COLORADO
DEPARTMENT OF NATURAL RESOURCES

*A Newsletter for Friends of the CAIC*

Spring 2006 ❄ Volume 10, Number 3

# THE Beacon

## THE POWDER STASH

by Scott Toepfer, Editor

It wasn't that long ago we were placing new batteries in our beacons, dusting off our shovels and probes, and trying to remember where we left our skins. Winter started early and with prodigious snowfall across the northern two-thirds of the state. I remember it well, especially since I was working on a remodel at Francie's Cabin, elevation 11,400 feet. And I thought avalanche forecasters were the only people that did a 1,000 foot climb on skis as their work commute. Now it is April, and it's still snowing. Along with the good snowfall, it has been a transitional year for us at the CAIC. Knox has retired, Dale and Halsted have moved on to greener pastures. Our new director, Ethan, Nick, Spencer and I have some huge shoes to fill. While trying to figure out where to take the center, we decided to conduct a survey of our users. A number of the results were no surprise. Many comments gave us new ideas and will help us figure out how to proceed. We have much to accomplish by next fall. Thanks to all of you that sent us ideas and comments, we hope to address your needs. Change is one of a few constants we can depend on, and change has hit me like the chunk of cornice that fell on me during the field portion of the National Avalanche School in Telluride last February.

It's been many years since I last taught at the National Avalanche School. This year I had the opportunity to help out at the Phase Two, or field session, in Telluride mid-February. The cornice block that knocked the cobwebs loose in my head made me think about how much avalanche rescue gear has changed over the last 30 years. At the NAS there were a couple of demonstrations on some of the new tools available for backcountry aficionados. Some of these items remain cost prohibitive for the day-to-day backcountry user, like the DKL heartbeat detector and the RECCO receiver unit. (FYI Many soft-ware manufacturers place RECCO tabs in a number of clothing lines). The variety of sophisticated and light weight tools that really do the job are beginning to make our choices difficult and packs full. There's no question the avalanche safety industry has come a long, long way.

Looking at the tools available to us in the year 2006 made me think back on all the advances we've seen since I un-spooled my first avalanche cord in 1977. That was my rookie year as a paid professional ski patroller (paid being a matter of definition I suppose). Later that same season I got a chance to start practicing with the next new wonder tool; a Skadi Hot-Dog beacon. Now when I go out and practice with my new rescue gizmo, it tells me which direction to go, how may people are buried, calls Ethan at the office and tells him I'll be late for the staff meeting, and then inflates into a rescue sled. It really is incredible how far we've come since I borrowed my Dad's soldering iron and tried to reattach the ear piece to my Hot Dog.

Beacon frequencies and technology have made very positive strides over the last three decades. They are far more user friendly, search ranges have increased, and you don't have to try holding that ridiculous ear piece in your ear anymore. Since we're talking about positive changes, how about avalanche-shovels! Our patrol director at the time (who will remain anonymous) bought 20 pound steel grain scoops for route packs. That really went over well, especially when we added on another 50 pounds of explosives to carry up the ridge. My first personal avalanche shovel was a steel spade I bought at

*continued on page two*

# Powder Stash

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McGuckins Hardware and it weighed only 12 pounds. After drilling the rivet out of the handle, I could take the blade off so it would fit in my pack. Today I was packing for a day trip up to the pass, (I forget which one). My feather weight and durable alloy avalanche shovel fit right into a special compartment of my light weight and ergonomic backpack. Right next to my feather weight stainless steel snow saw. The same saw, which attaches to my carbon fiber ski poles, magically morphs into a two meter probe pole. I was surprised with an Avalung as a birthday present a couple years ago and now I almost never go into the backcountry without it. Then the coupe de grace, a carbon fiber probe pole that folds up to almost the same size as my original Hot Dog beacon. It is so much nicer than dragging those 12 foot pieces of electrical conduit we used for probes when I worked at ABasin.

