

FIRE BUSH MEMORY HELPER:*

- 1) Have your matches container attached **ON YOU & WATER TIGHT**.
- 2) **An axe is the most important tool in the bush**, more so than the gun, bow and arrow, next in line is a good machete or those new all purpose shovels. pix*
- 3) The hunting knife comes next, but well sharpened & A GOOD ONE *#.
- 4) A bit of snare wire, some small waxed string & a long leather shoe lace, a strong rope, are more useful than a gun.
 - A) Snare wire, to snare rabbits, partridge & trouts.
 - B) Wax string to attach which you'll have to make in survival
 - C) Strong rope to suspend your game, or attach big snare, pulling.
 - D) Well oiled leather string to tie your luggage, transport pull an animal from water
- 5) **THIS BOOK FOR ALL KIND OF USES & S/KIT. PRACTICE IT!!!**
- 6) Your gun, ammo & other stuff in travelling kit. **(MAX 40 LBS!)**
- 7) **NEVER enter the bush without a good warm parka**, even if it's hot day, better to carry it on your back, than having nothing when night comes and you find that you**MUST** stay in the bush.
- 8) **MAKE SURE you NEVER enter wood without good strong boots**. The army type is not the best, for the leather sole slips on wood unless it has the nonskid & **WOOL SOCKS 1 SPARE**.
- 9) You **MUST** have some kind of container to boil things with, you may forget the tea or coffee but **NEVER** the container.
- 10) A 3 days Survival pack via food ex: pinole, pemmican, spiroolina, peanuts.
- 11) **ALWAYS carry a lot of matches and spare Bic lighters. (Keep them Dry!)**

WE URGE YOU TO BRING 4 BICS

- 12) Don't waste matches, use hot embers to light cigarettes, **BRING CANDLES (2)**
- 13) **SEE BEST #1 AND #2 S/KIT #3**

one for on you and one for 40 LBS,

PRACTICE FIRE LIGHTING:

FIRE IS ESSENTIAL TO SURVIVAL. It provides warmth, protection, a means of signalling, boils water, cooks and preserves food.

YOU MUST LEARN TO LIGHT A FIRE UNDER ANY CONDITIONS ANYWHERE, FAST & ANY TIME.

IT IS NOT ENOUGH TO KNOW ALL THE METHODS YOU HAVE TO BE EXPERT AT THEM.

FIRST ESSENTIAL ABILITY:

THE ABILITY TO LIGHT FIRE UNDER ALL KIND OF CONDITIONS IS ONE OF THE FIRST ESSENTIAL KNOWLEDGE IN SURVIVAL.

THUS YOUR ABILITY TO DO SO WILL GIVE YOU GREATER CONFIDENCE IN YOUR ABILITY TO OVERCOME OBSTACLES IN ALL AVENUES OF LIFE AND SPECIALLY IN SURVIVAL.

PREPARATION:

First **MAKE SURE** that you have sufficient quantities of tinder, kindling & fuel. Then prepare a fireplace, so that you can control the fire. Used carelessly fire can get out of hand and bring disaster.

THE FIREPLACE:

It needs to be prepared carefully. Choose a site that is sheltered, especially during high winds. Except for signal purposes or exceptionally to warm a temporary bough or a snowhole shelter.

Do not light a fire at the base of a tree or a stump. Clear away leaves, twigs, moss and dry grass from a circle **at least** 2m (6 feet) across & scrape everything away until you have a surface of bare earth.

If the ground is wet or covered with snow, the fire MUST be built on a platform.

Make this from a layer of green logs covered with a layer of earth or a layer of stones. If land is swampy or the snow deep a raised platform is needed, known as a temple fire.

TEMPLE FIRE:

This hearth consists of a raised platform, built of green timber. Four uprights support cross-pieces in their forks.

Across them place a layer of green logs and cover this with several inches of earth. Light the fire on top of this. A pole across upper forks on diagonally opposite uprights can support cooking pots.

IN WINDY CONDITIONS:

If there are particularly strong winds, dig a trench and light your fire in it.

Also good for windy conditions: encircle your fire with rocks to retain heat and conserve fuel.

Use them to support cooking utensils. Their heat, as well as that from the fire will keep things warm and you can use the rocks themselves as bed warmer.

WARNING! WARNING!:

Avoid placing wet or porous rocks and stones near fires, especially rocks that have been submerged in water.

They may explode when heated. **Avoid** slates and softer rocks and test others by banging them together.

Do not use any that crack, sound hollow or are flaky. If they contain moisture it will expand faster than the stone and can make it explode, producing **dangerous** flying fragments that could take out an eye if you are close to the fire.

LIGHTING FIRE FROM A COAL:*

Sometimes only a small red coal may be available to start a fire and **unless you know how**, you will **NEVER GET THE COAL TO CATCH ONTO TINDER AND SO TO GIVE YOU FLAME.**

IT IS EXTREMELY IMPORTANT! TO KNOW! HOW TO MAKE A FIRE FROM A SINGLE TINY COAL, NO BIGGER THAN THE PINCHED OUT SPARKS OF A CIGARETTE!

To light a fire from a coal, collect a bundle of dry tinder, softly tease a large piece and place the coal in the centre, fold the rest of the tinder over the coal and with the tinder ball held very loosely between the widespread fingers.

Now whirl the ball round and round at arms' length or if there is a strong wind blowing, hold the ball in the air, allowing the wind to blow between the fingers.

The ball will start to smoke as the tinder catches. When there is a dense flow of smoke, blow into the ball, loosening it in your hand.

These few last puffs will convert the smouldering mass to flame thus fire from coal at last.

ANOTHER TRICK: is to attach a pierced can to a 4 foot rope, put the coal & tinder in it, & let it swirl till it smokes & flames.

FIRE STARTING:

Select fire area, out of the wind, protected from rain & snow. Secure fuel, build fire before darkness. Gather adequate supply of fuel first, so that fire can be fed immediately as it grows.

FIRE ERRORS:

First error of the novice, green horn is to try to cook their food on a strong fire, result is burning the food, now one learns fast that for boiling, frying or sizzling all one needs is a good bed of red charcoal.

Some of those things written seem evident but **REMEMBER** that many a reader has **NEVER** set foot in the wild.

FIRE STARTING MOST COMMON ERRORS:

- 1) Choosing badly the tinder as well as the burning material.
- 2) Forget protecting the match from the wind as you strike it. (OOPS's!)
- 3) Lighting the fire under the wind instead of windward.
- 4) Smother the fire you just started by adding combustible before the proper time thus choking the fire.
- 5) Not having dry matches or fire starter which will work.

KEEP YOUR FIRE BURNING ALL NIGHT:

TO KEEP YOUR FIRE BURNING ALL NIGHT; COVER IT UP WITH A PILE OF ASHES.

The fire will keep burning underneath it, and will be ready for you in the morning! All you have to do is to blow on it to see it coming alive.

FIRE GOLDEN T"RICK":

HERE'S A TRICK WORTH HIS WEIGHT IN GOLD.

Before going to bed place near you head a small amount of dry moss or dry twigs or wood chips and when you wake up you just have to throw them in the fireplace, strike a match and the interior of the tent will quickly warm up.

PRINCIPLES OF FIRE:

There is no single way to built a fire camp but basic principles remain:

- 1) Fuel flammable enough
- 2) To give off gas sufficiently combustible
- 3) To be lit by the heat we are able to concentrate on it. This burning kindling in turn **MUST** be amply hot and long lived to release and inflame more and more gas from progressively larger amounts of fuel.

All that can be done with a match and proper fuel to get the fire going, but there are other ways.

TINDER ARE NUMEROUS:

Tinder is highly combustible substance in which a spark can be blown into flame & innumerable materials of this sort can be found, and carried in special containers such as tinderboxes etc.

Tinder principal property is that it **MUST** be readily combustible and finely fibred. **A simple test MUST be made to find out.**

Take a loosely teased handful of the material and blow. If the fire from the coal extends to the tinder then its good tinder.

Natural tinder is generally found in dry, beaten grass, finely teased bark and palm fibres.

Most of these coarse tinder's are improved in their ability to take and hold a spark by: being beaten and pounded until the fibres are fine and soft.

Natural fire-catching properties of tinder can be improves by the addition of a light dusting of **very finely ground charcoal** or better still by being thoroughly scorched.

If saltpetre (not saltpeter) is available a little may be mixed with the charcoal before it is added to the tinder or the tinder itself can be soaked in a solution of saltpetre and water and allowed to dry out before use.

Tinder impregnated with a solution of saltpetre and later dried **MUST** be carried in an airtight container.

If carried otherwise the saltpetre will become damp with moisture from the air. With this or other prepared tinder you **ALWAYS** have an emergency mean of getting fire going wild?

OLD COTTON OR LINEN RAG, SCORCHED BLACK AND TEASED IS AMONG THE BEST OF ALL TINDER.

A pinch of this placed where the sparks will fall is certain to take the spark and quickly become a glowing coal. So the spark to a coal (tinder) to a flame.

FIRE STARTER EVERGREEN:

Very often the lack of paper to start a fire is a problem but if there are evergreen then you have the problem licked.

Just take a branch of evergreen and pick up the needles, once they are dry they make **excellent tinder**. Pine needles on the floor would be good, providing that they are really dry.

MAKING AND USING FUZZ-STICKS:

Many bushmen start all fires, indoors and out, with them. Although in terms of initial effort they are often more bother than a handful of dry pine twigs, this shortcoming they counteract with the ingratiating characteristic of dependability

FUZZ-STICKS are a solution certainly in that most trying of weather conditions when every bit of fuel in the forest is covered with ice. You may have to go to the extra effort of splitting or breaking out firewood under such circumstances also.

Fuzz-stick is merely the name for a piece of wood to which a contrived cluster of attached shaving clings.

One is easily made by shaving a straight-grained stick of dry preferably split softwood with single knife strokes until one end is a mass of wooden curls.

The usual procedure is to bunch no less than 3 such fuzz-sticks so that the flames will be able to eat into the shavings, toss on any stray whittling, light the mass and then go through the usual procedure of adding progressively larger firewood. **ALWAYS ALLOWING FOR DRAFT.**

SLOW MATCH:

You will discover that some of the soft inner barks teased & spun into cord will smoulder slowly when lighted. It's called: Slow Match.

It's worth while to discover which plants whose barks have this property.

Lengths of cord made from such a bark can be used to maintain a "coal" for a length of time and so save your precious matches.

A slow match is a length of rope or cord that hangs smouldering to give fire when wanted. It is used as a means of preserving fire and also as a mean of carrying it from place to place.

It can be made by making a length of cord or thin rope from 1/4" 1/2" in diameter, from suitable barks or palm fibres.

Most of the silky soft fibred barks are ideal. When one end is put in fire or against a glowing coal it will take hold of the spark, smouldering slowly.

A slow match is a safe way when having no match or fire-lighting material to preserve the **vital** spark for further use after you have doused your fire and left camp for an hour or 2. For such a use, the slow match should be hanged from a branch and exposed to the currants of air.

TINDER ADD ON:

Birch bark can be detached in the thinnest of layers and these shredded to make tinder. Bark of some cedars is also good.

Piece of your shirt or pants, dry moss, lichens, dead evergreen needles dry hay are among the numerous substances that can be pulverized for tinder, even bird nests.

Dry fuzz from pussy willows is a well-known tinder, so is a dry wood that has dry rotted and can be rubbed to a powder.

A number of mushrooms and other fungi are dehydrated for such a purpose. Down from milkweed, fireweed and like vegetation.

A handful of very dry pine needles often works, you can also use the fluff of the so-called cotton grass, that of the cattails and the downy heads of such flower as mature Goldenrod.

Divers dry vegetable fibres serve as tinder and the down found in some nest or underneath part of some birds.

TINDER: (Not timber nor tend-her!)

It is any kind of material that takes the minimum of heat to make it catch in fire. Good tinder needs **only** a spark to ignite it.

TYPES OF TINDER:

Birch bark, dried grasses, fine wood shavings, bird down, waxed paper and cotton fluff from clothing all make good tinder. So do pulverized fire Cones, Pine Needles and the inner bark from Cedar trees.

