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Wilderness Survival
Shelter
Wildwood Trackers' Snow Shelter
February 2003

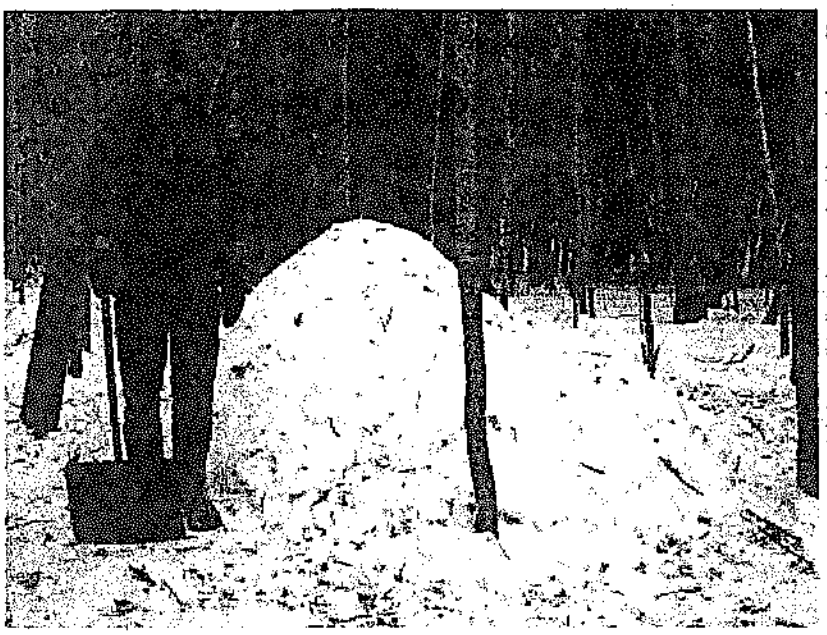
This is a report on the February 2003 meeting of the ***Wildwood Trackers*** club. At this meeting the participants constructed a snow shelter. This page documents the steps taken and techniques employed to make this shelter.

First, we prepared the site of the shelter by scraping away the snow that was there, and using it to start the pile. We had to break up the snow, as it had crystallized during previous warm weather.

We used two shovels and our feet.

Here's the beginnings of the snow pile.

We piled snow up to a height of about 3 feet. It was our intention to make a "demonstration" shelter, rather than one large enough to



accommodate us all.

Here's the finished pile of snow.

We let this sit for about an hour, while we went off and explored and ate lunch.

During lunch we found the first of two porcupines we saw that day. Plus lots of deer tracks & scat, porcupine tracks & scat, ruffed grouse tracks, and more. A great day for tracking!

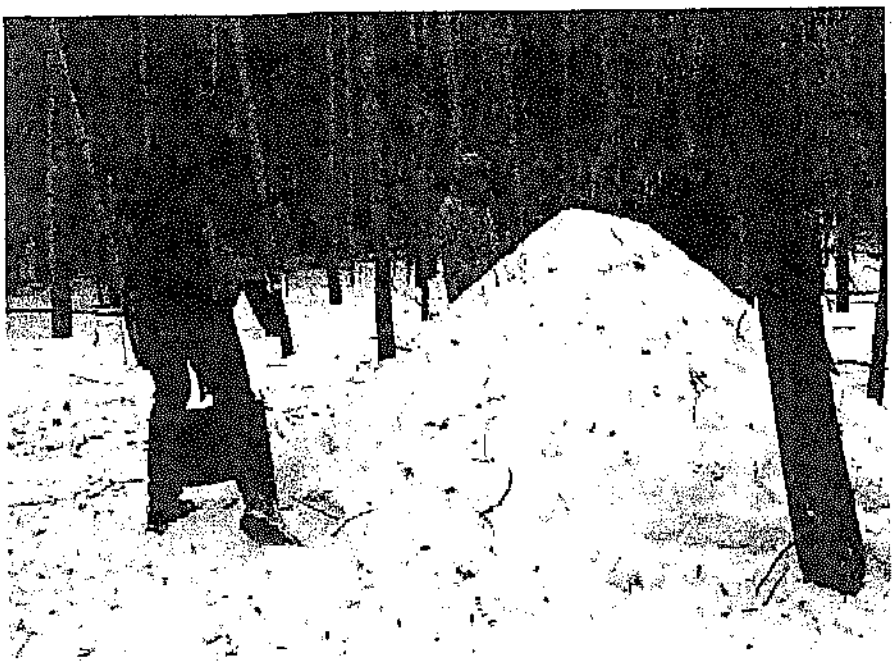
When we came back we found the snow pile had solidified enough to start digging out the shelter.

The method we chose was to excavate the snow from the interior through a large "rear" door that would later be closed back up.

The "rear" door was closed back up after most of the interior excavation was completed, using a cross-thatch of sticks and branches.

Snow was then scooped back on top of this "door" to close it up.

Here the temporary rear door has been fully covered up with snow.



The next step was to dig out the small entrance doorway at the other end of the shelter. The snow that was scooped out through the "rear" door in the pervious step was piled up at this end to create a small tunnel for the entrance.

A small entrance helps to keep the wind out and the heat in, but of course makes it harder to excavate the shelter!

There's a trade-off between having a small entrance to keep the wind and cold air out, and having an entrance that's large enough to crawl in and out of the shelter without getting too covered in snow.

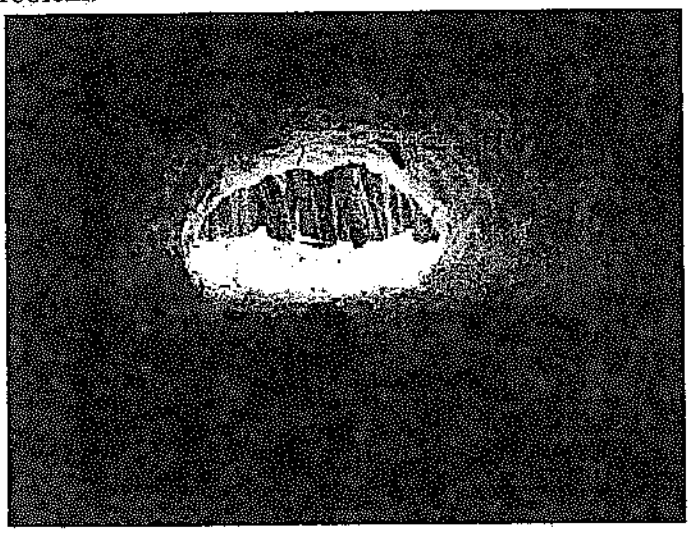
Perhaps this entrance is a tiny bit too small.

