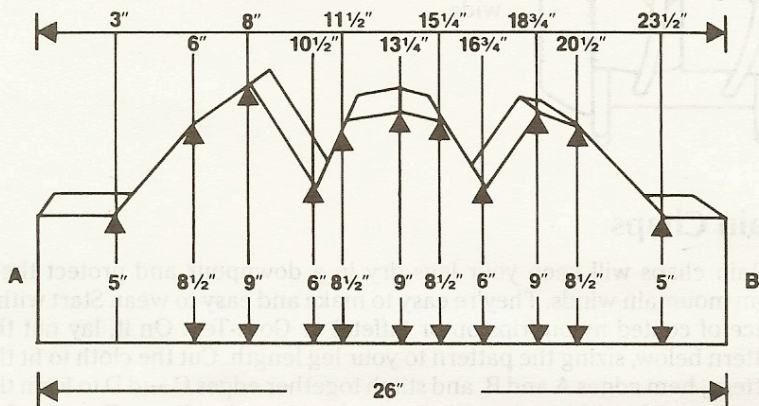
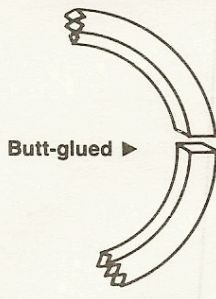
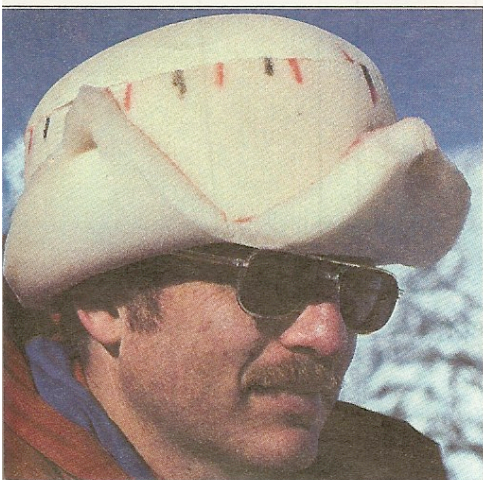


Foam Hat

Using 1-inch-thick low-density polyethylene foam from a furniture store, you can make light, comfortable winter camping gear that will keep you warm in even the most severe conditions. One of the most useful is the foam hat.



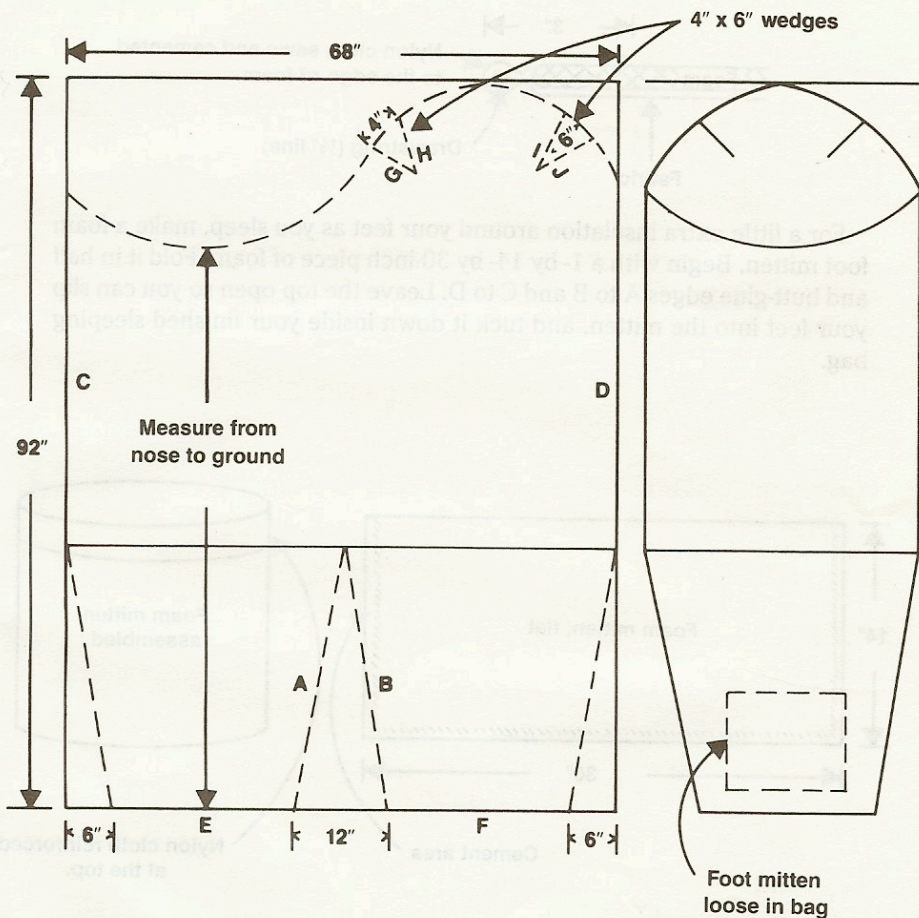
Start with a piece of foam 28 inches long and 8 inches wide. Draw the pattern on a piece of stiff paper, cut it out, lay it on the foam, and outline it with a felt-tip marker. Use scissors or a very sharp knife to cut the foam around until edges A and B meet, and glue them together with an adhesive such as 3-M Spray Cement. Known as "butt-glueing," this method of cementing two flat edges together is used in almost all foam gear construction.



