

VOLUME 1



SELF RELIANCE
illustrated





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The Hand Drill

By Alan Halcon

The ability to make fire

is, undoubtedly, one of the most important priorities in a survival situation. With fire, one can keep warm, purify water, cook food, protect, provide comfort, light your path, signal for help, etc. While there are many ways to start a fire, of significant allure is the ability to start a fire by rubbing sticks together.

In North America, Native Americans relied on the hand-drill to provide fire. While it is a primitive method, it is nonetheless an advanced skill to own. I have seen countless people fail time and time again with the hand-drill.

I have always been a huge proponent of getting a fast coal, for a couple of reasons. For one, getting a fast coal means there is less chance for injury by creating blisters on the hands. Second, getting a fast coal is less fatiguing on the body and helps retain energy stores for other tasks.

The Arizona episode of Dual Survival is a perfect illustration of these two points. Earlier in the episode, Cody quickly and effortlessly produced a coal with the hand-drill. The outcome was he had no blisters and wasn't tired. Contrast that against Dave, who with the same hand-drill set, was having problems getting the coal. The fact that he kept trying over and over, resulted in injury to Dave's hands in the way of blisters. And, if you recall, when Cody came walking back, Dave was sitting under the tree with the appearance of having little energy. Selection and preparation of the hearth and drill play a vital role in maximizing efficiency.

The Hearth

To begin, I like to use a thin hearth no more than a quarter-inch thick. The wood should be dry and of medium density. To determine if the wood is of proper density, one can use the thumbnail test. If it leaves a nice clear visible mark, it should work fine. If it barely leaves a mark it is too hard. If the wood is too soft, you'll know it because your thumb can make an indentation. As a general rule, willows, cottonwoods, poplars, ash and aspens will be medium density. After you gain some experience, you'll learn which medium density woods will work better than others.

The Drill

The drills I like are no smaller than one-quarter inch in diameter and no greater than 3/8 of an inch in diameter and about 30 inches in length. I also like my drills to be of medium density hardness and thoroughly dry. If the spindle is too long, the top has a tendency to whip around as you're spinning the drill. It may also have a tendency to bend in the middle as you apply pressure. The diameter of the wood is also important because you want to be as efficient as possible when you spin it. I have found that the tip of the hand-drill is most effective when it is about 1/4 to 3/8 of an inch, because it provides the best transfer of energy when you spin it. If the tip is too wide, then the transfer of energy is expanded over a wider area, making it less efficient. If the tip is too small, then there is not enough surface area contact between the drill and hearth to provide you with the dust and friction you need to make a coal.



THE AUTHOR DEMONSTRATES THE STANCE HE USES FOR MAXIMUM EFFICIENCY AND DOWNWARD PRESSURE.

Think of the beam from a magnifying glass if you will. It has a point where it is most efficient. If the beam is too wide, it disperses its energy over a wider area. That means it would take a lot more energy to create the heat needed for combustion. The same happens with a piece of wood whose diameter is too big. It disperses its energy over a wider area. When using a magnifying glass, you concentrate the beam into one point to make a fire. The same thing applies to the hand-drill. However, with wood you need surface area contact in order to create friction. If the drill is too small in diameter, there will not be enough surface area to create friction. If the drill is too big, it will require you to physically work harder.



The All-Important Notch

The notch is there to allow the dust that is created by the friction of the two pieces of wood to accumulate in one location. Without this notch, the dust has nowhere to go and would be smothered by the spindle, along with any hope of making a coal.

First I figure out how far in from the edge of the base the spindle should be. In this case, if the diameter of the tip of the spindle is a 1/4 of an inch, I move in a 1/4 of an inch from the edge of the base towards the center. This new position will be where the edge of the spindle's tip will sit. Once I have figured that out, I give the spindle some spins just so I leave its impression in the base. This will give me a visual reference when I start cutting out the notch. Once I have a nice impression, it is time to work on cutting out the notch. Take your knife, saw, or whatever is best for you, and cut a V notch in the wood as shown. It is important that the notch, where the V comes to a point, is not too wide. If that happens the spindle will have a tendency to slip into the notch and prevent you from spinning. The point of the v should come to a point about 1/16 of an inch into the depression where the spindle will be working. Once you have finished making the V-notch, you are ready to start using the hand-drill.

Technique

When actually spinning the hand-drill, I am a firm believer of maximum downward pressure with maximum speed. To help with downward pressure, I do two things. One, I get up over the top of the drill by getting up on one knee and centering my body mass over the top of the drill. Two, I flare out my palms a little, so the point of contact on the drill is between the meaty ridges of my palms. This helps me dig into the drill more. I've performed various measured pressure tests from the various body positions, and the act of getting up over the top of the drill, as opposed to being seated, really helps in adding downward pressure. Now, instead of your arms doing all the work of providing pressure, your body aids them.

Before you get into position, you should place something under the base to catch the coal. You can use a leaf, a piece of paper, or whatever else under the notch of the base. This will facilitate placing the coal in the tinder. You should also have your tinder, kindling, and wood ready to go. The last thing you want to do is run around scrambling for fuel to feed the fire.

Once all the elements are in place and you're ready to go, get into position and place the tip of the drill in the base. While applying downward pressure, start spinning the drill between the palms of your hands. You will notice that as you continue spinning, your hands start sliding down the drill. When your hands work themselves to the bottom of the drill, grip the drill with one hand while maintaining downward pressure. Take the other hand and bring it back to the top and re-grip the drill, always maintaining downward pressure. Release the opposing hand and bring it back to the top to meet with the other hand, where you start the spinning all over again. It is important that you maintain downward pressure as you shift your hands back to the top. This will prevent heat from escaping at the point where the drill and base meet. I know it sounds complicated, but with a little practice, all these moves should flow into one smooth action.

As you continue, you will see the wood starts to wear away and dust starts to fill the notch. The dust that fills the notch is what eventually will turn into a coal. At first the dust will come out a light color, similar to the color of the wood. Then you will see the dust turn darker and coarser in texture. you will also notice that you start producing smoke from the base. As the dust continues to heat up, it will start to turn black and smoke will come out in plumes. This is when you should give it your all and really spin hard a couple of more times and stop. If the dust continues to smoke on its own you have successfully made a coal.

Through practice, I know my baseline is around 12 seconds. If it is taking me longer than 12 seconds to get a coal, I know I am risking injury and fatigue. If that's the case, I stop and change out the woods I have selected.

A Short Story on Injury

At Wintercount, one year, I was confronted with a friendly challenge, by Tom Robins, to produce a coal using Desert Ironwood. For those that don't know, Ironwood is known as *quebracha* in Spanish, which translates into "axe breaker" in English. Yes, the wood is that dense and heavy. After unsuccessful goes with it, Tom and I decided we needed help. Of course, here comes Cody Lundin walking our way. We explained to him what we were attempting and asked for his help. Cody looked at both of us with that "are you crazy?" look, but agreed. The rotation would be first Tom, then Cody, and finally myself.

Almost immediately Tom started producing smoke from the wood, but no coal. After a few passes on the drill, Tom tired and Cody took over, picking up where Tom left off. By now we had a lot of smoke and a nice pile of powder but no coal. It was evident that we may actually achieve a coal with wood that by all standards should not be possible by human strength alone. When Cody finally tired, he gave me the go and I picked up where he had left off. With all of my strength and pressure I leaned into the hand drill. Smoke poured out massively and Cody began to fan the powder with his hand. After feeling like I couldn't go any more because my hands were on fire from the friction, Cody yelled out we had a coal. I quickly dropped the spindle and ran for a bucket of water to cool off my hands.

While we achieved the seemingly impossible, I did suffer with a blister so big it spanned the entire meaty portion of my hand from the base of my pinky finger, to near the bottom of my palm. Had that been a real survival situation, I might have been in some real danger. Not only did I risk infection of a wound, but I essentially negated my ability to perform other tasks.

While I like to consider myself accomplished with friction fire, make no mistake, it is a last resort in my book. If it comes down to me having to rely on friction fire, I screwed up well before I left the house by not being properly prepared. At minimum, on me, I have two ways to start a fire at all times. One is my lighter and the other my mini match magnesium and ferro rod which hangs on my key chain. *Always.*



Tips & Tricks for the Tee Pee Fire Lay:

10 Steps to a “One Match” Fire

By Tom Laskowski

We all can agree that fire is a key element in wilderness survival but what we may disagree on is the “best” way to start it. Over the years, I have tried most every fire lay, from pyramids to log cabins to a simple pile of small sticks thrown onto the ground. Each works to some degree, especially if the wood and air are bone dry. However, in more realistic conditions when you have unseasoned wood and high humidity in the air, I’ve found that the Tee Pee fire lay is the most reliable configuration, especially if you know a few tricks to “stack the deck” in your favor. The more things you do to “stack the deck”, the higher the chances you will “win” (get a fire).

Fire Volume #1, Midwest Native Skills Institute’s (MNSI) highly acclaimed video on primitive fire making, provides detailed instruction on making fire with flint & steel, the bow drill, and the hand drill. But because all fire-starting methods require growing your tiny initial flame into a larger, self-sustaining fire, we start the video with a section on “one match fires.” We cover a host of tips

and tricks that virtually guarantee that you WILL get a fire started if you meticulously follow each step and use each trick. I will be sharing some of those tricks with you in this article. On a dry summer day, with dry wood and no pressing need to get a fire started, you can skip many of these tips and still get a blaze going. However, keep in mind that you are decreasing your chances of getting the fire started with each step you decide to skip or short cut. On a dreary day, when all the wood you can find is wet and you’re within hours of going into hypothermia, I would strongly suggest you take the time and use each tip and trick to ensure that your fire (and you!) will survive.

Tips and Tricks

1. When talking about fire lays... size matters. Too small of a structure and

there won’t be enough burning kindling to build your fire up; too large and you’ll need massive amounts of tinder to fill it or, more likely, it will “burn hollow” and go out. I found the ideal size to be as tall as your hand.

