Stalking The Wild...

The Magazine of Outdoor Discovery

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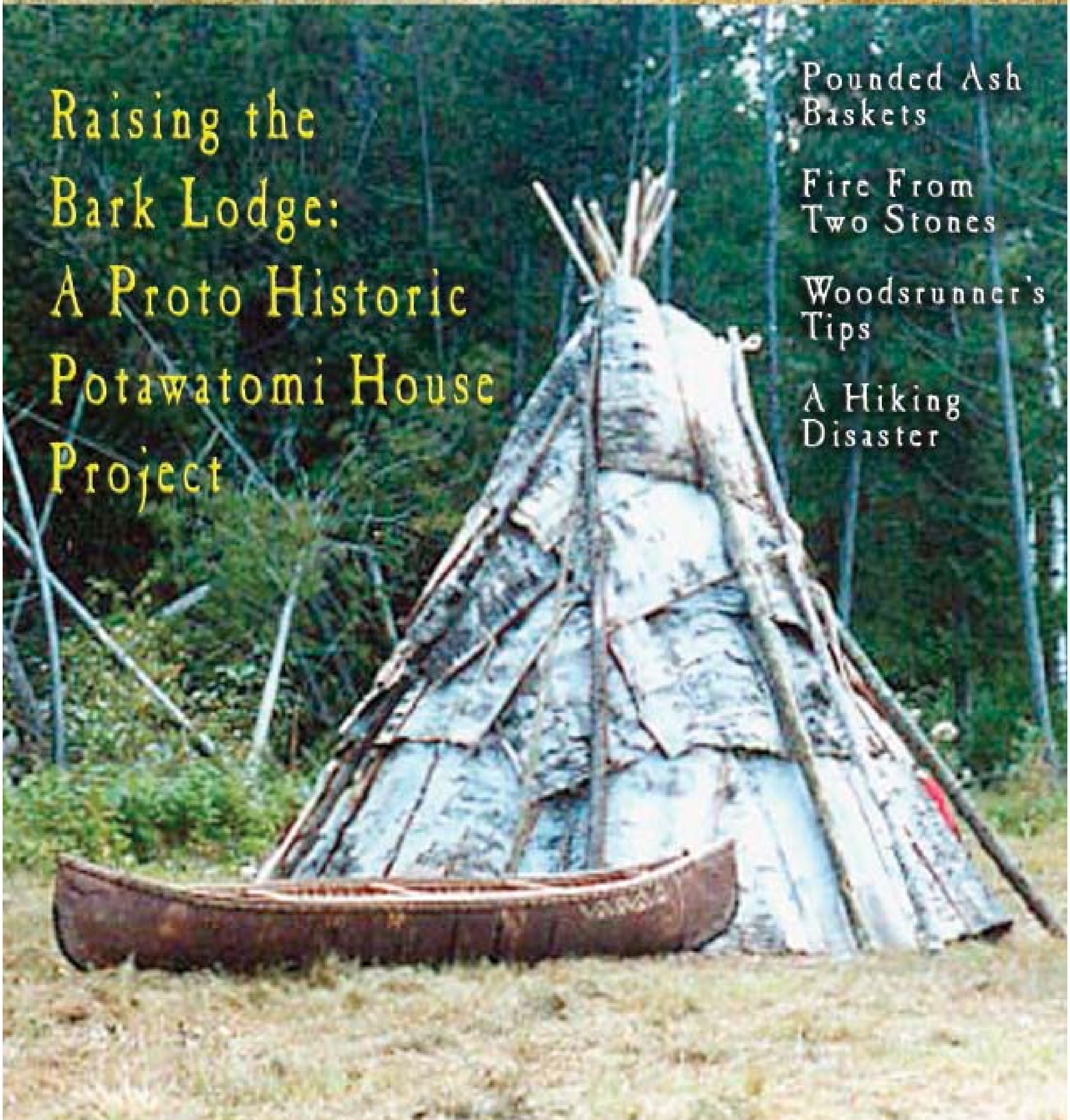

"Stalking the Wild..."

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In This Issue

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is a quarterly publication dedicated to the preservation of the skills of our ancestors. Article submission is welcomed and encouraged.

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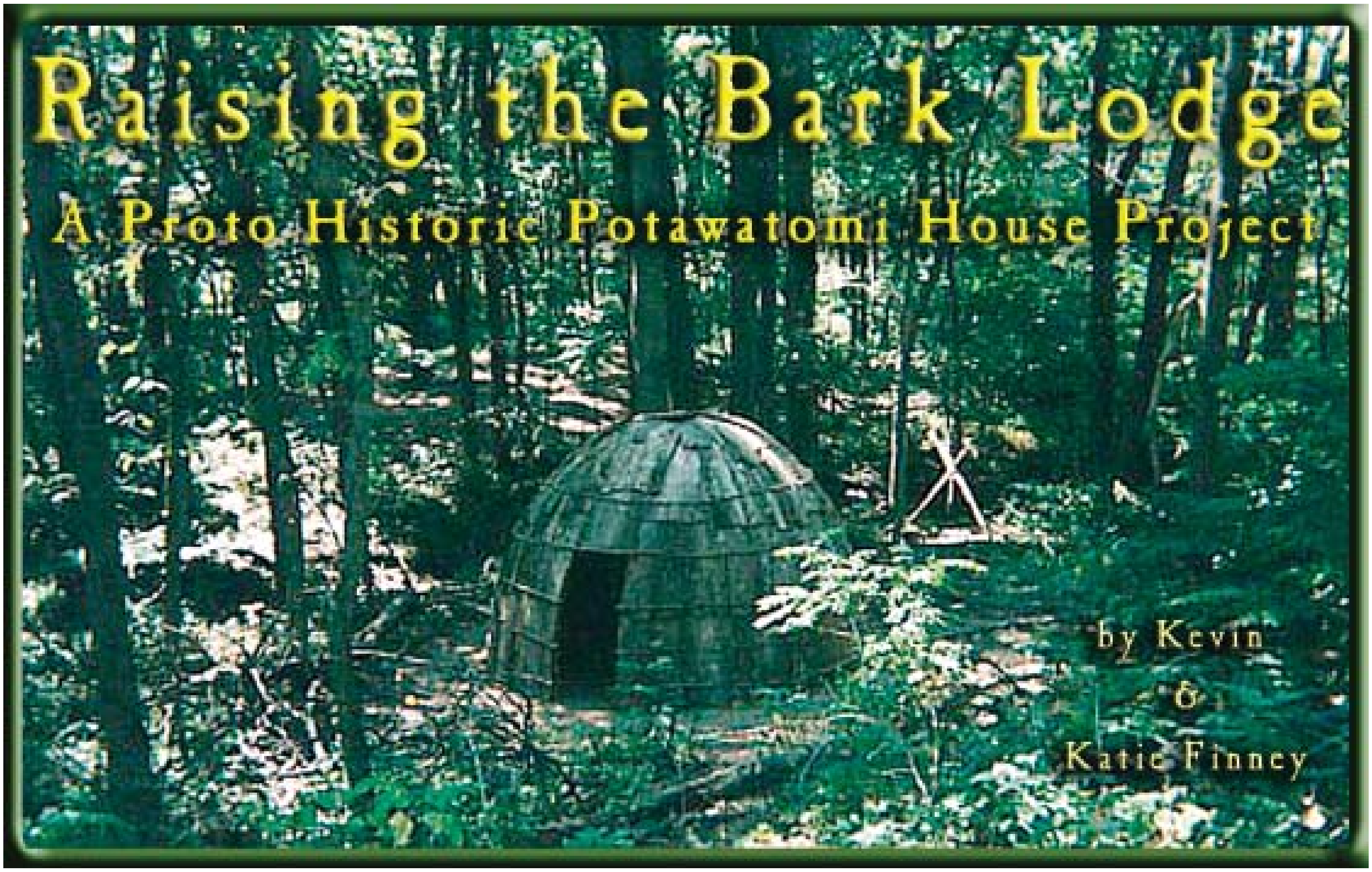

The story in the following pages is one of animating something from our distant past. It is a tale of one of our grand adventures in the realm of primitive arts, the sort that always seems to be laden with innumerable twists and turns, yet when hardened with a bit of determination is the type of challenge that is dotted with rich experiences and leaves one with as many new questions as answers.

In July of 1999, my wife Katie and I were contracted to construct a bark lodge for a historic site in Western Michigan. The park, which already housed a nineteenth century farm village and small museum, wanted to expand its education programs to encompass Native American culture and prehistory. A state history grant was received to make funding the project possible.

