WILDERNESS SURVIVAL – FIRE

Fire is essential in a survival situation. You need fire to warm yourself, cook your food, sanitize your water and it even helps to drive off bad thoughts that tend to come. If you get into a survival situation and you don't have a lighter or matches, how do you make fire?

Matchless fires have been made for thousands of years. It was a way of life until we invented sulfur matches. Many ways have been devised to start matchless fires. These ways can be grouped into five categories; electrical, solar, compressed air, spark and friction fires. Because we are more interested in the old traditional skills, we will not get into the chemical ways for starting matchless fires. We are including electrical because there are ways to make fire with a flash light.

There are a few things we need to know about fire that help us to achieve our goal when making a matchless fire. Fire needs three things in order to exist - heat, oxygen and fuel. Without all three you cannot have fire. **Matchless fires are not easy to do so understanding these three things is critical.**

When making matchless fires you will need to do them in steps or stages. Some fires can be done in one stage but most fires will take at least two stages. The first stage will be catching either sun rays, a spark, flash from compressed air or hot dust (called an ember) created by friction. The second stage will be putting this into some kind of tinder bundle and then blowing that into a flame. Sometimes three or more stages will be needed to get flame.

TINDER BUNDLES

When making tinder bundles, there is one critical thing we must drill into our heads because it can be the difference between success and failure. If you go to all the **work** to get an ember from a friction fire, you want your tinder bundle to work and not fail you. **It is very important to understand that edges catch fire easier then surfaces do**; therefore, our tinder bundles need lots and lots of small fibers that create lots of edges.

When making a tinder bundle, you want the inside of the bundle to be very fine, like hair. Any of the plants that make fuzz such as dandelions, thistle or cattail tops, can be used for this purpose. If these are not in season, you will have to find some very fine grass or the inside bark of a dead tree and shred it up very fine. Just outside of that in your bundle, will be thicker grasses or dead dry plants such as ferns. There are lots of things that can be used, just make sure what you use is dry and has lots and lots of edges.

It is good to learn how to make a tinder bundle from the wild and you should practice doing so just to see how well it works; but there will be lots of times you will want to practice your fire technique and you don't want to have to spend time finding tinder material from the wild. At these times I recommend you go to the hobby store and buy some macramé string.

Macramé is made from jute, which is a plant fiber so it behaves just like the materials you would find in Mother

Nature. To make a quick and easy practice tinder bundle, cut a piece of jute about six to eight inches long, separate the individual strands and unroll those to get the hair like fibers to make a hair ball for the inside of your tinder bundle.

FUNGUS USED FOR MAKING FIRES

There are two kinds of fungi that work well for making fire. The first is Chaga or tinder fungus. It likes to grow on the damaged parts of white birch trees. When you find it, the outside looks like it has been burnt. The part you want is on the inside of the fungus. It will look light brown and feel soft. This is my favorite for catching solar rays. The other is Horse Hoof Fungus. It also grows on white birch and beach trees. It gets its name because it is shaped like a horse hoof. The part you want is just under the hard crusty surface. It will be a thin layer of soft shami like material.

FIRE FROM ELECTRICITY

Everyone knows that an electrical short can and has burned down houses. You may be in a stranded car and have a set of jumper cables or some heavy gauge wire. These can be hooked up to the battery and touched together to make a spark that can be used to make fire. If you have a piece of fine steel wool and a nine volt or cell phone battery, you can touch the terminals to the steel wool and start it burning then blow on it and you can ignite other materials. If you chew gum, some wrappers have foil on one side and paper on the other. If you twist the wrapper in the middle and then take an AA, C or D size battery and tightly hold the foil side over the ends of the battery, the current from the battery will make the foil hot enough to start the paper on fire. This has been nicknamed the prison match because prisoners would do this. These are just a few of the fires that can be made with electricity.

FIRE FROM THE SUN

Solar fires are started from the sun and they fall into two groups*, reflection* and *refraction*. Most of us have played with a magnifying glass at some point and felt the heat that it can generate. This is from the glass bending all the sun rays so they come together at one point called *the focal point*. When we bend sunlight to a point, this process is called refraction. Some possible sources of lenses could be a camera lens or the far end of binoculars. A clear bag of water can a piece of clear ice can also be shaped to do this so they could be used as a fire starter.

The other way to use solar is reflection. Reflection is when you bounce the light back to a single spot or focal point. SundanceSolar.com sells a solar fire starter that does this. Women use magnifying mirrors that can be used. I teach how to take a flashlight apart, take the bulb out and put some tinder where the bulb was (Chaga works well for this) point it at the sun and the sun will start the tinder smoldering, this can be a first stage. Put the smoldering tinder into a tinder bundle and blow it into a flame.

