

Note of the co-author, this file is not finished yet as I write this on June 25 1995, it even needs a bit of translation still, which will be done in the final upload, so please bear with me till then.

However I believe that so far all which is written can be used without too much problemo. If you see any glaring mistakes write them to me & I will make the necessary correction. Thanks.

Note add on: this chapter as well as many others will need picture in order to be well understood.

At the present they are not yet included, not having a scanner nor the money but as soon as I can I will do that rest assure and not only for this chapter alone but for the rest of the book. Thanks for your understanding so far.

**NOTE OF THE CO-AUTHOR: OUR APOLOGIES FOR THE FOLLOWING TEXT WHICH OFTEN TIMES WILL REFER TO PIX # THOSE PIX ARE NOT IN THIS BOOK YET.**

**They will be part of the later edition when \$\$\$ comes along for me to scan all of them not only for this particular chapter but the rest of the book. This note is written as of June 1995, lets hope for all that by this time next year if not sooner we will have all that resolved. Thanks.**

#### **SHELTER & MAKING CAMP:**

**CAMP AND KNOWING HOW TO MAKE A GOOD SHELTER ARE ESSENTIAL SKILLS.**

You will need to make fire and to chose the right type of fire construction. Shelter **IS NECESSARY** to give shade, to repel wind, rain and to keep warmth.

**SLEEP & ADEQUATE REST ARE ESSENTIAL** and the time and the effort you put into making your shelter comfortable will make them easier to get.

**If you are a victim of a plane crash or a vehicle that has let you down,** it may provide a shelter or materials which one can be built, but if there is a fire or the threat of fuel tanks exploding wait until it has burned out before attempting salvage.

If you are the unequipped victim of an accident, are trapped by unexpected mist or caught by nightfall in

terrain where it is not safe to proceed or if exhaustion or injury prevents you to go further.

You may have to make do with any natural shelter that you can find for the night or until you can more fully assess the situation. In this case, virtually any protection from wind, rain & cold will be welcome.

If movement down a slope seems risky, traversing even a short way along the contour may bring you out of the wind. If no cave or crevice is available to give shelter, make use of any hollow in the ground.

Add to its height, if you can by pilling up rocks, but **MAKE SURE** that any structure is stable & use a back-pack, if you have one, to increase the windshield before settling down on the Leeward side.

**If there is still daylight to see by,** you have no injuries to handicap you and are not isolated by unnegotiable cliffs or other barriers, it will be worth seeking possible better places in the vicinity.

For a long term camp you should find a secure site with convenient access to your major needs.

#### **CAMPING MUST FILL THOSE REQUIREMENT WHEN POSSIBLE:**

- 1) Wind sheltered
- 2) Offer wood for installation.
- 3) Offer wood for burning
- 4) Away from swamp, dampness.
- 5) Close to drinking water supply yet not too close bugs.
- 6) Seek Dry ground as much as possible.
- 7) High enough to **AVOID** mosquitoes using air draft.
- 8) Tent facing East or rising sun position
- 9) **Winter:** Sheltered from wind as much as possible.
- 10) **Winter** storm **ALWAYS** come from West & North thus to **AVOID**.

#### **WHERE TO CAMP & WHERE NOT TO CAMP:**

- 1) Hill-tops exposed to wind, move down and look for shelter on the **Leeside**.
- 2) Valley bottoms and deep hollows - could be damp and especially when the sky is clear, more liable to frost at night.
- 3) Hill-side terraces where the ground holds moisture.
- 4) Spurs which lead down to water, which are often routes to animals' watering places.

**If you are on high exposed ground go lower down** to find a sheltered spot, but on low, wet ground you will need to climb higher to find somewhere securely dry.

Look for somewhere sheltered from the wind, on rising ground that **has no risk of flooding and is safe from rock falls or avalanches**.

Hot air rises, cold air sinks, so valley bottoms will often pockets of cold air and in cold weather, be susceptible to frost and damp mist.

In areas that get plenty of rainfall terraces across a slope will often be damper than the steeper ground above and below them, for water collects there before flowing further downward.

**Ideally you should be near water**, with a plentiful supply of wood near at hand.

Pitching camp too close to water, however may lead you to be troubled by insects and the sound of running water can hide other noises which might indicate **DANGER** or the sound of search or rescue parties.

### **ON RIVER BANKS LOOK FOR THE HIGH WATER MARK.**

In **MOUNTAIN REGIONS** streams can become torrents in minutes, rising as much as 5m (17ft) in an hour! Even on plains keep out of old watercourses, no matter how dry they are.

Heavy rain storms in nearby hills can easily send water rushing down them in flash floods with **PRACTICALLY NO WARNINGS**.

Choose ground that is reasonably flat and free of rocks and **MAKE SURE** that you have space to lay out

signals and that you can be easily spotted by rescue parties.

**Check above your head for** bees or hornets nests and for dead wood in trees that could come crashing down in the next storm or high wind.

**Keep away from solitary trees** which attract lightning, and in forest areas keep to the edges where you can see what is going on around you.

**Don't camp across a game trail-** you don't want marauding animals as unwelcome guests or to find your bivouac flattened by a herd of animals (elephants?) on their way to a water-hole or bar, but stay near to any obvious human tracks.

### **BEST TENT LOCATION:**

**Erected towards the South** will **AVOID** the cold wind of the North as well as the rain from the East.

### **SHELTER FROM COLD:**

In an emergency look for natural shelter in your immediate area; a shallow cave, a fallen tree, boulders.

**DON'T WAIT TILL DARKNESS FALL.** Make or find a shelter while there is light. You **MUST** get out of the rain, wind, snow before Hypothermia sets in. Make more permanent shelter when permitted.

If nothing better punch a head-hole in plastic bag (In your S/Kit). Put it on & huddle out of wind, back against boulder, tree trunk etc. Move legs & arms frequently.

### **SHELTER LOCATION:**

If choice, locate shelter out of wind on high ground, not in hollow where chilling fog will settle. Stay near forest if possible. Trees are good wind breaker.

Insulate floor of shelter as deeply as you can with brush, leaves, grass- anything to keep you of the cold ground.

### **WHAT IS UNDERNEATH IS MORE IMPORTANT THAN WHAT'S OVER YOU.**

Dig tunnel into snow if no other shelter is available. Use stick to keep air vent open. In deep snow, base of trees can provide shelter.

Use your imagination, improvise but **KEEP CONSTRUCTION SHELTER SIMPLE, DON'T WAIST VALUABLE ENERGY!**

#### **HOT OR COLD SLEEPING NOTE:**

**NEVER sleep at any time directly on the ground, winter or not, use a ground sheet** or if none then use evergreen as a thick mattress to isolate you from the cold ground. Cold comes from the ground.

#### **WHERE NOT TO CAMP:**

Common sense is the principal determinant to be close to drinking water and firewood nearby at hand and to **pick a spot as conspicuous as possible to make signal if in case of emergency.**

We will **AVOID** spot that may be inundated by a suddenly rising stream, particularly not if we are aware of the disastrous results in some areas of storms not even visibly locally.

Warning tokens to be considered often include scars and debris left by previous high water. So **AVOID** dry river beds which can be inundated fast.

Lush growth may be not only rough and soggy underfoot but it may presage troublesome insects.

Also **AVOID** places where there may be cave-ins, avalanches, or perils from tumbling rocks.

If there are dangers of electrical storms **REMEMBER** that solitary trees have a tendency to attract lightning.

Particularly to be shunned will be jeopardy from falling timber.

Such trees such as cottonwoods and poplars are particular offenders when it comes to unexpectedly tumbling limbs.

The fast growing coastal pines of California are **extremely** brittle & therefore, threats in every sort of weather.

Whenever there is any question, we'll bivouac among small growth or in the open.

That is where we will make any winter camps in treeless northern regions, well away from lees where drifting snow can be an insidious hazard.

#### **WARNING:**

But check the trees out. **Never** camp beneath a lone tree if there is any chance of thunderstorm.

With its limbs reaching higher in the sky than anything else around it makes a natural lightning rod, dear Mose! (Deer Moose?)

Dead tree are also a hazard, the heavy waterlogged birches in particular. One moment they stall tall & serene in the sky.

The next moment, sometimes without even the lightest zephyr having whisked across the ground, they lie uprooted and prone. Should your tent have been pitched beneath, well... Tough luck Charley Brown!

The same hold true, if to a lesser degree, for dead branches. **Don't camp beneath them.** Chances of a dead branches killing you in its fall are very slim indeed. But an injury is far from out of the questions, and the least it will do is ruin your tent.

#### **MOUNTAIN CAMPING:**

When pitching your tent above the timber line in mountainous regions, look up before you set up. Landslide are not a common occurrence statistically

But why become a statistic Slopes of loose rock, slabs, round boulders, or what looks like a frozen stream of smooth rocks down a gully may decide to move during a heavy rain or in the alternate freezing and thawing of the cold of night and warm of day. Give all of them a wide berth.

**Do pick a spot that is sheltered as much as possible from the wind.**

A firm outcropping of rock or large, well entrenched boulders are probably the **best shelters** you will find to pitch tent behind.

But take advantage of whatever you can. A determined mountain gale may hit a hundred & fifty to 200 miles/hour.

A good campsite is not that difficult to find, I hasten to add before proceeding with one more small caution: know what poison ivy & poison oak look like.

### **SETTING UP THE EASY WAY:**

To really enjoy camping, the trick is to make it as little work as possible. In pitching and breaking camp, each person doing specific tasks is the **KEY to a Wonder full time!** MMMMM!

### **SHELTER BASIC ESSENTIAL:**

**TO BUILT A SHELTER TAKES A LITTLE TRAINING BUT ONE THING THAT IS ABSOLUTELY ESSENTIAL:**

**IT IS A GROUND SHEET WATERPROOFED. IF YOU HAVE THAT THEN YOU ARE SAFE & WILL MAKE GOOD SHELTER.**

### **BUILDING A SHELTER:**

The type of shelter you build will depend upon: the materials available, the tools available, what you are sheltering from wind, cold, snow, rain, insects, etc.

How long do you intend to remain at the location? Snow caves and natural holes are ideal if you are on the move and do not need a permanent structure. Size will depend upon the number in the party! (Having fun yet?).

Take your time over building a complex structure and rest often. **OVER-EXERTION WHICH PRODUCES SWEATING MUST BE AVOIDED.**

### **BEST CAMPING SPOT:**

For best results, pitch the tent or lay out your sleeping bag on the East or North side of shade trees.

This way you will be greeted by the warmth of a cheery sun in the morning. Yet during the heat of the day you will be shaded from its harsh rays.

If prevailing winds are known, take them into consideration the same way.

### **WHERE TO CAMP BEST:**

The 3 traditional requirements for a campsite used to be Water, Wood & a flat area on which to lay out your sleeping bag or pitch your tent.

Wood is no longer a prerequisite, with the handy and convenient stoves on the market. Water is still necessary.

So is the relative flat stretch of ground. Flat ground can be as difficult a thing to find as water, if not more so, particularly in the mountains. There you may have to settle for a spot that slopes.

If you do, **MAKE SURE** you set up the tent or lay out the bags so that you will be sleeping with your head up.

Sleep with your feet higher than your head, and you will wake up in the morning feeling you have a nasty hangover.

Sleeping sideways on a slope will have all the occupants of a tent piled on top of each other on the downhill side before the night is halfway through.

If you are not in a tent, you don't know where you will wake up. The only certain thing is that it will be far from where you fell asleep.

So why not pitch camp at the bottom of the hollow? Well, usually because that is the wettest, coldest, foggiest spot around. In the case of heavy rain it usually also means the morning will greet you with a small quagmire all around.

The top of knoll avoids these problems. Its more positive advantage is ventilation. A good breeze will keep the bugs to a minimum.

### **BUGS CORNER: BZZZZZ!**

Speaking of bugs. There you are in the middle of a beautiful mountain meadow, fragrant summer blooms swaying in the breeze. A perfect spot.

No! For several reasons. Tall grass is there the chiggers, ticks and other bugs like to camp too. Also alpine meadows are fragile. Setting up a tent there for a week may leave a visible scar for years

For your own comfort and that of the meadows, pitch your tent at the edge instead of the middle. It will be as fragrant and the view will be better.

At the edge of a meadow is also where you find bushes and trees to provide wind shelter & shade for the heat of the day.

#### **COLD & HOT WEATHER CAMPING:**

Camp on the **Lee side** of rocks and trees when **it's Cold** and you need protection.

When it's **Warm**, make camp on the **Windward** side so the breezes help cool your wilderness home.

#### **NOTES:**

**ALL SHELTERS MUST BE ADEQUATELY VENTILATED TO PREVENT CARBON MONOXIDE POISONING AND ALLOW MOISTURE TO ESCAPE.**

Two holes are needed- have one near the top and one near the entrance.

#### **BED HUNTER HEATER:**

To heat up stones and wrap them well then insert them in your sleeping bag.

#### **BRION BED HUNTER TYPE 2:**

Also there is the old **trapper trick**: Dig a rectangular hole, fill it with hot coals which you then cover up with earth then lay a blanket over it all.

It is the ideal to sleep warm, or: Where you place your bed, lite up a fire for a few hours in order to dry up the ground and to heat it up.

Then remove the fire and clean the ground, add green boughs or canvas to the ground **because ONE MUST NEVER SLEEP DIRECTLY ON THE GROUND.**

#### **BROWSE BED:** (pix # needed)

It is famous but its construction requires a great deal more systematic efforts. You need first of all a surprising quantity of the softest available boughs.

Among the best for the purpose are the small young branches of the heavily needled balsam, but fir and even spruce will do nearly as well. These boughs can in the absence of knife and axe be stripped off by hand.

They can easily be carried if laid one by one over a long stick which has an upward angling fork at its bottom whereupon interlocking needles will hold the light although bulky load in place.

The operation is started by placing a thick layer of resilient green boughs at the head of the bed. These we lay with their underneath upward.

They are placed, in other words, opposite from the way they grow. The butts are kept well covered and pointing toward the bottom of the bed. The browse bed is thatched in this matter with row after row of boughs until it is a foot or more thick.

Whereupon it is reinforced and levelled by the poking in of soft young evergreen tips wherever an opening can be found. Unfortunately it has to be redone every third night.

#### **SUMMER CAMPING ADDED TIPS:**

Mosquitoes seem to hate the smell of Basilic try it out.

#### **THINGS TO AVOID:**

- 1) **AVOID all damp ground or** to be near swamps or marsh, as well as damp tall grass and also #ravines# which can be flooded any time.
- 2) **AVOID** also isolated trees which attract thunderbolt, #vieux sous-bois# which can provoke falling trees or branches, rocky slopes which can bring rock slides.
- 3) **AVOID** dead mass of waters and slow moving currants or rivers.

If there are a **lot of mosquitoes** try to find a place where there is a good wind and well cleared area at the tip of earth bank near a lake or on top of a hill.

- 4) **AVOID** to be under the permanent shadow of trees, this may be good when it is hot but when it rains then the rain keeps on coming down 1 to 2 hours after the storm and it is hard to keep your place dry afterward.

- 5) **REMEMBER** to pitch your tent **at least 1 HOUR BEFORE SUNSET.**
- 6) Sandy bottom maybe nice but they attract mosquitoes and sand bugs crazy, try to find a ground with good drain system.

#### **SHELTER FILE:**

Observe the usual wind direction & built your shelter in the **opposite direction** and the fire in front of you.

#### **THE EASIEST WAY TO CONSTRUCT A SHELTER IS:**

To fix solidly into the ground 2 forked sticks and to put across a pole as a ceiling and then you lean against it other poles or bunch of branches and cover the roof with grass etc.

#### **ANOTHER EASY WAY EVEN FASTER IS:**

To take only one pole and to lean it against a tree then tie it then used pine branches or leaves branches to make the sidings.

In a country like South **Africa** where one does not have poles at his disposal, one makes a hay wall or using brushes in an half circle so as to protect oneself from the cold wind and lights a fire in the open section.

If the sun makes your shelter too hot add another layer of grass or leaves. **THE THICKER THE ROOF THE COOLER THE SHELTER.**

If it is too cold then thicken the bottom parts of the walls or built a small wall about one foot high around the walls of the shelter.

**Don't forget** to dig a ditch around the shelter so that the rain does not wash you off or enters your shelter.

#### **TYPES OF SHELTER:**

It will depend upon local conditions and the material available. Also on how long you expect to need it.

For immediate protection from the elements, rig up a makeshift shelter while you construct something better and more permanent.

If you decide to stay put and wait for rescue, a more long term shelter can be build and improved on as time and energy permit.

For those walking to safety, on the other hand, temporary shelters can be built at each stopping point.

They can even be carried with you if they are sufficiently light and there is a significant risk that materials may not be available at the next campsite.

A more permanent shelter will certainly be worthwhile for the sick and injured, who **MUST** rest up in order to regain their strength or where it **IS NECESSARY** to wait for the weather to clear before attempting a journey. Use the time to stockpile equipment and provisions.

#### **HASTY SHELTERS:**

If no materials are available for constructing a shelter make use of any cover and protection that is available:

Cliff overhangs, gradients and so forth, which will help shield you from wind or rain. Incorporate natural windbreaks in quickly constructed shelters.

In completely open plains, sit with your back to the wind and pile any equipment behind you as a windbreak.

