were hypothermic, with frost nip on their hands and feet. Despite their condition, they managed to climb the rescue team's ropes to the summit.

Analysis

Justin and Luke had experience in stormy alpine weather and knew that storms were common in Yosemite, but they had not expected to encounter ice on the summit slabs. ("Staying Alive," the safety chapter in the Yosemite climbing guide, which they had read, states, "Temperatures may drop, freezing solid the next pitch...") May and June bring plenty of serious storms in the park, and any face climbing pitch may become impassable due to water or ice. Half Dome is particularly prone to winter conditions. At 8842 feet, its summit rises almost a mile above the Valley floor. The weather is equivalent to that in the high country, with occasional blizzards, ice—and rescues—even in August.

Claims of waterproof breathable fabric (Goretex and other brands) leaking, whether true or not, are common among wall climbers. Even with coated nylon bottoms, bivy sacks are notoriously poor shelters in wet conditions. There are just too many ways for water to find its way inside. The closest thing to a fool-proof shelter is a well designed portaledge in good condition, with properly sealed seams.

Two factors aided their survival. First, and most important, friends knew where they were. Second, the clouds broke enough for the NPS to fly. A ground approach—an eight-mile uphill hike in the snow—would have taken the rescue team several more hours, leaving Justin and Luke on the wall into the next night. (Source: John Dill, NPS Ranger, Yosemite National Park)

FALL ON ROCK, INADEQUATE PROTECTION, PROTECTION PULLED OUT, OVERCONFIDENCE

California, Yosemite Valley, El Capitan

Dave and I (Rob) had been planning to climb the Nose of El Cap (34 pitches, Grade VI, 5.11, A2) for the past year. Together we had 24 years of climbing experience, including many traditional 5.10 and 5.11 leads and a couple of Yosemite walls, so we felt the climbing would be challenging, but easily within our limits. I had not been climbing much in the last four years, so I had intended to climb outdoors as much as possible during our year of preparation. However, innumerable projects at work consumed nearly all my time. All I could manage were a couple of hours per week in a climbing gym and one weekend at Joshua Tree, where I did lots of 5.10 cracks. So my prep for the ascent hadn't gone as planned, but I still felt physically strong from the gym. Also, this was the first time in fifteen years that I could take a vacation at the right time of year, so I wanted to go for it. I thought that a few warm-up routes in the Valley would get me back to feeling totally comfortable on granite.

Rushing to tie up loose ends at work shrank my two week vacation to a week and a half. We arrived in Yosemite in the middle of a June storm. A cold biting wind, and rain and snow marked our first two days there. The Nose is often crowded, and friends had described it as a "bowling alley" with falling rocks and equipment funneling onto lower parties. But there seemed to be nobody

up there except for one group braving the storm on El Cap Tower. We'd already lost some climbing days due to work and the weather, and here was the opportunity to do the route with only one party above us, so we changed our plans. We would skip the warm-up routes and jump on the Nose as soon as the storm broke.

On June 3, our third day in the Valley, the weather was still nasty but the prediction was good, so we decided to get started. We got to the base at midday, a little later than we wanted. Another party must have been listening to the forecast; they were just starting the first pitch when we arrived, but they were fixing ropes to Sickle Ledge (top of pitch 4) and starting up from the ground the next morning. Our plan was not to fix, but to climb to Sickle and bivy there. Since both parties climbed at comparable speeds, we thought we could pretty much stay out of each other's way on the route.

We got to Sickle Ledge later than expected, after dark, so I had a quick dinner and fixed the next 60-meter section (pitches 5 and 6) by headlamp. By the time I returned to Sickle, reorganized the gear, and got into my sleeping bag it was well past midnight. Morning came way too soon. The sounds of the other party jugging their lines and a new party starting the route woke us up well after dawn, about 8:00 a.m. I was still tired.

We ate a quick breakfast, and Dave jugged up the line and hauled our gear. I stayed behind to control the haul bag with a back rope, so by the time I started up, the party below was jugging their last rope, right on our heels. I was carrying a pack, unbalanced at that, so the last steep part up to Dave was tiring, and I arrived at the anchors out of breath. In an effort to save time. I decided to take the whole rack with me on the next pitch. Since the climbing was rated at only 5.8, I thought the extra weight wouldn't be much of a problem.

Pitch 7 started with a long tension traverse. After being lowered 30–40 feet, I worked my way toward the next corner system to the right. Frictioning out on tension, I realized that my brand new shoes didn't provide the foot sensitivity that I am comfortable with. They were my usual model, but they weren't broken in and the soles were thick and not scuffed. I hadn't noticed it much the day before because we had aided most of the way to Sickle.