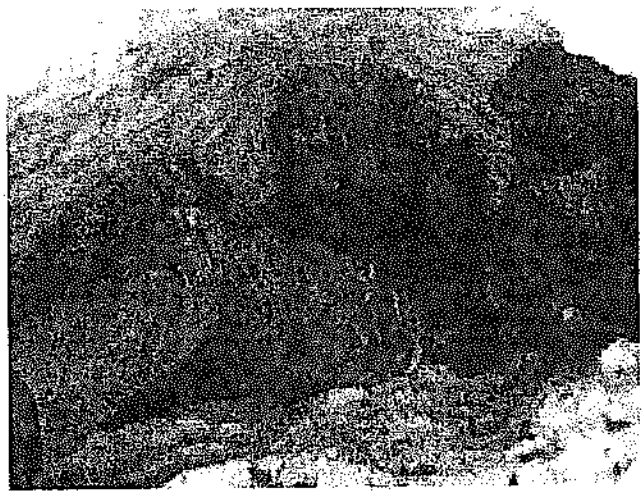
One way to deal with this is to make a door out of snow, ice, or something else that can be closed behind you when you crawl in.

**Don't forget to make some air holes with a long stick!!

Done!

Here's a view from the inside (L) and of four people inside the shelter. We could have fit all 6 of us inside, no problem.





Snow shelters are stronger than you think! We tried having 3 people on top, but it collapsed.

After it collapsed, we disassembled it completely, in order to reduce signs that we had been there. We were in an area that people sometimes walk through, so we wanted to remove signs of our project in order that their nature experience would not be impaired.

This picture shows the beginning of the disassembly process.

Two days later, here's what the site of the shelter looked like. It had snowed a few inches, which helped to erase the signs of the former shelter.

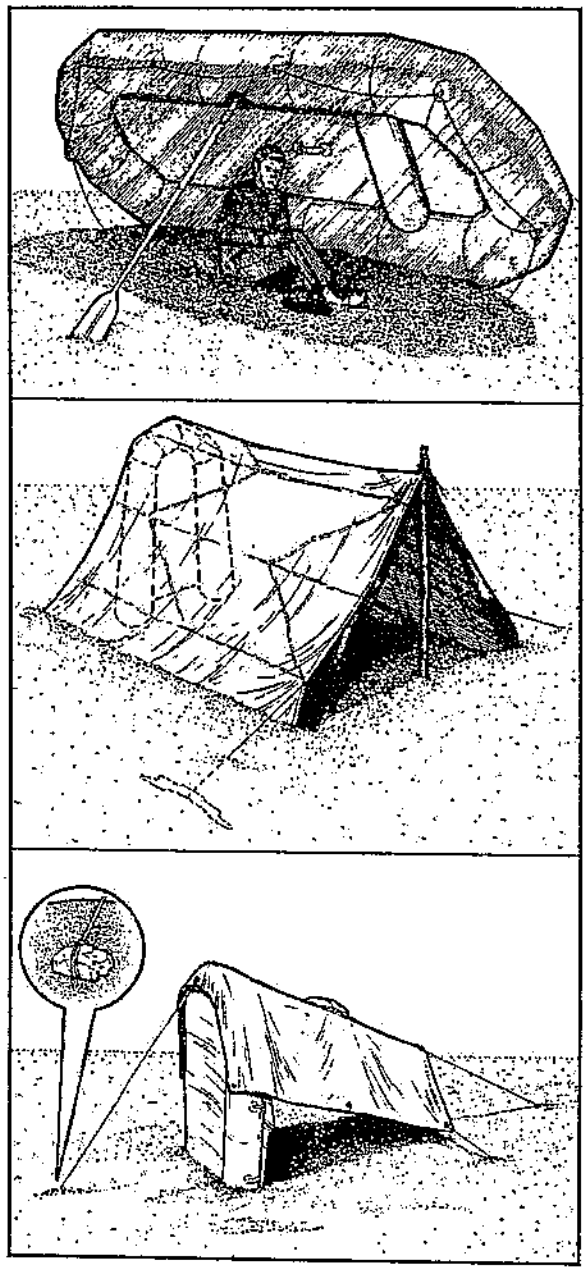


Figure 15-13. Improvised Natural Shade Shelters.

(b) The material should be kept approximately 12 to 18 inches above the individual. This allows the air to cool the underside of the material.

(c) Aircraft parts and liferafts can also be used for shade shelters. Survivors may use sections of the wing, tail, or fuselage to provide shade. However, the interior of the aircraft will quickly become superheated and should be avoided as a shelter. An inflatable raft can be tilted against a raft paddle or natural object such as a bush or rock to provide relief from the sun (figure 15-13).

15-12. Principles of Desert Shelters:

a. The roof of a desert shelter should be multilayered so the resulting airspace reduces the inside temperature of the shelter. The layers should be separated 12 to 18 inches (figure 15-14).

b. Survivors should place the floor of the shelter abou 18 inches above or below the desert surface to increase the cooling effect.

c. In warmer deserts, white parachute material should be used as an outer layer. Orange or sage green material should be used as an inner layer for protection from ultr violet rays.

d. In cooler areas, multiple layers of parachute mater should be used with sage green or orange material as th outer layer to absorb heat.

e. The sides of shelters should be movable in order to protect survivors during cold and (or) windy periods an to allow for ventilation during hot periods.

f. In a hot desert, shelters should be built away from large rocks, which store heat during the day. Survivors may need to move to the rocky areas during the evening to take advantage of the warmth heated rocks radiate.

g. Survivors should:

(1) Build shelters on the windward sides of dunes for cooling breezes.

(2) Build shelters during early morning, late evening, or at night. However, potential survivors should recall that survivors who come down in a desert area dur ing daylight hours must be immediately concerned with protection from the sun and loss of water. In this case, parachute-canopy material can be draped over liferaft, vegetation, or a natural terrain feature for quick shelter.

15-13. Shelters for Snow and Ice Areas:

a. The differences in arctic and arctic-like environments create the need for different shelters. Basically, there are two types of environments that may require special shelter characteristics or building principles before survivors will have adequate shelter. They are:

(1) Barren lands, which include some seacoasts, icecaps, sea-ice areas, and areas above the tree line.

(2) Tree-line areas.

b. Barren lands offer a limited variety of materials for shelter construction. These are snow, small shrubs, and grasses. Ridges formed by drifting or wind-packed snow may be used for wind protection (survivors should build on the lee side). In some areas, such as sea ice, windy conditions usually exist and cause the ice to shift, form ing pressure ridges. These areas of unstable ice and snow should be avoided at all times. Shelters that are suitable for barren-type areas include:

(1) Molded dome (figure 15-15).

(2) Snow cave (figure 15-16).