#### **BOUGH SHELTER:**

Make use of branches that sweep down to the ground or boughs that have partly broken from the tree to give basic protection from the wind, but **MAKE SURE** that they are not so broken that they could come down on your head!

Weave in other twigs to make the cover more dense. Conifers are more suited to this technique than broad leaved trees as they require less weaving in to keep out the rain.

Make similar shelter by lashing a broken-off bough to the base of another branch where it forks from the trunk (A).

#### **ROOT SHELTER:**

The spreading roots and trapped earth at the base of a fallen tree make a good wind and storm barrier, if they are at the right angle to the wind.

Filling in the sides between the extended roots will usually make the shelter much more effective and provide a good support for building a more elaborate shelter from other materials.

#### **USE A NATURAL HOLLOW:**

Even a shallow depression in the ground will provide some protection from the wind and can reduce the effort in constructing a shelter.

However take the necessary measures to deflect the downhill flow of water around it, especially if it is a hollow on a slope or you could find yourself lying in a pool. Make a roof to keep the rain off the and the warmth in

A few strong branches placed across the hollow can support a light log laid over them, against which shorter boughs and sticks can be stacked to give pitch to the roof and so allow water to run off. Consolidate with turf or with twigs and leaves.

#### **FALLEN TRUNKS:** (Not fallen drunk!?)

A log or fallen tree trunk makes a useful windbreak on its own, if it is at the right angle to the wind. With a small trunk, scoop out a hollow in the ground on the leeward side. A log makes also an excellent support for a lean to roof of boughs.

#### **DRAINAGE & VENTILATION:**

A run-off channel gouged from the earth around any shelter in which you are below or lying directly on, ground level will help to keep the shelter dry.

Hasty shelter will usually have many spaces where air can enter. Do not try to seal them all: **VENTILATION IS ESSENTIAL !**

#### **SHELTER MORE COMFY IF: STONE BARRIERS:**

**A shelter is more comfortable if you can sit rather than lie in it**, so increase its height by building a low wall of stones around your chosen hollow or shallow excavation.

Caulk between the stones **especially the lowest layer** with turf and foliage mixed with mud, and deflect the flow or rain-water around the shelter as shown below.

#### **SAPLING SHELTER:**

If suitable sapling growth is available, select two lines of sapling, clear the ground between them of any obstructions and lash their tops together to form a support frame for sheeting.

Weight down the bottom edges of the sheeting with rocks or timber. You can make a similar shelter from pliable branches driven into the ground.

If you lack sheeting, choose or place sapling close together, weave branches between them and consolidate with ferns and turf.

#### **SHELTER SHEET:**

With a waterproof poncho, groundsheet or a piece of plastic sheeting or canvas you can quickly and easily make a number of different shelters which will suffice until you can build something more efficient.

Make use of natural shelter (A) or make a triangular shelter with the apex pointing into the wind (B).

Stake or weigh down edges. If it is long enough curl the sheeting below you running downhill so that it keeps out surface water (C). Use dry grass or bracken as bedding.

#### **NEVER LIE ON COLD OR DAMP GROUND!!! (ITS THE BEST WAY TO CATCH COLD & RHEUMATISM.)**

A closely woven fabric, though not impermeable will keep out most rain if you set it at a steep angle. Fit one shelter a few inches within another (D).

The rain that does come through will rarely work its way through both layers.

#### **WARNING AGAINST DRIPPING:**

With any woven fabric **AVOID** touching the inner surface during rain or you will draw water through.

#### **TEEPEES:**

Best known from its North American form, the teepee occurs in many cultures.

**THE QUICKEST TYPE TO ERECT** has three or more angled support poles, tied where they cross to make a cone.

They can be tied on the ground and lifted into place before covering with hides, birch bark panels or sheeting. Leave an opening at the top for ventilation. Wider angle will give greater area but shed rain less easily.

#### **TROPICAL SHELTERS:**

In rain forest and tropical jungle the ground is damp and likely to be crawling with insects life, leeches (yerk!) and other undesirable.

Instead of bedding down on the ground you will be better in a raised bed. Consequently you may want to make higher shelters. (Tarzan style!)

Unless you are at an altitude high enough to make the nights cold you will be less concerned with protection from the wind than with keeping reasonably dry. A thatching of palm, banana and other large leaves makes the best roofs and walls.

#### **ATAP:**

Also known as Wait a while vine, Atap is especially useful, despite the barbs at each leaf tip which make careful handling necessary.

Look for any plant with a similar structure (A) the bigger the better. The broader the individual leaflets the better also.

Atap is best used horizontally splitting each leaf into two from the tip (B) then tearing it into 2 clean halves down its length. Do not try to split from the tick end or you will end up with a broken branch.

Closely layer halves of Atap on your roof frame (C). You can let it be a little less dense on walls. Woven Atap can be particularly effective for the sides of a shelter.

#### **ANOTHER METHOD:**

Do not split down the leaf but fold the leaflets on one side across to the other and interweave them (D).

You will probably find this easiest if you work first from one side then the other but it does takes practice.

#### **THREE-LOBED LEAVES:**

Or leaves cut in this fashion (E) can be locked over a thatching frame without any other fixing being necessary to hold them in place (F).

#### **ELEPHANT GRASS:**

And other large leaves can be woven between the cross-pieces (G). Only a small number are needed to produce a shelter **very quickly**.

#### **LONG BROAD LEAVES:**

Can be sown along the thatching battens with vines.

#### **PALM & OTHER LONG STEMMED LEAVES:**

They can be secured by carrying the stem around the batten and over the front of the leaf, where it is held in place by the next leaf (I) Leaves **MUST** overlap those below on the outside of the shelter.

#### **BAMBOO:**

This large-stemmed plant actually a grass, is a **very versatile building material** and can be used for pole supports, flooring and walls.

The giant form of bamboo- which can be over 30m (100ft) high and 30cm (1ft) in diameter - is an Asian plant found in damp places from India to China both in the lowlands & on mountain slopes.

But there are types native to Africa and Australia and two which are found in the southern USA.

Split bamboo vertically to make roofing and guttering to collect rainwater. The split stems, laid alternately to interlock with one another, form efficient and waterproof plant tiles.

Flatten split bamboo for smooth walls, floors or shelving by cutting vertically through the joints every 1.25cm (1/2in) or so around the circumference.

It can then be smoothed out. The paper like sheaths formed at the nodes can also be used as roofing material.

### **WARNING! WARNING! BAMBOO:**

**Take great care when collecting bamboo.** It grows in clumps which are often a tangled mass. Some stems are under tension and when cut fly forcefully and **dangerously** apart, exploding in sharp slivers.

### **SPLIT BAMBOO CAN BE RAZOR SHARP & CAUSE SERIOUS INJURIES.**

The husk at the base of bamboo stems carry small stinging hairs which cause severe skin irritations.

### **LIGHT STRUCTURES:**

Follow the methods outlined for the lean-to structure. You can extend it with a less angled roof and a front wall or you can build vertical walls and roof them over with deep eaves to give you extra shade from the sun and to ensure that rain runs off well away from the hut. Dig a channel to carry any water away.

If you have bamboo or other strong material available to build a firm frame, raise the floor of your shelter off the ground in tropical climates, so reducing access to ground creatures.

In **Hot climates** you will need to make your roof solid to keep out the rain and give good protection from the sun burns.

If it projects well over the walls, you can leave them as fairly open lattice to allow air to pass through.

Grasses and mud will seal cracks and all kinds of material will make a thatch if woven between roof cross pieces of sticks or cords.

In climates with heavy rainfall use leaves or bark like tiles on top.

### **BUILDING WITH RUSHES:**

When neither trees nor bamboo are available, rushes or other strong stems can be tied in bundles to form structural pillars a method used by the Marsh Arabs of Iraq.

Tie reeds in long thick bundles by starting and finishing with a clove-hitch knot. Choose the longest reeds and ensure that their ends are spaced out along the length of the bundle so that they do not cause a weak point by coming all together.

The base should be a flat end, the other should taper. Prepare more reed bundles, thinner and longer if possible. They will be used for securing the sides of your shelter. Range thick columns of reeds on the long sides of your shelter site.

Dig the thick ends into the earth and link the columns a short way up each by lashing on thinner bundles horizontally between them.

Bend the tops of the columns towards each other, overlapping them and binding them together. Add more thin bundles to link the sides of the columns and carry up over the arches.

Interweave a wattle of reeds between this framework, using thinner reeds until adequate shelter is provided or weave separate panels of leaves & reeds to attach to it

### **SOD HOUSE (TURF):**

Turf-built shelters are an alternative to log cabins when timber is scarce or there are no tools to cut it. Cut sections of turf 45 X 15cm (18X6in) and build with them like bricks, overlapping them to form a bond. (Yes James!)

Slope the sides to give pitch to the roof- to support which you will have to find spars of wood or other strong material. The greater the pitch, the better rain will be repelled.

The length of the spars will determine the size of the structure. Lay turves on the roof as well, or cover it with grass.

Unless you have a great deal of turf available keep the structure low, big enough to sit on the floor but not big enough to stand. One side could be open facing the fire.

### **DISTRESS SIGNALS WITH TURF:**

**Cut the turf in a pattern to leave a permanent DISTRESS signal on the ground at the same time as collecting building material.**

### **SMALL SHELTER & TURF ADD NOTES:**

For small shelter you could also use turves to make a beehive or igloo like structure. If time and resources are available a large hut can be built with turves. Some sort of timber will be needed for a door frame (A) & for roof spars.

Build an internal hearth and chimney, but if you use turf for them be careful that they do not catch fire themselves. Plaster the inside of hearth and chimney with clay.

Site the open side or doorway away from the prevailing wind and, with a small turf-built house make your fire outside the entrance and build a reflector on the other side of it to throw heat back inside.

Even with an open side, a short return will make the corners more stable. Bond the corners as with conventional brickwork for strength.

### **THE SOD HOUSE:**

This is a 6 sided house and may be improved by notching the logs and building them up one on top of the other, dome-shaped to the required height.

After laying some rafters for the roof and leaving a hole for the chimney the frame is complete.

In hot countries no chimney hole is left in the roof because the people there do not build fires inside the house, they go indoors to keep cool and not to get warm.

Make the doorway by leaving an opening pix # 150 and chinking the logs along the opening to hold them in place until the door-jamb is nailed or pegged to them.

And then build a shed entrance which **IS NECESSARY** because the slanting sides of the house with an unroofed doorway have no protection against the free entrance of dust and rain or snow.

The house is covered with brush or sod etc. Pix # 152 shows how to make a log dugout by building the walls of the log cabin in a level place dug for in the bank.

All such house are good in dry countries & countries frequented by tornadoes or by winds severe enough to blow down ordinary camp.

### **LOG CABIN:**

Scale your cabin to the number it is to house. You can **ALWAYS** enlarge it or add on extra rooms later.

The size of logs available will determine the length of walls. A square or rectangle will be sturdy and easiest to roof. 2.5m (8ft) square is a sensible size.

You may be lucky and be able to use trees that have already fallen, in which case you could perhaps lash a framework of logs together and fill the spaces in between, but it is much better to joint the corners to fit snugly into each other. **Do not finish off the projecting ends.** These are the strength of the structure.

Lay down your first layer of logs in the shape of your hut (A). Joint the corners to fit on top of each other (B) and cut other logs to fit neatly on top of them. Since logs tend to taper, place them alternately top to bottom to counter this (C).

Once the ground frame is established leaves space for a doorway on the side away from the prevailing wind.

You may be able to use off cuts from logs for these sections on either side of the door. Square off the edges and wedge a door frame in place (D). Do not bother with windows, the door will give sufficient ventilation.

Build up the front higher than the back to give pitch to the roof. The last log front and back should project well beyond the side walls.

These will support the roof. Across the hut from side to side notch in one cross-beam to keep short logs in place.

Lay a roof of logs, front to back, extending beyond wall. Notch the logs to fit on to the cross pieces or lash them down.

Choose a flat site for your cabin or level a slightly larger area. Dig into a hillside if necessary, but the **foundations for the wall MUST be level.**

The flexible saw in your survival kit will cut logs of sufficient size and if you are a survivor from a wrecked plane or boat there will have been a fire axe on board. There is no need to make a door yet.

Hang a piece of blanket to keep the wind out, or make a panel of wattle or fill the gap until you feel equipped to make a permanent door. Don't bother with windows either- the door will give enough ventilation.

Caulk in between the logs with mud or wood chips, or if there are big gaps, sapling before applying the mud. Mix it with grass and moss and use a sharpened stick to force it between logs.

Cover the roof with saplings before adding a layer of mud and turf. Instead of a complete roof of whole logs you could use lighter materials & mud on a timber frame.

Bark from the logs make an excellent top covering if laid as tiles. These could be pegged through with small supple twigs while the mud is still soft.

If there is no risk of a build up of water in which case it would be useful to build a floor later, dig down inside the hut to provide the earth for mud caulking and you will at the same time increase its interior height. If you leave a hole somewhere in the roof for smoke to escape you can make a fire inside the hut.

But do not leave it unattended put it out rather than risk your home burning down. If stone is readily available, you could build a proper chimney and fireplace.

You will retain more of the heat if it is a central structure. Fit stones as closely as possible and use small stones and mud to pack the spaces.

#### **SWINGING SHELTER:** (Ask Tarzan!)

A forked pole at least 4 to 5 inches thick and 8 feet long with a side branch coming off at right angles to the fork and 4 to 5 feet below it is required.

To the side branch a rope or very strong vine loop is secured, passed around a tree trunk and then bound very securely back on to the side branch. The long arm of the pole should be horizontal & 6 to 7 feet long to the ground.

To make the shelter top, lash 3 feet stakes each about 2 inches thick to each side of the pole. They should slope down at an angle of about 45 degrees & can be held outward by lashing braces across.

Length ways to these poles lash thatching battens each about 1 inch thick and 8 feet long. These should be 6 inches apart. They are then thatched with grass, fern palms or reeds. (branches and tree leaves are **useless.**)

The bed is suspended from the centre pole by ropes or vines to the 2 long sides which are held apart by lashing 2 cross bars at head and foot. The bed is then made up like the camp bed.

This shelter can be swung round the tree trunk to take advantage of sun or shade or get better protection from the weather.

#### **SHELTER FOR THE MAKING:**

Where we are with what we have, right now! A fallen tree is often at hand, even when we are looking for one under whose roots a browse bed can be laid so as to benefit from the luxury of a crackling night blaze.

Nor is it unusual to come upon a dry indentation in a stream bank that can be quickly roofed with brush and cheered by a campfire in front.

No canopy is more pleasant under favourable conditions than the open sky.

The only refinement we want on such nights if indeed we desire any, are a mattress of evergreen boughs a long hardwood fire and maybe behind us a log to reflect warmth onto those portions not turned toward the friendly heat.

On other occasions-when there is a storm or cold or when the situation is such that our every reasonable long range effort should be directed at conserving the utmost vigour.

#### **The time and energy required for throwing up a bivouac may well be returned several fold.**

Under circumstances when it may be desirable or perhaps obligatory to remain in one area, we may as well enjoy the sanctuary that for a combination of reasons is the best reasonably available.

This will be especially true if sufficient food is at least temporarily lacking, for then we may expect strength to be maintained in direct proportions to our ability to remain comfortably and warmly relaxed.

## **CONIFEROUS SHELTER:**

No one needs have much difficulty in finding sanctuary in softwood country, for no axe **IS NECESSARY** and in fact, we can get along very well without even a knife.

A heavy grove of big evergreen itself affords considerable shelter. From sudden shower you can keep dry by just lingering under a spruce or pine.

There is usually sufficient small growth in such a forest to break off and angle in lean-to form against a protective log or trunk.

## **CAPTAIN BRION NICHE:**

**It is very simple to make a niche** by stripping of a few lower branches from a well situated tree. These boughs augmented by others from nearby trees will quickly floor & thatch the shelter.

Such a nook is **particularly easy to heat with** the great amount of fuel almost **ALWAYS** available in such coniferous terrain.

If a blizzard is scuffing or rain dripping and some easily handled bark such as that from birch trees is available we'll probably want to insert a few sheets at least overhead.

## **VERY GOOD BEDDING: (MMM!)**

For bedding a soft mass of additional boughs sandwiches between such waterproofing bark can **FURNISH SURPRISING COMFORT EVEN WHEN THE WORLD IS RESTLESS WITH WET AND COLD.**

## **SHELTER IN BUSH AREA:**

**"LEAN TO": THE MOST COMMON & PRACTICAL IN EMERGENCY.**

**THE LEAN TO IS AN EXCELLENT SHELTER IN ALL SEASONS BECAUSE YOU CAN USE ALL KIND OF CAMP FIRES.**

A pole framework is covered with a thatching of evergreen boughs or rushes. When constructing the lean-to, find 2 trees about 7 to 9ft apart with fairly level, firm ground between them.

The distance between the trees will be the length of the opening of the lean-to although it is possible to incorporate variations. The number of people requiring shelter should determine the size.

When constructed for one man it should be made long for him to sleep across the open mouth of the shelter, whereas for more than one it should be planned for them to sleep lengthwise.

One or both ends of the ridge pole may be supported by a pie tripod if a second tree is not available. This leaves the builder a wider choice of sites.