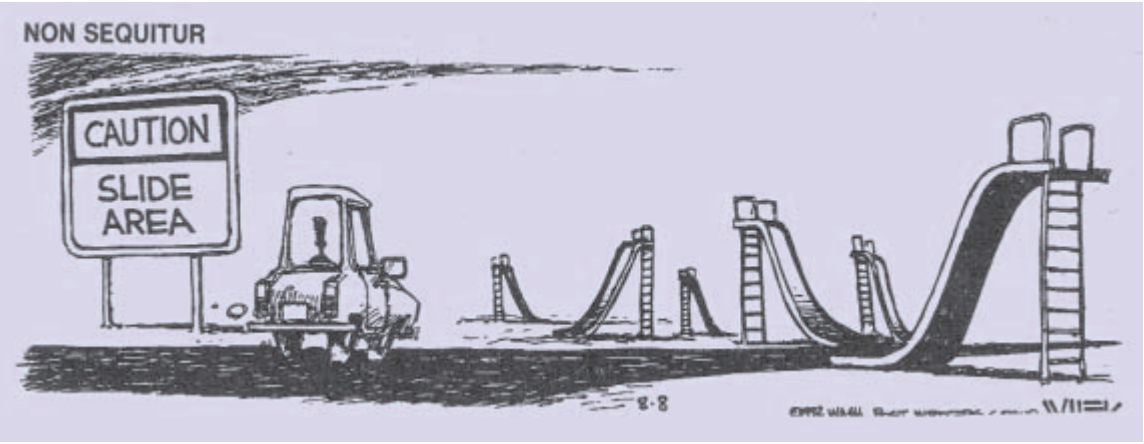
At the National Avalanche School (NAS) we had a French guide demonstrate the newest tool in the potential avalanche quiver, the ABS balloon backpack. This tool has been available in Europe for a number of years and has had an astounding survival rate. We have always felt that the best way to survive an avalanche is to not get buried in the first place. Real life experience has shown that this system really works. This pack has just started to show up on the U.S market. In the survey we put on our web page this past spring, twenty six people said they carry the ABS system on their backcountry tours. Even the ABS has made remarkable progress in just a few years. The new model just a few years ago has been redesigned, reduced in weight, and became far more reliable in just a few short years. The gas cartridges are smaller, and the rip-cord is basically fool-proof. Expect to see more of these packs in the backcountry near you over the next several years.

The DKL heartbeat detector was developed just before the World Trade Center incident of September 11. It was actually used with some success at the rescue (see www.dklabs.com). This small ray gun looking tool will find a human heartbeat behind walls, inside cargo containers and even under many feet of snow. The cost of this tool is rather high, but as a multi-function tool I can see it finding its way into the local sheriff department, and search and rescue teams. If we can get this tool to an accident sight in a short amount of time, it can help triage a scene in just a few minutes. Next year we hope to find the Fabulous Fuse Brothers so we can get more details on what's new in the world of staying on top. But it's April, and I find myself wondering where I left my bike shoes?

Ha, almost had you there didn't I? Those of you that know me, know I think winter is only half over. With the big winter we've had, we'll have good snow across Colorado's back-country into early summer, and I plan to take full advantage of it. I'll ride my bike up to snow line a time or two, so maybe I do have legitimate reason to find those shoes.

In this issue of *The Beacon*, Halsted describes a unique way of doing beacon practice, even if you have to do it by yourself. He calls it "Beacon First and Ten". It looks like a great way to get some practice in, just don't do it around Black Labs. Brad Sawtell, who heads-up our Summit County office, writes to us about a method he uses to analyze the snowpack. Brad spends a fair amount of time in the backcountry of Summit and Chaffee Counties examining the avalanche conditions. Like the rest of us, he learned about first aid skills long before he learned about avalanches, and this approach sounds very interesting. You'll also find a short piece on some wildlife that you may have noticed while out touring. The creatures we'll introduce you to are quite small, and certainly don't make a habit of being seen. Finally, we have another column of Q&A. There are some very interesting questions this time around. So until next season, enjoy, and we hope your spring and summer are safe and enjoyable.

