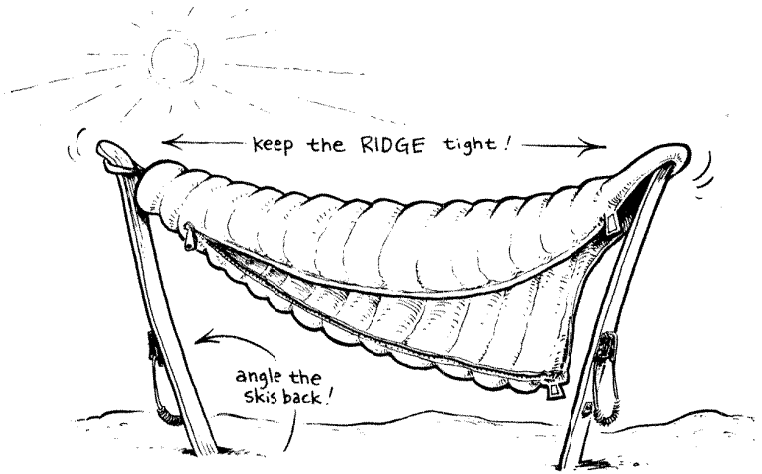
in your bag; other times, tie the laces together and suspend them around your neck underneath your parka. A small whisk brush is invaluable for cleaning the snow out of those hard to reach places on your boots. This keeps the snow from melting in your bag. An advantage to double boots, besides being warmer, is that you can sleep with just the inner boot and leave the bulkier shells out. If you wear glasses, you may find that your boots also make a great place to put your lenses at night.

Gaiters and anything nylon (like wind shells) dry quickly in the winter. For this reason I don't go to great lengths to dry this stuff at night. If I want to keep it from freezing I stick it under or between my sleeping pads.

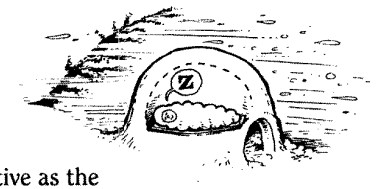
Finally, whenever the sun is shining you can dry wet stuff. If you are not wearing your boots, put them in the sun, with the insoles pulled out. If you have glue-on skins, hang them off your skis to dry. Put those frozen water bottles out. Use those sunny days to your advantage but be careful to not let things blow away if the wind comes up. As you become skilled at winter camping, you will find it easier and easier to keep stuff dry and to dry it out when it does get wet.



TIP FOR SLEEPING BAGS

Sleeping bags absorb moisture from our bodies at night, especially when we are drying out damp clothes. To keep them dry, hang them on your skis in the morning as soon as you get up. The warm moisture will evaporate out of your bag in the cold dry air. This works especially well in the wind. Even if it is snowing you can do this as long as it is not a warm wet snowfall. Dry snow easily brushes off without making the bag wet.

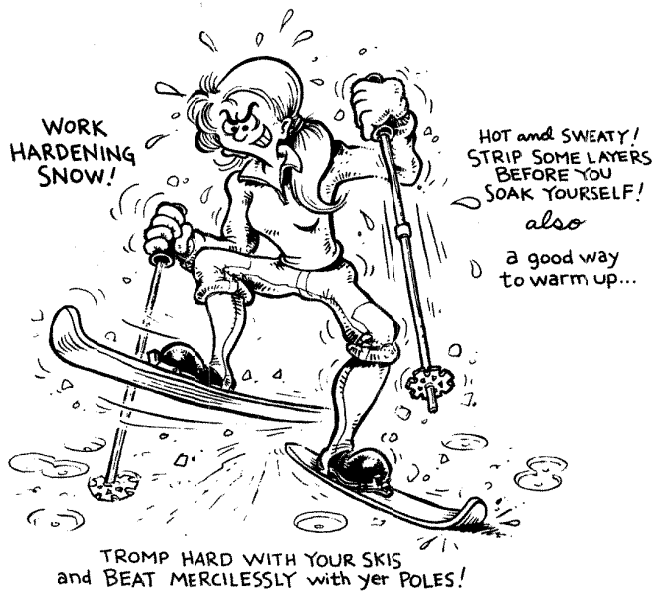
SNOW SHELTERS

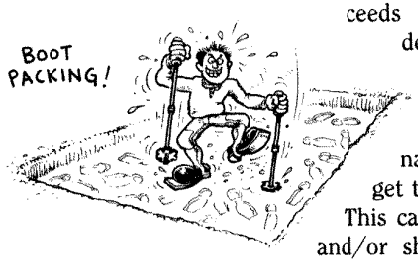


Perhaps nothing about winter camping is as distinctive as the ability to build with snow. The presence of this amazing stuff gives us the opportunity to build truly comfy winter shelters. A snow shelter is warmer and quieter then a tent, a big advantage on windy nights. They can be small enough for one person or big enough to accommodate 20 people. Once you have gained the know-how and have some experience under your belt, they become relatively easy to build.

There are many different types of snow shelters and each has its advantages and disadvantages. Some work only in certain given snow conditions, while others are more adaptable. The only things you really need to build a shelter are snow, a shovel and the willingness to work hard for a couple of hours.

There are two basic principles involved with snow shelters. One is work hardening of the snow and the other is shape. In work hardening the snow we are compressing it via mechanical action, thereby making it denser and strengthening the bonds between the grains of snow. This allows us to dig in the snow without having it fall down on us and gives us the ability to cut blocks out of it. The amount of work hardening that needs to be done depends on the snow.





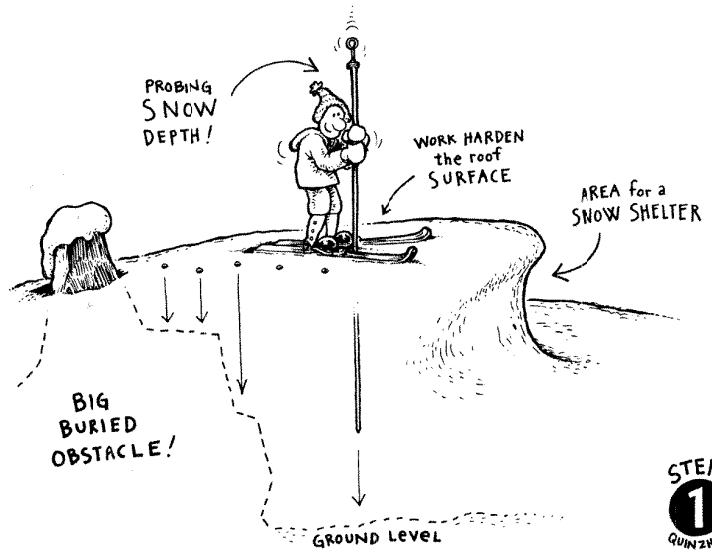
In its natural state snow settles. As this process proceeds it develops stronger bonds and becomes denser. Wind further work hardens snow by blowing it around and compacting it. This is why snow drifts tend to be so much harder than the snow around them. Often these natural processes need to be supplemented to get the snow to bond well enough to build with. This can be done by ski packing the snow or boot and/or shovel packing it. The less dense and well bonded the snow, the longer and harder you should work harden it. New snow tends to bond better than old sugar snow.

To ski pack the snow, ski around on top of it, side stepping the area you want to pack down. Ski packing only affects the top layers of the snow. Given the type of snow, i.e., denser versus lighter, we may be able to walk around on top of it without skis in a few minutes or it might take overnight to set up. Boot packing an area means walking around in the snow packing it out with our feet. This affects a deeper layer of snow and makes it denser and harder. To work harden even a deeper layer of snow, I can take my shovel and shove it as far down in the snow as I can while I boot pack. If I want to make a quarry to cut blocks for snow shelters, I first ski pack an area, then boot and shovel pack it till I can stand up without sinking in. I can also shovel in new snow from around the sides to build it up. Finally, I smooth off the surface with either my skis or my shovel and let it set up for an hour or so. Shovel packing the snow is done by shoveling snow, jabbing it with your shovel or packing the snow down with the back of your blade.

