Ed and his partner Meg at their Alaska cabin.
Photo by Mark Moore

Excerpts from

There was always the mountain: the passing of Edward LaChapelle

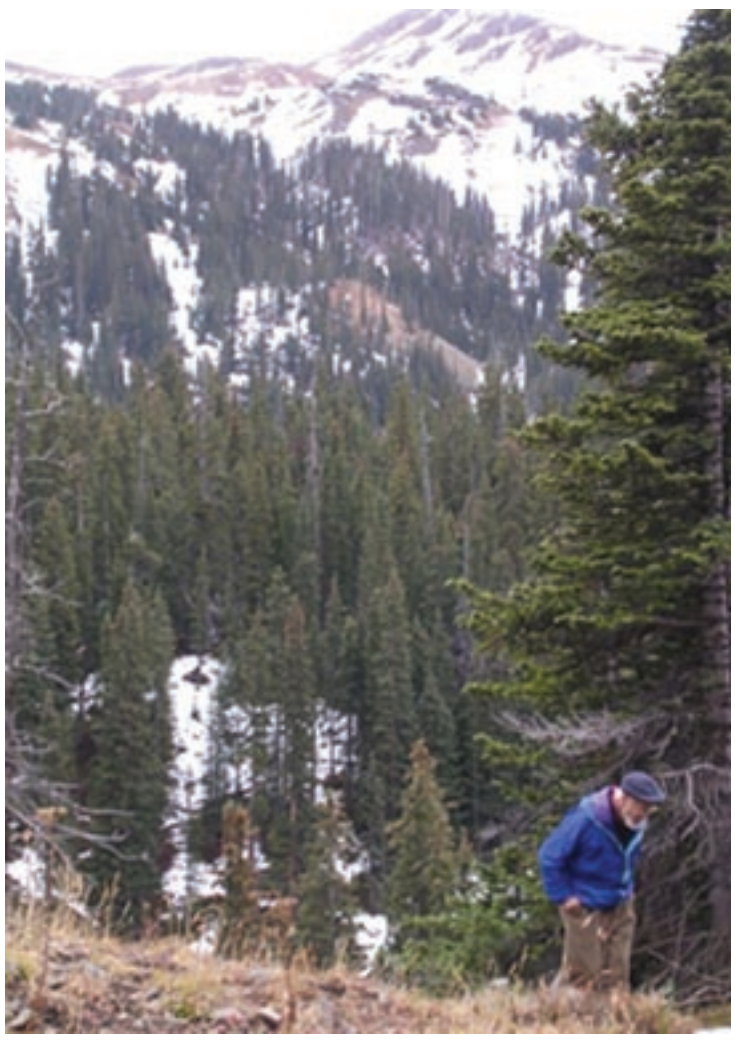
first printed in the *Silverton Standard and Miner*, reprinted by permission

Story by David LaChapelle

On the morning of February first, the eve of a full moon in the heavens, Ed LaChapelle went powder skiing at Monarch Pass, Colorado. On this day he was to ski his way into another world. At around noon, with the sun high in the sky, his heart began to falter. He left this plane of existence by mid-afternoon.

I remember first consciously seeing this aspect in my father one bright powder morning at Alta, Utah. I watched from inside the warm living room of our cabin as my father scooped up a handful of snow crystals, examined them with his pocket magnifying lens, and then let the snow fall from his hands. It was in the time the powder snow took to fall from his fingers and reach the ground that I saw a side of my father which transcended the science that anchored his life. He was, in that moment, reverent, as if listening to a greater voice than his senses could convey. He stood for a moment and I witnessed him encounter the world as if it were sacred. He turned from that moment, came inside and began to call the lodges to tell them that there would need to be some avalanche control work before the ski area could open.

He rooted his actions in a profound empiricism, and yet he had his heart tuned to a quality of intuition which made him exceptionally gifted at understanding the movement of snow and ice amongst the mountains of this world. This gift had immediate and very real consequences. The safety and well-being of many mountain dwellers rested upon his discernment and judgment of avalanche conditions.



Edward R. LaChapelle
May 31, 1926 - Feb 1, 2007

And so it is important for me to honor that my father wove the passage of the moon, the movement of the planet and the deep rituals of ancient peoples into his passing. I think he would listen patiently to this explanation, bowing to his son's artistry, but would keep a sharp eye on the true conditions being described. For he was a scientist, and his science was the extension of this competency and the fruition of his being. He would want us to examine carefully the conditions of his departure.

To understand why my father would leave us on a perfect powder day on a Monarch's slopes we need to go back to his childhood. His childhood and his destiny were arranged around "The Mountain." Ed's early days were spent at the foot of Mount Rainier, near Seattle. He played, hunted, hiked, and explored the landscape that was dominated by the volcano. His love of mountains began within the embrace of "Tahoma" (The Mother of all Waters). He would need the strength of this mother mountain and his own mother as he would face a most difficult test.

My father remembered very clearly reaching for a salt shaker at the dinner table as a young child and missing the object. He knew something was seriously wrong. Ed had contracted polio. He quite rapidly lost motor control of significant portions of his body. His mother took him to a family physician in Tacoma to seek help. This practitioner would alter the potential path my father's life greatly. In his official capacity, the doctor explained that there was not much that

could be done except to alleviate the symptoms and let the disease run its course. But as my grandmother was leaving he took her aside and said that he had a theory about the disease which might help her son. His theory was that if she could keep Ed immobile for a period of time then the damaged nerve tissue would grow back and he might regain more function. My grandmother put her faith in the doctor's knowing. She kept her five-year-old son immobile for a month, covering his legs with a cardboard box and reading stories to him to keep his attention focused on something other than his body. My father drank the waters of Tahoma, was sheltered in the fierce protection of his mother's faith, and drew his on own strength as the doctor's hunch was shown to be true. Slowly, steadily, my father's leg strength did begin to return. He was to walk with a limp his whole childhood. In high school, determined to change his limp, my father joined the high school track team. He never once placed in any events, but by the end of the year he no longer had his limp.

With the force of his determination my father had honed his body so that it would serve him in his life's passion. On his twenty-first birthday he climbed Mt. St. Helens, Mt. Adams, and Mt. Hood in three consecutive days. All three of these mountains afforded him an excellent view of Tahoma, the anchor of his childhood.

I remember speaking with an acquaintance of my father's in Alaska a few years ago about his amazing stamina in the mountains. This man was marveling at my father's ability, at 75, to leave much younger men behind as they made their way up a nearby mountainside. He said, "He simply set a pace, slow and measured, which he never altered. In the end we were left behind by the steady of strength of his maturity."

The only remnant of polio for my father would be an occasional intense leg cramp that usually would happen at night when he was sleeping. I remember, as a child, hearing him writhe in pain from the intensity of these cramps. I asked him about his cramps only a few days before he skied into eternity. He said that he hadn't had one in a while, and that even though he had been trying all his life, he couldn't figure why the cramps happened when they did. The scientist in him had still been trying to unravel this mystery.

Some mysteries we take with us when we leave. His cramps were the shadow of his astonishing physical ability. An ability which enabled him to climb mountains, ski powder, launch glacier expeditions in Greenland, Alaska, and Washington state, and to live self-sufficiently in the Alaskan bush until his eightieth year.

My father had a mountain "conversion" while he was in his late teens. At this time he was working at the Paradise lodge on the side of Mount Rainier as a bellhop. In a letter to my mother which I found for the first time this week after both of their passings, he described his experience of the mountain:

"One day 15 years ago when – oh this itself is a miracle – I looked out from the porch of employee's dorm at Paradise the second day I had come up there to work for the first time, and saw the storm clouds lift away and reveal evening sunlight on Mt Rainier…I can still remember to this day as clear and simple as the note of a bell – this was the single biggest turning point in my life, when in a single blinding moment I knew what I must do and where I must live with my life."

The conviction of my father's mountain-born insight lasted him until the final morning of his life. His contributions to snow and avalanche science, his practical ability to translate ideas into usable actions, his organization of glacier projects and the contribution he made to glaciology in general, the mentoring of a whole generation of avalanche experts, the numerous rescues he oversaw, the books he wrote, and the spirit of inquiry which was so alive in him all pivot around that moment on the flanks of Mount Rainier. My father's destiny carried him surely through the Great War and the incredible growth of the ski industry in the last 60 years.