Simply place your fingertips on the ground and extend your thumb straight out. The height of your thumb above the ground is about the height your Tee Pee fire structure should be.

2. Collect the driest wood possible. Damp wood doesn’t burn easily because the moisture keeps temperatures from rising high enough. The best source of dry wood is dead trees that are still standing (called “standing dead wood”). Since the standing dead wood is vertical (standing), the capillaries in the wood are also vertical, allowing gravity to pull moisture in the wood down to the ground relatively fast, leaving you with dry wood that hasn’t had time to rot. Your next best source is “snags” or branches that have broken off of a tree but were tangled up in other branches and still suspended off the ground. Snags can air dry without absorbing ground moisture or rotting.

As a last resort you can use wood off the ground, but remember: the ground holds moisture that is transferred to the wood lying on it. If you do use wood collected off the ground, at least try to avoid pieces that have mosses or fungi growing on them. It’s also a good idea to strip off the damper bark and even shave off the moister, outer wood to expose the drier, inner wood. Get the driest wood possible.

Three tests for dryness that I use are:

- Any stick that is green in color is still alive. Live wood is probably about 70% water, and water doesn’t burn.
- If a stick breaks with a “snap”, then it’s fairly dry. If it only cracks, or bends and then breaks, it is too damp.
- In the summer, you can hold the wood against your cheek. If it feels warm against your skin after a second or so, then it’s fairly dry. If it still feels cool, it’s too damp.

3. Get three straight sticks about the diameter of your pinky finger that will serve as the framework for your Tee Pee fire. At least two of these sticks should have a “Y” at the top so that you can use the “Y”. It’s to lock the framework together. Using your knife, carve all 3 of these sticks into “fuzz sticks” by shaving into the wood just under the bark and then lifting up the wood sliver (which remains attached). Push these sticks into the ground to form a “tee pee” and interlock their tops to stabilize the structure. You want the structure to be tall and skinny (not short and fat).

4. Determine which way the wind is blowing and choose the side of the Tee Pee structure facing into the wind to have the opening. This not only allows any wind to help your fire along by blowing the flames into the structure when it is lit, it also pushes the smoke away from your face if you need to blow into the fire lay (through the opening) to help it along.

5. Make a platform inside the structure. You can use small sticks or a piece of bark for this. The platform will keep the tinder you later put into the structure off the ground (and away from the ground’s moisture), plus the platform will raise the tinder up to allow air under it and create a “chimney effect” in your fire lay.

6. ESPECIALLY IMPORTANT: Collect thin, straight sticks (kindling) that are as long as your three support sticks from step #3. These kindling sticks should be the diameter of a toothpick. If they will not fit between your teeth (as a toothpick will), they are too big in diameter. This first layer of kindling has to be very thin to ensure that the sticks catch and burn on their own in the few seconds before your tinder burns out. Collect enough of these thin sticks to completely make one full, tight layer around the structure. Typically, this will take about 50 sticks (10 are too few and 100 are too many).

7. Collect a second layer of kindling sticks that are slightly larger in diameter than the first layer (*see photo comparison of level 1, 2 and 3 stick sizes*). The concept here is to have the first layer ignite the second layer in less than 20 seconds. If your second layer sticks are significantly larger than those in the first layer, they won’t catch before the first layer burns up, breaking the progression, and



your fire will go out. Arrange this second layer of sticks evenly around the structure over the first layer. It will take about 30 sticks to complete this layer

8. Collect a third layer of kindling sticks that is slightly thicker than those in your 2nd layer and arrange them evenly around the structure. This layer should take about 20 sticks.

9. Collect additional wood that you will use after lighting your Tee Pee fire lay to build up your fire into a campfire. Use the concept of gradually increasing the diameter: this wood should include pieces that are slightly thicker than those in your 3rd layer, all the way up to pieces that are the thickest that you intend to burn. The thickest pieces will determine how big your campfire will be and how long it will burn unattended. A small, quick fire may not need sticks any thicker than your finger, while an evening cooking fire may use sticks as thick as your wrist or upper arm.



10. The last construction step is to fill the inside to the Tee Pee structure with easily ignitable tinder. Tinder is any fine, fluffy material that will ignite easily using a spark (from a Ferro cerium rod) or flame (from a lighter, flint & steel or other primitive technique such as those demonstrated in *Fire Volume #2 - 40 + Ways to Make Fire without Matches*).

The best natural tinder is a mixture of several fluffy materials such as shredded inner bark from a cedar, shredded dry grasses, small bits of cattail down, dandelion clocks, dogbane or milkweed seed fluff, shaved bark from a tulip poplar, pine needles that have been crushed or finely shredded, and fine slivers of white birch bark.

Ideally, you want enough tinder to completely fill the interior of your fire lay. However, don't pack it too tight because you want to keep the tinder fluffy and airy so that it burns well.

Now, I know the tag-line of this article is *10 Steps to a One Match Fire*, but everybody likes a bargain. So, here's a bonus 11th tip that works for lighting most any fire lay:

11. To start the fire, ignite your match, lighter, or primitive tinder bundle as close as practical to your fire lay and use it to light the tinder inside the fire lay structure. If the tinder doesn't immediately flare up and catch the first layer of kindling, or if the flames start to die down before your fire is well-established, get your face down low to the ground and blow into the struggling flames, adding oxygen to help the fire grow. Until the fire is burning well on its own, place additional small sticks anywhere that flames try to rise above the structure. As the fire grows, gradually increase the thickness of the sticks that you add. When the fire is established and you have a bed of coals, you can allow the fire lay to collapse or knock it down, and convert the fire to a form that suits your needs, whether it be for boiling, cooking, warming, or simply comfort and enjoyment.

Having a fire at your campsite will provide you with warmth, light, and a way to cook food or purify water. In dicey situations, an even more important benefit is that a campfire can soothe and calm people who are stressed. The smell, warmth, and glow of a campfire can make any situation more enjoyable, whether you're simply on a weekend campout or in a real survival emergency.



Proper Bowdrill Form:

The Ember is in the Details

By Dave "Mitch" Mitchell

What is the single most contributing factor to success at producing an ember with a Bowdrill set?

Although there are many answers to this question including, materials the set is comprised of, carving techniques used through-out the set, length of the bow, tightness of the bow string, tinder bundle construction etc...When your spindle begins to revolve in its socket, it's your *form* that is the deciding factor in your success.

Great form will also give you the edge needed to push the odds in your favor against unfavorable conditions. Common hurdles to overcome are inclement weather, high humidity, cold damp conditions, and fatigue.

Fundamentals - Proper Form Fundamentals break down in the Natural Order into 3 Key Parts:

- BODY Form
- HAND Form
- SPINDLE Form

Body Form - Proper Body Form allows you to stay in the optimum position to use your bowdrill set efficiently and effectively as long as necessary to produce your ember. Conversely, if your posture requires you to be constantly "catching your balance" you will be expending calories unnecessarily, jeopardizing your success and survivability. When fatigued, an off balance foundation can be the only reason you fail at producing an ember, as you will tire more quickly.

Your Body Form consists of 3 Main Pieces:

- Front Foot on the Hearth
- Rear Knee
- Rear Toes

This Tripod allows equal weight distribution and a centered, low body mass for stability. It is important your Rear Knee is placed to the right of your Front Hearth Foot, this outside angle will allow you to hold your center of gravity from creeping right. The same is true for your Rear Toes protecting your center from falling left.

Hand Form - Correct Hand Form Relies on 3 Components:

- Front Wrist Locked onto Shin
- Perpendicular Bearing Block Angle
- Level Bow Hand

To stop your spindle from becoming loose or wobbly, you must lock the side of your front wrist onto your shin for stability. This is the "Rock" of your technique. A stable spindle creates more consistent friction, thus generating greater heat in less time.

Perpendicular Bearing Block Angle is incredibly important to controlling your spindle's progress. The spindle could slip out of the Bearing Block, or contact the Block's wall, creating friction, which slows down the spindle, as well as creating an irregular revolution pattern.



Keeping your Bow Hand Level will stop the string from traveling up or down your spindle during its revolutions. Downward pressure comes from the Bearing Block not your bow. Remember to use your larger shoulder muscles while bowing, not just your biceps and triceps.

Spindle Form

In one word... PLUMB. When your spindle's Plumb, 100% of the spindle's surface area is creating friction simultaneously. Your downward pressure transfers to the whole socket rather than a fragment, generating complete socket heat. This is the most important element to Bowdrill success. You generate more heat allowing you to "force" an ember with a less than ideal set or less than ideal conditions.

As we all know, the greater your need for fire, the harder it is to make. Proper form will give you the edge you need for success with a Bowdrill Fire. Now get out there and practice your form!



The Importance of Carrying Pre-Made Tinder

By Mike Lychock

I just finished reading an article which provided another example of a critically overlooked piece of outdoor equipment— pre-made tinder. Given a survival scenario, several different pieces of equipment could be needed, but when faced with the need for an immediate warming, snow melting fire, tinder jumps to the top of the list. In the article, a hunter who appeared to have been prepared for a day hunt in Idaho's White Cloud Mountains got lost when his GPS and compass failed. On the second day in the field, the cold and fatigued hunter, realizing his situation attempted to make a fire in the damp, cold mountain conditions. He tried to light wood shavings he made with his knife and then tried to light a dollar bill and toilet paper to no avail. Thirty matches later (the box's striking surface ruined by moisture and matches being lit by a butane lighter), he cut off a piece of cheesecloth game bag as tinder and got a fire going. He eventually walked out of the forest and rescued himself.

In a second article, an injured skier survived nine days in the backcountry. He was also prepared and when asked about making a fire in wet, cold conditions he suggested "packing smarter not more." He had matches, a lighter and magnesium bar none of which could ignite available tinder (wet leaves). He is quoted as saying "I would have given anything for a long-burning tinder cube."