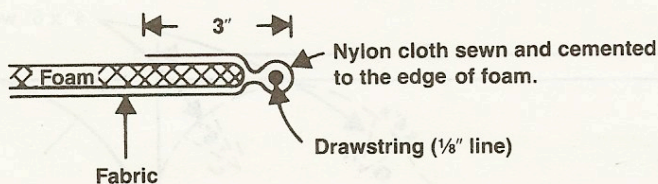
◀ Foam hat in use

Foam Sleeping Bag

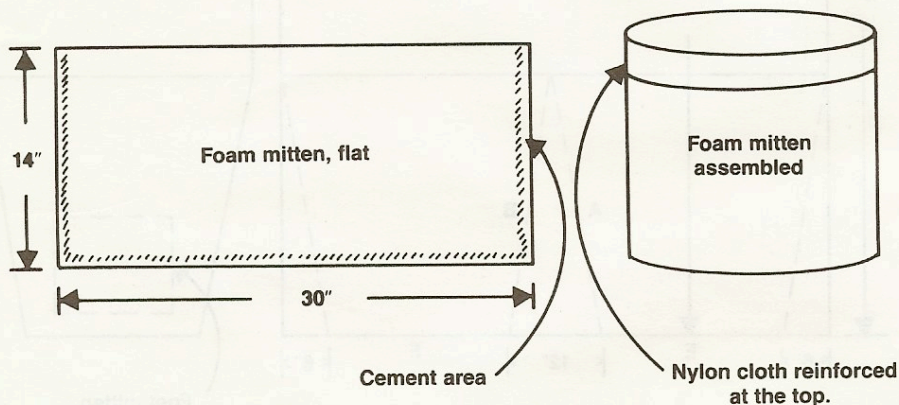
For a wilderness bed that will keep you cozy wet or dry, construct your own foam bag. Begin with a piece of $\frac{1}{4}$ -inch foam 92 inches long and 64 inches wide. As with the foam hat, draw a full-size pattern of the sleeping bag on paper. Cut it out, then transfer the pattern to the foam. Cut the foam along the lines and use 3-M Spray Cement to butt-glue edges A to B, C to D, and E to F. Cut under the two wedges at the top of the bag, and glue edges G to H, and I to J.



Complete the bag by making an inner liner of light nylon chiffon, tricot, or uncoated ripstop nylon, and an outer cover of lightweight uncoated ripstop nylon. Add 2 inches all around the sleeping bag pattern for the inner liner, and 6 inches all around for the outer cover. Sew liner edges A to B, C to D, and E to F, then do the same with the edges of the outer cover. Slip the liner into the foam bag, and put the bag into the outer cover. Stitch the liner seams and cover seams together around the head-hole of the bag.



