LESSONS FROM HISTORY

Paul Crews' "Accident on Mount McKinley" —A Commentary

George W. Rodway, CRNP, MSN

Department of Acute/Tertiary Care, School of Nursing, University of Pittsburgh, Pittsburgh, PA

Mount McKinley in Denali National Park and Preserve is the giant of the Alaska Range and the highest peak in North America at 6194 meters (20 320 feet). It is also the highest mountain in the world in or near the polar regions, situated at nearly 64 degrees North Latitude, 390 km from the Arctic Circle. Numerous accidents and tragedies have occurred on McKinley, still the mountain's official name though many now refer to it as Denali (an older Native American name for the mountain), since explorers first set foot on its slopes in June of 1903.¹ In many instances, lack of self-reliance and poor preparation have proved to be the undoing of mountaineering parties on McKinley.^{2,3} However, as highly skilled climbers have sought out increasingly difficult and dangerous routes on the mountain, they too have made their own contributions to the accident statistics.⁴

Prior to 1960, the few mountaineering parties that entered the Alaska Range had to place a premium on planning and caution, as any contingencies that arose would be theirs alone to handle.^{2,5,6} Participants in these early expeditions realized that a serious accident or illness would probably result in fatalities, as rescue, if it came at all, would not be timely. The first fatality on the mountain occurred via crevasse fall during the Cosmic Ray Expedition of 1932, which incidentally was also the first party to make use of aircraft to access the mountain.^{2,5,6} Radio communications made its debut on McKinley in 1942 during a scientific expedition organized and led by Bradford Washburn, and was also utilized during the 1947 and 1951 Washburn McKinley expeditions.^{5,6} The first rescue team appeared on the mountain in 1954 in response to a serious fall suffered by the Elton Thayer party after a successful first ascent of the South Buttress.² With 1 party member dead and another seriously injured after a 275 meter (900 feet) fall off of Karsten's Ridge, a helicopter dropped a 7-man rescue

team at 1800 meters (5900 feet) after a 6-day wait during which time 2 climbers had hiked out to the small community at Kantishna on the mountain's north side for help. The rescuers climbed up to the accident site and hauled the injured mountaineer down to an altitude low enough that would allow for evacuation by helicopter.

These early accidents and rescue efforts on McKinley were but a prelude to what occurred on the West Buttress route in May of 1960. A rescue effort that can accurately be termed as epic was set in motion after the 4-man John Day party from Washington State fell on the ice slope at 5500 meters (18 045 feet), just below Denali Pass, the night of May 17th after a successful summit bid earlier that day. This was the first reported accident at this location on the mountain, but as climbing traffic increased on the now-standard West Buttress route in subsequent years, many other parties have come to grief on this slope.² Most, like the Day party, fall while descending after a long and exhausting day of climbing to the summit.

Many accounts, both primary^{7–13} and secondary,^{2,5,6} cover the events on the mountain immediately prior to, during, and after the accident. The scope of this rescue was enormous enough to also make national headlines in prominent news publications of the time.¹⁴ Some of the primary sources differ with respect to how certain details of the rescue unfolded, but this is perhaps not entirely surprising, given the intensity of events that often accompany a large, complex, and extended rescue. All of the primary and secondary accounts make for very interesting reading, and it is not this author's intent to dissect the various tales for agreement or disagreement on the details of the accident and subsequent rescue. The decision to use the Crews article⁷ as a basis for commentary is due to Bradford Washburn's assertion that Crews' article, which appeared in the August 1960 issue of the mountaineering journal *Summit*, is "Probably the most accurate and detailed account of the dramatic John Day/Helga Bading crisis and rescue on Mc-

¹Direct correspondence to author: George W. Rodway, CRNP, MSN, University of Pittsburgh School of Nursing, 336 Victoria Hall, 3500 Victoria Street, Pittsburgh, PA 15261 (e-mail: gro100@pitt.edu).

Mt. McKinley 20 320 feet, from the SW
Illustrated by Bruce C. Paton.