Why don't more people consistently carry fire starters as standard emergency gear? Most survival kit lists include things such as fish hooks, split shot and sewing needles. All of which serve a specific purpose, but when the immediate need is to build a fire, nothing is more important than generating and maintaining a flame. Today's focus appears to be on a means of ignition. Both above mentioned outdoors men had ignition sources. Almost every kit list suggests some form of fire making equipment and usually three be it a lighter, matches, flint stick or magnesium bar. Conventional wisdom must take for granted that people will be able to find viable tinder in any situation under any conditions. I've got news for you, it isn't always so. If you've ever camped, hiked or hunted in wet conditions and tried to start a fire, you will understand the point I'm trying to make. Now, add cold temperatures and possible injury to the mix and you've got trouble. Our hunter and skier were in such conditions. Usually when you realize things have gone bad, it's too late. I remember an outdoor writer was preparing an on-person survival kit for a northern Canadian canoe trip and included 3



THE BURN AFTER 1:30 MIN/SEC. THE COTTON BALL IS SECOND FROM LEFT AND THE PITCH WITCH IS TO THE EXTREME RIGHT. THE ESBIT IS STILL MAINTAINING ITS ORIGINAL SHAPE AT LEFT, THE TRIOXANE IS BURNING WITH AN ALMOST INVISIBLE FLAME (CENTER) AND THE OBVIOUS COUGHLAN'S STICK IN THE FOREGROUND. ALL ARE BURNING WELL.



I REVIEWED THE FOLLOWING FIRE STARTERS (CLOCKWISE FROM TOP); PITCH WITCH TREE PITCH WRAPPED IN WAX PAPER FIRE STARTER, ESBIT STOVE FUEL TABLET, COUGHLAN'S FIRESTARTER STICK, VASELINE SOAKED COTTON BALL AND A TRIOXANE FUEL TABLET.

kitchen matches. I was told by a good friend who is a survival instructor that an effective fire starter must be able to light from direct flame or spark. It must also maintain flame for several minutes. Most started with just a spark after a bit of prep work i.e.: scraping or roughing. All started with a light from the lighter or match. The Vaseline cotton ball was the easiest to start from any source. All of the starters were ignited within seconds of each other. I documented the burns at different intervals.

All starters burned for a minimum time of 5:30 min/sec. with the cotton ball burning out first. Interestingly, the Coughlan stick burned the longest fizzling out at 10 minutes. It was however the most difficult to light even by flame. I probably won't include them in my gear from now on. In fact, after this experience and using the advice of several teachers of survival and preparedness, I have settled on Vaseline soaked cotton balls. They are very cheap and easy to produce at home, don't dry out and can be compressed to fit a fair amount into any sized container from match cases to 35mm film containers (what are they?). Though my control sample burned for over five minutes, the time can vary depending on the size of the cotton ball and amount of petroleum jelly applied. Triple size cotton balls are the best to use. I also prefer to smear the petroleum jelly into the fibers rather than soak them.

While there are many natural types of tinder to utilize and I do agree everyone who spends time in the woods should know how to locate and process them. Still, there is simply no substitute for premade tinder when the chips are down. Petroleum jelly cotton balls, dryer lint, wax and cardboard makes no difference. A cheaply made abundant fire starter can mean a difference between life and death. I know my kit is well stocked. Is yours?



Finding Dry Firewood

By G. W. Neal

that is usually the driest part of the wood. The key to it all is in the laying and the bark of the tree—it's just nature's way of protecting the tree's growth, while keeping the core nice and dry for us!

So when I need to start a fire and wet wood is all there is, I begin my search by reversing my usual routine. Instead of searching out smaller pieces of kindling first, I look instead for a larger piece of wood that would be a good candidate for splitting. I look for wood that has a decent amount of bark because bark tends to collect moisture and keeps it from being absorbed by the wood's inner layers as I already mentioned.

Once I have gathered a few larger pieces, I then split the wood by cutting the piece into a square. From this square I like to split the piece of wood again, only this time into quarters. I do this because it fully exposes the center allowing the driest part of the wood to be separated into four pieces and gives me the maximum amount of dry, burnable surface area. After I have enough of these dry, larger pieces, I then make my kindling from the drier, left over parts of the wood I have just split. I also like to use items in nature that can 'burn wet'—these are pieces that have specific properties that allow them to burn when damp or wet. Drier items that happen to be hidden under layers of rocks or plants also make great kindling. Just look for anything under nature's umbrella. What these items are exactly varies based on your geographic location. They are mostly types of pine needles, pinecones, and varieties of bark. Most of my outdoor life has been spent in New England. Luckily we are privileged to have an abundance of birch trees. Birch bark can 'burn wet', and ignites wet or dry with no problems at all due to the oils that it contains. Once I gather up some of this kindling, I go about building my fire per my usual way. It is important to remember that once your fire is built, it can then be used as a tool itself to dry out any wet firewood that you may want to use later to keep it going.

Even in our modern times, fires aren't always just luxuries or a means of camp recreation. For many of us folks, they are still a means of home heating, comfort, and food preparation. In these situations, knowing how to build a fire is the truest and indeed most ancient form of survival. Understanding how to do it with 'wet wood,' will see you through those cold and damp nights, warm and dry.

“Build a fire? But we don't have any dry wood!” I have heard these words time and time again from the mouths of novice young campers to fairly seasoned woodsmen. When the slightest thought of wet firewood enters my mind, those words resound like a broken record. Many a cold and wet Maine night, the fire of 'wet wood' has fed, warmed, and kept me dry.

There is always dry firewood, we just have to look to the core of the wood to find it. The areas that we need to target are the inner layers of a piece of firewood. And it's as easy as it sounds. Think back to the times when you were a child and you counted the rings on a tree stump to estimate the tree's age. The place where the rings begin is at the center of any piece of wood, and it is this very center



Fire Kit

By Alan Halcon



Fire! Stolen from the lightning of Zeus by the titan Prometheus, fire has been man's companion for thousands of years. Mythology aside, fire arises from and is sustained by the “fire triangle”—fuel, heat and oxygen. Remove any side of this triangle and fire isn't possible. If you apply enough heat virtually any material will burn—wood, aluminum, even the steel in your knife blade will be consumed in the presence of enough heat. Heat in the form of an externally applied source or selfsustaining is the hardest leg of the triangle to procure, produce and maintain. Interestingly enough oxygen does not burn; oxygen is merely an oxidant or catalyst that allows the interaction of heat and fuel to take place fast enough for fire to be produced and maintained.

Rooted in mythology and explained by science, fire is still largely an art to produce. In this article, let's take a look at some of the craftsman's tools and techniques that produce this important selfreliance element.

As I write this the outside temperature stands at two degrees Fahrenheit and the wind chill is in negative numbers; on a day like today the ability to start a fire rates high on the three-hour scale in the

Rule of threes. In fact I am going to argue that the ability to start your first fire enters into the threeminute scale—wind, cold and frostbite will rapidly erode your ability to use tools as the weather elements sap the dexterity and fine motor skills from your hands and fingers. If you want to test this, plunge your hands into a bucket of ice and water for five minutes and then try to strike a match, flick your lighter or strike your ferro rod; you will be amazed at the loss of function.

It isn't sexy but in cold weather my two most important fire items are a candle stub and a Zippo lighter—two very “low speed” but reliable items. Yes there are arguments against a Zippo lighter—but mine is thirty-plus years old and with fuel and flint it strikes every time; I'm talking about a quick, sure fire in a hurry. The candle stub lets me transfer the flame to another reliable and slower

burning fuel source—wax. A few years ago I broke through the ice crossing a shallow creek and got wet to the knees; not life threatening but cold. A handful of dry grass and some Sycamore branches provided tinder and fuel for a quick fire. My lighter lit the candle, the candle lit the tinder and in short order the tree branches were burning hotly. I dried my pants, brewed a cup of coffee and went on my way vowing to be more careful on thin ice.

With the “quick and dirty” out of the way let’s take a look at one of my fire kits. This one is packed in a small dry box (bright yellow so it’s hard to lose). The contents of the kit give me five sources of ignition—match, butane lighter, ferro rod, magnesium/ferro rod and Spark-Lite striker. Also packed in the kit are several sources of tinder— something to catch and grow the ignition source into a steady flame. The tinder includes Vaseline-soaked cotton balls, commercial Tinder-Tabs and a small roll of all-natural jute twine.

The dry box keeps the kit altogether and organized; it has a built in lanyard attachment point and a short length of Paracord serves as a lanyard or belt tie-in—come to think of it the Paracord would also serve as a string on a bow-drill set.

Looking at the ignition sources, first don't be quick to dismiss or deride a good match; in this case a commercial waterproof, strike-on-box match. It wasn't more than a century ago that the match was "modern" and prized above all other fire starting devices. The butane lighter is a more storable form of my tried-and-true Zippo; a bit cranky and stubborn in cold weather unless you carry it



close to your body. The ferro rod and magnesium/ferro rods are just high-tech versions of flint and steel—I keep the strikers with both; in fact the hacksaw striker will work with a bit of “found” flint or chert to throw sparks. The final ignition source is a Spark-Lite striker; small, compact and functional with only one hand available this is really a redundant Zippo striker minus the volatile Zippo lighter fluid. I suppose I could squeeze in a Fresnel lens or small magnifying glass but my personal experience is when I really need a fire the sun isn't shining!

The final items in the kit are a couple of forms of quick, reliable tinder. The commercial Tinder Tabs will work even after having been dunked in water as will the Vaseline-soaked cotton balls. You may need to shake them off, squeeze them dry but they do work after a wetting. The jute twine serves as an alternative to natural tinder once you unwind it and rough it up; it also works well with a bit of charcloth. (There is no charcloth in this fire kit but it can be improvised in the field with very little effort.)

Once you have flame, you need fuel. Remember to start small, use the finest, driest materials you can find and give the flame room to breathe—don't forget air (oxygen) is a critical element here. The subject of fuel for the fire and types of fire lays is a subject in and of itself. It is also highly dependent on where you are/what you have on hand—soft pine in the north or dried buffalo chips in the southwest and all in between may serve as fuel to maintain your precious flame.



