Plump Up:
A Primer for Cold Comfort in the Wilderness (rough draft)

Here on the edge of the Boreal Forest (the Fir-Spruce canoe country of the North) we know cold. Many of us live here because we thrive on the deep Snows and the silence that reaches all the way to the Stars on a crisp January night. A fresh track on newfallen Snow is so visible that it virtually seduces you to follow it. The winter tubers are succulent, the buds are dense, the sap is sweet, the animals are fat, and the pelts are luxurious — all because of the cold. So how could one who enjoys these gifts and blessings of the Farther Places not also be invigorated by the sting of cold on the cheek and the bite of sharp air in the lungs

Forget those horror stories about the North Country. The Natives who dwell here dance in the face of the cold and thrive in this season of abundance. It is all a matter of Balance. In order to help you experience some that bliss along with us, I'd like to share with you some of what I've learned about cold weather clothing from this Land's Aboriginal People . . .

Footwear

Most people seem to do alright garnering adequate winter apparel — with the exception of footwear. I believe this is because the normal features we consider when choosing footwear — watery repellency, support, traction, protection — are of minor importance for winter footwear. Keeping dry is not a problem. With the ice two feet thick and the snow nowhere near melting point, our bountiful water is locked up. In fact, the winter landscape is akin to a Desert — the humidity is low, skin gets dry, and the colder it gets the less moisture the snow contains. Traction is of minor importance; snowshoes provide that, and protection is little needed in a land of fluff. For example, I have a friend who wears nothing all winter even in sub-zero temperatures but over-sized tennis shoes. He'll wear several pairs of socks with a plastic bag between the two outermost pairs if the snow is wet and his feet stay comfortably warm.

In order to grasp the concept of cold weather footwear we have to think of it more as we would the covering on the rest of our body, where our primary considerations are not external as with warm weather wear, but internal — keeping warmth in and getting sweat moisture out. These two functions are so important that footwear is virtually useless if it cannot perform them both.

Let's first look at warmth. In order to understand the approach that works we need to think not about keeping out the cold but keeping in the warmth. Let me explain . . .

We have within us all the warmth we need — a gift of our Sun Father who fills us with His radiant touch. To let His gift escape dishonors Him, as He kindly bestows it upon us to fill our need. Imagine if you were a mother who gave your child enough food for a meal, but he did not trust in that so went out to beg.

If we are concerned with losing heat rather than retaining warmth we buy into an attitude that can spell misery rather than comfort, or in the extreme, death rather than life. We have set ourself up to fight the cold — the old "man vs. nature" dichotomy. It is a fight we cannot win, because we approach The Mother as an external threat, which takes us outside yourself and makes us mistrusting and prone to mistakes. The child who must scrap for his food wears a mood of competitiveness and suspicion.

When we embrace the warmth, we come from our center, a place of knowing trust and acceptance. We can then also embrace the cold, for it is no threat. The child who is well nourished has the capacity to venture forth with openness and trust.

With this approach you will choose clothing that works because you're focused on what matters — retaining warmth. Those who focus on keeping out cold may do so, while at the same time they are losing heat. Imagine that while you are preoccupied with keeping your neighbor's Goats out of your pasture, your Goats are escaping into his.

With this awareness we are now ready to learn about insulation — the material that retains heat. The effectiveness of insulation is based upon dead air space, which restricts the flow of heat. A closed window

creates dead air space, so heat is retained; an open window allows air to move, so heat is lost. The more windows, the more dead air space and the warmer the room remains. So think of insulative material as thousands of tiny rooms with closed windows. The more rooms and the smaller they are, the more efficient insulation. Thus, the thicker the insulation, the better it insulates.

Multiple layers of insulation work better than thick materials because the number of layers can be adjusted to maintain comfort level and allow for sweat evaporation, and the insulation can be broken down to allow for quicker drying.

This means winter footwear (and the rest of your clothing) will be bulky. Forget style! Footwear that is slender and one-piece, and yet promises to keep your feet warm, is not to be considered. You will look club-footed; there's no way around it.

Native footwear, which is well-suited to this region because it evolved here over millennia, consists of a light outer layer with a lot of room inside for layers of light furs and occasionally grass or moss. The Inuit mukluk is a good example. The light construction allows for foot flexibility even with the insulative bulk.