Kinley's West Buttress . . . written by one of those deeply involved from start to finish."⁶

As Washburn's quote suggests, John Day and his team were not the only people to merit consideration in this rescue. Helga Bading, a member of Crews' Anchorage climbing team, also figured prominently in the rescue. Bading was troubled by symptoms of acute mountain sickness (AMS) from 2400 meters (7874 feet) onwards, the severity of her discomfort waxing and waning with effort and rest, respectively. According to Rodman Wilson, MD, the physician member of Crews' climbing team and subsequent author of several articles dealing with injury and illness at high altitude,^{3,10,15,16} from 2400 (7874 feet) to 4900 meters (16 076 feet) Bading suffered listlessness, headache, nausea, and vomiting during periods of exacerbation.¹⁰ Bading's AMS worsened in high camp at 5000 meters (16 404 feet) just as the 4 sound members of the Crews party began to assist in the rescue of the stricken Day expedition.^{7,10,11} Dehydration, prostration, delirium, and coma quickly followed (without respiratory distress) in Bading¹⁰ while the Crews team strove to help the injured men in the Day party at 5300 meters (17 388 feet). The assessment of the injuries of members of Day's team revealed a broken leg, frostbitten digits, head injury with concussion, and possible fractured ribs.¹¹

Radio contact was established with the outside world shortly after the accident. The need for evacuation of the Day party was thus announced. However, no one in the

Day party was in as unstable condition as Helga Bading. Less than 24 hours after the Day team fell just below Denali pass, as Crews' party attempted to stabilize the injured and arrange for a precedent-setting high altitude air evacuation, it was realized that Bading was quickly becoming the rescue priority.^{7,11}

Of the many notable occurrences connected with this rescue, perhaps the one most interesting from a medical standpoint was the progressing severity of Helga Bading's AMS. High Altitude Cerebral Edema (HACE) had yet to be identified as a distinct, severe form of high altitude illness. Little was known about the pathophysiology of AMS in 1960 (let alone the treatment), and the cerebral form of high altitude illness that was first clinically described in the English language by English physician Thomas H. Ravenhill in 1913¹⁷ had all but been forgotten.^{18,19} In fact, Ravenhill's landmark paper¹⁷ wasn't "rediscovered" until 1964 when William H. Hall of the U.S. Army Research Institute of Environmental Medicine carried out an extensive literature search¹⁹ prior to writing a paper on AMS.²⁰

More than 48 hours after the Day party's fall, while air/ground evacuation options were still being sorted out for them, it was decided that Bading needed immediate evacuation to a lower altitude. Oxygen had been supplied in one of the airdrops that occurred at over 5000 meters (16 404 feet), but Bading refused to wear an oxygen mask. Hence, her parka was draped as a tent over her sleeping bag and the oxygen (1000 L) dropped inside

her sleeping bag.²¹ Despite this, no change was noted in her condition and she remained stuporous. In retrospect, Crews' team's decision to evacuate Bading down the headwall of the West Buttress to 4300 meters (14 108 feet) with the resources at hand (by means of a rescue sled that had been airdropped), rather than waiting for an outside rescue team or aircraft, almost certainly saved her life.¹¹ At 4300 meters (14 108 feet), the Crews team members who lowered Bading were met by many unacclimatized ground rescuers from the Anchorage and Seattle area, recently arrived (and still arriving) on the scene. Legendary Alaskan pilot Don Sheldon, who had originally flown both the Day and Crews teams to McKinley earlier in May, made a record breaking high altitude landing at 4300 meters (14 108 feet) in his Piper Supercub just before Bading and her team arrived.⁷ Sheldon loaded Bading into his airplane and he immediately departed for Anchorage and hospital. She completely recovered consciousness at sea level. Minor neurologic defects were present for approximately 2 weeks.¹⁰

The published case report on Bading's illness by Fitch in 1964²¹ represented another rediscovery of HACE,¹⁸ separated from Ravenhill's original clinical description¹⁷ by 51 years. It should be noted, however, that neither Ravenhill or Fitch actually used the modern term "HACE." Ravenhill, a medical officer for 2 years at high altitude Chilean mines that were the setting for his clinical descriptions,¹⁸ termed what we now know as HACE as *puna* of a nervous type¹⁷ ("*puna*" being the local Chilean word for mountain sickness). Fitch quite accurately termed his case "mountain sickness of the cerebral form,"²¹ reflecting the era's increasing level of understanding of the pathogenesis of mountain sickness.