One final note. Many of us in the avalanche industry had a very difficult week in early April. Doug Combs, friend, father and pioneering extreme skier fell and was killed in la Grave, France. He contributed to avalanche safety as well as offering a strong ethical contribution to the mountains and to the people that spend time in them. A few days later, Walter Rosenthal was killed trying to rescue two fellow ski patrollers from a fumarole on Mammoth Mountain in California. Walter was a pioneer as well, but did his best to stay out of the spot-light. Walter was a member of the Mammoth Ski Patrol for over thirty years, completed many first ski descents in the Sierra Nevada, and was a snow scientist at the University of California at Santa Barbra. Although Walter had already made contributions to snow science, most recently he had been investigating the processes that cause snow to sinter. Walt leaves behind a wife and fourteen year old daughter. Our community is very small and we will miss Doug and Walter for they were both warm and kind people that embodied the free sprit of the mountains. ❄



# First and Ten Beacon Practice

**by Halsted Morris, Avalanche Education Coordinator**

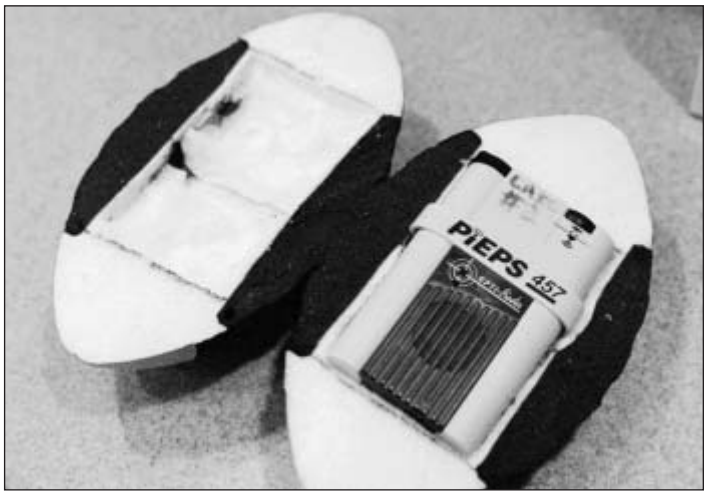
I always emphasize that the most important thing I can teach students about avalanche transceivers is that they need to learn how to use their beacon, practice with it, and then practice some more. I hope that students never have to use these skills on an actual rescue. However, as long as they are recreating in the backcountry it is possible that they will be part of a rescue. Most recreational users are not proficient enough to recover a companion from a significant burial. I believe the more you practice the better prepared you will be if something goes wrong.

As I explain how to practice beacon skills, there always seems to be someone in the back of the room who asks, "So what do you do if you don't have someone to practice with?" Doing solo transceiver practice isn't very realistic, because you are the one both hiding, and searching for the buried unit. So I came up with an interesting and fun way to address this question.

It would be great if you could simply throw a transmitting beacon over your shoulder, and then turn around and search for the "buried" transceiver. However, it is a little more difficult than that. After years of testing, I have developed a safe and effective method for solo beacon practice.

The solution arrived one day while I was at a local sporting goods store. I saw a small nine inch Nerf football, for less than $10 and the light bulbs started flickering. Nerf balls are made of soft foam of course, so the ball would work perfectly for padding the "buried" unit when it gets hucked over your shoulder and hits the landscape boulder at the end of your driveway. I cut the football in half lengthwise, and then I scooped out a hole that cradles the extra beacon. Then tape the whole thing back together with duct tape. Be sure to put the enclosed beacon on transmit before you toss it, or the search may take longer than necessary!

*Brad Sawtell demonstrates slab avalanches to a group of Summit County 5th graders.*




*The Beacon first and ten setup. (Photo: Halsted Morris)*

Lacking the John Elway arm for throwing footballs long distances, I found that tossing the thing backwards down a hill allows for more realistic practice sessions. You might also want to try it on a forested slope with plenty of undergrowth to simulate a more difficult and complicated search. Once you've tossed the ball, give it a minute to come to rest after pinballing off trees, rocks and your neighbors roof. So far my old Pieps 457 has survived 30 some huckings inside the Nerf ball.