We can approximate the mukluk as does my tennis-shoe wearing friend, or with commercially available footwear. Pac boots, which consist of an oversized rubber moccasin-style shoe stitched to a leather lace-up upper, are readily available commercially and reasonably priced. They work well over a wide temperature range and are left wanting only in extreme cold, which we'll discuss later. Pac boots usually come with a pair of thick felt liners.

When our shopping for a pair of pac boots, wear two pairs of heavy wool socks, then lace up the boots and walk around in them to be sure they are loose enough that they will not restrict your circulation. When it comes to maintaining warm extremities, circulation is everything. The warmth of your torso needs to reach the very tips of your toes, which is accomplished through your circulating blood. Blood returns to your torso, is warmed, then is pumped down to the tips of those toes again to keep them warm.

The boots need to be loose without being sloppy, and your toes need adequate room to spread out without compressing the insulative layer around them. Remember that a garment's insulative value is dependent upon the amount of dead air space it can trap, so the area around every part of your foot needs to feel somewhat loose.

Purchase three extra pairs of liners and about eight pairs of medium to heavy well-made wool socks. Next to fur, wool is the best insulative material you can use. It does not compress when it gets wet and its fibers absorb little water, so it maintains much of its insulative value. The reason that wool compares so favorably with fur is that wool is sheared fur.

Many contemporary pac boot liners have a high percentage of synthetic fibers. Shop around to find the highest wool content you can. You may make your own liners out of wool felt or use a couple of additional pairs of wool socks, assuring that they be of heavy construction and extra large size.

So many socks and liners are needed because they have to be changed frequently, especially when you are outdoors for extended periods of time. Their insulative value drops proportionately with the amount of sweat moisture they accumulate, so you may have to change your liners and socks twice a day. Once you gain a feel for how much you sweat it is best not to wait until your feet are actually getting cold because things take a long time to dry in frigid temperatures. Also, salts accumulate, which cuts down on insulative property. So the more you keep them rotated the cleaner they will remain, the faster they will dry, and thus the more available they will be.

I like to change my socks more often than my liners because socks dry faster and the liners are kept cleaner.

I increase the efficiency of my pac boots with the addition of a felt inner sole. It helps compensate for the compression of the underfoot areas of socks and liners. When Pac shopping remember to bring a felt sole along to make sure it will fit along with liner and socks.

Look for pac boots that have a triple row stitch attaching uppers to bottoms. Avoid the inexpensive models with stiff leather uppers; they will only get stiffer in the cold. Choose soft leather or canvas uppers. Some models have deep waffle-stomper type treads similar to those found on hiking boots. Avoid them, because they collect snow and in wet freezing conditions they are susceptible to ice buildup. Choose boots with a shallow open tread, with soles that do not have angular edges but are rounded and contour into the uppers, and with heels that do not protrude but are integral to the soles. This type of bottom will give you maximum traction and ease of walking without tripping you up on ice or objects protruding through the snow.

Pac-style boots can be made fairly easily. Perhaps the simplest to make and most serviceable is the mukluk, which is little more than an oversized high-top moccasin. The bottoms are made of an impermeable skin such as Seal in coastal areas, and Beaver inland. When tanning sole material the grain is often left on to furnish a more durable and water-resistant product. I also leave hair stubble on to provide traction.

A good upper material is a light duty, soft, breathable buckskin, as it allows for maximum flexibility and moisture escape. Avoid suede-finished leather, which attracts moisture like a sponge and creates drag when walking through snow. Some people prefer fur uppers; choose one such as Otter or Beaver, or Seal if you live on the coast, as these furs will stand up to wear and will not accumulate ice as easily as those of dryland animals. I personally prefer a hairless upper as it better allows fur leggings to overlap.

Mukluk tongues can be sewn in accordion-style so that the boot be snow and water resistant and so that the upper can expand adequately to accommodate insulation-clad feet.

A student of mine made a quite handsome pair of mukluks from the bottoms of an old pair of rubber galoshes, to which he sewed canvas tops. Mukluks can be made entirely of canvas, to which leather soles are sewn. These are particularly serviceable for snowshoeing.

When Mukluks are worn with snowshoes, traction is not an issue. When I use mukluks alone I wear a rawhide-net slipper over them, which proves adequate traction.

