

descending both anchors came out and he fell about ten feet. He was then lowered another 75 yards to a more comfortable and safe area. Bochoven was able to offer partial assistance. Mountain Rescue Council assistance was obtained and a routine carry-out was effected.

*Analysis:* I think this accident could have been avoided if the party had been smaller, therefore enabling me to maintain closer control and supervision. I also should have done the first rappel earlier and checked out what was going on below, while the assistant tended the top.

**AVALANCHE—Wyoming, Grand Tetons.** At 1100 on Saturday, 12 January 1974, a 15-member National Outdoor Leadership School Teton Winter Mountaineering Expedition checked out with Ranger Pete Hart for a two-week stay, with a tentative base camp to be placed on the Teton Glacier. It was snowing heavily at the time. Climbing cards were completed, and, as is customary with NOLS groups, only tentative mountaineering routes were discussed. Climbs on these courses are undertaken when the opportunity presents itself. The group stated they tentatively might try Mt. Owen and Teewinot by standard routes, and perhaps the east ridge of the Grand. Because of the blowdown in the Bradley Lake area, it was suggested that the group follow the Teton Park Road and ascend Burned Wagon Gulch behind the Fabian place and cross into Glacier Gulch near the Valley Trail-Amphitheater Lake Trail junction. The route up the gulch was also explained, and the difficulty of the traverse from either Amphitheater Lake or higher on the Amphitheater Trail was pointed out. The weather forecast predicting heavy snow and high winds was also made available.

Both Tom Warren (27), Expedition leader, and Ben Toland (23) are recognized by Park personnel as being competent mountaineers who have led NOLS trips into the Park on other occasions. They both voluntarily assisted the rescue team in the difficult Janis evacuation from Mt. Owen in August 1973. Avalanche hazard was, therefore, only mentioned in connection with areas to watch on the route up Glacier Gulch, with the idea that the group was well led and would be in the mountains for a long period of time.

The party left Cottonwood Bridge at noon and, after classes on skiing, waxing and packing, they followed the Teton Park Road to Glacier Gulch Turnout where they turned west and camped on the ridge north of Burned Wagon Gulch. It continued to snow heavily with high winds.

On Sunday, 13 January, the snow and wind continued. The group moved along the ridge and, at the trail junction, decided to proceed up the ridge in the timber toward Amphitheater Lake rather than ascend the more open Gulch because of the weather and fresh snow. They made it about halfway to the Lake that night and made camp on the hillside.

The next morning, Monday, 14 January, the weather began to clear and become colder. When the group arrived at Amphitheater Lake (9698'), it had begun to snow again and the wind picked up. They dug in and spent the night.

The storm continued on Tuesday, 15 January, with heavy snow and winds estimated at 75 mph. The party decided to spend another night in the same location rather than risk the difficult traverse from Amphitheater under Disappointment Peak and into Glacier Gulch. Steve Goryl (19) was suffering from an infection and was passing blood in his urine. That night it warmed up and the snow became heavier.

On Wednesday, 16 January, the weather dawned clear. Goryl was sent out with Ben Toland and Mike Busby (22) to obtain medical attention. They left at 1115 down the ascent route. About 15 minutes later, the remaining 12 members began the traverse into the Gulch. The traverse is tricky in early summer and very difficult in winter because of the high angle convex snow slope ending in a series of rock cliffs. The old glacier trail was blasted into this hillside and the remnants of the old cables are still in place. At 1200, Warren led across the first section belayed by Wes Krause (20). The new snow had built up and there was some sluffing. They carried their skis and made a knee-deep trench across the slope, fixing two ropes for the others. At the cable was a small solid area and they moved five to six people to this spot. Warren was then belayed the rest of the way across, putting in a trail. He then retrieved his pack and went across, skiing down through a small gully and over to the moraine which they then had to climb to get to their objective of the day—the Teton Glacier.

The moraine above them sloped up about 35 degrees for 600 vertical feet; then the slope levels out for 200 yards until the 300-foot rise of the terminal moraine is reached. Warren was soon joined at the base of the slope by Krause, Moseley (24), Brodsky, Rendall (21), and Silha (20). They began traversing and kickturning up the moraine on skis. There was a rippled wind crust, and they were having difficulty edging on the hard surface.