Historical and Cultural Context

The first step in the project was to find the appropriate historical and cultural focus for the structure and educational program. Having about 11,000 years of cultural history to choose from, it was evident that we would need to select a focus that was both appropriate to the location and sufficiently documented so that we could accurately recreate both traditional structures and other aspects of village life. To begin our search we examined a number of local historical documents and narratives, along with inspecting an extensive collection of artifacts recovered from the park property.

The site of the park, on the scenic Thornapple River, has had a long history of Native American occupation. During the early 1830s, the location was home to the Matchepenashewish Band of Potawatomi and a small mission. More interesting to us were the large quantities of lithics and potsherds recovered from the grounds, evidence of much earlier occupation. While milling through the park's collection of artifacts, a particular piece caught my eye. It was a gallon-sized clay pot in almost perfect condition. The style of the vessel was definitely the same as those recovered at Potawatomi sites in both Michigan and Wisconsin, which dated to the period just prior to European contact. We now had a context for our structure: about 1600 A.D. Potawatomi.

Before starting work on the project, we had business to attend to in the Western Upper Peninsula. While we were traveling we did a great deal of research. Fortunately, the time period and context we had chosen provided us with a great deal of source material allowing us to utilize both archaeological evidence and early ethnographic accounts.

Southwestern Michigan, the prehistoric estate of the Potawatomi, is located in the northern portion of the Carolinian biotic province, a region dominated by oak-hickory forests and scattered with a few small prairies. The Thornapple River, where the park is located, lies in the northern part of this region close the transitional zone between the Carolinian and Canadian biotic provinces, offering both northern and southern forest resources to its native inhabitants. The close proximity to Lake Michigan provides relatively cooler summers and warmer winters, along with increased precipitation and a 160-day growing season, both of which were of importance to native agriculturalists.

The Potawatomi subsistence pattern utilized a mixed economy of hunting and gathering and small-scale agriculture. The Potawatomi commonly abandoned crops at mid-summer to hunt buffalo south and west of Lake Michigan. Inhabitants then returned by late summer for harvest. Potawatomi villages thus served as a form of permanent base camp from which seasonal hunting and foraging expeditions were launched. Ethnographic data suggests average villages were home to between 50 and 300 individuals, and possibly 10 to 60 lodges. These permanent structures were dome-shaped, constructed of bent sapling frames and elm bark shingles, or at times covered with insulating mats of stitched cattail leaves. Evidence also suggests some Potawatomi villages were pallisaded for defensive purposes. Post molds from a few archaeological sites imply that benches or platforms may have existed inside the lodges to serve for sitting, sleeping and working.

We decided to build our house approximately 15 feet in diameter, large enough to house a moderately sized paternal family group. The ceiling height of the shelter would be 13.5 feet, high enough to theoretically keep smoke out of the eyes. An additional external sapling framework would also be added, as we had observed these among many photographs of nineteenth century Potawatomi domed shelters. As elm bark is no longer available in any decent quantity or quality due to Dutch Elm Disease, we opted to use northern white cedar bark instead, as it is somewhat similar in both consistency and flexibility. Internal platforms would be added to serve as sleeping benches and provide storage below. Upper shelves would also be added for additional storage space for clothing, baskets, tools and other items.

Selecting a Location

The next step in our project was to locate a village site. Our goal was to find a sheltered spot on the 250 acre property with access to a few important natural resources. The location we chose was a small valley about 400 yards north of the river (*figure 1*). The site contained a good flowing spring for water, was well sheltered from harsh winds and weather, and its distance from the river would make it a less obvious target for neighboring hostile bands. The forest at the site was

Fig. 1 Selected house site

primarily maple and hickory with a few large walnut trees. The mature maples would be useful for spring sugar production, while the abundance of long, straight, young saplings would serve for structural framing material. The walnuts and hickories would provide a valuable harvest of rich nuts in the fall. Black raspberries, gooseberries, spicebush and many other useful food plants were also abundant, as were deer and wild turkeys. One hundred and fifty yards north of the

Fig. 2 Katie separates the inner bark of basswood for lashing material.

Fig. 3 Kevin lashes vertical arches together

site was a level plain of upland sandy loam suitable for agricultural use.

Frame Assembly

The actual construction began on August 14, 1999. We began by clearing away sticks, debris and ground cover until we had exposed a clean dirt floor. Next we began cutting 2 to 3 inch diameter maple and hickory saplings for the house frame, and peeling basswood bark for lashing material. The basswood bark was removed from 4 to 6 inch diameter trees in long strips. The fibrous cambium was then separated from the hard outer bark to be used for lashing. (*Figure 2*). The main four arches of the frame were made of Shagbark hickory, whereas the rest were made of sugar maple. Ten vertical arches were used for the frame. They were strengthened at the base with additional stakes, and lashed together with the inner bark of basswood (*figure 3*). Five horizontal rings, approximately two feet apart, were then attached to complete the frame (*figure 4*). Five eight hour days were used for site preparation and frame construction.

Fig. 4 Horizontal rings added to the vertical arches for additional strength

Locating a Bark Source

Our next step was to obtain bark for a covering. I have learned from past experience that this is the most challenging aspect of house construction. A large number of sizable trees are required to cover a lodge. While forest resources may have been easily obtained by lodge builders 600 years ago, it is not so for their modern counterparts. By my estimation our house would require 70-80 cedar trees worth of bark. Furthermore, we had only a limited window of time to harvest, as the bark can only be removed during the season when the sap is flowing in the tree This is usually between early June and mid-August for cedar, but may vary depending upon a season's weather and rainfall. Removing the bark kills the trees, so we only harvest our bark from logging sites where the bark would be inevitably destroyed by logging machinery. Our situation, however, was additionally complicated by the fact that cedar often grows in damp, soft-soiled areas, so most loggers cut cedar in the late fall or winter when the ground is more solid. We had only a week or two to find a large cedar cut, a difficult feat in August. Even if we did locate a source for bark, we could not ensure that the bark would still be removable.

I made a number of desperate phone calls and after a few days and a great deal of frustration I was lucky come across an Amish logger who was cutting cedar throughout August on the Georgian Bay. Our plan was to first attend our favorite primitive skills event, the GLP Fall Gathering on Bois Blanc Island, then to proceed to Canada for our bark.

As the event came to a close we were confident that our journey was ready to continue without further complications, so we sort of puttered around until just before we had to leave to catch our ferry to the mainland. Quickly packing the rest of our gear into our rust-tattered "adventure van" we took off at the last minute, and shot down the rocky trail like huge, rusty, bouncing bullet skipping across the forest floor. I had often bragged that our old, spray-painted Chevy was really an SUV in disguise. Then it happened. With ferocious momentum, the old iron beast was tossed upward and came thundering down to a crashing halt. Dazed and a bit battered, we pulled ourselves off of the floor and climbed out to catch our senses. It was a horrifying sight. Like a rusty monument, she sat half perched on a large limestone boulder, her front wheel hanging limp and crooked.

It was one of those rare moments when you just cannot seem to catch the gravity of the situation. We thought we were sunk! Our van was hung up on some rock on a rustic island in the middle of Lake Huron with a busted ball joint. For the price of towing it back to the mainland and repairing it, we might as well have bought a new one.

Fig. 5 Two horizontal cuts are made in the bark and connected by a long vertical cut

It looked as if our bark house would remain uncovered until the next summer; but then something miraculous happened, divine intervention if you ask me.

Katie and I were sitting up at the island store (the only store) talking about our options when the owner Jeff stepped in. He found us an island local to fix the ball joint on site with a generator. He also provided us with his old Suburban to get around. Most amazing of all, he introduced us to a friend of his who was cutting cedar on the island. We could peel all the bark we wanted for free!! A friend of ours was also kind enough to allow us the use of the shower in their cabin during our stay. To make a long story short, we got paid to peel bark for a week while stranded, quite comfortably, on a beautiful forested island, and in the process had a wonderful time. To top it all off, the ball joint only cost us $150.

Harvesting Bark and Root

In five days we peeled 85 12 to 20 inch diameter cedar trees and gathered about 500 feet of spruce root for lashings. The bark was removed by the use of long spatula-shaped spuds we had fashioned from sugar maple (*figures 5 to 7*). The cedar sheets were pressed flat then portaged out to the van at the end of the week. The roots we gathered were from Black Spruce. Roots about the diameter of a pencil were selected. They were carefully pulled from the mossy soil at the forest's edge then put to soak to keep them flexible until later use (*figure 8*). We spent a total of five days on the island harvesting bark and spruce root.