Rubber-bottomed mukluks and pacs have a weakness: In extreme cold, water condenses on the inside surface of the rubber and freezes. One can end up walking on thin ice, but with the ice on the inside of the boot. In these conditions — especially if one is spending extended periods of time outdoors — a mukluk is needed that is constructed of a non-dense, breathable, insulative material (such as canvas or light buckskin) all the way down to the sole at least, and preferably the sole as well. Any dense material, whether breathable or not, can encourage condensation and ice build-up. Besides rubber, various plastics are the usual culprits.

For these conditions I have a pair of very lightweight all-felt military surplus mukluks that have felt soles covered with a thin layer of rubber. They work very well, as do the traditional Native-style mukluks described above. Yet mukluks have the edge, as they are more flexible, durable, and easier to repair.

Some people will follow these guidelines to the letter and still complain of cold, clammy feet. Besides being uncomfortable, this can lead to frostbite or worse. I find the cause to be one of two things, the most debilitating being stress. Fighting the cold rather than embracing it and working to keep the warmth in, as I described early on this article, pulls one out of Balance with her environment and therefore in a state of stress. This causes her muscles to constrict, she is not breathing properly, her fists are clenched and her toes are crimped — all of which restricts blood flow. She is fearful, which induces sweat when she is yet comfortably warm. Then as she chills she continues to sweat because she is under stress. On an extended outdoor stay could be at great risk.

The other common cause is drugs, some of which constrict the capillaries, thus reducing warming blood flow to the skin surface. That, along with the hyperactivity which some drugs induce, results in the same cold, clammy state as does stress. Nicotine and caffeine are the drugs usually involved.

Handwear

Hands are the body part most susceptible to heat loss. Fingers in particular have a large surface area in relation to their inner volume, which makes them efficient radiators. However, what little they contribute to the outside temperature isn't going to make a difference anyway, so you might as well let them keep their warmth. Also, every time hands get deeply chilled they permanently lose a degree of sensitivity.

Those new to the North Country often choose gloves over mittens, so that they can maintain manual dexterity. It usually takes just a wearing or two to convert those newcomers to the Mitten Way. Gloves keep fingers isolated from one another, unable to share warmth and reduce heat-losing surface area. In mittens fingers also benefit from the warmth of the hand in general.

My experience is that I actually have better manual dexterity with mittens. Working in gloves is clumsy, so projects take longer and don't get done as well. Fingers chilled because of inadequate insulation slow progress as well. When I take my mittens off my warm, unencumbered hands can do the job much more quickly and efficiently, after which I can slip them back into waiting warm mittens.

When making or choosing mittens, think of them as mukluks for the hand and use the same criteria. The primary difference is that, because hands are easier to keep warm than feet, you won't need as many insulative layers (two is usually adequate). As with mukluk shells, select a light breathable material and avoid suede finishes. A commercially available leather shell known by the generic term "choppers" is an inexpensive and functional option, so long as the leather is soft and not too thick.

Headgear

Contrary to what you might think about yourself, you are a hothead. You have your bloodthirsty brain to thank for that; it is better supplied than any other organ. Thus your head is the easiest part of your body to keep warm. This also means that you can lose a lot of body heat through your head — almost half, in fact, in certain conditions.

This can be both beneficial and risky: When hot we are tempted to first remove our hats, which does cool us quickly, but it doesn't solve the problem that caused the overheating in the first place. So, besides running the risk of overheating again as soon as we re-don our hat, we have sweat moisture trapped in our clothing that will continue to accumulate, with obvious dire consequence.

The best way to deal with overheating is to leave your hat on (or remove it for just a brief period if extremely overheated) and open or remove clothing layers, which will allow for moisture release and more directly address the cause of overheating.

I'd like to stress here that, besides the potential danger, the generation and release of excess heat is a disrespectful waste of the gift of warmth. We burn less calories maintaining a steady comfort level than we do bouncing between extremes.

Native headgear consists of nothing more than a single-layered fur hat, with fur side out (the rule of thumb for the most efficient wearing of animal skins is to wear them the way the animal did). A hat any thicker will induce sweating in most. The best hat furs are contributed by medium-sized animals such as Skunk, Raccoon and Fox. They may be used in the rawhide state if softened and oiled, however they are more breathable tanned. Wool also makes a good hat.

