could see Mother cooking breakfast. He watched silently as she deftly placed the patties on a hot stone next to the firepit. She stirred the heavy cooking pot that was set into the pit. From this pot came the mouth-watering fragrance of turtle soup. On a cradleboard propped up next to mother, wrapped in soft furs, Little Owl's baby sister slept soundly, a glistening spit bubble on her lips.

Outside the shelter, he could hear Father and Grandfather stamping around in the cold. Snow had fallen the night before, and the men were looking forward to hunting while the animal tracks were fresh. They had spent the later part of yesterday preparing darts, making sure the quartz tips were sharp and well-secured in the dart shafts, and resharpening their knives. Just before dawn, the men left, carrying their weapons and a pouch with some acorn cakes, and followed by their two dogs.

Although the cooking fire was small, it quickly warmed the small shelter. Little Owl got out of bed yawning, and helped himself to a cake and some turtle soup with a spoon made from a clam shell. He put on his cold weather clothing, including high leather shoes lined with dry grasses for warmth. Baby sister woke and began to fuss until Mother lifted her from the cradleboard and nursed her.

That morning, as they had on many other mornings, Little Owl and Mother walked around the margins of the swamp, checking their line of traps and snares, resetting them where necessary and collecting any animals that had been caught. Baby Sister came with them, riding in a carrier strapped to Mother's back, making chirping and cooing noises. This morning they were lucky; one of the snares held a fat turkey. Little Owl carried it home, very pleased with himself.

The day grew warmer. The snow melted off the mats that covered the shelter, and the mats dried thoroughly in the concentrated warmth of the sun, reflected back by the rock face. Mother decided they should open the shelter. She and Little Owl unfastened the mats and set them aside in a neat stack.

Little Owl helped Mother prepare the turkey. They plucked it and Little Owl saved many of the finest feathers in a basket. Then Mother cleaned it using a knife with a long triangular stone blade set in a wooden handle, and hung the bird over a tree branch, high enough so that the dogs wouldn't steal it. Then they gathered firewood.

Late in the afternoon, Father and Grandfather arrived home. They had not been able to make a kill, but they had seen tracks of elk, and were hopeful that they would soon be able to hunt the animal successfully—maybe tomorrow. Elk were very large and one elk would feed the family for many days. In the meantime, though, they were very pleased to see the turkey.

An ancient family portrait? An artist imagines a family and the snug dwelling they have built at the Flagg Swamp rockshelter 4,000 years ago.

Grandfather beckoned Little Owl to him. He knelt down slowly and reached into a pouch at his belt. “I have made something for you, Little Owl.” he said, smiling. He brought out a leather cord and placed it over Little Owl’s head. From the end of the necklace cord hung a small bundle of brown and white feathers, wrapped with a fine twine, in which small white shell beads were strung. “They are the feathers of a little owl.”

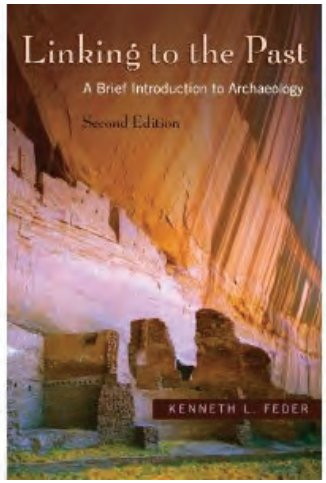
Little Owl’s face shone with pleasure. He excitedly jumped from Mother to Father, showing them his new gift. He even showed it to Baby Sister, who burbled happily and waved her little arms. Everyone laughed.

As she cooked their last meal of the day (venison stew from a deer that Father had hunted a week earlier), Mother looked up at the sky. “The weather is changing again,” she said. “We’d better cover the shelter.” Father and Grandfather, with Little Owl’s help, reset the poles and secured the mats. The evening, inside the warm shelter, by the dim light of the dying fire, Little Owl fell asleep to the soft sound of snow falling on the roof and Grandfather’s snores.

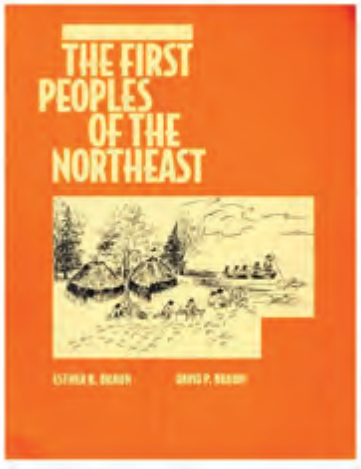
For Further Reading

If you would like to learn more about the Flagg Swamp Rockshelter, there is more information in an article in the *Bulletin of the Massachusetts Archaeological Society* Volume 67(1) 2006. This was written by Shirley Blancke and Arthur E. Spiess (Spiess did some of the original analysis of the mammal bones from the rockshelter), and is titled: "The Flagg Swamp Rockshelter, Marlborough, MA: A Summary." The article is written for archaeologists, and has many particulars about the site and its contents.

If you would like to learn more about how archaeology is done, there are many excellent college-level textbooks on archaeological methods. One of the best, in my opinion, is *Linking to the Past* by Kenneth L. Feder, published by Oxford University Press in 2008. It is an engaging read and draws many examples from New England archaeology.