The shape of the ideal snow shelter is domed. This is the strongest shape and makes the longest-lasting shelter because snow shelters tend to sag with time. The next best thing to a dome is an arch and the smallest and largest shelters will often have straight walls and an arched ceiling. The worst snow shelters have flat ceilings or an upside down saucer shape. They sag rapidly and are more likely to collapse when being dug out.

QUINZHEES

Quinzhee is an Athapaskan word for a snow shelter that was popular in the taiga regions of the great white north. It is a shelter that can be built even when the snow pack is shallow. The shallower the snow, however, the longer it takes to pile it up for the shelter, and you may even have to transport snow to the site in a really low snow pack.

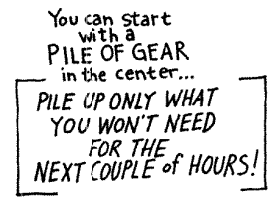


STEP 1 QUINZHEE

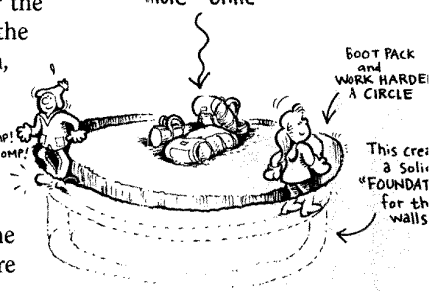
The first step in building a quinzhee is to determine how much snow you have. I usually do this by probing with my skis or a probe pole. If the snow is deeper then 4 feet, a quinzhee may not be the fastest choice (see dugloos). When probing to find the deepest snow, you should also feel for what is under the snow where you eventually plan to build a winter home. Although indoor plants are nice, they do take up precious space and finding trees, logs or rocks while digging out the quinzhee is a drag. By careful probing you can assure yourself of an uncluttered site. Once this is done you can determine the size you want it to be.

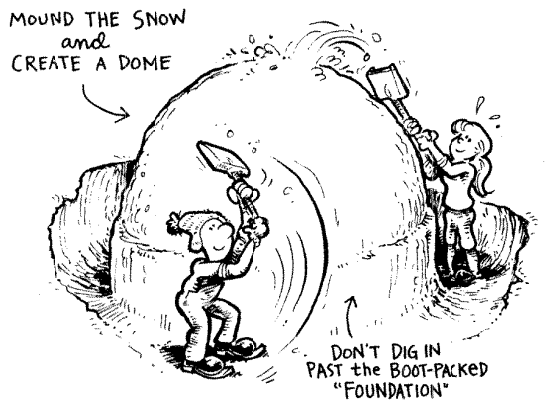
STEP 2 QUINZHEE

Now the sizing of quinzhees is a personal thing, so I will just give some guidelines and you can experiment and find what works best. In general, the smaller a snow shelter is the stronger it is.



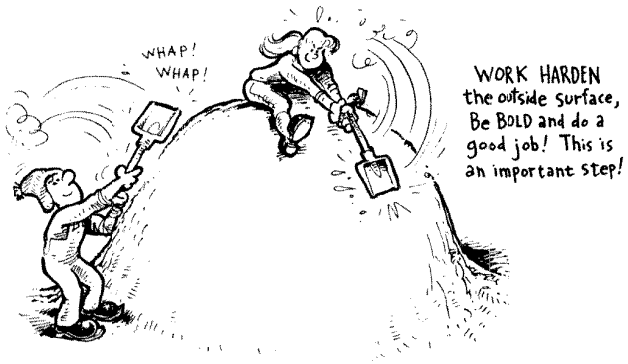
For three people a circle with the diameter of a ski seems to work most of the time. Now you may be asking how long is this ski? I like to use the tallest person's skis. Just remember that the shorter the ski, the shorter the person, and the smaller the quinzhee can be. For every additional person, you need to add about a foot to the diameter. When you have the diameter figured out, you want to walk around the perimeter of it two or three times to boot pack the snow some. This will be the foundation for the walls. I will often stand my skis up on the outside of this circle so I can remember where it is as I pile snow.





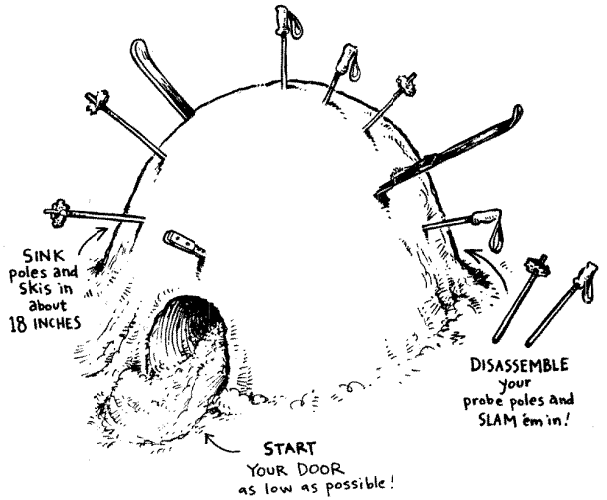
STEP 3 QUINZHEE

Now we get to the fun part. Piling snow in the middle of the circle, piling more snow on top of this and then more snow. Then you will have to pile some more snow until you get a nice dome shape that rises from the outside of your foundation to about 4 to 6 feet in height. The shallower the snow pack the higher it should be. Once you get to this point, you need to attack it with your shovels and pack the snow down. You want it to bond well so don't be shy! Then you get to pile more snow on and repeat this process until the packed snow is at the outer limits of the shape you want. At this point you can throw on the finishing touches, get that nice domed shape and smooth it out. Then take a dinner break. That's right, go take some time and eat a good meal and get a hot drink, because part two is about to begin and you will need those calories. Plus that work-hardened snow needs about an hour or two to set up.



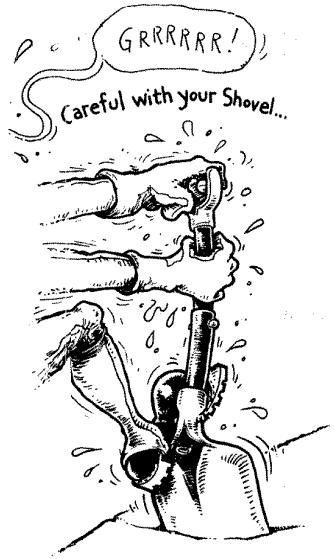
STEP 4 QUINZHEE

While you are waiting, you can walk around the quinzhee and shove skis and poles into the shelter. Push them in about 18 to



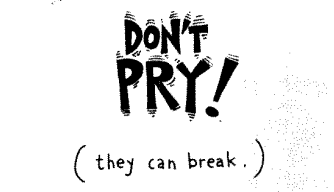
STEP 5 QUINZHEE

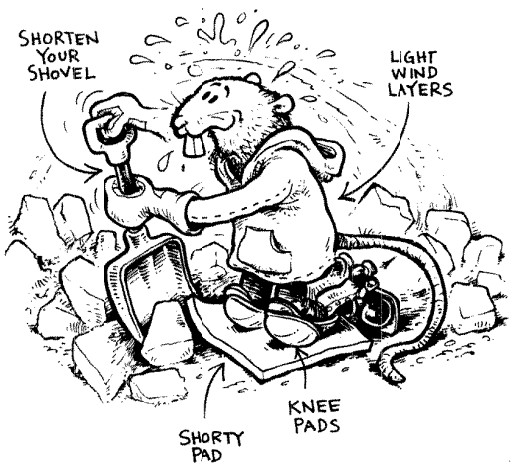
24 inches. They are your markers for when you are get close to the desired wall thickness as you dig it out. Once an hour or so has gone by, you can start to excavate all that snow you threw up. First the door: Start at the perimeter of the quinzhee and dig down until you're a few inches above the ground. Then start digging the door by digging in and then up. Once again personal preference will come into play. Some like it big, some like it small. I like a big door as I hate to crawl. But you will lose more heat through a big door. One thing to remember though is that it's easy to make a door bigger but almost impossible to make it smaller again. As you start to dig the door, you will realize this is a wet proposition. To help with this, wear a minimum of layers and all your wind clothes. Keep all your spare layers handy so that when you come out you can just throw them on before you get cold. The person doing the excavation is called the "mole."