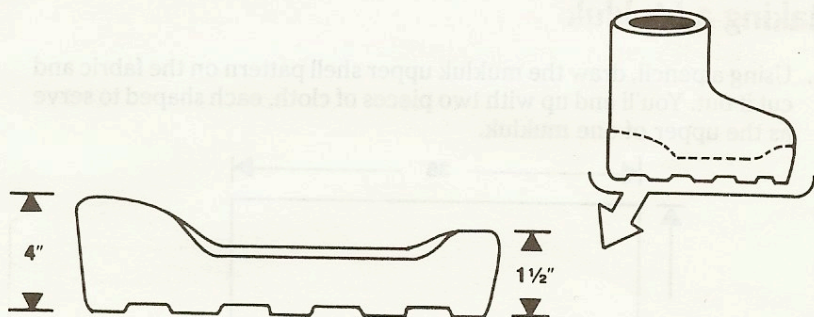
For a little extra insulation around your feet as you sleep, make a foam foot mitten. Begin with a 1- by 14- by 30-inch piece of foam. Fold it in half and butt-glue edges A to B and C to D. Leave the top open so you can slip your feet into the mitten, and tuck it down inside your finished sleeping bag.



MUKLUKS

Over the centuries, Eskimos have developed very effective ways of staying warm. Key to their clothing system are mukluks large enough to hold their feet and plenty of effective insulation. The soles are waterproof while the uppers are breathable to allow moisture to escape, keeping their feet dry and warm. The fur ruff around the top prevents the entry of snow. By combining the ages-old principles of the Eskimo with modern materials, you can make cold weather footwear that will keep your feet comfortable at temperatures far below zero.

Mukluk soles. The Eskimos use the tough hides of animals for mukluk bottoms; you can use the soles of large overshoes, shoepack boots, insulated "moon boots," or Army surplus winter footwear. Since they must be big enough to hold your feet and the bulk of foam socks (see below), start with soles several sizes larger than your regular shoe size; a size 12 sole will make a mukluk that will fit feet sizes 7-10. Cut the tops from the soles, leaving a 4-inch collar around each heel and 1 to 1½ inches up each side.



Mukluk upper shell. To make the upper shells of a pair of mukluks, Eskimos use soft leather or canvas. You'll need a 38- by 50-inch piece of heavy, *breathable* cloth that will not absorb moisture. It must not be waterproof. Nylon parapak cloth, heavy dacron, or breathable pack cloth work well and are available at fabric stores and backpacking equipment shops.

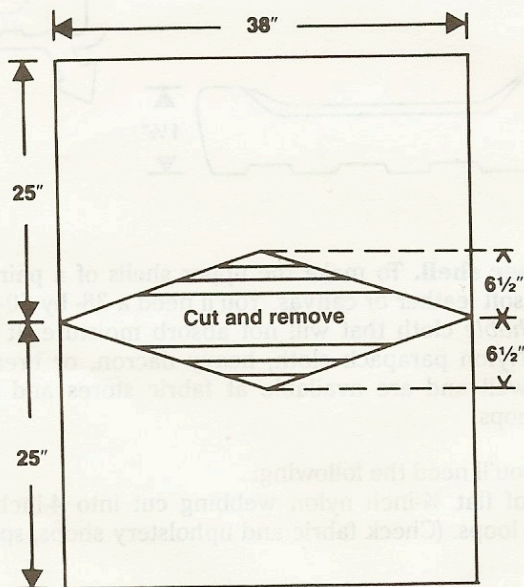
In addition, you'll need the following:

- 40 inches of flat ¾-inch nylon webbing cut into 4-inch lengths for lacing cord loops. (Check fabric and upholstery shops, sporting goods stores.)

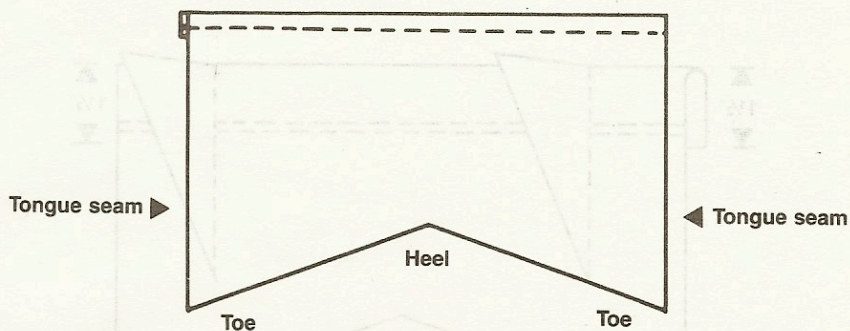
- 34 feet of woven nylon cord, $\frac{1}{8}$ inch in diameter. (Hardware stores.)
- Heavy nylon or acrylic carpet, 4 to 6 pieces, 5 inches by 14 inches, to line the bottom of the sole and serve as removable padding and insulation. Do not use shag carpet. Trim each piece to fit inside the sole. (Furniture stores.)
- 16 brass grommets, size $\frac{3}{8}$ inch.
- Grommet setter, for installing grommets.
- Sewing awl and heavy waxed, nylon stitching cord. (Tent and awning stores, hobby shops, BSA Supply Division catalogs.)
- Imitation fur, two pieces, each 6 inches by 24 inches. (Fabric stores.)
- Foam, two pieces each about 2 inches by 22 inches by $\frac{1}{2}$ inch. (Use scraps left from making foam socks).
- 12 cord toggles. Nylon $\frac{1}{4}$ -20 plastic machine nuts, or quarter-size leather disks with a hole punched in the center of each. (Hardware and electrical supply stores.)