When you start a fire you establish a link back through the ages with earliest man; a link that is shrouded in myth and legend. You also have an obligation—make sure you control your fire, don't let it burn out of control or unattended. If you are on public land (recreational) please use established fire rings/pits where they exist. If you are building a fire on “native” soil be sure to create your fire with an eye towards “leave no trace”. By doing so you maintain the wilderness experience for the next guy and you have an opportunity to practice your stealth—remember the best fieldcraft is never seen.



The Bamboo Fire Saw

By Ken Seals III

When we first think of friction fires, we all get visions of hand drills and bow drills— and its only natural since these are the most often spoken of, and taught methods of primitive fire starting. I am going to tell you about a method I use from time to time that can be done with one hand and the “tree” you use for it can be used for many other items with little to no work. I am of course talking about the bamboo fire saw method of fire starting.



one-eighth of an inch wide, and one inch long going the direction of the circumference. (See picture 2) You will of course need a bird's nest material, but unlike most friction methods where you transfer the coal to the nest, here the nest will be used to catch the coal. You can use just twine, or even a natural nest you have made or collected, but I prefer to just use the bamboo to make the nest. The outer skin can be scraped with the sharp spine of a knife (see picture 2a) and in short time you will have a good bit of nest, already fluffed and ready. Take the nest and put it on the backside of the notch you just made, and hold it in place with your thumbs, or first fingers (picture 3). Place one end of the unnotched piece in the ground...the other end goes in your chest, just under your sternum.

You can use a shirt, or bandana wadded up to make it a little more comfortable, or if you are a big fellow, you can wedge it into your hip. Place the notch on the edge of the bamboo, (picture 4a) with the back of the notch facing you, and the bird's nest against the notch, with light pressure holding it in place. With a slight downward pressure, and a steady rhythm, start pushing and pulling, or sawing the piece you have in the ground. In a few seconds you should smell the tell tale smell of burnt wood, and see a little smoke... as soon as the smoke rises, increase pressure, and speed. I generally count to ten when I see the edge of the bamboo turn black, and the smoke is rising steadily. Slowly remove the sawing piece and turn it over being careful not to drop the nest that should contain your coal. Take your time, and as with any other method, let the coal grow. Holding your hand under the nest, tap the bamboo with your knife, or other object, sometimes I use the other piece, and the coal should fall out into the nest. With long gentle breaths you should be able to blow the coal into a flame.

Now I know what you're thinking. I said this could be done with one hand, and you're reading back over what you have just read, and you don't see how it can be done. Here is the trick. If you are injured, or like a good friend of mine, have only one arm, there is an alternate method that can be applied. This method is also great to use with children, because two people can work the saw at once, making it a fun challenge for the kids. Prepare the bamboo as you did before, but when you split it into two pieces, we are going to

shorten on piece by cutting off the nodes on each end (see picture 5). The nodes are the sections inside divided by a thin, but dense membrane. Now split the pieces you just cut, so that you have one long piece, one short section with the membrane on each end, and four split pieces (picture 6). Make your notch in the short piece, and place your bird's nest against the notch. Place the section on the ground notch facing up...you may have to place a rock, or other item under the nest to make sure it stays close to the notch so it can catch the coal. Using the four sections you split off, drive one into the ground on each side and each end of the notched piece (picture 7). Now take the longer piece, and place it in the notch, and using just the one hand, you can saw into the bamboo, just as if you were trying to cut it in half. You can also use a shorter piece for the saw with this method, as you are only going to make strokes as long as the node itself.

The process is the same as with two hands, slow and steady, increasing downward pressure as you see smoke, and always saw a little longer than you think you need too. When you have a coal, lift the notched piece off the nest...and slowly lift the nest, fold and blow as before. While bamboo tends to burn fast and hot, it will burn even when it's wet. This is due to the wax coating on the outer shell of the trunk. So if you find a grove of it growing don't be afraid to scrape some tender off it won't kill the tree itself, and I have found that even in the most humid of conditions, you can blow a coal into flame with nest made from bamboo scrapings. It's a little harder to chop than most woods, but the saw from a multi-tool makes short work of it, and it splits with little effort.

I hope this gives you some insight into another primitive fire starting method you can practice, and I hope that you can go out and scout out a place where some bamboo is growing so you can learn even more of the many uses this amazing Tree holds. If you find some, ask the land owner, I am sure they won't mind you tasking it, and practice this skill till you own it. Take the working set, and pack it inside itself, and store it in your pack for future use. From water collection, bows, trap materials, to fire and even food. But those are stories for a future article. Till then, continue to follow the path less traveled.



Fire

By Larry Carr

In the early months of 1991, my Marine battalion just finished a “Red Force/Blue Force” exercise in Twenty-nine Palms, California. We still had one more night to go in the desert but, we did not have to follow the tactical “noise and light discipline” we had for the past four nights. As a twenty-four year old squad-leader, this was not my first time in this desert, so I had my squad grab anything that would burn: dead Beaver-tail cacti, dead Joshua trees, even dead Ocotillo flowers. Although not true—there is an old saying in this desert that you’ll only find one plant on each acre—it is not far from the truth. The ammo cans, which recently held .50 caliber machine gun and MK-19 rounds were soon full of fuel for tonight’s campfire. Despite my years of fire building, in the Boy Scouts and on many canoe trips, this campfire was to teach me the true power of fire.

We stopped somewhere just off the MSR (Main Supply Route) and set up camp. I passed out the MRE’s (Meal Ready to Eat) to my seven squadmembers. Even though I knew we were going to have a fire, I made everyone cook on the trioxane tabs. Despite spending the entire day gathering fuel for our fire, it would not last long. Of course, I got the dreaded omelet with ham. I ate it because I knew I would need the calories. This time-of-year it may be 60-70 degrees Fahrenheit during the day but the water would freeze in your canteens at night. Everyone put on their polypropylene base-layers and donned wool sweaters under their M-65 field-jackets.

Now, it was time to test my new Cold Steel Imperial Tanto. The knife was brand new on the market and I had not tested it yet. I took one of the .50 caliber ammo cans and laid it on its side. This would be a good test, I thought, especially if I am deployed to the sandbox during our next West Pac (a six-month cruise placing us near any military hot spot in the Pacific Rim). The Imperial Tanto was supposed to pierce a car door with ease, according to the advertisements of the day. It performed as advertised and soon I had the ammo can looking like a television without the picture tube. It was not the world’s prettiest fireplace, but after a week in the desert, we weren’t all that pretty ourselves, especially with the remnants of our camouflage grease paint staining our faces. We lit our little fire and sat around our impromptu fireplace like a family watching a sit-com re-run. We reverently took turns feeding our small fire with the silence and respect it deserved. For ninety minutes, our small fire burned and none of us said a word. Though we were not really any warmer than the rest of the Marines in the camp, our little group was peaceful and content, with none of the feet stamping and grumbling heard throughout the camp. That night I realized fire was more than the most important tool humanity has ever harnessed, but food for the soul as well.

A few decades later, I am back in northern Ohio, where in winter, fire can have a far more immediate impact than feeding

my soul. Whenever I build a fire I can’t help remembering that desert night and wondering just how many times this ritual of fire starting played itself out over the course of human history. Every time I fail to think ahead and knock the snow from a branch overhead, only to have it fall onto my fire just before it reaches the self-sustaining phase, I wonder how many have cursed themselves for a fool under the same circumstances over the millennia? How many have burned their lips eating meat removed too quickly from the spit? Could fire possibly be the most commonly shared experience among humans?

These days on YouTube and in magazines, the emphasis seems to be on starting fires the primitive way with hand-drills, bow drills, fire-steels, and even carved ice magnifying lenses, and, although I agree, knowing and practicing these methods may one day save your life—I am all about getting that fire started! When I am out in the woods, and it is near zero degrees Fahrenheit, I am not going to waste my time hunting materials and a constructing elaborate primitive fire starting apparatus, when I have a butane-lighter and piece of paper from my notepad to get that fire started immediately. My calories would be better spent getting a shelter built. Some might argue that it would be better to build the shelter first, and then worry about the fire. Well, in some circumstances that might well be true, but from experience, it takes time to build a shelter, and when your fingers and toes are getting numb, it can be down right pleasant to have a fire to warm them up a bit before continuing to construct a shelter. Remember, “Common Cents” is the only coin accepted when your life is on the line.

What type of fire should you build? That depends on what you need it do. If it’s mid-summer and you just need to boil some water to purify it or to cook your dinner, a small fire is more than enough. Using smaller diameter sticks for fuel will shorten the time to getting a bed of coals, and waste less of nature’s resources. However, if it is mid-winter in Ohio, I am building a larger fire with full-length hardwood logs. I use a variation on the star fire. A star fire is a fire made with four full-length logs with one end of each log touching the others at the center and radiating outward in four directions—like a star. When the end of the log has burnt mostly through, you simply, move the log a little closer to the center point. I only use two logs, as it is easier to reach out of my lean-to shelter to move a couple of logs than to have to get up and move the ones out of reach. I can also keep this fire closer to my shelter. Using the full-length logs also reduces the time necessary to process the wood for the fire, saving my calories for something else.

The type of fire you build is less important than building a fire that makes the most efficient use of fuel, heat, and oxygen. It doesn’t matter if you make a tee-pee style fire, upside down fire, or a log cabin style fire as long as it burns easily. I generally make

what I call the lean-to fire. This is where I take one thicker log and lay it on the ground and place my tinder next to that. Then, I lay my kindling on the thicker log and over the tender, that way air can move easily under the kindling until I have a self-sustainable fire. The fire I prefer for boiling water in my stainless-steel water bottle is the Cherokee fire pit. You dig a small pit in which you will build the fire and then dig a small tunnel to the fire pit to allow air to flow in. It makes a small hot fire and produces less smoke compared to just building a fire on the ground. This fire is good if you don’t want others knowing you’re in the area. It is also easy to put out without leaving a trace that you had a fire there. You must be careful with this type of fire; however, if you catch an underground root system on fire it can burn underground for long time devastating the environment undetected. When collecting firewood for the night, when you think you have enough— double it, then double it again. You won’t like having to get out of your warm shelter to gather more wood in the wee hours of the night.