I would suggest making the door just big enough so you can dig sitting on your knees without the top of the doorway being above your head. You can always make it bigger later if you want. Once you have dug in about 16 inches you can start digging up. Now you need to be thinking about a number of important things.

- You want the walls to be about 14 to 16 inches thick; if they get to be too thin or too thick they will sag faster. If you block the door from incoming light while you dig, you will notice that light comes through the walls at 16 inches or so. This should be a warning not to excavate more snow from these areas.



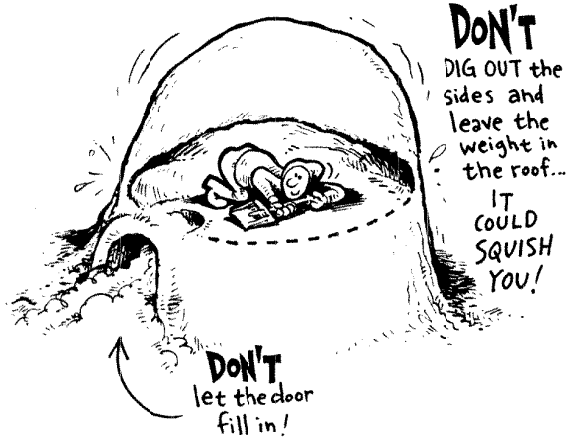


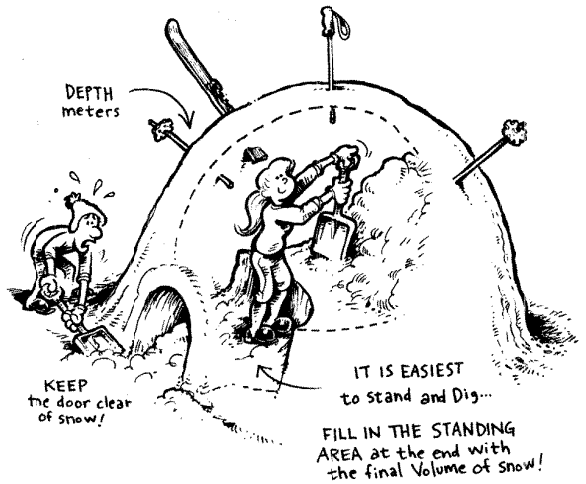
THE WELL DRESSED MOLE!

this is hot and active work in a very humid setting; be careful not to get too hot or get chilled when done!

the spooky sound of SETTLING SNOW!

- You need to dig up so that you don't find yourself with a whole lot of snow over your head (i.e., more than 2 feet) because if the shelter were to collapse for some reason you don't want to be buried. For this reason it is also a good idea to always have someone at the door once you start digging inside the shelter. Not only does this person shovel out the snow you toss out the door, but they are there to dig you out should the shelter fall down. Some moles like to wear their transceivers just in case.
- The snow forming the shelter may collapse or "whumpf" as you are digging, without knocking the shelter down. In this case it is a good idea to come out and let it set up a little longer.

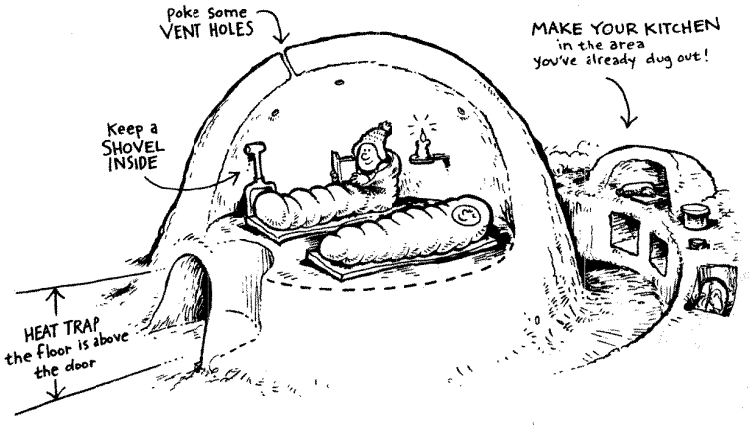




STEP 6 QUINZHEE

- Dig standing up as much as possible to stay drier. As you go, dig out the snow from the ceiling to the ground. You achieve maximum head room this way. You can build the sleeping platform at the end with the last of the snow you take off the walls.
- Try to make the walls as smooth as possible, and above all else keep it dome shaped.

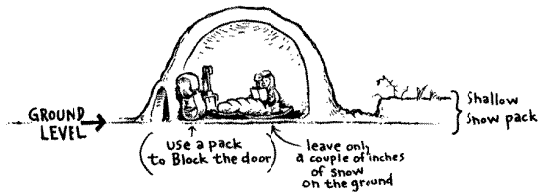
When the snow pack is deeper then 2 feet I build the shelter with a sleeping platform. If the platform is higher then the top of the door, it creates a heat trap and the shelter will be warm. I have never been to fond of these because they just fog my glasses up. Any raised platform creates a cold sink out the door and makes the shelter warmer so I tend not to worry about it being above the door. This way I don't need to crawl through the door either. But remember it is just personal choice and



COMPLETED 7 QUINZHEE

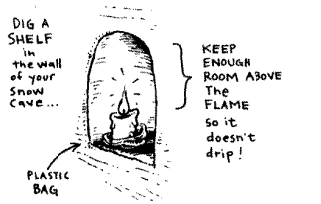
some folks really like the heat trap. Also with a deeper snow pack you can build the shelter on a hillside. Put the door on the downhill side. This facilitates snow removal.

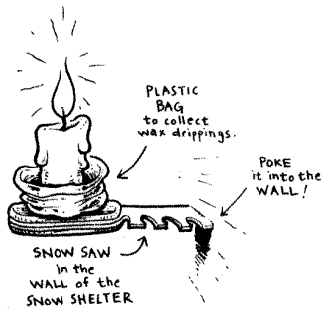
If the snow pack is shallow, do away with the platform and sleep closer to the earth; this means less shoveling and will give you more room. The temperature at the ground during the winter stays around 32 degrees and is warmer than the outside air temperature. Leave a couple of inches of snow on the floor to protect the plants near the ground.



Vents are poked with ski poles in the walls of the quinzhee to keep it from becoming steamy and wet.