FIRE FROM COMPRESSED AIR

Air when compressed fast and hard will flash. Long ago in places where bamboo grows they would use this feature by taking a section of bamboo, cutting it so one end is open and the other end is plugged, then a small hole would be

drilled into the plug. Some tinder (most of the time it would be old dry punk wood) would be placed on a hard surface such as a rock and the hole in the plugged end of the bamboo would be placed over the small pile of tinder. A rag that had animal fat smeared on it would be wrapped around a stick and stuck into the open end of the bamboo. This needed to be tight in the bamboo. Then while holding the bamboo over the tinder a rock would be used to smack the stick driving it down into the bamboo. This would cause the air inside the bamboo to flash and start the tinder to smolder. Placing the smoldering tinder into a tinder bundle they would then blow it into a flame.

A German engineer with the last name of Diesel saw one of these in action and it gave him the idea to design the diesel engine that is used today. Today you can buy these devices on the internet or make your own. They are called fire pistons. There will be a stick part that will insert into a cylinder. The stick part is called the piston. In the end of the piston will be a cavity and you will put some tinder into that cavity. Char cloth, Chaga, Horse Hoof and a lot of other things can be used. The piston will have some kind of seal that needs to be lubricated (I use chap stick myself). When inserting the piston into the cylinder, you must smack it with some force. It is important that you pull the piston out of the cylinder as fast as you can because the oxygen inside has burned up and if you leave the piston in, it will smother your tinder and it will go out. This takes some practice to get it right. Once your tinder is out of the cylinder, use a pick to place it into a tinder bundle and blow it into a flame.

FIRE FROM SPARK

There are many ways to generate a spark. Today one of the easiest ways is with a Ferro cerium rod. You can get these in different sizes. It is a manmade material and when you scrape it hard and fast enough the pieces that come off will turn into sparks. These sparks can ignite a lot of different materials. With a ferro rod you can achieve a fire in one stage most of the time. I encourage everyone to get and carry one of these on them at all times because, even if it gets wet, you can still get fire with it.

Another way to make fire with a spark is the method the mountain men used called Flint and Steel. The pieces you need for this type of fire are Flint, Steel, Char cloth and a tinder bundle. Flint is not a piece of metal; it is a type of rock that always looks smooth like glass or ceramic and contains a material called silica. Silica is one part that is needed to make the spark so not just any old stone will work The outside can be crusty or grainy but the part that will make spark is going to be hard smooth and glassy. Quarts and agets also have it but in a smaller amount. Flint comes in a lot of different colors depending on where it came from. Some of the colors are white, gray, pink, tan, orange, gray, black and I have some from Africa that is deep red

The next is the steel. It has to be hi carbon steel and it needs to be harden and have a smooth edge. If you find an old blacksmith, they can make these for you. The carbon in the steel and the silica in the stone with the energy from the strike will cause the carbon to burn and that is the spark. Now we need to catch this spark and this is where the char cloth comes in. What is char cloth?

It is any cotton material that has been burned and starver for oxygen as you burned it. Take a small can with a lid on it. Like an old paint can. Poke a couple holes in the top; not too many, two to four will do. Cut some squares of material and put them in the can, put the can into a hot fire down in the red hot coals. In a short time, you will see smoke come out of the holes in the lid. Then fire will come out after the fire quits then more smoke and when the smoke quits leave it in the fire for about another minute or so. After that roll the can out of the fire and let it cool off before you open it. When you open it you will have char cloth.

To get a spark you need to strike the steel against the flint. You will need to do this on a sharp point or sharp edge on the flint. It is important to get a good strike on the flint. When you first start to learn this you will find yourself scratching the flint instead of striking it. Scratching will NOT produce a spark. I teach everyone to start your swing from your chin or ear this helps to get a strike on the flint.

Once you are getting good sparks then lay a piece of char cloth on the edge of the flint near where you are going to strike. The idea is that one of the sparks will land in the char cloth. This will start the char cloth to burn. Place this into a tinder bundle and blow it into a flame.

If you don't have char cloth and it takes fire to make char cloth, you can use a slice of chaga or some horse hoof instead. The horse hoof work best if you tear it and make a fuzzy edge. The fuzz catches better than if you don't tear it.

One of the oldest ways to make fire with a spark is with two stones. Most schools across the nation will tell you this cannot be done. But if you take Iron pyrite and flint you can produce a small spark. Drop them onto char cloth or take some horse hoof and fuss it up so it is very fluffy and these sparks can catch and you can make fire with two stones.