Dried Fungi are excellent, if finely powdered and scorched or charred cotton or linen especially grounded finely, are also among the best.

Where insects such as wood wasps have been boring into trees the fine dust they produce is good tinder and powdery bird and bat droppings can also be used.

The insides of birds' nests are usually lined with down feathers and ignite easily, dry field-mouse nests are also usable.

Whatever Tinder you use MUST be dry. It is a good idea to carry tinder with you in a waterproof container. **ALWAYS** keep an eye open for tinder to collect.

KINDLING:

It is the wood used to raise the flames from the tinder so that larger and less combustible materials can be burned. **The best kindling consists of small dry twigs** and the softer woods are preferable because they flare up quickly.

Those that contain resins burn readily and make fire lighting a snip. The drawbacks of soft woods are that they tend to produce sparks and burn very fast. You may need more to get the main fuel going and they are soon consumed if they form the main fuel themselves.

DON'T COLLECT KINDLING STRAIGHT FROM THE EARTH, IT IS ALMOST ALWAYS DAMP.

Take it from Standing Deadwood. If the outside is damp, shave until the dry middle is reached.

MAKE FIRE STICKS:

Shave sticks with shallow cuts to feather them. Preparing kindling in this way: makes it catch light more freely and establishes a fire quickly.

FUEL:

Use dry wood from standing trees to get the fire going. Once it is established you can use greener wood or dry out damp wood. **

As a general rule, **the heavier the wood the more heat it will give**, this applies to both dead and green woods. Mixing green & dry wood makes a long lasting fire, which is especially useful at night.

HARD WOODS:

Hickory, Beech or Oak for instance burns well, give off great heat and last for a long time as hot coals, they keep a fire going through the night.

SOFT WOODS: **

Tend to burn too fast and give off sparks. The worst spark-makers are: Cedar, Alder, Hemlock, Spruce, Pine, Chestnut and Willow.

REMEMBER that damp wood is sometimes advantageous producing smoke to keep off flies: Midges and Mosquitoes and burning longer, so that it keeps the fire in.

HOW TO DRY WOOD:

REST LOG AGAINST A POT RAIL TO DRY!

Put them across 2 supports above a fire, not so close that it is set alight. Lay green log at an angle beside a fire, tapering away from the wind to speed combustion of a sluggish fire while drying them. *

BUILD A WOOD SHED ESSENTIAL IN WET WEATHER:

Set it close to the fire so that the fire's warmth will help dry the wood, but not so close that a spark could ignite it. Build two bays and use wood from one while the other batch dries.

WOOD-SHED:

You really should make one to prepare against a spell of wet weather, only then will there be a supply of dry kindling and wood after a heavy rain.

The ground dimensions of it should be 3' by 4' and 3' high at the front. **It MUST be windward of your fireplace** so that windblown sparks will not fall on it.

ALWAYS cut an ample supply of firewood, you NEVER know when you will get a spell of rain or snow. 3 days is best provision.

FIREWOOD AND FIRE IN THE RAIN:

Firewood gathered from the ground is useless for fire. It is far wiser to pull down dead branches standing on trees for your storage since this wood even after rain is reasonably dry.

WOOD BIN SURVIVAL: *

A STACK OF DRY WOOD MUST ALWAYS BE READY WHENEVER POSSIBLE, since sickness or injuries can strike at any time.

MAKE SURE that you do get one stack ready also you will need 4 mores for your signals should one pile refuse to light up the extra one will do it.

STAR FIRE:

Logs are fed in lengthways. When not required to produce strong heat they can be drawn apart leaving glowing embers and ash for cooking in the centre.

TO RESURRECT THE FIRE PUSH THEM TOGETHER AND THEY SOON TAKE FLAME AGAIN.

This type of fire is used mainly to conserve fuel but also saves chopping wood thus ENERGY!

OTHER FUELS:

In areas where wood is scarce or unavailable other fuels **MUST** be found.

ANIMAL DROPPINGS:

These make excellent fuel; frontiersmen of the Wild West used buffalo chips for their fires.

Dry the droppings thoroughly for a good smokeless fire. You can mix them with grass, moss & leaves.

PEAT:

Peat is often found on well drained moors. It is soft and springy underfoot and may be exposed on the edges of rocky outcrops-looking black and fibrous. It is easily cut with a knife.

Peat needs good ventilation when burning. Stacked with plenty of air the peat dries rapidly and is soon ready to burn.

COAL:

Coal is sometimes found on the surface-there are large deposits in the Northern Tundra.

SHALES:

Shales are often rich in oil and burn readily. Some sands also contain oil-they burn with a thick oily smoke that makes a good signal fire and also gives off a good heat.

OILS:

If you have had a mechanical failure and crashed or broken down with fuels intact you can burn petroleum, antifreeze, hydraulic fluid and other combustible liquids. Even insect repellent is inflammable

Anti-freeze is an excellent primer for igniting heavier engine oils. With a little Potassium Permanganate from your survival kit, you can set it alight in a few seconds.

In very cold areas; drain oil from an engine sump before it freeze. If you have no container drain it on to the ground to use later in its solid state.

Tires, upholstery, rubber seals & much of any wreckage can be burned. Soak less combustible materials in oil before trying to make them burn

Mix petrol with sand and burn it in a container as a stove, or dig a hole and make a fire pit. Burn oil by mixing in petrol or antifreeze.

Do not set a light directly to liquid fuels but make a wick and let that provide the flame. The same goes for insect repellent.

WATER & OIL FIRE:

ONE OF THE HOTTEST MOST INTENSE FIRES YOU CAN MAKE IS TO BURN WATER & OIL TOGETHER.

About the easiest method is to place a steel or iron plate on a couple of stones a foot above ground level.

Light a fire beneath this plate to make it really hot and while it is heating up arrange a pipe or narrow trough about 2 or 3 feet long.

One end of this pipe is over the centre of the plate and the other end is a foot or so higher than the plate.

Into this top end of the pipe arrange by means of a funnel and trough water and sump oil or any oil to be fed down the pipe to the hot plate

The proportion of flow is 2 or 3 drops of water to one drop of oil. When the water and the oil fall onto the hot plate it burns with a hot white **flame of very great heat.**

The rate of flow can be governed by cutting a channel in corks that plug the bottles holding the oil and water, or if tins are used, pierce holes in the bottom of the tins & use a plug to control the flow.

This type of fire is excellent for an incinerator when great heat is required to burn out rubbish. It also makes an excellent campfire where strong flame and light are required.

BURNING OIL AND WATER: *

THIS MIXTURE MAKES ONE OF THE HOTTEST OF ALL FIRES.

Pierce a small hole in the base of a tin can for each liquid and fit a tapered stick into it to govern the flow *A.

The oil & water runs down a trough on to a metal plate. Pulling the stick out increases the flow, pushing it in reduces it.

Try 2-3 drops water for 1 drop of oil. First light a small fire under the plate to get it hot. The mixture becomes highly volatile when heated. Light it above the plate. **This fire will burn almost anything.**

ANIMAL FAT: *jm

These can also be used with a wick in a suitably ventilated tin to make a stove. Bones can add bulk when fat is being burned as a fire. Sometimes it is the **only** available fuel in polar regions.

Start flame with tinder or a candle then place a network of bones cover it to support the fat or blubber. Use only a little fat at first.

Unless it is surplus, burning fat means sacrificing food value, but seal blubber spoils rapidly and makes good fuel.

FIRE LIGHTING:

Make a bed of tinder and form a wigwam of kindling around it. In a strong wind lean the kindling against a log on the #leeside#. Ignite the tinder.

Once the kindling has caught add larger sticks. Or take a bundle of dry twigs, no thicker than a match, light them first and place them in the wigwam.

MATCHES:

Matches are the easiest way to start a fire. Carry the non safety strike anywhere type and as many as possible.

Pack them in waterproof containers so that they can not rub or rattle and accidentally ignite. Some people split all their matches in half & it has been claimed that one can be successfully divided into six.

But do not risk wasting them. One that does works is more use than six that don't!

Strike split matches by pressing the business end against the striking surface with a finger. If this burns the finger then be ready to cool it at once, in cold water, snow or even spit on it & blow.

DAMP MATCHES:

If your hair is dry and not too greasy roll the damp match in it. Electricity should dry out the matches. Waterproof matches by dripping candle wax on them.

Rip it off with a fingernail when about to strike one. Strike a damp match by stabbing obliquely into the striker strip instead of drawing the match along it. *

REMEMBER:

Whenever you strike a match light a candle. Many things in turn can then be lit from it-saving matches.

Place it in the wigwam of kindling to start a fire and remove it as soon as the flame spreads. Only the smallest amount is burned & even a small candle will last a long time.

However many lighters or fire makers you carry still pack as many matches as you can you can not beat them. So called everlasting matches can be used over & over again but sooner or later even they pack up.

So carry the ordinary matches as well. Work out which kinds gives you the most strikes for the weight and room they take up.

FACTS OF LIGHTING FIRES:

Few facts are so immediately indicative an individual's woodmanship as the way he goes about lighting a fire especially without the help of matches.

Thus one needs dry matches and exert every reasonable precaution to have them dry and at hand, and to carry them in a waterproof container & **ALWAYS** on you. The best are the wooden types that you dip in wax before hitting the bush.

Paper matches are zip no good in bush for they easily get wet, or damp, from perspiration & outer wetness.

The most practical waterproof match case on the market that we have been able to find is put out by the Marble Arms & Manufacturing CIE. retails less than \$1.00. You can make one up but better spend \$1.00 and be safe.

Any match case for wood use should be made so that it fastens safely to the person and Marble's is built with a mobile metal ring at the top through which it can be pinned or tied.

The lid is attached in such a way that it can be unscrewed easily when the hands are cold or slippery and yet can not be mislaid.

With any match holder, another danger to happen is the accidental igniting of the matches within.

Although the Marble's waterproof match box has a protective rubber lining, be **careful** to stow about half with the butts up and to keep the heads of all as much apart as possible. That way you also pack more matches.

We also tell you that you can find waterproof matches, as well as tinder kits and magnesium fire starter, all those should be with your pack sack as well as in your pockets, it pays to be prudent

Better to carry a little more than a little less, fire wise. Caution soon becomes second nature to wood lovers and survivors.

WATERPROOF MATCHES: **

To make your wooden matches waterproof just dip them in candle wax that you have melted down or pour wax from a lighted candle.

USING A LENS: (Not using aliens)*

Strong direct sunlight, focused through a lens, can produce sufficient heat to ignite your tinder. Accidental fires are caused by the sun shining through broken bottles on dry leaves or pastures.

Your survival kit magnifying glass or a telescope or camera lens will serve instead. Shield tinder from the wind.

Focus sun's rays to form the tiniest brightest spot of light. Keep it steady. Blow on it gently as it begins to glow.

FLINT AND STEEL: *

Flint is a stone found in many parts of the world. If it is struck vigorously with a piece of steel hot sparks fly off which will ignite dry tinder. (Ask Fred Flintstone).

A saw-edged blade can produce more sparks than an ordinary knife and should be in your kit. A block of magnesium with on its side is an even more efficient device-magnesium burns very strongly.

Strike the blade against the flint (*A) or draw the saw across the ridged surface of the flint supplied with it (*B) close to tinder so that sparks fall on it.

With magnesium block, scrape slivers of magnesium on to tinder first (*C) then use the saw to produce the sparks.

MAGNESIUM STONE:

Among the top best to start a fire even after being hidden 3 days in icy mud. A necessity to be included in your survival kit.

FLINT 2001 BC-AD!:

Flint and stone were the common methods before matches were invented and not great skill is needed for their use. Yet the synthetic flint used in a cigarette lighter is a considerable improvement on natural flint.

A couple of pieces of synthetic flint pressed into a small piece of Perpex* make an excellent **emergency** fire lighting unit.

(Heat the Perpex and press the flints in while it's hot. Hold under the water and the *Perpex will shrink on the flints and hold them securely).