**IT SHOULD BE REMEMBER THAT THE STEEPER THE SLOPE ANGLE OF THE ROOF**

**THE BETTER IT WILL SHED RAIN AND REFLECT HEAT FROM THE FIRE.**

A 45 degree slope angle is generally considered a suitable compromise between available interior space and rain shedding effectiveness.

Once the framework has been constructed proceed with the covering. Spruce boughs make an excellent natural covering although the branches of any coniferous and of many leave trees will do.

They are placed on the lean to in the same manner as shingles on a roof, the first row at the bottom and the last row at the top. The brush ends of the boughs are placed down overlapping the butt ends of the previous row.

This method of thatching ensures that the rain will be shed more readily. Continue to lay rows of boughs in this fashion until the top of the lean to is covered.

Repeat the entire procedure of thatching until the entire roof is covered to a depth of at least 6". The triangular sides are filled in with large boughs set butt end up as in thatching.

The parachute shroud or a canvas or the covering of plane wings are all indicated to cover the lean to and to replace the evergreen boughs or with them if need be.

## **WHEN VERY COLD:**

**When it is very cold you first place the canvas upon the frame then you cover it with branches and evergreen.**

Inside the shelter the white colour of the canvas will better reflect the camp fire thus greater comfort.

#### **WHEN VERY WET:**

If however we run into a lot of rain or melting snow, then **you MUST PUT THE EVERGREEN BOUGHS FIRST THEN ON TOP YOU PUT THE CANVAS.** Using this method will help to keep the shelter dry. When possible it is **HIGHLY RECOMMENDED** to lay a second layer of canvas.

#### **ADVANTAGES OF THE LEAN TO:**

The lean to is an excellent shelter in all seasons **because you can use all kind of camp fires.**

The shelter has a low entrance and its depth is the width of a sleeping bag which permits for one person to have all his body exposed to the heat of the fire and to be **VERY COMFORTABLE EVEN UNDER THE GREATEST COLD. (mmmMMM!!!)**

One can construct such a shelter for many persons yet their head or feet are the only exposed part to the fire so it is not as comfy as if you were parallel to the fire's warmth.

One can construct 2 lean to face to face with a fire in the middle but it is difficult to place them so as to **AVOID** the smoke swirling into one or the other lean to. First you think you have succeeded then the least draft blows it into the shelter make it unbearable.

#### **JOIN THEM IT'S BETTER!:**

So while you are at it, why not join those 2 lean to that are facing one another so as to make a big shelter. Just keep on working till their top reach one another and there it is

#### **LEAN TO # 2 TWO TOO!:**

More complicated frames are easily enough assembled, particularly when the joints are fastened if only by lashing by lashing them with fine but tough spruce roots. Or with **wiry birch or willow withes.** (#?)

Natural forks can be used instead, however. So can the braces.

#### **NO NEED OF KNIFE EVEN:**

Although a knife will simplify the task, not even that **IS NECESSARY.** The skeleton can then be draped, interfaced or otherwise covered with green branches, bark, moss, grass, reeds, leafy vines and other such materials. The few basic principles are self evident.

When thatching a roof, as we do with bark, we will naturally start at the eaves and lay the bottom of each suddening layer across the top of the thickness beneath, so that any water will tend to flow unimpeded off the edge.

If we happen to build a roof with a double pitch, we'll further waterproof that by bending bark over the ridge and fastening or weighting it down on each slant.

**BOTTOM TATCHING IS A MUST SAID MRS TATCHER!:** (SHE WAS RIGHT!)

**When thatching the walls, we will of course start at the bottom** as if shingling and work our way up layer by layer with each higher series **ALWAYS covering the one immediately below.** Water will then be more apt to run down the outside of the structure instead of into it.

#### **GOING ABOUT THE CONSTRUCTION:**

Probably the most satisfactory way to describe a few of the more common types of lean-to is by means of the following self-explanatory illustration.

From them, even the newest greenhorn can pick #ure out the most practical way to use whatever wilderness materials happen to be at hand

If we have something such as a tarpaulin to stretch over a pole framework, our work will be considerably lessened. This will also be true to a considerable extent if only the roof can thus be quickly made waterproof.

#### **GOOD TO CARRY ON YOU AT ALL TIME:**

**A large rectangle of plastic, folded and carried in a shirt pocket is a good thing to take along at all times if only for possible emergency use as a rainy day**

**cover. Or use the survival blanket even a large strong garbage.**

### **OPEN LEAN-TO SHELTER #3:**

If there is nothing solid to lean a roof against and you are not trying to keep out of heavy rain or a blizzard.

Use panels of wattle or frames covered in grass for protection. Erect a horizontal cross-piece between trees or on simple supports.

On the windward side lean a panel of wattle or tie or lean saplings at 45 degrees to make a roof. Add side walls as necessary.

### **REFLECTOR:**

(A) **Site your fire on the leeward.** Add side pieces and **this is the trick**, build a reflector (B) on the other side of the fire to **MAKE SURE** that you get the full benefit of the warmth.

### **WHY NOT A HUT?:**

### **MAKING WALLS FOR BETTER SHELTERS:**

It may be expedient to build an emergency shelter so substantial that its wall can be additionally insulated by heaping sod or earth against them.

If these walls are leaned in slightly from the bottom, gravity will tend to hold such reinforcements more firmly.

The roof can also be made warmer by covering it with several inches of vegetation, topped by enough dirt or preferably more durable sod to keep everything in place.

An animal skin, some contrivance of woven vines or perhaps an available fabric may be hung over an opening to serve as a door. An open stone fireplace can be made in the centre of the dirt floor of such a shelter.

Although a chimney hole will then have to be cut in the roof for ventilation, this vent may be kept covered when the fire is entirely out.

It should not be closed otherwise because of the threat of **CARBON MONOXIDE POISONING.**

### **DOOR IN RELATION TO WIND:**

When the wind is any problem, the opening of a **temporary shelter is usually** placed on the side away from it.

### **SNOW OR CANYONS & MOUNTAINS AREAS:**

In open **SNOW COUNTRY** where blocking drifts may form in that lee, however, the entrance is best **built crosswise to the wind.**

This is also the most satisfactory compromise when one is camped where air currents alternate up and down, **as in canyons and along mountain streams.**

### **FOR LONGER STAYS:**

If we are putting up a structure that may be used for several days or longer, we will not be governed too much in this matter by the direction in which any breezes may be blowing at the moment.

We will be more apt to look around for natural signs, such as deadfall and leaning trees which indicates the quarter or the prevailing wind.

### **THE DOOR ORIENTED SOUTH / SOUTH-EAST IS USUALLY THE BEST ALL AROUND.**

### **TO DITCH OR NOT ? : ( Or Not to bitch?)**

We may want to ditch the survival shelter so as to conduct away water that depending on the terrain might otherwise soak the floor.

Any such drain should be placed so that in addition to other functions it will catch any moisture running down the walls. A channel several inches wide and as deep may be made with a sharp stick instead of a handier tool.

If this furrow is in the way of foot traffic as it may be at the front, or if the ground is such that it will crumble easily, the drain usefulness may be maintained by filling it loosely with small stones.

**If your shelter is on a slope, water will of course have to be shunted only from the upper side.**

If we **camp on sand or in forest** so carpeted with vegetation that water sinks into it almost immediately then **no ditching is needed**. (Yuppee!)

### **DOME STRUCTURE SHELTER:**

Even if no wood large enough for the ordinary lean-to is available, **we can still make a very comfortable structure from growth as slight as willow**.

Let us obtain first a quantity of the longest wands we can find. We can then, after examining them, draw a rough outline of the house. This at most should not ordinarily be much wider than the average length of the material.

The base of such a structure may be oval. It may be rectangular, in which case the final shelter may well resemble a barrel split lengthwise.

Whatever the general conformation in other words we will find it advantageous structurally to employ rounded sides and roof.

Lets start by securing the larger end of one wand in the ground on the outline there scratched which for purposes of illustration let us assume is a circle. Opposite the first wand on the round line, let us set the bigger end of the second switch.

We can then draw the tops together in the middle and tie them with roots, string, vines, rawhide or any convenient material.

Let us similarly set and bend another 2 wands so that above the centre of the circle they cross the first arch at right angles. At this apex we will lash all 4 together. The curve of the dome roof now defined, will govern the decreasing size of subsequent arches.

A few inches away or perhaps as much as a foot or so if our covering is to be canvas or light skins, we may make a slightly lower arch parallel to the first.

This we may cross at right angles with a similar arch. This crisscrossing operation we may continue in such a fashion except to allow for an entrance, tying each of the numerous joints, until the frame is sufficiently sturdy.

There need be no particular methodicalness, however for functional variations are as numerous as materials

and situations. If additional supports are later needed these can be added as necessary.

We may weave moss or grass through the final basketlike framework in lieu of anything better, perhaps laying on a second coat which can be both secured and insulated with a thick plastering of mud and snow.

### **TARP-CABIN:**

This shelter requires a considerable amount of work and when completed will a degree of permanency that other don't have.

In building the cabin particular attention **MUST** be paid to the choice of location, **as the cabin is not portable**.

**Choose an area close to water supply, yet not in a valley.** The ridges offer much more comfortable living conditions freedom from insects, flooding.

The area should also offer an abundant supply of long straight logs 4 to 8" in diameter. Build 4 walls log cabin fashion to a height of about 3ft. and then build a frame work of light poles to support a covering of parachute material or canvas.

### **CANVAS:**

From this stage its a simple matter to place this material over the framework to form a finished shelter.

**It is preferable to use a double layer of fabric** with an air space between to improve the insulating and water shedding qualities of the roof.

### **NO CANVAS: (RATTTTS!)**

To construct a #hutte# when no canvas nor parachute, you **MUST** then build the walls to the desired height and to add a roof made of #motte de terre ou chaume#

Don't try to build a complicated roof. All you need is a roof as smooth as possible that will shed the rain at the back.

### **THE LOWER THE ROOF THE EASIER TO HEAT.**

In this kind of shelter you **MUST** use a #rechaud# to do cooking and heating since the ventilation is not sufficient to make a camp fire as in normal condition.

### **WIGWAM:**

An easy and simple construction if you have a chute or canvas with ropes. Use the suspension of your chute which you cut at about 2 feet from the chute itself.

Attach a rope or a suspension section around the ropes at the top of the chute and tie this rope to a tree branch and also to a cross piece between 2 trees or at the summit of a tripod made of poles of **at least** 15ft. long.

After this operation, attach the chute to the desired height and maintain it close to the ground all around it its #perimeter# using rocks, pegs, #motte de terre# so as to form a#conical# tent.

The diameter of the tent depends of the number of occupants, if you use a chute you will near **ALWAYS** have an excess of canvas, which you can cut if you need it or just let it hang on as a door.

When you have the intention to make a camp fire in the shelter you **MUST** take care to have sufficient ventilation before putting on the chute.

In wooden area where great wind are generally rare the opening at the summit is usually to small to insure a good air draft thus you **MUST** make a small cut of a few inches along one of the #couture dun fuseau#.

To keep the hole open just use 2 stick tied in a cross shape to the dimension of the desired hole. The fire **MUST** be made in the centre of the tent directly in the axial of the draft hole.

### **TENT AND CANOE CAMPING:**

Put up your tent first as you get off the canoe but take it only as the last item when going back in the canoe, so that if there is a surprise shower you can wait it out in comfort.

### **BEST CANOE LANDING & CAMPING:**

If possible install your tent on an island near the shore, there is lesser risk for a forest fire. You will **AVOID** animals which could be **dangerous** and there is

generally less bugs on an island than shores but **BEWARE** of the rising water level to check up.

### **SHELTER FROM ANDREW:**

A friend told me this trick which I think could be worth mentioning, once you have cut or broken a big pile of evergreen which you have put into one place. Hide into the middle of that pile, working your way through until you are comfy.

**But BEWARE** for branches into your eyes and **MAKE SURE** you are well above ground level.

Then put a tarp on top of the whole branch pile which is secured either with ropes or other branches. It will keep you real warm into this makeshift shelter.

### **SHACKS SHELTERS AND SHANTIES:**

(Snack -Melt-hers and Panties?!)

**NOTE OF THE CO-AUTHOR: OUR APOLOGIES FOR THE FOLLOWING TEXT WHICH OFTEN TIMES WILL REFER TO PIX # THOSE PIX ARE NOT IN THIS BOOK YET.**

**They will be part of the later edition when \$\$\$ comes along for me to scan all of them not only for this particular chapter but the rest of the book. This note is written as of June 1995, lets hope for all that by this time next year if not sooner we will have all that resolved. Thanks.**

### **BALSAM BEDS:**

The balsam bed is made of the small twigs of balsam trees. In gathering these, collect twigs of different lengths from 18 inches long to be used as the foundation of the bed to 10 or 12 inches long for the top layer.

**If you want to rest well do not economize on the amount you gather to make it thick.**

If you attempt to chop off the boughs of balsam they will resent your effort by springing back and slapping you in the face. Ouch! **You can cut them with your knife but it is slow work and will blister your hand.**

Take twig by twig with the thumb and fingers (the thumb on top pointing toward the tip of the bough & the two forefingers underneath).

Press down with the thumb and with a twist of the wrist you can snap the twigs like pipe-stems shows two views of the hands in proper position to snap off twigs easily & clean.

The one at the left show the hand as it would appear looking down upon it; the one at the right shows the view as you look at it from the side.

### **PACKING BOUGHS:**

After collecting a handful of boughs string them on a stick which you have previously prepared pix # 4.

This stick should be strong green hardwood 4 or 5 feet long with a fork about 6 inches long left on it at the butt end to keep the boughs from sliding off and sharpened at the upper end so that it can be easily poked through a handful of boughs.

String the boughs on this stick as you would string fish but do it one handful at a time, allowing the butts to point in different directions.

It is astonishing to see the amount of boughs you can carry when strung on a stick in this manner and thrown over your shoulders.

If you have a lash rope place the boughs on a loop of the rope as in pix # 6 then bring the two ends of the rope up through the loop and sling the bundle on your back Rambo or Tarzan or Jane etc.

### **CLEAN YOUR HANDS:**

When you have finished gathering the material for your bed your hands will be covered with a sticky sap.

And although they will be a sorry sight, a little lard or baking grease will soften the pitchy substance so that it may be washed off with soap & water.

### **HOW TO MAKE BEDS: (Army style?)**

To make your bed, spread a layer of the larger boughs on the ground start at the head and shingle them down to the foot so that the tips point toward the head of the bed, overlapping the butts. pix # 7

Continue this until your mattress is thick enough to make a soft couch upon which you can sleep as home.

Then if you don't sleep well blame the cook or the fact that it was not thick enough.

### **OTHER BEDDING:**

If sleeping in a country without balsam, pine etc, you still can make a good spring mattress by collecting small green branches of any sort of tree which is springy and elastic.

Build the mattress as previously described. On top of this put a thick layer of hay, straw or dry leaves or even green material provided you have a rubber blanket or poncho to cover the latter.

### **FALLEN TREE SHELTER:**

For a one man one night stand, select a thick foliated fir-tree and cut it partly through the trunk so that it will fall as pix # 11.

Then trim off the branches on the under-side so as to leave room to make your bed beneath the branches, next trim the branches off the top or roof of the trunk and with them thatch the roof.

Do this by setting the branches with their butts up as shown in the pix #13 and then thatch with smaller browse as described in making the bed. **This will make a cosy one-night shelter.**

### **THE SCOUT-MASTER BED:**

Take 3 forked sticks (A, B, C PIX # 12) and interlock the forked ends so that they will stand.

Over this framework rest branches with the butt ends up or lay a number of poles & thatch this with browse or take Elm, Spruce.

These shelters may be built for 1 boy or made large enough for many men. They may be thatch with balsam, or any kind of long-stemmed weeds.

### **CAMP BED OFF THE GROUND:**

A framework similar to the table with the table top only is made and the 2 poles are overlaid with sticks exactly as for the bed on the ground.

When making a bed off the ground it is not necessary to have the forks as high as for the table.

A camp bed should **ALWAYS** be built off the ground in SNAKE country or in areas where ground pest. Such as leeches, ants, scrub mites, chiggers or ticks are liable to be troublesome.

An alternative to the forked stakes and ground poles is the use of 2 piles of stones to support the side poles.

#### **CAMP BED USING A COUPLE OF BAGS:**

A very comfy camp bed can be made by setting up the 2 forked stakes as for the preceding camp bed and 2 side poles are placed into the crotches of these so they are about 45 degrees slope.

2 long straight poles are cut and passed through the 2 sides of 2 bags which holes are cut in the bottom of each of these bags to allow the poles to pass through.

The closed ends of the bags are towards the ends of the poles and the bags overlap a few inches in the middle.

The 2 bed poles with the bags are laid one on either side of the angle poles. The weight of the body lying on the bags keeps the side poles pulled well down on the angle poles.

If the weather is COLD or greater comfort is needed, a stuffing of dried grass or bracken fern inside the bags will serve to give greater softness & a warmer bed to boot.

#### **FURNISHING THE CAMP:**

##### **MAKE-KING BEDS: (AHHHHH!)**

Sleep is the great generator and a comfortable bed is worth a little effort. Some form of bedding should **ALWAYS** be used to avoid lying directly on cold or damp ground.