Lastly, I would like to talk about the least mentioned part of fire construction: the reflector. The reflector is generally a wall of logs or rocks used to reflect the heat radiating away on the far side of the fire, doing you no good. The reflector redirects this potentially lost heat back into your shelter. One trick I use to make the reflector even more efficient is to place some shiny metallic material like aluminum foil over the reflector. An emergency space blanket will work; however, it is made of a plastic material that could melt from the fire’s heat if placed too close. So, whenever you build a fire, take the time to reflect on not only the warmth it brings your body, but also the warmth it brings your heart.



Firewood Basics

By Larry Carr

I can remember as a young boy watching my first camp fire my dad had built on my very first campout. As I sat watching the flames dance about, arms reaching up to the heavens, I was mesmerized and enthralled. Stories of bravery, tales of laughter, jokes both good & bad, and friendships have been made strong by its glowing light. Fire was the center of many ancient ceremonies. Fire is life itself. It is the one thing we must master. Fire makes the damp, dreary, inhospitable woods a warm and comfortable home. Without fire we can't boil our pond water, cook our beetle larvae or heat our lean-to's. Not to mention it helps your body with the all-important task of maintaining core body temperature.

As a boy scout I learned about all the different ways to build a cooking fire and camp fire. There are as many different types of cooking fires as there are knives for different tasks. Many times I have built a cooking fire with the sticks that I gathered from around camp and gotten it to a good roaring blaze only to have it burn out suddenly, or become so uncooperative I couldn't cook with it. Next thing you know dinner is late and you have a hungry mob hovering around you. Not good a scenario since they almost all have six inch hunting knives on their belts. My naïve assumption that any dry, solid stick is good for cooking fires had failed me.



On my quest to learn more about fire-craft I came across the writings of Bernard Mason (Woodcraft, A.S. Barnes & Company, 1939), which this article is based on. I learned that knowing how to build different camp and cooking fire designs is only part of the full fire-craft equation. The other half is learning about different woods, their burning qualities, and how to use them more effectively. We all know about hard woods and soft woods. The general formula is Softwoods for a quick blast that is soon over and hardwoods for a steady, even fire with plenty of coals. But another good rule for cooking is this: Softwoods for quick boiling and baking, hardwoods for broiling, frying, and stewing. The way different woods burn varies tremendously affecting the heat they produce, and the coals they make. For our use, we can classify fire woods into three types;

Class I— Soft Woods, the short lived woods that burns quickly and are consumed quickly.

Class II— Hard Woods, woods that burn slowly, evenly, and produce heat radiating coals.

Class III— “Un-inflammable” woods. Green woods that burn extremely slow.

Class I, Soft Woods

If you're like me, you thought of soft woods as just evergreen trees (conifers) and the hard woods (deciduous) was everything else. But trees are much more diverse than that. Pines are easy to recognize. The mature trees will have straight trunks that are free of branches half way up. Most evergreens are Christmas tree shaped. Dry soft woods make the best kindling and will light easily, but burn quickly down to dead coals. They're great for baking slowly and boiling quickly. The great North American Indians used soft woods for their council and ceremonial fires, when they needed a fire that produced the most light and less heat. There's nothing worse than performing a ceremonial dance in full dress around a blazing furnace in summer time heat. Here is a list of good burning soft woods:

- | | | |
|---|---|----------------------------|
| • Red Spruce, four sided needles | • Balsam Fir, flat needles, dark green top and two white lines on underside | • Chestnut (well-seasoned) |
| • Sitka Spruce, tallest American spruce | • Basswood | • Large Tooth Aspen |
| • White Pine, five needles to a cluster | • White Cedar | • Cottonwood |
| • Pitch Pine, three needles to a cluster | • Red Pine, two needles | • Quaking Aspen |
| • Alder, broad leaves, stalked buds, and small cone like fruits | • Jack Pine, two needles to a cluster | • Red Cedar |
| | • Buckeye | • Soft Maple |

A good fire-craft tip is to hang a pot of water to be boiled over the built fire before you light it. The initial flame and heat produced won't be wasted and will get your pot of moot water to a boil that much quicker, saving you from gathering more wood and burning more calories.

Class II, Hard Woods

Of course when you're out in the woods Mother Nature doesn't provide a grocery isle of different types of woods for you to pick and choose from. We have to use what the wilderness has to offer where ever we happen to make our camp. For cooking, use hard woods for making stews in “Hole in Ground” fires, broiling and frying, and cooking in outdoor stoves and ovens. Use hard woods for building long lasting fires such as a cabin style on a cold night, for melting the lead for making your musket balls, and drying out your wet socks. When its scary story time switch to the low light emitting hard woods to create the perfect atmosphere. Hickories are the best firewood to have. Sugar Maple and Beech are a close second. Black and Yellow Birch are great because they ignite easily, and the bark makes one of nature's best tinder, even when wet. White Ash is the best all-around wood because it will burn almost as well when it is green as it does when it is dry.



The best of hardwoods:

- Hickories
- White Oak, rounded lobe leaves
- White Ash
- Black & Yellow Birch
- Sugar Maple
- Beech, has smooth, pale gray bark.
- Tamarack
- White Birch

These good long lasting hard woods are great if you can find them:

- Apple
- Dogwood
- Hickories
- Holly
- Hornbeam or Ironwood
- Locust
- Mulberry
- Oak; bur, chestnut, live, swamp chestnut, swamp white
- Yellow Pine

Next time you find yourself in a survival situation without your tree field guide and you need to know if that piece of wood you're planning on making a bow out of is a hard or soft wood, use the “finger nail test”. If you can stick your thumbnail into the wood and it leaves a dent, it's a soft wood.

Green Woods for Fuel

Sometimes we will need to burn freshly cut “green” wood. Like at the end of a weeklong campout with your buddies and you've already burned all the dead wood within a ¼ mile radius with your nightly bonfires. How well a green wood will burn depends on the moisture content. The moisture content in a tree is separated into two layers, the outer layers, or sapwood, and the inner layers, or heartwood. Green Evergreens vergreens have far too much moisture in both layers to burn efficiently. Hard woods by nature have less moisture in them, but some hard woods have more moisture in the heart wood then others. The best time of year to cut a green hard wood is winter, and on high ground. Trees close to bodies of water and water ways will have more moisture in them. Green White Ash has very low moisture content in both its sap and heartwood.

- | | | | |
|---------------|----------------|--------------|-----------|
| • White Ash | • Beech | • White Oak | • Hickory |
| • Sugar Maple | • Yellow Birch | • Soft Maple | |



Class III, Un-inflammable Green Woods

Many times we need wood for uses other than burning. Some examples are a reflective wall, the side logs of a hunter-trapper fire, pot hooks and hangers, cranes, and Indian waugans, broilers and grills.

Here is the list of “Uninflammable” wood or extremely slow burning green wood:

- | | | | |
|-------------|--------------|----------------------|----------------|
| • Black Ash | • Butternut | • Hemlock | • Sassafras |
| • Balsam | • Chestnut | • Red Maple | • Serviceberry |
| • Basswood | • Cypress | • Red & Water Oak | • Sycamore |
| • Buckeye | • Elder, Box | • Pitch & White Pine | • Tamarack |
| | | | • Tulip |

Spitting & Crackling Woods

How many times have you slept next to a warm, crackling fire to wake up the next morning to discover holes in your ground cloth, or worse, your \$400 dollar sleeping bag? Knowing which woods will launch more flaming balls of fire than other woods is just one more reason to learn how to ID different woods.

Here is a list of spitting & crackling softwoods that sleeping bags detest:

- | | | |
|---------------------|--------------|---------------|
| • White & Red Cedar | • Spruces | • Chestnut |
| • Alder | • Soft Pines | • Tulip- Tree |
| • Hemlock | • Basswood | • Sassafras |
| • Balsam | • Box Elder | • Willow |

“I have never been fortunate enough to go into the field with someone who would name the plants, birds, insects, mammals, or other wild things for me. It is all in text books someplace, just waiting for you to read it and take that knowledge into the field. To become proficient at anything, it takes a lot of study in the field, the library and the lab.”

*- Boyd Shaffer
The Botany News
Kenai Peninsula
Botanical Society*

With over 600 native trees in the United States it would take a long time to learn every tree out there. If you start out with just the basic, most abundant and useful trees in your area, you’ll be off to a great start. Studying trees is a lot like walking down a busy main street. You are surrounded by people you don’t know and barely notice them, until you bump into a friend. You may have even noticed him from far off. You know all about him, his likes, dislikes and where he lives. It is the same with trees, as you get to know your wood-en friends you’ll notice more and more friends on your scouts. Keep a good tree book in your pack and add one tree to your mental arsenal every time you venture out to your personal space. Pretty soon you’ll be able to leave the book at home. In the words of Cody Lundin “the more you know the less you need”, and one less field guide book that I have to carry in my pack the better.

Let’s be honest, when you’re freezing your butt off in the winter or just cooking up Mr. Squirrel caught in your snare, you’re not going to care if your using sassafras or tulip wood. But if you need to find emergency tinder, build a strong bow, or even build a replacement pack-basket out of brown ash you’ll need to have a better assortment of trees in your mental tool kit to make the right choices and save time & calories.



Finding Dry Tinder

By Zeb Allison



PHOTO 1: CEDAR BARK
TAKEN OFF TREE IN
THE BACKGROUND.