Covering the Frame

When we returned to the house frame Katie began boiling, peeling, and splitting the spruce root, and I set about cutting thin, maple sapling for the external framework. The process of preparing roots continued throughout the attachment of the bark covering. Bark panels were placed around the base of lodge, overlapping at the edges. External poles were placed horizontally over the bark then clamped to the internal frame with spruce root at intervals of 5 to 8 feet (*figures 9 and 10*). The process continued around the lodge from the bottom up. Thick pieces of bark were used for the bottom of the structure while the thinner, more flexible pieces were added on top. Adding the covering was a long, tedious process. We used 83 of our 85 sheets of bark. The two extra sheets were used shortly after the lodge's completion, to patch a hole created by the park's director when he rather mysteriously fell through the structure's roof. A total of five days were needed to attach the bark and two days to prepare the spruce roots. Small holes

Fig. 6 the edge of the work is gently worked loose from the tree

and cracks in the bark were sealed with spruce pitch

Fig. 7 A spatula- shaped maple spud is used to remove the cedar bark from the tree in a large sheet

tempered with charcoal. We used half of a #10 tin can's worth of pitch for sealing. Preparation and application of the pitch took a little less than one day.

Benches and Shelves

The final phase of construction was the addition of benches and shelves. These were added to three sides of the house, leaving a square, open dirt floor around the hearth. By this time a great deal of our energy went into locating, cutting and halving thin saplings, as we had more than exhausted our immediate source. All the bench and shelf saplings were lashed to supporting framework for sturdiness. I had greatly underestimated how labor intensive this phase of construction would be. My estimate was about a day and a half, but in actuality this step took us four days to complete.

Conclusions

The project also taught us much about the quantity of forest resources needed to establish and maintain a prehistoric settlement. Our house, being 15 feet in diameter, would have been on the larger side for a domed lodge of this period. The chart below refers to average house size as 12 feet in diameter (approximately 80 percent of the size of our house) at an average of 5 persons per household.

The calculations above illustrate the massive amount of saplings and mature trees for bark required to construct and maintain a sizable village, especially considering that this chart does not include cook houses, open-sided work shelters, menstrual houses and the additional religious or community-maintained structures commonplace in early historic Indian villages. For us, this painted a very interesting picture of the environment surrounding permanent village sites. Acreage directly surrounding such a settlement would certainly be clear of young saplings and much undergrowth. Large clearings from bark harvesting would also be present within close proximity to the village. These were most likely incorporated into the process of clearing land for agricultural use. Furthermore, it must be considered that the depletion of such resources over time at a sizable village site would be inevitable. Thus, villages would be forced to relocate at intervals of every decade or so. It is interesting to note that these land use patterns are consistent with both ethnographical and archaeological

Fig. 8 Spruce roots are carefully pulled from the mossy soil edge if the forest

data for this region.

Native American communities probably chipped in with collective labor for larger tasks such as shelter

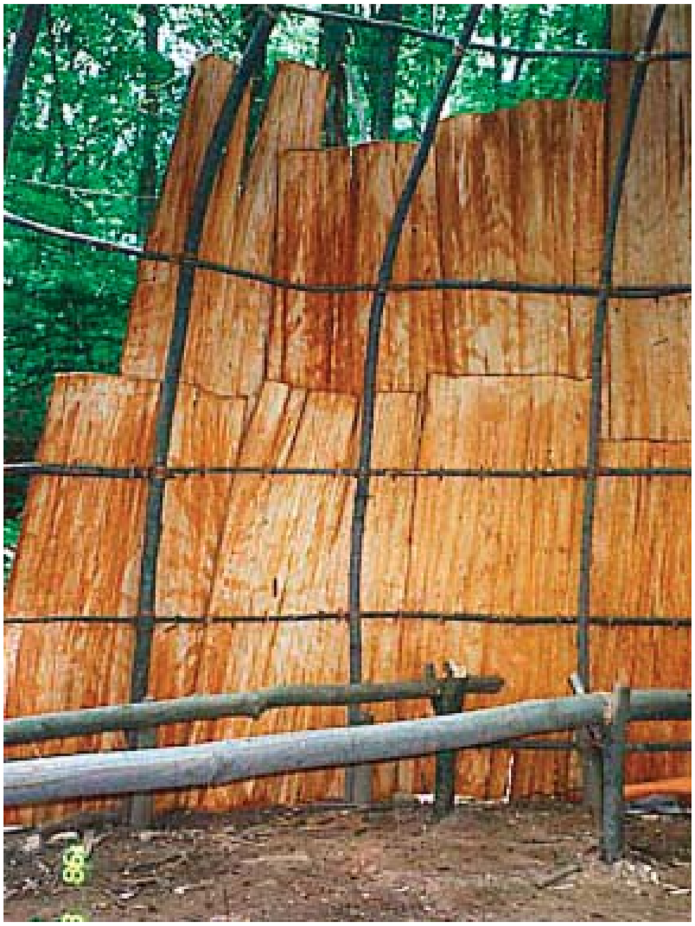

Fig. 9 External poles are used to secure the bark to the inner framework

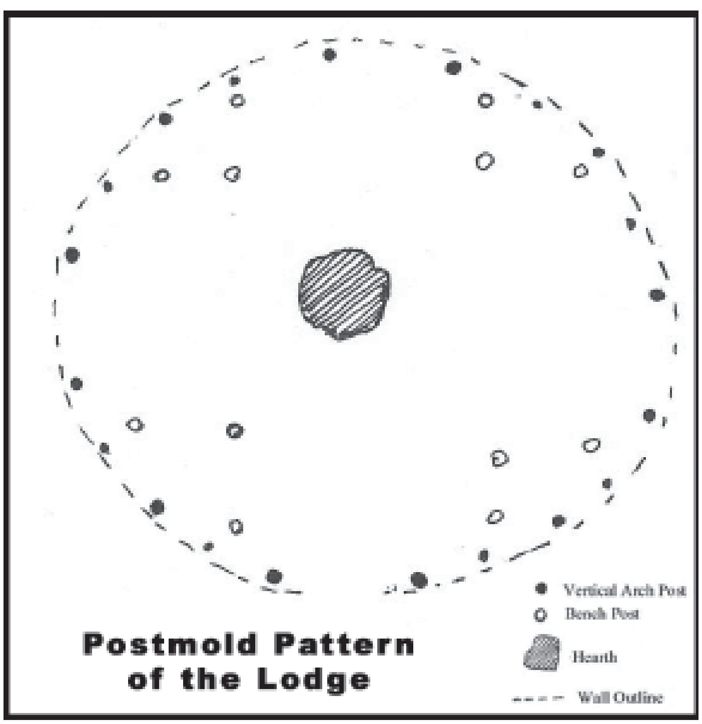

Fig. 12 A diagram of the post mold patterns

Fig. 10 Note the spruce root clamps at regular intervals along the lower two rungs

construction. On the other hand, for two people with a few Stone Age structures under our belts, the project required a total of 352 combined hours or 22 days to complete. Due to our limited time frame and public

Fig. 11 The completed house

funding we could only use a sampling of stone tools. Most of our work was done with steel hatchets, knives and awls. Assuming our limited experience made up for the slightly lower efficiency of stone tool usage, we estimated that a group of five adults and three children could accomplish the same task in a little under a week's time. However, if a communal effort of 15 adults and seven children participated, a similar structure might be raised in only two and a half days.

Our higher ceiling theory also proved to be somewhat correct, as this structure was a bit less smoky than other domed structures we have built. We also found that by keeping the fire burning well and the doorway covered the smoke seemed to exit more politely. Still, it was smoky by most people's standards. Like native people in the past I suppose, we just got used to it, and walked around smelling like we lived in a chimney.

The Finished House

When the covering was all added and the structure stood complete we thought it proper to invite as our first guests Kit and Steve Pigeon, friends of ours from the Matchepenashewish Band of Potawatomi. They were dually impressed. They felt both honored at the memory of their ancestors and pleased at the beauty of the lodge. As we sat inside we all marveled at the crisscrossed poles against the golden bark, the gentle curvature of the walls and the way the sunlight poked through the smoke hole and danced upon the floor. To us the house was more than a learning experiment, it was a beautiful, symmetrical and enchanting piece of art, a sort of doorway to our distant past.

Katie and I spent the next few days living in the house complete with all period gear. The flickering firelight against the cedar wall and ash baskets on the storage shelves above our heads lulled us to sleep in our bed of soft hides. There is something less tangible one gains from such experiences, maybe it is a feel for the essence of days long past or perhaps simply the reward of surrounding oneself with the functionality and beauty of simple things; but it was something we knew that all who visited would experience.