The rapid ascent of large numbers of ground rescuers from teams hastily transported to Mt. McKinley during this unfolding drama^{6,13} not surprisingly set the stage for more episodes of high altitude illness. Most notably, an unacclimatized rescuer from Seattle who had climbed rapidly from 3100 meters (10 170 feet) to the camp at 4300 meters (14 108 feet) on the West Buttress started to experience weakness, dizziness, shortness of breath, and unproductive cough by his third day in camp,¹⁰ just a few hours subsequent to Helga Bading's flight out to Anchorage with Don Sheldon. Later the same day as Bading's evacuation to definitive medical care, May 20th, Link Luckett flew his Hiller helicopter, stripped of everything including the starter-battery, to 5200 meters (17 060 feet) and extracted John Day.^{6,7} The next day he repeated this amazing feat to similarly rescue Pete Schoening at the same altitude.

The same day that Schoening was flown off by Luckett in dramatic fashion, an expected storm broke over

the mountain. The remainder of the Day party descended with members of Crews' team on foot to at least 4300 meters (14 108 feet), completing the last part of the descent to camp in the midst of the blizzard.^{7,11} By the next day, as the climbers and rescuers waited out the storm at 4300 meters (14 108 feet), the aforementioned member of the Seattle rescue team who had been experiencing weakness, dizziness, shortness of breath, and unproductive cough was unable to stand unassisted. He lay weakly, though fully conscious, in his sleeping bag with resting respiration and heart rates of 30 and 130, respectively.^{10,11} Though it was not recognized at the time, the history and physical exam of this patient is consistent with what we know today as high altitude pulmonary edema (HAPE). It must be remembered when Dr. Wilson diagnosed bronchitis in this patient,¹¹ his thinking was quite consistent with the medical understanding of that era, at least in the English-speaking world. While HAPE had been recognized for many years in South America by Peruvian medical professionals practicing in high altitude regions as edema of the lungs in newcomers,¹⁸ this was not brought to the general attention of the modern English-speaking medical community until 1960 when Herbert Hultgren and Warren Spickard published an account of a 2-week visit to Chulec General Hospital in La Oroya, Peru.²² At La Oroya, they were afforded the opportunity to review the medical records of 41 patients diagnosed with high altitude illness and make daily rounds with the house staff. In Ravenhill's earlier mentioned 1913 paper,¹⁷ he also spoke of an affliction he termed *puna* of a cardiac type, the description of which was certainly consistent with HAPE. Italian physiologist Angelo Mosso may have described HAPE in English even earlier when his book *Life of Man on the High Alps* was translated into English in 1898,²³ but his descriptions are not as detailed, accurate, or as convincing as Ravenhill's. However, Hultgren and Spickard's paper, which was published under the title "Medical Experiences in Peru" in the *Stanford Medical Bulletin*, May 1960, was the first account of HAPE published in English where the "salient clinical and investigative findings were very clearly reported."¹⁸ This account of Hultgren and Spickard²² did not have the impact it might have, and the account titled "Acute Pulmonary Edema of High Altitude" by Charles S. Houston published in *The New England Journal of Medicine*, September 8, 1960,²⁴ is generally recognized as the most influential publication in the rediscovery of HAPE in the English-speaking medical literature.¹⁸ Dr. Houston's case report was of a 21-year-old ski-mountaineer who had become so ill with severe dyspnea, weakness, and cough when crossing a 3660 meter (12 008 feet) pass in the Colorado Rockies in late December 1958 that evac-

uation became necessary. Houston was involved in the rescue and his examination after evacuation revealed cyanosis, marked orthopnea and dyspnea, and both lung fields filled with coarse to medium rales. A radiograph of the chest showed a normal cardiac silhouette with mottled infiltration throughout the right lung field, less marked on the left. The diagnosis was not clear, however, and in May 1959 the patient was examined by a cardiologist in Denver. He wrote that there was no evidence upon which to base the diagnosis of any form of organic cardiovascular disease,²⁴ but uncertainty persisted. In the April 1960 issue of *Summit*, Houston reported the case under the title "Pneumonia or Heart Failure?" and, in a manner characteristic of many of his later publications, brought this malady to the wider attention of practicing mountaineers.²⁵ By the time of his September 1960 article in *The New England Journal of Medicine*,²⁴ Houston had concluded that this was a case of acute pulmonary edema without heart disease brought on by the sum of high altitude, cold, and heavy exertion.

