ground, decide on a backup method, practice it, and stick to it once you're on the wall. With a little experience, it won't slow you down, and it might save your life. (Source: Lincoln Else, Yosemite Climbing Ranger)

WEATHER, STRANDED–BENIGHTED, INADEQUATE CLOTHING AND EQUIPMENT, EXHAUSTION

California, Yosemite National Park, Tuolumne Meadows, Fairview Dome

On September 19, two Japanese climbers, Kengo Tagai (31) and Akira Uasa (39), began ascending Fairview Dome at 0830. when they reached the 4th class area of the route (about 2-300 feet from the top), they were exhausted and the rock was wet from snow-fall. They were unable to complete the route, and as they only had one rope, were unable to descend. They spent the night huddled under a nylon tarp on a ledge. They had no bivouac gear.

On the following day, Tagai climbed out, but Uasa was unable to follow. Akira Uasa was short hauled off, then helicoptered to Mammoth Hospital for treatment for kidney failure. Kengo Tagai had frostbitten toes and swollen feet, but suffered no permanent damage. (Source: From an NPS SAR report)

STRANDED–INEXPERIENCE

California, Yosemite National Park, Tuolumne Meadows, Tenaya Peak

On September 26, Marvin and Mary Kilgo (both 42) became stranded about three or four pitches from the top of Tenaya Peak. They requested help. Another climbing party reported this to rangers, who responded by rappelling down to them.

The Kilgos had adequate clothing and equipment, but had limited outdoor climbing experience. The rangers set up a top-rope situation for them, so they were able to climb to the top.

(Editor's Note: Two more examples of being stranded—for different reasons, but with the common denominator of being in a new and unexpected situation.)

STRANDED BY WEATHER–INADEQUATE GEAR, FOOD, AND STRATEGY

California, Yosemite Valley, El Capitan

Just before midnight on October 16, a cold front brought heavy rain to Yosemite Valley. Several climbing parties managed to retreat from big wall routes, but four teams caught high on the face of El Capitan were stranded by what became a four-day winter storm. Three of these parties survived long enough to be rescued by the National Park Service, but two climbers died from hypothermia three pitches from the top of the Nose. This account summarizes the problems the parties faced and the roles that preparation, strategy, and luck played in the outcome. First of all, here is a description of the situation on each route:

Tempest. On Monday, October 4, two weeks before the storm began,

Dave Turner (22) started up Tempest (Grade VI, 5.10 A4). This was his sixteenth climb and tenth solo of El Cap. He had climbed it twice in winter, had soloed it in a day, and had experienced severe weather on at least one previous El Cap climb. When the storm arrived on his 13th day on Tempest, Turner was three pitches from the summit.

Never Never Land. A week later, on Monday the 11th, Tommy Thompson (40) and Erik Erickson (49) started up Octopussy (Grade VI, 5.9 A3+), a route that joins Never Never Land before topping out on Lurking Fear. Thompson and Erickson had almost 70 El Cap ascents between them, including some of Yosemite's hardest aid lines. Both are experienced mountaineers, and both have endured previous storms on El Cap. After hearing of a chance of rain later in the week, they cancelled plans for a longer route and chose the shorter alternative. They intended to finish in five days, but the route proved harder than expected and when the storm hit on their sixth night they were still three pitches short of the top.

The Salathé Wall. On Wednesday the 13th, four days before the storm, Tom Andrews (44) and Marisol Monterrubio Velasco (22), started up the Salathé Wall (Grade VI, 5.9 C2). Andrews, an AMGA guide with extensive mountaineering experience, had climbed several walls including the Nose on El Cap. Velasco, from Santo Torras, Mexico, had climbed long routes in Peru as well as the Nose and Half Dome. They figured the Salathé would take them five days. They stayed on schedule, but on their fourth night the storm pinned them down on Sous le Toit ledge with seven pitches to go.

The Nose. On Thursday the 14th, Ryoichi Yamamoto (26) and Mariko Ryugo (27), both from Hyogo, Japan, started up the Nose (Grade VI, 5.9 C2). Yamamoto was a talented free climber and Ryugo was a competent follower, though inexperienced compared to Yamamoto. Their only aid climbing experience was a recent ascent of Washington Column, where Ryugo apparently led her first pitch. They probably planned to spend four or five days on the Nose. Yamamoto led every pitch and they made good time, keeping pace with a party above them. By the end of their third day they were bivouacked at Camp 6, five pitches below the summit, with all or part of the next pitch fixed. The party ahead of them pressed on after dark and reached the top just as the first wave of rain arrived.