Cedar & Cottonwood

I think my first resources when finding tinder in my neck of the woods is cedar bark. (See photo 1) What you want from the cedar is the inner bark. This layer is almost always bone dry. One thing you can do with it is to tear it into thin strips and

rub it against each other in your hands. Got an injured hand? Rub the bark on a rough rock, no rough rock? Rub it on your boot, no boot? Well you better hope you don't need tinder if you don't have boots.

If I couldn't find a cedar tree I would look for a cottonwood. The inner layer of cottonwood bark is good for many things such as rope, tinder and twine just to name a few. But in this article it is just the tinder we are concerned about. What you do is simply take a knife, hatchet, machete, or whatever else you have and cut off a large chunk of it. (See photo 2) Now the next step is to strip off the cordlike strands of the inner bark. These should be dry unless it has just rained. If it has just rained shove them in your shirt your body heat should dry them off shortly. I think that sums up cedar and cottonwood for tinder. Now, on to the next tinder resource...

Cattail & Leaves

Cattails themselves are not tinder. It is the head you want. (See photo 3) Cattails grow throughout America and in some other countries as well. Cattails tend to grow near still or slow moving water. Once you find the cattail grab it below the head and give it a quick snap. Depending on the time of year and weather, the cattail head may be busted open. If it is just take the fuzz off of the head. This is the tinder you want. (See photo 4) It doesn't really



PHOTO 3: CATTAIL FUZZ MAKES
GREAT TINDER WHEN PUT ON TOP
OF ANOTHER TINDER MATERIAL.

Finding dry tinder material for a bird nest can be very difficult. It might not be as hard to do on a sunny day when you are in good health and you aren't hungry but imagine a situation where you were in a plane crash or fell and broke your leg or wrist. If you have a lighter you are already at an advantage. A lighter gives you something that almost nothing else can, a flame. Now with a bow drill, hand drill or ferro rod you have the potential to get a fire. This can be done and successful most times but never bet your life on it. With a lighter you have a flame without primitive friction fire. If you get a coal with the ferro rod you get sparks. True the coal or sparks are hot but you've got to remember water won't burn. There are many ways to find dry tinder, or just tinder itself. That is what I will be discussing in this article, finding the right materials. When you think of tinder you probably think of wood chips or cotton. While these items will work, more often than not you won't have cotton or wood chips available. Preferably tinder is a dry fluffy substance used to make a flame, spark or coal into a flame; with that said its time to discuss the tinder.



PHOTO 2: COTTONWOOD BARK
MAKES MORE TINDER THAN YOU
MIGHT THINK WHEN SHREDDED.

matter if it is wet or not but if it is just put it in your coat for about five minutes. This type of tinder ignites better than cotton and is easier to find than cotton. The next type of tinder I will discuss are leaves... Leaves are not the best tinder ever but if you know what you're looking for they can work. Most people would look for leaves under a tree, or on the forest floor. This can work but what if it has just rained? You could put them in your coat but they dry off slowly. They need time to dry. So your only option is to find them where they are dry. But where should you look? If it is raining where is there a dry place? Caves and large crevasses under rocks are a great place to find dry leaves. (See photo 5) Often animals will make these spaces their homes. They have picked that spot because it is warm and dry. That is the perfect place to look for leaves. Often time animals will bring in fluffy things such as cotton or animal fur. All you need to do is look under the rock or cave and pull out a couple of handfuls and there you go, warm dry tinder ready to ignite. Now with that being said don't use this technique unless you really need to, a handful of tinder to an animal is a day of work and a night of coldness.

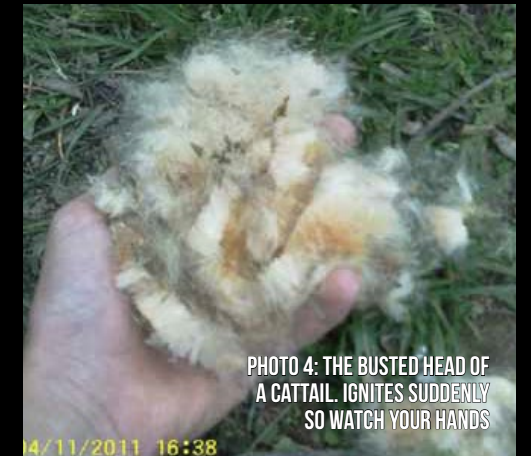


PHOTO 4: THE BUSTED HEAD OF
A CATTAIL. IGNITES SUDDENLY
SO WATCH YOUR HANDS

Char Cloth

Char cloth is probably the ultimate tinder; char cloth is made by putting cotton cloth in a sealed airtight container. A metal water bottle works great. You cut the cloth into pieces about 1" by 1" and put it into the container. Make sure no air can get in. Put the container on a bed of hot coals for about five minutes then take it off of the coals, but don't take off the lid until the container has cooled off. Once it has cooled off take off the lid then remove the cloth squares which at this point should be black. If they are not, repeat the first step until they are. This type of tinder should be pre-made and packed in your survival kit. The reason they turn black is because the heat takes out the impurities of the cloth leaving nothing but dry cotton behind. (See photo 6) This type of tinder



PHOTO 6: NOTICE THE BLACK
PART OF THE CLOTH THIS WILL
TAKE AND HOLD A SPARK EASILY.

will take the tiniest spark you can imagine if you have a good carbon steel knife and a piece of flint.

Bamboo

Bamboo is not a very common resource of tinder but it can be used if it is available. The bamboo itself is not what you want, it is the shavings. Hold your knife at a ninety degree angle over the bamboo and rub it back and forth over it. This should create something that looks like sawdust except fluffier. This is more of a lighter or ferro rod type tinder although it can be used with bow drill, hand drill, and other friction fire methods. There is also a tinder specifically for bow drills or hand drills called the one leaf tinder bundle, but it is very difficult to explain and very hard to use. It is best to just stick to the tinder materials that I have discussed. That sums up this article but never forget to be creative. Survival and bush craft is all about thinking outside the box, and always keeping a positive mental attitude.



PHOTO 5: GREAT PLACE TO LOOK FOR
TINDER. IT HAS RAINED FOR TWO DAYS
AND I STILL FOUND DRY LEAVES.



Flint and Steel Fire Makin'

By Craig Caudill



PHOTO 3, FLINT PIECE, "JUST RIGHT".



PHOTO 2, FLINT PIECE WITH AN EDGE THAT IS TOO DULL.



PHOTO 1, FLINT PIECE WITH AN EDGE THAT IS TOO THIN.

One of the easiest and fun ways of getting semi-primitive fire is to utilize the flint and steel method that was so commonly utilized by the frontiersman and pioneering families of early America. There are three main pieces of this fire making puzzle and we are going to cover the materials of each as well as the various methods of working them together to obtain fire.

The first piece to this fire making puzzle that we will discuss is the flint and other useful rock material such as chert. Flint can be found throughout the world but obviously some places are better than others. As for locating and or finding it, one of the best places to go looking is in a creek or river bed or along other drainages where most, if not all, of the earth has been washed away and there is ample amount of rock exposed. The actual names of the types of flint are varied and by talking to any good flint knapper you will find they have a wealth of knowledge to educate you on the subject. Do not expect to go out and find copious amounts of ready-to-strike flint. This is where it pays off to have some basic skills in flint knapping yourself or to have a good flint knapping buddy that gives you plenty of leftover rock. If you intend on doing it yourself, which is what I recommend, this invaluable skill will allow you to be more self-reliant. To make a good piece of flint for striking, you must first break off a smaller piece of flint. You will break this off from a large flint rock which is otherwise known as a flint spall. Do this by "hammering" the



PHOTO 5, TINS FOR MAKING CHAR CLOTH



PHOTO 4, PATHFINDER BLANKET PIN STRIKER ON THE LEFT, BASIC STRIKER ON THE RIGHT.

spall with another rock that causes the larger rock to break. You will often have pieces of flint when doing this that range in size from tiny fragments, up to pieces nearly the size of the flint spall itself. What you are looking to obtain with this process is a piece of flint that fits in the palm of your hand and is in the neighborhood of one-half of an inch thick. What you also are looking for is a piece that has an edge to it but is not too sharp. (See photo 1). A piece of flint that has an edge too thin and sharp will often times simply break away when it is struck with the striker. On the other hand, a piece of flint that is too "dull" will not give you the needed edge to "slice" off tiny slivers from the steel striker. Once you do this you can get the piece you want and carry it with you. Personally I try to keep an almost finished spear point in the flint and steel kit that I carry, so that it can easily be knapped into something useful such as a cutting tool if the need arises.



PHOTO 6, STRIKING WITH CHAR IN TINDER BUNDLE.

and are really fond of, mainly because it serves more than one purpose in our kit. It is blanket pin, a leather/material awl, even a belt buckle if you choose, and the obvious usefulness for our purpose here, a flint striker (check out Dave Canterbury's YouTube video on the subject to see him demonstrating its many uses). The flint striker on the right is another very basic model that is very common. Also keep in mind the need to "use what you have" and use what you can find at the time. Any kind of high carbon steel will do including something as simple as the back of your knife or a steel tool that may be around at the time such as a file or center punch.

The next piece of this puzzle that you need is the flint striker itself. You will need to utilize a piece of high carbon "tool steel". You will most certainly not get the desired results from stainless steel. Steel strikers come in all shapes and sizes and are basically left up to the imagination of the blacksmith who makes it as to how they appear. Photo 2 depicts two basic kinds of strikers. The one on the left is one that we purchased from the Pathfinder store



PHOTO 8. AUTHOR'S SON PREPARING TO START A FIRE WITH FLINT AND STEEL.