LIGHTER FLUID:

WEIGHT FOR WEIGHT YOUR BEST ALL AROUND MAIN SURVIVAL ITEM IS:

A LIGHTER FLUID PLASTIC CONTAINER 142 MM OR 5 OZ. AND A GOOD OLD ZIPPO LIGHTER AND FLINTS or with BIC TYPE.

4 pkg. under lighter can secured by duct tape and all around the can itself to protect from shock and leak as well.

It gives; light, warmth, signal, cook, kills germs. Purify and makes your survival chances much greater.

FIRE STARTERS:***

#CARBURE DE CALCIUM #.....* to explain ***

MAKING FIRE BY STRIKING SPARK:

Campfire can be started without matches just as games animals can be bagged without guns, cleaned without knives and cooked without utensils. Direct spark is the easiest ancient method.

This is where magnesium shaving comes in, also flint and steel but also hard stones such as quartz, jasper, iron pyrites, agate and native jades replacing the traditional flint.

No need a knife or even steel be used. Iron will do. Striking iron pyrites stones will do as well, the Esquimos use them all the time.

FIRE BY AIR COMPRESSION:

In parts of S. East Asia people make fire using this ingenious method of suddenly compressing air in a cylinder and thereby concentrating the heat in the air to a point when the heat is sufficient to ignite tinder.

Their fire-making sets, frequently a cylinder of bone or hollow bamboo with a bone or wooden piston. (Almost a piece of museum today and invented 100's years before Dr. Diesel.)

In use a small piece of tinder is inserted into a cavity in the lower end of the piston. The piston is placed in the cylinder and the flattened end opposite the piston head struck a smart blow with the palm of the hand, driving suddenly down the cylinder.

Compression of air with concentration of the heat it carries produces a small glowing coal in the tinder placed in the recess of the piston head.

Frequently the jar of the blow will shake the tinder loose, so a spark remover is used with the set to pull out the glowing tinder if it lodges in the cylinder.

The dimensions are roughly as follows: **Cylinder:** 4" to 6" long outside diameter 3/4" to 1", inside diameter about 1/2".

PISTON:

4" to 6" long of which the shaft is 3" to 5", piston length 3/4" to 1", diameter to nicely fit the cylinder.

Recess at the lower end of the piston--about 1/4" wide by 1/4" to 5/16" deep. Piston shaft end is smooth & about 1" to 1 1/2" in diameter for striking with the palm of the hand.

HOW TO MAKE FIRE BY USING A SAW MOVEMENT: *

You take 2 sticks of wood and you rub them vigorously against one another in a sawing movement. This method is often used in jungle.

The stick that you use as the "saw" is a split bamboo or any soft wood type. The **under wood stick MUST be very dry**. The friction is done over a mass of good tinder.

THONG METHOD:

Use a piece of cane about 60 cm long and a dry stick. Make a small slit in one of the cane's end, then lay it on a stone. Maintain this slit open using a small wedge (stone or wood).

Place a mass of tinder under the cane and between the cane and the tinder mass pass a thong or lash which you will slide quickly against the cane in a sawing movement. Meanwhile retain the board or cane with your foot.

OBTAINING FIRE WITH A BOW AND DRILL:

10 minutes, if experienced! Fires have been made throughout the world long ago from glowing embers obtained by the combined use of bow, drill and fire board.

Although the technique is simple, considerable diligence and efforts are required for its application can be very laborious. It's a riot?

Once you have started don't become too easily discouraged but keep on going. (1 hour, use your punk friend).

You will need a bow, with a thong long enough to loop around the dry stick that is to serve as a drill, you will need a socket with which to hold the drill against a hollow in the fire board.

By moving back and forth and so rotating the drill in the fire board, you cause so much friction that a spark starts glowing in tinder gathered to catch it.

The spark you blow into flame with which the campfire is lighted. Friction can cause riot???

SOCKET: (To me Baby!)

The only use of the socket is to hold the drill in place while the latter is being turned.

The socket which for this purpose is held in one hand, can be easily grasped knot of wood with a hollow shaped in its underneath.

It can be one of the smooth stones with a slight depression worn in one side, often found near water.

The socket may be oiled or waxed to allow the drill whose upper end should offer as little resistance as possible, to spin freely

FIRE BOW: *To see this one its explanations see previous chapter on fire making**

HAND DRILL: ***

This variation of the fire bow is particularly useful in dry territories with low humidity and little rainfall-making everything tinder dry.

In a baseboard of hardwood cut a "V" shaped collecting notch that will hold tinder, but still allow air to reach it, but still allow air to reach it.

Make a small depression near it. For a spindle use a stem of hollow softer wood with a soft pith core.

Roll the spindle between the palms of the hands, running them down with each burst of spinning to press the spindle into the depression in the baseboard.

When the friction makes the spindle tip glow red, blow gently to ignite the tinder around it.

Putting a pinch of sand in the spindle hole increases the friction and speeds the heating of the tinder. A cavity below the spindle as shown for the fire-bow is also recommended.

FIRE PLOUGH:

This method of ignition also works by friction. Cut a straight groove in a soft wood baseboard and then plough the tip of hardwood shaft up and down it. This first produces tinder & then eventually ignites it.

WHAT WOOD TO USE:

Among the North American woods favoured for making fire by friction are: #Poplar, Tamarack, Basswood, Yucca, Balsam Fir, Red Cedar, White Cedar, Cypress, Cotton-Wood, Elm, Linden, Willow.#*

The drill and the fire board are both often made of a single one of the above woods but not **ALWAYS** the case. Pix #* p55** Note: When not sure of type of wood see below: PUNK. *

The DRILL: (Not the thrill!)

The drill may be a straight & well-seasoned stick from 1/4 to 3/4 " in diameter & some 12 to 15" long.

The top end **MUST** be as smoothly rounded as possible so as to incur a minimum of friction. The lower end for maximum of friction **MUST** be blunt.

A longer drill, perhaps one nearly a yard in length is sometimes rotated between the palms rather than by a bow.

The hands maintaining as much downward pressure as possible are rubbed back and forth over the drill so as to spin it as strongly and as swiftly as possible.

When they slip too low, they **MUST** be shifted back to the top to the top with as little delay in rotation as possible. The method is however not as effective as bow and socket.

FIRE BOARD:

The size of the fire board that may be split out of a dry branch can be a matter of convenience. The board can be about 1" thick and about 3 to 4" wide, and long enough to be held under the foot. Using a knife or a sharp stone, start a hole about 3/4" from the edge of the board.

Enlarge this hole, thus fitting it, & the end of the drill at the same time, by turning the drill with the bow as later described.

Then cut a notch from the edge of the fire board through to the side of this cup. This slot or undercut " V" that is usually made wider and deeper at the bottom.

It should be **at least** 1/8" into the hole itself, will permit the hot black powder that is produced by the drilling to fall as quickly as possible into tinder massed at the bottom of the notch. (Generous bundle of tinder under "V" cut!).

THE BOW:

Sometimes made from an easily handled stick such as those to propel arrows, other people employ a stout section of a branch with a bend already in it. One hand of the bow may have a natural crotch to facilitate the tying of the thong.

The bow may merely be notched for this purpose, however, or perhaps drilled if heavy enough not to split.

The bow string from a shoe lace to a twisted length of rawhide etc. is tied at both ends so as to leave enough slack to allow its being twisted once around the drill.

NOTE: To use a fire set, the drill is put under the thong, and twisted so that the drill finally is on the outer side of the thong & with that portion of the thong nearest the handle of the bow on the upper side of the drill.

This is important. If the thong is on the wrong way on the drill, it will cross over itself & cut in a few strokes, also the full length of the stroke can't be obtained.

USING BOW AND DRILL:

See the pix #* of the components** and used as shown, when the campfire first being made ready to ignite. The tinder is bedded under the slot in the fire board.

If you are right handed, you kneel on your right knee and place the left foot as solidly as possible on the fire board.

Take the bow in the right hand, looping the string over the drill. The drill is set in the cavity prepared in the fire board. Pressure from the socket which is grasped in the left hand holds the drill in position.

You can grip the socket more steadily you will find if you will keep your left wrist against your left shin and hug the left leg with that arm. (**Its a MUST!**)

The bow is held in the right hand with the little and third finger outside the thong so that by squeezing these 2 fingers the tension of the thing can be increased.

Press down on the drill, but not enough to slow it, when you start twirling the drill by sawing back and forth with the bow. **Only a light pressure is put on the socket.**

Now start drawing the bow smoothly back and forth in sweeps as long as the string will conveniently permit. **Maybe you have dropped a few grains of sand into the cup to increase friction.**

PUNK TIP:

Given by some authorities is to put a little charcoal or gritty material into the hole in the foot piece. They claim that this enables more punk to be grind out and the spark to be obtained more quickly.

At any rate the hole will eventually start smoke. Work the bow even faster now, **NEVER** stopping the swift even action. Press down more firmly on the drill.

When the drill is smoking freely & that you have the Punk grinding out easily so that the V cut is full of it, put extra pressure on the socket at the same time give 20 to 30 faster strokes with the bow.

Lift the fill cleanly and quickly from the foot piece. Fold some of the tinder over lightly and blow gently into the "V" cut.

If you see a blue thread of smoke continuing to rise, you can be sure you have a coal, you will see it glowing red.

Fold the tinder completely over the foot piece & continue blowing into the mass. The volume of smoke will increase and a few quick puffs will make it burst into flame.

LIGHTING THE FIRE & PUNK:

Hot black powder (punk) will begin to ground out into the tinder. Keep on drilling, for the heartier a spark you can start glowing there, the quicker you will be able to blow it into a flame.

By examining the "punk" you can learn if the woods used are suitable for fire making.

The punk which will produce a glowing coal **MUST** feel slightly gritty when gently rubbed between the fingers and then with more pressure it should rub gradually to a silky smoothness as soft as face powder.

This testing of the "punk" IS EXTREMELY IMPORTANT; if you do not know for certain that the woods you are using are suitable for fire lighting.

ALWAYS MAKE THIS TEST FIRST.

Natives often carry fire so won, igniting for this purpose dry spongy wood that, like the punk sod for setting off fireworks smoulders over long period of time. This fire stick they transport with them ready to be blown into flame when the next blaze is ready to light.

ADD ON NOTES:

There are other refinements that are worth knowing: The boring or burning of a hole for the thong at the tip and also through the handle of the bow. The end of the thong at the tip of the bow has a thumb knot tied on the top side.

The hole through the handle takes the long end of the thong, which is then wound round the handle in a series of half hitches. This hole in the handle enables you to adjust the tension of the thong with **greater accuracy.**

A socket of shell or smooth grained stone with a hole in it is less liable to burn than a socket of wood. Tinder **MUST** be carried in a waterproof bag.

ONE OF THE BEST TINDER IS BIRCH BARK:

Even if you dip it into water you will see it burst into flame if you touch the pronged flame of a match to a frayed corner.

WHEN THE WOODS ARE WET:

Even when drizzling, you start with the same flammable wisp but next to them you lean and crisscross larger ribbons of Birch bark.

It is easier to cut the tree length wise, pry up a long roll of bark and pull that around and off.

The thick sheet thus obtained can then be ripped to narrow strips that will burn much more readily than would intact section.

In most extreme circumstances, you get so that you start almost automatically to lay a broad sheet of Birch bark in as sheltered a nook as appears handy.

On top of this go the shreds & the stouter fragments, and these you can cover with larger portions.

The small and then the bigger pieces of dry softwood go up in a teepee formation, forming a compact yet well-ventilated peak through which the flames can hungrily climb. Rectangles of birch bark finally roof the pile, blocking out wind storm.

The time comes to light the match. You realize that you **MUST** hold it so that whatever air currents reach it will run the flame down the match stem will be the initial fuel on which to feed.

Perhaps you will face the wind with your 2 hands cupped in front of the match. Perhaps you will elect to light between the wind and the pile using your body and perhaps the opened flap of a Mackinaw (sport coat) as a barricade.

FLAMMABILITY OF EVERGREEN TWIGS:

Except on days when every branch is slick with ice, it is **practically as easy to start a fire with a tight handful of small dead evergreen twigs as with birch bark**. Quantity of these dead resinous little stubs angle from the underside of all conifers.