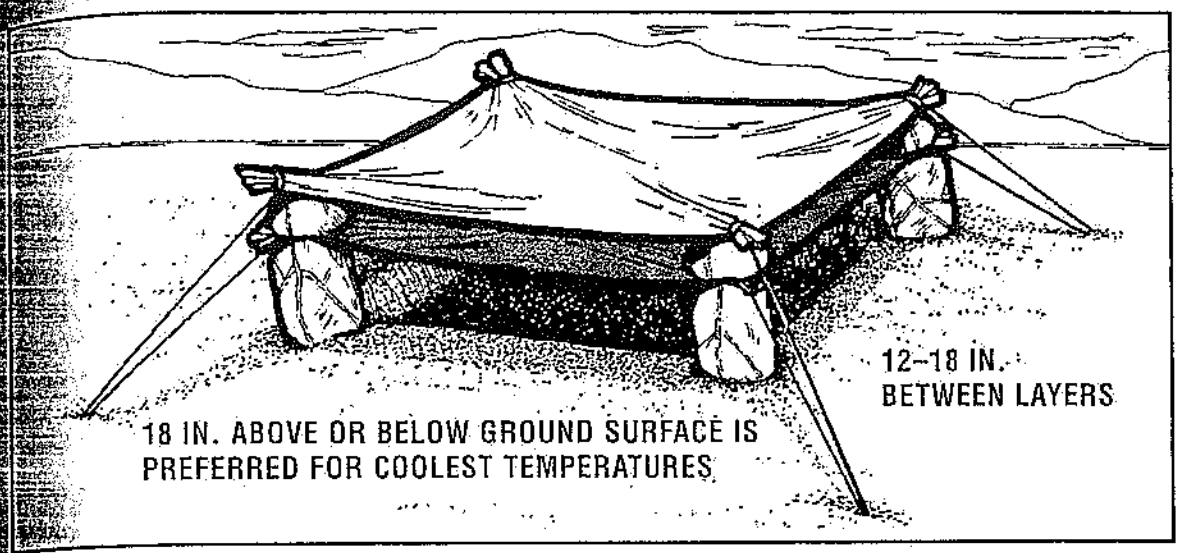


Figure 15-14. Parachute Shade Shelter.

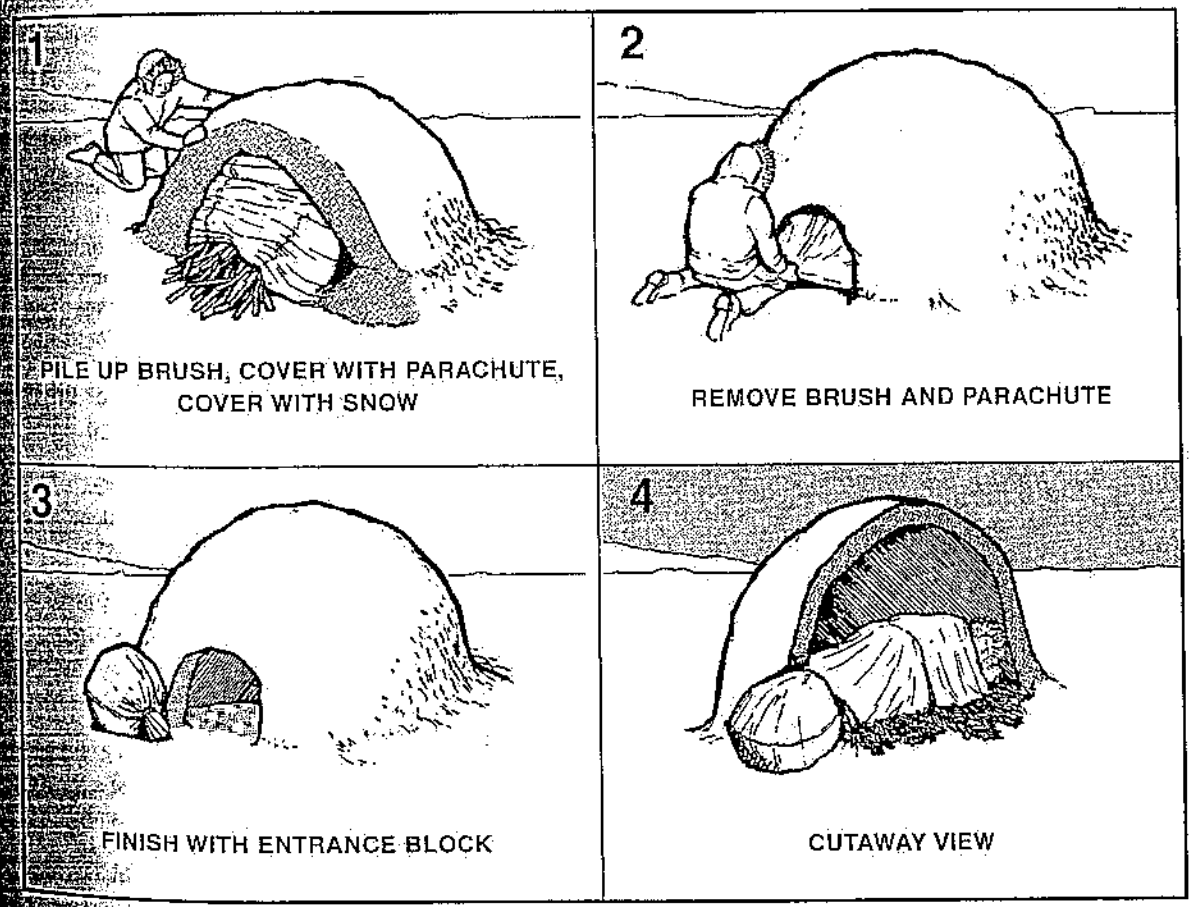


Figure 15-15. Molded Dome Shelter.