Essentially with the Nerf ball transmitter you're doing a transceiver search without the generally helpful "last seen area" when you start the search. This is usually the most difficult simple search that you might come across. Practicing the more difficult searches should improve your over all beacon skills. As the old saying goes, "Train for the worst, hope for the best."

Just like the real thing, you first need to acquire the victims transmitting signal. Quickly do your zigzag pattern across and down the slope. Once you've picked up the victim's signal you shift to a secondary search pattern until it is time to pinpoint. At this point you may see the Nerf ball if it didn't sink very far into the snow. Another idea would be to toss several identical Nerf balls down slope to help disguise the transmitting unit. You can also hold the receiving unit a couple feet above the snow to mimic a deeper burial.

My objective is to get people to do a lot of searches. Once you start getting good, try it with two transmitting Nerf balls. How fast can you master a multiple burial scenario? Now, not having a partner is not an excuse to skip beacon practice. The Nerf ball method is an easy, simple and inexpensive way to get some practice. Who knows, maybe a talent scout will see that amazing toss and sign you up for the big leagues. ❄

*(Editor's Note: The CAIC does not recommend throwing your rescue transceiver even if it is housed in a Nerf ball. Halsted has been using retired units for this exercise.)*

# Assessing Stability: Interpreting an Unconscious Patient

**by Brad Sawtell, Forecaster, CAIC-Summit County**

The problem with snow is that it's white. It always looks so inviting for backcountry users. It's pristine, and arguably quite beautiful. We are drawn to beautiful things. Beautiful things make us feel special. We all like to feel special because those feelings make us happy. We all can tell stories of events that made us feel good and the story gets better with age. Think of your last powder day. Was it an epic event?

Beauty is only skin deep. Unless we dig snow pits, we only see the pristine surface of the snow. The snowpack is a multi-layered structure with a mix of both strong and weak layers. For avalanche assessment, the relationship of the layers is more important than the snow surface. To make a good avalanche assessment we need to get beyond the superficial beauty and get to know the whole snowpack. Over the years I have developed a set of questions and analogies that help provide the encouragement necessary to take that time.

I encourage all of you to ask yourself a few basic questions that many of you may already intuitively ask before you go on a backcountry tour. First call your local avalanche hotline to find out what the avalanche danger is rated for the area to which you plan on going. Then, ask yourself the four questions from the book *Snow Sense*, by Doug Fessler and Jill Fredston: first, "is the weather contributing to instability?" second, "is the snowpack capable of producing an avalanche?" third, "is the slope steep enough to slide?" and fourth, "what is my group like?" It is hard to die in an avalanche if you are not in, on or below avalanche terrain. So if the answer to the third question is "no", then there is little to worry about. If the answer is "yes", then the savvy backcountry traveler must answer the other three questions. You may not cognitively ask yourself these questions, but I am sure the concepts from the basic questions run through your mind.

Answering the weather and group questions can, in some cases, be straight forward. The group question in most cases gets us in trouble, but decision making is another topic to be discussed later (or visit Ian McCammon at www.snowpit.com). Answering the snowpack question can be a daunting task. Hopefully, all of you have practiced and/or performed stability tests. As an avalanche educator, I am continually asked by students to break things down into an understandable format. What follows is a series of analogies that I have used and had success with while trying to interpret the stability (or instability) of the snowpack. I have also found the analogies to be an aid in getting others to make field observations and evaluate stability; especially if you have a basic level of wilderness medical training.

For starters, let's say that all snowpacks on a slope steep enough to slide are "unconscious". A sliding or avalanching snowpack is a "conscious" one. I will borrow a patient assessment process used in wilderness medicine and taught by the Wilderness Medicine Institute of NOLS to help me recognize and make field observations.