This conviction was honed by the bodily condition he had overcome. My father's capacity for hard work, discipline, organization, and thoroughness was deep. Whatever he turned his attention towards he would master. He sewed his own backpack, building the aluminum frame himself; he made his own sleeping bag; created a whole pantheon of instruments for his different experiments; created a unique snow crystal photo lab and mastered calligraphy, photography, woodworking and financial management. After he "retired" from teaching and working for others, he created, with his partner Margaret Hunt, a self-sufficient Alaskan home. For years I have been proud to say that my father is the only one of my extended circle who lives completely off the grid.

Ed loved electronics. His passion for the discipline carried him to the top of his naval radio school. As a teenager, he graduated first in his class ahead of over 200 men of all ages and experience. He joined the Pacific Fleet right at the close of World War II. (My father said that one of the most impressive sights of his life was seeing the American naval power arrayed in Tokyo Bay for the signing of the armistice.) His skill in electronics served him well in developing the various instruments for his science. It also helped launch the first portable avalanche beacon (now a main necessity of back-country skiers worldwide).

Yesterday as I pored through the various items he brought on his last ski journey, I found his short-wave radio. The current version is a small hand-held device that is dwarfed by the radios I remember from my childhood. But the fact that it was included in his orderly set of clothes and tools for his fateful road trip testifies to the deep love he had of listening to the echoes of humanity across the electromagnetic spectrum.

Ed also loved good practical jokes. He tempered the rigor of his science and the discipline of his work with various schemes and mischief events. As a teenager he and a partner developed something called "power pills" which were small bombs made of gelatin capsules and bb's mixed with a propriety blend of now illegal explosive substance. He took great delight in setting these incendiary devices off in a variety of locations. His pranks with the power pills earned him a visit from the Tacoma police.

While directing the Blue Glacier project, a multi-year research station on Mount Olympus in Washington state, he decided to try his hand at bit more dramatic explosive activity. You probably have heard of or seen young boys putting a firecracker under a tin can and using the explosion to send the can as a rocket into space. My father went them one step better. He put a stick of dynamite under a used 55-gallon fuel barrel on the glacier to see if he could send it into space. He should have done his calculations a bit better, because instead of sending the drum into the atmosphere the explosion shredded the steel sending shrapnel flying everywhere. It was a miracle that no one was hurt.

I was at the receiving end of one of his pranks while I was with him on the glacier. I must have been nine or ten and was reading the *Narnia* books by C.S. Lewis. The books were populated by dragons and such, and I was enjoying the fantasy of imagining such creatures in a distant place and land.

My father decided to bring them closer to home.

He had one of the men who worked for him on the project dress up in a parachute camouflage with a cardboard dragon's head and hide in the small rock crevice above the research station. The man also carried a fire extinguisher.

I was led up the crevice on some pretext I do not remember. As I climbed down into the crevice I heard a bellow, saw rolling carbon dioxide smoke clouds coming towards me, and the dim shape of a dragon behind. I was literally ejected from that crevice by the adrenaline that ran through me.

That wasn't our family's only encounter with dragons. Many years later, my mother would name one of her favorite Tai Chi sites, the "Dragon's Back."

It was only eleven days after my mother left her body that my father passed on from his. Given that, I cannot but bow to the depth of their connection. My father had driven down from Montana, where he was skiing with his partner Meg, to be at the memorial for my mother here in Silverton. It was apparent in the unspoken grief in his eyes that her passing had stirred his soul.

He first met my mother in the Canadian Rockies during a summer climbing camp. They were walking along a glacier and my mother was knocking snow bridges from a recent snowfall out of the top of crevasses with her ice ax. She slipped and began to fall towards the heart of the glacier. My father, with startling reactionary speed, grabbed her, saving her from a possible early death.

I want to honor the difficult truth that my mother tested my father, and he her, in very strong ways. Their marriage was not easy. It served as a fire of purification which gave both of them the steady wisdom of their later years. It allowed him to rest in the tranquility of his Alaskan life with his beloved Meg, and it allowed my mother to endear herself to her extended community in Silverton. His years with Meg nourished my father in ways that he never was able to experience with my mother. I am deeply grateful for companionship, love, and patience that Meg wrapped around my father during their 25 years together. His love for her was tender to witness and carried him with great strength through the long years of his Alaskan life.

My mother and father were teachers for one another. Sometimes we are not allowed to live with our teachers full time. The fire is simply too hot. My mother's uncompromising search for her own spiritual integrity, and my father's determination to hone the scientist's discipline of observing the world, took them in different directions for a time.

My mother was raised Catholic; a faith she renounced in her adult years. At the end of her life, two of the people who were serving her in her last month reported to me that she asked them to pray with her.

In these humble requests I see a revolution in my mother's being. A surrender she had searched for her entire life was beginning to manifest. On the wake of her surrendering, my father took to the powder slopes and followed her. This is a remarkable testimonial to the depth these two beings shared.

It was a depth ringed in mountains, suffused with clear high-altitude light, filled with driving determination, passion for truth, and the knowing of this world and others. My father tended this world with great care while my mother sought the Source of experience with great determination.

I have my father's skis, boots and poles now. Several days ago I put them on and skied a few runs in his honor. It was not powder, but the memory of powder lives in his skis and in my legs. The steady strength of my father's being carried me down the slopes. I can no longer turn to him for help with my Alaskan cabin, or any of the other myriad ways he expressed his love for me in the small details he tended, but I can ski again in the high mountains marveling that this man gave me, and so many others, a way of the mountain.

Thank you my dear father for the integrity of your life.

Your turns are true now, no longer limited by an aging body. The fall line is clean and the crystals are eternal that slip under your skis as you descend the mountains of light that live within us all.

Ed playing with son David in Alta, Utah, where Ed helped pioneer the snow ranger program. *Photo courtesy Rick Grubin*

Alpenglow Ski Mountaineering History Project: Edward R. LaChapelle, personal communication

Excerpts from a taped phone interview
5 December 2001
Used by permission of Lowell Skoog

Ed LaChapelle's interest in mountaineering began when he was in high school in the early 1940s. In 1942 and 1943 he spent summers working for the national park company at Mt Rainier. He served in the Navy for two years (1944-46) after high school. He spent another summer at Mt Rainier after leaving the Navy. Ed got into skiing while in college at the University of Puget Sound (UPS), beginning in about 1947. He was active in skiing and mountaineering during college, making climbing trips to the Canadian Rockies and serving as climbing committee chairman for the Tacoma Mountaineers. In 1949, he graduated from UPS with degrees in physics and math.

Above: The American Geographical Society sent Ed to the Greenland icecap for glacier research, summer 1953.
Photo courtesy David LaChapelle

Top: Ed and Meg at Dolores's memorial service in Silverton, Colorado.
Photo by David LaChapelle

SNOW AND AVALANCHE CAREER OVERVIEW

Ed spent the winter of 1950-51 at the Swiss Avalanche Institute at Davos. This experience led to a job with Monty Atwater at Alta, Utah in the fall of 1952. Atwater was a 10th Mountain Division veteran, about 20 years older than LaChapelle. Ed started at Alta doing general snow ranger work and assisting Atwater in avalanche studies. Later, Atwater transferred to Squaw Valley, California to lead U.S. Forest Service avalanche control efforts for the 1960 Olympic Games. Atwater stayed at Squaw Valley after the Olympics and it fell to Ed to carry on the research at Alta. Eventually, he spent all his time doing research, while day-to-day snow ranger work was handled by others.

For many years, Ed had parallel careers. In winter he was employed by the Forest Service doing snow and avalanche research in Utah. In summer, he did glaciology studies. He began working for the American Geographical Society of New York in 1951. In 1952, he did research for this organization on the Juneau icecap in Alaska. In the summer of 1953, they sent him to the Greenland icecap. Later, he did glacier research for the University of Washington (UW). He was appointed to the UW faculty in 1967. He taught autumn and spring quarters at UW and continued working winters at Alta through 1972. During that year he spent time in Japan in support of the Sapporo Olympic Games.

From 1973-77, Ed was involved in avalanche studies at the Institute for Arctic and Alpine Research of the University of Colorado at Boulder. He spent winters at Silverton in the San Juan mountains. After 1978, he went on an extended leave of absence and in 1982 he retired formally from the UW faculty. He is now retired in McCarthy, Alaska, where he keeps track of the local glaciers and does a little consulting work. He is currently involved as a snow consultant with the architect designing the new visitor center at Paradise, to replace the Space Needle-like building put up in the 1960s. "The flying saucer decoy's days are numbered," he said.