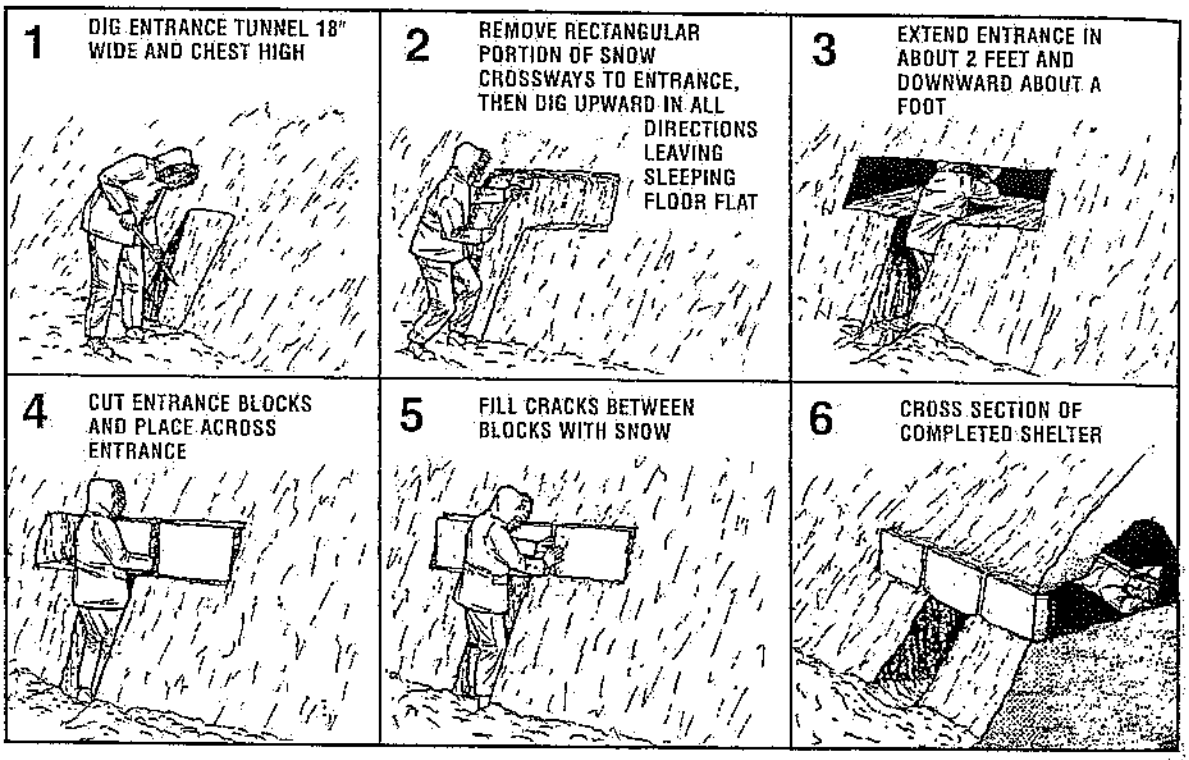


Figure 15-16. Snow Cave.

(3) Fighter trench (figure 15-17).
(4) Igloo (figure 15-18).
(5) Para-snow house (Figure 15-19).

NOTE: Of these, the ones that are quick to construct and require minimum effort and energy are the molded dome, snow cave, and fighter trench. It is important to know which of these shelters is the easiest to build since reducing or eliminating the effect of the windchill factor is essential to remaining alive.

c. In tree-covered areas, sufficient natural-shelter building materials are normally available. Caution is required. Shelters built near rivers and streams may get caught in the overflow.

d. Tree-line-area shelter types include:
(1) Thermal A-Frame construction (figure 15-20).
(2) Lean-to or wedge (figure 15-21).
(3) Double lean-to (figure 15-22).
(4) Fan (figure 15-23).
(5) Willow frame (figure 15-24).
(6) Tree well (figure 15-25).

e. Regardless of the type of shelter used, the use of thermal principles and insulation in arctic shelters is required. Heat radiates from bare ground and from ice masses over water. This means that shelter areas on land should be dug down to bare earth if possible (figure 15-26). A minimum of 8 inches of insulation above survivors is needed to retain heat. All openings except ventilation holes should be sealed to prevent heat loss. Leaving vent holes open is especially important if heat-producing devices are used. Candles, Sterno, or small oil lamps produce carbon monoxide. In addition to the ventilation hole through the roof, another may be required at the door to ensure adequate circulation of the air. (As a general rule, unless persons can see their breath, the snow shelter is too warm and should be cooled down to preclude melting and dripping.)

f. Regardless of how cold it may get outside, the temperature inside a small, well-constructed snow cave will probably not be lower than -10°F. Body heat alone can raise the temperature of a snow cave 45 degrees above the outside air. A burning candle will raise the temperature 4 degrees. Burning Sterno (small size, 2 5/8 oz.) will raise the cave temperature about 28 degrees. However, since they cannot be heated many degrees above freezing, snow shelters provide a rather rugged life. Once the inside of the shelter "glazes" over with ice, this layer of ice should be removed by chipping it off, or a new shelter built since ice reduces the insulating quality of a shelter. Maintain the old shelter until the new one is constructed. It will provide protection from the wind.

g. The aircraft should not be used as a shelter when temperatures are below freezing except in high wind conditions. Even then a thermal shelter should be constructed as soon as the conditions improve. The aircraft will not

provide adequate insulation, and the floor will usually become icy and hazardous.

15-14. General Construction Techniques:

a. All thermal shelters use a layering system consisting of the frame, parachute (if available), boughs or shrubs, and snow. The framework must be sturdy enough to support the cover and insulation. A door block should be used to minimize heat loss. Insulation should be added on sleeping areas.

b. If a barren land-type shelter is being built with snow as the only material, a long knife or digging tool is a necessity. It normally takes 2 to 3 hours of hard work to dig a snow cave, and much longer for the novice to build an igloo.

c. Survivors should dress lightly while digging and working; they can easily become overheated and dampen their clothing with perspiration that will rapidly turn to ice.

d. If possible, all shelter types should have their openings 90 degrees to the prevailing wind. The entrance to the shelter should also be screened with snow blocks stacked in a L-shape.

e. Snow on the sea ice, suitable for cutting into blocks, will usually be found in the lee of pressure ridges or ice hummocks. The packed snow is often so shallow that the snow blocks have to be cut out horizontally.

f. No matter which shelter is used, survivors should take a digging tool into the shelter at night to cope with the great amount of snow that may block the door during the night.

15-15. Shelter Living:

a. Survivors should limit the number of shelter entrances to conserve heat. Fuel is generally scarce in the

