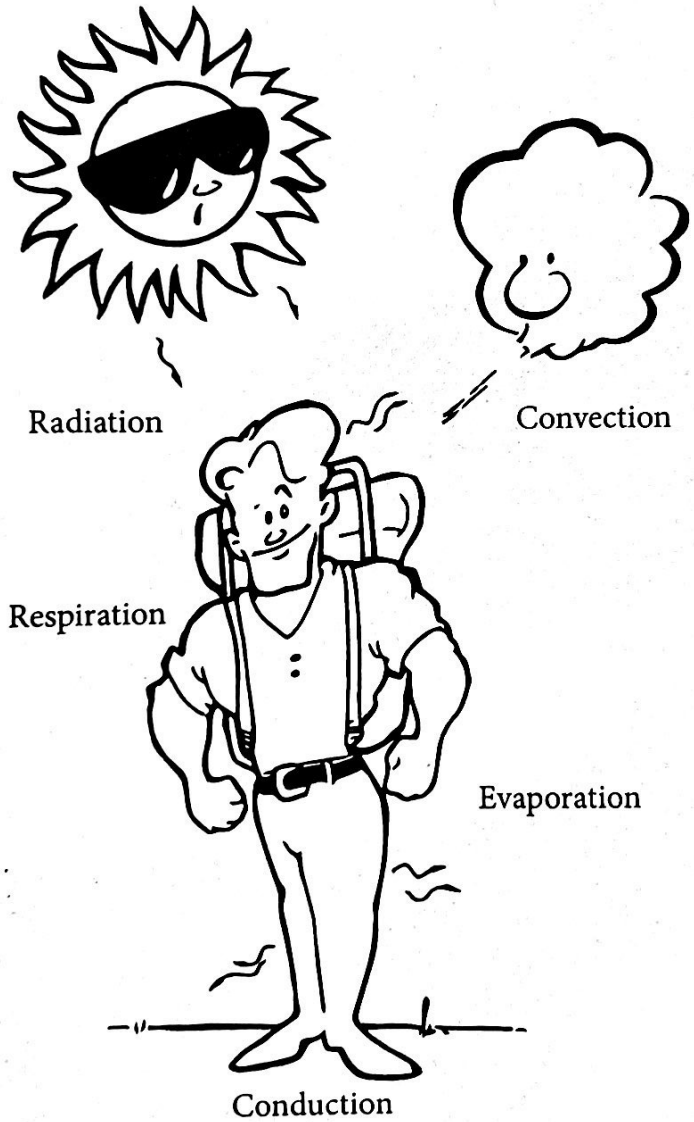
How to Keep Warm
or
If Your Feet are Cold Put On a Hat



BUSHWHACKER

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If Your Feet are Cold, Put on a Hat

Are your Feet Cold?

Do you wear a hat? No? Then I'm afraid you've lost your right to complain, and this little brochure will help explain this old adage. We also hope it will help you be a little more comfortable and have a little more fun when you're outside in the cold - whether it be skiing, canoeing, backpacking, or just shoveling snow or watching your son's football game.

Heat Transfer and Your Body

To understand our old adage, you first have to understand a little about your body, its survival mechanisms, and how heat gets in and out of it in the first place.

Heat Gain

Your body acquires heat from both external and internal sources. You can control both of these to a certain extent.

External Sources

Obviously, anything that's warmer than you are will add heat to your body. It's mostly common sense, but if being cold is going to be a problem, don't pass up a chance to sit in the sun, go inside, sit by a hot fire (or friend), or drink some hot chocolate.

Internal Sources

Your body is a marvelous machine that burns food for energy and produces heat from within. If a machine runs out of fuel (or food), it shuts down. Don't forget to eat! All this heat moves around inside your body via the bloodstream. Eliminate the blood supply to an area and that part of your body gets cold.

Now your body also has a pretty amazing survival reflex that allows it to shut down the blood flow to its extremities to pol warm blood in vital organs of the torso and head. Yes, if your body is getting cold, it will sacrifice your feet and hands to save its life. Did you ever wonder why your feet and hands always get cold first, but your head and chest never do (even if you were wearing Bushwhackers's latest $350 gloves and boots). Now you know why, and all you have to learn now is why wearing that stupid hat may help.

Heat Loss

Your body loses its heat in five ways - through radiation, convection, conduction, respiration, and evaporation. By understanding a little about each process, you should be able to control your heat loss, and thus stay more comfortable.

Convection

Convection is moving air. Wind blowing through your loose knit sweater, under the loose waistband or cuffs of your jacket is heat lost through convection. Windproof outer layers are the best prevention for convective heat lost.

Conduction

You probably wouldn't sit on a cold rock in the middle of winter - no one would be that stupid. But you might sit on some cold bleachers at a football game, grab a ski pole, sleep in a sleeping bag without a ground pad, or just get a cold zipper against your neck. It's all heat loss by conduction.

Respiration

Every time you breathe, you breathe out warm air. There's not a lot you can do to prevent this one (the cure is worse than the problem), but just be aware that you're going to lose some heat no matter what.

Evaporation

Here's an important one. Evaporation is a very efficient cooling process. Air conditioners work on the principle. Put a wet cotton glove on one hand, and a dry one on the other and see which hand gets cold. Wet cotton long underwear is going to present the same problem. Think about that when you ski a tough bump run, or sit in the heated car on the way to the football game. Wet cotton is very bad.