In the months ahead the house would be alive with young children, transported back in time 400 years. They would cook lunch over an open fire, gather water from a bubbling spring, and harvest wild foods from the surrounding woods. They would travel through wooded trails to observe the old ways of trapping and bubble with warmth and anticipation as they sat around the fire and heard the stories told here before. It would be a living classroom where students could fill their imaginations and learn through direct experience about the native people who lived here long ago.

# of Domed Structures per Village	# of Saplings Required	# of Trees for Bark Required
1	160	66
5	800	330
20	3200	1320
50	8000	3300
100	16000	6600

Pounded Ash Baskets

by Michael J. Aldridge

Need a basket? Make one. That statement in itself brings to mind thoughts of trudging through the woods for hours looking for just the right White Oak tree. If you do find one that will work, now comes the chore of getting a froe, axe, maul and wedges and then spending hours making splints. If you want an easier, more primitive way to make baskets, why don't you give pounded ash a try? Pounding ash for baskets is a more primitive way, the trees are easier to find and it works down into strips or splints with less effort.

Most material written on ash baskets mention using Black Ash (*Fraxinus nigra*). Although Black Ash is the material of choice, there are others trees that will work almost as well. White Ash, although not as supple and harder to pound, makes a functional, sturdy and attractive basket. White Ash is found from Nova Scotia and Southern Quebec down into Florida and Texas.

Although White Ash works best here in the South, you may live in an area that does not have suitable trees. If this is the case, there are other trees you can experiment with for basket material, such as Sassafras, Black Elm, White Maple, Swamp Maple, Northern White Cedar and Poplar. Give these a try; it is not as complicated as it seems.

Pounding Ash

Begin by choosing a straight tree with little or no twist. Try to find one without limbs for six to 10 feet (depending on the length of splint you want) and six to ten inches in diameter, as this will give you the most splints. Knots to some degree are all right although they do require a little extra effort. Unlike White Oak, these knots can be dealt with and does not prevent the ash from being used.

If you cut the tree in the spring, begin by removing the bark and cambium layer down to the sapwood. This can be done with a drawknife, axe or machete and at this time of the year the bark is easily removed. If you cut the tree in the summer or winter, it will need to be soaked in a pond or stream for about two months to soften the fibers.

Start at the butt end of the log and begin pounding. This can be done either with a wooden maul or a sledgehammer. If you use a sledgehammer, be extremely careful or you will break the fibers. Try and hit the tree straight on and don't let the edge of the hammer hit first. Some writers suggest striking the end of the log diagonally to separate the layers but this is not necessary.

Move along the length of the log, pounding with the maul or sledgehammer and slightly overlapping the previous blow. Be sure and follow the grain and if you see it twisting off in another direction, just follow it on out. Once you reach the end, reverse your direction and pound back over the same area you just pounded. If you encounter any knots, give them an extra blow or two. The first layer will require this second pounding while succeeding layers may not require more than one pounding. The whole purpose of pounding is to crush the springy growth layer (the dark brown, narrow, porous ring of growth). It is this porosity of the growth ring that causes ash to work so well for pounding out splints.

As you pound, the growth rings will begin to crush and the strips to separate. You may need to initially help this process by taking a knife and lifting the end of a strip, but they will begin to peel apart on their own after that. Pull up strips one at a time and as more layers are pounded you may be able to remove two or three layers at a time. You might find it helpful to score the log in order to keep the splints an even width. As you pull, watch for tight spots, which may require a few extra blows to loosen. If you work on a log over a long period of time, it might be necessary to periodically soak the log to prevent cracking.

Splints work best when used fresh from the log. However, if they aren't needed for immediate use, you can roll them into coils and store in a cool shady place. It will not harm the splints to store them soaking in water. Be sure and change the water daily to prevent the growth of algae. Trim the wet splints with shears or a knife into the width you want. To

finish the splints, lay a piece of leather across your leg; place the splint on top of this, hold a knife blade perpendicular to the splint, and pull the splint. This scrapes, thins and smooths it.

Some splints to need to be thinner to make them easier to work with. To thin strips, which can be as much as a quarter of an inch thick, score across the grain one half the thickness of the splint about one inch from the end. Bend down the tab that was formed and pull apart by using your fist as a vice. Let your thumbs do the work of separating the splint. If the splint starts to run off-center, put more pressure on the thicker piece until it centers up. This splitting can be done as many times as needed to thin and divide the strips to a usable thickness. This also results in giving you satiny smooth splints to work with. Roll up the splints and place in water unless you are going to use them immediately.

Weaving The Basket

To weave a simple rectangular basket, lay out six one-inch wide splints parallel to each other. Weave a strip in and place to one side of the center. Weave in three more splints using the over and under weave.

Place a straight edge along each side of the base and push the spokes up against it. This makes bending the spokes up easier.

Add the first weaver. Weave over and under starting at one corner, going all the way around the base and coming back around to the starting point. Keep the weaver tight, especially around the corners. This will help make the spokes stand up. You need to split the first corner spoke in half to get an odd number of spokes. This is a critical step in the weaving process. Continue weaving over and under snugging each new weaver against the last one. Treat the split spoke as being two separate spokes. If you need to add weavers, overlap the new weaver over the old one and tuck the end under the closest spoke.

Before the last round, you will need to taper the weaver so that its width decreases. End this weaver at the split spoke. Tighten all weavers down starting with the bottom weaver and push towards the bottom of the basket.

Cut all the spokes on the inside of the weavers off at the weaver. Score the outside spokes above the weaver. Soak the top of the basket long enough to soften the spokes.

Bend the tabs of the spokes and tuck under the third weaver down.

Measure the circumference of the basket and cut two splints one and one half inches longer. Start at the split spoke with a thin narrow weaver. Place one splint inside and one

splint outside the basket. Using the weaver, lash the two narrow splints to the top of the basket. When you reach the start, reverse and lash back around. Tuck the end of the weaver under a spoke cut off inside the basket.

You now have a complete, ready to use basket. Given proper care it will last you many years.

Woods to Pound for Baskets

White Maple	**Black Ash**
Swamp Maple	**White Ash**
Northern White Cedar	**Sassafras**
Poplar	**Black Elm**

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Appalachian Mountain Hiking Accident

by Mark Antwoon

A little foreshadowing should have warned me of the potential for disaster when I slipped on the ice near the Mt. Mitchell Summit parking lot. Over the years of hiking, all the way back to the Boy Scout times…I have developed three rules.

Rule number one - it's hard to be too careful when undertaking a winter camping expedition. Be prepared, mentally, physically and gearwise.

I had just started down the trail from the summit of Mt. Mitchell, the highest point east of the Mississippi River. The air was a crisp 14 degrees. For several years, I have sought out true winter camping conditions in the Black Mountain area and I had finally found them. I wanted the real deal. I wanted life-threatening cold conditions. I wanted to test my training, skills and equipment against the elements.

After I slipped, I thought about it. "What would happen if I slipped on the ice and injured myself.?"

No problem, I thought. Got the fix for this problem. Feeling quite proud of myself, I retrieved a pair of Yax Trax from a side pocket of the Kelty. Donning them and walking across ice was like walking across a rough asphalt parking lot. "This is beautiful," I thought. A Yax Trax is a rubber frame with steel wire on the bottom designed to increase ice traction. They work well under benign circumstances, and are exceptionally lightweight, but they are none too rugged. I had never used them in this particular situation, but they came highly recommended by many folks who hike in far worse conditions than I was expecting.

Rule number two - never use untested equipment when your life might depend on it.

I noticed that I had blown out a Yax Trax on the way down. "Bummer," I thought to myself. "I'll take them off and save them for the ascent back up, where I really need them," and proceeded to continue down the trail, avoiding the ice by walking outside the trail when necessary. This worked well and I made it to Commissary Ridge before dark.

"Perfect," I thought to myself. I had enough time to set up camp under a ledge on the leeward side of a small hill. I love camping under the stars. With little chance of rain, because of the temp mainly and a dry high-pressure system moving into the area, there was almost no risk of the camp becoming sodden by a sudden downpour.

Quickly, I rolled out the tent bottom, which I decided to use as a ground cloth, placed the sleeping pad on top and fluffed out my Kelty Light Year 25 bag with a Marmot bag liner on top. For the temperatures I expected, this would be enough, though in hindsight, next winter camping trip I am going to bring my 0 degree bag. It is warmer than the combination and about the same weight.

Behind a screen of rocks, I set up the kitchen which consisted of a titanium pot and a Svea 123 Climber stove. The Optimus Svea is one of the most dependable stoves on the market. I own several stoves, ranging from the Optimus Nova, which can burn any hydrocarbon lighter than tar to the Primus Titanium Alpine cartridge stove which weighs less than three ounces. I chose the Svea because of its proven reliability and ease of use. Cartridge stoves are notoriously unreliable when the temp drops below freezing. I took out the amount of food I would need for the evening meal and hung the rest as a precaution against bears. I had seen scat near the trail and didn't want to take any chances.