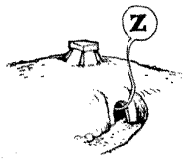
If it gets dark out while you are building, a candle works great to light up the inside of a quinzhee. Also once you smooth out your floor give it a little time to set up. The warmth from the candle will help with this as well. While the quinzhee is going up, the stove can be melting water for dinner, hot drinks and so on. The person moling the quinzhee out is likely to get quite wet and therefore it is a good idea to pump them with hot water and food. Once a shelter is done, it is very rare for them to collapse. They just tend to get stronger. In fact, you can normally walk on top of them after a couple of days. What usually destroys a snow shelter is time. The snow will eventually sag down until there is no more shelter. With time and practice you will get faster at digging these shelters. I have built a quinzhee in less than two hours but I have also seen it take up to six. Plan on going slow until you gain more experience with them. Some people fly or tent camp the first night and build the shelter the next day.





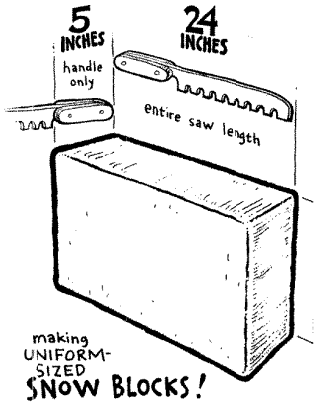
DUGLOOS AND IGLOOS

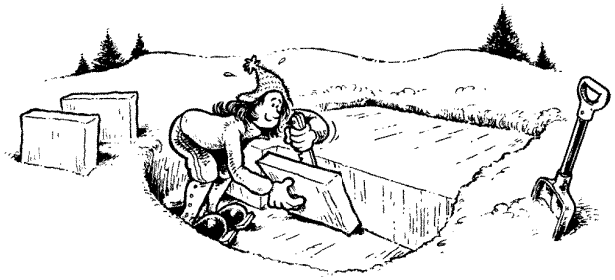
Both of these shelters require the use of blocks, which means that in addition to a shovel you will need a snow saw. If the snow is hard enough to stand on, you can just cut blocks directly from it. If not, you need to make a quarry. For a dugloo you should work harden an area a ski length by a pole length. For an igloo, make it a ski by two skis. This gives you some room for error. Let your quarry set up for at least an hour and don't step on it or you may put cracks into it. Next, you need to dig a trench around two sides of your quarry and smooth off these sides. The longest side will be the front. Now you are ready to begin cutting blocks.



THE FINE ART OF BLOCK CUTTING

Make blocks that are the handle of the saw wide, the full saw in length and a saw blade in depth. First cut the back, then cut this into lengths and lastly cut along the bottom. When cutting out the blocks make sure to use smooth even strokes. Rushing through the process makes incomplete cuts. You should notice the block drop down while finishing the last cut. If not run the saw through the cuts again. By placing the saw behind the blocks you can carefully tilt them forward until you can pick them up. Be careful picking up and moving blocks as they are fragile. The more time they sit after having been cut the stronger they become.

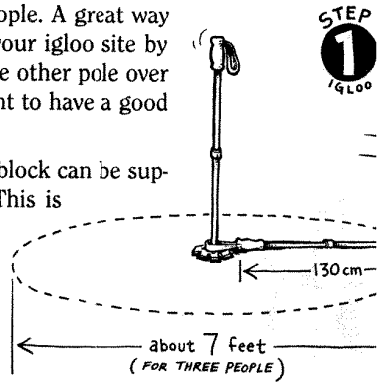




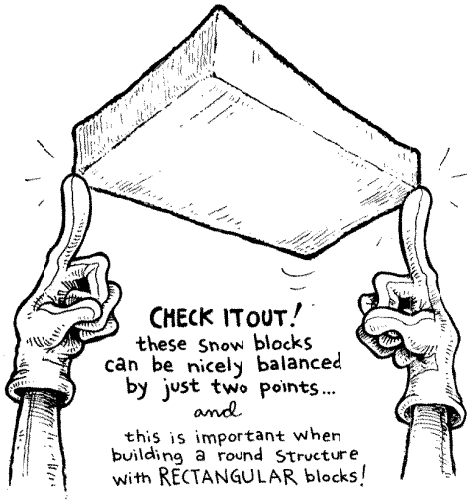
work hardened
QUARRY for SNOW BLOCKS

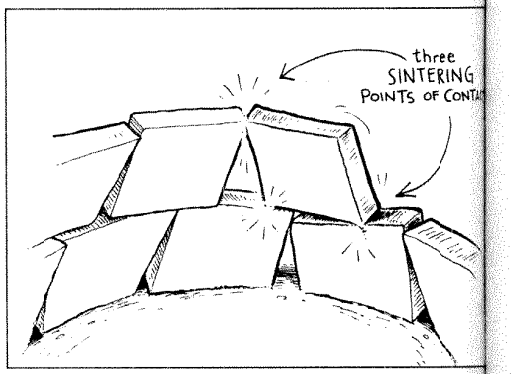
IGLOOS

These are fun but are not the most efficient structures to build unless you have hard snow. They are the most challenging of all the structures to build, so be patient. There are also many ways to go about building them, but I will limit myself to the one with which I am familiar. Start out on a ski-packed surface by making a circle the radius of a ski pole, about 130 centimeters in length. This should fit about three people. A great way to get a nice circle is to mark the middle of your igloo site by planting a pole there. Now slip the strap of the other pole over it and scribe out a circle with it. It is important to have a good circular shape.



Now you can start laying the blocks out. Any block can be supported by two diagonally opposite corners. This is the basis of block setting. A third corner helps hold the block in position. Getting the corners to stick to the previous blocks is the biggest challenge. This is called sintering the

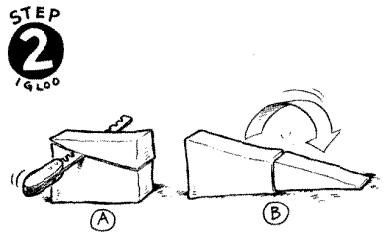




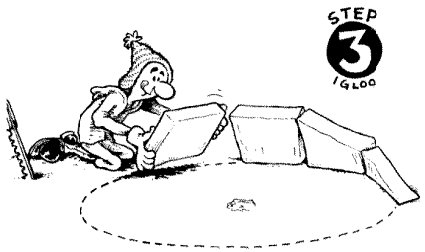
corners because that's the name of the process in which snow crystals bond together.

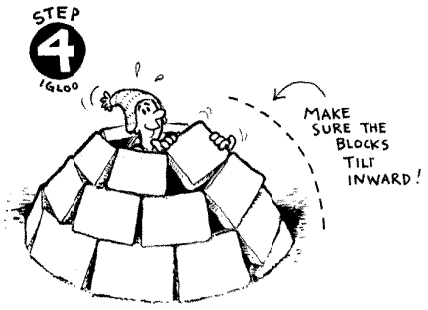
To start, cut a block into two unequal halves and lay the halves along the outside of your circle. Help sinter the corners by tapping the block slightly and blowing on the corners. It is important to hold the blocks in place until they are self-supporting. Keep laying blocks around the circle until the first row or course is complete. These blocks should all lean toward the middle of the circle. The next course will spiral up the ramp you created with the first block. Be patient with these blocks and give them plenty of time to sinter. You should expect to drop some or have one fall out of place when you thought it was set. It is important that each new course have more lean toward the center than the previous row!