The Rescues. It rained four inches on Sunday the 17th and low clouds covered El Cap for most of the day. On the afternoon the 18th the clouds lifted for a few hours, allowing rangers on the Valley floor a view of the face. Everywhere on the wall, streams of water ran off the summit and blew sideways in the wind. Although conditions were clearly miserable, none of the four parties the rangers could see appeared to be asking for a rescue and no one in the Valley reported friends in need of help. Monday night the rain returned.

By the morning the 19th, snow coated the Valley rim. Thompson and Erickson on Never Never Land and Turner on Tempest relayed through friends by FRS (family band) radio that they were OK for the moment, but Turner was losing confidence as he continued to get colder. Nothing was known about the Salathé and Nose parties at this point, including names, experience, and gear, but the Salathé team appeared to be sheltered in a portaledge.

Visibility remained poor all morning. Efforts continued to get information about the Nose team, and late Tuesday morning rangers finally tracked down a Japanese climber who knew them. With this climber translating through a loud speaker, the NPS tried to communicate with them. One possible responding call was heard but nothing more. Nevertheless, given the weather and what rangers now knew about this team, it was clear that if a rescue were not needed already it would be soon. Preparations began immediately for a large operation supported by additional rescuers from outside the park. Given the weather, helicopter assistance was out of the question. By 3 p.m. an advanced ground party was hiking and snow shoeing through deep powder toward the summit, a distance of about 11 miles. About the same time, a break in the clouds allowed spotters with a telescope to see a climber (probably Yamamoto) about two pitches above Camp 6, apparently trying to wrap himself in a yellow tarp. Two hours later another break showed what looked like two people, motionless, with the tarp partially unwrapped and blowing in the wind.

Despite attempts to hike through the night, harsh conditions and low visibility kept rescue teams from reaching the summit until late morning on Wednesday the 20th. As they arrived, Turner on Tempest radioed that he had become significantly hypothermic and might not survive another night on the wall. By this time visibility had improved. It was obvious to NPS observers in the Valley that the Nose party was deceased, so the summit team turned its attention to Turner. When a rescuer was lowered to him, Turner was able to jumar up the NPS ropes unassisted.

In mid-afternoon, not long after Turner had reached safety, Thompson and Erickson on Never Never Land also radioed for help. They assured the NPS that they could stay on the wall until the next day, so rescuers fixed lines down the slabs to the rim above them and returned to their basecamp on the summit for the night.

[From the summit of El Capitan, several hundred feet of granite slabs slope down to the rim, where the vertical face begins. In the storm's early stages the slabs ran with water and as temperatures dropped they became coated with ice and snow. Rescuers were forced to begin fixing lines much farther from the edge than they normally would if the rock were dry.]

On Thursday morning the 21st the rescuers split into two teams. One team descended their fixed lines and lowered two rescuers to the Never

Never Land party. Thompson and Erickson were able to ascend the lines under their own power and reached the summit by mid-afternoon. Meanwhile, the second team lowered a rescuer to the Nose party. After he had investigated the scene, the bodies of Yamamoto and Ryugo were raised to the summit. In early afternoon, while these operations were continuing, Andrews and Velasco began signaling for a rescue from the Salathé. By the time personnel and equipment could be released from the Nose and Never Never Land and moved into position, it was clear that the Salathé operation would take the rescue team well into the night. Because of ice on the slabs and runoff on the face, the team decided to delay the rescue until the next day. The park helicopter was able to deliver a haul-bag of food and dry clothes directly to the Salathé party just before dark, ensuring that they could spend a more comfortable night on the wall. On the 22nd, six days after the storm had begun, a rescuer was lowered to Andrews and Velasco and they were raised to the summit in good condition.

What follows next are the stories from each party.

Tempest. Dave Turner was equipped with a Black Diamond two-person portaledge and an A5 rain fly (both borrowed), a Bibler big wall bivy sack, a synthetic sleeping bag (rated to 25 degree F) with a fleece liner, two sleeping pads, Gore-Tex raingear, warm synthetic layers, a butane stove, and an FRS radio. He had no winter hat or waterproof gloves.