Purposefully, I did not carry a lot of water down the mountain because I knew water would be available at the campsite I had selected. When I went to fill up the bottles, I noticed a pair of campers with a dog, filtering water out of a nearby spring. They were set up in a tent at the foot of the open space, quite close to the trail. They were the only people I met during the trip. One of the hikers was struggling with a frozen filter and having quite a time getting water. While the wind screamed by at 35 mph, I cooked supper - a freeze-dried meal of Polynesian Chicken, some miso soup, trail mix and that most wonderful winter beverage, hot chocolate. I ate rather quickly because the food was getting cold as the evening wore on. At first, I planned on reading a novel before bed, but the cold drove me into my bag early.

All the while, the temperature was dropping. I had measured the temp on my Motorola two-way radio at various intervals both driving up the mountain and climbing down the mountain. The coldest temperature was at the top - a scant 8 degrees F. At the campsite, out of the wind, the temp was 22 degrees. This seemed normal to me. The summit of Mt. Mitchell is 6,700 feet and Commissary Ridge is about 3,000 feet lower. I measured the temperature during several bathroom breaks at night and the coldest I recorded was 18 degrees at 3:36 a.m.

After a good night's sleep, I woke up at 7:30 a.m. to a 22 degree temperature and a light dusting of snow. I got up and started the stove to cook breakfast, which consisted of two packages of instant oatmeal, hot chocolate, trail mix and an energy bar. I piddled around camp for a couple of hours trying out gear and packing everything back up. I filled up the water bottles and treated the water with Polar Pure, an iodine treatment which has a temperature indicator telling how much iodine is needed to treat at a given temperature. This stuff is proven - I used it for over two weeks in Peru while drinking from questionable water sources and never got sick.

Things were warming up a bit, warm being a relative term. I measured the temperature at 31degees, still cold, but approaching melting point. This means, in certain places, that ice begins to melt somewhat — and becomes very slippery. Shoulda been a warning to those in tune….

But I was making good time and walking to my own tune, as I am wont to do in the mountains. Better time than I expected. I was getting good and warmed up, which meant I was moving faster and feeling better. So good in fact that I decided to push on until I got to one of the balds, where I could brew up a nice cup of tea, heat some soup and have some lunch while watching the hawks circle around looking for rabbits and mice.

Local Native Americans called this entire region *Nantahala* which translates to "Land of the Noon-day sun." True to name, the sun peered out from the clouds as noon approached. With golden sunshine drenching the otherwise dreary, yet lovely, winterscape, my spirits soared. Thin wisps of clouds flew by overhead. The trees were shorn of their normal adornment of leaves and the rugged grey and mossy green flanks of the Black Mountains were visible. This is what I had come for.

Almost lost in thought, I rounded a curve in the trail which brought me to an interesting place - a sheer face going up on one side and a very steep cliff going down on the other side. Not much space in between. At this point, the trail was frozen solid with a thick ice. Like I had been doing all along this morning, I tried to tiptoe through a narrow leaf-covered, seemingly ice free spot in the trail. However, I misstepped and slipped.

Vibram soles are no match for slippery ice…

In less than the blink of an eye, I went from walking vertically to laying horizontally on the ice. I heard a sharp crack, like a tree falling. When I came to, I was face down on this ice slab. The 50-pound pack had slammed into me when I fell. Stunned and disoriented, I couldn't move. I was not in any immediate pain, save for the breath having been knocked out of me. When I realized what had happened, I tried to get up.

Disaster had struck

But this is what I had trained and prepared for since I decided I would hike alone more than six years ago. Though the ice was cold, I kept still and began to regroup. I wiggled my toes and moved my fingers to make sure I hadn't suffered that most dreaded of all injuries - a broken spinal cord. To my relief, I had not. So I tried to get up and in doing so, found my left arm unable to move. I thrashed about on the ice for a few moments and tried to get up, but to no avail. Struggling wasn't going to get it, so I relaxed and began to think things over.

By now I realized that I had to get the beast off my back. There was no way I could get up with the pack on. Using my right hand, I managed to unfasten the hip belt and chest strap. All hell broke loose when I began to wiggle out from underneath the pack. My left arm felt like it was on fire to the bone. I winced and rolled off the ice onto a relatively dry piece of leaf-covered rocky ground.

As I stood up and my arms relaxed to my sides, my left arm hurt like nothing ever before. My left arm was definitely broken, possibly with a compound or complex fracture near the shoulder. The pain was excruciating. The only comfortable position I found was to keep it bent at the waist.

Then my training took over. I fashioned a sling out of my scarf. Yes, I carry a silk scarf in winter camping because it has many uses. This time, the scarf turned out to be one of the most important pieces of gear I had brought along. With my arm stabilized and not yet throbbing, I began to take stock of the situation.

My arm was broken and the hiking over for this trip. I could do one of two things. Make camp on the trail as best I could and wait for someone to come by and help. This was not appealing because I had told everyone I was going to be gone for seven days and not to assume anything was wrong until day eight. I had plenty of provisions, but the thought of spending what could be days in pain waiting for rescue in the sub-freezing weather sounded dicey at best. The other option was to hike out. That meant hiking back to the trailhead over nearly four miles of rough ground and back up the mountain. With a broken limb. Neither option sounded great to me.

Weighing the choices, I decided to hike out. The previous night was cold enough when I was healthy. I didn't want to spend another night out in the cold if I did not have to. I was going to go for it. If I were going to hike out to safety, I would have to do it in one shot and have to make it out before dark. It was 1:30 p.m. and getting dark already.

Deciding to hike out meant making more choices. What gear was I going to carry? Carrying the pack was out of the question. So I ended up taking my survival kit, a space blanket, several energy bars and extra matches, along with a fleece and my Northface Gore-Tex rain jacket. My plan was to hike as hard as I could to make it to the summit before dark so I could get help. If I didn't make it, I would have to dress in the jacket and fleece, wrap up in the space blanket and hope for the best.

It wasn't going to be easy

I took the remaining Yax Trax device and put it on so I would have some traction over the ice. My hiking poles were gone - down the mountain. I couldn't have used them anyway, so I was going to have to be extra careful to avoid falling again. Another fall might have been the end. I took two Vicodin, which my doctor had prescribed for just such a situation, drank my fill of water and headed out.

About halfway back to the summit, the remaining traction device gave out. I had to cross one larger patch of ice before getting to a trail, which would take me to the road leading to the summit. Not willing to risk walking across bare ice again, I got down on my hands and knees and scooted across.

My training helped. Each night, I usually walk between four and ten miles to help build and maintain cardiovascular fitness. It made the difference. It took me about four hours to get out, but I did. I hitched a ride with some friendly tourists who were heading for the summit. They brought me to the ranger station. The ranger, a North Carolina Parks and Recreation employee, called for an ambulance to meet us halfway to Spruce Pines, a small community with a hospital.

The hospital staff were friendly and professional. Soon, I found out that I had a simple fracture of the upper humorous - and let me tell you it wasn't too funny. Soon, I had a real sling rather than the makeshift sling I had improvised and was on the way back home.

I reaffirmed a few things after the event. First, training is essential. Second, equipment is vital in winter camping. Together, they will prevent panic and keep you out of trouble.

Also, much to the consternation of my friends and family, I will continue to hike alone when I feel like it! That is a hiker's thing….not many people understand. Oh, by the way, Rule number three is have a blast!

Tips for Woodsrunners

by George Hedgepeth

The edge of a partially rolled down vehicle window is a very handy and effective way to touch up the edge of a knife. This ground glass surface is fine grained, much like a smooth ceramic sharpening rod. It will not remove more than a tiny bit of metal, but will true and realign the edge of a knife that is starting to loose its bite.

Cordage from Cedar, Cypress, Basswood, or Poplar bark, while not tremendously strong, has many uses. One application that it shines at is for wicks. Short, fat pieces of cord made from these barks, loosely twisted, are nice for grease lamps. Experiment at home using shortening.

The tall dead flower stalks of many biennials, such as Burdock and Jerusalem Artichokes, can help the autumn and winter forager. These stalks are visible for many yards, and often first year plants with their fat, calorie filled roots are clustered around the dry stalks. If nothing else, they will provide a signal that conditions are good for root huntin'!

Many large non-toxic leaves, like Grape, Plantain, or Basswood, are good for wrapping food for cooking or transport.