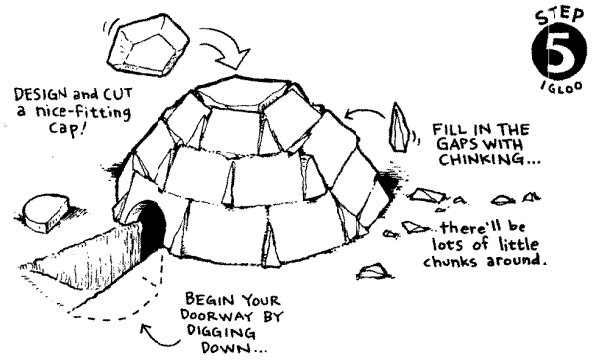
As you set these blocks you will notice that they leave bigger and bigger triangular spaces behind. This is perfectly okay. When the last block has been laid on top you can come back and "chink" all these holes with leftover and broken blocks. During the first row of blocks you should cut an extra long one that will span the space where the door goes. Keep spiraling up and checking that each block tilts or leans in more then the one in row below it. This is where the domed shape comes from. If you don't get enough lean, you will either wind up with a turret or a volcano, neither of which you want.



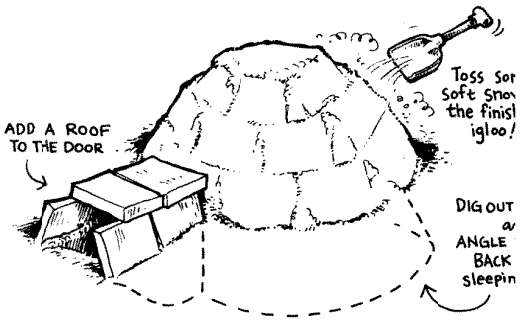
HOW TO MAKE YOUR FIRST BLOCKS

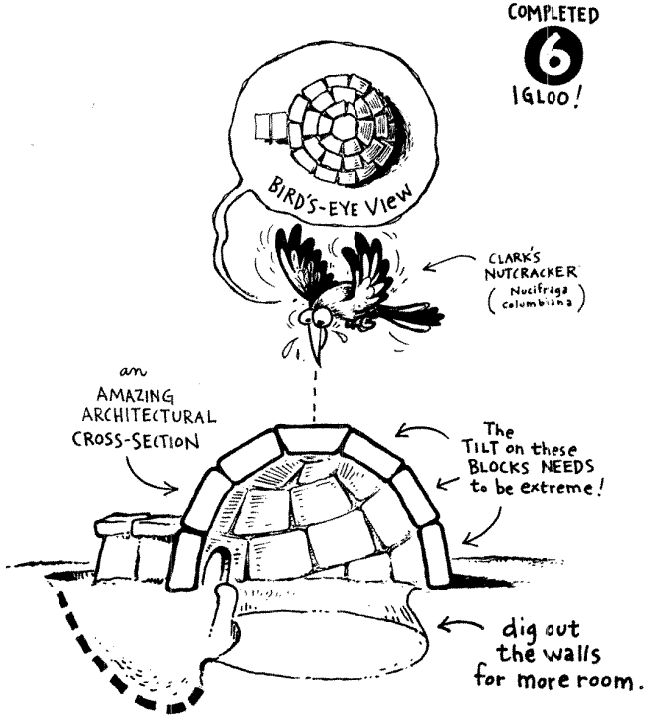




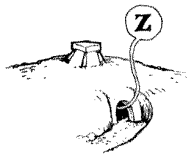


As you are laying the blocks you want to shovel the floor down one to two feet, bevel the walls out for more room and put in the door. At some point, you need to stockpile some blocks inside the igloo, as this is easier than passing them in through the door. By about your fourth row you should be getting ready to close





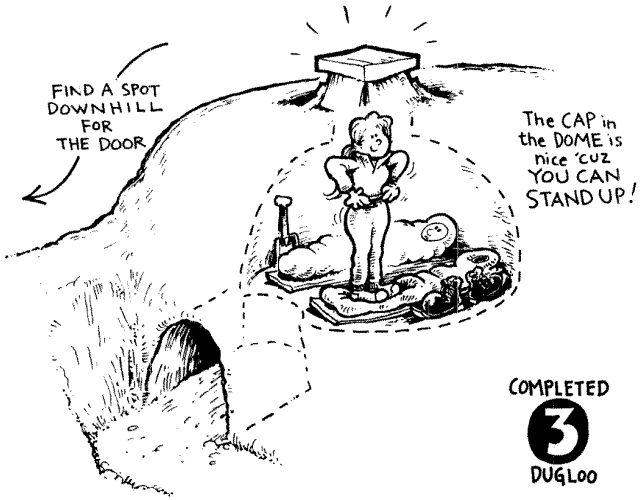
it off. One or two blocks cut to fit and laid horizontally make up this cap. Be careful maneuvering these into place. Often times you can place the block in the hole and trim it fit by sawing along the joint with the surrounding blocks. It should drop into to place with a slight thud. Once you finish chinking, throw a dusting of light snow over the whole thing. It should take between 20 to 24 blocks to complete an igloo this size.



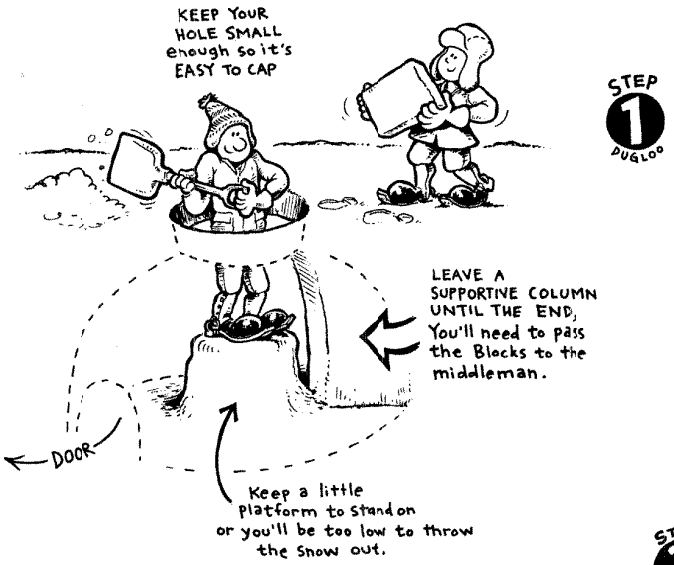
DUGLOOS

This snow shelter is a dome-shaped cavity in the snow, dug by starting at the top and then capped with blocks. It is faster to build than a quinzhee when there is a deep snow pack because there is no piling of snow, and you only need to cut a few blocks. First probe to see how deep the snow is; it should be more than 4 feet. Also make sure there are no buried objects. Next ski pack the snow where you want to build. One person then starts to dig down in the middle of the ski packed area. This is the middle of the dugloo. Meanwhile someone else can be building the quarry, starting the stove and so on. The person digging in the middle wants a hole just big enough to get the shovel out easily. Keeping it small (less than 3 feet in diameter) will make "capping" the structure easier. Once the person digging gets down 2 feet or so, he or she can start to "bell" the structure out. Once again, shoot for that dome shape.

At this point figure out a place for the door. If you are on an incline then it should be on the downhill side. Locating the

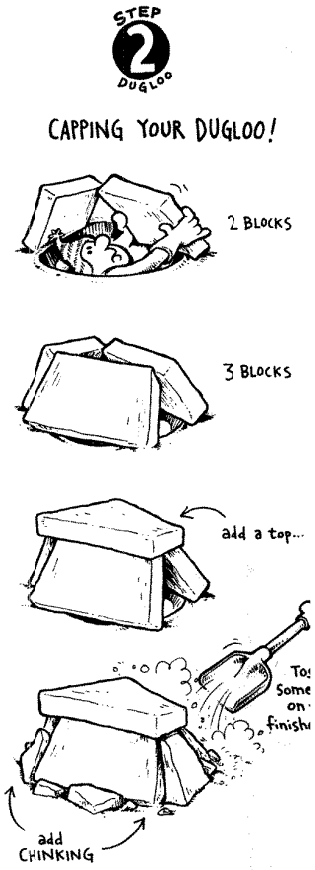


door just over a pole length away from the edge of the hole should work, it is better to begin too far away than too close because it is a lot easier to move the entranceway closer. A second person can begin work on this.