Making a Mukluk

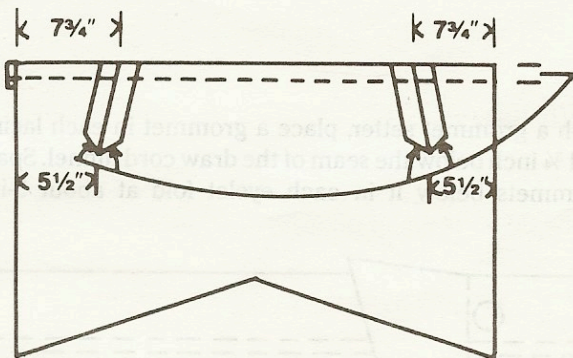
1. Using a pencil, draw the mukluk upper shell pattern on the fabric and cut it out. You'll end up with two pieces of cloth, each shaped to serve as the upper of one mukluk.



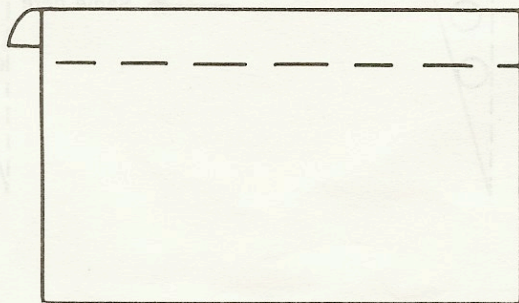
2. Sew a 1/2-inch hem across the top of each shell.



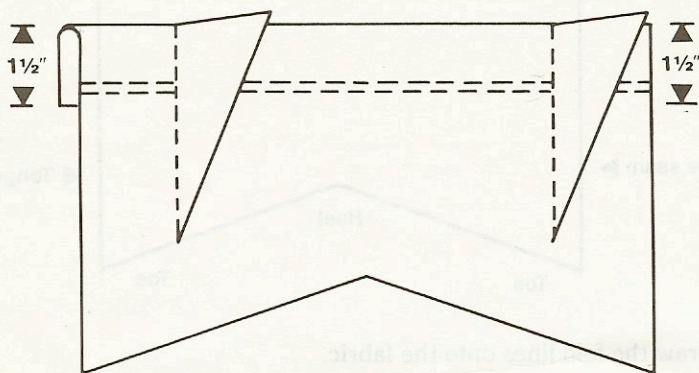
3. Draw the fold lines onto the fabric.



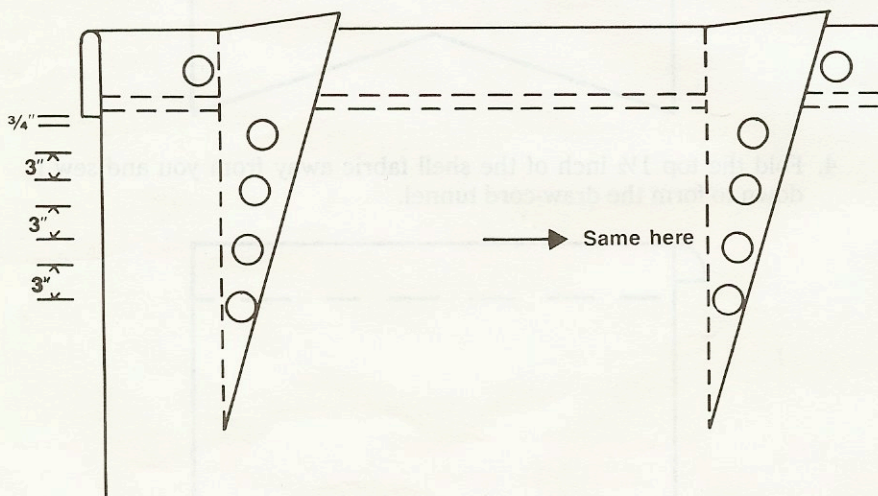
4. Fold the top 1 1/2 inch of the shell fabric away from you and sew it down to form the draw-cord tunnel.