You can break them off in thick uniform fistful, lit if desired while turned most advantageously in the hand and finally laid down in such a way that the flames will sputter it forward the centre.

Already gathered fuel can then be **quickly angled and crisscrossed** above this blazing nucleus in well-separated patterns through which fire will be able to start quickly.

GUN POWDER AND AMMO:

Place the powder of 5 or 10 bullets under a tinder mass. Take 2 stones lay some powder on one of them and strike the 2 stones together.

Their rubbing **MUST** be done just above the powder that is placed under the tinder. Thus the crushed powder will light up then will light up the other one then fire will catch on.

BATTERY SPARKS: (SPOCK?)

If down from air crash, sparks can be made by scratching together the negative and positive wires from a live storage battery.

You **MUST** spread a generous wad of tinder to catch the sparks so that when these shower of sparks flow into the bed of highly flammable matter.

The area can be blown to a glow and then to flame. If the tinder is placed in the wind, natural air currents may be enough to take care of this step.

In case of plane or car troubles one should get some gas from the tank or carburettor, using a stick and a rag to get the gas then the spark from the battery or from flint will get it going wild.

Once the tinder is in flames, all we have to do is to shove it under fuel already laid as for any outdoor fire.

BATTERY FIRE LIGHTING: *

A spark from a car battery can start your fire, and torch and radio batteries should have sufficient power. You need two lengths of wire, which you can simply attach to the terminals.

If you cannot find any wire you could do it with a couple of spanners or other metal implements. Unless you have long pieces of wire, take the battery out of the vehicle first.

Slowly bring the bare ends of the two pieces of wire together. Just before they touch, a spark will jump up across.

You **MUST** catch it on your tinder. A small piece of cloth with a little petrol on it makes the best tinder. The petrol vapour igniting from the sparks.*

LIGHTING FIRES WITH WATER AND ICE:

Of course a small magnifying glass is a convenient device with which to start a fire when there is enough sunlight as well as similar lenses.

Such as binoculars, telescopic sights, ordinary glass from a broken jar, even your bi-focal if you wear any but the magnifying properties of water can also be used:

- 1) Holding the crystals from 2 watches or pocket compass of about the same size back to back.
- 2) Filling the space between with water.
- 3) Directing this makeshift enlarging lens so as to converge the rays of the sun in a point sharp enough to start tinder glowing.
- 4) Thus a satisfactory lens can also be made by experimentally shaving & then smoothing with the warm hand a piece of clear ice to do the same trick.

STARTING A FIRE WITH A DROP OF WATER:

Irony yes, yet true. You make a small hole in any paper sheet, even from this book, you spit in this hole or you put a clear water drop that you present to the sun rays as a magnifying glass and you wait with tinder underneath for the desiring results.

This method asks for patience for it is a **very slow method**, but with patience one can achieve nearly everything, even this book.

This method was found by natives who discovered a bush fire while it was a very dry season and that some perforated leaves had received some drop of water on them and were exposed and traversed by sun rays causing a bush fire. Try it out.

FIRE LIGHTING WITH CHEMICALS:

A survivor's pack is not likely to include a complete chemistry set but there are some very common chemicals that if they are available, can be used to produce combustion.

The following mixtures can all be ignited by grinding them between rock or putting them under the friction point in any of the types of fire drill already described.

Mix them carefully, avoiding contact with any metal objects. All are susceptible to dampness and MUST be kept dry.

WARNINGS! WARNINGS!:

Handle these chemicals **carefully**, Sodium Chlorate in particular it ignites from percussion, so **avoid** shaking it up or letting it spill. Spilled weed-killer on a hard path has been known to ignite when stepped on, or a watering can put down on it!

POTASSIUM CHLORATE & SUGAR:

In a mixture of 3/1 by volume is a **fierce-burning incendiary** that can also be ignited by: dripping a few drops of Sulphuric Acid on to the mixture.

POTASSIUM PERMANGANATE & SUGAR:

Mixed 9/1 is less sensitive and temperature is a critical factor in how long it takes to ignite. The addition of Glycerine will also produce ignition.

SODIUM CHLORATE AND SUGAR:

Mixed 3/1.

Sulphuric Acid: Is found in car batteries

Potassium Chlorate:

Is found in some throat tablets, their contents may be listed on the pack. Try crushing one & see if it works

Potassium Permanganate:

Is included in your S/kit.

Glycerine:

Is a constituent of anti-freeze.

Sodium Chlorate:

Is a weed killer.

FIRE WITHOUT SMOKE & WITHOUT FLAME: (FLAMELESS FIRE)

Smoke is the result of incomplete combustion thus by feeding the fire with small dry twigs which catch fire almost instantly the size of them about 1/8" thick there will be no tell tale blue smoke haze.

If possible light your smoke free under a tree, but not against the trunk, the leaves and branches will completely disperse what tiny amount of smoke given off by the twigs.

Fire without flame calls for the lighting of a small fire in the start and then this is fed with charcoal previously gathered from half-burnt stumps. It may be necessary to fan this continuously if there is no breeze.

A charcoal fire needs a lot of air and though it requires flames to start, it will burn and give great heat with a total absence of flame when well alight.

An old kerosene tin or 4 gallon drum pierced to allow plenty of air holes, makes a good brazier for a charcoal fire.

BY ITS USES THERE IS NO VISIBLE FLAME! If a tin isn't available, built a stone wall surrounding your fireplace to hide the glow of your charcoal fire.

LIGHTING 2 DIFFERENT FIRES ON 1 MATCH: *

Just split the match, but there is a knack to do it. To split a wooden match, push the point of your knife or pin immediately below the head and force it down sharply.

With a paper match simply start to split it at the end away from the head by peeling paper towards the head.

It will be easier if you bend a few times the paper end that releases the paper tightness thus easier to separate it equally.

Practice = perfection During war, prisoners were able to split it in 6 portions & strike each one of them with certainty.

Now to strike them, the stalk of the match **MUST** be held between the thumb & forefinger with the tip of the middle finger resting lightly on the head of the match, the match is drawn lightly and flat along the striking surface.

In learning how to strike those funky matches you will get scorched finger tip, the quickest relief is to grab the lobe of your ear with the burnt finger, the natural oil on your ear will seal off the burn. **To use those matches you need extreme care in preparing the material for your fire.**

LIGHTING FIRE WITHOUT MATCHES:

DIRECT FLAME METHOD:

** Using Sugar and Permanganate of Potash. (#Condy's crystals#*) take about one teaspoonful of sugar and about 1/2 teaspoon of Condy's crystal from your F-aid kit*

Mix together and place in a hollow cut in a piece of dry wood. This hollow **MUST** be big enough to hold the whole of the dry mixture.

Round off a straight stick about 3/4 to 1/2" thick and 12" long to a shallow point. Place this end of the stick in the powder and rotate the stick rapidly between the 2 hands.

The mixture will burst into slow flame. Several attempts may be needed to ignite it. It may not be effective in damp or cold weather.

STARTING A FIRE WITH FIREARM:

Pry the bullet from the cartridge, first loosening the case if you want by laying on a log & tapping the neck all around with the hack of your knife.

If you are carrying a shotgun, uncrimp the top of the shell and remove the wadding and projectiles. Have the campfire lain with a good bed of tinder beneath.

Pour some of the powder over this tinder. Stuff a small bit of dry frayed cloth into what remains of the load.

Fire the weapon straight into the air. The rag if it is not already burning when it falls nearby should be smouldering sufficiently so that when pressed into the tinder it can quickly be blown into flames.

POWDER FROM AMMUNITION: **

If you are carrying arms you can use the gunpowder propellant from a round to help ignite your tinder.

Break open the round and pour the gunpowder on to your tinder before using your flint (*A) or remove **only** half the powder & stuff a piece of cloth into the cartridge case *(B).

Chamber the round and fire as usual, into the ground.*** The cloth will be ejected smouldering. Place it on tinder with the remaining propellant and you will soon have a fire going.*

FIRE STARTING CARTRIDGE: **

When raining or not, just force open a cartridge & mixed some powder from it with paper, dry leaves and wood shavings.

Then just rub a piece of wire along a piece of hardwood till red hot and simply push it into the tinder. The powder fires at once and sets the wood shavings alight. Let there be light! Boom!

FIRE:

Fire can make the difference between living and dying. It will not only cook food but make it go further, for its warmth will save calories being used up in producing body heat. It can dry clothes and provide comfort.

It can scare away **dangerous** animals while its smoke keeps insect pest at bay. It can be used to heat metal to make tools, to sharpen sticks, to bake pots and make signals.

Make the most of a fire; it can do these things all at the same time. It is well worth **REMEMBERING** the Fire Triangle. Its 3 sides represent Air, Heat, Fuel.

If any one of the side is removed the triangular collapse & the fire goes out.

CONTROLLING THE FIRE IS VERY IMPORTANT:

When lighting a fire **ALWAYS ensure adequate** ventilation with enough fuel and hot enough source to ignite this fuel. To produce flame, this temperature **MUST** be maintained to keep air & fuel continuously reacting.

The more oxygen introduced, the brighter the fire, by using wind or forcing a draft, the fire is fanned to a high temperature and rapidly burns fuel.

By reducing the ventilation the fire burns less fiercely and embers are allowed to glow, **needing less fuel.**

If these principles are understood, smoky fire can be avoided. Smoke is the result of incomplete combustion, with **care smoke can be virtually eliminated.**

TYPES OF FIRE:

However quickly you want to get a fire going take time while you gather fuel and get the tinder ready, to choose the best location and the best type of fire.

FIRES FOR WARMTH & REFLECTORS:*

With a single fire outdoors only surfaces facing it are warmed. With two fires you can sit between them but that would use a lot of fuel and no matter which way the wind is blowing you are bound to be covered in smoke. Build one fire and use a reflector.

A good reflector, close to the fire, not **only** reflects the heat back to you but also helps to make the smoke go upwards, drawn by hot current of air, instead of getting into your beautiful eyes. Use a reflector to direct heat into a sleeping shelter.*

The inexperienced often build a fire up against a tree stump or a rock. **DON'T, BUT** build the fire away from it and do sit between the two; so that the rock reflects the heat and warms your back.

Add a reflector. If there is no ready-made reflector build one-and build another reflector on the other side of the fire to reflect as much as possible of its heat back to you.

SNAKE HOLE FIRE: (SMOKING MEAT)

This is a shielded fire that produces a good draught and burns almost anything once lit. In the side of a firm earth bank excavate a chamber about 45 cm (18 inches) deep.

From above drive a stick down into the chamber, manoeuvre it about a little to make a chimney, removing the spoil that falls below. Build the fire in the chamber.

Good for burning rubbish and for **SMOKE PRESERVING MEAT AND FISH.** The snake hole fire entrance is best sited downwind in windy conditions.

KOOLIK:

For thousands of years Eskimos have use Koolik as an oil lamp, heater, and to cook their food.

This lamp give a soft, agreeable light & comfortable atmosphere to an igloo, when well taken care the Koolik does not smell nor smoke, & you can regulate it for more or less heat.

Usually made from a block of soap stone neatly emptied or carved to give it the shape of half moon vessel.

You **MUST** dig a #chanfrein# in the vertical ends of the basin so that you can pass a wick made of moss or lichen or cotton. As combustibles they use seal oil, caribou grease etc.

To avoid that the heat melts the snow on the ground and to keep the lamp hot enough to melt the grease, they put it on small stakes stocked into the snow.

You can make one Koolik using a ration box. If you have at your disposal some grease or oil, all you need is a thick piece of cotton, a piece of tarp or hydrophile cotton even a Tampa to make a wick and some kind of ramp to make the wick hold straight up

In this kind of lamp you can burn motor oil or lubricating oil but it will smoke & you will have to cut the wick more neatly to remedy this fault.

When the oil level goes down, it can happen that the flame goes down in the wick itself thus creating more smoke.

To avoid this & to regulate the flame better, you just built a small register with a piece of tin or Al. Foil.