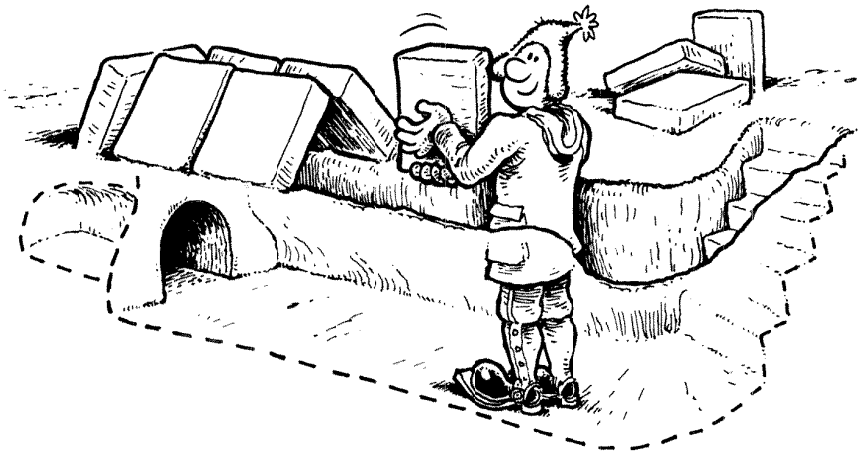
The person doming should leave at least a foot of snow between the top of the dome and the top of the snow to support the blocks when they are laid. After it is capped this can be thinned down to a few inches. Also leave a 2-foot-wide pillar or undomed section of the shelter. Blocks can be passed along here instead of through the door.

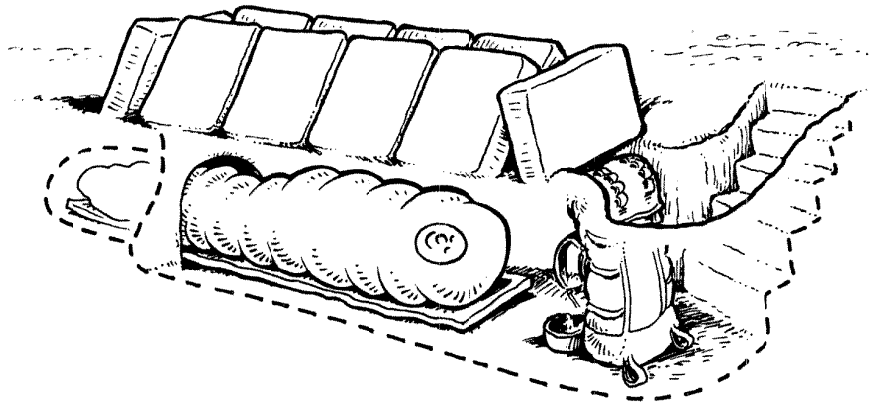
To cap the dugloo you need three to four blocks and some chinking material. If you kept the hole small then you can lean two blocks together in a wide A frame and chink the ends. If not, you still shouldn't need the elaborate spiral of an igloo. By setting the blocks with lots of lean to begin with, you should be able to cap it by the fourth one. Then chink away and cover the whole affair with a light layer of snow. To finish, shovel out the pillar, shave the walls down to a nice smooth dome and work harden the floor.



DOG HOUSES

Dog houses are quick, easy, one-person shelters. To build one you simply dig a trench deep enough to sit up in, with a tunnel for your legs so you can lay down in it. You can cap the top of the trench with an A frame of blocks, or lay skis and poles across the top and cover with a tarp or space blanket followed by snow.



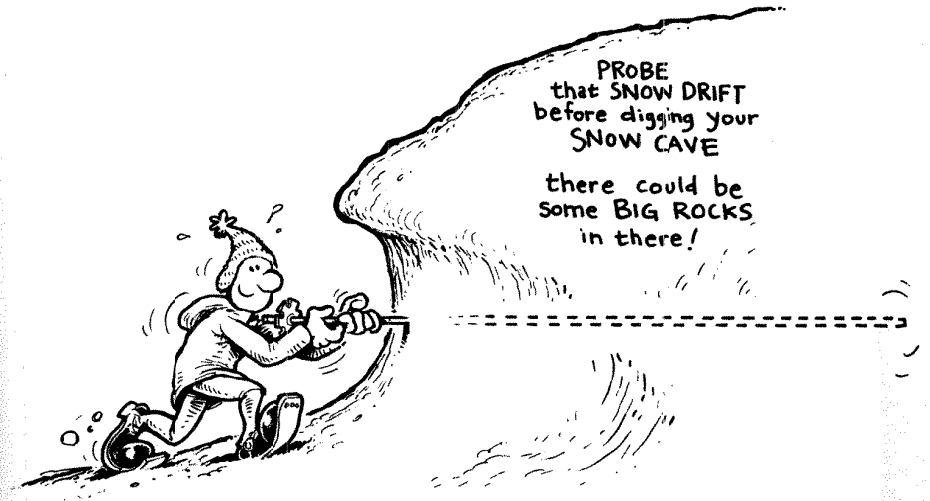


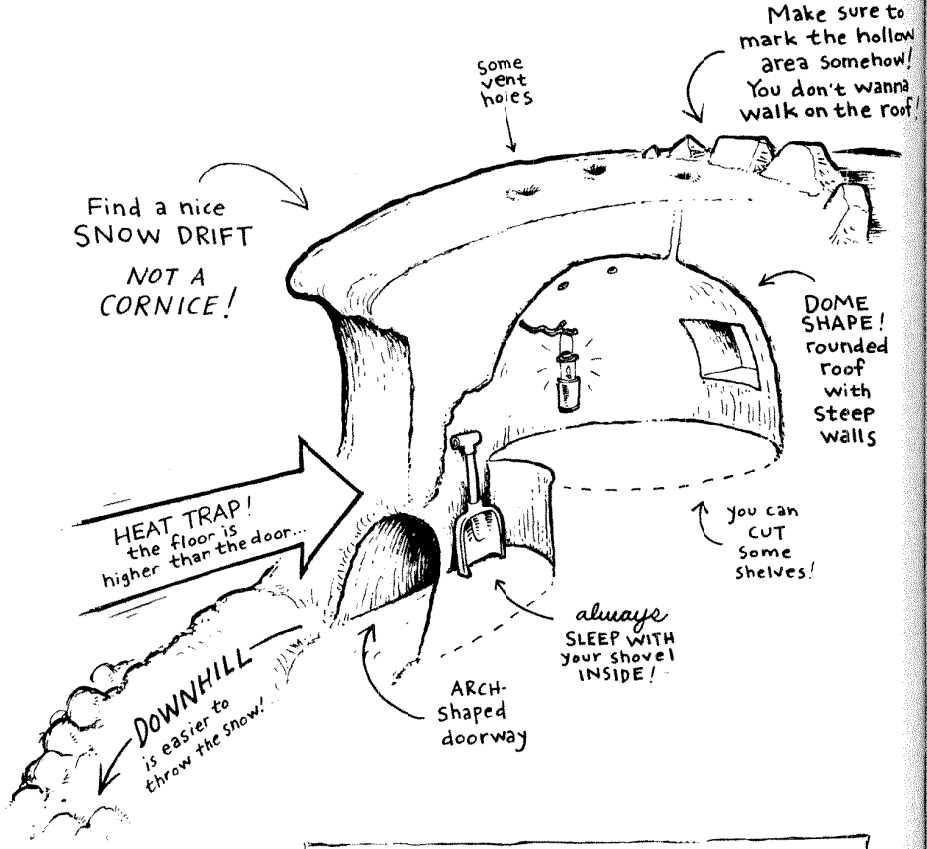
SNOW CAVES

A snow cave is similar in design to a quinzhee, but you don't need to pile any snow because there is already 6 feet of snow on the ground. Look for big snow drifts or probe around to find the deepest snow pack. I avoid drifts formed by ridges or gullies as they tend to drift in very fast when it is windy and it takes a lot of shoveling to keep the door clear.