Radiation

Just as a wood stove radiates heat into a room, so does your body radiate heat into the air. The more insulation you put around it, the less heat that's lost. There are lots and lots of blood vessels in your head, and these all carry warm blood. Leave your head uninsulated, and you'll be radiating an awful lot of heat out of your body.

Are you starting to get the picture?

You'll be a whole lot happier, and be able to stay our skiing a lot longer if you can stay comfortable - neither too cold, nor too hot. Obviously, you say, but how? Remember the 5 ways you lose heat? Remember how you gain heat? Balance the total heat loss against the heat gained, and you stay comfortable. Add more heat than you lose and you get hot and eventually start to sweat. Lose more than you gain and your body starts to get cold. So what does your body do? You guess it - it shuts off the blood flow to your feet to conserve warmth, and your feet start to freeze. You can cause the same blood flow shutdown if you wear too tight a boot or try to stuff too many thick socks into a normal fitting boot. Keep the blood flowing and you'll stay warm - shut if off and you get cold. It's that simple.

Generally, conserving heat is the main problem in the winter. Think about the 5 ways you lose heat and the 4 over which you have some control. If your feet or hands are cold, it's a good bet your losing a bunch of heat somewhere. I know, the perfect hat hasn't been made, but put it on anyway along with that fleece sweater. You'll reduce your radiative heat loss. Put on that windshell and pull up the drawstring to reduce convective heat loss. Stop sitting on that cold rock in the shade to rest, and brush the snow off those blue jeans. Better yet, reduce the evaporative heat loss even more by changing out of the jeans and into some good synthetic long underwear and ski pants. You'll be amazed at how much warmer your feet will be without even changing socks. Oh, by that way, don't forget that extra 'Snickers" in your pocket. Your body can't produce heat if it's out of fuel.

Occasionally, you overheat and need to reverse the process. Take off the hat, open the jacket and stow the sweater before you start to sweat. Even the best synthetic gear takes awhile to dry, and you'll be sorry when all that sweat starts evaporating when the sun goes away and the wind starts blowing. People always tell you to dress in layers to stay warm. Not that two thin layers is any warmer than one thick one, it's just easier to control your thermostat that way.

So, now that you know why putting on a hat helps keep your feet warm, you're ready for the great outdoors. Just remember to listen to your body, balance the heat loss against heat gain, use common sense, and you'll be comfortable in most anything Mother Nature can dish out.

Clothing

People always ask us 'Will this jacket keep me warm?' We can show them which jackets are warmer than others, but it's probably clear to you astute readers that no single piece of clothing can guarantee warmth. There are just too many ways to loose heat.

Long Underwear

The single most important item in your wardrobe, though, is good long underwear. And by good, we mean synthetic (e.g. Patagonia Capilene) or wool (e.g. Smartwool) and not cotton. The good synthetics will wick moisture away from the body and keep a warm, dry layer next to the skin, thereby eliminating most all evaporative heat loss. Wool absorbs moisture, but because it also wicks and insulates when wet, it feels dry, warm, & comfortable. You've probably worn traditional longies, worked up a sweat (shoveling snow or skiing), stopped, and felt that bone chilling cold. That's water evaporating, and you're history until you get out of the wet cotton. It's not a problem with Capilene and Smartwool.

Capilene, about $120 a set from Patagonia, is a specially treated polyester, that is environmentally friendly, machine washable and dryable, and wicks moisture better than other synthetics. It doesn't contain lycra which holds moisture and makes you cold.

Because it's made from the long-haired Merino sheep, Smartwool (about $160/set) is soft, non-itchy, and extremely comfortable for light and moderate activity levels.

In short, start dressing from the inside out, because a set of good long johns on the inside is the single most important element in keeping you comfortable when you're outside. Save money on the jacket if you must, but don't skimp on the long johns.

Insulation

Your next layer, after the long johns, is the insulation layer. It's primary function is to reduce radiative heat loss. The more you put on, the less heat you lose.

There is not room to talk about all the brands of insulators out there (the number is mind boggling), but we can hit the high points.

Goosedown is still the lightest insulator for a given warmth. The higher the cubic inches/oz. number (e.g. 800 vs. 500), the more efficient the down is. It takes 16 oz. of 400 down to be as warm as 8 oz. of 800 down. Polyester synthetics, like Primaloft, will generally be a little less expensive than down, will dry quicker, but wont last as long or be as lightweight.

The synthetic fleece sweaters you see are good insulating layers too. Like wool, they're warm when they're wet, but they're softer, and they dry out quicker.

Don't get too bogged down in all the types of insulation. It's how it's used, and how it's incorporated into the jacket that counts, and remember that the warmest jacket is probably the thickest jacket.

Weatherproof Shells (the Outer Layer)

It should be clear to you by now that you want to keep wind and water out, but let water vapor escape from the inside of your clothing. Simple in principle, but more difficult in practice.

Shells range from totally waterproof and not very breathable (often called hardshells) , to very breathable and not very waterproof. Of the 'waterproof/breathable' hardshells, Goretex is the most waterproof, most breathable, longest lasting, and most expensive, although there are many very acceptable (and less expensive) substitutes. Think about your individual needs and budget before you decide on a shell. People standing in heavy rains require total waterproofness, while more active users in less rainy weather will want to opt for more breathability.

Well, we're glad you got this far, and while we really only hit the high spots, we hope you got some good tips, and are able to stay warm and comfortable on your next outdoor outing.

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