**In Tropical climates it is ALWAYS better to raise the bed into the air**, both to keep off wet earth and to provide a current of cooling air.

**In COLD CLIMATES**, when no permanent shelter has been erected, choose fuel which will keep the fire going through the night and build a screen to reflect the heat back to your sleeping space.

When the ground is dry, or under a shelter, stones heated in the fire and then buried under a thin layer of soil beneath will keep their heat through most of the night, adding to your comfort.

#### **A-FRAME BEDS:**

An A-frame forms a strong construction and will keep you off the ground. Drive two pairs of post into the ground at an angle, leaving a little more than your height between the pairs. Lash the tops together.

If the ground is hard, cross-members will be needed between the feet of each A frame and between the two A frames.

#### **TUBE BED:**

This simplest form depends on having or making a tube of strong material, sewn or thronged together. A large heavy duty plastic bag is suitable, but not thin plastic.

Really toughly made clothing could serve but would usually make a rather narrow bed. Do not risk this method with any fabric that might give under your weight or with seams that might come apart.

Make A frame supports and choose two fairly straight poles, each slightly longer than the distance between the frames, and pass them through the tube of plastic or fabric.

Place them over the frames so that they rest on the sides, the tube preventing them from slipping lower.

#### **BOUGH BED:**

Where conifers are growing, fir tree branches arranged in alternate layers will be more comfortable and their fragrance will ensure a good night's sleep.

#### **LADDER BED:**

Make A frame supports and select poles as for the tube bed, but you will also need a number of cross-pieces-how many will depend upon the size of the sleeper and the kind of bedding to be used.

Springy saplings will be more comfortable than boughs, provided that they are strong. Lash the end "rungs" to the A-frame, jutting out either side.

Make these of strong timber and lash them securely. Fit the ladder over the frames and lash in place. Lay bedding of bracken, ferns or leaves.

#### **HAMMOCKS:**

It takes a little practice to sleep in a hammock-in a string one you **MUST** push the sides outward so that it cups around you.

#### **BED HUNTER HEATER:**

To heat up stones and wrap them well then insert them in your sleeping bag.

#### **ALSO THERE IS THE OLD TRAPPER TRICK:**

Dig a rectangular hole, fill it with hot coals which you then cover up with earth then lay a blanket over it all.

It is the ideal to sleep warm, or: Where you place your bed, lite up a fire for a few hours in order to dry up the ground and to heat it up.

Then remove the fire and clean the ground, add green boughs or canvas on the ground then make your bed on top, because one **MUST** not sleep directly on the ground.

#### **PEEL BARK AND SELECTION:**

To get Birch bark, select a tree with a smooth trunk devoid of branches and placing skids for the trunk fell the tree and then cut a circle around the trunk at the two ends of the log and a slit from one circle clean up to the other circle.

Next With a sharp stick shaped like a blunt-edged chisel, **pry off the bark carefully** until you take the piece off in one whole section.

**If it is spruce bark** or any other bark you seek, hunt through the woods for a comparatively smooth trunk and proceed in the same manner as with the birch.

**To take it off a standing tree**, cut one circle down at the butt and another as high as you can reach and slit it along a perpendicular line connecting the two cuts.

Then peel off the bark **carefully**, this will kill the tree but your survival is more important than the tree or is it? Yes it is.

#### **USING BARK:** (Not dog)

To shingle with bark, cut the bark in convenient sections, start at the bottom, place one piece of bark set on edge flat against the wall of your shelter.

Now place a piece of bark next to it in the same manner, allowing the one edge to overlap the first piece a few inches and so on all the way around your shack.

Then place a lawyer of bark above this in the same manner as the first one the end edges overlapping, the bottom edges also overlapping the first row 3 or 4 inches or even more.

Hold these pieces of bark in place by stakes driven in the ground against them or poles laid over them, according to the shape of your shelter.

Continue thus to the comb of the roof, then over the part where the bark of the sides meet on the top lay another layer of bark covering the crown, ridge, comb, or apex and protecting it from the rain.

In the teepee form, the point of the cone or pyramid is left open to serve as chimney for smoke to escape.

#### **THE ADIRONDACK:**

It is a lean-to open in the front. Easily made. The usual manner is to set up two uprights then lay a crosspiece through the crotches and rest poles against this crosspiece.

Over these poles other poles are laid horizontally and the roof thatched with browse by the method shown before.

But here the tips of the browse **MUST** point down and be held in place by other poles on top of it. Sometime a log is put at the bottom of the slanting poles depending of the need.

#### **THE SCOUT SHELTER:**

Where Birch bark is obtainable it is shingled with slabs of this bark, the bark being held in place on the roof by poles laid over it and on the side by stakes being driven in the ground outside of the bark to hold it in place.

### **THE PIONEER:**

A tent form of shack shows how the bark is placed like the shingles overlapping each other so as to shed the rain.

The doorway of the tent is made by leaning poles against forked sticks, their butts forming a semicircle in front or rather the arc of a circle and by bracing them against the forked stick fore and aft they add stability to the structure.

### **BARK TEEPEE:**

Lash 3 sticks together at the top ends spread them in the form of a tripod then lay together sticks against them their butts forming a circle in the form of a teepee.

Start at the bottom as you do in shingling a roof and place sections of birch bark around, others above them overlapping them and hold them in place by resting poles against them.

If your camp is to be occupied for a week or so, it may be convenient to build a wick-up shelter as a dining-room.

This is made with 6 uprights, two to hold the ridge pole and two to hold the eaves and may be shingled over with browse or birch etc.

Shingle with the browse in the same manner as that described for the bark beginning at the eaves & allowing each row of browse to overlap the butts of the one below it.

### **MATERIAL:**

In building a shelter use every and any thing handy for the purpose; off times an uprooted tree will furnish a well made adobe wall, where the spreading roots have torn off the surface soil as the tree fell.

And what was the under-side is now an exposed wall of clay, against which you may rest the poles for the roof of the lean-to. Or the side of the cliff may offer the

same opportunity. Maybe 2 or 3 trees will be found willing to act as uprights.

Where you use a wall of any kind, rock, roots or bank it will of course be necessary to have your doorway at one side of the shack.

The upright poles may be on stony ground where their butts cannot well be planted in the earth and there it will be necessary to brace them with slanting poles. Each camp will offer problems of its own. Poor Rambo!

### **BEAVER MAT:**

The beaver camp is a new one and under favourable condition a good one. Cut your poles the length required for the framework of the sides.

Lash them together with the green rootlets of the tamarack or strips of bark of the papaw, elm, cedar or the inside bark of the chestnut.

Then make a bed of browse of any kind handy but make it in the manner prescribed for making balsam beds.

You will thatch so that when the side is erected it is shingled like a house the upper rows overlapping the lower ones. The lash a duplicate frame over the browse-padded frame and the side is complete.

Make the other side or sides and the roof in the same manner after which it is a simple matter to erect your shack.

The great advantage of this sort of shelter is that it is much easier to do your thatching on the ground than on standing walls and also when done it is so compact as to be practically water-proof.

### **FAGOT SHACK:**

Intended where large timber can not be cut but where dwarf willow bamboo cane, alders or other small underbrush is more or less plentiful.

From this gather a plentiful supply of twigs into bundles of equal size. Use these bundles as you would stones in building the wall and lay them so as to break joints.

It is so that the joints are **NEVER** in a continuous line. Hold the wall in place by stakes as shown in pix # 26.

Use the browse, small twigs with the leaves adhering to them, in place of mortar or cement so as to level your bundles and prevent their rocking on uneven surfaces. The doorways and window opening offer no problem that cannot be solved.

Pix # 27 shows the window opening, also shows you how the window-sill can be made firm by laying rod over the top of the fagots. Rods are also used across the top of the doorway upon which to place the bundles of fagots or twigs.

Twigs is probably the best term to use here, as fagots might be thought to mean larger sticks, which may be stiff and obstinate and hard to handle.

### **ROOFS:**

After the walls are erected, a beaver mat roof may be placed upon them or a roof made of a frame such as shown in pix # 28.

And thatched with small sticks over which a thatch of straw, hay, rushes or browse may be used to shed the rain.

**One great advantage** which recommends the beaver-mat and fagot camp to lovers of nature lies in the fact that it is unnecessary to cut down a single large or valuable young tree in order to procure the necessary material to make camp.

Both of these camps can be made in forest lands by using the lower branches of the trees, which when properly cut close to the trunk do not injure the standing tree.

The faggot hut may be made into a permanent camp by plastering the outside with soft mud or clay and treating the inside wall in the same manner thus transforming it into an adobe shack.

### **APACHE HOGAN:**

These shelters have been used with success by Indians for centuries, this White Mountain Apache builds a tent-shaped shack which is practically the same as that already described and shown..

The difference being that the Apache shack is not covered with birch bark a material peculiar to the North

but the Apache uses a thatch of the rank grass to be found where his shack is located.

To-day they use the corn-stalks with which to thatch the long sloping sides of this shed like house which makes good material as well.

### **SAN CARLOS SHACK:**

It is a domed-shaped hut built by making a framework of small sapling bent in arches as pix # 30.

The ends of the poles are stuck in the ground in the form of a circle, while their tips are bent over and bound together thus forming a series of loop which overlap each other and give stability and support of the principal loops which run from the ground to the top of the dome.

The Indians thatch these huts with bear-grass arranged in overlapping rows and held in place with strings made of Yucca leaves.

### **CHIPPEWAS SHACK:**

Much farther north the Chippewas Indians built a framework much the same manner as the Apache of San Carlos.

But they covered their frame with layers of birch bark held in place by ropes stretched over it as shown in pix # 32. The door to their hut consisted of a blanket portiere.

The dome -shaped frame is a good one to be used in many localities and like all other frames it can be covered with the material at hand.

It may be shingled with smaller pieces of bark, covered with brush and thatched with browse or hay, straw, palmetto leaves, palm leaves or rushes, or it may be plastered over with mud and made as adobe hut for Tarzan even Jane.

### **PUMA LODGE:**

They make a flat-roofed lodge with slanting walls pix # 33 which may be adapted for our use in almost any section of the country.

It can be made warm and tight for the far North and cool and airy for the arid region of the Southwest.

The framework as pix # 33 is similar to the wick-ups we make consisting of 4 upright posts supporting in their crotches two crosspieces over which a flat roof is made by placing poles across. **But the sides of this shack are not upright** but made by resting leaning poles against the eaves.

### **WHITE MAN'S WALLS NO GO ! :**

The main difference between a white man's architecture and the Indians's lies in the fact that the white man with brick, stones or frame house in his mind, is possessed of a desire to build perpendicular walls, walls which are hard to thatch and difficult to cover with turf.

Especially in the far North, where there is no true sod such as we understand in the middle country, where our grass grows thickly with interlacing roots.

You will do well to **REMEMBER** this and to **imitate Indians in making slanting walls for your shacks in the woods.**

If you have boards or stone or bricks or logs with which to build you may use a perpendicular wall otherwise slant them. Indians were no dummies.

### **ADOBE ROOF:**

If you want to put a dirt roof on a shack of this description, cover the poles with small boughs or browse, green or dry leaves, straw, hay, grass, or rushes and put the sod over the top of this.

If in place of making the roof flat as pix # 33 p271 you slant it so as to shed the rain.

**This sort of shack will do for almost any climate, but with a flat roof it is only fitted for the arid country or for a shelter from the sun no to be expected to be used during the rain.**

### **THE BOG KEN OR MARSH SHACK:**

It is a house built on stilts where the ground is marshy, damp and unfit to sleep upon.

As pix # 66 the house is built upon a platform however the shelter itself is formed by a series of arches.

The uprights on the two sides have their ends bent over and lashed together, forming arches for the roof.

### **VARMINTS PROTECTION:**

Over the arches are lashed horizontal poles as pix # 67 which shows one way to prevent varmints of any kind from scaling the supporting poles and creeping into your camp.

The protection consist of a tin pan with a hole in the bottom slid over the supporting poles.

Pix # 66 shows how to lash the thatching on to the poles and pix # 68 shows how to spring the sticks in place for a railing around your porch or balcony.

The floor to this bog ken is a little more elaborate than that of the last described camp because the poles have all been halved before laying them for the floor.

These are supposed to be afterward covered with browse, hay or rushes and the roof shingled with bark or thatched.

### **THATCHING: (Ask Margaret?)**

Soak your straw or hay well in water and smooth it out flat and regular. The steeper the roofs the longer the thatch will last.

In this bog ken our roofs happens to be a rounded one, an arched roof, but it is sheltering a temporary house and the thatch will last as long as the shack.

You can use any kind of material but to make a really good thatch one should use **only straw which is fully ripe** and has been trashed clean with an old fashion flail.

**The straw MUST be clean of all seed or grain & kept straight, NOT mussed up, crumpled & broken.**

If any grain is left in the straw it will attract field mice, birds, etc and these creatures in burrowing & scratching for food will play havoc with your roof.

It is not necessary to have straight and even rafters, because the humps, bumps and hollows caused by crooked sticks are concealed by the mattress of straw.

Take a bundle of thatch in your hands, squeeze it together and place it so that the butt ends project about 3 inches beyond the floor (A pix # 66).

Tie the thatch closely to the lower rafter and the one next above it, using for the purpose twine, marling, raffia or well-twisted white hickory bark.

This first row should be thus tied near both ends to prevent the wind from getting under it and lifting it up.

Next put on another row of wisp of thatch over the first and the butt ends come even with the first, but tie this one to the third row of rafters.

The butts of the third row of thatch pix # 66 should be about 9 inches up on the front rows, put this on as pix # 66 till the roof is completed.

The thatch should be 10 or 12 inches thick for a permanent hut but not to be so if temporary shed. As there is no comb to this roof the top **MUST** be protected where the thatches from each side join.

And to so this fasten a thatch over the top and bind it on both sides but not in the middle, so that it covers the meeting of the thatches on both side of the shack.

This top piece should be stitched or bound on with wire if you have it or hastened with Willow withe or even wisp of straw if you are an expert.

**A good thatched roof will last as long as a modern shingle roof, a well made thatched roof will last 15 years.**

But a bog ken is one that is built over buggy or marshy land too soft to support an ordinary structure.

To overcome this difficulty requires considerable study and experiment. If you wish to build a duck hunter's camp on the soft meadows or for any reasons you desire a camp on treacherous boggy ground, you may build one by first making a thick mattress of twigs and sticks as pix # 70 pB.

This mattress acts on the principle of a snow-shoe and prevents your house from sinking by distributing the weight equally over a wide surface.

The mattress should be **carefully** made of sticks having their branches trimmed off sufficiently to allow them to lie in regular courses as in the diagram 71.

The first course should be laid one way and the next course at right angles to the first, and so on, until the mattress is sufficiently thick for the purpose.p272b

Standing on the mattress, it will be an easy matter with your hands to force the sharpened ends of your upright posts A B C D down into the yielding mud.

**But be careful not to push them too far** because in some of these marshes the mud is practically bottom less. **It is only necessary for the supports to sink in the mud far enough to make them stand upright.**

The next step is to lay, at right angles to the top layer of brush a series of rods or poles between your uprights as shown in pix # 70

Then take 2 more poles, place them at right angles to the last ones, and press them down until they fit snugly on top of the other poles and there nail them fast to the uprights as shown in pix # 70 ,

After which to further bind them you may nail a diagonal from A to D and B to C but this may not be necessary.

When you have proceeded thus far you may erect a framework like on pix # 71 and build a platform by flooring the crosspieces or horizontal bars with halves of small logs pix # 71.

It is now a simple matter to erect a shack which may be roofed with bark as in pix # 72 or thatched as in pix # 74.

Pix # 72 shows the unfinished shack in order that its construction may be easily be seen;this one is being roofed with birch bark.

A fireplace may be made by enclosing a bed of mud pix # 73 p 272b between or inside of the square formed by four logs.

On this clay or mud you can build your camp-fire or "cook-king" fire or mosquito smudge with little or no danger of setting fire to your house.

**AVOID MOSQUITOES ALSO:**

The mosquito smudge will not be found necessary if there is any breeze blowing at all, because the insects cling to the salt hay or bog-grass and do not rise above it except in close, muggy weather where no breeze disturbs them.

Many have slept a few feet over bog meadows without being disturbed by mosquitoes when every blades of grass on the meadows was black with them, but there was a breeze blowing which kept the mosquitoes at home.

### **OVER-WATER CAMPS:**

If the water has a muddy bottom it is a simple matter to force your supporting posts into the mud.

This may be done by driving them in with a wooden mallet made of a section of log or by fastening poles on each side of the post and having a crowd of men jump up and down on the poles until the posts are forced into the bottom, you may also use a pile-driver if one is around.

If your camp on the water is over a hard bottom of rock or sand through which you cannot force your supports you may take a lot of old barrels pix # 75, know the tops and bottom out of them.

Nail some cross planks on the ends of your spiles, slide the barrels over the spiles, then set them in place in the water and hold them there by filling the barrels with rocks, stones or coarse gravel.

Pix # 77 shows a foundation made in this manner;this method is also useful in building piers pix # 78.

But if you are out in the boon then you can make yourself cribs by driving a square or circle of sticks in the ground a short distance & then twining roots or pliable branches inside and outside the stakes basket fashion as in pix # 76.