If you would like to learn more about the ancient Native American peoples of Massachusetts, a good place to start is the book titled: *The First Peoples of the Northeast*, written by Esther K. Braun and David P. Braun, published by Moccasin Hill Press in 1994. This is an excellent introduction to the archaeology of the region for the non-archaeologist.



Acknowledgments

This publication was made possible through Transportation Enhancement Program funding provided by the Federal Highway Administration (FHWA) and Massachusetts Department of Transportation (MassDOT) under an Interdepartmental Service Agreement administered by John Rempelakis, Archaeological Resources Supervisor at the MassDOT and Brona Simon, Massachusetts State Archaeologist and Executive Director of the Massachusetts Historical Commission, a division of the Massachusetts Secretary of State, William Francis Galvin, Secretary of the Commonwealth

Many people worked hard to make this research project succeed, and all deserve thanks. Let me begin by thanking the original staff and crew of the Institute for Conservation Archaeology: Michael Roberts, director; Russel Barber, Research Director; Frederick Huntington, Project Director; and Scott Andrus and Amy Gazin-Schwartz, Laboratory Supervisors. They hired me for my first professional archaeological jobs in Massachusetts, and enabled me to participate in and contribute to some very special projects, including, of course, the Flagg Swamp rockshelter excavation. I would like to thank all the field and laboratory crew who participated in all three phases of archaeological research at the rockshelter: Byron Borck, Jeffrey Clarke, Ann Davin, Amy Gazin –Schwartz, Peter Gordon, Tonya Largy, Gretchen Neve, Martha Prickett, Debra Randall, John Rempelakis, Joanna Roche, Fernando Sanchez, and Laurie Weinstein. I hope I have not left anyone out!

The specialists whose analyses brought out so much important information included Scott Andrus (fauna), Russell Barber (fauna, lithics), Edna Feighner (fauna), Joyce Fitzgerald (soils), Mark Hedded (fauna), Joanna Roche (flora), Rosemary Smith (lithics), and Arthur Spiess (fanua).

Mitchell Mulholland developed the computerized archaeological data recording system that was used in the excavation.

Original graphics for the Flagg Swamp rockshelter reports, some of which are reproduced in this booklet, were produced by Nancy Lambert-Brown.

Thanks are also due to Valerie Talmage, who was the Massachusetts State Archaeologist at the time of the Flagg Swamp rockshelter excavations. Her support and impeccable judgment were great benefits to the archaeological research

For this booklet, I would like to especially thank Brona Simon, who provided valuable insights, guidance, and encouragement. Ed Bell, senior archaeologist at the Massachusetts Historical Commission, read an early draft of the booklet and offered many helpful suggestions. Jennifer Poulsen was incredibly helpful in locating artifacts, photographs, slides, and documents associated with the dig, all of which are now curated by the Massachusetts Historical Commission in the State Archives Building in Boston. I have also benefitted from recent conversations about the project with Amy Gazin-Schwartz, Mitchell Mulholland, and Rita Reinke.

Many thanks also to Frederica Dimmick, President of the Massachusetts Archaeological Society, who graciously permitted the reproduction of William Fowler's superb drawing of ancient Native American ceramic pots.

Any errors, omissions, or other shortcomings are my own responsibility

Eric S. Johnson, Amherst, Massachusetts, August 2011

Photograph/Illustration Credits

All illustrations and photographs are by the author except as noted below:

Page	credit
5 (lft)	University of Massachusetts-Amherst Archaeological Field School
6	Institute for Conservation Archaeology (ICA)
7	pot photo by Massachusetts Historical Commission, bone photo by University of Massachusetts-Amherst Archaeological Field School
8	ICA
9	ICA
12	ICA
13 (rt)	ICA
14	Nancy Lambert-Brown, ICA
15	ICA
16	ICA
17	ICA
18	ICA
21	Nancy Lambert-Brown, ICA
23	Nancy Lambert-Brown, ICA
24	Nancy Lambert-Brown, ICA
25	bear skull photos by ICA, black bear photo by Steve Hillebrand/U.S. Fish and Wildlife Service (USFWS)
27	T.C. Fitzgerald, Massachusetts Historical Commission
33	Nancy Lambert-Brown, ICA
35	Nancy Lambert-Brown, ICA
36	drawings by Nancy Lambert-Brown, ICA
37	William S. Fowler, "Ceremonial and Domestic Products of Aboriginal New England," *Bulletin of the Massachusetts Archaeological Society* 27(3&4):52 (1966). Used with permission of the Society.
38	elk photo by Gary Zahm/USFWS
39	turkey photo by Steve Maslowski/USFWS; heath hen photo by Luther C. Goldman/USFWS
40	saw-whet owl photo by Gary M. Stoltz/USFWS, spotted turtle photo National Oceanic and Atmospheric Administration's Estuarine Research Reserve Collection; painted turtle: John J. Mosesso/National Biological Information Infrastructure (NBII); wood turtle Trishia Shears
41	otoliths, ICA; tomcod and alewife drawings by H.L. Todd/ NOAA Historic Fisheries Collection
43	turtles on a log: Charles H. Warren/NBII
46	rockshelter photo ICA
47	bear and raccoon drawings by Bob Hines/USFWS
49	salmon jumping painting by Robert W. Hines/USFWS
50	drawings and b&w photos Nancy Lambert-Brown, ICA
51	drawings by Samuel de Champlain, coloring by the author
55	ICA

This Report was Supported by the Federal Highway Administration