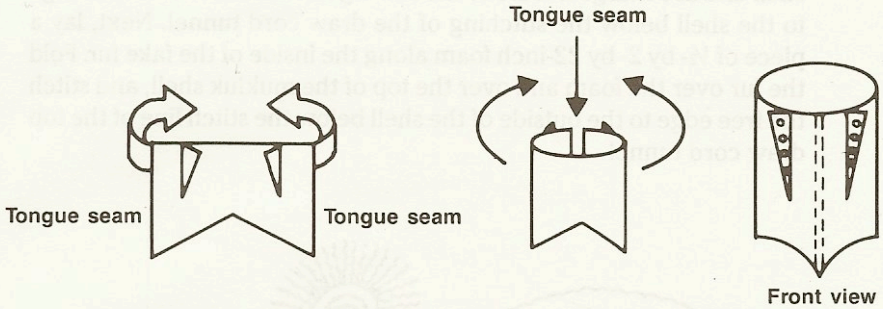
5. Fold and sew the lacing cord eyelet folds.



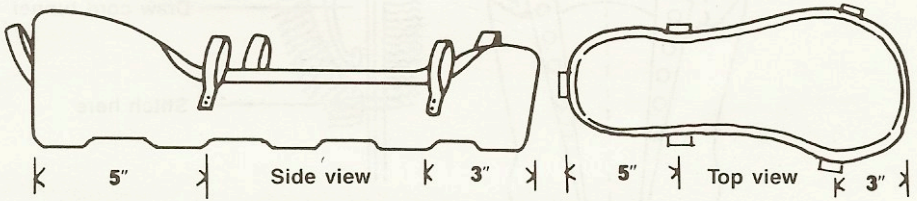
6. With a grommet setter, place a grommet in each lacing cord eyelet fold $\frac{3}{4}$ inch below the seam of the draw cord tunnel. Space three more grommets below it in each eyelet fold at about 3-inch intervals.