When the crib is complete it may be **carefully** removed from the ground and used as the barrels were used by filling them with stones to support the uprights. Pix # 79 shows an ordinary portable house which has been erected upon a platform over water.

Our experience with this sort of work lead us to advise the use of piles upon which to build in place of piers of stones.

Where we have used such piers upon small inland lakes, the tremendous push of the freezing ice seems to slide around the piles without pushing them over.

**The real danger with piles** lies in the fact that if the water rises after the ice has frozen around the uprights the water will lift the ice up and the ice will sometimes pull the piles out of the bottom like a dentist pulls teeth.

Nevertheless, piles are much better for a foundation for a camp or pier than any cribs of rocks and that is the reason we have shown the cribs in pix # 75 and 77 made so as to rest upon the bottom supposedly below the level of the winter ice.

### **SIGNAL TOWER, GAME LOOKOUT:**

With a small tower all the joints may be quickly lashed together with strong heavy twine, rope or even wire or bind the joints with pliable roots or cordage made of bark or withes.

Now to secure the necessary timber, first lets cut 8 straight poles as straight as one can find them. These poles should be about 4 1/2 inch in diameter at their base & 16 1/2 feet long.

After all the branches have been trimmed off the poles, cut 4 more sticks each 9 feet long and 2 1/2 to 3 inches in diameter at the base.

When these are trimmed into shape one will need 26 or 27 more stout sticks each 4 1/2 feet long for braces and for flooring the platform. This should be enough for Tarzan's lookout.

### **CACHES:**

Unless a cache is absolutely secure then it will be raided by wolves, bears and other creatures so **BEWARE** dear Jane or Tarzan.

### **PROSPECTOR CACHE:**

This first cache pix # 98 consists simply of a stick lashed to 2 trees and another long pole laid this to which the goods are hung, swinging beneath it like a hammock.

This cache is hung high enough to be out of reach of a standing bear. The tripod cache pix # 100 consists of 3 poles lashed at the top with the goods hung underneath.

**Another form of the Prowpector's cache** is shown by pix # 102 where 2 poles are used in place of one and an open platform of sticks laid across the pole; the goods are placed upon the platform.

#### **TENDERFOOT'S CACHE:**

In pix # 105 is used only for temporary purposes as it is too easily knocked over & would be of no use where animals as large as bears might wreck it.

It consists of 2 sticks lashed together at their small ends and with their butt ends buried in the earth. Their tops are secured by a rope to a near-by tree while the duffel is suspended from the top of the longest pole.

#### **MONTAGNAIS CACHE:**

Is an elevated platform upon which the goods are placed and covered with skins or tarpaulin etc. pix # 99.

#### **ANDREW STONE CACHE:**

It is a miniature log cabin placed on the ground and the top covered with halved logs usually weighted down with stones pix # 101.

#### **BELMORE CACHE:**

Consists of a pole or a half a log placed in the fork of the 2 trees on top of which the goods are held in place by a rope and the whole covered with a piece of canvas lashed together with eyelets like a shoe.

#### **SHELTERS SHACKS & SHANTIES:**

Now lets build camps in which we use logs instead of poles. Most of these camps are intended to be covered with sod or earth and are nearly related to the old prairie dugout.

The sod house is used in the arctic regions because it is warm inside and it is used in the prairies because it is cool inside.

#### **THE STEFENSON FRAME:**

Is made of larger timbers because it not only **MUST** support a roof and side of logs and sod but **MUST** also be able to sustain any quantity of snow.

First erect 2 forked upright sticks pix # 132 and then steady them by 2 braces. Next lay four more logs or sticks for the side plates with their butt ends on the ridge pole and their small ends on the ground as in pix # 133.

Support these logs by a number of small uprights-as many as needed for the purpose. The uprights may have forks at the top or have the top ends cut wedge-shaped to fit in notches made for that purpose in the side plates as shown by 133 A

The shortest uprights at the end of the roof should be forked so that the projecting fork will tend to keep logs from sliding down.

The roof is made by a number of straight rafters placed one with the butt in front next with the butt in the rear alternately, so that they will fit snugly together until the whole roof is covered.

The sides are made by setting a number of sticks in a trench and slanting them against the roof. Both sides front and rear of the building should project 6 inches above the roof in order to hold the sod and dirt and keep it from sliding off.

Up in the north country one **MUST** not expect to find green closely cropped lawns or even green fields of wild sod in all places.

Although in some places the grass grows taller than a man 's head in other places the sod is only called so by courtesy.

**Consequently we MUST secure the sod** by having the walls project a little above the rafters all around the building.

Of course in summer weather this roof will leak, but then one may live in a tent, but when cold weather comes and the sod is frozen hard and banked up with snow the Stefenson makes a good warm dwelling.

The same style of camp can be made in the temperate zone of smaller trees & shingled with browse or in the South of cane or bamboo & shingled with palmetto

leaves or in the Southwest of cottonwood where it may be covered with adobe or mud.

Pix # 134 the front is left uncovered to show its construction and also to show how the doorway is made by simply leaving an opening like that in a tent.

In winter this may have a hall way built like the one described in the Navajo earth lodge pix # 35 or in milder weather the doorway may be protected with a skin. An opening is left in the roof over the fireplace which answers the purpose of a chimney.

### **UNDERGROUND HOUSE: p276**

One funny thing about this house is that it **MUST** be furnished before it is built, because the doorway and passageway will be too small to admit any furniture larger than a stool.

So select or make your furniture and have it ready then decide upon the location of this dug out on the edge of some bank pix # 158

In this diagram the dotted line shows how the bank originally sloped. The real hard work connected with this is the digging of the foundation which is hard work.

The trouble is that with caves there is a danger of caving in but a properly built underground hogan is perfectly safe from such accidents. After you have levelled off the foundation erect the rear posts of two by four A B C D pix # 156

These post should be of the same height and tall enough to allow the roof to slant toward the front as in pix # 155.

The front posts E F G H although shorter than the back post should be tall enough to allow headroom. One, two or three more posts may be erected between the post A B C D if additional strength is required.

The same is true of the sides and in place of having only one post in the middle of each side pix # 156 there may be 2 or 3 more posts, all according to the size of the house you are building.

The main point is to make a compact and strong box of your framework so that in wet weather the banks

surrounding it will not be tempted to push in the sides and spoil your house.

Erect the frame pix # 156 by having someone hold the uprights in place until they can be secured with temporary braces. (Not those in your mouth)

You may then proceed to board up the sides from the outside of the frame by slipping the planks between the frame and the bank and then nailing from the inside.

The door-jambs will help support the roof which will be covered by planks etc then by sod.

### **CLIFF-HOUSES ROOF:**

If you wish to make the roof as the cliff-dwellers made theirs, put your biggest logs crosswise of your house for rafters and across the large logs lay a lot of small poles as close together as may be, running from the back to the front of the house.

Fill in the cracks between with moss or calk them with dry grass; on them place a layer of brush, browse or small sticks and over this a thick coating of clay, hardpan or ordinary mud and pack it down hard by tramping it with your feet until it becomes a smooth and packed crust. Over this you can put your sod and weeds to conceal your secret house.

### **PASSAGEWAY: P276**

To make the frame for the underground hall or passageway pix # 156 first across the door-jambs to form the top to the doorway, after which put in the supports.

Next built the frame and joint it by the two pieces and put in the middle frame support. The passageway should be about 6 feet long and the front doorway pix # 156-157 of sufficient size to enable you to creep through with comfort.

The bottom piece can be nailed to a couple of sticks driven in the ground for that purpose. The next thing in order is the floor and to make this firm you **MUST** lay a number of lumber 2 X 4 & see that they are level.

You will need a number of shorter pieces of the same material to run parallel for the hall floor as seen pix # 157. Across these nail your floor securely as shown in pix # 155.

There are no windows shown in the diagram, but if the builders wish one it can be placed immediately over the entrance or hall way in the frame pix # 156.

In which the covering of dirt **MUST** be shovelled away to admit the light in the same manner as the dugout shown in pix # 142 and in the small sketch 154.

The ventilator show in pix # 155 sold may be replaced if thought desirable by a chimney for an opening fire.

On the variation a stove would not be a properly thing for an underground house but opening fire could help for the ventilation. prob of text here to check.

This diagram the ventilator; it may be help of barrels or barrels fill in the dirt around by the scanting 2 x 4 and 4 x 4 #as a rimer# to cover the roof with small sticks and fine brush and grass weed grass weed. You should have good strong front door pix # 157 & padlock from trespassers.

#### **AURE HINGES:** p276

A rustic hinges may be made by splitting a forked branches pix # 157 and using the 2 pieces nailed to the sides of the door-jambs pix # 157 run through them.

The middle of the B stick is flattened to fit on the surface of the door of which it is nailed. The hinged was invented by Victor Aures.

When all is completed you can conceal the ventilator with dry brush or by planting weeds or shrubs around it, which will not interfere with the ventilation by will concealed the suspicious-looking pipe protruding from the ground.

The top of the ventilator should be protected by slats as in pix # 161 or by wire netting with about one quarter inch mesh in order to keep small animals from jumping or hopping down into your club house.

#### **TRAP DOOR:**

In place of a ventilator or a chimney a trap door may be placed in the roof and used as a secret place entrance access to inside being had by a ladder pix # 169 170b P277b.

Pix # 159 p276 shows a rude way to make a chandelier, and as long as the candles burn brightly you may know that the air in your little hogan is pure and fresh.

When such a chandelier is used pieces of thin should be nailed above the candles to prevent the heat from burning holes through the roof.

#### **HOW TO CUT AND NOTCH A LOG:** P277

None of us is to young to use an axe. **REMEMBER** that every time you hurt yourself with an axe you learn to be more careful.

Joking aside, we **MUST** get down to get serious work of preparing the logs in order to build a little cabin or your own, a log club house for our gang or a long camp for a troop of scouts.

#### **NOTCHING LOGS:** P277

To make logs hold together at the corners of our cabins it **IS NECESSARY** to lock them in some manner and the usual way is to notch them.

You may cut flat notches like those show in pix # 162 P277 and this will hold the logs together as shown by pix # 162 or you may only flatten the ends, making the General Putnam joint shown in pix # 163.

Or you may use the Pike notch which has a wedge-shaped cut on the lower log, as shown by pix # 164 made to fit into a triangular notch shown by pix # 164 which was drawn from a cabin built in this manner. But the simple notch is the rounded one shown by A B C pix # 165.

When these are logged together they will fit like those shown in pix # 165. Away up North dovetail the ends of the logs pix # 166 so that their ends fit snugly together and are also locked by their dovetail shape.

To build a log house, place the two sills logs on the ground or on the foundation made for them, then two other logs across them as pix # 168 P277

#### **HANDLING THE LOGS:**

That the log may be more easily handled they should be piled up on a skid way which is made by resting the top ends of a number of poles upon a big log or some other sort of elevation and their lower ends upon the ground.

With this arrangement the logs may be rolled off without effort as they are used to.

### **CHINKING:**

A log cabin built with hardwood logs or with-pitch pine logs can seldom be made as tight as one built with the straight spruce logs or the virgin? forests.

The latter will close as close as the one shown in pix # 162 P277 while the former on account of their unevenness, will have cracks between them like those shown in pix # 165

These cracks may be stopped by quartering small pieces of timber in pix # 168 and fitting these quartered pieces into the cracks between the logs where they are held in place by spikes.

This is called chinking the cabin. To keep the cold and wind out, the cracks may be muddled up on the inside with clay or ordinary lime.

### **MODELS:**

Study the diagrams **carefully**, then sit down on the ground with a pile of little sticks alongside of your and sharp jack-knife in your hand and proceed to experiment by building miniature log cabins.

**Really this is the best way to plan a large scale cabin if you intend to built one up.**

From your model you can see at a glance just how to divide your cabin into rooms, where you want to place your fire place, windows and doors, and we **would advise you ALWAYS do make a small model before building.**

Make the model about one foot 3 inches long by 10 inches wide, using stick for a log a little less than one inch in diameter.

That is one inch through one inch thick. I have taken these dimension or measurements from little model that I have before here in my studio but of course you can vary them according to the plans of your cabin dear Crusoe or Jane.

### **NOTCHED LOG LADDERS: P277b**

Pix # 169-170 Our purpose is to tell you to use of the notched logs. Our pioneers ancestors used them to ascend to the loft over their cabins where they slept in pix # 179.

It is also good ladder to use for a tree house and a first rate one for our underground hogans when we have an entrance through the top instead of one at the side shown in pix # 156 P276.

Since you have learned how to use the axe you make one of these primitive ladders to reach the hay loft in your barn if you have one.

You make the ladder of one log if you set the pole of log upright and knot it on both side so that you can clasp it with your hands and placing one foot on each side of it, climbing down the same manner.

### **LOG ROLLING AND OTHER BUILDING STUNTS: p278 (Even the Rolling Stones!?)**

Of course readers know all about geometry but if not of should not prevent them from using that science to square the corners of this log cabin.

Builders **ALWAYS** have a tenderfoot measuring rod-that is, a rod or straight stick ten foot long and marked with a line at each foot from end to end.

Make your own ten foot pole as straight as possible from a piece of wood as you can find.

With it measure 6 feet **carefully** on the log C, G in pix # 180 P278 and mark the point at in pix # 180 measure 8 feet on the other log C A in pix # 180 and mark the point at N.

If these measurements have been **carefully** made from C to O and from C to N your corner is square.

Then your 10 foot pole will reach between the two point O and N with the tips of the pole exactly touching N O.

If it does not fit exactly fit between N & O either the corner is not square or you have not marked off the distances accurately on the logs.

Test the measurements and if they are not found true then push your logs one way or the other until it is

exactly 10 feet from, O to N. Then test the corner at H in the same manner.

### **LOG ROLLING: (Rolling stones?)**

In the old times log-rolling was **ALWAYS** a great frolic and brought people from far and near to lend a helping hand in building a new house.

In handling logs lumbermen have tools made for that purpose, cant-hooks etc. But the old lumbermen and pioneers who lived in log houses owned no tools but their tomahawks, their axes and their rifles.

So the logs of most of their houses were rolled in place by the men themselves pushing themselves up the skids laid against the cabin wall for that purpose; later when the peddlers brought ropes to the settlements they used these to pull their logs in place.

In building my log house we used two methods, one was hand-power pix # 181. Taking 2 ropes we fastened the ends securely inside the cabin.

We then used the free ends of the ropes around the log first under it and then over the top of it, then up to a group of men who by pulling on the free ends, rolled the log pix # 181 up to the top of the cabin.

But when my buddies were supplied with some oxen they fastened a pulley-block to the other end side of the cabin.

That is, the side opposite the skids, and ran the line through the pulley block to the oxen as it is run to the 3 men in pix # 182.

When the oxen were started the log slip up the skids to the loose rafters N O P when once there it was easily shoved and fitted into place.

### **LOG STEPS:**

Sometimes one wants front steps to one's logs house and these may be made of flattened ?opgs or puncheons as pix # 183

### **THE ADIRONDACK OPEN LOG CAMP AND ONE ROOM CABIN: 279**

The men in the woods often build such a camps of logs with a puncheon floor and a roof of real shingles. The pix # 184 P278b is made from such a camp.

At the rear the logs are notched and placed like those of a log house pix # 162 163 164 165 166 p277 but the front ends of the side logs are toe-nailed to the two upright supports.

In this particular camp the logs are also flattened on the inside in order to give a smooth finish, as they often are in Virginia log houses.

In Virginia they formerly hewed the logs flat with broad axes after the walls were up, but rarely used these days.

### **CABIN PLANS: P278B**

A one room log cabin with double bunk at one end makes a good camp pix # 185 p278b with room for 2 to 4 sleepers according to the with of the bunk pix # 186

### **THE BUNKS:**

The bunks are made by setting the ends of 2 poles into holes in the log bored for that purpose pix # 185 P278b and nailing slats across the poles.

Over this a bed of browse is laid and on this blankets are spread and all is then ready for beddy bye bye.

### **THE NORTHERN TILT AND INDIAN LOG TENT: 278B**

Some years ago the Indians built themselves logs like the pix # 187. These were the winter houses in the north country.

A ridge pole was set up on tow forked sticks and the logs slanted up against each other and rested upon the pole.

Smaller pole were then laid against this frame, both front and rear all of which could then be covered with sod or browse and made into a warm winter house.

You may build a similar house by using small poles instead of big logs or they may make a northland tilt pix # 189 which is a modification of the Indian log tent and has 2 side plates pix # 188 instead of one ridge pole.

The log chimney is also added and when this connected with a generous fireplace the fire will brighten and warm the interior of the tilt and make things comfortable.

The chimney can be erected in the same manner that you build a log house.

The front of the northland tilt is faced in with small logs set on end, as shown in pix # 189 this makes a substantial warm winter camp. If the logs fit close together on the roof they may be calked with moss or dry grass.

If the cracks are too wide on count of the unevenness of the log, cover them first with grass, fine brush or browse and over all place a costing of sod or mud and you will have a house fit for a king to live in.

To tell the truth it is much too good for a mere king and almost good enough for a real american boy even a Rambo.

#### **HOW TO BUILD A RED JACKET, THE NEW BRUNSWICK: p279**

This another camp but this you see has straight walls, marking it as a white man camp in form not apparently borrowed from the red men. It is however a good comfortable rough camp.