To help you light the wick add carefully some plane or car gas. **One MUST NEVER try to burn volatile gas as Koolik combustible.**

You may succeed but also gather a lot of troubles. No one has yet been able to burn down an igloo so do not try to be the first one. Even the Guinness book of World Record would not bee-leave-u!

SLUSH LAMP: *

Made by filling an old tin or small hollow piece of branch with clay earth, packed tight at the bottom. The earth should come to about an inch from the top of the tin.

Into this a twig is pushed a piece of old cotton rag or **very finely** teased bark fibre is wound round the twig to serve as a wick.

Fat from your cooking is poured on top of the earth and when the wick is lit the lamp burns with a clear flame. The amount of light can be controlled by the size of the wick.

COOKING FIRES YUKON STOVE: *

THIS FIRE ONCE LIT WILL BURN ALMOST ANYTHING. It takes a lot of effort to build but is worth it, for the whole structure gives off good heat & the top can be used for cooking

Dig a hole circular in shape and about 24cm (9in) deep with a channel on one side leading down to it.

Set rocks up all around the outer edge of the main hole and build up a funnel, bridging over the channel and gradually sloping inwards.

Let the upper courses begin to open out again. Seal all the spaces between the rocks with earth. The fire is shielded, the chimney creating a good draught. Light the fire first in the channel. When it gets going push it beneath the chimney.

Fuel is then fed in through the top of the chimney and the rate of burning is controlled by opening or closing the top. This fire leaves very little ash and will burn a very long time before it needs clearing out.

WINTER & ARCTIC FIRE & COMBUSTIBLE:

Choose a place well sheltered from wind. Trees and shrubs are good wind breakers. But in the absence of them, on open field, a row of snow blocks, a cliff, the concave side of a snow bank can do the job. You can also elevate a wall of shrubs that you have cut & stocked in the snow.

A wall of coniferous branches will do as wind breaker, however this Berlin wall **MUST** go a little more than 3 feet high and **MUST be in a horse shoe form** around your fire.

Don't forget to protect your fire from snow which may come from above nearby branches, for the heat will melt it and could kill your fire in a flash. **

COMBUSTIBLE IN ARCTIC:

In great North all that burns is called combustible, whales fat, charcoal piece, drift wood, grass, lichens etc. In some Arctic parts however only the animal fat exist as combustible. It **MUST** be burned in a metallic container and the ignition **MUST** be made with a fire-lighter.

Seal fat make good fire. If you have a little gasoline, you will not need a metallic container. One square foot of seal fat can burn for hours & the ashes are even comestibles The Eskimos light the seal fat with the bones of the seal.

To do this, they pile up the bones in a pyramid shape, then they put fire to an oily rag that they place under the bone pile.

They neatly recover this bony pile of fat pieces. That way the heat coming from the bones, melts the oil from those pieces of fat that drips on the heated bones and then whole thing lights up afire.

GREASE STOVE:*

Here is how to improvise one of those stoves: First pierce a multitude of small holes on all the surface of a tin box. Then fashion a wick using a rag or piece of tarp or dry moss or from a seal skin etc.

This wick once impregnated of oil **MUST** be placed under the tin box then you light it up. The grease will then be placed on this little stove. This will produce twice as much heat as a wick alone.

TRENCH FIRE: * (Not French fire)

This fire is sheltered from strong wind by being below ground level. Dig a trench about 30X90 cm (12X36 in) and about 30 cm (12in) deep plus the depth of a layer of rocks with which you now line the bottom.

Build the fire on top of the rocks. Even when it has died down they will remain hot and make an excellent grill. A split placed across the embers is excellent for roasting.*

TRENCH FIRE PLACE: *

IN AN OPEN SPOT, A TRENCH FIREPLACE IS VERY ECONOMICAL ON FUEL AND SAFER THAN AN ABOVE THE GROUND ON A WINDY DAY.

Dig it just wide enough to fit your pots about a foot deep and 2 or 3 feet long, widen the windward end to catch the wind for good draft, funnel like.

HOBO STOVE: *

This stove provides heat source several people can huddle around and its top can be used for cooking. To make it you need something like a 5 gallon oil drum.

Punch holes in the bottom and around the bottom of the sides of the drum for the draught to enter. Cut out a panel on one side about 5cm (2in) from the bottom through which to stoke the fire.

Punch holes in the top if to be used **only** for heating, but make them on the upper part of one side if you do not want to smoke coming through the top. Set the whole drum on a ring of stones so that there is plenty of draught beneath.

SPONTANEOUS COMBUSTION:

Fire sometimes breaks out spontaneously in a compacted heap of wet hay. It can be produced in cotton soaked in linseed oil provided the atmosphere is warm and dry, but temperature can be critical.

Either it will burst into flame within a couple of hours or not at all. Not a reliable way of fire lighting-but a risk of which to be aware.

THE BUILDING OF CAMP FIRE: *

THE BEST OF ALL CAMPFIRES:**

3 or 4 logs about 3 to 5 feet long are laid side by side and across them another layer with, if you desire a third layer on top of these. On top of the layer the starting fire is laid. This is built up finally like a small pyramid.

This type of fire is lit at the top. The starter fire ignites the logs below with falling coals and so this fire burns downwards.

IT RADIATES HEAT EVENLY ALL AROUND & REQUIRES NO ATTENTION DURING THE NIGHT.

Also because there is no falling in off the fire the risk of sparks spreading and starting a bush fire is greatly diminished.

COMMON MISTAKES IN FIRE MAKING:

In building a campfire is to make pigsty construction with heavy logs on the outside and then pack the inside with light brushwood. Such a fire are rarely a success.

The light inside wood burns out in a quick blaze of glory but the heavy outer logs lack sufficient heat to get them properly alight and also having only small points of contact with each other at the corners do not burn well nor do such fires give out a good radiation of heat.

If the pigsty method is to be used the top of the 2 layers should be completely across the top, one layer going in one direction and the other layer crossing it.

These 2 top layers when alight get plenty of air from underneath after the brushwood has burnt out and the heat generated will be reflected downwards giving better radiation than with a simple pigsty construction.

A good camp fire is built if the wood is standing end up and the fire is built like a pyramid or cone.

The centre is fired and as the core burns away the outside logs fall inwards, constantly feeding the heart of the fire. This type of fire gives good radiation and even when wet wood burns well.

FIRE IN WET WEATHER: *

The inclusion in your camp gear of fire making aids such as a few Meta* (dried alcohol) tablets is a matter of foresight which you will appreciate if your are overtaken by bad weather.

KEROSENE FIRE TRICK:

One of the really useful fire aids is a Kerosene-soaked bandage. **THE KEROSENE DOES NOT AFFECT THE BANDAGE RATHER IT ACTS AS AN ANTISEPTIC.**

AND HELPS TO KEEP THE BANDAGE STERILE AND IF THE NEED ARISES, THE KEROSENE-SOAKED BANDAGE IS USED TO START A FIRE, IN A VERY WET WEATHER.

The best way is to pour kerosene into the roll of bandage till the roll is thoroughly saturated but not to excess or the dripping stage, then you put the bandage back into the f/aid kit.

CAMP KITCHENS: NOT KITTENS!?!

It MUST be sighted so that the breeze will not blow the smoke into the cooks' face! This is quite easy when you know which direction the winds **Blow Both in the Morning and Evening**.

The Morning breeze blow Up the valley, because the warm air of the valley floor rises, and the Evening breeze blow Down the valley.

Therefore set your kitchen so that the cook will **face neither up or down** the valley from the fire but sideways //.

Thus the smoke will blow past him/her and he can cook in comfort! The kitchen **MUST** be sighted on a slight rise, so that during rain, it will not be flooded.

The fireplace in badly drained ground **MUST** be built up a few inches above ground level. (Use your head?!?).

COOKING METHODS:

FIREPLACES: 4 METHODS:

If stones are available, build a wall to enclose the fire. This wall of Berlin should be about 9 or 10" high **and the opening MUST be Parallel to the valley.**

DON'T TAKE STONES FROM WATERCOURSE. THEY EXPLODE!

POT SUSPENDER:

To suspend your pots, use the most simple trick, a stick across the end walls.

A trench fireplace is an efficient cooking place but **Only** suitable in clay soil and if no flooding expected.

3RD METHOD:

Is a single stick, lying over one of the end stones and with its farther end held down either under a hooked stake or by a heavy stone.

2 simply erected tripods of interlocking forked sticks at either end with a cross stick is another way of suspending your pots over the fire.

This latter has the advantage that by changing the base of the tripods, the height of the pots above the flame can be varied.

4TH METHOD:

To suspend your pot is by an overhead stick supported by 2 forked stakes driven into the ground at either end of the stone wall.

THE BEST METHOD OF ALL:

In a permanent camp call for a single straight stake driven into the ground at one side of the fireplace, and from this single stake a swinging gantry is hung.

The height of the gantry (pot) on the upright stake can be adjusted to any height above the fire.

It will swung free from the flame and the pots can be removed without burning your fingers. Although it will take 5 minutes to make, it will save burnt fingers & spilled or spoiled meals.

CRISS-CROSS FIRE LAY: (COOKING)

This is the best method when you need a bed of coals for Broiling and Baking.

Place 2 pieces of wood about as thick as your wrist and about a foot long on the ground parallel to one another about a foot length apart.

Lay a number of thin kindling sticks crosswise on top of this base leaving space between each stick.

Continue building up cross layers increasing the thickness of the wood from layer to layer but **ALWAYS** placing the pieces a distance apart.

This allows the flames and the draft to come upward. About 8 layers is enough. Light the tinder near the ground from the windward side.

When properly laid, the criss-cross fire will flare up with a blaze then quickly turn into a bed of hot embers.

MAKESHIFT STOVE:

You can use gas from the car or plane crash that you put in a tin can fill with sand or earth, once soaked you just light it up.

To save on gas, you can add oil from the motor before it freezes, even if it spills on the ground, this oil can be used even in its solid frozen state.

WOOD BURNING NOTE ADD ON:

REMEMBER not to use dead wood from the ground because they retain dampness, **ALWAYS choose standing dead wood**. Some woods burn well in winter while the sap is not up, while in summer they fire badly.

All the woods that grow in up places are better combustable than those from the swamps.

We also note that the #tremble, frene, peuplier, pine, spruce, pruche# **do NOT burn when freshly cut.**

SLEEPING BUSH "CHESTERFIELD": *

Using 2 small fires a bit apart to keep your warm and cosy, you install in the middle of them your "chesterfield".

Take 2 log about 4 feet long, sharpen well one end that you plant firmly into the ground with a 30 degree angle.

Enrol your rope around these 2 post every 6 inches or so. Then lay down your ground sheet or evergreen branches and you will be very comfy.

If you have enough green wood you can also build reflectors on each side behind your 2 small fires that will keep the heat even more and reflect it on you for greater comfort. Ain't that nice to know us?

STAR FIRE-NO FLAME-NO SMOKE HARDLY:

Once you have your fire going good and that you dispose of 3 big logs, put them on the ground in a star shape as spokes of a wheel.

SUCH A FIRE LAST INDEFINITELY, as the logs are burning you push them forward in the fire, so as to produce **ALWAYS** fresh embers. It makes a good cooking fire.

Another advantage is that it does not reveal your presence to the enemy, for it produces little flames and hardly any smoke.

IN FLOODED COUNTRY: p57*

Or in a marsh or swamp land, it may be impossible to find a spot of dry land to light a fire. Thus you overcome this by building a raised platform with its floor a few inches above the water level.

The sticks that make the base of the platform are covered with a thick layer of mud. On this you can light your fire and cook your meal.

REFLECTOR & WIND: *p67? 57

In the absence of stones and where green wood of no value is plentiful a reflector fireplace may commend itself to you, especially if the place is windy.

The reflector MUST be on the Windward side of the fire, so that the wind passing over it draws the flames up to the top of the reflector and then across.

Reflector can be made of logs, rocks or sod & close to the fire. The log reflector is made by driving 2 heavy stakes into the ground, both leaning slightly away from the oven. Logs are then stacked horizontally one on top of the other against the stakes.

Green logs will last longer, if not available, the logs may be covered with dirt, clay, mud or soil.

For more efficient reflection the logs can be covered with a sheet or 2 of Aluminium foil.