Once I reached the corner, the climbing was only 5.6 and I quickly made it to an old, bolted belay station, 30 feet to Dave's right and horizontal with him. I didn't want the lead rope to go straight right from Dave and then make a 90-degree bend to follow me up the pitch, so I skipped clipping the bolts and climbed higher. The climbing was still easy and I was feeling confident and moving quickly. The hand-sized crack above looked good.

I got to a point where the angle of the rope looked okay and placed my first piece, a cam. I estimate I was now 30 feet to Dave's right and 15 feet above him. I considered placing more gear here, but I wanted to save time and keep our hand-sized cams for what looked like the crux above and possibly for the belay, still a long way up. I climbed another 15 feet or so, where the wall steepened to vertical and the crack narrowed to thin hands. Though I was still below the crux, it wasn't the best of all stances—I had a right hand jam and the tip

of my right foot in the crack, not really solid—but I decided to stop and place another cam.

My first choice was slightly too small. The long layoff from climbing put me a little out of practice. Also the rack was huge, so it took longer than usual to find the right size. Although the stance had been adequate for a short stay, I was getting more fatigued by the second, the weight of the rack getting heavier and heavier. After digging through the hardware, I found the right cam and placed it. My hand was beginning to sweat. I reached down to grab the rope and clip the 'biner when, Boom!, my foot popped out of the crack and I was falling.

Everything happened fast: I tried to grab the rock, but it was going by too quickly. I never felt the cam, but it must have pulled out, since I kept going farther and farther, gaining more and more speed. The sound of the air rushing by me was intense. There were lots of little impacts, not hard, but I'd let out a grunt each time. Then I hit something and flipped over and the back of my head struck the rock. My helmet absorbed the brunt of the impact, but now I was falling upside down, incredibly fast; a head first blow, I was thinking, would surely snap my neck. When the rope caught, I was jerked left in a huge pendulum, still hitting the wall, 50–60 feet below Dave. I swung around the corner into the right facing dihedral we'd come from, and finally stopped there. The math works out to a 70-foot vertical fall plus the high speed pendulum.

At first, everything seemed to be okay. I could feel and move my hands and feet, and I just felt badly bruised, with the wind knocked out of me. But I couldn't raise my arms, and, although the pain hadn't set in at that point, I thought I had broken both shoulders. I called up to Dave to see if he was all right. He said his hand had jammed in the ATC while holding my fall; it was swelling and might be broken.

After a while, Dave got things sorted to the point where he could lower me to Sickle. It wasn't easy, because I had to get down through all the blocks in the dihedral without my hands, using only my butt and legs. The party on Sickle helped out any way they could; one was a Wilderness First Responder and Dave was an EMT B, and they constantly checked me over for head injuries.

Initially I thought that I could continue lowering to the ground with everyone's help. But my shoulders had started to hurt about 30 minutes after the fall, and the pain gradually became excruciating. I felt completely immobile—any movement, even breathing, intensified the pain. The last thing I wanted to do was to call for a rescue, but I soon relented, and one of the guys rapped to the trail to get help.

The NPS got the word a little before 10:00 a.m. Two YOSAR climbers came up the fixed lines and two rangers rappelled out of the park helicopter. They thoroughly checked me over and came to the conclusion that I had probably dislocated both shoulders. They couldn't rule out spine or shoulder fractures, however, so they immobilized me in a spine splint. Clouds had been building on the rim all morning, and the wind had picked up to the point where it was too dangerous for the park helicopter to extricate me, but the bigger Huey from Lemoore Naval Air Station arrived just before noon to back up the NPS. The

Navy helicopter hoisted me off Sickle with no problem, saving me a long lower down the wall and a potentially bumpy carryout on the trail—though the rangers said that if we'd gone that route I'd be floating on a cloud of morphine.

The physician at the Yosemite clinic found that Dave's hand was only bruised, and that my injuries were two dislocated shoulders, a hairline crack in the left one, and a whole lot of bruises. About eight hours after my fall, they reduced the dislocations and I was able to ride home with Dave. I had to let the shoulders heal for six weeks before starting physical therapy; they're still really weak seven months later, but I've started going to the gym.

Analysis

A lot of factors contributed to my accident, not the least of which was inadequate protection. After a long tension traverse like that, I like to at least double up the first piece because of the long runout and because the angle of the rope can create a sideways pull on the protection, making it more likely to "walk out"—which is what I suspect happened.