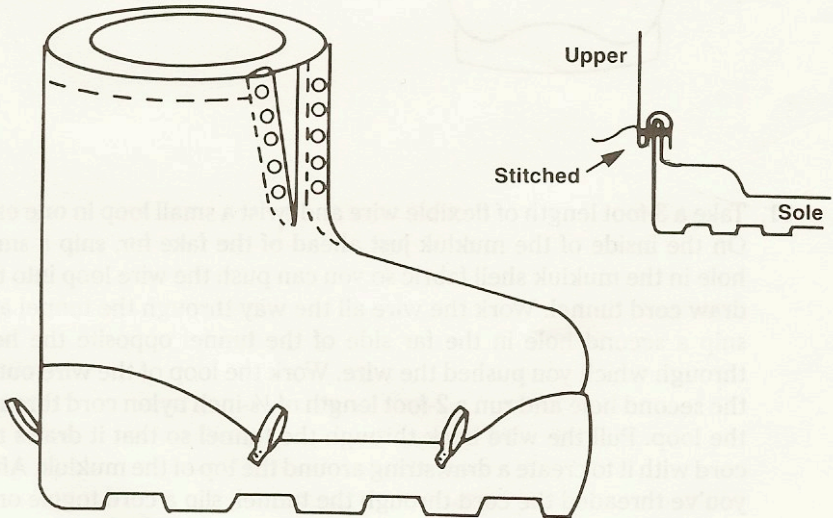
7. Sew tongue center seam,



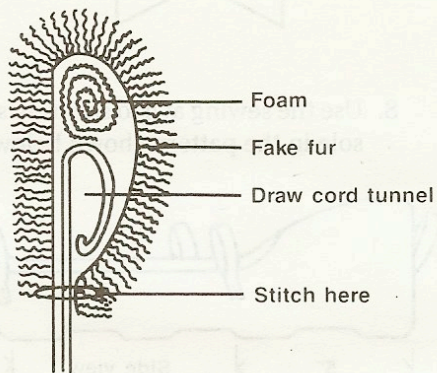
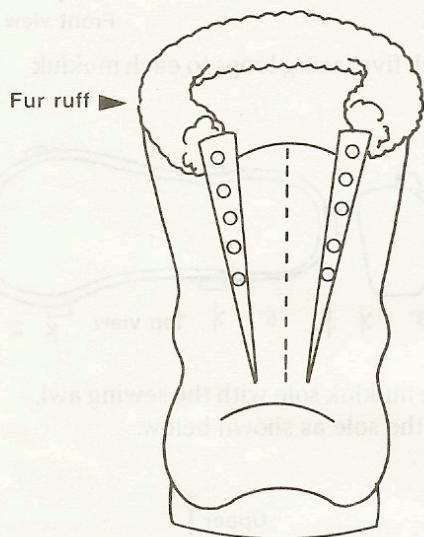
8. Use the sewing awl to securely stitch five lacing loops to each mukluk sole in the pattern shown below.



9. Stitch the mukluk upper shell to the mukluk sole with the sewing awl, folding the fabric over the edge of the sole as shown below.



10. Center and fold a strip of imitation fur over the top of the mukluk shell and use a large needle or the sewing awl to stitch the inside edge to the shell below the stitching of the draw cord tunnel. Next, lay a piece of $\frac{1}{2}$ -by 2-by 22-inch foam along the inside of the fake fur. Fold the fur over the foam and over the top of the mukluk shell, and stitch the free edge to the outside of the shell below the stitch line of the top draw cord tunnel.

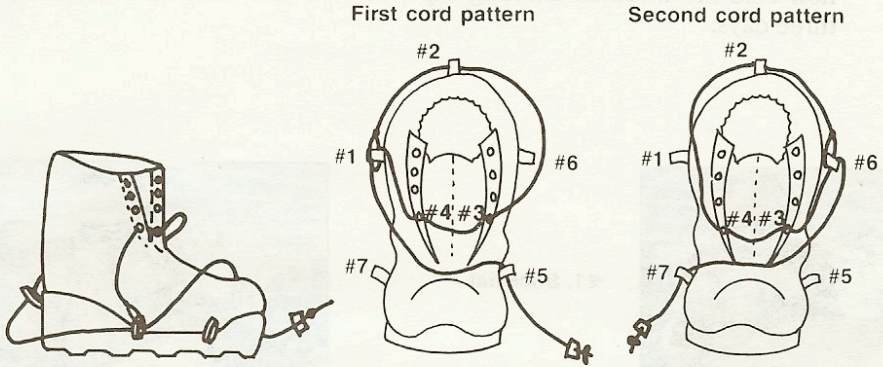


Cross-section showing detail of fur ruff assembly

11. Take a 3-foot length of flexible wire and twist a small loop in one end. On the inside of the mukluk just ahead of the fake fur, snip a small hole in the mukluk shell fabric so you can push the wire loop into the draw cord tunnel. Work the wire all the way through the tunnel and snip a second hole in the far side of the tunnel opposite the hole through which you pushed the wire. Work the loop of the wire out of the second hole and run a 2-foot length of $\frac{1}{8}$ -inch nylon cord through the loop. Pull the wire back through the tunnel so that it draws the cord with it to create a drawstring around the top of the mukluk. After you've threaded the cord through the tunnel, slip a cord toggle onto

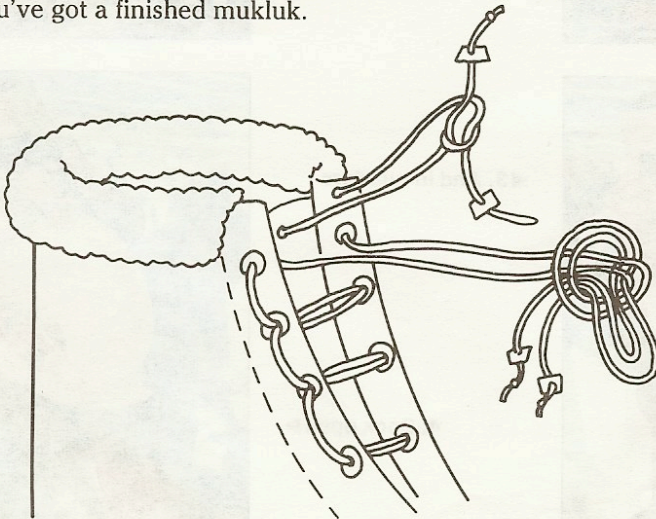
each end of the cord, then knot the cord to keep the toggles in place and to prevent the cord from being pulled out of the tunnel.