The ledge and fly were in excellent condition but of different brands and the fly did not provide sufficient overlap. By the time he awoke Sunday morning Turner was in a puddle. "[My friend] said they would probably be compatible," he said, "but I did not check this on the ground—I should have." He managed to slow the leaks with garbage bags but then he discovered water dripping through the unsealed seam of the pole sleeve that ran the length of the fly.

Turner had several days of food and water left, so he initially felt comfortable waiting out the weather. "I was only slightly damp and only three pitches from the summit, " he said. "I figured it would clear up in a day or two." Nevertheless, he was already wet, in a leaky shelter, and facing three more storm days on the way.

When the rain let up briefly on Monday afternoon, Turner made a dash for the top. Water poured down the dihedral he was climbing. His progress was slow and each time he raised an arm to place gear, water ran into the cuff of his jacket. In his hurry to get moving he had left his rope bag cinched too tight, forcing him to retreat from half way up the pitch to release a snagged rope. "A rookie mistake," he said later. By nightfall he had managed to fix one pitch above his ledge, but the effort had left him soaked and mildly hypothermic. Attempts to dry his clothes and keep warm with his butane stove proved fruitless. When it snowed heavily Monday night, he

realized that the two slab pitches above would now be impassible and that runoff from snowmelt would continue after the storm cleared. On Tuesday night the temperature dropped further and he shivered continuously. By Wednesday morning he was losing sensation and function in his hands and feet. He knew he could not spend another night on the wall so he radioed for help.

Never-Never Land. Thompson and Erickson left the ground with solid storm gear: an A5 Cliff Cabana two-person portaledge with expedition rain fly, Gore-Tex bivy sacks, 0 degree F synthetic sleeping bags, sleeping pads, full Gore-Tex rain gear, and warm synthetic layers. Like Turner, they were not too worried at the start of the storm. However, their situation deteriorated over the next four days as wind-driven rain worked through the ventilation port on their fly, condensation built up inside, and the drain holes in the floor proved inadequate. "I felt like we were in a row boat in the middle of a north Atlantic hurricane," Thompson said. "We had the best ledge money could buy, with a four-season fly that encompassed the whole thing. This system saved our lives, but even with everything set up right, we didn't have a single dry item to our name...and we slept in a puddle."

Unlike Turner, they did not try to leave their ledge to climb, and although they were cold, hypothermia never reached a critical point. However, they had packed only one day's extra rations and in the end they ran out of food and water. "We were already using our reserves before the storm hit," Thompson said. "We initially declined any rescue efforts, but with no food and no assurance we could climb the slabs above the lip even if the weather broke, Erik and I had to discuss the unspeakable—getting help." When they were finally rescued on Thursday, they hadn't eaten in three days.

Salathé. When Andrews and Velasco began their climb, the forecast called for clear skies with the possibility of cloudy weather in several days. They planned to bivy on natural ledges, but as a hedge they brought a one-person portaledge (an old, beat up, Gramicci prototype) with a new one-person Black Diamond rain fly. They also brought lots of warm synthetic layers, hats, gloves, and a butane stove. Andrews had full Gore-Tex rain gear and a sleeping bag but Velasco had neither—against his better judgment, Andrews had allowed her to leave her bag behind when she suggested that her bivy sack and extra fleece would be sufficient. Their supply of food and water was barely enough for the climb, so by the time they reached Sous le Toit ledge on Saturday, a little more than a day's worth remained.

When the rain started that night, they crammed themselves into the portaledge. Like everyone else on the wall they were soon wet from condensation and fighting to maintain their shelter against the wind. As temperatures dropped, chunks of snow and ice falling from the summit slammed into the fly. One strike broke the fly pole but Andrews managed to grab it before the

jagged ends shredded the fabric. He and Velasco shared their one sleeping bag and bivy sack. As it got colder and their food ran out, they lived on lemon drops dissolved in hot water. Somehow their portaledge developed no major leaks, and in a stroke of luck, Sous le Toit ledge saw little runoff compared to the other parties. As a result, Andrews managed to fix two pitches during breaks in the weather.

By the time the storm ended mid-day Wednesday, they were cold and tired, but they initially turned down a rescue. "After much consideration and despite the urge to give up, we said no, that we were fine and would try to continue climbing," Andrews said. "Besides, I figured there had to be other teams in worse shape." At that point they still hoped to climb out the next day, but Thursday morning they awoke to find their fixed ropes, the portaledge, and the pitches above encased in a layer of ice. When the ice finally melted in the afternoon, they tried to lead the first headwall pitch but quickly recognized that they were exhausted, moving too slowly, and becoming dangerously sloppy with their rigging. Like Thompson and Erickson, lack of food was the primary factor that finally forced them to call for help, but the cold and the constant physical and psychological effort to keep their shelter together and their spirits up were close behind.

