

Death in High Places

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THE INCREDIBLE and the tragic were commonplace in the Himalayas during 1986. A world-class climber completed climbing all fourteen 8000 meter summits, two Swiss climbed Everest north face direct from base to summit—and back—in 43 hours, without oxygen, shelter, or food. Twenty-five persons summited K-2—but seven of them died, along with six others. On other high peaks some of the world's great climbers were also lost. Too many of the deaths were avoidable. . . .

Also commonplace were outrageous behavior, intense rivalry, and disregard of mountain ethics—which caused several deaths. Not many years ago some of the things that were done would have led to excommunication by the climbing fraternity. But this is for others to discuss: my concern is the violation of physiological principles and the odds of surviving such transgression.

Two years ago in this *Journal*, I discussed recent advances in what we knew and what we guessed and what we did not know about high-altitude wellness and illness. We have learned only a little more since then, but it is worth repeating some basics for those who wish to live longer to climb again.

Above 20,000 feet mountaineers face several potentially killer hazards. Lack of oxygen, cold, dehydration and exhaustion are the most subtle and the most dangerous. They are synergistic—each re-enforcing the impact of the others. They affect judgment, perception and coordination early and progressively, and while numbing the thinking brain, are free to kill, almost uncorrected. No one, not even the strongest and the best, is immune.

Almost everyone realizes that alcohol whittles away our higher faculties but fortunately most people have learned to enjoy its pleasures and to avoid the penalties of over-indulgence. Lack of oxygen is very similar—but since it is not something we experience every day, many climbers assume it will not affect them. But above 20,000 feet (and for many people much lower) every one is impaired by altitude, and usually is unaware of how much. Hypoxia slows the works and will wreck the lovely machinery of the body if the warnings are ignored.

What's less well recognized is that hypoxia increases the risk of cold injury—frostbite and hypothermia—putting the climber at altitude in double jeopardy. Like oxygen lack, hypothermia muffles the brain, dampens the reflexes, stiffens the muscles and causes hallucinations and erratic behavior. Both reduce the unwary to clumsy automatons, able to move about but unable to think clearly or to take care of basic needs—like water.

Dehydration is the third great enemy on high mountains. The thin dry air sucks moisture from lungs and skin insatiably but almost imperceptibly. Dehydration thickens the blood so it flows sluggishly, and the red blood cells stack together, surrendering their load of oxygen less readily, thus further aggravating the cells' lack of oxygen. The thicker blood tends to form clots which obstruct blood flow in legs or arms and may migrate to the lungs, fatally. Without adequate water, the kidneys cannot function well, and acclimatization is slowed. And if blood volume is decreased greatly, blood pressure falls, aggravating the effects of both hypoxia and of cold.

The higher the altitude the greater the volume of air breathed, indeed this is the body's best way of adjusting to oxygen lack. But every breath of the cold dry air drains both water and heat from the body—first to warm the inflowing air to body temperature, and second by evaporating water from the mucus membranes to saturate this air. So much heat is lost that it may be difficult or impossible to keep warm, regardless of what one wears.

The body must burn fuel for heat and activity and just to stay alive, and the fourth danger, also aggravated by hypoxia, is exhaustion. This too is compounded by lack of oxygen which causes loss of appetite and faulty absorption. It is difficult to make the effort to cook or even to find food. The body's stores are depleted. The climber who does not eat will burn his own tissues for a time, but as these are consumed, or when he needs rapid energy, fuel is not immediately available, and his muscles, like his mind, falter and fail.

Why are these obvious dangers so often ignored? Clearly, lack of oxygen, and cold so dull the mind that they are not only self-reinforcing, but their impact rapidly snowballs and becomes lethal. Though they affect every one above 20,000 feet, the climber who is at the limit, straining every nerve and sinew in alpine-style climbing, will be at greater risk, more likely not to sense or to heed the warning signs.

As one tries to analyze the terrible events on K-2, it takes no great wisdom or insight to realize that the victims—as well as many who survived—were terribly dehydrated, empty of body fuel, bemused by oxygen lack, and undoubtedly drained of heat. Cause of death: hypoxia, dehydration, hypothermia—an accumulation due to bad judgment, bad manners, and bad luck. They had not enough food and fuel. Unplanned sorties clustered too many people in too few tents; some crammed into small tents, others crouched in snow holes, sapping their strength from lack of sleep, cold, exhaustion and lack of oxygen.

Other parties or individuals poached fixed lines, cut rappel ropes to make slings, used supplies that others relied on, too often it appears, in a selfish grab for the summit. Quarrels divided too many parties and strangers found themselves climbing together. The weak were left to descend alone. Ironically, much of the tragedy played out during the same week and in the very place where we had coped with a similar situation in a different way in 1953.

Does this condemn alpine-style climbing? Not at all. The experienced team (and it must be more than one person), fit, well acclimatized and well fed and

PLATE 3

Photo by H. Adams Carter

K2 from the South.



rested and splashing with water, choosing wisely the right day and route can do far more than we dreamed a few years ago. The Swiss pair on Everest showed what such a team can do—but they were immensely lucky that no sudden storm, no small injury from a small fall, no failure of their tiny stove did not kill them. Somehow they escaped HAPE and HACE which killed Pete Thexton and Chris Chandler, and many others, not to mention scores of near misses.

This brings us to a big question: why do some people succumb to altitude illnesses while others trying something even more extreme are unscathed? Why are some world class climbers affected on one occasion and not on another, apparently similar? Can we predict, not only who can acclimatize well, but whether an individual will do well or badly today or tomorrow? Unfortunately not. These answers are yet to be found.

These incredible alpine-style climbs have taught us a great deal. Eighty years ago only a few persons believed a person could survive overnight above 20,000 feet. Twenty years ago most physiologists believed that slow ascent, with ample time for acclimatization was the only safe way to climb. Within the last ten years we have found that acclimatization develops, and perhaps develops best, if the climber spends weeks at 17,000 to 18,000 feet, making frequent climbs many thousand feet higher, returning to Base to minimize what we call altitude deterioration for lack of better understanding. I find the evidence now persuasive that climbing for many weeks from a comfortable Base Camp at moderate altitude will perfect acclimatization better than creeping slowly up a great mountain in siege style. But if the climber tries to cut short these weeks of acclimatization, he is in real danger of death from altitude sickness.

We must remember that siege tactics also have dangers. The same potential killers stalk those who inch their way higher, stockpiling as they go. Perhaps acclimatization may be more complete at first but at great altitude deterioration parallels or outstrips acclimatization. The party may burn out, lose enthusiasm, drive and strength unless they husband their reserves. Too much time at very high altitude may be as bad as too little. Which leads to the conclusion that each person, each party must find its own pace and rhythm. By being always aware of the dangers, by recognizing that judgment and perception are always dulled, and by choosing to retreat and try again, the real and great risks can be controlled by invoking the very faculties that are first to be dulled by cold, dehydration, hypoxia and exhaustion. The alpine-style climber who wishes to climb again must be aware of the hazards not in an abstract way, but how they are affecting him, at the time.