The last piece of this fire making puzzle is not a required piece to get sparks, however it will prove to be an invaluable tool to take those sparks to a tinder bundle and get the beginnings of your fire. This last piece we are speaking of here is char cloth or other char material. An in-the-field natural option for this, but an unreliable one, is to find an old fire pit or a tree struck by lightning and pull out or off of it a piece of burnt, natural material and make sure it is completely dry. Again this is unreliable and we recommend you make your own. You are in essence going to take material and burn it until it is nearly consumed by fire and/or heat, but not entirely. Think of this material as being an extremely thin piece of charcoal. It is important when making char cloth that you only use natural materials such as cotton, hemp or even dried grasses or tree bark. Typical material that you can find around the house that seem to

work well are cotton t-shirt, denim from worn out blue jeans, or old flannel shirts. No need to buy material for this purpose, simply use those old clothes that have already found their complete usefulness and are about to find their way to the trash. Again, it is worth emphasizing it, you should not use material that is man-made. Only use natural materials. Manmade materials have synthetics in them (think polyester) and will simply burn and melt in the next process we will describe.

To make char cloth you need to have a metal container to hold some of this material. Photo 3 depicts a metal container on the



PHOTO 7. STRIKING WITH CHAR ON PIECE OF FLINT.

left that is made for this purpose and another version on the right that you can make from common household trash. Put your natural material into the container and place the container into an already made fire that has plenty of coals. Yes, this is one of those pieces of your kit that must be made before you need it and carried with you. Make sure that this metal container has a way of allowing oxygen into the container but not much. The easiest way to do this is to punch a small hole in the container. What you are trying to achieve is to put this container in the fire and allow it to get extremely hot so that the material in it almost ignites. You can watch this process closely while your container is in the fire. If a flame is coming from the container then the material will be consumed and you will only be left with ash. However, if there is not enough oxygen in the container the material will not be able to be completely consumed. It will turn it to this entirely useful stuff we are calling char cloth.

When you open the tin the material should be black and not turned completely to ash.

Now we will discuss the process of putting it all together. We have found that there are two basic methods for this next step and people get kind of particular as to which one they think is the better of the two. What we suggest you do is practice both and any others not depicted and find the one that works best for you.

Method 1 (see photo 4) involves striking the striker against your flint such that sparks that are created and fly off into a piece of char cloth that is lying in an already-made tinder bundle. **Method 2** (see photo 5) is where you take a piece of char cloth and place it on top of the flint. You then strike the striker against the flint so that sparks come off and land on the char cloth. You then transfer this piece of char into an already made tinder bundle. Expect your char to glow in the area where it catches the spark but it will not burst into flame. If you have not done this before you will probably be surprised at how fast the char actually “takes off” after catching a spark. Please note that what you are actually doing is knocking off tiny pieces of very hot steel. It is those pieces that make the sparks you will be seeing. If you are having trouble producing sparks then simply change the angle by which you are striking the pieces together. A steeper angle is better whereas a 90 degree doesn’t serve to “cut off” the tiny slivers of steel well enough.

There you have it. From tinder bundle to a full fire is another process worthy of an article in and of itself. Suffice it to say you must slowly blow and nurture the bundle until it makes flame and utilize it to get a fire started with small, then larger woody material. You can then warm up that core body temperature or roast you some nice venison over the fire.



Understanding Fire

By Jim Miller

You know of fire as one of the 4 essential Earth elements. We depend on it to cook our food, boil our water and keep us warm and dry. It is one of the most critical tools to have at our disposal in a wilderness environment, yet not everyone really understands how it works.

In this article, we will discuss some of the science and principles of fire, and how that pertains to constructing and maintaining a fire. Simply put, fire is a chemical reaction that converts fuel (potential energy) into kinetic energy in the form of heat and light.

What is needed to make fire?

Four things are needed to start and maintain fire; heat, fuel, an oxidizing agent (normally oxygen), and a self sustaining chemical reaction. Together these make up a model in fire science known as the fire tetrahedron.

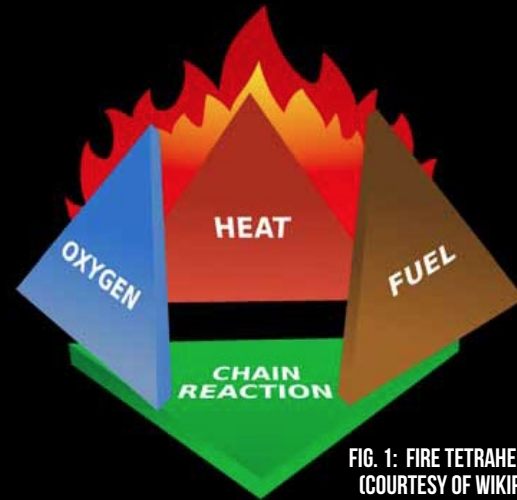


FIG. 1: FIRE TETRAHEDRON. (COURTESY OF WIKIPEDIA)



FIGURE 2: TWO PHOTOS TO ILLUSTRATE WOOD BEING BROKEN DOWN TO SHOW INCREASING SURFACE AREA.



FIGURE 3: TWO TEEPEE FIRE LAYS. THE ONE ON THE LEFT IS SET UP TO PROVIDE MORE OXYGEN. THE EXAMPLE ON THE RIGHT IS MORE DENSE AND WILL LACK SUFFICIENT OXYGEN.

Heat can be generated in a number of ways including spark, friction, light, chemical reaction, etc. The fuel is what is burned. For this discussion we will limit fuel to “Class A” fuels, or ordinary combustibles such as wood, leaves, paper, etc. The chemical reaction must produce enough energy to keep the fire going. The oxygen is provided by the air that surrounds us.

When heat and oxygen are combined with a fuel in the proper ratios, it is possible to start a fire. Once the fuel adequately ignites, the chemical reaction takes over and either maintains the current fire, or causes it to grow by spreading to other nearby fuel. Solid fuels such as wood are heated by the fire, which causes them to chemically decompose and release flammable gases. The flammable gas is what actually burns. In Fire Science this process is known as pyrolysis. The burning gas releases more heat, which continues the chemical reaction.



FIGURE 4: A DENSELY LAID FIRE LAY THAT IS NOT GETTING SUFFICIENT OXYGEN.



FIGURE 5: THE AUTHOR ADDING SUPPLEMENTAL OXYGEN BY BLOWING INTO THE FIRE.



FIGURE 6: THE SAME FIRE LAY, NOW WITH ENOUGH OXYGEN.

Why won't it burn?

If you are having trouble getting a fire started or keeping it going, you do not have enough of at least one of the essential components of fire. Wet fuel has trouble reaching its ignition temperature. This is how insufficient heat will keep your fire from thriving. An overly dense fire lay will rob your fire of precious oxygen. We've all seen the know-it-all that manages to get his tinder burning, only to add so much kindling to the tinder so fast that he completely smothers the fire and puts it out.

If you cannot get the fire started initially or can't maintain the fire that did start, you will need to do a little troubleshooting and take some corrective action.

If you get tinder started but the kindling or fuel will not catch, there could be numerous things wrong. A classic mistake is to try to ignite fuel wood without getting enough kindling burning to catch it. If this is the problem, the fuel is too big to ignite from the available flames. You can remedy this by adding surface area (the amount of exposed surface) to the fuel by cutting it into smaller pieces. This will increase the "surface to mass ratio". (Photo 1) Consider a 10 lb log. Undoubtedly, you would have real trouble trying to get a 10 lb solid piece of wood to light with a match. That is because it is made up of one solid piece of fuel. The amount of surface area for that amount of wood is very low. Now split that log into smaller pieces, and it would be easier to light. Split the wood again and it would get even easier. In fact, the more surface area you can create for the fuel that you have, the easier it will be to get the fuel to burn. That is the whole premise of starting with tinder (high surface to mass ratio), then moving to kindling and fuel wood, which have decreasing surface to mass ratios. Note that the lower the surface to mass ratio, the slower the fuel will burn.

If you cannot get the fire to spread to other perfectly dry fuel, change the position of the fuel. Heat rises, therefore fire will spread faster when the available fuel is in a vertical position. This is why the tepee fire lay is so effective. The more vertical your fuel

supply, the faster and easier the fire will spread. Horizontal wood will burn slower than vertical wood.

If you have a good fire lay set up but you cannot get it to catch, you may not have enough heat to support the ignition. This is often what stands in your way while trying to start a fire through friction or concentrating sunlight through a magnifying glass. You may need to try harder or a different method to produce the required heat through friction, spark, light, etc.

If you have enough heat, but the tinder won't catch, you might need to try some different tinder. Tinder has to not only catch a spark, but it also has to burn long enough to ignite the kindling. This is why something as simple as petroleum jelly saturated cotton balls work so well. The cotton catches the spark or other heat source, and acts like the wick of a candle while the petroleum jelly burns long enough to spread the fire. If the tinder isn't your problem, it may be the fuel itself. For example, wet wood does not burn well because it is hard to get to its ignition temperature while it is wet.

If you get the fire going but it just seems to smolder and put off a lot of smoke, you might not have enough oxygen. The best way to ensure enough oxygen is to build your fire properly in the first place. Try to position your fire lay so that you have adequate wind blowing into it. Don't build your fire lay so that it is so dense that your fire can't breathe. You want your tinder/kindling/fuel close enough together so that the fire can spread, but not so close together that the fire suffocates. If your fire is smoldering or needs more oxygen, you need to either get down on all fours and blow into the fire or wave something in a fanning motion to create wind to provide the additional oxygen. Be sure to take a deep breath before you get your face down next to the fire so you don't get a lung full of smoke or other fire gases. This should help fan the flames and spread the fire.

Remember, it is best to think of your fire as a living thing. It needs to breathe (oxygen), eat (fuel) and stay warm and dry, just like you. By remembering the four essential components to support combustion, you will be able to troubleshoot a distressed fire, and it will even help you prepare by building a proper fire lay in the first place.



Numyth Vulcan Fire Piston

By Andy Blanchard

In this Woods Monkey feature we will be taking a look at the Numyth Vulcan fire piston. Functional woodland ally, entertaining conversation piece, or fire nemesis. Let us take a look and learn together.