POST-WAR SKI MOUNTAINEERING

We talked about the growth of the ski industry after World War II and the impact of the 10th Mountain Division. Ed noted that many of the people who got into the mountain troops were skiers to begin with. He thinks that after the war many of them would have gotten into the ski industry anyway. It was not their 10th Mountain experience that directed them that way. The real boost provided by the mountain troops was cheap equipment.

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The following article was first published in The Avalanche Review, 24-1, October 2005

The Ascending Spiral

Story by Ed LaChapelle

Decisions, decisions…the February issue of TAR spoke from several informative points of view and the editor invited a dialog. Here is one contribution to the perpetual questions of how to evaluate avalanche hazards, consider human factors, and communicate (or execute) decisions.

Here is what I mean by the title. Rather than seeing our mastery of snow and avalanche science and decision-making as linear progression, I see it as the same issues and ideas coming around again and again, but each time at a more sophisticated and technically advanced level—hence the ascending spiral.

I take as my theme the wisdom that Whymper (1871) handed to us many years ago. He spoke of mountaineering in general, but his words are just as cogent today in this decision context: "Climb if you will but remember that courage and strength are naught without prudence, and that a momentary negligence may destroy the happiness of a lifetime. Do nothing in haste, look well to each step; and from the beginning think what might be the end."

DO NOTHING IN HASTE. This speaks loud and clear to the pressures of time, planning, and economics, plus the perpetual urge to action that drives so much of our modern life. Here is where the human factor in avalanche-related decisions comes to the fore.

And this brings us to Elbert's Rule. When I first worked at Alta in the 1950s, the daily mail was brought up the Little Cottonwood Canyon road by Elbert Despain, who had been doing this for many years and was still carrying the mail at age 90, when he achieved the distinction of being the oldest mail carrier in the United States.

As we all know, that canyon is beset by a horrendous series of avalanches. I once asked Elbert how he managed to miss getting caught in an avalanche in all that time. His answer was the epitome of common sense, "After a heavy fall of new snow, wait two days." Note that even the United States Mail, famed for a high determination to deliver, could at least in those times wait two days.

Elbert was mostly dealing with natural releases where his rule is hard to beat. Artificial releases, intended or accidental, can stretch out the safety wait depending on snow conditions, but the concept of giving the landscape a chance to stabilize and "do nothing in haste" points to the fundamental problem of including the human factor in decisions. The idea of waiting two days, or almost any kind of wait, just doesn't fit today's activities in avalanche terrain. Is there a heli-ski manager who can get away with asking his guests to wait two days before skiing 50 cm of new powder? No way! A ski area operator who will close half his runs in similar circumstances, or a highway foreman who will garage his plows until the snow sets up? Only in dreamland!

The basic human problem with decisions in avalanche terrain is not so much personal attitudes, group interactions or risk management. It is the expectation that human activities can be scheduled by artificial constructs like calendar and clock in a natural world that moves at its own independent pace. A weekend ski tour is not going to be put off until Monday because a snow dump on Friday created avalanche hazard, so we might as well adapt to this behavior. But at least recognize the root of the problem in training for decision-making. That tour might still take place on a hazardous weekend, but with a revised destination.

LOOK WELL TO EACH STEP, covers many individual actions or observations on the way to acquiring bases for decisions. Here I will look at a couple in detail.

First, there is the eternal business of digging snow pits…how many, how often, where, and in what detail (the ascending spiral is spinning fast here). McCammon and Sharaf (2005) cite Peter Schaerer's sensible admonition to be quick—an approach to snow pits I can readily endorse.

Let's look closer at this whole pit-digging business, one that sometimes can become the tail that wags the very large dog of avalanche data collection. Snow-pit digging is a necessary but far from sufficient action to understand snow stability. If it is only part of the picture, why does it so often come so much to the fore? I suggest this is because we can observe and record a select body of detail—like crystal type and size, hardness, density, layer thickness, etc. And why do we record these particular features? Because they are readily rendered into numerical values and logged in notebooks, an act that may convey comfort in having acquired "objective" data but not always be what we need to know.

For example, rate of change of viscosity in a snow layer might be more informative, but this is a tough one in a cold laboratory and impossible in the field. So we are often led down the easy primose path of the possible. Let me put forth the heretical notion that we do not need more data from a given snow pit, but less. The act itself of digging with a shovel is the culmination of the Schaerer Quick Pit concept. By the time I have finished digging a snow pit, I usually know about 90% of what I am going to find from it about snow stability. Logging pit details is a good educational tool and expands knowledge about a wide range of snow properties, but should not be confused with the backbone of avalanche forecasting.

In the larger picture of snow stability, snow pits provide a quick but static snapshot of conditions at a given time and place. From the external perspective of a passing observer, snow on a mountainside is just sitting there, apparently dormant. The snow cover, however, is neither static nor dormant, but a positively seething mass of activity. Snow is constantly gliding, creeping, and settling. Layer by layer, the physical properties are constantly changing as crystals metamorphose. Waves of changing temperature sweep through the snow cover while radiation works at the surface. Snowfall and wind drifting change the amount and distribution of loading with each passing storm.

Understanding the complex behavior of snow is a problem in rheology, the science of deformation and flow of matter. In this case, the problem is further compounded by the matter in question being a granular visco-elastic solid close to its melting point. You can't make it much more complicated than that.

The observational role of the snow pit in all this compared with a broader and more lengthy data collection is clarified by a concept in rheology put forth by Meiner (1964): the Deborah Number. Meiner pointed out the significance of the Prophetess Deborah singing, "...the mountains flowed before the Lord." In the limited time frame of human perception, the mountains are static and eternal, but for the Lord, whose time frame is infinite, they flow. Meiner defined the non-dimensional Deborah Number as follows:

D = time of relaxation/time of observation

A high Deborah Number means the subject in question appears to an observer to be a static and unchanging solid. The brief observation from a snow pit implies a high-D snow cover and hence a static view of what actually is an active ("flowing") snow cover. To gain insights into the dynamic character of the latter, observations extended in time are needed to lower the value of D. In other words, stability evaluation has to be an on-going process, the longer the better. Ideally, the estimate of snow-stability evaluation on a given avalanche path begins with the first snowfall of winter. More about this in a moment.

A second relevant action, consulting some sort of checklist, appears when George (2005) describes the NivoTest. This is where the ascending spiral really starts to spin. Checklists have been around for a long time and in various formats; the NivoTest stands out as possibly the most sophisticated one to date. Looking into history, the earliest checklist I can find is G. Bilgeri's Six Points (three for terrain, three for snow conditions) in use by the 1930s, described by Seligman (1936). Later, as an example, we have Atwater's Ten Contributory Factors (1952), initially with equal weight but later informally modified by various weighting schemes.

I like the NivoTest because it nicely condenses terrain, snow features, current avalanche activity and human factors. However, it is disquieting to see it illustrated in TAR by a photo of a guide consulting it in the field in the middle of what appears to be avalanche terrain. This brings the checklist concept into play far, far, too late. If you wait until standing on the edge of an avalanche path before considering snow stability and risks, very poor decisions can ensue. Again, evaluating snow conditions is an ongoing process, not a single

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ALPENGLOW HISTORY

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In the late 1940s you could buy boots, skis, and poles for $20, with a parka thrown in for good measure. That really boosted skiing.

Ed did some spring ski mountaineering in the late 1940s, while in college. He remembered a spring ski ascent of Mt St Helens, on the east side, near the Shoestring Glacier, probably in May. Everyone still used wood skis, but Ed had acquired a new epoxy ski base that you could paint onto the skis. It had a durable surface and you could put various climbing or downhill waxes on it. He recalled that the snow on St Helens had melted to expose a layer of volcanic dust on the surface. "I was astonished to get to the bottom of the mountain and find that my fancy epoxy ski base had vanished," he said. The pumice had sanded it right off. "But I also remember it was excellent skiing." Ed did a lot of ski mountaineering during summer research on the Juneau icefield in 1952, 1954, and 1956.

After overcoming childhood polio, Ed learned how to ski in 1947 and continued skiing until his death February 1, 2007, on the slopes of Monarch Mountain in Colorado. Here Ed enjoys a day at Bridger Bowl in Montana. *Photo by Don Bachman*

GENERAL POST-WAR AVALANCHE WORK

The ABCs of Avalanche Safety was a by-product of Ed's original 1961 USFS avalanche handbook. Ed realized that "the avalanche handbook was all fine and good, but it seemed like there ought to be a handy pocket reference for people going out on a tour." Ed wrote the original edition "off-hand in a couple weeks" in his spare time, and it has been going strong ever since, after several revisions. There were no compact books on avalanche safety at the time he wrote it, but there are several today.