COOKING TRICK:

When you want to boil a pot quickly in an open space in a very high wind, the flames will be blown away if the pot is suspended.

Woodsmen have a trick: Place the pot on the ground and build the fire windward on both sides of the pot. The wind will blow the hot flames around the sides and your pot will soon boil. *p57b

FIRE FOR COOKING ADD ON:

It's the heat not the flame that cooks food, thus hot coals if better than quick or big flames.

A COOKING FIRE MUST BE A SMALL FIRE, EASILY CONTROLLED.

Often you need a "long" fire because there are 2 or 3 pots a frying pan etc. all of which **MUST** be on the fire at the same time.

2 green logs 6" or 8" thick placed about 12" apart will contain a cooking fire for you & make an excellent overnight fireplace.

A fire for cooking should be low with the quick heat of small wood. **A bush saying: the bigger the fire, the bigger the fool.** When laying a cooking fire it is a good plan to put a thicker stick in front of the fire.

This will serve to rest your frying pan, and keep the heat from your hands, also helps to contain the fire within the fireplace.

NOTE: IN VERY WINDY OR COLD CONDITIONS IT IS WORTH THE EFFORT TO MAKE A REFLECTOR FOR YOUR COOKING.

If you have enough green wood you can also build reflectors on each side behind your 2 small fires that will keep the heat even more and reflect it on you for greater comfort. Ain't that nice to know us?

ANOTHER TYPE OF REFLECTOR "V" TYPE:

- 1) Split 3 logs length-wise, to do this, you use the peg method.*
- 2) Put those half logs one atop the other against the stakes put in triangle shape.
- 3) Plug the exterior sides of the logs with turf & protect the base of those stakes inside with turf or mud.
- 4) Place steel bars in front to support your pots.
- 5) Start your fire under #4

POLYNESIAN COOKING FIRE:

First dig a hole the size and depth of an ordinary water bucket. Light it up with small twigs at the bottom, in order to burn well this type of fire **MUST** be a strong fire.

Using sticks of 1/2 to 1 inch thick and about 1 foot long, put down along the walls of the hole standing up, you need a wood giving good embers

The position of the cooking pot is that its bottom **MUST** be at about 1 inch lower than the top of the hole and suspended to stay like that using any types of hooking devices as seen above.

If the fire is dying or weakening, remove the pot, put a few twigs on the fire to activate it a bit. Then once the fire has restarted and only then, put the pot back in the hole, not before.

You can use a tube made from bamboo or elder branch that you have emptied you blow on your fire to reactivate it. **NEVER blow directly on a fire with your mouth, you will get burn.**

If the walls of the fire come down, make another hole beside the first and recover the first one.

If you find an old water bucket you put it half way in the hole, its bottom removed of course, then you just put your own pot in that old one, the old one makes stronger walls & its easier for cooking

ADVANTAGES:

THE POLYNESIAN FIRE LAST FOR A VERY LONG TIME. Put your potatoes or yams in the pot and go for a walk, 1/2 hour later they will be cooked. The necessary skill to make a good Polynesian fire only comes with experience.

THIS FIRE IS NOT SENSITIVE TO WIND, DOES NOT BURN THE COOK AND NEVER NEED TO BE RE-LIGHTED.

You can camp for 10 days with only one match. At night or when you go for a long walk, put in it a big log at the bottom and cover your fire with a big flat stone or an old tin, do not make it airtight however.

REFLECTORS: **

If weather is at all cold, you owe it to yourself to take the fullest advantage possible of reflected heat.

You soon appreciate the efficacy of a night fire against some radiating surface such as a flat boulder, a wall etc., the value of having such a reflector behind you is usually a matter of great experience.

The green bushman, kindle his fire against a cliff and sits in front of it.

The old timer builds his fire farther away from the rock face and sits between the cliff & the fire. Its the best.

NIGHT FIRE:

The nuisance of overnight sleeping in the bush is to rise up a dozen times to add fresh fuel, but you can beat that, up to a point by pounding a couple of green poles into the ground behind the fire from which they slant.

You pile a single wall of green logs against these. The theory is that as the lowest log disintegrates the lowest one above will replace it.

This operation seldom work out this automatically but you should still enjoy a considerable amount of reflected heat which will need feeding only a few times during the night and which at dawn will still boast enough coals so that over them you can cook breakfast or **at least** toast your hands while coming awake?

SPECIAL HEATING UNIT = NAIDA!: *

Used by Siberian woodsmen to sleep warm. Using 2 big spruce logs that have been squared off on one side, they are placed one on top of the other but separated by blocks or stones wedges.

Then they light a fire all along the logs in between them. This heating wall is placed across the entry of the tent or hut.

Another factor often overlooked is the fact that a long fire is very often preferable.

BUILDING FIRE IN EXTREME COLD:

One **MUST** find the best shelter available (Hawaii) and to lay up beside a fire until the frost moderate.

When vitality starts ebbing and a chill begins to spread throughout the body, one needs nourishment or rest and preferably both.

It is a poor policy to keep on travelling on nerve unless the distance to travel is short and the gain to get is large.

The best axiom old timers find is to get a fire going and to eat. If food is lacking, the next best thing is to keep as warm as possible & as inactive as possible until the cold breaks.

EVERYTHING MUST BE READY FOR THE FIRE BEFORE THE HANDS ARE UNCOVERED. The fingers will probably be nearly stiff anyway.

If flames do not start almost immediately once hands are bared they should be shoved against the skin to warm **before another attempt is made.**

As soon as the fingers are limber enough to hold a match, the try can be made again as quick and certain as possible.

OTHER FUELS: \$\$\$???

If no trees around growing, driftwood is your best fuel. If above the timber line, you may still find enough stunted bushes to serve your purpose.

On the Plains one come to use small brush, roots of vegetation such as the #Mesquite#, knots of grass & the dry cattle shit.

ARCTIC FUEL:

In parts of the ARCTIC with no driftwood, coal and peat are occasionally found, roots and brush are frequently available.

The small heather like Evergreen known as #cassiope#* is sufficiently resinous to burn while wet & green. **Moss & Lichens are also fuels. All can be secured under the snow if necessary.**

TO BURN OR TO EAT:

Animal hair and hides provide warmth, so will bones and fat, the latter in some instances being laid in strips over a small pile of the bones and the starting flame and heat furnished by a mass of moss, until oil begins to run over the bones and to burn.

Another way to burn animal fat or oil is to place it in a container, suspend or hang in it a wick of some dry vegetation or a fish line braided for the purpose & once the latter has soaked enough fluid to light it.

OIL STOVE HOME MADE:

From a metal container by:

- 1) Punching a hole in one side above the fuel level to serve as an air vent.
- 2) Making a wick with a rag or some plant or other things.
- 3) Suspending this wick inside the container by means of a snare wire or a strip of metal cut from the can itself.
- 4) And finally lighting the wick once it has become saturated with oil, first melted if need be by outside heat.

None of these animal substances should be burned, certainly when any may be needed more for clothing or for food, especially fat.

SET OF POT HOOKS:

This set of hooks is more and more useful and is easy to make. **To our knowledge it is a MUST once experience has been made.** It solves the problem of suspending pots over the fire. Made with a few coat hooks and a pair of pliers. *

BILLY HOOKS & FIRE TONGS: *

Suspending bilies (pots) is improved with billy-hooks, easily made by cutting a few hooked sticks about half an inch in diameter and varying length from 6" to 10".

At the farthest end from the hook, a single deep nick is cut into the wood, so that the direction of the cut is away from the hook. The wire handle of the pot will set safely in this nick.

NOTE:

It is better to cut the nick on the side opposite to the hook.

ADJUSTABLE WIRE POT HOOK:

It is worth while making a couple of adjustable wire pot hooks if you go camping often.

The advantages of being able to have one pot high above the flame so that it can simmer gently and another right down over the fire to boil quickly is apparent! The adjustable hook is held at whatever height desired by the link that locks it securely.

In addition to your billy stick and hooks **you will be well advised to make a pair of fire tongs. They will only take a few minutes to make but may save a badly burnt hand.**

Another improvised pair of fire tongs uses a narrow but long fork and a single stick through its crotch.*

PEGS & STAKES: (Not pigs & steaks!)

Camping without equipment calls for a really sharp tool and a good deal of common sense. **A good machete is probably the most useful of all the tools for bush work.**

You will need sticks either for pegs or stakes or forks, or hooks coming from windblown branches close to your camp. It is **ALWAYS preferable to use dead timber**(not rotten) rather than growing wood.

Even a simple stake or peg **MUST** be cut properly and its head bevelled and toe properly pointed to be well driven in ground.

This stake will drive cleanly into the ground, it will not split when being driven because the head is properly bevelled.

Whereas these stakes * will be a failure. One will not drive because it has a bend and this deflects the blow. The other will split at the head or drive crooked because the toe is cut at an angle.

FORKS: *

Generally the correct sort of fork to select is one with a perfectly straight drive from the head to the toe and with the forked stick coming off an angle.

A fork that is to be driven in the ground **MUST** have the head bevelled and toe pointed. Here is a perfectly straight drive from the bevelled head right through to the toe. This fork will drive into the ground and stand securely. These forks can not be driven.

****(Left):** If you try to hit one of the forks the blow will deflect by its angle. If you try to hit the crotch, the fork will split.* **(Right):** Because the main stick is not straight; it wont go into the ground.

Most beginners think??? that the wrong way will work out all right. Everyone does! The first time! Then you learn that it pays to spend 5 minutes finding the right shaped stick or fork.

HOOKS: * & "HOOKERS?"

Unless hooks are to be driven into the ground, less care is required for their selection. After you have selected the stake, fork, hook and before you trim it.

MAKE SURE that the wood is not rotten. The inner wood **MUST** be sound. These hooks will do the job.

DRIVING STAKES: (Not skates?)

Stakes can be driven into the ground using an axe or a large stone, held in the 2 hands and "pulled" down to the head of the stake will drive quite well.

When using a stone, it is flat, use the edge rather than the flat. The edge will put more weight behind the drive, & less chance of the stone to break in 2 with the force of the blow.

FIREWOOD AND FIRE IN THE RAIN:

Firewood gathered from the ground is useless for fire. It is far wiser to pull down dead branches standing on trees for your storage since this wood even after rain is reasonably dry.

DIFFERENCES IN FIREWOOD:

The difference between hard-wood and soft wood is a matter of botany, it has nothing to do with grain, texture or weight.

SOFTWOOD: come from coniferous trees such as Pines, Tamaracks, Spruces & Cedars Hardwood are from trees that instead of needles or scales have the familiar types of flat leaves.***

The resinous softwoods when seasoned generally make the best kindling. They catch & burn quickly. They are smoky however short lived and prone to throw sparks.

RESINOUS SOFTWOODS ARE MOST VALUABLE WHEN WE WISH TO START A FIRE OR NEED A FAST BRIEF BLAZE.

The seasoned hard woods in most cases provide a steadier & long lasting fire.

MOST SUITABLE FOR COOKING as they make hot enduring coals that afford the intense even heat desired. When we can we start a fire with soft wood and holds it with hard wood.

WHAT WOOD TO USE OR NOT!:

We soon find out that **FALLEN WOOD THAT HAS ABSORBED MOISTURE FROM THE GROUND MUST BE AVOIDED.**

About the only time is worth bothering with unless fuel is scarce is when it is desirable to keep a fire going for a long period without very much heat.

Standing deadwood is what we usually come to seek and we also soon realize that there are varying degrees of qualities even in this.

An upright stump that is rotten is of little value except to hold a fire, although one can occasionally uncover a tough resinous core in decayed soft wood that will burn as if soaked in oil.

Dead Birch on the other hand quickly loses most heat producing ability if the bark remains intact holding moisture.

A few green woods such as: Birch, White Ash, burns best when alive. Green wood in general however is best used mixed with dry. Some of the barks, such as Hemlock gives of steady warmth.

There is also variation of results due to atmospheric and soil conditions so experimentation is best teacher.

Hickory leads the North American firewood in heat capacities. Oak is next, then Beech** then Birch and Maples, Ash* and Elm is a favourite of many of us.

