Cause of the failure has not been determined. Two climbers independently inspected the remaining slings in the leader's pack and found all solid water knots. The sling had carried the rappel load, but then failed with approximately 80% more weight. Tensile tests were carried out on slings with knots that were intentionally not dressed (twisted or folded), but these performed surprisingly near to perfectly tied knots.

One possibility was that the knot did not take a set, and slipped through to the melted end on rappel, and continued slipping on the victim. Regardless of reason for failure, it is strongly recommended that setting a single sling, equalized or not, should only be done after careful deliberation as to the risk. It is recommended that any anchor system with bolts or gear be set with two independent, bombproof anchors, or at least three good independent anchors by traditional gear placement. Bombproof means two modern solid anchor bolts with hangers, solid horns or trees.

Independent slings or quickdraws should be clipped to each anchor point to provide sufficient back-up for an individual sling or anchor point failure. If one judges the need for an equalized sling, it should be backed up with the rope or slings slightly longer to allow equalized movement) to each anchor point. (Source: Michael Dianich)

FALL ON HARD SNOW—CRAMPONS ICED UP, UNABLE TO SELF-ARREST

Oregon, Mount Hood, Palmer Glacier

On June 11, Andy March (32) was descending from the summit of Mount Hood about noon when his crampons became "iced up," and he was unable to clear them by tapping them with his ice ax. He slipped and fell 300 feet before he was able to stop his fall.

His partner summoned help at Timberline Lodge, and a rescue team proceeded to help March down the mountain. They returned to the lodge by 7:30 p.m. March was transported to Mount Hood Medical Center for an evaluation of his chief complaint—lower back pain. (Source: Clackamas County Sheriff's Office)

(Editor's Note: The term "iced up" most likely means consolidated snow that did not dislodge using the usual method of tapping—or giving a good whack—with one's ice ax. Experienced climbers like these fellows would not use an anchored belay in this kind of situation, but those with moderate or less experience should.)

FALL ON SNOW, CLIMBING UNROPED, SNOW CONDITIONS—NÉVÉ

Oregon, Mount Hood, Cooper Spur

On September 6, Mark Fraas (40) fell 1500 feet down the Cooper Spur after losing his footing.

Analysis

There have been at least 13 fatalities on the Cooper Spur. All follow a similar scenario: loss of footing, inability to self-arrest, and a long fall over rock cliffs above the Eliot Glacier. Because of the hazardous fall line, this route should only be attempted when snow conditions give firm footing and the party is prepared for immediate self-arrest. These conditions are usually present in the very early hours of spring mornings.

Friends of Mark Fraas indicated that he had climbed Mount Adams and Mount

Hood several times, that he was an expert telemark skier, and that he was not a foolhardy person. He and his partner, Rodney Brenneman, were carrying skis and were not trying to reach the summit.

It was also reported that he was a person who "did everything to the limit." Further, "He was always ebullient, enthusiastic... operating at a different level than most people." (Source: Jeff Sheetz, Portland Mountain Rescue; and "The Oregonian," September 8, 1997).

Excerpts from a letter by Rodney Brenneman, Fraas' partner, to the Crag Rats Mountain Rescue offered the following:

I feel there are three likely potential causes of Mark's fall: One, he was hit by a rock and knocked off balance. While he wasn't wearing a helmet, there was almost no rockfall and this seems highly unlikely. Two, his crampons lost grip or edge points broke out. I found no icy or crusty spots at all, nor was the snow the slightest bit slushy (I was wearing gloves with no shell, placing my one hand against the snow constantly, and my gloves weren't the slightest bit wet). This is possible, but seems less likely than the third possibility: He caught his crampon points (probably left foot) on his leggings as he stepped through. This I believe is the most likely cause. Mark was wearing leg warmers he had made, which could be pulled down to boot top (like cyclists use) if they become too warm. He had these pulled down (as well as his sleeves off) at the time of the fall. Given the steepness of the slope, there would be a very small space for the uphill leg stepping through during traversing.

Regardless of the cause, the fact that Mark was traversing (*piolet canne)* without anchoring his ax meant any slip was a fall. Finally, once he lost his ax (and without a leash to perhaps help him retain it) there was no chance of arrest. I also have no idea how familiar he was with self-arrest techniques.

I understand from others that Mark was an excellent and experienced telemark skier. Nothing I know or heard about Mark indicates that he had any experience as a "climber"—except in the context of doing approaches for skiing. I have climbed and taught rock climbing for a number of years, and climb grade WI 4 ice. Mark had the knowledge of the local terrain, fitness and confidence of an experienced "climber." In retrospect, it is my gut feeling that he may not have had the experience to judge when he had crossed over his technical limitations and when to adopt a more conservative approach.

Cooper Spur should never be climbed fourth class—roped but without placing protection. You don't stand a chance of holding another climber's fall on this steep a slope without some anchor. I don't feel unroped climbing is unnecessarily dangerous for an experienced climber on this route—as it is the fastest method of ascent. Personally, the only change I would have made would have been to use two axes in *piolet panne* (with leashes) so that I always had an anchor. It is just as fast and is safer. There is a danger with two axes and leashes should you somehow come off, however. I believe that self arrest is nearly impossible from the upper slope in the *névé* conditions we had and that the climber must not fall.

In conclusion, I think information which alerts people to the seriousness of the Cooper Spur route is one of the best accident prevention tools. The most dangerous aspect of the Cooper Spur route is that it never really looks or feels dangerous or particularly exposed—at least until one is very committed to the upper portion.