I mentioned that although the 1950s have been described as the "dark ages" for ski mountaineering, they seemed to have been a boom period for avalanche studies. Ed said that in the 1950s and 1960s the Forest Service suddenly found that they owned a lot of avalanche paths that were being developed for ski areas. Ed was occasionally sent out to investigate prospective new ski areas in the intermountain area. He would make recommendations on how to lay out the area and so on.

> "You can't try to outguess the snow. You may stop and poke around, maybe even dig a pit, but well, that's some evidence, but you still have to make some practical decisions on the next slope you're going to cross, and it could be entirely different."

It was easy to get explosives and artillery for avalanche work in the 1950s because it was war surplus. Ed recalled, "You could just call the Tolila ordinance depot and say I need some powder and they'd say, 'Come out and get it.' You could just take a government pickup out and fill it up." TNT, tetrytol, plastic explosives, whatever you needed. Ed remembered a time when they went to get some explosives and the fellows said they'd just melted down and poured a lot of it, so "go help yourself from that pile over there." They were 50-pound blocks. Ed replied that that wasn't exactly what they had in mind. They were looking for something more like two-pound blocks. So the guys said, "Here, take this sledge hammer." Ed explained that, being military explosives, the stuff could not be set off by impact or even rifle bullets.

BIRTH OF THE AVALANCHE TRANSCEIVER

Around 1968, Ed began experimenting with the use of a radio transmitter to locate a person buried in an avalanche. Ed built a tiny transmitter that operated in the broadcast radio band. It was about the size of a cigarette pack and could be put in your pocket. He used a small portable transistor radio to pick up the signal. He was trying to figure out how much power to use and what sort of antenna it needed to work well, but hadn't advanced too far when he talked with John Lawton, a regular Alta skier. Lawton was an electrical engineer with some connection to Cornell University. (Ed thought he may have worked as a private consultant.) Lawton said, "I think I know a better way to do this."

Lawton's idea was to use an audio-frequency induction field, in which the strength of the field diminishes with the cube of the distance to the transmitter. By contrast, ordinary electromagnetic radiation diminishes with the square of the distance. The third-power relationship of the audio-frequency induction field makes its signal more sensitive to how close you are to the buried transmitter.

Lawton made several versions of the device and sent them to Ed to test. The first one had a wire coil about 15 inches in diameter which was intended to be sewn into the back of a parka. The transmitter and battery fitted into a pocket and the coil acted as the antenna. It worked great, Ed recalled, and had quite a long range, but wasn't practical because it was integrated into a garment. The next version was what Ed called a "ferrite loop-stick thing" with a nice compact antenna. The first operating model was known as the "hot-dog Skadi." It was long and narrow, about the size of a hot dog. Lawton continued to improve the design and started a company with his son to build and market Skadi avalanche transceivers. (I found a note about the Skadi in *Summit*, March 1971, page 29.)

The Skadi was the primary avalanche search beacon for a number of years. Ed recalled that the audio-frequency induction signal was virtually free of interference and "would penetrate anything." You could follow someone walking through a tunnel in bedrock with it while walking on the surface. The Swiss subsequently did a lot of research and eventually moved to a higher frequency (457 kHz) which has since become the international standard. The higher frequency gives better range with less power. The third-power relationship doesn't apply for the newer higher frequency models, but they have other advantages. One is that they can use an entirely different antenna which is less sensitive to antenna size than the Skadi. Several companies in Europe and the U.S. now manufacture avalanche beacons.

AVALANCHE WORK IN WASHINGTON

Ed participated in a study of the North Cascades highway for the Washington state highway department. The engineering was complete at that point and the road was already under construction. Willow Milroy, chief research engineer for the Department of Transportation (DOT) realized "they were buying themselves into a lot of avalanche problems," so she visited Ed at UW to request the study. He produced a thick report that included an atlas of avalanche paths, recommendations on how to set up control programs, maintenance requirements, and so on. The DOT used the report to argue against winter plowing of the highway because of the cost. Ed noted that the hairpin turn below the Early Winters Spires gives avalanches two opportunities to hit the road, on either side of the switchback. He recalled that during the highway study he brought some visiting Japanese colleagues to Washington Pass to observe the avalanche problems. "They looked around," recalled Ed, "and saw how the road comes up the west side and goes down the east side. Then they shook their heads and said, 'We would tunnel.'"

During the controversy in the 1970s over developing an open pit copper mine on Miners Ridge in the Glacier Peak Wilderness Area, I remembered reading a letter to the editor of the *Seattle Times* from Ed pointing out that the proposed mine was located in a huge avalanche path. Ed said he remembered writing that letter. He'd never made a formal study of the area, but when he saw a picture of it in the newspaper, it was just an obvious case of somebody looking for trouble, so he felt obliged as a citizen to point this out.

As a result of the work Ed did for the Washington state DOT on the North Cascades highway, the state became more interested in snowfall and avalanche forecasting. Pam Hayes, one of Ed's graduate students at UW, did work on detailed snowfall forecasting for the Cascades that was quite successful. The highway department was able to demonstrate that they could save a lot of money deploying highway crews if they had more accurate snowfall forecasts. Around the same time they started considering the possibility of central avalanche forecasting. Mark Moore and Rich Marriot, two of Ed's graduate students in geophysics and atmospheric sciences, did masters theses related to avalanche studies. Their timing was just right. According to Ed, "The highway department pirated their masters theses and turned them into a couple of jobs." That was the birth of the Northwest Weather and Avalanche Center.

AVALANCHE SAFETY EDUCATION

In the early years, avalanche training was mostly for snow rangers and professional ski patrollers. The Forest Service avalanche school has a long history. Monty Atwater started it and Ed helped develop it. Today there are many safety courses for recreationists taught by private industry. We talked about some of the new systems for avalanche hazard evaluation and Ed offered this bit of wisdom:

"There's a lot of basic common sense and good judgment factors that you don't have to have a slide rule to use. I always emphasize to people that the important thing is terrain recognition. Good route finding is the secret of staying out of avalanche trouble. Especially if you're going to an area where you haven't been and nobody else has been, where there's no data. You can't try to outguess the snow. You may stop and poke around, maybe even dig a pit, but well, that's some evidence, but you still have to make some practical decisions on the next slope you're going to cross, and it could be entirely different. Whenever I work with people on avalanche education, I put a strong emphasis on safe route-finding."

Skiing Community Loses a Pillar

Story by Bob Berwyn

SUMMIT COUNTY — The avalanche and snow science community lost one of its founding fathers when Ed LaChapelle died of a heart attack while skiing powder at Monarch Mountain Feb. 1, 2007.

LaChapelle, who was 80, was skiing with a group that included his partner, Meg Hunt, Paula Mears, former Colorado Avalanche Information Center director Knox Williams and Art Mears, another Colorado-based avalanche expert.

LaChapelle was known for his groundbreaking research on basic snow safety and avalanche control work, as well as for his writing and his involvement in the development of the first practical avalanche rescue beacon.

Speaking from his home in Buena Vista, Williams said the group was enjoying 17 inches of fluffy powder that had fallen at Monarch the previous two days.

"Ed said, 'Let's go ski some powder.' So we got some skiing in before things went bad," Williams said, explaining that LaChapelle appeared to succumb to a heart attack that came on gradually over the course of about an hour. LaChapelle was transported toward medical care via ambulance but died later that day.

"It was a great day, but a sad ending," Williams said. "Like his partner, Meg, said, here's a guy who lived for skiing and the mountains, and he was skiing some pretty good powder on his last day on the planet," Williams said.

LaChapelle died just a week after his ex-wife, Dolores LaChapelle died of a stroke in Durango. Dolores LaChapelle was another legendary figure in the world of powder skiing. She pioneered groundbreaking routes and powder skiing techniques in Alta, Utah, while her husband was based there as part of a seminal U.S. Forest Service team of snow rangers.

"He contributed so much to basic avalanche research and forecasting," Williams said, explaining that everyone today involved in the field has been touched by LaChapelle either directly or indirectly. "Almost everyone knows him or knows of him," Williams said, explaining how LaChapelle's expertise and mentoring spanned three generations of snow safety experts.

"He was the experimenter. He had this huge base of knowledge and anm inquisitive mind, always asking how can we look at the snowpack and understand it better," Williams said.

"He was a mentor to us," said Don Bachman, a retired avalanche professional now living in Montana who worked with LaChapelle in Silverton during the 1970s. "He taught us with an enthusiasm that was contagious," said Bachman, who also served a very short stint as ski patrol director at Arapahoe Basin. "We're walking in Ed's sizable footsteps, or ski tracks, rather, since he would rarely walk if he could ski."

Bachman recalled LaChapelle's distinctive, sonorous voice, "always speaking with purpose, always with a twinkle and a wry sense of humor."

Out of the work that Bachman and LaChapelle (along with others) did in Silverton during the 1970s grew the current Center for Snow and Avalanche Studies, now headed by Chris Landry.

LaChapelle was born in 1926 in Tacoma, Washington and started his snow science career at the renowned Swiss Avalanche Institute as a guest worker in 1950-1951. He served as a U.S. Forest Service snow ranger at Alta, Utah from 1952 to 1972, with breaks to do glacier research in Greenland, Alaska and Mt. Olympus. He was appointed to the faculty of the University of Washington in 1967, retired as Professor Emeritus of Geophysics and Atmospheric Sciences in 1982.

LaChapelle was part of the pioneering crew of Forest Service snow rangers at Alta who laid the basic groundwork for avalanche control programs at ski areas and for highway departments. As well, he authored *The ABCs of Avalanche Safety*, a slender, pocket-size how-to manual that has for decades been a mandatory text for winter backcountry travelers. Another book he authored that graces the shelves of many snow enthusiasts is the *Field Guide to Snow Crystals*, beautifully illustrated with spectacular photos of different types snowflakes.

The Alta snow rangers were dubbed the Avalanche Hunters in Monte Atwater's on the Forest Service research program. They refined the use of explosives for avalanche control work with some dicey and exciting field experiments, well-described in Atwater's book.

While Atwater wrote the first Forest Service avalanche manual, LaChapelle refined the work and published the agency's first official avalanche handbook in 1961. *The ABCs of Avalanche Safety* was a direct outgrowth of that work, according to a telephone interview with LaChapelle, taped by Lowell Skoog in 2001.

He was also involved with another ground-breaking innovation that has become a standard piece of equipment for backcountry powder skiers — the avalanche transceiver. LaChapelle began experimenting with the use of radio transmitters as a locator for buried avalanche victims in 1968. Working with John Lawton, an electrical engineer who skied regularly at Alta, LaChapelle refined the device, which gradually evolved as the "Skadi," which remained the primary avalanche search beacon for many years.

Ed LaChapelle was a well-loved and respected member in the brotherhood of avalanche experts, and his passing leaves a big void. Comments on several online ski forums reflect the respect he engendered, as other avy pros recalled their last meetings with him at the International Snow Science Workshop in Telluride this past fall.

This story reprinted courtesy of the Summit Daily. Bob Berwyn can be reached at (970) 331-5996, or at bberwyn@summitdaily.com.

A recent picture of Ed at his home in Alaska. *Photo by David LaChapelle*

Dolores LaChapelle (née Greenwell) was a mountaineer, skier, Tai Chi teacher, independent scholar, and leader in the Deep Ecology movement. She graduated from Denver University in 1947 and then spent three years teaching skiing in Aspen, Colorado. In 1950, she made the first ski ascent of Mount Columbia, the second highest peak in the Canadian Rockies, and also of Snow Dome, the hydrographic apex of the continent. After marrying Edward LaChapelle, she spent a year with him in Davos, Switzerland from 1950–51, and then moved to Alta, Utah in 1952, where her son David was born. She moved to Silverton, Colorado in 1973, where she spent the rest of her life and directed the Way of the Mountain center.

LaChapelle died on January 22, 2007, just 11 days before Ed passed away.

She was the author of a number of books, among them were *Sacred Land, Sacred Sex: Rapture of the Deep* (1992) and *Deep Powder Snow: Forty Years of Ecstatic Skiing*, *Avalanches*, and *Earth Wisdom* (1993)

Photo of Dolores LaChapelle by Ed LaChapelle, courtesy Lou Dowson and WildSnow.com

Memories of Ed

Ed and Meg enjoyed life off the grid at their cabin in Alaska. *Photo by Mark Moore*

I was lucky enough to know Ed for 30 years. And like so many others, I had the amazing experience of knowing Ed as a professor, mentor, colleague, and mostly as a friend who shared the love of mountains, snow, and ice. For me the most distinctive memory of Ed was his creativity in solving problems – both in research and in the everyday.

Everywhere Ed lived or worked, he left a trail of inventions and creative solutions (often with a common theme that could be traced back to successfully making gunpowder as a child in Tacoma!). He may have been at his peak when he ran the Blue Glacier Research Station (established for the International Geophysical Year (IGY) in 1957). I had the pleasure of listening to Ed relate a lot of stories about those early days, when I spent time with him on the glacier in the '70s.

The station is located 20 miles and a mile of vertical from the trailhead and is often inaccessible during bad weather – sometimes for weeks. Ed and his colleagues overcame many scientific and technical difficulties on the glacier – some more mundane than others. Like showering. Hot water was in short supply on a glacier. So Ed and his cohorts developed a piping system to act as a heat exchanger between the generators and the melted snow and presto – hot water for the tiny shower stall built in the corner of the generator shack. Or when they decided to prefab a fiberglass shack and fly it in with a helicopter. They carefully calculated the weight that the helicopter could lift and built to that, but they forgot about the downwash of the rotor on a large object. They couldn't get over the ridge of the High Divide! The solution: land in the backcountry, get out a saw and cut the building in half, fly it in parts, and "glue" it back together. It lasted for over 30 years. But the best was the Fourth of July when they were reminiscing about the times as kids when they would make a rocket out of a small juice can. They would cut out one end, punch a hole in the other, put a firecracker in the hole, place the open end in a bucket of water, light the firecracker, and watch it propel the can tens of feet into the air. Now they didn't have those components, but Ed realized they had empty 55 gallon drums and plastic explosives. Again another problem solved – though Ed admitted it took numerous tries to find the right amount of plastic explosive that would lift the barrels without turning them into lethal shrapnel!

The stories could go on and on because Ed never stopped finding solutions on the Blue, on an avalanche slope, or in the quiet of his office. I saw this most recently two years ago when Mark Moore and I visited Ed and Meg in McCarthy – 60 miles down a dirt road in Alaska (the theme of remoteness was constant in Ed's life too). Here at the foot of glaciers, Ed continued to invent and overcome. No electricity – Ed had solar panels on what seemed like every sunlit surface. He showed us the banks of batteries that they charged in the cellar – dug in the permafrost under his cabin. And not just a simple system. Two banks and two sets of circuits through the house. One for straight DC and another through an inverter produced AC for more civilized devices like a clothes washer (Ed had moved beyond the washboard he left for us on the Blue). Finally it was time for a shower and Ed escorted Mark and me to the greenhouse (whose ventilation was controlled by ropes and pulleys that automatically adjusted for the heat of the day and the coolness of the evening) where we showered with hot water from a wood water heater amongst the happy tomato plants. That's when I told Mark, "Ed has built another Blue Glacier Station, just this time a little closer to sea level."

We'll all miss Ed, but I know we will all feel his presence when we're out somewhere on a snow-covered slope, crossing a crevassed piece of ice, or amongst the tomatoes facing a problem that requires a "creative" solution!

—Rich Marriott

Ed LaChapelle was my first teacher in the avalanche field and remained my best mentor and teacher to the end. He helped me troubleshoot balky solar power systems, provided insights as a peer reviewer for my highway studies, and was always willing to bat new theories of snow processes and tests around in freewheeling discussion.

But I remember best the days of working for him on the Blue Glacier project in the Olympic Mountains of Washington State. After I had gotten myself into a near-miss avalanche while a geology student at the University of Washington, Ed took me under his wing as a glaciology student and field assistant on the glacier project.

Much of the summer at Blue Glacier was spent as one of two hutkeepers for the research hut on a saddle by a large glacial dome high on Mt. Olympus, on a rocky saddle beneath a small but abrupt mountain that was named Panic Peak for its overhanging summit cliff beneath a perfect mountain-watching flat spot and backrest ledge. We did routine snow and weather observations and maintenance chores deep in the peaceful wilderness.

But for several weeks the glacier was transformed into a bustle of activity as floatplanes landing on the snow brought in a small team of scientists from Cal Tech and the University of Washington. I ran a thermal hotpoint drill to place thermistors to measure the internal temperature of the ice to thousandths of a degree, while the main crew drilled core samples a mile up-glacier.

Ed's example always taught us to think across disciplines and outside any known boxes, but I remember being especially impressed by his approach whenever I would break from drilling and watching Dolores do Tai Chi while silhouetted against the sky atop Panic Peak.