The Nose. Like the Salathé party, Yamamoto and Ryugo planned to sleep on natural ledges. They brought Gore-Tex bivy sacks, light-weight synthetic sleeping bags, sleeping pads, and a very light rain fly from a tent, but no portaledge. For warmth they had some synthetic layers but less than the other parties on the wall (for example, Ryugo had only thin nylon pants with no insulation). They also lacked waterproof rain shells and warm gloves.

They probably met the initial rain with dismay but not desperation. In dated photographs found in their digital camera they appear relatively comfortable at Camp 6 on Sunday morning. Like many Nose parties before them, however, they probably found that in storms, Camp 6 becomes the base of a funnel draining the dihedral above, and also that a tent fly is inadequate protection.

In the next (and last) set of photographs, taken Tuesday morning, Yamamoto is seen ascending their fixed line from Camp 6, apparently attempting to reach the summit. Based on evidence found at the scene, here is an educated guess at the subsequent events: Yamamoto stopped at the top of pitch 27 and Ryugo joined him. She belayed him as he led pitch 28, in conditions as bad or worse than Turner had experienced on Tempest the day before. Yamamoto completed pitch 28 and fixed his line. Then he descended, perhaps to help Ryugo after her long, cold belay at the anchor below.

They were now fully exposed to the storm. Their hands barely functioned and hypothermia was eroding their abilities both physically and mentally. In the hours that followed they appear to have changed strategies a number of

times. Their lead line was now unavailable, rigged to the anchors above. In a final effort—either to descend to Camp 6 or to keep climbing—they cut their lead and haul lines in various places, possibly because their hands were too cold to untie the knots. Somehow, in the midst of their confusion, they dropped their haul line and haul bag with most of its contents, including insulation and food. They still had one sleeping bag and the tent fly, which Ryugo had been using for shelter while belaying, but the remainder of their bivy gear was now gone. They were found huddled together, wrapped in the fly, at an impromptu—but still logically arranged—belay, half way up pitch 28. They probably died Tuesday evening.

Analysis

Weather changes everything. Climbers don't leave their ropes and racks behind, but without threatening clouds overhead, most parties shortcut on storm gear in one way or another. The only reason to check the forecast in storm season is to decide whether it's worth starting the climb, not whether to bring full survival gear. Always distrust a sunny forecast and go fully equipped. Take along the means to receive updated forecasts—a weather radio, cell phone, or FRS radio. (See Communications, below.)

Shelter. A tent fly inherently leaks and can't be pitched properly. A portaledge fly alone is not much better, as previous El Cap climbers have discovered. A portaledge is essential. It must be in top condition, with all seams sealed and with a correctly fitting fly. One small leak over a couple of days can be disastrous. A portaledge would probably have kept Yamamoto and Ryugo alive.

Clothing. Because of condensation, even the best shelter will be wet eventually. Bivy sack, sleeping bag, warm clothes (including winter hats, gloves, and socks), and rain gear all extend survival time in a soggy portaledge or on rappel. Extra pairs of warm, waterproof gloves are crucial to the party's ability to function. Nothing dries out in 100 percent humidity, so all insulation must be rated for colder temperatures than may be encountered. Most parties also rely on hot drinks as another source of warmth. Finally, an under-equipped partner is a weak link for the whole team, so double-check each other's gear and don't allow shortcuts.

Food and water. The Salathé and Never Never Land parties were stopped primarily by lack of food. One day's cushion is not enough. First, overestimating one's climbing speed even in good weather is common. Second, severe multi-day storms in October are not unusual. Third, even if the storm is brief, impassable wet/icy slabs and run-off from melting snow can add a day or more to one's immobility. "We needed more than twice as much food and water than we had originally planned for," Tommy Thompson said. "Where do you draw the line?" The answer is: Unless you want others to bail you out, you have to be as thorough with calories as with the rest of

your preparations. This isn't about gourmet dining. A tiny package of ten energy bars will cover one person's basic requirements for a day.