Instead I relied on just one piece and spent too little time placing it because a) I felt pressure to stay ahead of the party below, b) I wanted to get back on schedule by reaching El Cap Tower early, c) it was still easy going, and d) I thought I would soon have many additional pieces up higher. The cam seemed solid and oriented for an out and down pull, so I quickly moved on, instead of making absolutely sure it was bombproof.

Since I wasn't all that high above Dave vertically, I had the illusion that I wasn't running it out, but with the rope making a bend and the pendulum factored in there, I really was. It may have been better to just clip the bolts for my first protection, regardless of the angle—they're multi directional.

Another factor was my failure to break in the shoes. I've done many "R" and a couple of "X" rated leads. I normally know when I am on the verge of falling, so, if I'm placing protection, I'll readjust my stance if necessary. Although I was getting fatigued, I didn't realize my foot was about to pop because I couldn't feel much in those new shoes.

But the shoes were a minor problem, because if I had concentrated better I could have easily adjusted my stance. The main factor was my preparation, both mental and physical. Four years ago most 5.8 cracks posed little or no challenge, even when I was weighed down with a full rack and a backpack. The warm up climbs in the Valley should have been mandatory, as a way of assessing my present climbing abilities. Gym climbing kept me physically strong, but my friction footwork suffered and it was not adequate preparation for the type of climbing on this route. The gym and the 5.10s at Joshua Tree just made me overconfident.

Being immobilized by pain was scary, and I was lucky that YOSAR was there to bail me out. What if this had been in the backcountry? If we had brought prescription strength pain medication along, we might have been able to self rescue with the help of the other party. Reducing the dislocations soon after the injury might also be an option, especially in a remote situation. Some people have "trick" shoulders that they can pop back in easily, but most dislocations

are more serious; reducing them requires training and present a risk of complications, especially if shoulder fractures are involved. A Wilderness First Responder course provides the training to decide when and how to attempt a reduction; it's now high on my list of things to do. (Source: Rob S. and John Dill, NPS Ranger, Yosemite National Park)

FALLING ROCK

California, Yosemite Valley, Glacier Point Apron

After climbing in the Valley for a couple of weeks, Peter Terbush (22), Joseph Kewin (21), and Kerry Pyle (20) were nearing the end of their vacation. On June 13, in late afternoon, they decided to climb Apron Jam, a one pitch, 5.9 crack near the west end of Glacier Point Apron. Pyle led the pitch while Terbush belayed at the base and Kewin lounged beside him.

Just after 7:30 p.m., as Pyle was finishing the pitch, he heard a loud rumble above, and, within a second or two, boulders the size of Volkswagens were flying by to his right. He scrambled the last few feet to the belay (a pair of bolts), clipped in two quickdraws, and began forming a clove hitch in his rope, as a tie in. Before he could finish, rock fragments slammed into his head. He dropped the rope and simply grabbed the quickdraws and pressed himself against the wall. He grew faint and nauseous from the blows but hung on and survived. Without a helmet, he received severe scalp lacerations, but no other major injuries. As the rockfall ceased, he noticed that his lead rope was still snug, and called down to his friends. Kewin responded that he was OK but that Terbush might be dead.

When the rockfall began, Kewin scrambled several feet east to get out of the way, and, like Pyle, hugged the wall. After the noise stopped, he went back to Terbush and found him unresponsive and pulseless. Terbush had not moved from his original position; in fact, he was still holding Pyle's rope as if on belay. Kewin removed the rope from Terbush's hands so that Pyle could use it to rappel, then he ran down to the parking lot for help. One ranger arrived a few minutes later and confirmed that Terbush had received fatal head injuries.

The NPS delayed bringing Terbush out until it could assess the risk of more rockfall. On the 14th, NPS and USGS specialists examined the release point by helicopter and telescope; despite a couple of very small rockfalls that day, they permitted a ground team to make the recovery on the 15th.

Analysis

The rockfall that killed Terbush—estimated at 525 tons—originated 1200 feet up the Apron, just above the Oasis, and fell directly down the Harding route. Terbush, Kewin, and Pyle were 300–500 feet left of the main fall, yet unfortunately within range of the shrapnel. The same release point has been active since at least November 1998, when an even bigger fall occurred that sent small rocks as far as the tents at Camp Curry. (For a detailed geological report on this series of rockfalls, go to http://landslides.usgs.gov/html_files/landslides/newsinfo.shtml)

Large rockfalls occur in the valley almost every year. However, with granite