Wes Krause and Mike Moseley were in the lead and nearing the top of the slope. Tom Warren was at the end of the last switchback, 60 feet behind Krause and Moseley, and removed his skis because of poor edging conditions on the hard snow. He took about eight steps uphill and was about 50 feet from the top of the moraine when the avalanche occurred at 1550 on 16 January.

Warren was carried 50 feet down the slope and stopped on top of a large boulder, buried to his waist in a standing position. Krause and Moseley were carried about 500 feet down the slope, and Krause managed to stay on top by swimming and got rid of one ski, poles and pack. Moseley was buried and had landed about 15 feet below Krause. Bart Brodsky (18) was ascending the moraine and was about 200 feet below and to the west of Warren. He was carried about 50 feet by the slide and buried. Three members of the party, Peter Rendall, Donald Webber (21), and David Silha, were just beginning the ascent of the moraine when they were hit by the mass of snow near the edge, carried less than 15 feet and buried.

The remaining five members of the party, Instructor William Brudigam (23), Jesse Reimer (17), David Lundy (20), George Huey (20), and Ted May (21), had just completed the traverse from Amphitheater and were resting and beginning to put on their skis in a safe area above and to the south of the slide path. All five witnessed the slide and saw the others disappear from view. It took these five men about three minutes to get to the avalanche area. Huey, May, and Brudigam went immediately to where Webber, Rendall and Silha were buried. Parts of Webber's and Rendall's heads were exposed and they were immediately dug out from just under the surface in about three minutes. Warren joined in the digging and had David Silha's head exposed eight minutes after the slide had occurred. Silha was buried face down, with his head downhill, one and one-half feet under the surface. He was not breathing and did not respond to artificial respiration.

Brudigam, Webber, Rendall, and Warren then began probing for Brodsky. Brudigam had marked the last seen point and located him. He was face down in a prone position two feet under the snow surface. It took ten minutes to dig him out, so it was at least 25 minutes after the slide before cardiopulmonary resuscitation was initiated. He did not respond.

Krause was free of the snow when he stopped. He could hear Moseley groan. Moseley's pack was on top of the snow but was not attached. Krause began digging under the pack. David Lundy and Jesse Reimer arrived within five minutes and helped dig and probe. Finally Krause hit a boot with a ski pole. Moseley was lying face down with his knees bent and his feet extending upward. He was buried about three feet below the surface, about five feet downhill from his pack. It was about 20 minutes after the avalanche before Moseley was dug out. Cardiopulmonary resuscitation was begun immediately, but he did not respond.

For the next hour and 25 minutes, cardiopulmonary resuscitation was administered to all three victims. At 1745, Warren left Brudigam in charge with instructions for the survivors to move to Delta Lake. Warren and Krause then skied out to report the accident at Park Headquarters at 2210 that night.

*Analysis:* The avalanche was a hard slab with a fracture line varying from 18 inches to three feet across the 350-yard breadth of the slide. The avalanche traveled about 600 feet downslope to the base of the 35-degree southeast-facing slope. Some of the debris then spilled an additional 400 feet down a gully toward Delta Lake. The slide was classed as HS-AS-4-2. It was a hard slab, released artificially by skiers, of large size in relation to the total slide area, with an average fracture line of two feet.

From the data, it appears that the several days of subzero weather ending on 12 January produced a temperature gradient layer in the snowpack. The heavy snow and high winds of the storm period ending on 15 January resulted in a wind slab condition on this southeast slope which became increasingly unstable as the air temperature rose, providing an extreme avalanche hazard on this slope. When triggered by the party on skis, the slab broke loose and slid on this lower layer produced by the temperature fluctuations. Warren estimated weather conditions at the time of the slide (1550, 16 January) as gusty winds of 24-25 mph with clear skies and temperature near 25 degrees.

The slope of the moraine is deceptive to the route finder as numerous large boulders protrude from the snow surface. Although these rocks did keep a portion of the center of the slope from sliding, the slab generally flowed over and around them.

Contributing factors in the accident were the subzero cold spell of the preceding week and the high winds and heavy snowfall, which occurred on the four days preceding the slide. It appears that a highly unstable windslab condition developed on this 35-degree southeast slope near the 10,000-foot elevation. Party members had just crossed the most difficult obstacle of their route before attempting this slope. Alternate routes are a matter of speculation as all contained some avalanche danger. The party ascended the wrong slope at the wrong time. (Source: Peter M. Hart, Grand Teton National Park.)