Strategy. Hindsight suggests that the best strategy for all parties, even for the Japanese climbers, would have been to stay in their shelters, out of the wind, and ride out the storm as best they could. Tom Andrews on the Salathé was able to climb safely during breaks in the storm only because his pitches happened to be fairly dry. Turner and the Japanese faced much worse conditions when they tried to climb and their clothing proved inadequate for the task. They needed sealed sleeves (e.g., kayak dry-top jackets), waterproof gloves that fit over the sleeves, and ample insulation. In addition, all four parties faced potentially ice-covered pitches during and after the storm, for which small pitons, hooks, and even bolts, might be required. (In 1984 two Japanese climbers died of hypothermia on the last pitch of the Nose, probably for lack of similar hardware. They had made a dash for the top in a storm without adequate clothing and shelter.)

However, the summit is only half-way to safety. Had Turner or the Japanese team reached the top, they would have found themselves in worse physical condition and facing deep snow, high wind, low visibility, and dangerous terrain. Negotiating the East Ledges descent from the summit of El Cap in these conditions is a life-threatening endeavor in itself.

Rappelling is another option, but like climbing out, it can not be taken for granted. According to their friends, Yamamoto and Ryugo chose the Nose partly because they could descend from any pitch on the route. When the time came to decide, however, they were already wet and they may have realized how exposed they would be to the weather and how dependent on finding every anchor.

Communications. Cell phones and radios degrade the wilderness character of a climb, but in a desperate situation those values may not seem so important. "I had never brought a radio or cell phone on El Cap before, and I will never *not* bring them again," said Thompson of Never Never Land. However, these devices are only an extension of the basic rule: Tell someone where you're going and when you'll be back. Even lacking a radio, an emergency plan with friends might have made the difference for Yamamoto and Ryugo. If all else fails, remember that cries for help—but not the details of a message—can be heard from the Valley floor. (Note: Some cell phones do not work in the park, and the NPS does not routinely monitor FRS radios.)

Don't count on a rescue. All the communication in the world won't guarantee a rescue in the time one has left to survive. "The question I keep asking myself," Thompson said, "is, what would we have done if there was no rescue team, if we were on some remote wall elsewhere?" To answer the question, imagine yourself on a wall only as "remote" as Half Dome,

hidden by clouds, while the rescue team is focused on El Cap. A safe return depends on self-sufficiency. (Sources: Lincoln Else and John Dill, NPS Rangers, Yosemite National Park)

FALL ON ICE—ICE FOOTHOLD CAME OFF, ICE TOOLS CAME OUT, WEATHER

Colorado, Rocky Mountain National Park, Hidden Falls

On January 10, Steven Crane (57) was leading Main Falls Center I WI 4 (one pitch, 80 feet) when he fell about 30 feet. He had placed three ice screws prior to the fall. As he moved further on the upper column, he was sprayed by water coming off the right side of the falls. According to local sources, it had been a wetter than normal year at Hidden Falls.

Crane was wearing prescription glasses,which became all wet and fogged. He said that he eventually had no vision at all and began climbing by feel. The belayer said that Crane was within reaching distance of the top and approximately ten feet above his last screw when he stopped to place a final screw. As he was attempting to place the screw, he lost his left crampon placement when a piece of ice supporting the left foot popped off. His left tool placement then failed and he barn-doored out. Unable to recover, he then lost his right tool placement and fell upside down. His right crampon temporarily hung up and caused him a minor ankle injury prior to coming out.

He yelled while falling and never lost consciousness. He impacted the right side of his back against vertical ice of the upper column and came to a stop above the sloping ledge area. The belayer lowered him to the base of the route and began medical and rescue procedures with the aid of the other two ice climbers. Park personnel and volunteers responded to complete the rescue.

Analysis

Objective hazards are an integral part of ice climbing. Some hazards, such as breakage of ice holds and dislodging of loose ice, are routinely expected. Other hazards, such as the open spray of water at the top of a normally dry route, may be more of a surprise. The assessment of objective hazards and changing conditions is generally much more serious for an ice climbing leader than for a sport rock climb leader, hence the longer time that it generally takes for one to develop good lead ice climbing skills. Visual inspection of an ice route may or may not reveal all of the possible hazards. When the lead ice climber in this incident recognized that the water spray was becoming an obvious hazard, he had two choices: he could either lower off from his last placement after supplementing it with an additional ice screw (and then retrieve his gear on top-rope), or he could lead through the hazard. There is no right or wrong choice, but there are always possible negative consequences to either choice. Had he decided to lower off, his highest anchor may have failed before he could have supplemented it. The negative consequence of leading through was unfortunately the incident that