FIRE BY FRICTION

You may have heard the term getting fire by rubbing to sticks together. Fire buy friction has been used for thousands of years. It is the hardest technique of all the groups. So why do we teach it? Why don't we just learn the easy ones? If you get into a survival situation, out of all the techniques that can be used this is the one you will probably be able to find the materials to make. Out of all the other ways the chance of finding the stuff to make them is slim. But with friction fire Mother Nature grows the stuff for you. There are many different kinds of friction fires. To name just a few: Saw fire, Plow fire, Pump Drill, Hand Drill, Bow Drill and these are the most popular ones. But they all have one thing in common; they all produce heat by having two surfaces rubbing together. The heat has to build to 650 - 800 deg. This is the point where wood starts to smolder. When you build this amount of heat then you want enough pressure to pull dust off the two surfaces that are being rubbed together. This dust needs to collect into a notch or valley. When you get a big enough pile lightly blow on it so the heat will build till you get a red spot show up on the surface. This is called a coal. Transfer the coal to a tinder bundle and blow it into a flam. Let look at the pieces needed for these mentioned friction fires.

Saw Fire: You need six pieces to make this fire. You need to make a fire edge, a fire slot, two tinder balls, a tinder holder, a tinder pick and a fuzzy stick. Saw fires are mostly done where bamboo grows. Take a peace 4" or more in diameter, cutting length wise take a third to a half of the side off. Make this cut about 12" to 18" inches long. Save the peace you cut off to make the fire slot. To make the fire edge take the peace you cut the fire slot off of and pick one of the edges and trim it as sharp as us can get it. Next you need to make the fire slot. Take the peace you cut off and make a slot on the outside in the middle running perpendicular to it just big enough to fit on the sharp fire edge that you just made. Make sure this slot comes through to the inside of the bamboo. On the inside of this carve a small channel running perpendicular to the slot you just made. Next make to tinder balls. These are going to fit on the inside, one on each side of the fire slot. Next hold the tinder balls in place with a small stick lying across them both. Position the fire slot on the sharp fire edge. One hand one side and the other hand on the other side you will start rubbing back and forth like you would if you were sawing wood. This is where it gets its name Fire Saw. As you start to see smoke apply more pressure and increase you speed. At a point you will start the tinder balls smoldering, it takes practice to guess when this happens. When you hit this point turn it over still holding the tinder balls in place and use the fire pic to open the slot and get more air in to the tinder. Lightly blow in the slot until you have a good ember going then turn it over, remove the tinder holder, turn the tinder balls over, use the fuzzy stick and the tinder balls and blow them into a flame. There is another form of fire saw that can be done if you don't have bamboo. Take two sticks, around one end of one sticks tie some cordage and make it tight. Split the other end and place a small stick or pebble in the split to hold it open. You want this to be about a quarter of in inch wide. Pick a spot near the stick or pebble and cut a notch across the split. This does not need to be very deep. The other stick needs to be strong enough to lean on without breaking it. Sharpen this down the length of it to make a wedge running length wise along the stick. Take the stick with the sharp wedge and place the wedge in the notch and with one hand on each side start sawing. This will produce and coal in the split that can be put into a tinder bundle and blown into a flame.

Plow Fire: The plow fire is very susceptible to moister in the air and so try this one in low humidity areas. To make a fire plow you need a fire board and a stick for a plow. The fire board can be another stick that is dead and dried enough to have a crack in it that run the length of the stick. It can also be made form a log or board and carve a channel in it. This channel or the split in the stick needs to be five inches long. Keep it pretty close to this length. Carve a notch or a hole in the end of the channel for the ember to form. Take the stick or plow and on one end carve it to a wedge that will fight the channel you made in the fire board. This wedge needs to be on an angle so when it is placed flat in the channel the stick is up where you can hold it with both hands for lots of pressure. Place the wedge in the channel and began plowing back and forth until you have and ember. This takes a lot of work. This can be done in teams just make sure that you make the switch as fast as you can so you don't

lose heat in between. Once you have an ember place it in a tinder bundle and blow it into a flame.

Pump Drill: Pump drills where more used by the Indians for drilling holes then for making fire. You can't get as much pressure as you can with a bow drill. To make a pump drill you need a fire board, a drill and a pump to spin the drill. The pump needs a counter weight, a cross member and some cordage. The counter weight can be made from a small log, cut a piece 4" to 6" long, spilt it in half, carve a grove in each of the halves to make a snug fit around the drill. Lash it to the lower end of the drill tight enough so it won't come off when you spin the drill. The counter weight acts like a yoyo and when you get to the bottom end of the pump it will keep the drill spinning long enough to rewind the string to the top end of the pump so you can pump again. The cross member is made from two sticks lashed together side by side with a hole carved in the center just a little bigger then the drill. It is good to carve each half before you lash them together. The drill for a fire needs to be about three-feet-long and straight and without nots in it. You will sharpen the fire end and make a notch in the other end. The notch needs to cradle the cordage that comes from one end of the cross member up to the top of the drill and down to the other end of the cross member. Sharpen the fire end at a 25 to 35 deg. angle like a dull pencil. This is how you burn in a socket. Take the fire board make a small dimple in it. Place the fire end of the drill in the dimple, wind the cordage up by spinning the drill and counter weight to the top and began drilling by down and up motion till you have a dimple the size of your drill. Stop and cut a notch in your fire board from the edge into just short of the bottom of the dimple. This notch should be about the size of an eighth of a piece of pie. Place the drill back into the dimple and drill unit you have the notch full of hot dust. This dust needs to be hot enough to smolder. Lightly blow on the dust to produce a coal or ember. You will see the red burning when the coal is ready to transfer into a tinder bundle and blow into a flame.