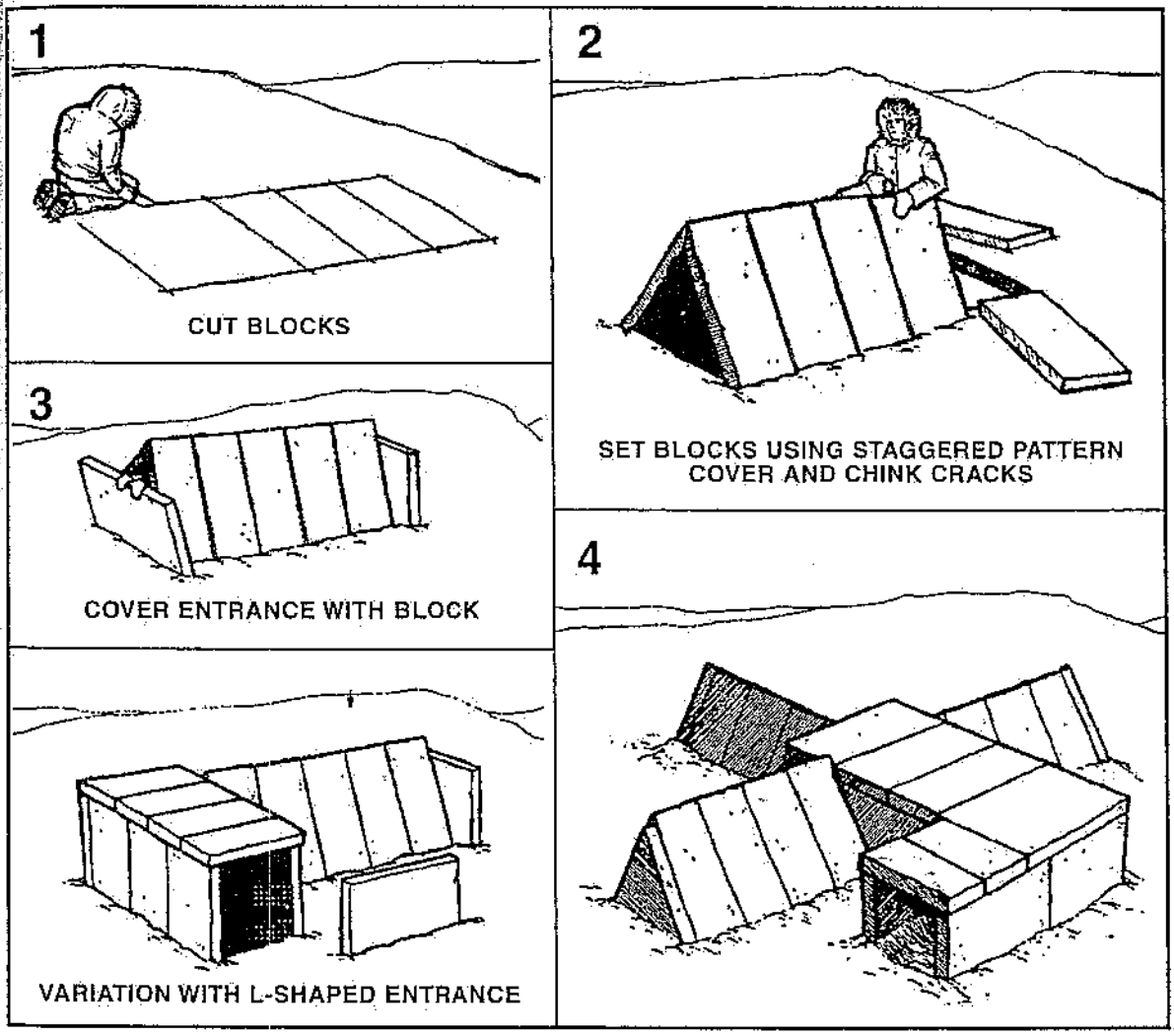


Figure 15-17. Fighter Trench.

Arctic. To conserve fuel, it is important to keep the shelter entrance sealed as much as possible (figure 15-27). When it is necessary to go outside the shelter, activities such as gathering fuel, snow, or ice for melting, etc., should be done. To expedite matters, a trash receptacle may be kept inside the door, and equipment may be stored in the entryway. Necessities that cannot be stored inside may be kept just outside the door. Any firearms (guns) the survivor may have must be stored outside the shelter to prevent condensation from building, which could cause them to malfunction.

b. A standard practice in snow-shelter living is for people to relieve themselves indoors when possible. This practice conserves body heat. If the snowdrift is large enough to dig connecting snow caves, one may be used as a toilet room. If not, tin cans may be used for urinals, and snow blocks for solid waste (fecal) matter.

c. Survivors should use thick insulation under themselves when sleeping or resting even if they have a sleeping bag. They can use a thick bough bed in shingle-fashion, seat cushions, parachute, or an inverted and inflated rubber raft.

d. Outer clothing makes good mattress material. A parka makes a good footbag. The shirt and inner trousers may be rolled up for a pillow. Socks and insoles can be separated and aired in the shelter. Drying may be completed in the sleeping bag by stowing around the hips. This drying method should be used only as a last resort.

e. Keeping the sleeping bag clean, dry, and fluffed will give maximum warmth. To dry the bag, it should be turned inside-out, frost beaten out, and warmed before the fire—taking care that it doesn't burn.

f. To keep moisture (from breath) from wetting the sleeping bag, a moisture cloth should be improvised from a piece of clothing, a towel, or parachute fabric. It can then be lightly wrapped around the head in such a way that the breath is trapped inside the cloth. A piece of fabric dries easier than a sleeping bag. If cold is experienced during the night, survivors should exercise by fluttering their feet up and down or by beating the inside of the bag with their hands. Food or hot liquids can be helpful.

g. Snow remaining in clothing will melt in a warm shelter. When the clothing is again taken outside, the water formed will turn to ice and reduce the CLo value. Brush clothes before entering the shelter. Under living conditions where drying clothing is difficult, it is easier to keep clothing from getting wet than having to dry it out later.

h. If all the snow cannot be eliminated from outer clothing, survivors should remove the clothing and store it in the entryway or on the floor away from the source of heat so it remains cold. If ice should form in clothing, it may be beaten out with a stick.

i. In the cramped quarters of any small emergency shelter, pots of food or drink can be accidentally kicked over. The cooking area, even if it is only a Sterno stove, should be located out of the way, possibly in a snow alcove.

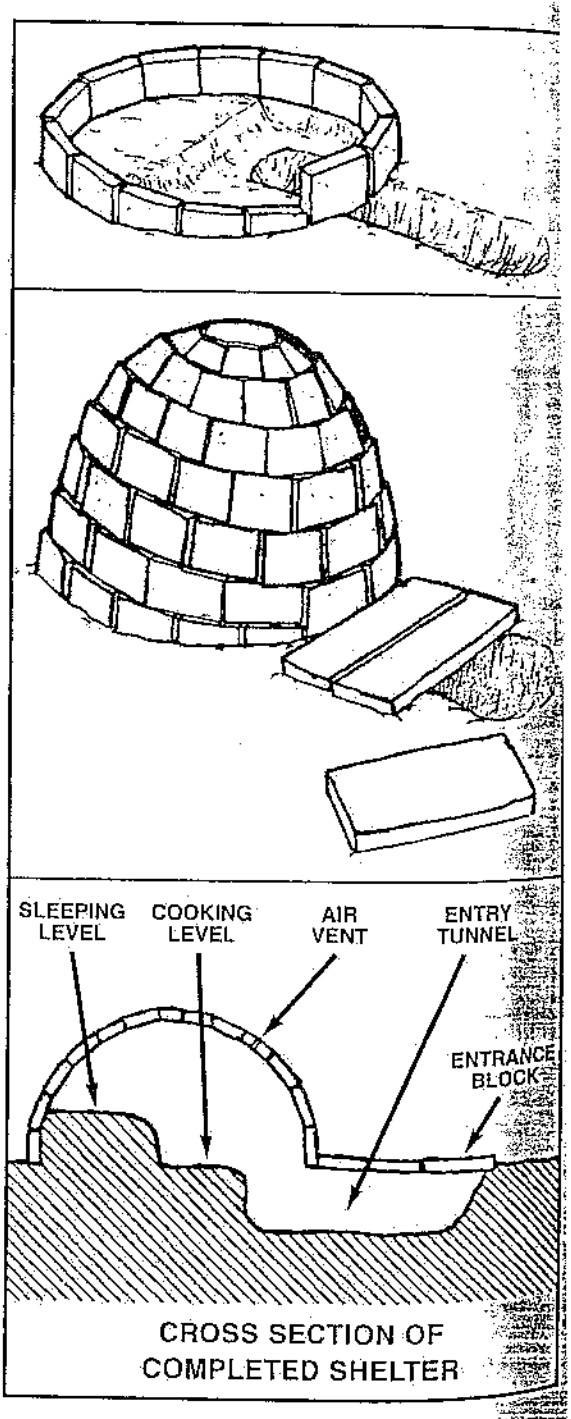


Figure 15-18. Igloo.