## The Scene

*It's Saturday morning and you awoke to a sunny sky and 4 inches of fresh light snow. If you live in Crested Butte, it would be 14 inches. Over a fresh cup of coffee, you decide to call a couple of friends to join you in skiing the NE face of Mt. Beau. They want to meet you at the trailhead at 9 am. You and your friends have all taken a Level 1 Avalanche course and you also took a Wilderness First Responder course last summer. Your gear is packed and, of course, you called your local avalanche hotline. The hotline recording said that winds were light from the SW, and the system passed overnight. Today winds will be light from the N, clear skies, and temperatures will be between 18 and 25° Fahrenheit. The avalanche danger is rated MODERATE with areas of CONSIDERABLE above tree line on lee slopes steeper than 35° facing N-E.*

## The Trailhead

*You finish breakfast and drive to the trailhead. Along the way you notice a small natural avalanche on a NE aspect on Mt. Loki. You meet up with your friends, get in your skis, discuss this morning's avalanche bulletin and perform a beacon check. All systems are go.*

In wilderness medicine, a thorough patient assessment helps not only your patient but also helps direct you as the first responder to stabilize or fix the patients injury. Similar to first aid, making field observations is important in determining the snowpack's stability and making good choices. Starting from the trailhead it is important to start your patient assessment—I mean your snowpack assessment. Metaphorically speaking, it is time to put on the rubber gloves.

If you were a first responder, the first thing on your list would be to stop and perform a "scene size-up" to confirm that the scene is safe or acceptable to enter. Then, you would check the A, B, C, D and E's: Airway, Breathing, Circulation, Disability and Environment & Exposure. In the backcountry, I check for:

- Avalanches: Have you seen any Avalanches? What aspects and elevations?
- Bad layers: Have you felt facets or weak layers in the snowpack with the ski pole test?
- Collapsing/Cracking: Have you felt any Collapses (basal or mid-pack facets)? Have you experienced any cracking in the surface layers while breaking trail?
- Deep slab: Were deep slab instability problems mentioned in the avalanche report? Can you feel it with your ski pole test?
- Environmental/Exposure: What is your weather history? How exposed are you to steep slopes?

*So, you are cruising along, breaking trail, feeling how the snow reacts under your feet, performing the ski pole test and*

*talking about snow conditions and route finding options with your partners. By now, you have stopped several times. Your scene size-up has included measuring the slope angle, confirming you are approaching avalanche terrain. Because you have cognitively paid attention to your trail breaking and the results from the ski pole test and talked about the snowpack with your partners, you determine it is relatively safe to approach the slope. It is a short slope but it is facing NE, the same aspect of the slope on Mt. Beau.*

What do you see? "Look at all the pow!" What do you think? "I can't wait to let 'em rip!" or "let's build a booter!" Traveling in a snow covered backcountry setting, you perform the scene size-up and A, B, C, D, & E check on the go. Utilizing the A, B, C, D and E's as a tool in an "observation tool box"; allows me to get to my intended location using conscious choices. This toolbox also helps me choose a location to dig a snow pit. I dig a snow pit when the vitals of my snowpack have changed. I know they have changed when I notice a change in my patient's A, B, C, D and Es. I seek more information by digging a snow pit. A snow pit is essentially checking my unconscious patient's vitals.

*Look at the snowpack…*

*listen to the snowpack…*

*feel the snowpack.*

In a first aid setting, how frequently do you check for vitals? Every 15 minutes, every 30 minutes, every hour or when you have a significant change in the patient's Level of Consciousness (LOC). I see a change in LOC when I change aspect or elevation (similar to the CAIC danger rose: below, near or above tree line). Additionally, I will see a change in LOC when I experience a significant change in the weather (wind speed, direction, exposure to the sun, etc.). I also see a change when breaking trail feels different or the results from my ski pole test tell me the snowpack has changed.

There are several other acronyms from the wilderness medicine world that can be used as tools in your observation tool box. Here is another example using "SAMPLE": Symptoms, Allergies, Medications, Pertinent medical history, Last intake/output and Events. Looking at the snowpack, I check for:

- **S**ymptoms: natural signs of instability (collapsing and cracking).
- **A**valanches: Slab, loose and wet slide activity.
- **M**echanics: Slope shape and size, stability tests: compression, shear and tension.
- **P**ertinent weather history: Trends (both long and short term) and or changes in those trends.
- **L**ast storm: how much snow fell, rate and intensity. When the last avalanche cycle was (is the snowpack nearing a new cycle or trending towards settlement)?
- **E**vents: I look at this in two ways. First, ask yourself what has been the trend in the avalanche advisory? Second, what are the events that created the white structure that I am standing on?