I prefer a small visor, of about two fingers' width, to keep snow off of my face, and a breathable top. The hat I use most has fur sides (which when warm can be flipped up to expose neck and ears) and a loose-knit wool crown. Oiled Buckskin strips or soft plant cordage are also good crown materials.

The fur that works best for a face covering is called a beard, and I recommend that you grow one if you can. If that's out of your genetic realm, or in wind or extreme cold, a pull-down wool hat with openings for mouth, nose and eyes works very well. One style is known generically as a balaclava. A soft buckskin version can be easily made. My hat has a one-piece ear-forehead flap that, along with my beard, suffices without addition.

Sleeping Gear

As with cold weather head and foot wear, furs make the best bedding. In my lodge sleeping area I begin with a layer of marsh grass or Pine boughs about a hand's length thick. Over that goes two layers of fur, both with hair-side up. Usually I'll use raw Deerskins because, insulative as they are, their hollow hair is brittle and breaks easily, so they do not serve well under more active usage. Their service as rugs gives them the opportunity to age and soften prior to tanning. This "tenderizing" eases the work of tanning.

The most serviceable blankets (which we call sleeping robes) are made of sewn-together furs which are light and soft so that they are not weighty upon the body. They also conform well to the body's shape, thus better holding in warmth. Fox, Raccoon and Coyote furs work quite well. Choose dense, lofty furs, which are from animals in their winter prime. I don't' care for Buffalo or Bear robes in cold conditions because they are heavy, not as insulative as the just- mentioned furs, and their leather is thick so they do not conform as well to body shape.

Make your robe big enough so that you can pull it over your head and tuck it in around you on both sides and under your feet. This extra size is also important because the Native sleeping robe is a multi-purpose garment, used also as a wrap-around to keep warm in the daytime, to wrap goods carried in an open pack-frame, and as a tent. That's why a Native-made sleeping bag is a rarity.

In very cold weather I use two sleeping robes, with the lower one hair-down and the upper one hair-up.

The sleeping robe can be approximated using wool blankets. Choose the lightest weight and loftiest, yet tightly woven, blankets you can find. Dense or thin tightly-woven blankets do not have the insulative value you need. Some blankets that appear to have all the right qualities are yet not tightly enough woven. You can determine the quality of the weave by holding a blanket up to the light. If light penetrates and you can clearly make out the woven structure of the blanket, reject it.

In extreme cold you may need up to eight blankets to keep you warm. That mass can lay pretty heavily upon you, which is why it behooves you to choose the best quality blankets available. The weight-to-warmth ratio of blankets is not as good as furs, so some extra weight is to be expected. But the weight of the number of poor quality blankets needed to keep you warm is difficult for some to sleep under.

Good quality blankets are still available from a few specialty stores and mail-order houses. The best deals are found in second-hand stores and from military surplus vendors. The quality of military blankets varies considerably, so if you are mail-ordering them be sure you have returned privileges.

Body moisture accumulates in sleeping robes and blankets just as it does in footwear. The colder the sleeping conditions the more often robes have to be hung to dry. Items will dry even in temperatures considerably below freezing because water has the capacity to convert directly to a gaseous from a solid to a state without first having to becoming liquid. So hang your items where they'll receive as much sun and breeze as possible. They may also be dried around the fire, but I've seen too much good fur and wool ruined

that way to heartily recommend it. If you must do so, hang your items far enough away from the fire that they only become warm to the touch and stay with them at all times, checking them regularly.

In extreme cold, people have a tendency to pull their blankets over their heads and breathe through the blankets. This results in a considerable amount of condensation and frost accumulation on the outer blankets. To avoid this, pull the blankets over your head and then form a tunnel to the outside air. The tunnel tempers the temperature of the incoming air as well as allowing the harmless escape of most breath moisture.

Because of the difficulty of drying sleeping bags I do not recommend them for extended cold weather use. The best way to use them is either in combination with blankets or by doubling up a light duty winter bag with a three-season bag. This allows for more versatility in terms of adjusting to temperature differences than a single heavy-duty winter bag, and the two thinner bags are easier to dry. I prefer a light winter bag in combination with blankets, as the blankets give even more flexibility in terms of temperature adjustment, and they dry fast.