To build the Red Jacket one will first have to know how to build the more simple form which we call the New Brunswick then the next step will be the Gist then the Red Jacket.

#### **THE NEW BRUNSWICK:**

You will see that it is practically a deep Adirondack open-face with a wind-shield build in front of it.

To build this camp, make the plan about 6 feet by 12 on the ground of course the back logs **MUST** be something over six feet long to allow for 6 feet in the clear. Notch about 4 or 5 back logs with the plain rounded notch already described pix # 165 p277.

Then lay the side sill logs and erect 2 uprights forked sticks for the front of your cabin to hold the cross stick which supports the roof rafter.

Now build up your cabin as you would a log house, notching only the small ends of the side logs & saving the larger ends for the front.

Between each of these is the other end of the cabin built just the same as the rear end, but it should be build of peeled logs as they are less liable to catch fire than the ones with the bark upon them.

If you feel real lazy it will **only be necessary** to peel the bark off from the inside half of the log.

Above the door at the end of the roof of the Adirondack camp part of the space is filled by logs running across, with the lower one resting upon the top of the door jamb.

This close the shed above the wind shield and leaves a little open yard in front wherein to build a camp fire.

#### **THE RED JACKET:**

It constitute the suggestion offered by the Gist and extends the side walls all the way across to the wind shield and the latter now becomes the true end of the log shack.

The side walls and end wall are built up from the top of the shack to form a big wide log chimney under which the open camp-fire is build on the ground.

The Red Jacket is roofed with bark in the same manner as the New Brunswick and Guist and occupies the important position of the missing link between the true log cabin or log house and the rude log camp of the hunter.

If you look at pix # 184 p278b then the camp with the shield enclosed but still open at the top where the wind-shield enclosed has turned into a fire place with a chimney.

Then pix # 271 and 173 p281 showing the ends of the real log cabin you will have all the steps in the growth or evolution which has produced the American log house.

#### **CABINS DOORS & DOOR-LATCHES AND FOOT LATCH: P279b**

One of the simplest of the foot latches consist of a piece of wood cut out by the aid of axe and hunting knife to the form show in pix # 199 P279b.

A hole in the door cut for that purpose admits the flattened and notched end and upon the inside it fits the round log sill.

The owner of the log when reaching home, steps upon the foot latch pix # 199 which lifts up the catch on the inside and allows the door to swing upon ready for Jane?.

#### **TRIGGER LATCH: P279B (Not tiger catch!)**

Pix # 200 shows a more complicate form of latch with a trigger protruding from the lower part of the door which is hinge to a wooden shaft, and the shaft in turn is connected with the latch.

The fastening of the trigger to the shaft and the shaft to the latch are made with hardwood pegs or wire nails which move freely in their sockets.

The latch is the simplest form of a wooden bar fastened at one end with a screw or nail on which it can move up and down freely the other end is allowed to drop into the catch.

The latch itself is similar to the one shown in pix # 193 and 194. The trigger is also fastened to a block on the outside of the door by a nail or a peg upon which it moves freely.

So that when the weight of the foot is placed upon the trigger outside the door that end is forced down which pushed the end attached to the shaft up.

This pushes the shaft up & the shaft pushes the lack up; thus the door is unfastened. The pix # to the left of pix # 200 shows the edge of the door with the trigger on the outside, the shaft upon the inside.

The diagram to the right in pix # 200 shows the inside of the door, the end of the trigger, the shaft, the latch and catch.

#### **THE LATCH STRING: P279B**

In the preceding locks and fastening, no matter how generous the owner may be, his latch-string **NEVER** hangs on the outside but this one the latch literally hang

outside and any one may enter by pulling it pix # 193-194.

But when the owner is in and does not want to be interrupted with Jane he pulls the string in which tells the outsider (cops) that he **MUST** knock before he can be admitted.

The simplest form of latch has been here put upon the simplest form of a door, a door with a wooden hinge made by nailing a round rod to the edge of the door and allowing the ends of the rod to project above and below the door.

In the sill log below the door a hole about 2 inches deep is bored to receive the short end of the hinge rod, above a deeper hole is bored to receive the long end of the hinge rod.

To hang the door run the long end up in the top hole far enough to lift the door sufficiently to be able to drop the lower end of the hinge rod in the lower hole. Your door is then hung and may swing back and forth at your pleasure.

Notwithstanding the fact that such a door admits plenty of cold air, it is a very popular door for camps and even used for log houses.

#### **SIMPLE SPRING-LATCH: p279b**

A simple form of a spring-latch is pix # 196 as you see A is a peg driven into the door-jamb. It has notch in its outer end so that B a piece of hickory may be sprung into the notch; B is fastened to the door by a couple of screws. By pushing the door the latch will slide out of the rounded notch and the door opens.

When you pull the door to close it the end of the spring strikes the rounded end of the A peg and sliding over it, drops naturally into the slot and holds the door closed also good one for gates.

#### **SECRET LOCKS: p280**

Secret locks are more useful than the strong ones for a country house which is left alone during the winter months.

Hence if your locks are concealed your house is safe from all but professional thieves who seldom waste

their time to break open a shack which contains nothing of value to them.

The latches shown by pix # 193 200 and 201 may be made very heavy and strong and if the trigger in pix # 200, the latch string hole in pix # 193 and the peg hole in pix # 201 are **adroitly concealed they make the safest & most secure locks for summer camps, shacks and houses.**

If a large bar pix # 201 1/2B be made of one by four inch plank bolted in the middle of the plank with an iron bolt through the centre of the door.

And fastened on the inside by a nut screwed on to the bolt it will allow the bar to revolve freely on the inside of the door and bar the door when resting in the A I C catches.

But if a string is attached to one end it may be unfastened by pulling the string up through the gimlet hole in the door.

To conceal this lock, draw the string through the gimlet hole and fasten a nail on the string. When it is undrawn the door bar is horizontal and the door is consequently barred.

Then push the nail in the gimlet hole so that only the head appears on the outside and no one not in the secret will ever suppose that the innocent appearing nails are the key to unfasten the door.

When you wish to open the door from the outside, pluck out the nail, pull the strings and walk in. Bingo Rambo!

There are thousand of other simple contrivances which will suggest themselves to the camper and he can find entertainment for rainy days in planning and enlarging on the ideas here given.

In the real wilderness however every camp is open to all comers that is the latch string hangs outside the door but the real woodsmen respect the hospitality of the absent owner and replace whatever food they may use with fresh material from their own packs.

Wash all dishes they may use and sweep up and leave the shack as apple pie order after their uninvited visit for this is the law of the wilderness which even horse

thieves and bandits respects. After all they are survivors of a kind themselves.

### **THE TIPPECANOE:**

This latch is worked with a wooden spring and when properly made of well seasoned wood will probably outlast a metal one for wood will not rust and can not rot unless subjected to moisture.

The position of the spring in pix # 201 shows the latch with the bolt sprung back. The fact that the bolt-hole is the catch is empty also tells the same story.

The drawing of the outside of the door pix # 203 shows by the position of the peg that the door is fastened.

To open the door push back the bolt by sliding the peg to the opposite end of the slot. From a view of the edge of the door pix # 202280 one may see how the peg protrudes on the outside of the door.

Although the Tippecanoe latch is made of quite a number of parts, it is really a very simple device but in order to display the simplicity of this construction to you.

I have drawn all the parts but the spring stick natural size pix # 204 to 207 but since the original diagram is drawn too large for this page and was reduced by the engraver there is a scale of inches at the bottom to give the reader the proportions.

There are no fixed dimensions for this or any other lock latch or catch but the proportions here given are probably the ones that will fit the door.

The foundation block is shown by pix # 204 upon this the latch rests and is securely nailed or screwed to the door.

Pix # 205 206 are 2 wooden clamps which are fastened to the door and also to the foundation block pix # 204.

These clamps **MUST** be notched as in the diagrams to allow for the movement of the bolt but since the bolt pix # 207 is larger and thicker at the butt.

The notch in pix # 205 is made just a trifle larger than the butt end of the bolt and in pix # 206 the notch is made with a trifle smaller than the opposite end of the bolt.

The object of the offset on the bolt pix # 207 forward of the peg is to make a shoulder to stop it from shooting too far when the spring is loosened.

#### **THE CATCH: (22 ?)**

Pix # 201 and 204 1/2 show the catch which is to be securely fastened to the door jamb.

The spring of course **MUST** be made of well seasoned elastic wood, hickory is the best. This stick may be quite long say half again as long in proportion as the one shown in pix # 201 P280.

It **MUST** be flattened at the upper end and secured by 2 nails and it **MUST** be flattened at right angles to the upper part and somewhat pointed at the lower end so as to fit in a notch in the bolt pix # 201

A well made lock of this sort is a source of constant joy and pride to the maker and he will **NEVER** tire or springing it back and forth and extolling its virtues to its guest. like a new born child to show around.

#### **HOW TO MAKE A FIRE PLACE AND CHIMNEY FOR A SIMPLE LOG CABIN:**

Pix # 269 Shows a sample of a fireplace which is practically the granddaddy of all the other fireplaces.

It consist of 3 walls for windbreaks a side up in a stone of sod against some stakes driven in the ground for the purpose of supporting them.

The four cornered stakes are notched or forked & small logs, are laid horizontally in this forks and on top of this a pyramidal form of a log pen is builded of small logs and billets and this answers the purpose of a chimney.

This type of fireplace is adapted to use in camps and rude shacks like those shown by pix # 187-189-192 also for the most primitive log cabins but when we make a real log house we usually plan to have a more elaborate or more finished fireplace & chimney. The pix # 279 shows also 270

#### **MUD EARTH: See also turf & sod #?**

Here you see there is a mud earth, a wall of clay plastered over the stones of the fireplace. This will

prevent the fire from cracking and chipping the stones but clay is not absolutely necessary in this fireplace.

When however you build the walls of your fireplace of logs and your chimney of sticks the clay **IS NECESSARY** to prevent fire form igniting the woodwork and consuming it.

For a long framed-fireplace, make a large opening in the wall of your house and against the end of the logs where you sawed out the opening.

Erect jamb pieces of planks two to 3 inches thick running up to the logs see pix # 272 next lay your foundation of sill logs neatly notched so as to look like the logs in the walls of the cabin.

Build your fireplace walls as shown by pix # 272 after which take your mud or clay and make the hearth by hammering the clay down hard until you have a firm smooth foundation.

The front hearth may be made as shown in the diagram or stones of any size from pebbles to flagstones with the surfaces levelled by sinking the under part down into the clay a uniform level till reached at the top.

The fireplace may be built with bricks or moist clay and wet clay used for mortar. Make the clay walls of the fireplace at least one foot thick and pack it down hard and tight as you build it.

If you choose you may make a temporary inside wall of plank as they do when they make cements walls and then between the temporary boards wall and the logs.

Put in your moist clay and ram it hard down until the top of the top of the fireplace is reached after which the boards may be removed and the inside of the fireplace smoothed off by whipping it (Ouch!) with a wet cloth.

#### **STICK CHIMNEY:**

After the walls of logs and clay are built to top of the fireplace proper, split some sticks and make them out one inch wide by one half inch thick or use the round sticks in the form in which they grow

But peel off the bark to render them less combustible, then lay them up as shown by log cabin style. With the chimney we have four sides to the wall in place of 3 sides as in the fireplace.

The logs of the fireplace where they run next to the cabin may have to be chinked up so as to keep them level but the chimney should be built level as it has 4 sides to balance it.

Leave a space between the chimney and the outside wall and plaster the sticks thickly with mud upon the inside as shown by pix # 271 281A which is supposed to be a section of the chimney.

### **DURABILITY:**

All through the mountains of Tennessee and Kentucky I have seen these stick chimneys some of them many many years old.

In the mountain countries the fireplaces are lined with stones but in Illinois in the olden times stones were scarce and mud was plenty and the fireplaces were made just like those described and illustrated pix # 272

The stone chimney is an advance and improvement upon the log chimney but I doubt it requires any more skill to build.

### **CHIMNEY FOUNDATION:**

Dig your foundation for your fireplace and chimney at least 3 feet deep then fill the hole up with small cobblestones or broken bluestone until you have reached nearly level of the ground upon this you can begin to lay your hearth and chimney foundation.

If you fail to dig this foundation the frost will work the ground under the chimney and the chimney will work with the ground causing it either to upset or to tilt to one side or the other and spoil the looks of your house even if it does not put your fireplace out of commission.

### **STONE CHIMNEY:**

In laying up the stones for your chimney **REMEMBER that it makes no difference how rough and uneven it is upon the outside.** The more uneven the outside is the more picturesque it will appear.

But the smoother and more even is the inside is the less it will collect soot and the less will be the danger of chimneys fires.

Lay your stones in mortar and cement. See that each stone fits firmly in the bed and does not rock and that it breaks joints with the other stone below it.

By breaking joints I mean that the crack between the 2 stones on the upper tier should fit over the middle of the stone on the lower tier.

This with the aid of cement locks the stones and prevents any accidental cracks which may open from extending any further than the 2 stones between which it started.

If however you do not break joints a crack might run from the top to the bottom of the chimney causing it to fall apart.

Above the fireplace make 4 walls to your chimney as you did with your stick chimney extend above the roof **at least 3 feet this will not only help the draught but it will also lessen the danger of fire.**

**FOR FIRE MAKING, AND TENDING AS WELL AS FIREPLACE SEE FIRE FILE #**

### **END OF SHACK AND SHANTIES!**

(not snack & panties?!?)

Again our apologies for the chapter you just read it will be uploaded with the pix mentioned in the chapter, but for now due to the lack of money, honey and secretary not mentioning time, we uploaded the whole thing as is. As soon as we can we will upload the whole 9 yards with all the pix to go along. Thanks.

PS If you are really pissed off, send me some \$\$\$ and I will hire someone to do the job! Oh well!

## **CAVES: (CAVEMAN 2001 BC-2001AD)**

**IN CAVES THE RISK OF CARBON MONOXIDE POISONING IS EXTREMELY HIGH. USE THEM ONLY TEMPORARILY. (See CARBON MONOXIDE #?)**

Caves are the most ready made of shelters. Even a shallow cave in stone usually known in fact as rock shelter offers an excellent permanent home.

People still live in them in many parts of the world, sometimes with all the modern convenience! Caves situated above valley will be dry even if water seeps through in some places from above.

They are weather proof and require little constructional work, usually simply the creation of a barrier to close off the entrance. Make this of rocks, wattle, logs, turves or almost any materials.

Caves can be cold and they may be already inhabited by wild animals, so approach any such shelter with caution. Plenty of dry plant matters and pine boughs on the ground will provide insulation. A good fire will usually make animal occupants leave. Allow them an escape route.

### **WATER IN CAVES:**

Sometimes a cave will have its own fresh water supply, especially if it goes deep into a hill-side, either from an underground stream or from water seeping through the rocks above.

### **WARNING WARNING:**

Check for the possibility of a rock fall inside or outside the cave. You might be desperate for shelter but your situation will be a lot worse if you are trapped or injured by falling rocks.

### **CAPITALIZING ON CAVES: QUALITIES NEEDED:**

Temporary shelters need the same qualities than those of Stone Age:

**DRY, PROTECTED FROM THE WIND, SAFE AND PREFERABLY SMALL ENOUGH TO BE EASILY HEATED.**

Such natural bivouacs are found everywhere in the wild and rural area of N. America and the world.

### **CAVES ARE FOUND IN:**

Caves are usually found in mountain and sloppy regions as well as cliff near sea, rivers etc. **Yet if they are damp stay away.**

**BEWARE** that many good ones are already occupied so be careful upon checking them out, for bears, lynx Even Fred Flinstone etc.

Yet whenever possible to build a shelter go for it since caves can be **dangerous** for cave in and the risk of **carbon monoxide poisoning is extremely high.** Use them only temporarily

### **HALF CAVE SHELTER:**

The Indians were **ALWAYS** quick to see the advantages offered by an overhanging cliff for a camp site. Pix # 9-10.

His sample camps all through the arid Southwest had gradually turned into **carefully** built houses long before we came here.

The overhanging cliffs protected the buildings from the rain and weather and the site was easily defended from enemies.

Although not **ALWAYS** necessary, it is sometimes best to make a shelter for the open face of such a cave and this may be done by resting poles slanting against the face of the cliff.

And over these making a covering of balsam, pine, for thatch to shed the rain & prevent it driving under the cliff to wet our bed.

### **WALLS:**

It is not **ALWAYS** necessary to thatch the wall; a number of green boughs with leaves adhering may be rested against the cliffs and will answer for that purpose.

Set the boughs upside down so that they will shed the rain and not hold it so as to drip into camp.

Use your common sense? which will teach you that all the boughs should point downward and NOT upward.

I am careful to call your attention to this matter because it is important to know better.

#### **DANGERS FROM CARBON MONOXIDE:**

It is a potential threat in any closed space be it a tent, cabin, hut or cave where there is a fire of any kind.

Even a glaze in a tight new stove with adequate drafts may be **dangerous** for the heat reddened metal itself can release dangerous amount of **POISONOUS** gas.

**CARBON MONOXIDE** results from incomplete combustion is particularly **dangerous** because being colourless, odourless and cumulative.

The ill effects of breathing small amount of the usually unsuspected **POISON** day after day accumulate slowly in the body until one more perhaps otherwise inconsequential dose lays the victim low or dead.