As in first aid, the focused exam or head to toe is performed rapidly by the trained first aider. The first aider goes through the process quickly, looking for patterns. Using the above mentioned acronyms may be an aid for you if you are struggling with how to use the tools in your observation toolbox. I use these concepts to help me be more observant not only of my surroundings but also to maintain cognitive, thoughtful choices. Unlike in a first aid setting, in the backcountry, I want my snowpack (or patient) to maintain in state of unconsciousness. The fail-safe alternative is to seek lower angle terrain. But if I am going to choose higher angle terrain, I need to seek more information about my patient's consciousness by using my observation toolbox, digging snow pits and being aware of the snowpack.

## In the Field

*Back to our ski tour with friends, we have noticed that the vitals and LOC of our patient have changed as we climb towards the summit of Mt. Beau. We know this because we are now above tree line and we started down in the trees. We decide to stop and get another set of vitals, we cautiously move out onto the NE face to dig another snow pit and perform the necessary stability tests. We find a reactive layer of small facets. We perform a rutschblock test, getting a score of RB6, Q1 on a layer where there are four lemons (see www.snowpit.com for more info). It is a beautiful day, the snow looks great, but by paying close attention to our patient's LOC, we chose to stop and get more data. I'm glad we did.*

When I am using these concepts in the field, I continually ask myself about my patients LOC. I take advantage of subtle terrain features like areas where I can inspect slopes with different aspects traveling up or down a valley. It is similar to assessing a patient's left arm and then their right. Once again, what helps with using these analogies is if you are already familiar with first aid and comfortable with patient assessment. Using these analogies increases my level of awareness of what is around me. Do not ever forget that the problem with snow is that it is white. Imagine if the snowpack was color coded like a box of crayons? Figuring out the avalanche danger would be much easier if the stable snow was green and the unstable snow red. Do you think the surface snow would be as beautiful if it was fire engine red? Look and listen for clues. Feel for data. Then appreciate snow for being pristine and beautiful. ❄

# You've got questions? *We've got answers.*

**by Scott Toepfer, Editor**

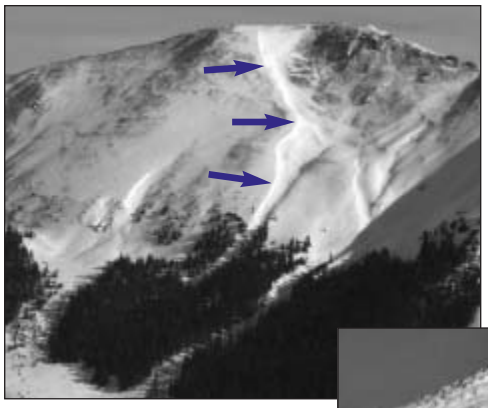
**Q: I was wondering about 38°. What is it that makes that the most common angle for slides?**
—Leslie, Breckenridge, CO

*A: Many avalanche classes and texts on avalanches show a distribution of bed surface inclination for slab avalanches. The peak of this distribution is typically near 40° with most of the avalanches occurring between 25° and 45°. The easiest way to understand this phenomenon may be to examine the end points. We commonly observe fractures in snow on slopes with an incline that is less that 30°. Even though the snow fractures on these slopes, there is not enough downhill force for the slab to move very far. On slopes steeper than about 45°, snow often slides down the slope during a storm in point-release or sluff avalanches. The exact slope angle where sluffing is prevalent depends on the snow climate, snow type and temperature. If the slope is steep enough, snow typically sluffs off during storms, and it is unlikely that a slab will form on that slope.*