If you are having trouble getting friction fire, check if your drill and board are polishing instead of grinding out heat and dust. If this is the case, a pinch of dry dust or wood ash will help "break through the shine" and increase friction enough to produce a coal.

The claw shaped can opener found on scout knives and multi-tools has another valuable use beyond getting to the beans and tuna. It is a fantastic tool for untying stubborn knots, even with small, wet cord.

Film canisters are a cheap, common source of waterproof storage. They are great for salt and other seasonings, greased cotton balls for metal match tinder, and small items like fishhooks and sinkers. They are an easy way to organize one's small bits of gear.

Dental floss is a very versatile item to stow away. It's strong for its size, knots well, and comes in a handy storage device. It is great for sewing- I often re-sew buttons on my field clothes with floss to prevent loosing them at inconvenient times. It makes a nice fishing leader when attached to heavier cordage. It even works for flossing teeth!

Bird and mouse nests are a good source for emergency tinder. Mouse nests are especially well suited for this, because they are usually built by their clever little owners in an area that will stay dry. Look under junk sheet metal, boards, or in hollow logs to find these little dry caches of tinder.

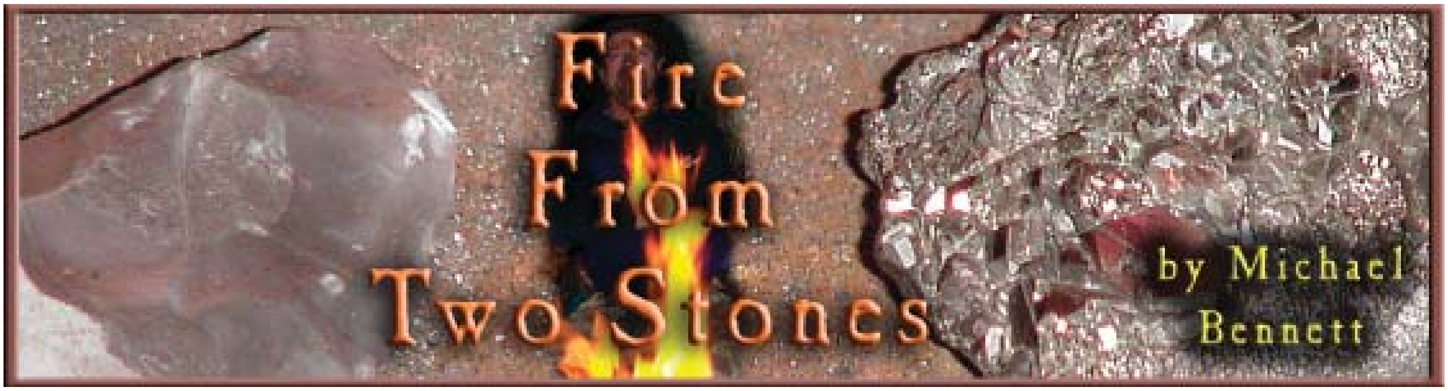
This should be an emergency tactic only. The mouse needs his home! Also, be aware of the dangers of Hantavirus.

A large slot head screwdriver or pry bar makes a good tool for digging in the field. They are tough, compact, and versatile. They are also lighter than a trench tool.

Dead Elm trees shed sheets of bark that are perfect shingles for shelter building. They are light and waterproof. The dead Elms are easily recognized at a distance by their bare silhouettes. They are also a favorite roost for tasty doves!

The incisors of large rodents can be used to carve wooden implements. The teeth can be set into a handle for use, or left intact in half of the lower jaw. They can have their edge retouched on a fine-grained pebble with a round edge. A beaver jaw will do a nice job of turning a burl into a bowl.

When looking for bait, think like a bear. Crickets, beetles, larvae, and worms are easily found under rotten logs. Put the logs back when enough bait is gathered. Even crickets like a roof over their heads.



Yes, it is possible to start a fire with just two stones and some tinder. Some months ago, I began to give serious consideration to two stone firestarting methods. I've already been successful with flint and steel, the bow drill and the hand drill. I wanted to see if I could find a percussion spark method more primitive than flint and steel.

After I had done some cursory reading on the subject, I felt that there were many similarities between the two stone method and the flint and steel method for firestarting, so I based my research on the flint and steel method.

THe flint and steel system has three components to it -- flint, steel and tinder. In my case, the tinder is always charcloth or steel wool. Since charcloth is processed -- made of woven cotton that has been charred -- and both my steel striker and steel wool are manmade also, I began to think about using natural, unprocessed minerals for fire starting. In each case, a spark is generated by striking two minerals together. The resulting spark lives long enough to travel an air gap, get caught on tinder and begin to generate a coal. The result is blown into a coal, then used to produce a fire.

I had two goals: the first goal was to get to the point where I could generate fire with two stones and natural tinder. The second goal was to replicate the method that might have been used by the people indigenous to my region, the Wampanoags. Surely, the bow and drill or hand drill methods were more laborious than the percussive technique of flint and steel, I thought. Could these people have used a percussive technique, too?

The short answer -- yes -- came in a reference from Robert Ellis Cahill's *New England's Viking and Indian Wars*: "[e]veryone carrieth about him a purse of tewed leather, a mineral stone and a flat emery stone, tied fast to the end of a little stick. Gently, he striketh upon the mineral stone, and within a strike or two, a spark falleth upon a piece of touchwood and with the least spark, he maketh the fire." This description from John Brereton, a crewman aboard *The Concord*, describes the fire making skills of the Wampanoag Indians of present-day Westport/ New Bedford, Massachusetts in March of 1602. It is confirmation first hand that they indeed were aware of, and used, this way to create fire. Was this method more efficient than, say, the friction methods I'd used?

There is more evidence supporting the use of percussive fire starting techniques by New England's ancient peoples. Groups not native to this area certainly used a two stone technique. C. Keith Wilbur's "New England Indians" suggests it possible to create fire by striking two iron pyrites together or one iron pyrite and one "flint."

I managed to contact a member of the Wampanoag tribe in Massachusetts and asked her if the technique is still practiced today by any living members of the tribe. Sadly, she could not recall it being done by any living person.

When I read an article in *Wilderness Way* magazine by Allen "Bow" Beauchamp, detailing his success with starting fire using a "two-stone" method, my interest was heightened. I hoped to use his technique and materials (pentlandite and quartz) as starting point. Later, I wanted also to succeed by reproducing an alternative two-stone method, namely that used by the Wampanoags.

So how does someone create fire using just two stones and tinder? What were the modern names for Brereton's "mineral stone," "emery stone" and "touchwood?" Where or how did these people acquire them?

I knew there would be obstacles to reproducing this method. New England has changed significantly over the last 300 years. Quite likely, the necessary materials would be difficult to identify and collect. I remember as a teenager discovering the brief, dull flash that I got when clacking together of two pieces of quartz-like stones I found at a beach. The flash, caused by the triboelectric effect, was so fragile and brief it was best seen at night. More suitable materials existed locally, I reasoned. I just had to either find them, or trade for them, as the Wampanoags may have done.

Which materials are suitable?

So the search began to identify complimentary minerals to begin my experimentation. I felt that I could use Beauchamp's formula, but I wanted to make my own contribution if I could rather than just confirm his process. Through reading, searching the web and making contact with some very helpful archeologists and geologists, I learned that university research has turned up evidence that the Wampanoags, who lived in this area for at least some 3,500 years, used chert/pyrite combinations for their fire starting kits. This mineral pair seemed another logical place to start.

Whether I strike flint against steel or vice versa, I needed a hand stone and a striker stone. I opted to strike with the flint, so I started my search for a striker stone. Clearly, this striker stone should be, or mimic, flint. Beauchamp uses quartz in his example, and quartz is known to generate sustained sparks when struck with steel. Quartz is especially abundant, but I have any number of suitable striker materials available to me, including chert from New York, flint from Giverny, France and local quartz.

The hand stone should have the properties of steel, including a composition of iron, carbon and other trace elements. With the supporting evidence of Beauchamp's quartz/pentlandite combination and the university research suggestion of chert/pyrite, I began to get good reference points to resolve this issue of what mineral to use for a hand stone.

One curious notation by Beauchamp is his remark that ores containing sulfur seem to him to have the best promise for generation of a sustainable spark. Since sulfur is a component of gunpowder, I could see his point that it could possibly enhance the spark generating capability of an ore. Pentlandite and pyrite both contain iron and sulfur.

Pyrite holds promise for a complimentary hand stone. Pyrite, FeS_2, is also known as iron sulfide or the classic "fool's gold." Indeed, pyrite gives its name to an entire class of minerals containing both iron and sulfur and the etymology of the name for this family offers a strong indicator that they would be suitable.