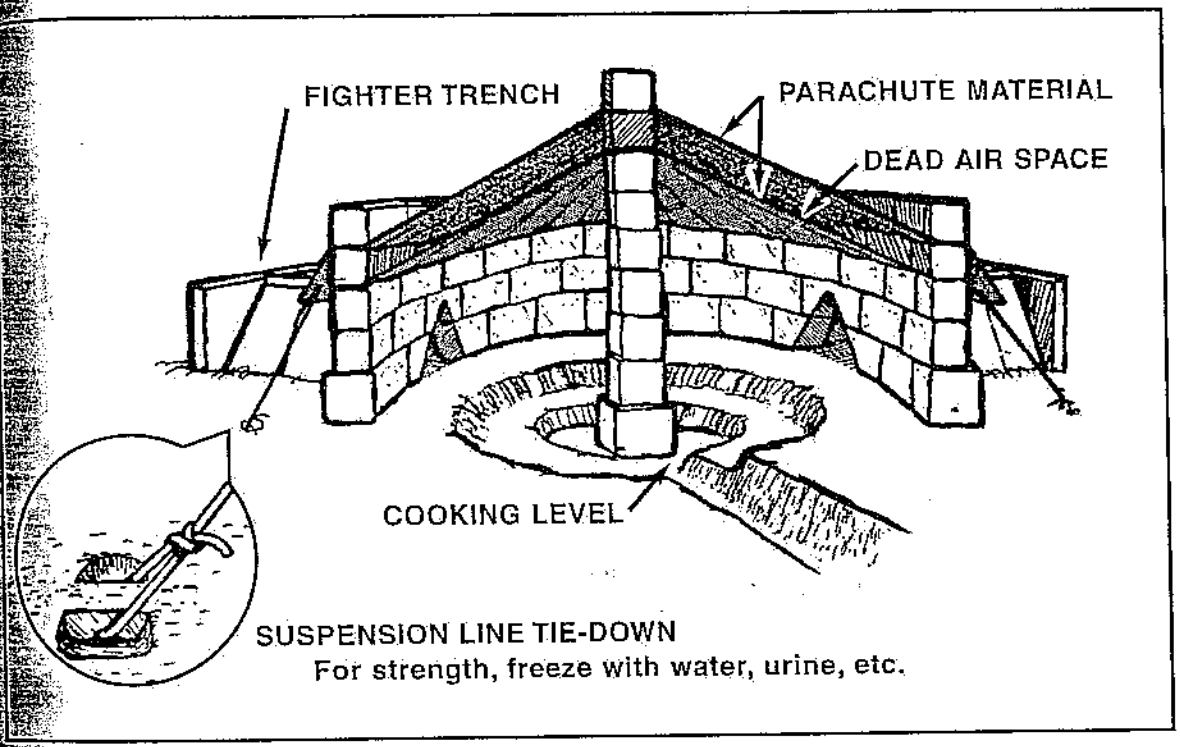


Figure 15-19. Para-Snow House.

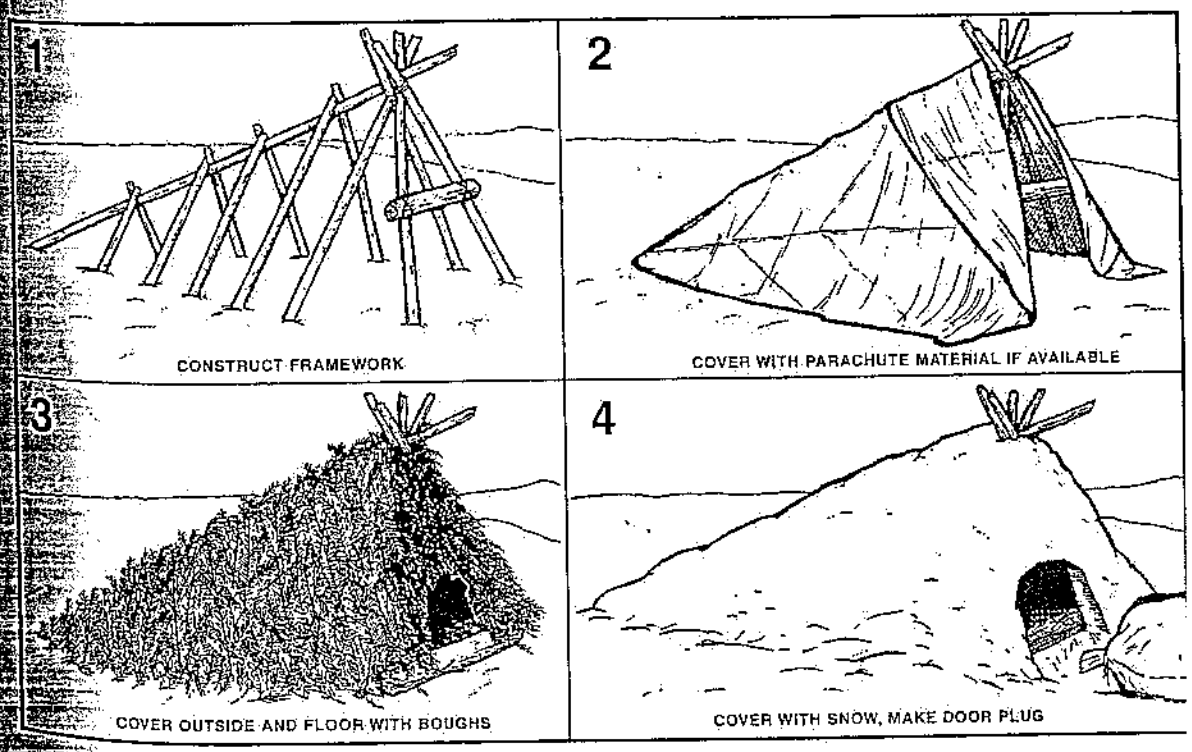


Figure 15-20. Thermal A-Frame.