Down(feather)-filled bags are functional only as an outer layer because they compress under the weight of blankets or another bag, which reduces their insulative value. Wet down clumps, which renders it useless as insulation and makes it hard to dry. Down works best on a Goose; I suggest leaving it there.

Now that you have proper sleeping gear, you'll want to stay warm in it, and the best way to do that is to get naked. The mitten-glove comparison applies here as well: when you wear clothing to bed, you isolate your extremities from each other and from your torso. When all together, your body parts' total exposed surface area is reduced and the escaping heat from one helps to keep the others warm. When separated from each other, the extremities' increased exposed surface area radiates heat that does nothing other than chill the body.

Hint: sleep with your undergarments. They provide additional insulation, your body heat helps dry them, they're warm when you put them back on, and you can dress in bed without exposing yourself to the cold.

Torso Clothing

Our discussion thus far has given you most of what you need to know about clothing, as the insulative, layering and breathing principles we covered apply to all body coverings. One additional principle that we'll we want to incorporate in the design of our clothing is that of heat rising. When clothing is shingled — when the upper layers overlap the lower, warm body air rising inside clothing will not escape. So you'll want to make or procure clothing that overlaps — leggings over footwear, shirts over leggings. Overlap also keeps snow and other matter from getting into clothing, and allows for ventilation (because of which, clothing is not beset with the moisture accumulation problems of footwear). Allow for enough overlap; I like at least a hand's length. That's enough so that you won't have to tuck in to keep drafts out, as tucking interferes with both ventilation and shingling.

Being more complex than footwear and sleeping robes, clothing requires some additional design considerations, the most important being that it needs to allow for the rapid regulation of body temperature. It's easy to take mittens off or throw off a blanket; allowing excess heat to escape from the torso is more difficult. And it is a higher priority, as surplus torso heat can induce prodigious sweat over the entire body.

Because of the nature of outdoor activities, we need to allow for heat escape while we are moving and without having to take off layers of clothing, as that could result in an inconvenient carrying burden and compromise movement. Front-opening clothing is the simplest way I've found to do that. Without missing a stride I can open and close layers as I need in order to regulate my comfort level and release moisture. Pullover clothing, unless it be an under-layer, is too inconvenient to be of practical service.

Vests are liked by some because they help keep the torso warm and allow freedom of arm movement. Their drawback in extreme and long-term cold usage is that they do not keep the arms warm. Because arms cool more quickly than the torso, and because blood needs to be kept warm to reach the hands, the arms need at least as much coverage as the torso.

Again — you guessed it — fur is best. The same types of furs that work well for bedrolls work well for clothing. In extreme cold, two layers of fur are worn, with the inner layer fur-in and the outer layer fur-out. A heavier pelt, such as Wolf, Caribou or Bear, may be used for the outer. Deer may be used also, even though it sheds. Its life expectancy will be short, particularly with heavy use, yet I know of people who use it anyway because of its easy availability.

And, as usual, wool is next best. Use the same criteria for choosing wool clothing that you would in choosing wool blankets. Undergarments are an exception. Wool can be itchy next to the skin, so choose high quality long underwear that you can comfortably wear. For those who react to wool, silk may make a good undergarment (Don't use cotton! Because of its absorbency it makes a great warm season fabric, and because of its absorbency it has killed many in the cold season). Good quality wool clothing is available from many of the same sources as wool blankets. As with footwear, you need to shop with all of your layers on to be sure of good fit.

My cold weather ensemble consists of four wool shirts and three wool pants over wool long-johns. With well-designed clothing I consider a scarf to be unnecessary, and a nuisance besides, as its main function seems to be to dangle and get in the way.

This system of clothing works in temperatures that range from freezing down to about 30 degrees below zero, which is about as cold as it gets here. With eye protection, and if you are acclimated, this system serves well in even colder temperatures. Test your clothing and sleeping gear throughly before taking it with you on an extended cold weather adventure. That's easy enough to do, as it gets just about as cold in your backyard as it does in the nearby wilderness.

Now you're ready, clothing-wise at least, to go and join the ever-singing Chickadees and the Aspens popping like firecrackers from the cold. Have fun!