Then comes Tamarack, Yellow Pine, Chestnut, Poplar, White Pine and Spruce. Much depend on your location.**

For ex. in the Rockies; Poplar and Lodge Pole Pine* will keep you comfortable trough 60F below zero stretches. Willow Oak is among the least effective in caloric energy.

THE GENERAL RULE IS: THE HEAVIER A WOOD = THE GREATER IS ITS HEATING POTENTIAL.

FIRE COOKING TIPS:

Suppose you wish to cook with several utensils at the same time? Then you will want to suspend these above a long slim conflagration from a green pole laid between 2 crotched sticks.

Possibly you will prefer to set them instead in some steady position where they will get sufficient heat.

2 of the simplest way to do this; will be to build a long narrow fire, either in a narrow trench or between 2 green logs laid closely enough together so that the pots can straddle them.

TO TAKE ADVANTAGE OF THE BEST AVAILABLE DRAFT A LONG FIRE MUST BE LAID IN A LINE WITH PREVALENT AIR CURRANTS.

When the fire is confined by 2 logs, these can be advantageously placed in a slim "V" with the open end toward the wind.

COOKING TIP 2:

When cooking over an open fire, you can save yourself a lot of souring the outside of pots and pants, if you smear a thin coating of mud over them before cooking. The soot will collect on the mud. After you have finished cooking, tap the pans and off comes the mud, soot and all. (Ain't that nice!)

HOT STONES HOT TIP: (Hot shots?)

Also consider the merits of heating stones in the fire as a substitute for hot water bottles, yet don't use stones from or near water they could explode.

COOKING TIPS 3:

MAKE SURE your cooking is done on level solid ground to avoid tipping. Fill your Primus stove, lanterns etc away from your shelter and over some utensils that will catch spills thus reducing waste and eliminate fire hazard.

WAYS OF CONSERVING ENERGY:

VERY IMPORTANT IN SURVIVAL!

The point remains that frequently it is easier thus preferable under survival conditions to burn fire wood in two, instead of expending, losing energy unnecessarily in sectioning it.

ANOTHER WAY TO SAVE ENERGY IS:

To lay the ends of long sticks in the blaze, continuing to advance them as they are burned.

Another factor often overlooked is the fact that a long fire is very often preferable. If you want an open fire to lie beside for example, it **MUST BE AS LONG AS YOUR BODY!**

SLEEPING WARM WHILE SIWASHING:

You can build a long large fire, brush it **carefully** to one side when ready to sleep and then to stretch out on the warmed ground.

SAVING ENERGY CUTTING:

When cutting thick sticks into short lengths, an easy way is to make deep cuts, opposite each other on either side of the stick and then taking the stick, bring it sharply on to a convenient log or rock, with the cut area at the point of impact.

One sharp blow will usually break the wood and you will save yourself the work of cutting right through the wood. **LAZY = EASY = BEST IN SURVIVAL.**

SPLITTING FIREWOOD:

FIRST DO YOU NEED TO SPLIT IT? For fire cooking, sticks 1/2" thick to an inch are most suitable, because the amount of heat can be easily control.

For fire for warmth use thick logs, it will be often easier to burn a long log in half than to try to cut it.

For these long logs, start the fire in the centre of the log & when it burns through, the 2 halves will be easier to handle.

For an all night fire occasionally pushing the 2 burning ends together will keep the fire burning gently and a fair size log can be made to burn all night.

BREAKING DEAD WOOD IS EASIER THAN CHOPPING & SAVES ENERGY!

Blocks of wood are most easily split either around the circular rings or radially that is across the circular rings.

Some woods will split easily either way, others will be excessively tough. If you try to split the wood the wrong way, it will be very hard work and the wood will be cranky.

Immediately you try the right way the wood will split fairly easily unless of course it is knotty. Trial and error are the best way to find out, use a comparatively light blow to test the grain.

When splitting wood with an axe the best result are made by driving the blade axe into the block of wood, then raising both axe and wood and by reversing the axe head in the air, bringing the axe head down with the wood uppermost.

One blow in this manner will generally open the toughest block unless knotty. After wood cutting it is good practice to stack it in graded heaps, little, medium, big, separately with twigs in separate also.

SAVE ENERGY: (ESSENTIAL IN SURVIVAL!)

DON'T WASTE ENERGY CHOPPING LOGS. BREAK THEM by smashing them over a rock (*A).

If that does not work, feed them over the fire, letting them burn through in the middle (*B) or if they are not so long, feed them end first into the fire.

If it is absolutely necessary to split logs in order to conserve fuel, an axed is not needed. Even quite a small knife placed on the end of a log and hit with a rock may split it. (*C).

Once begun plug a wooden wedge in the opened gap and drive this downward to complete the split. But if you only have one knife don't take the risk of damaging it.

CANDLE & NYLON ROPE TRICK:

Save match by using a candle. A trick to **get very high heat fast**: if you find on the beach a few pieces of nylon rope, throw 3 or 4 of them 6" long in your fire you will get intense heat, fast believe you me.

MODERN TINDER: (To bring along John!)

Empty cardboard milk cartons MAKE EXCELLENT FIRE STARTERS. You can carry your supply easily by simply cutting off the ends of the cartoons, slitting down one corner and folding them flat.

The paraffin soaked cardboard will light when wet wood will sputter and refused to burn. The cartoons are waterproof to boot.

FIRE FOR WARMTH:

If sleeping out without sleeping bag or any bedding, select the site for your fire against a dead log (**MAKE SURE** the log is not a hiding place for snakes).

Rarely will a single log burn by itself unless there is a strong draught blowing onto it.

Therefore you **MUST** feed the fire with **at least** one other log. This is done by selecting a solid fairly long log 8' or 9' through if possible and 6 to 7 feet long.

By pushing the end of this against the bigger log where you have built your fire, you will ensure continuous burning and as the smaller log burns through the night you simply push it against the big log and the fire will take fresh start.

An alternative is to lay your logs in a star shape and push the ends together during the night. A small log pushed against a dead fallen tree will give you a good overnight sleeping fire.

REMEMBER NEVER to sleep directly on the ground, use a ground sheet or branches etc to isolate you.

FIRE PRECAUTIONS:

Observe these campfire rules and you will **NEVER** start a bush-fire.

- 1) **NEVER** light a fire at the foot of a standing tree or tree stump. **NEVER** light a fire you can not put out.
- 2) **NEVER** leave a fire burning when you leave camp. **ALWAYS** clear an area 3 feet wide around your fire place.
- 3) **Whenever** possible enclose your fire either with stones, by using a pit-fire place, or by using a couple greens logs.

BUSH-FIRE FIGHTING:

There are 2 types of bush-fires, most frequent is: the Ground fire then the Tops or Trunk forest fire.

Forest fires move at great speed and because of terrific air currants they generate they jump considerable distances.

Ground fires can be fought by beating it or by making a fire break. If the fire is purely grass fire, use a green leaf branch to attack the fire by beating the burning edge back towards the burnt portion.

When the bush and scrub are alight you may be able to beat the fire out with a green branch, but if possible a length of sacking thoroughly soaked will prove a more efficient beater. Beating out an extensive grass or scrub fire is hard work.

If the fire extends along a wide front, too wide for you to attack or if it is fanned by too high a wind, your best defense is to burn a firebreak between you & the approaching fire.

Select the line for the firebreak where the grass or scrub is the thinnest and fire a small area--beating the young fire out on the side farthest from the approaching fire so that it'll move away from you towards the main fire.

In the draught created by the heated air, the fire along your firebreak will advance against the wind feeding upon the flammable material in its path.

Extend your firebreak in a wide semicircle round the bush-fire side of your camp and when the approaching fire reaches the ends of your firebreak be ready to attack it if it starts to burn back against the wind. Water if available, can be used to fight a bush-fire by playing a jet of water at the heart of the fire.

FOREST FIRES:

There is little 1 or 2 people can do without fire fighting equipment against a forest fire.

The **only** really effective way to fight such a fire is by cutting a firebreak 100 to 200 yards wide, and this is impossible on short notice.

IF FIRE IS COMING:

THE ONLY SAFE REFUGE PLACE IS IN A WATER HOLE or the FIRE SHELTER:

IT'S NO USE TO TRY TO ESCAPE BY RUNNING AWAY FROM THE FIRE.

Men galloping in front of forest fire on fear maddened horses have been overtaken by the racing flames, which in minutes have killed both horse and rider.

WILDFIRE & FIRE SHELTER:

REMEMBER that great fires create their own rules, even their own weather. For example a fire goes faster up the hill than downward.

A fire shelter is an aluminium tent about 2 1/2 meters long and a metre wide. When a fire fighter is caught in the advance of a raging wildfire, his shelter maybe his last chance.

He clears an area as well as he can and gets under the shelter. He waits there, face down in the dirt, as the fire roars over him.

The fire fighters call the shiny aluminum shelter his "shake and bake" Time spent under it is like time spent in hell.

Here is a true story about this. In 1985 in Idaho's Butte fire, 73 fire fighters were caught by a fire from that raced through three kilometres of forest in 15 minutes. When it overtook the fire fighters, it was 30 story high and looked like a bright orange sun exploding.

The fire fighters got under their shelters and for the next hour the fire roared around them. Hot winds whipped at the shelters, ripping holes that let the heat and light through.

The fire fighters pressed their faces to the earth, and prayed. Between the blasts of fire, they called out to one another. They talked about how they loved their families and girlfriends.

After an hour, the fire let up. The forest was blackened -- "toast" in the fire fighters vernacular. Near the shelters, now covered with a fine white ash, the handles of shovels had been burned clean away.

BUT ALL 73 FIRE FIGHTERS HAD SURVIVED.

WATER MUST NEVER BE USED ON OIL FIRES:

If water is placed upon burning oil or fat the water merely increases the intensity and spreading the danger. The **only way to fight an oil fire** is to seal the fire off the air. Or use a dry chemical powder that smothers the fire.

To fight an oil fire, throw sand or dirt on the seat of the fire that will seal off the air and the fire will die quickly.

NORMAL FIRE MUST BE ATTACKED AT THE BASE GOING UP. (IE: walls). Often fire starts in a frying pan.

NEVER use water to throw on the pan, throw sand, or flour or put a lid over the pan.

FIRE ON CLOTHING:

When clothing catches fire, there is a tendency to panic & run. Keep calm (easy to say). Beat the fire out with your hand or roll in the dirt.

Better still, grab a blanket, or a rug and roll in it. You may feel painful skin burns but if you run, air will feed the burning clothing, you may be so badly burnt that you will lose your life.

CLOTH CAMPING TIPS:

In the Arctic* damp clothing can be left to freeze and the moisture beaten out of it when frozen. When drying clothing by the fire use these rules:

- 1) **NEVER** place clothing nearer than you can comfortably hold your hand.
- 2) **NEVER** leave clothing by an unattended fire.
- 3) When drying boots or shoes use the sand trick which is to heat sand in a pan or from pile a sand which you have made a fire above, fill these boots with the hot sand, wait 1/2 hour then empty them and redo the process once more, thus dry in 1 Hour.

MISCELLANEOUS EQUIPMENT:

- 1) Have a designated place for the equipment and return it after use, have this location well marked and let everyone in the party aware of that rule. Avoid lost and misplacing.
- 2) **NEVER** lay equipment down on snow, spruce boughs, or ground. Put it in your pocket or hang it well in sight.
- 3) Put your equipment in an accessible place, so that you can reach such items as your signal flares in a moment's notice.
- 4) Small items such as compass, matches container **MUST** be tied to your person to avoid loss while travelling.

OTHER RULES:

Do not cut rope or twine **unless absolutely necessary** as you may need in its original length.

Make habit of tying knots that can easily be undone such as the Bowline, Clove-hitch* particularly in cold weather.

FIRE PRECAUTION:

To prevent fire problems, the fireplace should **NEVER BE OVER 2 1/2 FEET IN DIAMETER**. In summer light the fire outside the tent, with your tent flap open & **ALWAYS BE CAREFUL OF THE TRICKY WIND GUSHES**.