12. Tying up the lacing loops attached to the mukluk sole requires two cords, each 8 feet in length. Tie the end of one cord to lacing loop #1 with a bowline. Run the other end through loop #2, eyelets #3 and #4, through loop #1 again, over the toe, and through loop #5. Attach a cord toggle.



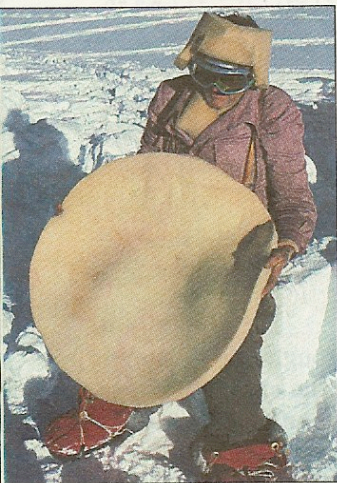
Take the second 8 foot cord and tie it to lacing loop #6. Thread the free end through loop #2, eyelets #4 and #3, loop #6 again, over the toe, and through loop #7. Attach a cord toggle.

13. Finally, take a 7-foot length of cord and lace it through the eight grommets in the eyelet fold. Attach cord toggles to the ends, slip a couple of pieces of carpet into each mukluk to serve as an insole, and you've got a finished mukluk.



Foam Socks

To insulate your foot inside a mukluk, use a circular piece of 1-inch-thick low-density polyurethane foam 30 inches in diameter. Fold it in half twice, then pull back the top layer. Wearing heavy wool hiking socks or no socks at all, put your foot in place and wrap the foam around it as shown in the accompanying illustrations. Insert your bundled foot into a mukluk, tighten and tie all the lacing cords, and your foot will stay warm no matter how cold the weather. On long trips, unfold and rotate the foam every three days.



◀ 1. Sock flat



2. Folded in half ▶



◀ 3. And in quarters



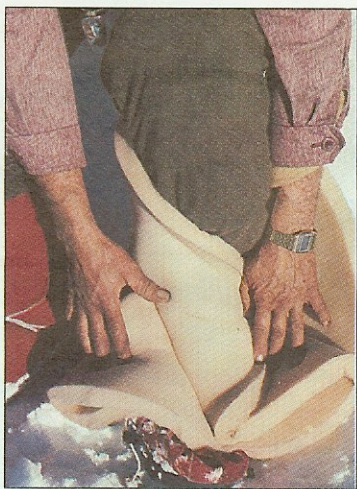
4. Sock open ▶



◀5. Mukluk open ▶



6. Foot and sock
in mukluk ▶



◀7. Wrap layer
left against
leg.



8. Next, wrap right ▶



◀9. Then left



10. And right ▶



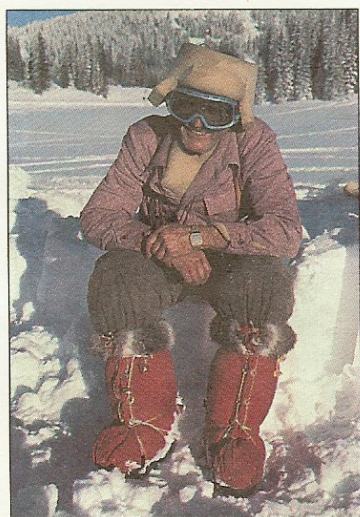
◀ 11. Pull up mukluk top.

12. Lace ▶



◀ 13. Pull tight; tie.

12. Warm from head to toe ▶



natural windbreak where it catches lots of direct sunlight. Check overhead for tree limbs heavily laden with snow; strong winter winds can blow it onto your shelter.

A WINTER SLEEPING SYSTEM

Ever shivered through a hard winter's night in a thin, damp sleeping bag? Even a heavily-insulated bag tends to become clammy and cold as moisture from your body permeates it night after night. No doubt you wished someone would figure out a way winter campers could sleep warm no matter what the weather.