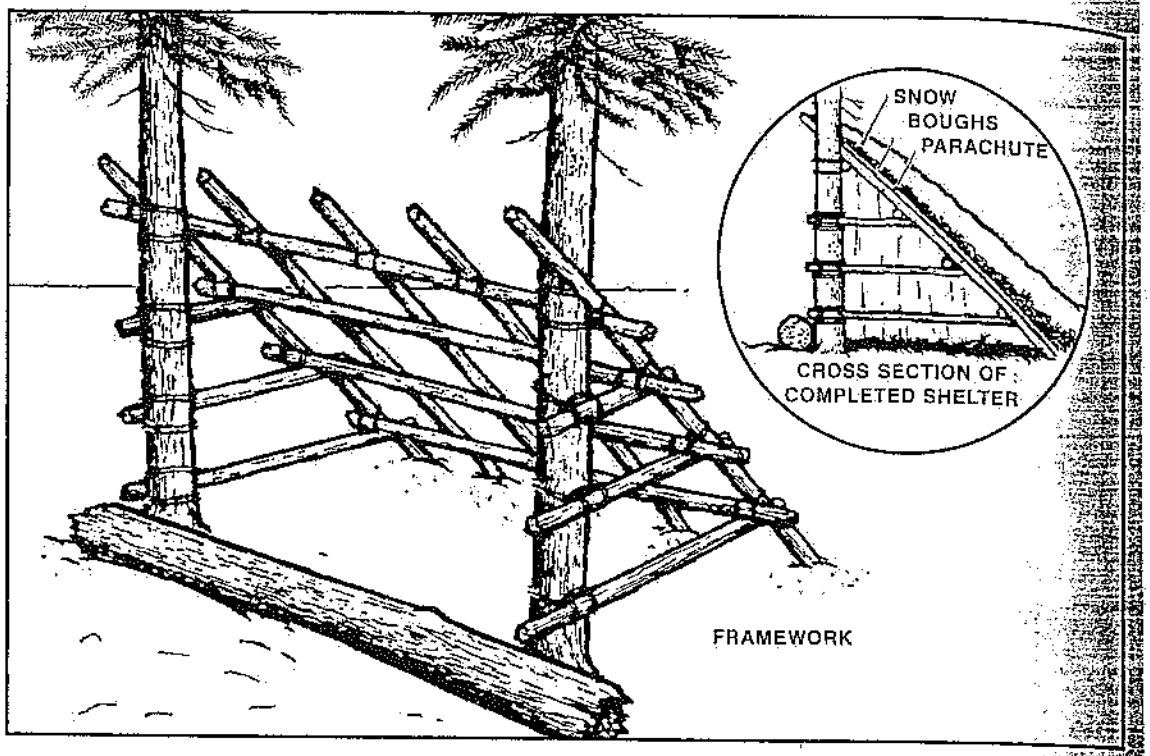


Figure 15-21. Lean-To or Wedge.

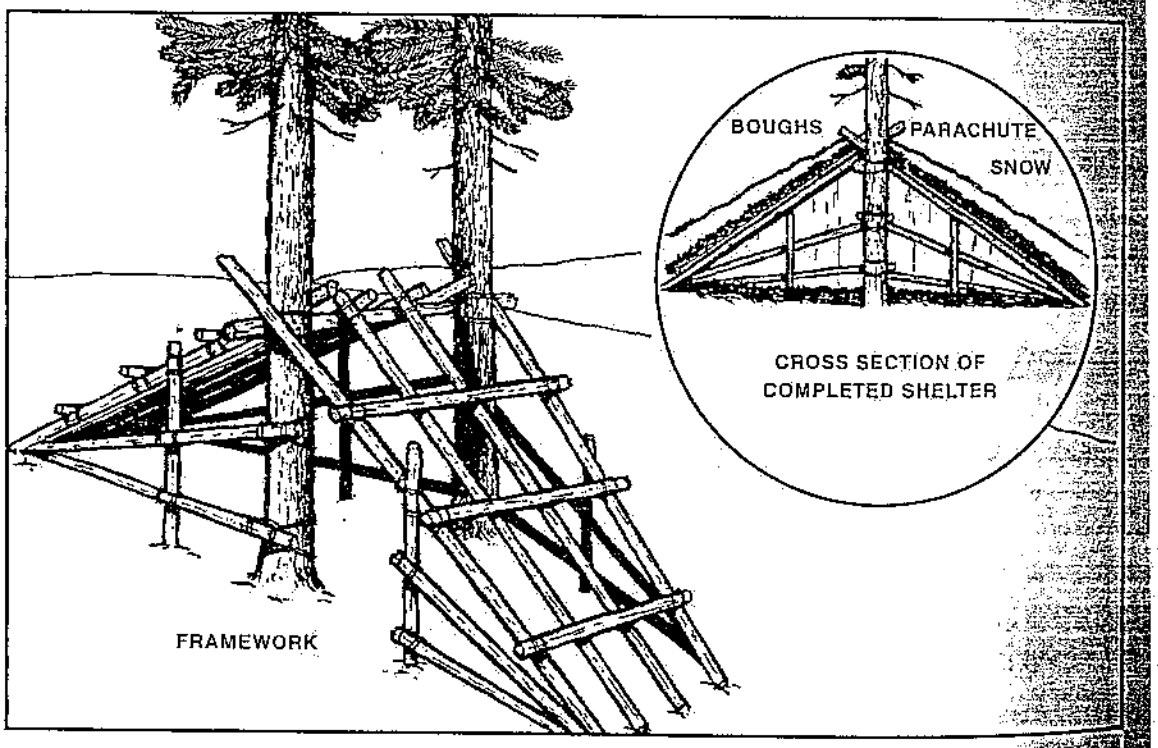


Figure 15-22. Double Lean-To.

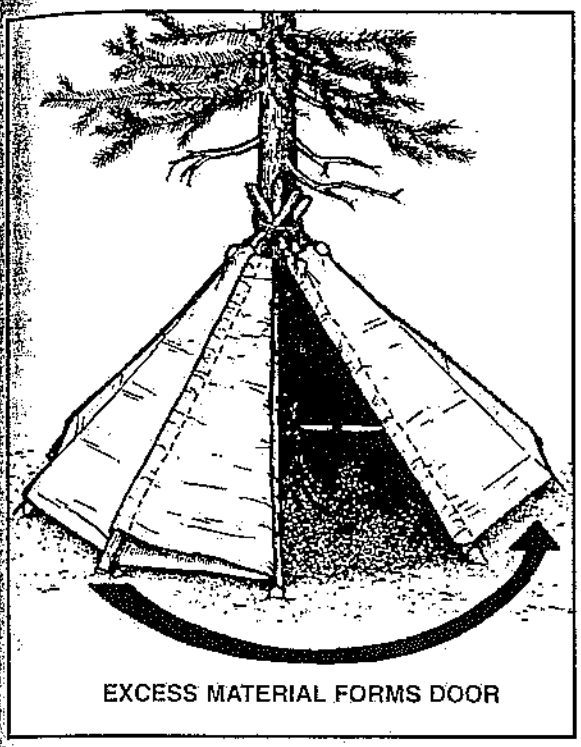


Figure 15-23. Fan Shelter.

15-16. Summer Considerations for Arctic and Arctic-Like Areas:

a. Survivors need shelter against rain and insects. They should choose a campsite near water but on high, dry ground if possible. Survivors should also stay away from thick vegetation, as mosquitoes and flies will make life miserable. A good campsite is a ridge top, cold lakeshore, or a spot that gets a breeze.

b. If survivors stay with the aircraft, it can be used for shelter during the summer. They should cover openings with netting or parachute cloth to keep insects out and cook outside to avoid carbon monoxide poisoning. Fires must be built a safe distance from the aircraft.

c. Many temperate area shelters are suitable for summer arctic conditions. The paratepee (of the 1- or no-pole variety) is especially good. It will protect from precipitation and keep insects out.

15-17. Shelter for Open Seas. Personal protection from the elements is just as important on the seas as it is anywhere else. Some rafts come equipped with insulated floors, spray shields, and canopies to protect survivors from heat, cold, and water. If rafts are not so equipped or the equipment has been lost, survivors should try to improvise these items using parachute material, clothing, or other equipment.