FIRE CAMP RULES SAFETY:

Pick your spot for your fire, **MAKE SURE** it's in open space at least 10 feet away from brush and the nearest tree.

Clear a 10 foot circle down to mineral dirt, that is the stuff that is free from grass, dry leaves, twigs and needles.

On grassy soil, remove the turf and place it on one side, after finishing your campfire replace the turf.

If the ground is wet, build a platform of sticks and bark of dead trees. In **Winter** scrape the snow away & tramp it down before laying your platform.

MAKE SURE, SURE AND ABSOLUTELY SURE YOUR FIRE IS WELL OUT BEFORE LEAVING IT!

Cover it with dirt after much water on it, & spreading sticks and coals and scraping burning embers from large logs and sticks, **COALS MUST BE COOL TO THE TOUCH**.

CLOTHES DRYING:

FEVER & COLD PREVENTION:

As much as possible NEVER keep wet clothes on till they dry up, it is THE BEST WAY TO GET FEVER AND SICK.

Take the first occasion to remove them & to dry them, even if you have no other clothes to change with, light your fire, stay under some kind of shelter near by your fire and let them dry up.

To dry them, built a small cage with small branches in form of beehives or teepee on hot ash & hang your clothes on it they will soon get dry.

F/AID: *

Even in hot climate it is dangerous to stay in damp cloth from sweating. Baden Powel use to have a spare shirt that he wore on his back tied up to his neck by the sleeves.

At each halt every 1/2 hour or so, he would remove the shirt he wore to change it with the other that the sun had dried, (one can carry the other shirt on a cross stick).

That way Powel had rarely the fever while all the others were all afflicted by it. Note about boots dried in 1 hour.*

BUSHMEN FOOD OF THE OLD TIME:

In the old colonial days, the hunters used to carry molasses and salted lard for their long travelling, and the hunting and fishing to supplement their needs.

It still works very good, for salted lard keeps very well and very nourishing.

A slice of lard is put directly on hot coals, since the lard is greasy, the coals do not stick & it cooks great with no problem.

CLEANLINESS:

One of the reason many get sick at camp it that they are not **careful** in cleaning themselves as well as the food and the pots and pans to do their cooking.

MAKE SURE you wash and clean well all that is needed for cooking, use clean sterile water especially around towns & villages because of pollution. 1 ounce of prevention is worth a pound of cure.

THE FORGOTTEN ART OF BUILDING A LONG LASTING FIRE: (Old Farmer's Almanac)

We have lost this art of building a long lasting fire without constant and bothersome attention. Most people begin with no ashes in the fireplace and proceed to build the fire with paper and dry kindling wood laid directly on top of the andirons.

This explodes into a large, scary blaze. As soon as it dies down, so that one can get close to it, larger logs are thrown on top, another large, uncontrollable blaze quickly burns and dies out.

All of this results in a fire constantly needing attention and always either too hot or too cold, too large or too small. It also can result in a scorched mantle or a second good fire up in the chimney.

All of this amateur nonsense is **the result of too much draft** which in turn results from the improper use of the andirons. You should not think of the andirons as a grate but simply as uprights to prevent the logs from rolling out of the fireplace.

ASHES ESSENTIAL:

To build a fire of good steady heat with a small blaze and a minimum use of wood, the fireplace should be covered with a bed of ashes about one or 2 inches above the andiron's legs. **If ashes are not available, sand may be used.**

Now choose a log 8 to 10 in. in diameter. Place this, called the back log, against the brick back of the fireplace, with a slightly smaller log balanced on top of it. Then place a log 4 to 6 inches in diameter in front of the fireplace, just in back of the andirons.

This is called the fore log. **It is essential that these logs be well bedded down in the ashes** as the point is to keep the flames and draft out from under the logs so only their tops and faces burn.

Build the fire between the back and fore logs, starting with paper and kindling and gradually building up to 4 to 6 inches logs. Once the fire is lit, the fore and back log eventually will burn through.

As this happens, move them into the center of the fire and replace them with new logs, once more well bedded in ashes.

This results in a fire that burns with a hot blue flame & red-hot coals. The face of the back log burns red-hot & reflects the heat of the fire. The fore log holds the fire in and prevents air from passing under it.

MORE OR LESS HEAT CONTROL:

If you want less fire, you can dampen this arrangement by putting a shovel of ashes on it. If you prefer more blaze, a few small sticks of kindling can be added to the top of the fire.

SAVE YOUR FIRE TILL NEXT EVENING:

If a good fire remains when you retire for the night, **cover it with ashes from the side of the fireplace. This holds the fire all night, & when you uncover it the next day, or even the next evening,** you will find a bed of red hot coals upon which to build a new fire.

This is how heat and fire were maintained from day to day in colonial homes when such fires were a hard necessity.

FIREPLACE AND ART OF TENDING THE FIRE:

Hard question to answer since the fireplaces vary so much one from the other. In fig 282 *0282 the great advantage is the back pitches forward thus reflecting more heat into the room.

This fireplace is well constructed and on very cold days I have the fire burning out on the hearth fully a foot beyond the line of the mantel without any smoke coming into my studio.

Fig 282 shows a diagram with the dimension of my studio fireplace and represents the vertical section of it. I give these for the benefit of the people who want to know how to build a fireplace that will not smoke.

But of course even the best fireplace will smoke if the fire is not properly arranged. With smoke the angle of reflection would be equal to the angle of incidence did not the constant tendency of smoke to ascend modify this rule.

Throw a rubber ball against the wall and the direction from your hand to where it strikes the wall makes the angle of incidence when the ball bounces away from the wall it makes the angle of reflection.

MANAGEMENT OF THE FIRE:

The management of the fire itself is done by yourself unfortunately females never did and never will learn the art they show a real deficiency in this art, no sexism here intended, too bad for the bra-burners, but those are the hard facts.

The first thing they want to do with a fire is to make the logs roost on the andirons the next thing is to remove every speck of ashes from the earth then she wonders why the fire will not burn. Poor Jane!

ASHES ESSENTIAL:

In my studio the ashes have not been removed from my studio fire since it was first lighted last fall.

Ashes are absolutely ESSENTIAL to control a wood fire and to keep the embers burning overnight. You will see by fig 288 that the logs are not resting on the andirons. **.

We only use the andirons as a safeguard to keep the logs from rolling out on the earth.

If the fire has been replenished late in the evening with a fresh log before retiring pull the front or the ornamental parts of the andirons to the hearth and then lay the shovel and poker across them horizontally.

When the burning log is covered with ashes and the andirons arranged in this manner you can retire at night with a feeling of security and the knowledge that if your house catches afire it will not be because of the embers in your fireplace.

Then in the morning all you have to do is to shovel out the ashes from the rear of the fireplace put in a new backlog and bed it in with ashes as fig 286.

Put your glowing embers next to the backlog and your fresh wood on top of that and sit down for comfy breakfast with sweet Jane.

Don't make the mistake of poking a wood fire with the idea by that means of making it burn more briskly or boosting up the logs to get a draught under them it will not work at all.

2 logs placed edge to edge like those in fig 288 with hot coals between them will make their own draught which comes in at each end of the log.

And what is **ESSENTIAL** in fire building they keep the heat between themselves constantly increasing it by reflecting it back from one to another.

If you happen to be in great haste to make the flame start, don't disturb the logs but use a pair of bellows. Fig 287 shows a set of the logs that will make the best constructed fireplace smoke.

The arrow point shows the line of incidence or the natural direction which the smoke would take did not the heat carry it upward.

*Fig 285 shows the same logs arranged so that the angle of incidence strikes the back of the chimney and the smoke ascends in the full and orderly manner. But both fig 285-287 are clumsily arranged.

The B logs in each case should be the backlog and the small log A and C should be in front of B.*

In all of the fireplace that we have described you will note that the top front of the fireplace under the mantel extends down several inches below the angle of the chimney.

*Fig 283 shows a fireplace that is improperly built it costs a small fortune and was built by a firm of the best architect from USA and Europe.

But the fireplace smoked because the angle of the chimney was below the opening of the fireplace and consequently sent the smoke out into the room of smoky bear.

Fig 284 shows the most primitive form of fireplace and chimney, one that a child may see will smoke unless a fire is kept in the extreme back of the hearth.

The advantages of ashes in your fireplaces are manifold. They retain the heat, keep the hot coals glowing overnight and when the fire is too hot may be used to cover the logs and subdue the heat.

WOOD CUTTING BEST TIME & CURING:

Know also that hardwood such as oak, maple, cherry or birch is the best to burn. This **MUST be cut in late winter or early spring** so that it can dry and cure in the hot summer sun. A drying and curing period of at least 6 months is necessary.

KOOLIK:

Pots can be suspended from pegs driven firmly into the walls above the fat lamp koolik or the Primus stove koolik.

The Koolik has provided heat for comfort and cooking "even cookin-king" for thousands of years, giving a quiet pleasant light and warmth to the native home.

Properly tended it does not smoke or smell and it can be controlled to give more or less heat on demand.

It is carved from soap-stone in the form of a shallow pan of 1/2 moon shape. The straight edges of the lamp are veiled to support the wick made of Arctic cotton or moss.

Seal oil or caribou fat is used as fuel. To **AVOID** its melting into the snow shell and to keep it warm enough to render fat, it is supported on short sticks driven into the shelf.

IMPROVISED KOOLIK:

(Invented by "AL" KOOLIK?)

You can improvise a fat lamp out of any flat pan, such as a ration can. If you have fat to burn, all that is required is a piece of heavy cotton, linen cloth or absorbent cotton for a wick and a slopping ramp to support it.

You can burn lubricating oil in a fat lamp but the flame will smoke more readily and the wick will have to be trimmed more **carefully** to keep the flame below the smoking point.

When the level of the oil drops, the flame may follow down the wick causing further smoking.

A simple damper, made of sheet metal will prevent this and will permit closer control of the flame. A few drops of aircraft fuel used with caution will aid in lighting the wick.

NEVER try to burn a volatile fuel in the Koolik, you would be far too successful and might find yourself in trouble.

REMEMBER that a little animal fat in lubricating oil makes a good improvement in the flame.

SAFE OPERATION OF THE KOOLIK:

The left-hand man remains on the bench assist in cooking and maintaining their Koolik.

If this lamp is burning animal fat it requires only moderate attention.

Lubricating oil is not so easily used, as the flames smoke easily and the wick needs more frequent attention. A little animal fat dissolved in the lubricating oil makes a big improvement in the flame.

DANGER:

During the day, the door is left open. At night it is closed by a snow block which should be chinked and a ventilation hole 3 to 6" in diameter bored through the upper part.

The more fumes generated the larger **MUST** be the opening. Don't wait until the lamp will not burn properly and you begin to feel groggy before letting in air.

It is dangerous and not necessary. If the roof hole does not draw properly because of the wind, a snow chimney can be made by setting a perforated block over the hole.

Now that you are in the residence the igloo will warm up rapidly. **If the inner walls start to glaze with ice and drip, you are overheating.** Take corrective actions before icing develops, cut down the heat if you **MUST**.

FRYING: Etc.

Frying, baking or broiling have no place in igloo living. Boiling and stewing are easier and prove **very satisfactory**.

Canned goods may be heated in the can by bringing them unopened to a bowl in a pot of water which completely covers them.

Use the pressure cooker or tightly covered pot to **AVOID** steam. **NEVER place an unopened can over direct heat, it will explode.**

Two good meals a day, breakfast and the main meal, in the evening **AVOID** loss of the working day. A snack at noon will not bring the activity to a halt for more than an hour or so.

Body heat is derived from food intake, so eat all your ration and supplement with fish whenever possible. **Eat fat rather than burn them if the supply is low.** A diet of meat is good for you.

The explorer Stefenson lived for a full year on meat alone to prove this point. If you are forced to live solely on the product of the chase!

You **MUST** eat flesh, fat, liver and every edible part, to ensure that you do not suffer from dietetic deficiencies.

REMEMBER FAT IS ESSENTIAL IN ARCTIC SURVIVAL DON'T WAIST IT.

SEE PICTURES OF CAMPFIRES & CAMPSITES: