conditions are outside the range of one's experience. For Sundquist and Martin, the fact that the avalanche caught and carried them both compounded the consequences of their misjudgment. Martin had no last seen point for Sundquist, digging himself out delayed his search for Sundquist, and he couldn't dig as fast with his hands. He made a determined effort nonetheless.

More than one person on a slope

Eight large natural avalanches released further up the valley later that night.

GOBBLERS KNOB, BIG COTTONWOOD CANYON, UTAH | 19950212b

February 12, 1995

Three backcountry skiers caught and carried; two partially buried, one injured, and one killed. The party was hit by a slide from above while traversing on moderately-angled terrain. Another party in the area came to their assistance, finding the buried skier and providing medical care that stabilized a severely injured skier.

SITE

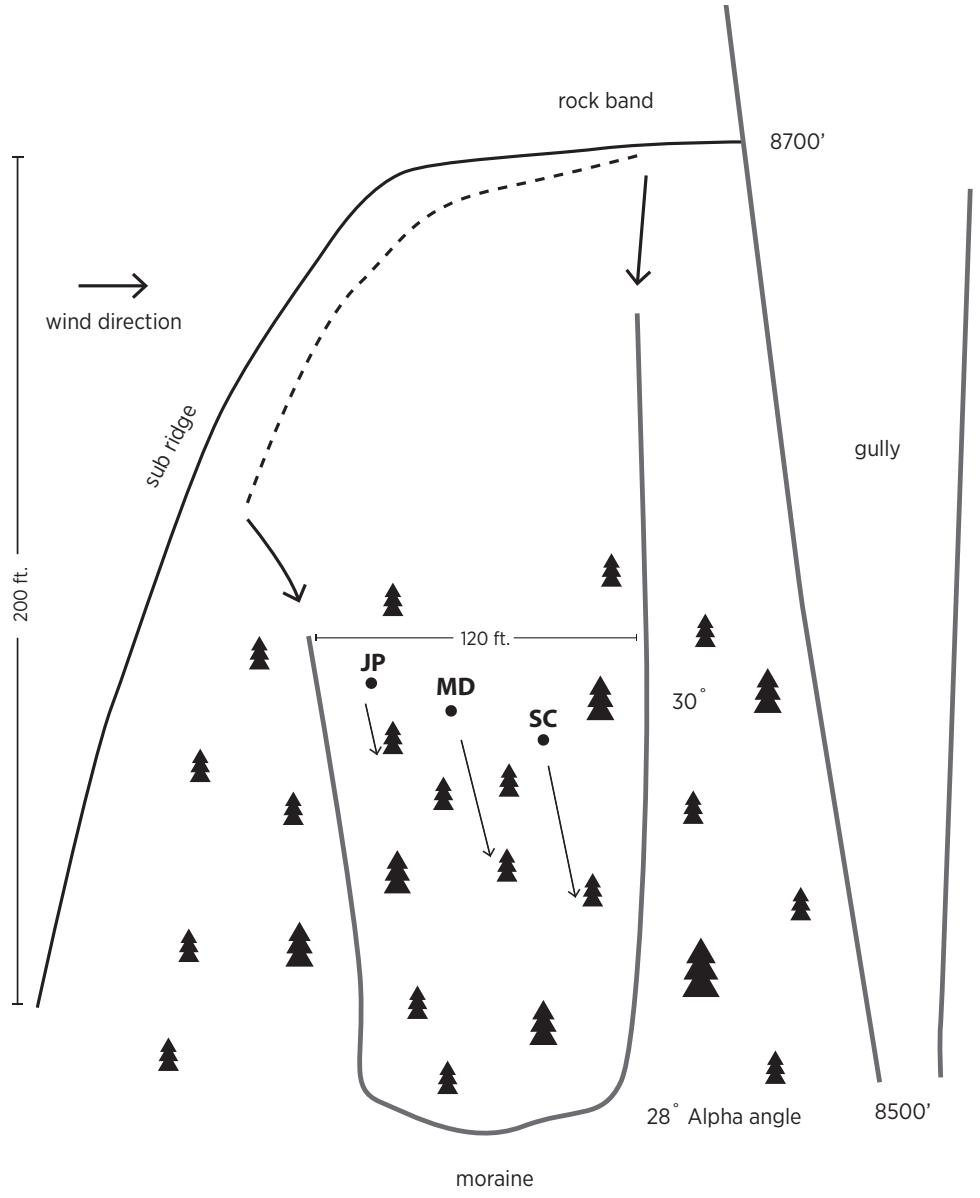
Gobblers Knob (10,246 feet) is the highest peak on the ridgeline between Big Cottonwood and Mill Creek canyons. Relatively short access and a variety of terrain make it popular with backcountry riders. One popular trip climbs Butler Fork in Big Cottonwood Canyon, traverses the southern flanks of the peak in Mill A Basin, crosses a small pass, and descends Porter Fork in Mill Creek Canyon. The southerly slopes of Gobblers Knob, however, are distinguished by "several major avalanche gullies and a number of smaller potential slide paths."[100] The traverse to Porter Fork crosses "through the tracks of some steep avalanche paths which tend to load up in windy conditions."[101] An alternate route avoids this exposure by dropping 300 feet off the ridge between Butler Fork and Mill A Basin, then "follows the flat floor of the cirque and is well out away from steeper slopes above."[102]

The area has a long history of avalanche accidents. Including the victim in this accident, four people have died in avalanches on its flanks. These fatalities occurred in accidents on its northwest (March 14, 2003/20030314), east (February 21, 2007) and south (January 21, 2016) slopes. A previous volume of *The Snowy Torrents* describes a fifth fatality on March 11, 1981 that involved a party traversing from Butler Fork to Porter Fork, where the accident happened.

WEATHER AND SNOWPACK SUMMARY

Clear weather in early February left a one-inch-thick sun crust on sunny slopes. A weak storm from February 8 to 9 dropped low-density snow that quickly faceted. A stronger storm arrived late on February 10. The Mill D North SNOTEL (8,967 feet; 2.25 miles east) recorded two inches of snow-water equivalent by February 13.[103] At the Alta study plot, this translated into 22 inches of new snow on the morning of the accident. Snow showers continued through the morning, "sometimes depositing snow at 2 to 3 inches per hour in Butler Fork."[104] Winds the day of the accident were blowing 20 to 25 mph from the west-northwest and temperatures were in the 20s. The Utah Avalanche Forecast Center rated the avalanche danger as High for slopes steeper than 35 degrees at the elevation where the accident occurred.

High avalanche danger



Recreation of a diagram from the Utah Avalanche Forecast Center's unpublished, undated Avalanche Accident Reporting Form.

ACCIDENT SUMMARY

Steve Carruthers (37), James Paul (37), and Marshall Denton (33) left the Butler Fork trailhead following a skin track broken earlier that morning by another party. Individually and collectively, Carruthers and his friends had many years of experience ski touring in the Wasatch. They carried avalanche rescue gear and planned to traverse to Porter Fork.

More than one person on a slope

At the ridge between Butler Fork and Mill A Basin, the group ahead Carruthers' group "decided, on a vote of three to one, to take the lower route."[105] However, when Carruthers and his friends reached the ridge, they saw that group's tracks descending into the basin. They chose to break their own trail "through deep, windblown snow"[106] across the southwest face of Gobblers Knob, roughly following the summer trail. They crossed the

first major avalanche path and, with Paul leading and Denton and Carruthers trailing, headed through "some small aspens on a 25 to 30 degree slope"[107] when they heard an avalanche just before it hit them. They did not hear a collapse and had no time to react. "All three were caught by the slide and swept a short distance through the trees. All three stopped against aspens and initially, all three were totally buried."[108]

In avalanche runout

RESCUE SUMMARY

A third party —Larry Dunn, Annette Keller, Al Trese, Amy Abbott and Graham Stork—was behind the Carruthers group on the ridge between Butler Fork and Mill A. At about 12:45, they heard shouting that became clearly distinguishable as cries for help as they neared the accident site. Abbott and Stork immediately turned around, skied out to the trailhead, flagged down a vehicle, and alerted the sheriff from the Silver Fork Lodge at 13:16. The sheriff's office dispatched a search and rescue team and an air ambulance.

When Dunn, Keller, and Trese reached the accident site, they found Paul had cleared the snow from his face and started digging himself out. He had managed to keep his hands in front of his face, creating an air pocket as the snow pushed him down the slope. He told them it had been about 30 minutes since the accident and that one skier was missing. Then Dunn found Denton with just his face showing, cold and in pain from a badly broken femur.

The rescuers had a tough decision to make quickly—how much time to spend stabilizing Denton before searching for the missing third skier, Carruthers. Given the time since the accident, they knew Carruthers' odds of survival were low. Denton, meanwhile, was "badly injured, hypothermic, and susceptible to shock."[109] They chose to extricate Denton, and Trese, a physician, stabilized him while Dunn did a beacon search for Carruthers.

Dunn found him in five minutes, and had his head uncovered in less than 10 minutes. He was unresponsive, not breathing, and had no pulse. His body was buried one to two feet deep, chest against a tree, with his jacket pulled over his head and no ice mask. He had suffered multiple injuries, including broken ribs, and "he was probably unable to expand his lungs after coming to a rest."[110] Trese initiated CPR, which the group continued for two hours.

Terrain trap

Fog and snow initially hampered the air ambulance, but it managed to land shortly after 15:00. A five-person search and rescue team on skis reached the site at about the same time. Shortly thereafter, rescuers ended resuscitation efforts. The rescue supervisor, concerned about the danger of additional avalanches, directed the helicopter to evacuate Denton, Paul, Dunn, Keller, and Trese as darkness approached. A second air ambulance retrieved Carruther's body.

AVALANCHE DATA

The avalanche broke on a 35- to 38-degree slope and ran about 200 vertical feet, depositing debris one to three feet deep. The crown face was 120 feet wide and an estimated 1.5 to two feet deep. A UAFC forecaster investigated the accident the next day, by which point the crown face was "almost completely drifted in."[111] He described the slope as "a minor sub ridge curving off the main Southwest face of Gobbler's [sic] Knob. Wind from the Northwest drifted snow onto the slope on the lee (observer's right) side of the sub ridge."[112]

In his crown profile, he identified the bed surface as the early February crust and the failure plane as the interface between the two February storms.

> The interface between the faceted layer and the snow from 11 Feb [sic] consisted of plate-like stellar crystals, many of which were oriented horizontal to the slope angle. These stellars were the weakest layer on the morning of 13 Feb [sic], 24 hours after the slide. This unusual type of crystal and their orientation may have behaved much like a layer of surface hoar crystals.[113]

The UAFC forecaster concluded that skiers remotely triggered the slide that released above them, though the survivors believed that it was spontaneous. He noted that "there were two spontaneous slides in the area in the next 18 hours,"[114] and that the party was "a long way off and only on a 30 degree slope; plus the instability did not seem to be the classic long distance collapse failure that usually catches people from above."[115] Countering those points, however, was a series of three other skier-triggered slides in the vicinity that day.

> Up the East Fork of Butler, a skier triggered a 150' wide, 2' deep slide that deposited him in a gully bottom, uninjured with his head out. A second person was unglamorously dumped onto the Butler Trail when he triggered a small slide on steep slopes near the road, and a third skier triggered a slide sympathetically in the Circle All area.[116]

The last slide was triggered by a highway forecaster about an hour before the accident from several hundred feet away; it ran surprisingly fast and far. By the morning of February 13, the tally was two spontaneous and four skier-triggered slides in the Butler Fork/Mill A area, two of them releasing remotely. That instability was "quite localized"[117]; few other human-triggered slides were reported outside this small area and avalanche control work did not suggest sensitive conditions. The unusual conditions appeared to result from the "period of intense snowfall, greater than 3"/hr, that occurred earlier that morning [February 13]."[118]

TYPE	TRIGGER	R SIZE	D SIZE	BED	ASPECT	CHARACTER
SS	ASr	2	2	O	SSE	PS

COMMENTS

This accident highlights the difficulties long-time backcountry recreationists can have recognizing and adjusting to unusual and unexpected conditions. Carruthers was well known for making first ascents of hard rock climbs and for numerous ski descents, all in good style. A local guidebook author noted, "He would take calculated, acceptable risks, but he would never push the envelope."[119] His death rippled through the backcountry ski community. He "was no avalanche neophyte, as is often the case. In other words, if Steve Carruthers can get killed in an avalanche, nearly anyone can."[120]

Yet Carruthers' experience and risk assessments proved inadequate. The UAFC investigator observed that

> the avalanche danger that day was not that obvious. The slope doesn't come quickly to mind as a deadly slope….The storm was not too big either, at least by Wasatch standards. The weather was starting to break up and the underlying snow was stable. The avalanche danger was only within the new snow—a situation which most experienced backcountry skiers can handle.[121]

He also noted that he might have chosen the same objective that day, evaluating snow and weather conditions as he traveled. He would have carefully crossed the main avalanche paths on the southwest face of Gobblers Knob, but he "like them, might not have worried much about the slope that caused the accident."[122]

The UAFC investigator did, however, call out the party's choice to traverse the southwest face of Gobblers Knob rather than taking the lower route, out of avalanche runouts. He emphasized the need to "Never let your safe travel protocol slip….Keep trying to do everything right, the absolute best you can, and hope the cards don't go against you."[123]

In this case, Carruthers and his friends didn't do that; in one critical decision, they exposed themselves to an avoidable hazard. Had they chosen the lower route, as the party ahead of them did, it wouldn't have mattered if they'd recognized the highly localized instability that was developing from the intense morning snowfall and wind. They had enough clues—High avalanche danger, strong winds, high snowfall rates, trailbreaking in deep, windblown snow—to warrant conservative routefinding, even if it meant losing 300 vertical feet. The value of strictly adhering to best travel practices—like choosing an ascent route that's avalanche proof—is in how it minimizes the need to rely on experience. It matters far less if one recognizes unusual or rapidly changing conditions, because one's exposure to avalanche hazard is less.

Two aspects of the rescue merit comment. One is the decision by two members of the first responder party to go for help. The standard protocol is to keep everyone at the site, so as to have more people and resources to search and administer first aid. In this case, the decision helped Denton survive, because an air ambulance was on scene sooner. The second was Dunn and Trese's decision to briefly delay the search for Carruthers in order to stabilize Denton. "Usually, if a person's head is above the snow and [they are] breathing, they should be considered a secondary priority. On the other hand, one must not lose a live patient…searching for someone who may already be dead."[124] The UAFC investigator remarked that the limited time spent stabilizing Denton was justified, given his condition and the time since the accident. He concluded: "The initial search stage of avalanche rescue is a dreadful matrix of potential bad decisions faced under a deadly time limit. In this case the rescuers quickly made well reasoned decisions. A nicely done job."[125]

CONUNDRUM CREEK, SOUTH OF ASPEN, COLORADO | 19950214

February 14, 1995

One resident buried and killed. A weeklong storm resulted in an historic cycle of long-running natural avalanches, one of which hit an occupied tipi. Neighbors were not able to find the victim during an initial rescue. The sheriff deemed conditions unsafe for an organized rescue until the third day after the avalanche.

SITE

Conundrum Creek is a major tributary of Castle Creek; the two creeks join about four miles south of Aspen. A road leads just over a mile up the Conundrum Creek drainage to a trailhead for the Maroon Bells-Snowmass Wilderness. Among the homes and cabins along the road in 1995 was one owned by Marta Steinmetz; a tipi stood "a stone's throw away."[126] Steinmetz, who had lived along Conundrum Creek since 1960, claimed tipis had "sat on the plot consistently since 1970."[127]