In a large snow cave, the Cal Tech scientists were busy thin-sectioning glacier cores, photographing through crossed Polaroids, taking copious notes, making sketches, measuring, and sampling. Meanwhile, Ed would be stretched out on a foam pad in the sun, hat over his face, seemingly sound asleep until the next core section needed to be raised. He'd then appear to wake to assist and then return to sleep. It was only after observing for a week or so that I realized that Ed was not asleep at all, but was spending the time in deep contemplation of the mysteries of the snow and mountains.

He'd stir and sit up with a light in his eyes and a new theory to ponder and eventually to discuss. He knew his internal process well enough to trust it and swim against the social grain, seeking the grand patterns while those around him focused entirely on the details.

I took that lesson with me and have used it all my life. It was not so much the concrete lessons I learned from Ed, it was his example that taught me the most. I thanked him for it at ISSW last fall. I'm glad I had the chance to pass on the appreciation, and I'm glad I had the chance to learn from a true pioneer in the field.

—Bill Glude

I have a little story, inconsequential to most but cherished by me. I was amazingly lucky to be sitting at a table next to Ed's – in fact our chairs were back-to-back – at the 2006 ISSW Banquet. I had brought along my copies of *Field Guide To Snow Crystals* and *Secrets of the Snow* in hopes of turning them into autographed copies. Also in my possession were color prints of slides my father-in-law had taken at Alta in the 1950s of Ed and Dolores LaChapelle; the intention was to give them to Ed.

My wife and I nervously approached Ed, and I asked if he would be so kind as to sign one of my books. He inscribed "Many fine powder days!" in the *Field Guide To Snow Crystals*. We handed him the color prints, and his genial demeanor changed to one of surprise. He had never seen the images, and he smiled broadly as he remarked on his memories of those days. He thanked us and said that he was going to show them to Dolores when he saw her next. Given his delight, I hope he was able to do so.

I saw Ed briefly on the day he died, on a fine powder day at Monarch Mountain in Colorado. Very bittersweet.

—Rick Grubin

Rick Grubin works at the National Center for Atmospheric Research, developing tools to process and visualize all sorts of geophysical data. He is also a ski patroller for the Bryan Mountain Nordic and Loveland Ski Patrols in Colorado.

I am writing on behalf of Ed LaChapelle's partner Meg and his son David to let you know of Ed's death on Thursday, February 1. By now, many of you have heard of Ed's passing, for the internet, though impersonal, is efficient. Meg asked that I try to convey yesterday's events in a little more personal note to Ed's friends and acquaintances in the avalanche community.

Ed and Meg were on their annual ski roadtrip around the western U.S., when Dolores LaChapelle passed away in Silverton, Colorado. Ed and Meg came to Silverton to attend Dolores's memorial service last Sunday, and then they went to Gunnison to visit Art and Paula Mears for several days. A two-day storm dropped 17 inches of light powder at Monarch Mountain. Ed was excited at the prospect of a good powder day, so on Thursday morning Ed, Meg, Art, and Paula came from Gunnison and I came from Buena Vista, and we skied.

It was a cold day, one of those when fingers and toes make their presence known and beards and neck gaiters freeze solid. But the skiing was good – damn good. Ed was skiing well and loving it. We should all be so lucky when we are 80. But after several runs, he mentioned that maybe he was overdoing it and thought he should go down to the lodge to rest. While at the lodge, he showed symptoms of a heart attack. The Monarch ski patrol responded, and Ed was rushed by ambulance to the Salida hospital. He died there a short time later. Meg was at his side.

It was a beautiful day that suddenly and tragically took a wrong turn. Certainly, we who were there will never forget that day. Not because of the tragedy of it, but because we got to spend a day skiing powder with a great man. Meg said it best last night: Ed loved to ski, and could there be a more fitting final day than the one he had?

—Knox Williams

Like most of us, the last time I saw Ed was at the Telluride ISSW this past fall. Several of us old-timers went out to dinner with Ed and Meg one evening. There was Doug Fesler, Jill Fredston, Art and Paula Mears, Karl Birkeland, Janet Kellam, and me. As is usually the case when I'm in Ed's company, I unrelentingly quizzed him on every avalanche question that has ever confused me.

I asked him what he thought of the presentations at ISSW and the current state of avalanche research. He said something to the effect, "Well, there's lots of hand waving and hot air, but really nothing new. They are all still missing the point." He went on to explain that it was the deformation within the weak layer prior to avalanching that was the critical piece of the puzzle and that no one was studying it properly. We discussed ideas for various sensors that could measure deformation on a real-time basis – sensors which did not exist when he was in his prime and are only now becoming small enough and sensitive enough to measure the critical parameters on a real-time basis.

And, of course, he will be forever remembered by his comment on the same subject at ISSW when he went to the microphone after someone's talk and said (if my memory serves correctly):

"I see all of these static tests being presented and the snowpack is dynamic. Is there any dynamic testing going on? Otherwise don't you think it is like throwing a blanket over a herd of cats and trying to follow what the cats are doing? Are you really getting to the problem?"

For four years, I was one of the lucky few people who got to live in the Upper Guard Station at Alta, which has housed so many famous avalanche scientists and practitioners including Monty Atwater, Ed LaChapelle, Ron Perla, Ray Linquist, Onno Weirenga, Peter Lev, Binx Sandahl, Duain Bowles, and Doug Abromeit among others and roughly in that order. I used to sit there and hope that the floors and walls had absorbed some of the accumulated wisdom and was re-radiating it back to me.

There were still dozens of old, cut-off electrical wires hanging out the side of the building that used to be connected to a plethora of gizmos that Ed built through the years to monitor weather and snowpack characteristics. On one of Ed's annual visits to Alta I quizzed him at length about the wires and what they monitored. He relished in retelling his old, famous story about when they had all their weather instrumentation set up near the Guard Station and in the middle of one stormy night, he was awakened with a huge booming and cracking noises as the avalanche deposited all his instrumentation into the parking lot below and ripped all the instrumentation wires out of the house. "But we made the best of it," he said with a twinkle in his eye, "we published a study about the distribution of objects in avalanche debris."

One fine summer day, a man knocked on my door and he introduced himself as David LaChapelle, Ed and Dolores's son (he was originally called Randy, but he later changed his name to something he liked better). He was born and raised in the Upper Guard Station and wondered if he could come in and have a look around. "Wow," I stammered, "come on in." So I spent the next couple hours quizzing him about the old days and what it was like living with two legendary parents. Later that winter, David came and stayed for a week or so.

Among the stories I can remember, an old loudspeaker was still mounted to the outside of the building, which Ed had installed as a way to broadcast avalanche information in case of a rescue, but most of the time Dolores and Ed used the speaker to monitor David's crib so they could ski while he was sleeping and return when they heard him crying.

David seems to have followed more in his mother's footsteps than his father's as he worked as a youth councilor in Alaska and he was deeply interested in spiritual matters, which we discussed at great length.

Ed gave me boxes of his old files, photographs, and film from his research days at Alta and trusted me to get them into the proper hands. I brought most of the files to the Center for Snow Science at Alta library and I stored his old film and photographs at the University of Utah Marriott Library.

Once when Ed visited me at my house in Salt Lake City, I sat him down with a tape recorder and got him to tell me as many old stories as I could coax out of him. But the stories were disappointingly sanitized versions of the great colorful tales I remember him telling at other times when his tongue was lubricated with a few beers in the company of friends.

I always meant to record his stories again under more favorable circumstances. One year, I brought the tape recorder with me to Alaska when we boated the Tachanchini River, after which my wife Susi and I were going to stop by McCarthy and spend some time with Ed and Meg. But Susi's father died during that trip, and we headed back south instead. Then last summer we were in Alaska again, but despite Doug Fesler and Jill Fredston urging me to pay him a visit because his health was deteriorating rapidly, we lingered in Denali too long on an extended backpacking trip, and we ran out of time, so we put it off yet again. And, of course, now I wish we had done otherwise.

—Bruce Tremper

The LaChapelle family enjoyed a sunny winter day in Alta, Utah. *Photo courtesy Rick Grubin*

For Ed

A long time ago in a place far away,
A place that it rains most every day—
A young student came, fresh off the beach,
He came to be molded for his mentor to teach.

He didn't know very much about snow,
What made it stay or what made it go—
He didn't know that it had energy and strength,
Or that it had structure along its whole length.