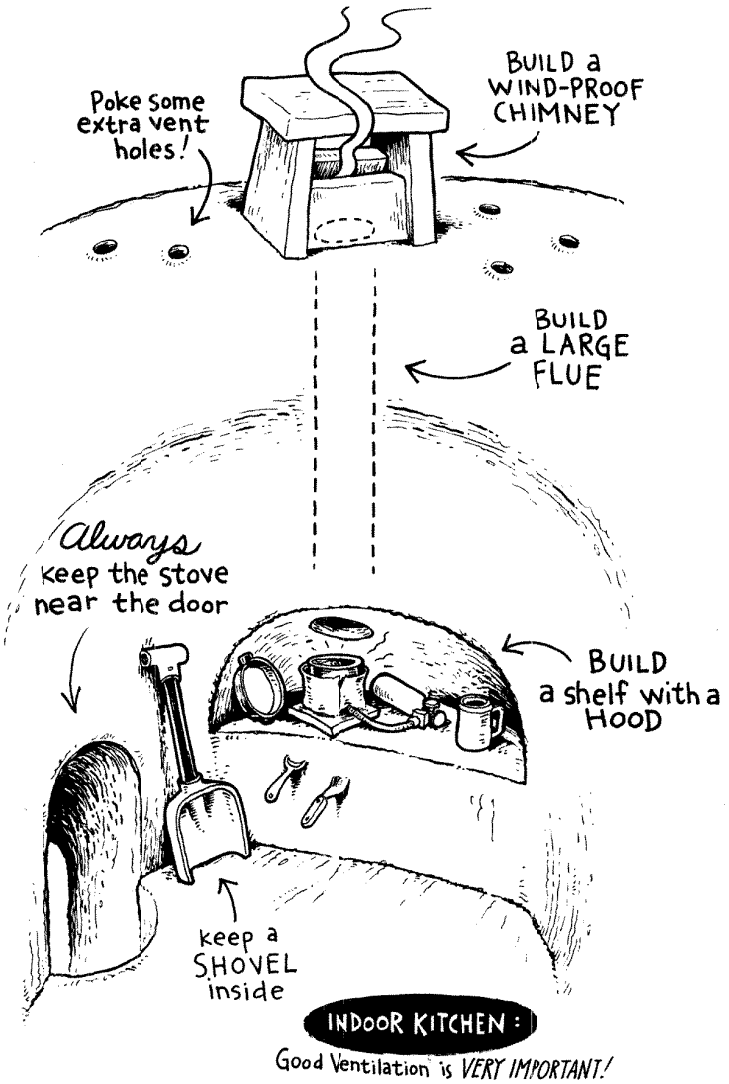
If the snow is soft, ski pack the top of the area you wish to dig, otherwise just start digging. It is a good idea to probe from the inside every once in awhile to see how close to the surface you are. Ideally you would like your ceiling to be about 2 feet thick. Once again you are shooting for that all important dome shape, but if you want to build a really big one, then dig it as a long arching hallway. With a really deep snow pack and a lot of ambition, you can make some very elaborate snow caves with separate rooms, benches for sleeping on and so forth. It is important to punch vent holes into the ceilings of snow caves to ensure enough air flow. Ski poles work well for this.

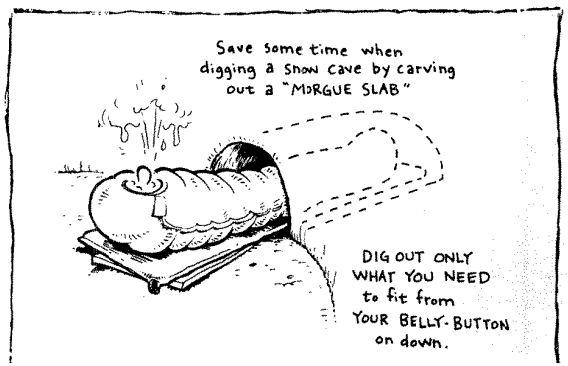
I am not much for stoves and lanterns in caves. Candles work just as well as a lantern and present no danger of a Kevorkian-style death. As for stoves I prefer to cook outside or build an alcove or igloo with minimal chinking. If you do choose to cook in your shelter, it is very important do it in a well-ventilated area and build a dome, as a hood, directly above the stove with a chimney.

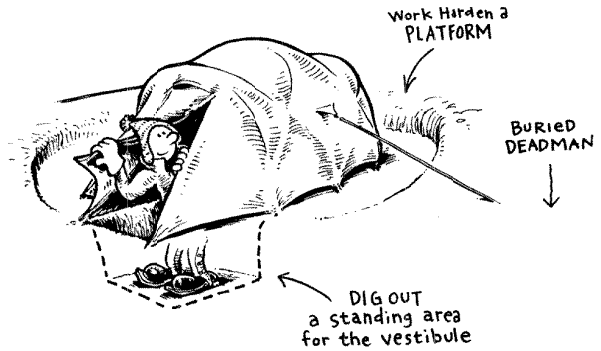



Find a nice SNOW DRIFT
NOT A CORNICE!
Some vent holes
Make sure to mark the hollow area somehow! You don't wanna walk on the roof!
DOME SHAPE! rounded roof with steep walls
you can CUT some shelves!
HEAT TRAP! the floor is higher than the door...
always SLEEP WITH your shovel INSIDE!
ARCH-shaped doorway
DOWNHILL is easier to throw the snow!


Golly, where did I set that $400 Gore-Tex™ parka?
40°C


Poke some extra vent holes!
BUILD a WIND-PROOF CHIMNEY
BUILD a LARGE FLUE
Always keep the stove near the door
BUILD a shelf with a HOOD
keep a SHOVEL inside
INDOOR KITCHEN:
Good Ventilation is VERY IMPORTANT!


Save some time when digging a snow cave by carving out a "MORGUE SLAB"
DIG OUT ONLY WHAT YOU NEED to fit from YOUR BELLY-BUTTON on down.