Hand Drill: Hand drill fires are like the plow fire in that they are very susceptible to moisture. So they were used in places where the humidity was low. Hand Drills need two pieces, the fire board and a drill. The fire board is thinner than the pump drill or bow drill board. The drill needs to be as long as the inside of your elbow to the tip of your fingers. It is good to use a plant that has a pith in the center of the stalk. Start by burning in a socket with a dimple in your fire board and spinning your drill between your hands and cutting a notch like we explained in the pump drill. Once you have your socket you can hand drill until you have a full notch going fast at the end to heat up the coal. Lightly blow until you see the red and transfer it to a tinder bundle and blow it into a flam.

Bow Drill: Bow drills work very well in adverse conditions. You can get a lot of pressure on the drill which means more heat produced. I have been able to make fire by friction in dense fog with a bow drill. It is still not easy but to get fire with the other friction techniques is virtually impossible. To make a bow drill you need a bow, a drill or spindle, a fire board and a hand hold. To make the bow you want a stick that has some curve to it and is strong. You need some cordage to tie to it. It is possible to make cordage from what Mother Nature gives you if you need to. Check out the

cordage section to find out how to do this. If you want to use a manmade cord go to a small engine shop or some car parts stores and get a length of small engine starter cord. This is very rugged cord and will stand up to the stress placed on it when it is spinning the drill. When you chose wood for the drill and the fire board some will tell you to use two different kinds of wood. They will say hard for the drill and soft for the fire board. The fact is in order to get the heat you need it is best to have both peace's made from the same kind of wood. If you have a hard and a soft rubbing together the hard will chew up the soft before the heat has built and you will have a lot of dust but it isn't hot enough to smolder. You can make them from just about any wood but I like some of the softer hard woods. Cotton wood is my favorite but cedar, and aspen families are some of the ones I have used. To make a fire board you can find a branch that is dead and dry, shave it flat on two opposite sides. For the drill, find another branch a little smaller in diameter and about a foot to 16 inches in length. I like my drill to be a half to three quarters of an inch in diameter. The hand hold is going to be made from a big limb one that is comfortable in your hand when it is split in half. Another option is a hip socket from a deer. To start sharpen the drill on both ends. Make a dimple in both the fire board and the hand hold. Load the drill into the bow by twisting it into the cord so the drill is outside of the bow. This prevents it from rubbing on the bow stick when drilling. If it rubs on the bow it makes it harder to turn and this is enough work already without making it worse. Place your foot on the fire board in a kneeling position. The arm that is holding the hand hold should be wrapped around your knee to give more holding power on the drill so it doesn't pop out as you are drilling. You need to burn a socket into the hand hold and the fire board at the same time. This takes a lot of work. When you have this done cut a notch in the fire board like described for the pump drill. Next you want to stop any more friction on the hand hold side so you need to lubricate that end when you use it. In the wild you would use some grass or a mushroom anything to make it slip easy. In practice time I find liquid hand soap works will for this. Make sure that once you lubricate the hand end that you do not use this end for the fire end. You will not get fire on that end unless you shave it down to new wood and start over with that. I carve a small notch around that end so I know it is the hand end. Once you have burned in your socket and cut your notch then you are ready to make fire. Load your drill in your bow as before. Set something under you fire board so your coal doesn't soak up moister. Get set as before and start drilling. Start with just enough pressure to hold the drill in place while you warm up the socket then press down hard and make sure your strokes are as long as you can make them. Long strokes can make the difference between success and failure. Let the notch fill. When you think you have enough, (this takes practice), lightly blow until the red shows up. Transfer the coal to a tinder bundle and blow it into a flame.

SETTING A FIRE

I want to talk about how to set a fire so it will give you the best possible chance for success. If you go to all the work of getting flame you don't want your fire to fail because the way you set it was done poorly. Wet or really cold ground can

cause your fire to fail. So it works best to start with a platform of dry dead wood. Many sticks side by side acts to insulate between the ground and the infant fire that is just starting. Also it makes channels for air to come in through. They will burn and make coals early on and this is a big factor when the ground is wet. Next in your build will be very fine small stuff. I like dead pine twigs or birch bark for this. When this starts to catch and burn then place two big bundles of small dead dry twigs side by side so the fire comes up between and through them. Once the fire comes up through the top then start placing bigger sticks and then the big stuff as needed. And the last step is to go get the marshmallows.