But the master was patient and chuckled a lot,
And I'm sure to himself he gave it some thought—
What do I have here, that I'm expected to mold?
To teach so that he'll learn and live to grow old.

This youngster must think about weather and terrain,
And how new layers form through snow and from rain.
And he's got to be quick to respond and transform,
Even through stability is often the norm.

Now this scene's been repeated an amazing number of times,
I could fill in lots of your names by just having more rhymes.
You've touched many lives with deep wisdom and thought—
And many of us here say, "Thanks Ed, thanks a lot."

—Mark Moore

Meg and Ed share conversation during a visit from Mark Moore and Rich Marriott at their home in the Alaska bush. *Both photos this page by Rich Marriott*

Dolores and Ed...very strange weekend for Dolores's memorial. Richard/Betsy Armstrong (INSTAAR director and worked with Ed) were down for the Silverton Avalanche School. First time in 20 years. I'm good friends with them so we spent a lot of time, and Dolores died just before the school, so we all attended the memorial. Ed showed up on Saturday night before Sunday memorial and we had dinner with him and caught up. I gave Ed my last "excellent" bottle of Pisco from Chile, and my girlfriend met him and heard some old stories about all of us. My Prescott group got to meet him and the Armstrongs who all are legends in the snow field, and Lane and I got to work with all of these folks... Ed's passing was truly an end of an era....

Our time together was often punctuated with stories about Chile and the mines that we both worked but just as much time was spent talking about recipes for the "perfect Pisco sour." He truly was a mentor to many of us and to many snow people who didn't even know him. He was a universal zeitgeist *(the ethos of a cohort of people, that spans one or more subsequent generations, who despite their diverse age and socio-economic background experience a certain world view, which is prevalent at a particular period of socio-cultural progression)*. He loved empirical evidence as a scientist, but as his son said he was just as intuitive. I remember taking my first avalanche course from him back in the early 70s, and I think it was Denny Hogan, Tim Lane, and myself who stood on a side of a peak with Ed and Rod Newcomb after digging a pit that probably was a typical weak San Juan hole. They asked us what we wanted to do, and we jumped in and skied the line. Later after the two of them carefully worked their way down the old-man route (safe route), I remember Ed saying "You're going to die skiing lines like that. You can never trust a slope with depth hoar on it." And it was a matter-of-fact response, not a sermon or pissed off reaction. That stayed with me. He was a great teacher and a very humble human being that I enjoyed spending time with.

—Jerry Roberts

The news of Ed LaChapelle's passing hit me hard. Certainly Ed was getting on in years, but seeing his usual feisty self at the Telluride ISSW mistakenly assured me that he had at least a couple more ISSWs in him. It softened the blow a little to know that Ed lived a long and productive life, and that when he passed away he did so surrounded by Meg and other close friends, and after a morning of powder skiing.

I really only got to know Ed over the past 10 years or so. For many years he would tour around the western U.S. (often accompanied by Meg), visiting friends and skiing at some of the smaller ski hills. His trips invariably included a stop in Bozeman to see his friend Don Bachman, and when they weren't up at Bridger Bowl they would often stop by my office to chat about avalanches, recent research, and the National Avalanche Center. One time he even left me with his old snowpit kit. During Ed's visits, Don generously hosted several parties for the local avalanche community so we could talk with Ed, and at these gatherings he would regularly challenge us to come up with new answers to age-old questions in the avalanche business.

One thing I will miss is sending Ed research papers. Sending him a paper was always a little nerve-wracking, since I knew he wouldn't shirk from challenging poorly supported points. However, I couldn't resist since our e-mail exchanges and discussions were always interesting and enlightening, and it was certainly rewarding to see him delight in small discoveries that might help explain some of his observations from his many years spent in the field.

It's a well-worn cliché, but Ed really was a giant in our field. I looked up to him, as did almost everyone I know. Who wouldn't want to be like him? He had two successful careers – first as a Forest Service snow ranger at Alta and then as a professor at the University of Washington where he mentored many of the leaders in the avalanche business. He was revered by both practitioners and scientists. His 1980 *Journal of Glaciology* paper on avalanche forecasting still stands as one of the seminal works in our field after over 25 years. He was more mentally acute at 80 than most folks half his age, and he was still out skiing when many others his age move to Arizona and hang out on golf courses.

For me, I'll miss having a connection to the "good old days," someone who could tell stories about the Alta days with Atwater and Perla, and offer a different perspective on the Forest Service. Mostly though, I'll miss having him continue to provide lively challenges our papers, research, and ideas about avalanches – thereby improving them.

We'll all miss Ed. Luckily for us, he chose to put his energy and time into our field. Those efforts yielded answers to some difficult problems, while his inquisitive mind left us with many other questions to ponder.

—Karl Birkeland

Regarding Ed LaChapelle, I'm sure you won't have any trouble getting lots of good information on his contribution to the industry. There are lots of us working with snow and avalanches who owe much of our success to his encouragement. He had more to do than any other person to steer the development of modern techniques of avalanche forecasting and control that we all use today in our work. I could go on at length about how he was the major player in the development of avalanche education in the U.S., beginning with the early Forest Service Schools held in the late 1950s and 1960s. He trained us well.

—Rod Newcomb

When I arrived at the University of Washington as a prospective graduate student in Atmospheric Sciences in 1973, I was younger, cocky and frightened all at the same time. I was younger because it was several (?) years ago, cocky because I hadn't started to forecast anything other than food for the next meal, and frightened because Ed was larger than life. His disarming smile and easy manner put the initial fears to rest, at least for awhile. Then on my first wintertime field trip with Ed, I came to the realization that here was someone really thoughtful about life. In early December, back in those years when winter arrived early and stayed late in the Pacific Northwest, my wife and I drove with Ed in his old Ford pickup from Seattle to a snowcat pickup enroute to Washington Pass. We were heading up to check on one of Ed's research programs that involved avalanche path mapping and path characteristics along the proposed highway corridor for State Route 20 across the North Cascades (stretching from Newhalem to Winthrop). In any case, Ed's pickup was slow and the trip was long – about three hours or more of side-by-side camaraderie in the front seat. Trying to engage in conversation and learn from the master, I asked a great many questions. As I recall, to each question Ed replied rather simply "Yes" or "No" with either little or no elaboration on any point. Quite flustered, I sat there thinking what was wrong, and how could I possibly endure perhaps years of this "failure to communicate." Then it came to me. Ed was waiting for me to ask an "intelligent" question – perhaps something about all of the important observations that I was probably missing as the world flowed by the pickup window.

Anyway, when we arrived at the closed highway gate above Ross Lake, piled out of the pickup, and got our touring gear together to await our snowcat pickup, I noticed Ed keenly looking around and intensely interested in most everything around him. When I realized that this was the learning process that he hoped I'd pick up on, we immediately got into an engaging and quite interesting conversation about hoar frost (which was everywhere), when and where and how it formed, and how important it was as a weak layer. From then on, if I was observant and thoughtful about the world around me, from variable snow depths to wind effects to changes in terrain, I never seemed to be at a loss while talking with Ed – who was always intimately examining and analyzing everything natural surrounding him. The rest of the trip was mind-expanding for me as we ski-jored up behind the Thiokol for some 15 miles from the gate to the Washington Pass summit. There a small portable A-frame lay between the base of rather imposing Liberty Bell Mountain and adjacent Cutthroat Ridge and acted as the winter home for Frank and Donna, the UW/Washington State Department of Transportation avalanche activity observers back in the winter of 1973-74. As we observed and examined the multitude of avalanches that had recently hammered the basin all around us, and Ed's keen eyes sparkled with interest and enthusiasm, I knew that my true education as an avalanche forecaster had begun.

For the next several years as a graduate student, I was fortunate to have Ed as a rather constant source of enlightenment, and an excellent critic of my fledgling thesis abilities. His guidance ensured that I critically evaluate everything that I wrote, and that I stated each point as carefully and completely as possible. Though he attempted, unsuccessfully, to refine and shorten (succinctify?) my somewhat lengthy and verbose writing style, it is to his credit that he persevered and at least made what I did say have some reasonable content, rather than just a ramble without purpose. Yet Ed was certainly not all grim work, re-writing papers, teaching, or research. He enjoyed laughter more than most and when he laughed it was a whole body deal. Ed had a great passion for many things, and shared his passion for snow and weather science through great classes and teaching expeditions. His "Ski the West" college course (a nickname for a more profoundly named research class) at UW was imminently popular, and why not – after several weeks of classroom instruction, Ed loaded his students into a UW van, embarking upon a snow and avalanche survey of many Western mountain locations to verify and expand on what they had learned. Of course this involved lots of downhill time at a variety of powdery areas. Though we all garnered lifetime benefits from the course, we also learned that mountain time was fun time with Ed. Rich Marriott, Sue Ferguson, Pam Hayes, and Dave McClung all participated in this course which received uniformly high marks for student satisfaction. Ed took every opportunity to be away from the office and out in the field, and I don't remember any of his graduate students having research projects that didn't involve many, many field trips.