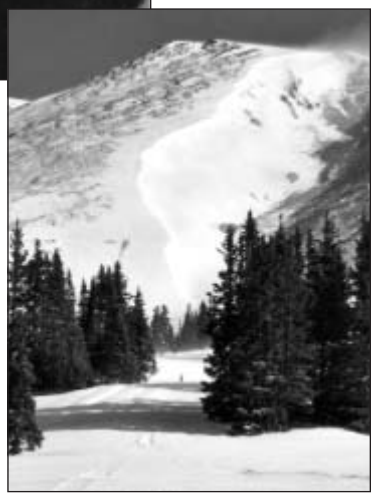
*The above discussion may explain the range of slope angles where we observe avalanches, but it does not explain the peak of the curve. Explaining the 38° value is a bit more complicated. There are several good studies that include discussions of bed surface inclination and report mean values near 38° (we suggest Perla, 1977 and Schweizer and Jamieson, 2000). However, there are a few things that you should remember when reading these studies. First, some of the data comes from* **human triggered** *avalanches and probably is influenced by where most people like to recreate (more people like to ski 38° slopes than 45° slopes). Second, the data may also be skewed by how we measure slope angles and the avalanches that we choose to measure (i.e. the ones that are easy to get too). Therefore our sample mean may not be the population mean. Finally, the studies could be skewed by the regions where the data were collected. Regional variations in terrain, snowpack characteristics and backcountry use could influence the data. Based on these studies it is probably safe to say that 38° is the most common slope angle for human triggered avalanches but it may be overstepping our collective knowledge to say this about all avalanches.*

**Q: What do you mean by "Cross-loaded terrain"?**
—Bob, Colorado Springs, CO

*A: Cross loading all depends upon how a particular mountain, or slope, faces in relation to prevailing winds. Most often we think of avalanche paths loading from the top as wind flows up a slope, (the windward side) picking up snow, and depositing it onto the top (leeward side) of an avalanche path. Many avalanche paths can load from the side too. If we have prevailing winds coming from the north, striking a long ridge whose slopes face east and west, those north winds will strip wind from exposed northerly surfaces and load that snow along the northern edge of south facing depressions or gullies. Often times these cross loaded slopes will manifest themselves as long, vertically running cornices. Sometimes the cross loading will build deep pillows of slab along one particular side of an open alpine bowl. These pillows are where we would most expect an avalanche to start from.*



▲ *Winds from the northwest cross load the classic ski run "Dave's Wave" near Loveland Pass. Note the long vertical running cornice. (Photo: Nick Logan)*



*The sides of gullies and secondary ridgelines are often cross loaded by wind. (Photo: Scott Toepfer)* ▶

**Q: I understand that loud sounds can trigger avalanches (assuming the conditions for it are otherwise present), but our debate is this: I believe that when sound triggers an avalanche, it is usually as a result of an echo, or at least that a shout/gunshot/etc. is more likely to trigger an avalanche if the mountain echoes the sound (by focusing the vibrations and/or changing their frequency). My colleague believes the echo is irrelevant. What do you think?**
—Alexander, Boston, MA

*A: The short answer is that loud noises cannot trigger avalanches. There are always extreme cases, but to our knowledge there are no documented cases of a loud noise triggering an avalanche. It is a myth perpetuated by old cowboy movies and Bugs Bunny Cartoons. It is common practice in the avalanche industry to release avalanches with explosives. This is done in a "controlled" manner to reduce or remove an apparent danger. In this case it is the shockwave and not the noise of the explosion that releases the avalanche. A shockwave is similar to a sound wave except it travels much faster. As the wave travels it creates a region were the air pressure is higher than the ambient air pressure ahead of the wave called "overpressure". It also creates an area behind the wave were the air pressure is lower than the ambient air pressure called "underpressure". The over and under pressure zones affect the snow and trigger the avalanche. Sonic booms can occasionally release avalanches. This is not common, but it can happen when you have a very unstable snowpack. A sonic boom is a special case of a "noise" as, like an explosive detonation, it contains both a sound wave and a shockwave.* ❄