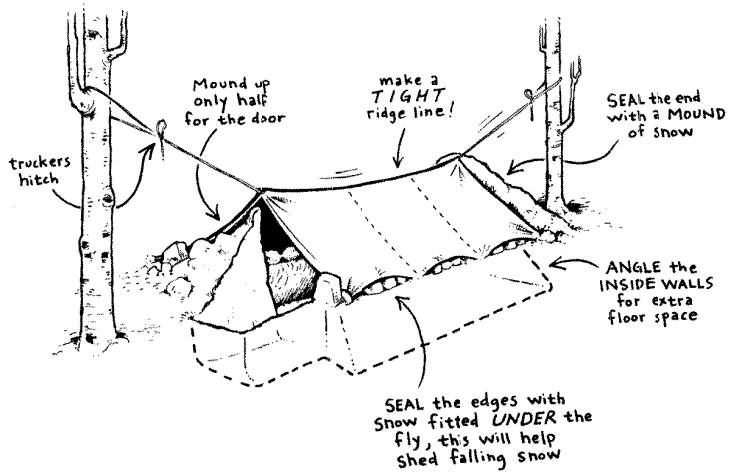


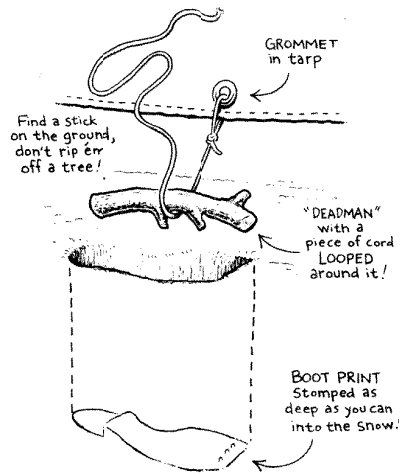
TENTS AND FLYS

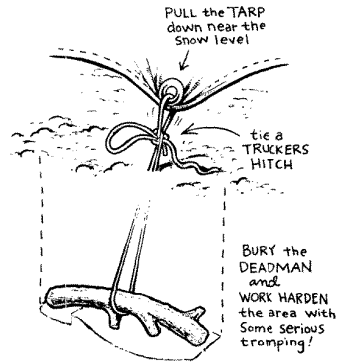
Although not true snow shelters, tents and flys definitely have their place in winter camping. They are fast to set up and are great for single night camps or for people who don't want to go through all the work of building a snow shelter. Tents are especially easy. All you need to do is ski pack a platform, set up the tent and stake it down well.

Staking things out in the snow is a little different than staking out in the ground. For one, regular stakes won't work in most snow conditions and when placed in the conventional way, they tend to melt out, leaving your shelter vulnerable to the wind. You do have some alternatives though. You can use your skis and poles as stakes if you are just making camp for the night and know you won't be needing them, or use deadmen.

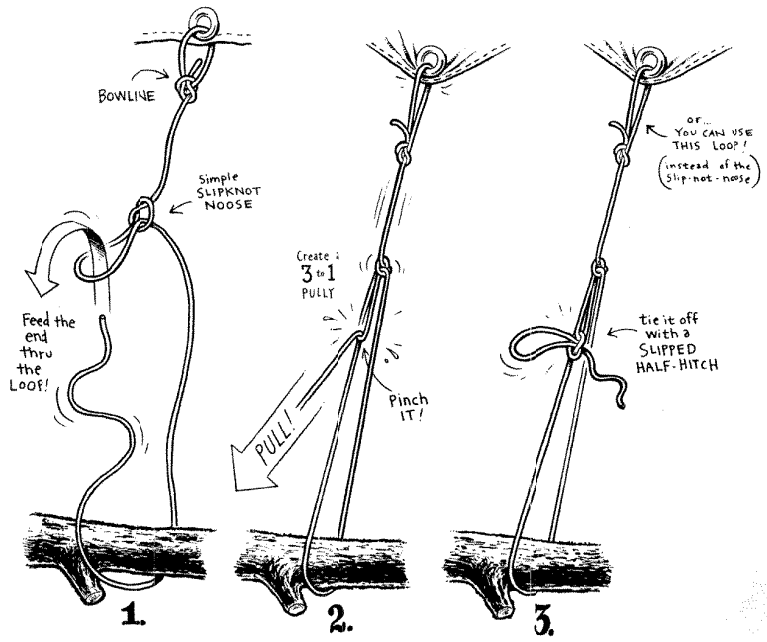
You can deadman anything that you won't have any use for—stuff sacks, extra fuel bottles, etc. While digging my kitchen, if I can find sticks or branches that have blown off trees , I prefer to use them since I won't have to dig them back up. Don't break them off the poor trees, however. The advantage of deadmen is that they won't melt out if buried deep enough.

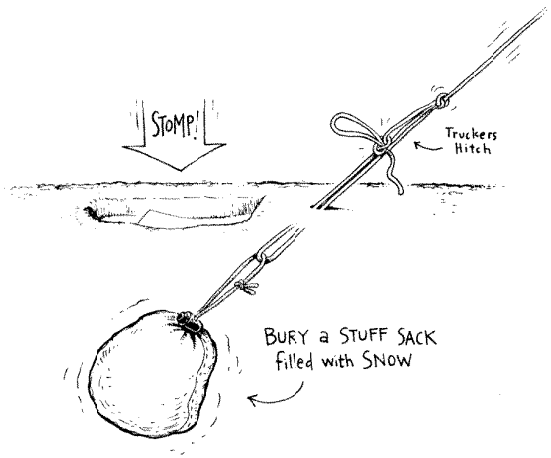




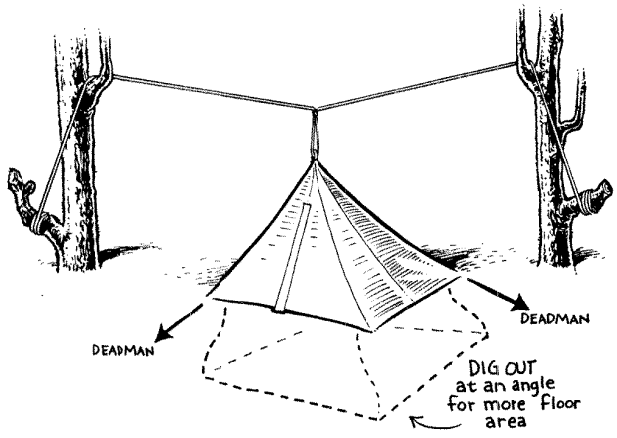


Flys work well in the winter and are lighter than tents, although they are not quite easy to set up. With the traditional fly design, I like to ski pack out an area betwe two trees, set up the fly and then dig a beveled trench underneath to increase t amount of room. With the snow I dig up, I close off the two ends and the sides until is completely sealed except for a door. It is a good idea to pitch the sides of the fly a steep angle so snow will slide off. Failure to do this during a snow storm can result the occupants "sucking nylon" during the night as the fly collapses on them.





If you are using a megamid, try pitching it with a string between two trees. This will do away with the pole (which will sink into the snow anyway unless you have some type of platform for it). You can also seal off the sides of this and dig down to increase roominess.



MINIMUM IMPACT AND OTHER BACKCOUNTRY ETHICS

A simple equation exists between freedom and numbers: the more people the less freedom.

Basic Rockcraft by Royal Robbins

Ethics can be seen as set of principles or standards that help govern the actions of a community. In our case, these ethics can help define proper behavior for skiers in the backcountry. This covers a lot of ground and not all these standards are accepted everywhere. But by having high ethical standards we can stave off regulation meant to modify irresponsible behavior. With increased use of the backcountry, we are beginning to see government agencies and private citizens consider regulations to protect it and its users. Wouldn't it be better to govern ourselves through the use of ethics? This allows for flexibility rather than having to follow a set of unbending rules.

Some of what I discuss here is just plain courtesy to others, while other issues are of a more serious nature. All in all, it's worth the time to consider and to accept those things that ring true to you. If you are unsure of something then give it a try, ask opinions of others and do some research. Don't just blow it off as the opinion of some mad man. By education, we learn more about the true nature of things. In addition to being of an ethical nature, much of the following are just good backcountry skills to understand and practice.

Minimum impact skills are meant to protect backcountry areas that are seeing more and more use and to give each person the chance to experience the backcountry on his or her own terms. By practicing minimum impact, we decrease our impact on the land and all the associated things that go with it such as water, animals, plants, etc. We also strive to lessen the impact we have on other users in the backcountry. In turn, it is hoped they will do the same for us.

Once upon a time, three friends and myself were getting ready to descend a north-facing bowl on skis after having done a great climb up the northeast ridge. We had been having a