It seldom gives any recognizable warnings. There is no difficulty to breathe for instance.

What usually occurs is that one is so suddenly overcome that when first he does something is wrong, he is already nearly if not entirely helpless.

#### **PREVENTION:**

**CARBON MONOXIDE** has killed many in the wilderness. **THE BEST PREVENTION IS TO MAKE SURE OF GOOD VENTILATION.**

There is even a real danger in a tent for if the spaces in the weave of the fabric are closed either by waterproofing or by frost as ex: a small heater can and in many recorded cases has killed all occupants.

Danger is increased as cold deepens because the human tendency to restrict ventilation in favour of warmth.

Poor circulation of air not only permit the invisible & odour-free gas to accumulate in closed area.

But the very fact that the atmosphere becomes progressively more and more stale itself tends to

increase the formation of **CARBON MONOXIDE** by not affording sufficient oxygen for complete combustion.

#### **DEATH AWAITING PARKED MOTORISTS:**

It may save lives to draw attention to motorists stalled by snow and ice. The tendency under such conditions is to keep windows closed tight and the motor going so as to heat the car.

The danger when any closed vehicle is so parked particularly if a white smother of flakes is building up around the car is that the **CARBON MONOXIDE** can and many times does collect inside the unventilated car in killing quantities.

#### **EMERGENCY TREATMENT:**

**Get outdoor QUICKLY** or at least in a position where you can breath fresh air even if this means slashing or smashing something. Keep warm. As soon as you are able to do so without too much risk of being overcome, eliminate the cause.

If for example this is a wood stove whose drafts have been too tightly closed, open the outlets as wide as possible and of course get fresh air into the shelter and from then on keep it particularly well ventilated. Drink some stimulant such as hot tea, coffee or chocolate if you have it.

Take it easy as you can for a while, lying quietly in blankets if possible, breathing deeply to help rid the blood of the effects of the **POISON**.

#### **COLD & WINTER TENT TIPS:**

**Although not ESSENTIAL a double roof makes the tent much more comfortable because** the air pocket insulation, so if you have an extra ground sheet use it for that purpose.

Also in order to **AVOID** drafts you should raise a wall of snow all around the tent about 8 to 12 inches high this will also increase the warmth.

#### **ARCTIC SHELTER:**

In polar areas simple shelter will be those already waiting for you in natural caves and hollows.

If you can carry some kind of bivouac equipment, you can erect it and increase its protection by piling up loose snow around and over it, so long as it can support the weight.

But to build in hard snow- and at very low temperatures snow will be solid. You need some kind of implement to cut into it or make blocks from it.

### **SPADES AND ICE SAWS ARE ESSENTIAL EQUIPMENT FOR POLAR EXPEDITIONS:**

Snow or rock caves will be easily recognizable but not so obvious are the spaces left beneath the spreading boughs of conifers in the northern forests when the snow has already built up around them.

A medium-sized tree may have a space right around the trunk (A) or a large one have pockets in the snow beneath a branch (B).

Try digging under any tree with spreading branches on the Lee side. Even soft snow can be built into a windbreak. Those with equipment can cut blocks. (C).

### **THIS IS THE MINIMUM SHELTER FOR THE MINIMUM EFFORT.**

Anchor a ground sheet or poncho along the top with another course of blocks, use others to secure the bottom edge. Use more snow blocks to close the sides.

### **BUILDING IN SNOW:**

A saw, knife, shovel or machete **IS NECESSARY** to cut compacted snow into blocks. **The ideal snow** will bear a man's weight without much impression being made, but be soft enough to allow a probe to be inserted evenly through it.

Cut blocks about 45 X 50cm (18 X 20in) and 10-20cm (4-8in) thick. These will be an easy size to handle, thick enough to provide good insulation, yet allow maximum penetration of the sun's rays.

### **SNOW TRENCH:**

This is a much quicker shelter to construct than trying to build in snow above the ground, but its suitable for only one person and then only for short term use- while

you are on the move or making something bigger for example.

Mark out an area the size of a sleeping bag including head support and cut out blocks the whole width of the trench. dig down to a depth of at least 60cm (2ft).

Along the top of the sides of the trench, cut a ledge about 15cm (6in) wide and the same deep. Rest the snow bricks on each side of the ledge and lean them in against each other to form a roof (A).

Put equipment below your sleeping bag so that you are not in direct contact with the snow beneath.

Block the windward end with another block or piled up snow. At the other end downwind have a removable block as a door (B) or dig an entrance (C) Fill any gaps with snow.

**It is Most effective when built on a slight slope**, the cold air will collect in the entrance leaving warmer air in the sleeping place.

### **SNOW CAVE:**

Dig into a drift snow to make a comfortable shelter. Make use of the fact that hot air rises and heavier, cold air sinks.

Create 3 levels inside: build a fire on the highest, sleep on the centre one and keep off the lower level which will trap the cold.

Drive a hole through the roof to let out smoke and make another hole to insure that you have adequate ventilation.

Use a block of snow as a door and keep it loose fitting and on the inside, so that it will not freeze up and jam.

If it does a block on the inside will be much easier to free. Smooth the inside surfaces to discourage melt drips and make a channel around the internal perimeter to keep them away from you and your equipment.

### **TO AVOID THE DRIPPING:**

Which comes from the inside heat **MAKE SURE** that the inside dome walls are well smoothed use the back of your mittens or mukluks to do this job not your hand.

### **REMEMBER ABOUT DRIPS:**

If the inner walls start to glaze with ice and drip, you are overheating.

### **DRIPS STOPPED!:**

In igloos can be stopped by placing a piece of snow on the source.

### **SNOW HOUSE (IGLOO):**

An igloo takes time to construct but centuries of use by the Eskimo demonstrate its efficiency.

Build the main shelter first then dig out an entrance or build an entry tunnel which is big enough to crawl along.

### **MAKE SURE THAT ITS ENTRANCE DOES NOT POINT INTO THE WIND:**

You could bend the tunnel or build a wind break to makes this less likely. Mark out a circle on the ground about 4m (13 1/2ft) in diameter and tramp it down to consolidate the floor as you proceed with the rest of the building.

Cut and lay a circle of blocks on the perimeter. Be prepared to dig a tunnel (A) leave a space for an entrance (B).

Place another layer on top of them but, as when laying bricks, centre new blocks over the previous vertical joint.

Build up more layers but place each only halfway over the lower tier, so that the igloo tapers in or becomes dome shaped. Shape out the entrance arch as you proceed. Seal the top with a flat block.

Make ventilation holes near the top and near the bottom but not on the side of the prevailing wind or so low that snow rapidly builds up and blocks it.

Fill any other gaps with snow. Smooth off all the inside to remove any drip-points. This will allow any consideration to run down the wall instead of dripping off.

### **IGLOO (SPIRAL METHOD):**

Lay the first course of blocks and then shape them to the required spiral. You do not have to overhang the blocks if you angle your initial spiral downwards and inwards.

And shape the top and bottom faces of subsequent courses to lean inwards. The last few blocks in the centre may need some support as you fit them into position.

Cutting the first course to an even spiral eases the whole process. Angle the top edge slightly down towards the centre.

**THE FINAL BLOCK MUST BE CUT TO FIT-** unless the space is small enough to leave for ventilation, but this blocks helps to keep the structure from collapsing.

### **INSIDE THE IGLOO:**

Build a sleeping level higher than the floor or dig down when building to create a lower cold level which can be used for storage.

Cut an entrance way through the lower course of blocks or dig a tunnel beneath them. The central hole can be used as an entrance if you are too exhausted to complete the structure.

### **PARACHUTE SNOW HOUSE:**

This is a useful structure if stranded on sea ice where sufficient snow for an igloo for a larger party may be hard to find.

Look for snow or convenient blocks of ice in the pushed up pressure ridge of the ice. Mark out a circle and build up a circular wall of snow blocks about 1m (4ft).

Leave an entrance space if on ice. You will not be able to dig an entrance tunnel. Dig a lower area in the floor for cold air to sink into.

Raise a central column of blocks in the centre about 1-1.5m (3-5ft) higher than the wall. Drape the parachute over this and the wall securing it with a further row of blocks on top of the wall.

### **REMEMBER:**

The structure of this parachute roof makes it a snow trap which could become a **dangerous** weight poised above your head. Clear accumulated snow regularly.

If you want a small fire inside ensure there is adequate ventilation. Site the fire on the outer shelf where it will not affect the canopy, not near the central column.

Anchor parachute cords with further block of ice or snow or cut a hole in the ice and pass the top through it to make a firm anchorage.

#### **LIVING IN A SNOW HOUSE:**

In bad weather **MAKE SURE** that you have a good supply of timber or liquid fuel, inside the shelter.

Do not carry loose snow into the shelter, knock it off your boots and clothing before you enter. That snow would melt inside and make a mess and more dampness.

**Mark the entrance clearly** so that it is easily found. Keep shovels and tools inside the shelter, you may have to dig yourself out.

#### **COLD & HOT WEATHER CAMPING:**

Camp on the **Lee side** of rocks and trees when **it's Cold** and you need protection.

When it's **Warm**, make camp on the **Windward** side so the breezes help cool your wilderness home.

#### **NOTES:**

**ALL SHELTERS MUST BE ADEQUATELY VENTILATED TO PREVENT CARBON MONOXIDE POISONING AND ALLOW MOISTURE TO ESCAPE.**

Two holes are needed- have one near the top and one near the entrance.

#### **SNOW SHELTERS BASIC NOTE:**

In snow shelters the **holes MUST be regularly checked** to ensure that they have not become blocked by ice or snow.

**Regularly clear accumulated snow** from any entrance tunnel to ensure that it does not become blocked.

The smaller the shelter the warmer it will be inside, but since it will not be possible to heat the shelter to many degrees above freezing, you will need a little time to adapt to the environment so far from Miami.

#### **DOOR IN RELATION TO WIND:**

When the wind is any problem, the opening of a **temporary shelter is usually** placed on the side away from it.

#### **DOOR ORIENTATION IN SNOW OR CANYONS & MOUNTAINS AREAS:**

In open **SNOW COUNTRY** where blocking drifts may form in that lee, however, **the entrance is best built crosswise to the wind.**

This is also the most satisfactory compromise when one is camped where air currents alternate up and down, **as in canyons and along mountain streams.**

#### **FOR LONGER STAYS:**

If we are putting up a structure that may be used for several days or longer, we will not be governed too much in this matter by the direction in which any breezes may be blowing at the moment.

We will be more apt to look around for natural signs, such as deadfall and leaning trees which indicates the quarter or the prevailing wind.

**THE DOOR ORIENTED SOUTH / SOUTH-EAST IS USUALLY THE BEST ALL AROUND.**

#### **HYGIENE:**

Relieve yourself inside the shelter- this is usual practice in these conditions and conserves body heat. Use plastic bags, ration tins or other containers and empty when possible.

Try to discipline the bowels to work just prior to leaving the shelter in the morning and then remove faecal matter with other rubbish accumulated.

## **ORGANIZATION:**

In a shelter with several people organize a roster of duties. It **is important that someone tends the fire at all times.**

Others can check the vent holes, gather fuel, go hunting when possible, prepare meals and do the other job (s). (Signals when need be!).

**REMEMBER** that a low temperature you will need more food.

## **HEAT:**

No matter how low the external temperature, that inside a well constructed snow house will not drop lower than -10C (0F) Just burning a candle will raise the temperature by 4 degrees.

The traditional Eskimo way of heating an igloo was a wick in a bowl of fat. In a large shelter with a wood fire the temperature is cosy. An oil burner or fat on bones are alternatives where there is no wood or Casiope.

## **LONG TERM SHELTER:**

If you decide that any possible search for you has been abandoned & that it is impracticable to make your own way to safety, whether due to distance, time of the year, lack of equipment or physical condition, you will want to make the most comfortable permanent shelter possible. Hilton?

Somewhere that you will be able to establish yourself cosy until you can eventually attract rescue or equip yourself to undertake the journey with your own resources.

In a cold climate you will want to be warm and snug. In a warm one, on the other hand, you will want to take advantage of any available breezes.

Your shelter will need to provide protection against the changing seasons and night temperatures which may differ from daytime ones.

## **WHAT IF THERE IS SNOW?:**

Snow can make the task of bivouacking even easier. Suppose we're travelling along a wilderness river.

There may be boulders along the shore between which snow walls can be heaped and over them several young evergreens spread.

Among the driftwood at hand, you will find some large dry snags which when a conflagration is kindled against them, will themselves burn with the help of enough occasional extra fuel to keep them going.

Another way to get by is to tunnel into sufficiently deep snow taking care to do this at right angles to the wind so that there will be less chance of the opening's being choked by drift. Or: when snow lies heavy you open a crude hole from the top down.

Such a trench can often be made by stamping. It may be in the shape of rough triangle with the wider end roofed and floored with evergreens, large enough to sit or curl up in and with the narrower part reflecting a small fire.

## **PRECAUTIONS WITH SNOW:**

**AVOID** making a snow camp where there are dangers from rapidly forming snow-drifts, from overhang or from slides.

**If in open country BEWARE** of making the shelter on the side of an elevation that is protected from the wind.

Taking such a precaution **is exactly opposite from what we would do in the forest**, but in open terrain such lees gather drifts than can bury and suffocate one.

Keeping dry is particularly **important** under such conditions, inasmuch as clothing that becomes damp or frozen or lying in direct contact with snow.

It will be **safer** to have some protective material between and this may be an oilskin game bag, section of plastic, mitts or any handy bark.

## **HOUSES OF SNOW:**

An easy way to go about constructing a snow house in very cold weather, is to heap snow in a mound slightly larger than the enclosure desired. Pack down the final surface.

If the weather is well below freezing and if water is at hand, throw that over the pile so that a glaze of ice will form.

Otherwise let the mound harden as well as it will in the air for 1/2 hour or so. The burrow into the pile at right angles to the wind.

Keep scooping out snow until as thin a shell as seems feasible remains. Build a small blaze within. Any melt will be blotted up by the snow remaining.

Drag out embers and ashes finally, poke a ventilation hole through the dome and allow the shelter to ice.

A very small fire within such a snow house, augmented by body heat will keep the temperature surprisingly comfortable.

The tendency in fact will probably be toward overheating, extremely important in any event will be the maintenance of good ventilation. (**CARBON MONOXIDE**)

#### **EVERYONE SHOULD:**

Everyone who travels on land in the Arctic or the barren lands in winter should be able to build a snow house.

This skill could easily mean the difference between life or death, if an accident or sudden blizzard conditions make unexpected delays necessary.

#### **ARTIC TOOLS:**

**THE COMBINATION SNOW SAW-KNIFE OR A SNOW KNIFE IS ALMOST ESSENTIAL TO SURVIVAL NORTH OF THE TREE LINE.**

With it snow blocks can be cut to build a shelter while on the trail or if lost.

#### **MATERIAL:**

The snow from which the snow house is built should be in a firmly packed and frozen form with several characteristics not often encountered south of the tree line.

The snow should be solid enough that a cubic foot block will support the weight of a man, yet it can be cut, sawed or split with ease.

**ONLY A SMALL PERCENTAGE OF SNOW IS SUITABLE FOR SNOW HOUSE BUILDING.**

First search an area where snow-drifts are deep enough to permit cutting snow blocks from a vertical face.

This will require a depth of nearly 2 feet. The snow should be firm enough to support your own weight with only a slight marking of your foot print.

Probe into the snow with your saw-knife or a long sturdy stick. Try to find a place where the resistance to the probe indicates an even firm structure, free of harder or softer layers.

When you find a spot, probe around to ascertain whether enough good snow is available.

**IT IS WELL WORTH HUNTING FOR AN HOUR TO FIND PROPER SNOW AS YOU WILL SAVE THE TIME & ENERGY DURING SNOW HOUSE BUILDING.**

If snow of sufficient depth to cut vertical blocks cannot be found, it will be necessary to cut them from the flat surface of snow.

This is time consuming and requires a much larger snow area, and the snow house will have to be built higher, because it cannot be dug into the drift.

**THE FIGHTER TRENCH:** (Not fighter French!)  
**(QUICK AND EFFICIENT)**

If time does not permit building an igloo, a **PIX #FIGHTER TRENCH CAN BE BUILT EASILY AND QUICKLY WITH MINIMUM WORK FOR THE RESULT ACHIEVED.**

This is simply a trench dug in the snow and covered by blocks to form a shelter. If a large drift of snow at least 3 feet deep is available, the shelter can be made by cutting large vertical blocks from a trench wider than the sleeping bag and **long enough to accommodate the one or 2 builders. (2 French trench-her?)**

The snow blocks are stood on each side of the trench. When the trench is completed a notch is cut along each side to provide non-slip support for the snow block roof.

A triangular block is placed at one end of the trench as a support for the first snow block of the roof.

The first roofing snow block is cut narrower than the others in order that the succeeding blocks will overlap, each supporting the next. The remainder of the roof blocks are placed in a similar manner.

In a 2 man trench an entrance door is placed halfway down the trench, opening into a roofed-over square pit which allows room for "cook-king" and removing clothing before entering the sleeping bag.

Be sure to cut a ventilating hole in the roof and have a good snow block handy to close the entrance at night.