The name is derived from the Greek word for "fire stone." This, combined with the archeological evidence, makes the pyrites a strong candidate for successful Wampanoag_style fire starting, as there is an indication of local availability.

Clearly pentlandite, a pyrite cousin, is another obvious choice for a complimentary stone for my kit.

Beauchamp's research supports this logic in his choice of hand stones. Pentlandite, $(Fe,Ni)_9S_8$, is also known as iron nickel sulfide. I felt the likelihood of my success was higher if I could copy documented "tool kits." But not wanting to place all faith in a single "holy grail" mineral, and anxious to experiment, I also set out to locate and identify other ores which might be suitable as companion stones to complete my kit. With my assumption that iron is also a critical element for producing a spark, I began to look for minerals containing both iron and sulfur that might fit the bill.

I began digging into the compositions of the pyrite family of minerals and found other potential choices among the iron sulfides. Chalcopyrite, $CuFeS_2$, is also known as copper nickel sulfide and seemed to me to have potential. There is also Pyrrhotite, Fe1_xS. Pyrrhotite is like iron sulfide, but in a form with some sulfur atoms missing. Pyrrhotite is often found with pentlandite.

But what if sulfur content was not required to make a good fire stone? There are other iron ores, not pyrites, which I felt might merit testing. For example, there is hematite, Fe_2O_3, also called Iron Oxide and Rhodonite, (Mn, Fe, Mg, Ca) 5 (SiO_3) 5, also known as Manganese. Iron and Magnesium Calcium Silicate contained the necessary elements to be contenders, I reasoned.

Now that I have determined the names of the minerals I wanted to use, I needed known samples of the rocks I wished to test. I'm not much of a "rockhound." Aside from the very basics, I do not have any more than a layman's grasp of geology. I needed to be sure of the composition of the minerals being tested. I began researching for a source for known materials to take the guesswork out of what stone I was using.

Like the Wampanoags, I established my trade partners, mineral vendors, and my trade good, U.S. dollars, and set out to secure some samples. As luck would have it, I was fortunate to find a small selection of some iron sulfides, chalcopyrite and pyrite, at an earth sciences store in a mall near my house. The sample sizes were small, but they were suitable for quick and dirty testing and reasonably priced. Pentlandite and pyrrhotite samples proved more difficult and expensive to obtain.

I decided to conduct the following tests:

· Do the samples produce sustained sparks when struck together or with quartz, flint or chert beyond that of the triboelectric effect?

· Is the spark generated sustainable? Do those sparks travel far enough to catch the tinder?

· Are those sparks hot enough to ignite the tinder and generate a coal once they land on the tinder?

Testing for viable sparks

My first test was a simple spark test. If the two stones were struck together in a manner similar to flint and steel, would a spark result? I started by using the flint as a hand stone and struck the minerals being tested against it. I learned that I had a much better chance of seeing (and more importantly tracking) the sparks if I turned off the lights and tried percussion in a low-light environment.

Testing with flint**.** I could not get the polished hematite to generate sparks when struck with flint. It did generate tiny flashes that quickly died. They did not jump into the air as I had hoped.

The chalcopyrite gave occasional single sparks. I suspect that the copper in the ore, which does not exist in pyrite, may be impeding spark generation. It appears to be coating the flint. Chalcopyrite seems to flake off in larger pieces rather than spark.

The pyrite faired better. There was some initial fracturing, but I was able to generate clusters of sparks that leaped a distance of about 3-4" and in some cases fell 8" before extinguishing. It might last to generate a smoldering coal when it comes in contact with tinder. There was, however, a different kind of problem. Pyrite formations are clusters of iron sulfide chunks, The size of the individual chunks varies widely by sample and in these particular samples the individual grains were about the size of rock salt or half the size of pepper corns. I've discovered that this small-grained sample of pyrite does not hold up well under the stress of the percussion needed to generate a spark from a two stone method. Instead, the sample shattered. Clearly, if pyrite is to be the viable contender its name strongly suggests, a more stable sample
is needed for testing. Should I use a single crystalline sample or an extremely fine-grained sample? Which would fair better under percussion?

Testing with quartz. I found a piece of white quartz in my yard and decided that this was more likely representative of the local minerals and decided to use it for testing. I first tested the quartz with a steel striker. I was able to strike the quartz with the steel striker and get sparks strong enough to survive and form a coal on my charcloth. I knew this was possible before, since this combination -- quartz, charcloth and a steel striker, is my basic percussion fire kit. No surprises there.

I moved onto testing the chalcopyrite with quartz. As suspected, I got very little sparking and these did not survive to ignite the charcloth. Still, there were occasional strong sparks. I set chalcopyrite aside and made a mental note to perhaps revisit it at a later time.

Pyrite/quartz also generated sparks that were promising. But by this time, the sample was getting smaller and smaller. I decided that I definitely need larger and more stable pieces of pyrite and felt that I'd like to try pentlandite and also pyhhrotite to see if they were good minerals for two stone firestarting.

I began scouring the Internet for sources. After a lot of web surfing and emailing, I located a source of pyrite, pyrrhotite and pentlandite. I found them at Roger's Minerals, located in Ontario, Canada. Sudbury, in Ontario is home to one of the larger sources of pentlandite in the world. Additionally, the Weinman Museum in White, Georgia had excess pyrite, and I was able to secure from them four samples of pyrite.

The Georgia pyrite samples arrived first. The first thing I noticed about the samples was the variety of composition in the samples. Pyrite comes in various compositions including large singular, crystals and smaller, granular forms. The shininess of these samples makes me think that these are mined samples as opposed to surface layer samples.

Once I started striking the samples, I noticed right away that two-stone firestarting is very dusty! There is a good amount of debris that is generated in addition to the sparks. I started striking pyrite against pyrite, then striking quartz against the pyrite, then chert and flint against the pyrite. Each generated a good number of spark clusters. However, the pyrite that seems to generate the least amount of debris and seems to be the most stable in terms of not shattering while using what is called "massive, fine grained" pyrite.

It's my observation that striking pyrite against pyrite offers no advantage in the size and number of sparks generated versus the other materials. Additionally, it generates as much debris or more and I believe uses up the pyrite more quickly. If pyrite is in short supply, it could be wasteful to use pyrite-on-pyrite for firestarting.

Testing with tinder

Once I was comfortable that I had found a combination of stones that would generate sustained sparks that traveled at least 6", I started testing to see if the spark would land on, and grow on, tinder. I selected three types of tinder to test with this method. The "ultimate" tinder, the one that to me signifies that I really have the process down in its original form, is the tinder fungus *Inonotus obliquus*. This tinder comes from the conch rot typically found on birch trees. It requires little if any preparation and seems like the logical natural tinder source the Wampanoags may have used.

The second tinder I hoped to use was charcloth. This is a "less pure" tinder in my mind because it a) needs to be charred in preparation for being used and b) is made of cotton, which the Wampanoags would not have available to them before European contact. The third, most expedient tinder would be 0000 steel wool which is a completely manmade tinder unavailable at the time, but still one that works well.

I started with charcloth as my first tinder. The smell of sulfur permeated the air as I began to strike the sample. The percussion of quartz on pyrite knocks off specks of pyrite, which reflect the ambient light. Under low-light situations, you can much more clearly track the actual

sparks amid the pyrite flecks. The downside to this is that you cannot easily tell when your tinder is covered with pyrite dust and debris. This covering happens quickly and the dust reduces the tinder's ability to "take" a spark! I could see that this dusting was going to be a source of frustration.

For my setup, I held my pyrite in one hand and my striker in the other. My tinder was laid out as a 2" x 2" flat sheet on another surface with about 3-6" below my handstone. I hoped to strike sparks from above and have them survive the fall to the tinder. It was my observation that the sparks could easily travel this distance. Hopefully, they would be hot enough to ignite the tinder on impact. This is a different method than my flint and steel method, during which I hold the tinder above or below my flint and strike with the steel. But I felt that it afforded me a better view of the interaction with the minerals and the tinder.

The first night of working the pyrite/quartz combination was frustrating. I could not get the tinder, charcloth to ignite. The sparks would alternatively bounce off of the tinder, or stick to the tinder, but die within about one-half of a second. This may have been because of the amount of debris generated, which seemed to inhibit the growth of the spark, or because the size of the tinder did not permit a spark to land on an area that was not covered with debris. Or possibly, it may have been because the spark might not have been hot enough to ignite the tinder. I started to analyze why I could not get a spark to stick. It made sense to have a larger piece of tinder. This would increase the chances that the spark will land in a spot not inhibited by debris.

I regrouped my thoughts and approach the next night, tried using a larger piece of charcloth. Again, I was not successfully after prolonged effort. I decided I needed to try another approach.