# Life on Snow, the Mini World of Critters that Live on the Snow Surface

**by Scott Toepfer, Forecaster, CAIC-Boulder**

Early in March I was heading up a favorite Gore Range tour when I happened to look down at my skis. What I saw made me stop dead in my tracks. Thousands of little black dots were hopping all over the snow. The things, as tiny as the head on a pin, were everywhere. Either someone in a tree above me just spilled their pepper shaker, or the snow was springing to life. We had always called them snow fleas. They aren't the kind of flea that drives your dog nuts with scratching, but a different kind of insect all together. These fleas are actually called springtails, or the scientific name, Collembola. These guys have two really tiny tails that wrap and hook under their abdomens. When released these tails cause the little guys to spring into the air, looking like the cartoons of the flea circus we saw when we were growing up. These snow fleas, as we'll still call them, live on the soil all year long, but they can make it to the snow surface on warm spring days, especially around trees. They feed on decaying plants and actually help form better soil in our mountains. For some reason they sometimes migrate to the snow surface as temperatures begin to rise. Look for them if you are heading into the backcountry this spring.

*(Photo: Courtesy CU Museum, ©2004)*

Another insect you can find on the top of the snow pretty much all winter is the wingless fly. I've seen these stilted creatures on tours for many years. At first I thought they were spiders, but upon closer inspection they have only 6 legs. These snow flies are members of the Crane Fly family, or *Chinoea nigra*. Most of us have seen the big mosquito looking fly during the summer months, that gangly insect is also a member of the Crane Fly family. Several years ago I called Billy Barr with the Rocky Mountain Biological Labs in Gothic to see what he could tell me about Crane Flies. At that time he had little information on them (this was many years before the advent of the world-wide-web and Google searches). Billy really couldn't tell me much about them, only a minor effort had been put into their research. As of 2006, both the University of Colorado and the University of Kansas have done research on these winter enigmas. It seems that these snow flies have an antifreeze-like substance in their blood, which allows them to survive frigid winter temperatures. When temperatures really drop, these flies find routes back under the snow surface. Back to the warmer ground surface, just like we would when seeking shelter in a snow cave. These flies are most often found from 8,500 feet to timberline in Colorado. They seem to be most active when the temperature hovers around 25 to 30 degrees. Snow fly larvae, like snow fleas, also appear to feed on decaying plant matter, though adults have never been seen feeding. It is thought since adult flies may not eat; there would also be no internal plant material to act as nuclei to start the freezing process, which would rupture cell membranes with the sharp edged ice crystals.

Like snow fleas, the snow fly has little to worry about from predators. The winter climate keeps most enemies at bay through the long cold days and nights. Another oddity recently discovered about these flies is an even smaller life form, called nematodes, or very small roundworms. It seems that nematodes build a ring, or necklace around the neck of some snow flies, using them as a means of transportation. It is thought that these nematodes eat feces, probably from mice. So the snow flies carry the nematodes from mouse burrow to mouse burrow. As you can imagine, not much research has been done on any of these strange creatures, but it is certain that odd creatures are living under foot. I'm still trying to find the elusive snow-snake my parents always blamed for the crashes we had as kids while skiing at the Basin. For more info on snow flies you can go to http://cumuseum.colorado.edu/Research/Objects/dec04_snowfly.html or http://www. emporia.edu/ksn/v38n2-may1992/KSNVOL38-2.htm. For more on snow fleas, try http://www.collembola.org. There are some great photos and more information than you can probably take in. ❄

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# Renewal Notice (or recruit a Friend)

**Yes, I will join the Friends of the Avalanche Center. Enclosed is my donation of:**

- ❑ $30*, which gives me a CAIC window decal (if I am a new Friend), *The Beacon* newsletter, the *Avalanche Wise* booklet, and a morning forecast by e-mail.
- ❑ $45*, which gives me all the stuff above, plus an afternoon forecast sent by e-mail.
- ❑ Please accept my additional donation of $_____*
- ❑ I'm a renewing member.
- ❑ I'm a new member. Please send a CAIC decal.

*Your donation may be tax deductible and your canceled check is your receipt.

Name _____ Address _____

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**Please mail this form & your check payable to "CAIC" to: Colorado Avalanche Information Center ❄ 325 Broadway, WS1 ❄ Boulder, CO 80305**

**Mission:** The Colorado Avalanche Information Center promotes safety by reducing the impact of avalanches on recreation, industry, and transportation in the state through a program of forecasting and education.

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*A program of the:* Colorado Geological Survey
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