If no deep snow drifts can be found, a trench style shelter can be erected by building a wall of blocks enclosing the shelter area.

This wall is then roofed over with large slabs which are hollowed slightly on the inside after erection to form an arch.

The Pix # fighter Trench while a **good emergency shelter** is too cramped to permit much movement without dislodging the frost on your clothing and sleeping bag and in time you will become damp without a good means of drying out. This is why you should begin your igloo as fast & as soon as possible. (P/S there is even a Trench fire place #?)

#### **IGLOO# 2 add notes:**

Ideal winter shelter in the Arctic. It is solid, soundproof and wind resistant and is large enough for comfort.

There are a few building techniques which **MUST** be mastered but none of these are particularly difficult.

Once the method is learned, the igloo will almost invariably be the shelter used in an emergency. So when you have found a good snow-drift, lay out the floor plan Jan!.

Draw a circle centred on snow firm enough to support a person and at least 20 inches deep with the approximate diameter as follows:

1 man = 8 feet / 2 men = 9 feet / 3 men = 10 feet / 4 men = 12 feet / 5 men = 13 feet / 6 men = 15 feet.

#### **KEY #1 SUCCESS OF AN IGLOO:**

**NOTE:** Once you have laid out your plan and pack down the area which you want to use for your igloo

#### **REMEMBER THAT:**

**#1 KEY FOR THE SUCCESS OF YOUR IGLOO IS THE EXISTENCE OF A PERFECT CIRCLE. (Oui oui Pere-rond?)**

**One way to ensure this**, is to put a peg in the middle of the area you wish to built then using any rope tied to the centre you tie the other end to a stick and use it as a compass to draw your circle.

**MAKE SURE the stick stays straight though while you work the outline of your circle.**

#### **IGLOO BUILDING NOTE 3:**

Now begin to lay in a supply of snow blocks. Cut them from the face of a trench, laid out as shown, and to the depth of at least 20 inches.

Begin cutting blocks by digging out a clear vertical face at A-B with a width of about 48 inches and a depth of about 20 inches.

Smaller blocks are not much easier to cut and igloo construction is slower and more difficult with them. Using a snow saw-knife along the ends of the block.

Cut the blocks about 8 inches thick and break off at the bottom. Cut about a dozen blocks before starting to build.

Dimensions of blocks about 36" long, 18" wide and 6" thick. With your snow saw-knife, cut a slot at each end of the block about 2" wide and the full depth of the block.

Next, score a groove parallel to the face marking off a block about 6" thick. (p99). If you have a snow saw-knife, saw along this mark, breaking off the block with a firm jab in the centre.

If you are using a snow-knife, deepen the groove by running the point back and forth, then 3 or 4 gentle stabs and a firm central stroke will break it off.

Lift the snow block to one side and begin another. When you have about a dozen cut, then you may begin to build.

When the first row reaches the snow block trench, a snow block is replaced in it to permit the wall to be taken across it.

**NOTE:** The slope of the first row of blocks. All end joints are fitted with faces radial to the igloo centre, **or you are heading for trouble.**

When the first row is finished, begin the spiral which will end at the key block.

**If you are right handed,** cut away any 3 blocks diagonally, sloping down from left to right. If you are left handed cut the slope the other way.

Now fit the next block, leaning it inward so that its inner face is roughly a tangent to the dome.

Even at this early stage the block might fall in, except that it is supported by the face of the notch and the top of the previous blocks.

The block **MUST** bear only at area A-B- and C it should not bear at D or it will pivot and slip.p99

All blocks from this point on until the key block are set in this manner. Continue cutting blocks from within the igloo circle, fitting them as you go.

**Don't use block less than 2 feet long or 18" wide if you can help it.**

Lay small blocks aside for later use in snow bench and doorway building. The slope of the block, which of course governs the shape of the igloo is estimated by eye.

The block is raised into place and the joints are trimmed until the block settles into position. When the third row is under construction the slope will be great enough **TO MAKE CAREFUL FITTING ESSENTIAL.**

Each block bears on the same 3 positions only = A-B-C The remainder of the joint can gape wide, or almost touch, but these 3 faces **MUST** carry the load to jam in the block.

The tendency to rotate inward about A-B is resisted by pressure between the upper third of the faces of the new block and the previous block at C. This face **MUST** be

radial to the igloo centre or the previous block may be displaced.

When fitting snow block on the A-B-C method described, the block should be lifted into position and the joint fitted roughly with the faces in contact and the block supported by the left hand.

If the snow saw-knife is run between the new block and the previous one to make them fit, then a slight undercut on the under face at the end nearest the previous will leave the joint supported at A and C **only.**

A firm tap downward at C as shown by the arrow will drive the block into the final position, setting at A, B and C when it need no longer be supported. Carry on building block by block.

You will find that the increasing slope of the igloo wall will of course increase the tendency for the block to fall in.

But that is compensated by the increasing angle between the A-B axis of the successive block as the diameter of the opening decreases. Building actually becomes easier toward the finish as the blocks will jam firmly into place.

When you run out of block snow inside the igloo, cautiously cut a small door as far down the wall as you can, tunnelling underneath to make enough space for the outside workers to push in more building blocks.

Try to keep the curve of the walls symmetrical & **AVOID a pointed igloo,** because the high ceiling would reach the limiting warmth before the sleeping bench gets its share of heat.

It is surprising how flat an arch can be built using the spiral technique. The last few blocks will be almost horizontal, **but if you REMEMBER the A-B-C- fit, they won't fall.**

When the remaining in the roof is small enough to permit doing so a key block is fitted. After what you have been doing, this is easy. The edges of the hole should be bevelled at about 15 degree from the vertical.

The hole should be longer than it is wide to permit passing the key block up through then juggling it into position.

This is tricky but not as difficult as it may appear. By judicious use of your snow-knife, cut away the block, letting it slowly into position. You have builded your igloo.

**NOTE:**

**The entrance tunnel permits to AVOID drafts.** Windows are easy to build, just freeze water in a round bucket about 1 to 2cm thick which you can incorporate to your wall. Eskimos use ice block to replace one of their snow block.

And they put this ice block at the top near the centre block to give more light in the igloo, they even add a reflecting block of snow on the outside of the igloo top so as to add more light.

The tunnel length entrance is about 2 1/2ft high and 5ft long and the door is at right angle from the prevailing wind. Igloo floor can be covered with evergreen as insulator.

**ANOTHER FORM OF IGLOO #5:**

According to the latest researches of the Arctic Aeromedical Laboratory in Alaska, they can not only be builded from solid block of polar snow pressed together, but also from fresh fallen snow-as is the practice of the Nunamiut Eskimos in Alaska.

When the Eskimos of this tribe want to pitch camp, they pile up branches and bushes and cover them with skins or tarpaulins.

Then heap the loose snow on top (use snow shoes as a shovel). After about an hour it hardens and the leaves and branches can be taken away. The igloo is ready.

**IGLOO METHOD #6:**

Igloo made from block of snow or stone and a parachute see pix # p100 b for this one

**OTHER SNOW SHELTERS:**

**MAKING THE IGLOO HABITABLE:**

Across the floor, about one third of the way back from the door, build a snow wall about 20" high to conserve warmth.

This will form the front of your sleeping shelf, which will raise you into the warm air trapped above the door.

Shove all the snow in the igloo behind the wall to form the shelf. Break lumps and blocks to soften the bench and to provide better insolation.

Level the bench top **carefully**. At each side of the door leave or erect little benches allowing about 20" of leg room between the sleeping shelf and bench.

This is the kitchen and heating area. It **MUST** be reasonably close to the bench to permit the cook and lamp tender to reach it without rising from the sleeping bench on which he is sitting.

Chink the dome of the igloo **carefully** with powder snow, which when packed firmly into the open seems will soon harden and stop loss of warm air from the igloo. If you plan a short stay, chink **only** the outer seams, but for a better job do both inside and outside joints.

You may throw loose powdery snow on top of the igloo to act as chinking but not so much as to add to the weight of the dome. You may bank the bottom row of blocks to prevent wind driven snow from causing erosion.

**IF A HIGH WIND IS BLOWING:**

The drifting snow can erode the wall of the igloo can **erode the wall of the igloo very rapidly.**

A snow wall should be erected to act as a wind-break and any broken blocks can be piled against the windward wall to protect it from the cutting effect of the drift.

Now, with the igloo chinked, the door cut in and the sleeping bench completed, all you need to do before moving in is to clear out all loose snow.

Then bench is first covered with caribou skin or other insulation and the sleeping bags are then enroled and placed heads toward the door, side by side.

All snow and frost **MUST** be removed from hides, bedding and clothing before they are placed on the sleeping bench.

**DRYING:**

Drying racks made by forcing sticks into the walls, above the heat sources will serve the following purposes:

- A) Drying of clothing from which all snow, ice and frost have first been scraped. **NEVER MELT SNOW ON GARMENTS, ALWAYS SCRAPE IT OFF.**
- B) Thawing of frozen rations which do not need "cook-king." This requires quite a long time
- C) Protection of the igloo wall & roof from melting.

### **KOOLIK FOR COOKING IN FOOD WITH THE FOLLOWING 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 edge 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.

### **SOME RULES FOR LIVING IN IGLOO:**

Persons entering the igloo for a stay of longer than an hour or so, after removing mukluks and snow from garments, should get up on the sleeping bench out of the way.

The cook usually at the right hand bench has the primus stove, under which is a piece of cardboard from a ration box to prevent it from melting into the shelf and tipping. He may also have a koolik, if fat is available for slow cooking.

### **ONE PERSON MUST BE RESPONSIBLE FOR ADEQUATE VENTILATION!**

Keeping the vent holes in the dome and door open enough to **AVOID** risk without freezing the occupants.

### **BEWARE OF CARBON MONOXIDE:**

The left-hand man remain 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 smokes easily and the wick needs more frequent attention.

A little animal fat dissolved in the lubricating oil makes a big improvement in the flame.

If the group finds the igloo cluttered with odds and ends, a miniature igloo can be built against the outside

wall and a doorway out through to form a cache. Keep the entrance low to avoid loss of heat.

### **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 won't 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 don't suffer from dietetic deficiencies.

**Remember FAT is ESSENTIAL in Arctic survival don't waist it.**

### **SNOW SHELTER BESIDE IGLOO:**

If you are stranded in forest in the winter and darkness comes simply dig a hole in the snow at the foot of a tree all around it.

Cover the bottom of evergreen branches as well as the walls on the outside toward the tree which you then cover up with snow. It is not central home heating but will prevent freezing to death.

Ex: Temperature outside = 0F temperature inside hole = 40F. Many a mountain climber have thus saved their lives with this simple snow hole dug in loose snow round a tree trunk and then covered with branches.

**Scientist from Aeromedical laboratory have established** that the temperature within such a shelter even excluding the bodily warmth of those occupying it can be 18F higher than the outside where storms may be raging at 36F below freezing point.

If there are several people in the hole, the temperature will rise even further, this seems the only explanation that in case of avalanche death is due more often to suffocation than exposure.

To build such a shelter is only profitable of course if the victim of an accident does not wait till he is too exhausted but starts on it directly after his crash.

### **ANOTHER FORM OF SHELTER:**

A hole is covered with branches and a tarpaulin except for the entrance, a little snow is put on top.

Inside this primitive shelter the temperature will soon rise. This would apply in an area where there are no trees of course.

Using this particular method 2 men and a young woman ran into a heavy snowstorm on a peak in the Alps nearly 10,000 feet up.

The storm lasted 5 days they were found alive and well even through a storm which had blown with a force of 60 mph.

**REMEMBER:** That the shelter door **MUST** be placed at 45 degree from the wind direction and the shelter has its back to the wind in order to have good ventilation and not being snow ploughed under.

#### **SNOW CAVE SHELTER:**

The first thing is to choose a thick snow bank which you will make your dug out bottle shape. The best places usually are river bed, bottom of cliff #ravine#, any snow bank from slopes.

**AVOID** to install in fresh fallen snow, or in powdery snow or in snow too well packed.

**MAKE SURE** that when you start digging the entrance that the wind will not blow the snow inside or that a overhang will not come to block the entrance. You **MUST** then dig a small tunnel about 2ft long directly in the flank of the snow bank.

Starting from there then you dig a chamber, the best is to dig from the right and the left so that the chamber is at right angle to the tunnel entrance.

If you dig in the tunnel entrance axial you can hit older snow usually harder than the fresh snow and the task will be harder.

To speed things up you can dig a second entrance which will be blocked off when the chamber is ready.

#### **NOTE:**

- A) The room **MUST** be high enough to permit easy sitting, it's more comfy.
- B) When not in use, block the door completely or in part using snow block or your bag.
- C) When the entrance is blocked, the tunnel is airtight **it MUST BE VENTILATED. You need 2 air holes (dome, door.)**

#### **SNOW WALL SHELTER:**

In winter in arid regions when no shelter, you can build a snow wall by cutting back in the compacted snow.

Use this blocks to build a 1/2 moon shape wall about 3 feet high, then reinforce it with snow on the wind side. The wall act as wind-shield beyond which you can sleep. Yet it would be better to build an igloo.

#### **COLD SLEEPING NOTE:**

**NEVER SLEEP AT ANY TIME DIRECTLY ON THE GROUND, WINTER OR NOT, USE A GROUND SHEET** or if none then use evergreen as a thick mattress to isolate you from the cold ground. Cold comes from the ground.

#### **SNOW BLOTTER FOR CLOTHING:**

An old Eskimos trick for any one who falls through ice in order to dry your garments before they freeze.

Undressing **QUICKLY** they stamp foot their wet garments in the powder snow around them, this snow is so dry that it acts as a blotter and will absorb sufficient water to **AVOID** the catastrophe.

#### **SUNGLASSES YES?:**

**IN POLAR REGIONS IN SPRING FROM APRIL TO JUNE & IN WINTER YOU MUST WEAR SUNGLASSES AT ALL TIME.**

When the sun is high or even when the sky is partly cloudy you have great danger to be hit by snow-blindness otherwise which brings grave consequences.

#### **PARACHUTE SHELTER TIME:**

##### **PARACHUTE TEEPEE:**

A parachute suspended by its centre makes an instant teepee. Peg out the bottom edge. Parachute material can be used to cover a teepee but even simpler is to suspend one from a tree.

Give the sides a steep angle and even when the fabric is not impervious, water will run off. Fold a segment of the chute double for a door flap, slit along a seam and make a tie fastening to close it.

##### **STICK WALLS AND SCREENS:**

It is easy to build walls by piling sticks between uprights driven into the ground & if possible tied at the top.

Caulk them well to keep out wind and rain. These are ideal for making one side of a shelter for blocking a shelter's opening or for a heat reflector behind a fire.

If large rocks are not available use this method to dam a stream. **To make very sturdy stick walls**, increase the space between the uprights, use two stacks of sticks and as you build it, fill the space with earth.

#### **COVERING:**

Make wattle and woven covering for roofs or walls from springy saplings, plant stems, grasses and long leaves either whole or if large enough, shredded for tighter weaving.

First make a framework from less pliable materials either in situ or as a separate panel to attach later. Tie the main struts in position. Weave in the more pliant materials.

If no ties are available drive vertical stakes into the ground and weave saplings between them. Caulk with earth & grasses. If suitable firm cross pieces are too few, weave creepers between the uprights.

Very large leaves, lashed or weighted down or hooked over lines of creeper, can be overlapped like tiles or shingles to keep out the rain. Long grass can be bunched and woven, overlap the ends irregularly to make a continuous warp and weft.

Or use birch bark to make shingles. Ring a birch tree with even 60cm (2ft) cuts and **carefully** remove the bark. (A).

Across a frame fix pairs of canes or creepers in close-spaced pairs. (B). Upper ends of shingles are gripped between the canes, the lower ends rest on top of those below (C).

#### **PARA-TEEPE:**

This is a simply erected teepee. Cut 3 poles approximately 12 feet in length. Tie these with rope or strips of skins or bark about 8" from one end and set up as a tripod. Place extra poles about the tripod and lace together at the top.

Theses may be covered with canvas or spruce boughs. Arrange the boughs in rows starting at the bottom and ending at the top.

#### **REMEMBER:**

**THE FRONT OPENINGS OF ALL SHELTERS SHOULD BE KEPT CROSSWIND. A FIRE IS USUALLY BUILT IN FRONT OF THE OPENING.**

#### **DESERT: SHELTER FROM HEAT:**

**DON'T REMOVE CLOTHING / KEEP HEAD COVERED.**

As you find / make shelter, **move slowly to avoid excessive:** sweating, waste of energy & dehydration. Stretch tarp, blanket overhead.

**Don't stay in car**, or enclosed tent that restrict air circulation. If no tarp or blanket is available for shelter, find shade under brush, shady side of car, boulder, ledges etc.

**Try not to sit or to lie directly on hot ground**, which is usually much hotter than air temperature. Above or below ground is desirable.

Sit or lie on brush, packs or other improvised elevation, preferably with air circulation underneath.

**IF? travel is ESSENTIAL**, Move ONLY during evening, morning hours or during moonlit nite. **BEST** to stay in shelter, put on aerial marker, prepare to signal.

Leave shelter ONLY if you know precisely where to go, the length of the journey, & limits of your strength and water supply.

**DON'T venture far** from established shelter, you could become lost a second time.