You're in luck. Using gear you can make yourself, you can sleep cozily at temperatures far below zero. In fact, it's effective even when you have no shelter. Here's what's required.



Plastic Sheet

Use a 12- by 12-foot piece of 4-mil clear polyethylene, the same as that you can use to rig up shelter in milder weather.

(For directions on reinforcing a sheet for use as a trail tarp, see "Making Equipment.")

◀ 1. Spreading plastic sheet



Deicing Cloth

A piece of nylon fabric about 3 by 7 feet.

2. Spreading deicing cloth▶



Moisture-Handling Pad

A pad of 1-inch-thick low-density polyurethane foam, 3 by 7 feet.

- ◀ 3. Spreading moisture-handling pad.

4. Spreading sleeping bag ▶

Foam Sleeping Bag

Made according to the pattern in "Making Equipment," the bag is constructed of 1¼-inch foam, lined and covered with breathable nylon.

In addition, you'll need to be dressed in warm, breathable clothing with no water-proof coatings to impede the passage of body moisture through the cloth. Some winter campers fashion pants and vests from the same foam as that used in the moisture-handling pad, and wear them under large woolen trousers and shirts.





- ◀ 5. Since the fabric and foam of the system are breathable, a plastic envelope is necessary to block the wind. Fold the narrow length of the plastic over the top of the bag.

6. Next, fold the remainder of the plastic over ▶ the bag and tuck extra underneath.

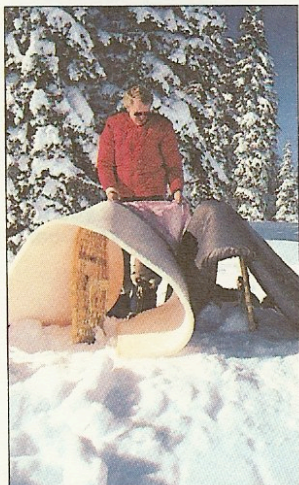


- ◀ 7. Finally, fold the end of the plastic under the foot of the bag. Loose enough to allow you to breath easily, the plastic will protect you from the wind and falling snow.

8. To get into bed, slip off your footwear and ► tuck it under the head of the bag for use as a pillow. Slide into the bag, placing your feet inside a foam foot mitten, and when you're all the way in, take off your parka and drape it over your chest between the sleeping bag and the plastic. Snuggle down, pull the parka over your face, slip your hands into your mittens, and you're set to sleep soundly through the coldest arctic storms.



▼9. Drying the system in the sun



Note that the clothing you wore during the day serves at night as one layer of the sleeping system. Because all the fabric and insulation is breathable, the warmth from your body will drive moisture through your clothing and the sleeping bag until it hits the plastic or the deicing cloth and freezes. In the morning you'll find that you are warm and that your clothing is dry, even if it had been damp when you went to bed. Shake the ice off the plastic and the deicing cloth, and you'll be ready to pack up your sleeping system and get on with the activities of the day. If you aren't traveling and the sun is shining, spread out your sleeping gear and let it dry, though the system will keep you warm even if the foam bag becomes very wet.

SHELTERS

Winter shelters help ensure your comfort and safety in the snow. With a little practice you'll be surprised how quickly you can prepare a secure, warm shelter.

One warning, however: *never burn a stove or heater inside a shelter!* Snow shelters and closed tents can become virtually airtight. A stove will burn up the available oxygen and replace it with odorless, colorless carbon monoxide—a deadly poison. Play it safe and do all your cooking outside.

Shovel

An essential part of your winter gear is a sturdy shovel. In addition to building snow shelters, you'll use it for all kinds of camp chores, and it is an important rescue tool in case of an avalanche. The shovel you choose should be strong, light, and durable. Some of those sold by outdoor equipment stores are fine, but others are too flimsy. Many winter campers prefer an aluminum grain scoop with a shortened blade (you can trim it to size with a hacksaw and round the edge with a file). Weighing about 3 pounds, it has plenty of capacity and durability.

Saw

When the snow is deep and well packed, use an ordinary carpenter's saw to cut the blocks of snow necessary to construct igloos and snow houses. A stiff rip saw is ideal. Guard the blade with a length of split garden hose and carry it whenever you travel in snowy country.