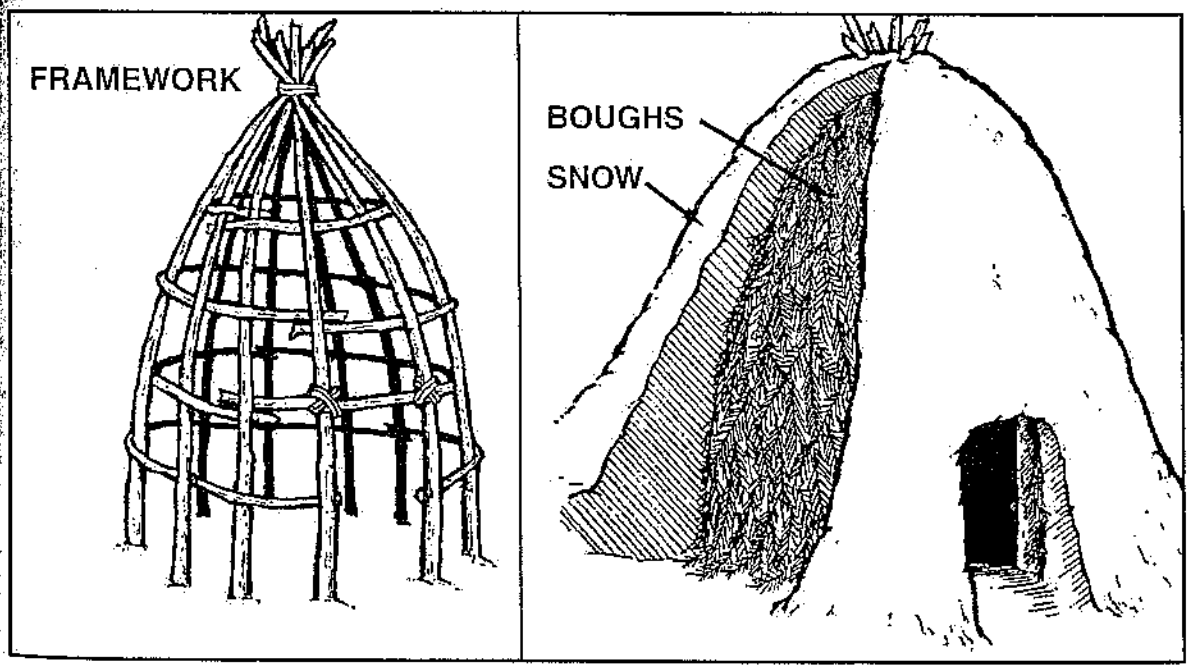


Figure 15-24. Willow Frame Shelter.

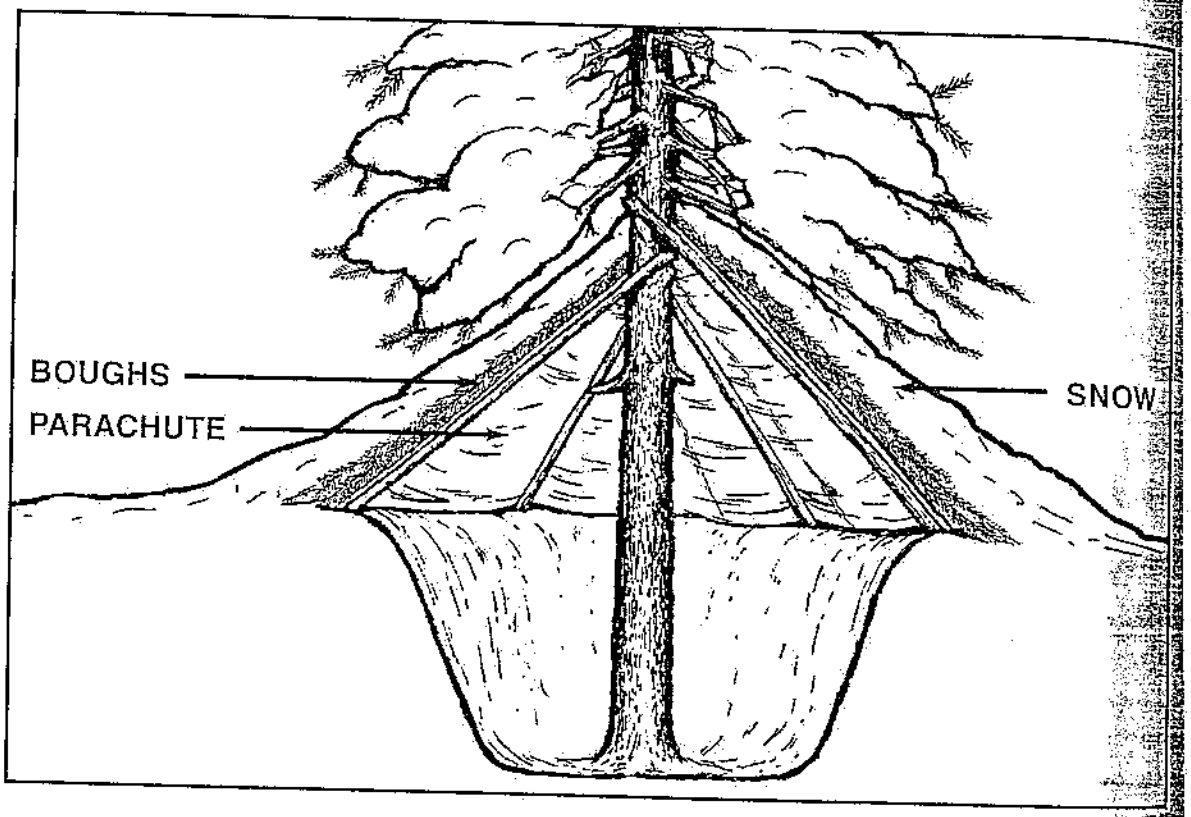


Figure 15-25. Tree Well Shelter.

Figure 15-26. Scraping Snow to Bare Earth.

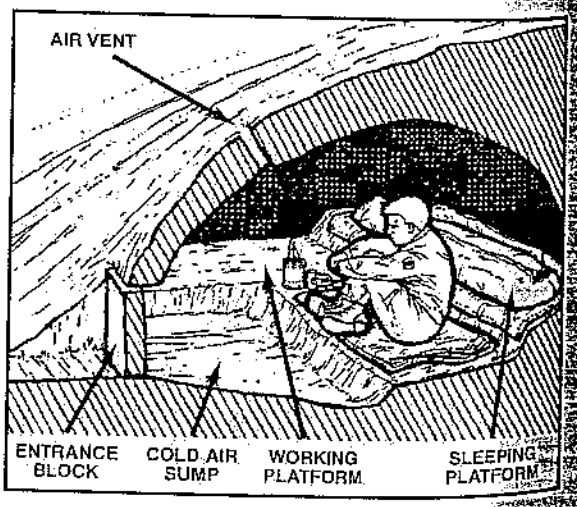


Figure 15-27. Snow Cave Shelter Living.