A change in tinder was in order. Then I switched to 0000 steel wool and after 10-15 minutes of effort, trying different striker stones and alternating between pyrite-as-striker and pyrite-as-handstone, it ignited!

I thought about this success and realized that a good amount of debris was generated. Perhaps because the steel wool was more "fluffy" than the flat-lying charcloth, the pyrite debris did not collect on it as much. The spark was able to latch on to strands of steel not covered with debris. The spark had room to catch and grow. Just to confirm that this wasn't a fluke, I made a second coal in the same manner with fluffed steel wool. This was a small victory for me, a step toward the objective of totally primitive two-stone fire starting. Steel wool is far from primitive, but apparently effective.

Pleased with my success and eager to expand my research, I went back to charcloth as tinder. I struck ferverishly at the pyrite to no avail. I held the pyrite in my right hand, the flint in my left and the charcloth on another surface about 2-3" below it. I'd strike with the flint and watch the sparks hit the tinder. I was hoping that one would catch, but each time one glowed for a split-second, it would die before I could blow on it. Every twenty or so strikes, I would pause to clean off the charcloth.

Then it happened. After much effort, one spark hit the edge of the charcloth and caught! I was able to blow on it and it grew into the nicest, prettiest coal you ever saw! I suspect that the edge of the charcloth was jagged and free of debris and tthat hese factors allowed it to "stick."

I examined the pyrite and noticed that a groove was developing in the mineral. Because of repeated striking to one area, the stone was wearing. I did not find this to be significant. What was important, I felt was the properties of the edge of the charcloth. I felt that it "caught" the spark better. Therefore, more "edges" might make a better spark "catcher." I cleaned up the area of pyrite debris and picked up two squares of charcloth, each about 2"x 2". I shredded them and placed them in a crumbled pile. Striking in the same manner, I had a coal within about three minutes.

My samples of pentlandite and pyrrhotite had arrived and I was ready to check them. On examination, there were visible differences in the samples. My pentlandite sample looked almost like granite or more like a mica-speckled stone than a true iron ore. The pyrrhotite looked midway between pentlandite and pyrite. The pyrrhotite had the metallic sheen of pyrite, whereas the pentlandite has more of the look of silcates common to New England.

It is important to note that while I have only one sample of pyrrhotite and one of pentlandite, I had five samples of pyrite, from two different sources. Because of this, I feel that I have much better information regarding pyrite than I do concerning pyrrhotite and pentlandite. My Baffin Island pyrite sample, which came from Ontario, shows the most variety. It too was shiny, indicating that it was not a surface sample; however, it has a much more pronounced granularity to it as opposed to the solid, crystalline structure of some of my Georgia samples. The Baffin Island sample's grain structure ranged from extremely fine grains which held together well under percussion, to larger crystals about ¼" in size. I did not strike the larger crystals because of my earliest experiences with granular pyrite. I did not want to splinter the sample. The total sample weighs about 10 ounces. I find that the Baffin Island pyrite worked as well as the solid, crystalline pyrites from Georgia and generated no more debris.

I found that there was a "seasoning period" for some of the pyrrhotite and pyrite, where little sparking occurs intially, and I expected this. Another thing that I noticed is that in addition to having a seasoning period, these materials have a "sweet spot" in some cases. That is, there is a particular orientation of holding both the handstone and the striker that if worked, results in better sparking capability. It is best to try several spots on the stones in different orientations to find the area that you think will be most rewarding.

I picked up the pyrrhotite and struck it with my flint striker. The pyrrhotite seemed to wear easier than the pyrite, but soon I was getting sparks similar to those of pyrite that fell from the stone. They lived long enough to engage tinder and I felt it would be a good candidate for fire starting. Indeed, I was able to get coals on both 0000 steel wool and charcloth using pyrrhotite with little more effort than I needed with pyrite. I did notice that this ability diminished after a few minutes. It seems that my sample of pyrrhotite responds much better to a sharp edge on the striker. My pyrite looks to be more forgiving to the striker's edge.

Then I picked up the pentlandite for testing. After the same time period of striking with the flint as I'd done on the pyrrhotite, I still was not getting sparks. This fact, and the general condition of the pentlandite lead me to believe that this sample was likely on the surface for some time. There is a patina on one side of the sample. On the other side, there is a surface that is somewhat similar to pyrrhotite, but I have not gotten the pentlandite to spark. Perhaps I would need to get through the sample a bit to get decent sparks.

There's always more time to try! I believe pentlandite would work, but perhaps my sample leaves a little to be desired. Another thing that I noticed is that despite the fact that quartz, chert, flint and numerous similar but unknown stones generated good sparks, I found myself going back to a particular piece of flint as a striker. The reason for this was the shape and feel of that particular piece. It was easier to get and keep in shape to make a good striker. Note that the striker also chips during this process of spark making and this particular piece of flint just lent itself as a striker tool.

***Inonotus obliquus* tinder**

Getting a sample of tinder fungus for testing has been a quest in and of itself for me. This fungus most commonly is found on white or paper birch trees and is recognized externally as a rot. Internally, the fungus is orangish-red and is purported to readily catch a spark. I finally located some in the western part of the state and was able to gather a small quantity. There was enough for testing, so I set to work.

Initial testing was disheartening: the fungus wouldn't take sparks from ferrocerium. However, after a few days, I tried it again and was able to get ferrocerium sparks to stick. The fungus had dried. I then tried flint and steel, and that worked, too.

The coals emerge

For two-stone testing, I started by used the largest piece of the conk to provide the largest surface area for catching a spark. I was able to get a coal after some effort, but the debris generated definitely impeded progress. This lead me to an interesting discovery. I used a piece of flint to scrape the conk free of debris.

In addition to clearing the pyrite dust, a good amount of tinder fungus debris fell away while I did this, leaving a pile of mixed pyrite and tinder dust. Curious, I formed this tinder into a small pile and found it successfully ignited with a flint/pyrite combination. These small pieces of tinder fungus are like the charcloth shreds. They provide surfaces for the spark to catch and grow. I had only about one second to begin blowing gently on any spark that caught to turn it into a larger coal, but my success rate in doing so was about 95 percent! In other words, once I got a coal that stuck, I was almost always able to blow on it to produce a large, hot coal in the tinder fungus. The debris pile is also easier to clear of pyrite dust, if you place a piece of birch bark, or cookie tin cover underneath the pile. Simply agitate the combined pile, and the pyrite dust, which is heavier, will settle to the bottom of the pile, leaving the tinder fungus debris on top to catch the next spark. The tinder fungus proved to catch sparks from pyrite and pyrrhotite and I was able to get nice hot coals from each.

I believe the key to success with two-stone method is to be able to consistently generate sparks. Both stones are changing with each strike, but with patience and effort, I found I was able to consistently get a coal starting from scratch with in only a few minutes with less effort than a bow drill would take.

The process I have settled on is this:

Use something, a tin lid or sheet of birchbark, to catch and hold your debris. This photo shows the materials I used. From left to right, they are: pyrite sample from Baffin Island, tinder fungus *inonotus obliquus*, and flint. They are sitting on a tin lid in a mixture of pyrite debris (silverish in photo), tinder fungus debris (brownish in photo) and flint debris (more grey and chunky). Did I mention this method is messy?

Begin by taking two chunks of tinder fungus and rub them together briskly, letting the dust and debris settle onto your container. Alternately, you could use a piece of tinder fungus and the flint piece. Once you have debris in an area roughly 2" x 2", hold your pyrite and flint a few inches above the tinder and prepare to strike the flint against the pyrite, as shown. Here is the position of the materials prior to striking the pyrite with the flint. I use a method similar to the flint and steel technique, but I let the sparks fall to the debris pile below. Strike to generate sparks and let them fall into the tinder. Pay close attention. The sparks are small. Any that catch will need to be blown on immediately to let them grow. See photo at left.

The first is a tiny reddish blot underneath the flint in the lower left corner and the second coal shows as a dark brown spot between the flint and pyrite among the brown tinder fungus debris. If you look very closely, you can see a slight wisp of smoke coming from the right side of the second coal.

This photo shows one larger coal after the two have been combined. It also has been blown on and covered with tinder to make it grow. Remember that two-stone firestarting generates a lot of debris and too much pyrite dust is a "spark killer." You may want to occasionally agitate the debris pile, shaking it gently to let the pyrite dust settle.

If you wish not to use the debris pile and strike against the tinder fungus directly, you may want to clean it of pyrite dust frequently. All in all, this exercise has been quite interesting for me. Should you decide to try it for yourself, I hope you'll find it useful.