Some of the gear we tote along with us on our outdoor forays is pure function, some pure entertainment, and some things are a happy mix of the two. For me the fire piston usually fell into the entertainment category. Follow along with me as I have a change of heart about this historically valid fire making tool. The Vulcan fire piston is the brain child of the proprietor of Goinggear.com, Marshall Hoots. I got to meet Marshall this year at the Blade show and all I can say is that it seemed like I was immediately friends with him. Like so many of our outdoor specific business and vendor friends, he was like minded to the Monkey troop. He and his staff were friendly and knowledgeable about the products they offered and the outdoors in general. Marshall started a new company called Numyth and he intends to use it to bring some exciting new woodland tools to market. The first of which is today's piece of fire making woodland gadgetry – the Vulcan fire piston.

How a Fire Piston Works

I have always had a fair hand with fire making. Even in my rookie days in the Boy Scouts I was typically one of those boys that could coax a flame from whatever was on hand. The first time I pestered a re-enactor into showing me how to use a flint and steel set at a local rendezvous I was about twelve. I was fairly successful and that kindled an interest in the primitive methods of fire making that has stayed with me for years. If you're like me you may have heard of a fire piston but maybe you never got a good lesson in the working mechanics or the theory behind it. Knowing these things can turn a frustrating series of failed attempts into a more pleasing session of honing skills. Let's begin with what components any fire piston should have before we go into the specifics of the Vulcan fire piston. A fire piston is typically made from sturdy materials like bone, hardwoods, horn, metallics, and more recently high density acrylics. The piston usually has an oversized handle or head to ease the impact when the piston is driven into the bore. This piston has a fit section that allows a good seal in the bore of the companion piece of the piston. Documentation puts this tool on the scene as early as the seventeenth century but it's widely believed that these tools were used in Southeast Asia and the Pacific islands much earlier than that. Most often there is a notch in the face of the piston to accept tinder. When the two pieces of the piston are compressed or driven together the piston



compresses the gas in the bore to extreme pressures. Suffice to say that a gas, when compressed, takes on heat. This is what occurs in the operation of a diesel engine. In a diesel engine there are no spark plugs. The pressure in the cylinder is simply high enough so that when it compresses the diesel fuel the fuel and air in the cylinder take on the heat from the surrounding area and boom: explosion, or combustion, without a spark. This is exactly the way in which a fire piston is able to ignite a small ember in the tinder notch.

The Numyth Vulcan

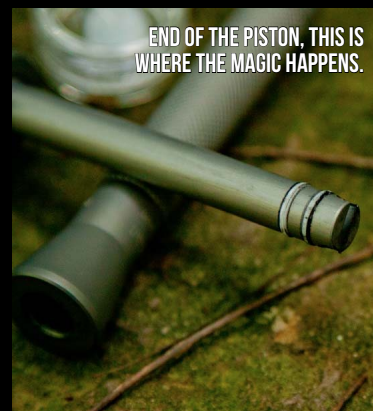
Now that we know the way it works let's look at the specific design innovations Marshall has brought forth with the Vulcan fire piston. First, he has chosen to use aircraft grade aluminum. Light weight and corrosion resistant this is a great application for this



material. The Vulcan fire piston can be broken down into four main pieces. Assembled and closed the unit is 4 7/8 inches in length. The handle, or plunger top, has a removable cap with an O-ring that seals a chamber suitable for carrying tinder. The handle tapers down below this section to fit the bore of the accompanying piece. At the distal end of the piston shaft we find a double O-ring seal to get maximum compression. The tinder notch is a crescent that actually retains the tinder quite well. The piston body is also aircraft grade aluminum and has a removable tip sealed by square cut threads and an O-ring seal. The tip has a hole in it for a lanyard. Interestingly this removable end also allows you to carry the fire piston fully compressed or inverted without concern of it falling out. Most fire pistons don't have a removable end so you can't fully seat them. Since you can release the compression or vacuum in the bore by means of this removable end it opens up many options. This removable end is one of the greatest innovations to me, I'll explain a little more about that soon.

Time to Make Some Life Giving Fire

I can't say my trials with the fire piston were all pleasant. I've played with others before this one and had mixed responses. So much so that a fire piston has never been a part of my kit, until now. I never had anyone practiced with one showing me how to





do it, or the tips and tricks, so in addition to talking about the Vulcan specifically, I also want to give you some pointers that might put the fire piston in your pocket or pack instead of in the drawer. Let's start with the basics here. We are essentially trying to start a fire, and what does fire need? Oxygen, fuel, and heat. We described how we are going to generate heat. The fuel will be provided by charcloth we put into the tinder notch. You can also use natural tinder like tinder fungus. Now, a word on the oxygen component. This is really obvious once I figured it out but I admit it took me longer than it should have to decipher. Once you plunge the piston you have compressed the gases in the bore and spent them. Repeated tries may not contain enough oxygen to ignite the tinder even if your technique is perfect. The great part about the Vulcan fire piston is the removable end. You have but to take it off and swing the piston around in the air a little to recharge it with oxygen from our atmosphere. This also leaves the bore open at both ends so you can run a rag or pipe cleaner through it should it get gummed up or wet. I feel that this one fairly simple thing was my key to success with a fire piston. Purging the piston bore took my success rate up enough to justify it in my kit as a viable means of ignition.

Using the Vulcan

I will give you the blow by blow as it were here, but I do recommend taking a trip to Youtube. Marshall has a great little video up that goes over the Vulcan fire piston tip to tail and shows a great technique. The thing to pay attention to is the move he does immediately after he finishes the compression. He snatches the base of the fire piston the second he has struck, and continues to raise the bore side piece up and off the tinder. The reason this is important takes us back to oxygen. The compression of the bore gases is what generates the heat to a degree high enough to achieve combustion of your tinder. But once that combustion is achieved it begins to deplete the oxygen in the relatively small bore very rapidly. That is why speed is needed here. A properly loaded fire piston from compression to retrieval or separation of the bore should be somewhere in the neighborhood of one second or less. That seems undoable at first but the mechanics are simple and you can get good at it really fast. It just takes practice.

Start off with finding the area in which to try your fire piston. You want a solid surface to strike on but not a rock or really hard wood that might damage it. A log or a hard packed section of ground will likely be fine, you may even get away with the palm of your hand but repeated attempts can bruise. Next, load a small piece of charcloth into the tinder notch. This should

not be any wider than the tinder notch so as not to interfere with the seal. Check your end cap and O-rings, apply a conservative wipe of grease if they're dry. Place the piston into the bore just enough to engage both O-rings. Placing the larger end down, hold the fire piston in your hand and take a practice swing. Speed is required but not as much force as you'd think, you need to achieve full compression and get it open quick. Swing into the striking surface fluidly without hesitation. You may feel a rebound upon full compression being achieved, possibly an audible "whoof" or a puff of smoke. The moment you hit the striking surface, swing in with your other hand and snatch the large end or the piston, pulling them apart. If you don't have an ember check your tinder, O-rings, purge the bore for oxygen, and try it again. Once you have an ember you can tip it into another larger piece of charcloth or a tinder bundle you have prepped ahead of time. Blow it to life and sit back and enjoy the connection you made to a technology that is possibly older than 400 years but, thanks to the innovations of Marshall Hoots, is still relevant for today's modern woodsman. I have learned a great deal in this review and I hope the experience is similar for you.

The Numyth Vulcan Fire Piston retails for \$34.99 and can be found at Goinggear.com.



Primitive CharCattail: Nature's CharCloth

By David "Mitch" Mitchell
Photos by Mike Belleville

In a Self Reliance situation, fire is incredibly important as it provides warmth, disinfection of water, container making, tool making, food cooking and preservation, signaling etc. Being able to make fire as easily as possible is the name of the game. Primitive methods like bowdrill and handdrill work well, but their downside is a large expenditure of calories and time producing the set, and then using the set to produce an ember, which is not always guaranteed to work.

The ability to use Charcloth gives you almost an instant ember when it is ignited by a spark saving you the calories needed to make your "Next Fire". Remember Charcloth is made from 100% cotton cloth, which is a natural product from a plant source. Here's the first dilemma - usually the only 100% cotton you have with you is your clothes! We will source our "cotton" from another plant commonly found in the woodlands, cattail. A metal container is used to starve the cotton of oxygen during combustion, charring but not burning the material. Here's the second dilemma - if you have a metal container with you it is most likely holding your water. Not everyone thinks ahead and carries a little metal container loaded with cloth on them at all times to make Charcloth, but even if they did they would run out of cloth in no time. So what is the solution? Primitively charred cattail!

The process is simple, apply heat to the seed head and starve it of oxygen to prevent combustion and cause charring.



To Get Started!



1. Dig a Small Hole Beside your Fire.



2. Place the Buffed Out Cattail Fluff in the Hole.



3. Lightly Cover it.



4. Mark the Spot with a Small Rock.



5. Move your Fire Over the Buried Tinder.

Now it's a waiting game, or rather a multi-tasking game! You're free to check your traps, gather edibles, make cordage, and work on other projects. The amount of time depends on how dense your cattail seed head is, how deep you buried it, how hot your fire is, quantity of seed head buried, how much you teased it, etc. Rest assured somewhere between fifteen minutes and an hour your cattail has charred enough to catch a spark, and turned into CharCattail!

The Unveiling!



1. Move Fire to Original Position, Uncover the Cattail.



2. The CharCattail Finished.



3. Flint and Steel Ignition!



4. Flint and Knife Ignition!



5. CharCattail Ember.



6. Place in a Tinder Bundle This one is Raw Cattail and Birch Bark.



7. Blowing Tinder Bundle into Flame.



Success! By owning this skill of producing primitive CharCattail, you will make your “Next Fire” quicker, easier, and with less calories spent! This also brings up an important concept in Self Reliance I use... Primitive Mimics. Primitive Mimics are when you devise a way to replace a modern item with a natural primitively made item. Case in point, CharCattail is a Primitive Mimic of CharCloth. By learning and mastering Primitive Mimics you will be less reliant on modern gear as you can make primitive gear in the field that replaces it and serves the same function! Now get out there and make the Primitive Mimic of CharCloth.....CharCattail!!





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