Although many of us knew or think we knew Ed well, I believe that there is a part of him that is/was quite unknown. It's the part that was "Obie Juan," the mystical Ed, the snow wizard whose mind was often a step or two ahead of his colleagues. One evening while celebrating the anniversary of *The Avalanche Review* with Sue Ferguson, Rich Marriott, and several other graduate students, Ed pranced into a rooftop party/meeting of the UW Atmospheric Sciences Avalanche Group wearing long purple robes, a pointed magician's hat, and bearing a large flask of a potent mix dubbed "Snow Snake Oil." Unfortunately, as the evening evolved, Ed brought the level of levity way up, was way too generous with the SSO concoction, and I was far too eager to sample it. I do believe that he chuckled continuously later that evening as he and Meg drove my semi-comatose body home in the old VW microbus. But what else could you do while watching the hit movie *Avalanche* starring Mia Farrow and Rock Hudson? While my recollection of this stunning box office flop is dim, I do remember that it was not noted for either its acting or special effects. In any case, it was a history of antics such as this interspersed with amazing insights and wisdom about most anything that for me sealed his reputation as a grand snow wizard, a reputation which has been reinforced many times in many ways over the intervening years.

Many of us have special memories about Ed: what he meant to us personally and to the avalanche community as a whole. But the common theme is that we will all miss Ed. Although I presented this at Ed's intro at the ISSW06 banquet, it seemed fitting to include it again here. It sums up my ramblings above, and Ed would have been pleased for such brevity, with content of course.

—Mark Moore

Hi Lynne,

Well life comes full circle. Thank you so much for keeping this part of Sue (*The Avalanche Review*) alive and thriving. Thank you for your work. I remember the beginning of this *Avalanche Review* adventure. Sue had to sign her house over to my Dad in order to secure a loan from him to start *The Avalanche Review*. I remember many evenings helping her prepare for the dreaded mailing. This was a big deal back then. As a college student she worked for a t-shirt maker, she had this brilliant idea (all her ideas tended to be brilliant) to make t-shirts to raise money and to promote the *Review*. I wore mine until it was a faded rag. While we were cleaning out her house I found a brand new one. It has become my favorite thing of her along with her two black cats named Toby and Frieda.

Our family wants to send along our gratitude for Ed's life as a teacher and a mentor to our sister and daughter. He was a very special person in Sue's life and in the lives of so many other people. I first met Ed at Sue's PhD dissertation defense. I was the lone family member. I remember Ed asking Sue a tough question in a tone I did not appreciate. I remember vividly wanting to pounce on him but instead I cleared my throat as loudly as I could…Sue nearly killed me. I met him again at Sue's graduation party, and finally when he spoke with so much eloquence and joy about his beloved student and colleague at Sue's memorial.

They will both be missed.

With Love, Brother Bob (Sue Furguson's brother)

—Bob Ferguson

Ed and Don Bachman share a light moment at the Red Mountain Pass field trip at ISSW 2006. *Photo by John Stimberis*

ASCENDING SPIRAL

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event (reduce the Deborah Number!). The NivoTest, or any similar scheme, needs to be constantly in play days prior to any avalanche exposure, when evolving weather conditions contribute to the checks. Early entries to the NivoTest may be hazy as to detail, but even then a picture will start to evolve than can be constantly updated until the final moment of decision in avalanche terrain.

Seligman (op. cit.) nearly seventy years ago placed strong emphasis on anticipating snow conditions from weather patterns long before going into the field. More recently I have made the same point (LaChapelle, 1980). Of course, the weakness of any checklist system is the risk of rigidity and thus locking out unusual thinking demanded by unusual conditions. Whether a NivoTest or any other scheme, check lists have to be reminders and not substitutes for constantly paying attention to a wide spectrum of clues about snow behavior. I view George's mention of mandate to use checklists like the NivoTest with much alarm. Plaintiff's lawyers can have a field day with mandates.

Among the various TAR articles about decisions, only Stewart-Patterson mentioned luck, where he named it one of the three main factors in decision-making, though only in passing. This topic needs wider recognition. Let's face it, most of us in the avalanche game have been saved many times over by luck. George (op. cit.) mentions that even experts say they are right only 50% of the time. Now we know that experts don't get caught in avalanches 50% of the time, so the obvious conclusion must be that luck along with undocumented skills is right in there as a major player.

This is not surprising when we consider that most places and most times the alpine snow cover is stable in the face of normal triggering forces. The whole business of evaluating snow stability and making decisions hinges on recognizing those fewer times when it is not. Thus the odds more often favor a mistake on the safe side than one that raises risk. Of course, by random chance, bad luck as well as good can follow even the most skilled and careful decisions.

FROM THE BEGINNING, THINK WHAT MIGHT BE THE END— This really gets to the heart of the matter, emphasizing the idea of stability evaluation as an ongoing and continuous process. Whymper spoke to anticipating risks in mountaineering; his words speak with equal force to anticipating risks in avalanche terrain.

Here is where the experts get sorted out from the beginners. My idea of an expert is a person who constantly follows evolution of the snow cover and repeatedly thinks ahead to "what might be the end" for one risk situation after another. The end might be an avalanche fall and, even more important, might be consequence of an avalanche fall.

I learned this many years ago from Andre Roch (personal communication) who pointed out that two questions are involved. First: will an avalanche occur, and second: if it does occur, what will be the resulting risk?

For example, a small avalanche poses less risk to a skier if it has a gentle outrun onto safe ground than it does if it carries a victim over a cliff or into a crevasse.

The whole business of expertise is examined by Conger (2005), who allots analytical skills in decision-making to persons ranging from novice to proficient, but reserves the role of intuition for experts. He is onto something here, raising the whole question of just what constitutes intuition.

Perhaps this is a case of of not being able to define intuition but being able to recognize it when we see or exercise it. Certainly we can all recognize the "seat-of-the-pants" factor in evaluating snow stability, but just what do we mean?

Here I will make a stab at answering this question and defining intuition in this context. To begin, consider what intuition is not. It is not some magical quality bestowed on mature people of wide experience along with gray hair and slowing reflexes. It is not some sort of extra-sensory perception—quite the contrary. Intuition is the lifetime accumulation of precisely those sensory perceptions of snow, weather, and avalanche behavior that have accumulated, often in the sub-conscious, that cannot readily be quantified, logged in a notebook, or clearly explained. Such perceptions, nevertheless, are based on the physical behavior of the real world, not on vague mental constructs.

An example is the meteorological perception of a mountain-snowstorm evolution based on subtle changes in the spectral distribution of light filtering through clouds as the sun descends in the sky and cloud layers come and go in shifting fashion. No doubt a wide-spectrum recording light sensor could construct graphic records of these changes and eventually build a quantitative document. But the expert integrates all this under the guise of intuition and recognizes the likely next storm trend.

Here is another example from my own experience. I once was involved in a field-training program for heli-ski guides. The exercise was preceded by a very light fall of fluffy snow, followed by a substantial fall of mixed-snow types and mid-range densities. This combination produced widespread instability with the fluff acting as lubricating layer. Two days of field training produced ski releases everywhere, excellent for demonstrating how, and how not, to test ski an avalanche path.

On the third day the first helicopter flight took several of us to a ridge top. One of the experienced guides skied 100 yards down the ridge and stopped. I followed close behind and joined him. He turned and said, "There is no tension in the snow today." I replied, "I agree." That day-long exercise never started another ski release no matter how hard we tried. So here were a couple of presumed experts putting their intuition accurately to work.

What did we actually sense about the snow? We can throw around words like kinesthetic perception and psycho-rheology, but what we actually had was many years of experience with the way our skis and legs reacted to snow structure, accumulating this experience somewhere in our heads. Did we actually experience "tension" as physics would define it? Probably not; this is another convenient word to toss around, but we both knew what we meant.

How many TAR readers know what we meant? As the spiral ascends and scientific and technical knowledge about snow continues to grow, are we coming closer to improved training and safety practices for avalanche risk management? Or are we locked into Wilde's (1994) risk homeostasis trap? The dialog needs to continue.

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