It is thus fair to suggest that Dr. Wilson was faced with 2 potentially lethal high altitude-related clinical entities on McKinley in May of 1960 without having the luxury of being able to recognize and appreciate HAPE and HACE signs and symptoms for what they truly represented. The invaluable contributions to our present understanding of the pathophysiology, diagnosis, and treatment of these illnesses by high altitude medicine and physiology pioneers are advancements of medical science that modern high altitude mountaineers can all too often take for granted.

In the event, Dr. Wilson made the right decisions not only for the Day party and his HACE patient but for the Seattle rescuer that ultimately was in need of rescue himself because of his development of what today is recognized as HAPE. On May 24th, after the blizzard had abated, a radio call was made for yet another air evacuation. The HAPE patient was subsequently flown out via fixed-wing aircraft by Don Sheldon on May 25th and quickly recovered at lower altitude.¹¹ The remainder of the climbers and rescuers descended on foot that day to 3100 meters (10 170 feet) where they were met by U.S. Army and Air Force aircraft (which had assisted in the rescue efforts *en masse*) that evening and the next day and hence flown out to Talkeetna and Anchorage.

Obviously, the early 1960s was a crucial period of time in the development of understanding of high altitude illness. Hultgren and Spickard²² as well as Houston²⁴ published landmark papers concerning HAPE in May and September 1960, respectively. Additionally, the serious illness of Helga Bading became the basis for the very important case report by Fitch in 1964,²¹ representing the modern rediscovery of HACE.

Aside from the pivotal importance of the year 1960 in the realm of mountain medicine, this epic 1960 rescue on McKinley represented a turning point for big-mountain rescue in Alaska in general and Mount McKinley in particular. It is probably not an exaggeration to suggest that the Day/Bading incident changed the attitudes of many mountaineers interested in climbing McKinley. Prior to 1960, outside rescue was hardly in the forefront of the minds of those who got into trouble on its slopes.⁶ After the flights of Sheldon, Luckett, and numerous other military aircraft involved in the 1960 rescue, it was evident that rescue was a realistic option. According to Talkeetna pilot Jim Okonek, climbers in the 1980s had been known to radio for a rescue, not to request extrication from an emergency situation, but merely to save themselves a long walk down a glacier.⁶ The complete self-sufficiency that was required of the pioneer climbers on McKinley became superseded by radios, aircraft, and dependence on other climbers.² Not surprisingly, all of this had somewhat of an adverse effect on the behavior of those who came to ascend the peak. The caution displayed by the pioneers, not to mention the acceptance of the fact that one's destiny was alone in one's hands, became a thing of the past among many modern McKinley climbers.

As one who has been personally familiar with the climbing scene on McKinley for more than 20 years and served recently as a volunteer on high altitude National Park Service (NPS) ranger patrols, this author clearly realizes that as much as it might be desirable to return to the radioless, isolated ways of the pioneers, this is hardly an imaginable option. However, the NPS at Denali National Park and Preserve realized even before the 1970s came to a close that the tremendous influx of U.S. and foreign climbers coming to climb McKinley and the simultaneous increasingly costly rescue activities that were occurring presented a management problem.

The shape of things to come with regard to managing accident and illness among climbers on McKinley and encouraging self-sufficiency among those who might otherwise have called for an unnecessary rescue took a quantum leap forward in 1982. During the 1982 mountaineering season, the Department of High Latitude Studies of the University of Alaska, Anchorage, with the consent of the NPS and the air support of the U.S. Army, initiated the seasonal operation of a medical research facility on the 4300 meter (14 108 feet) plateau of the West Buttress.²⁶ While this research camp, termed the Denali Medical Research Project, was not ostensibly situated on the mountain for purposes of managing accidents, illness, and rescue, the physicians and others who participated in this project were experienced mountaineers and prominent researchers in high altitude physi-

ology and/or practitioners of mountain medicine. Throughout the years of operation of this research camp from 1982 to 1989,²⁶⁻³¹ (discontinuous because funding was not available every season) those involved with the project assisted with numerous rescues, provided emergency medical care to all climbers requesting such, offered altitude illness screening tests, and provided advice on acclimatization, cold injury prevention, and other medical and non-medical problems.²⁶ These services were all provided free of charge, proved invaluable in a variety of ways, and had a significant impact on the extent and cost of taxpayer-supported rescue activity on the mountain.

Though funding and other logistical problems did not make operation of the Denali Medical Research Project viable after 1989, the NPS realized how valuable it was to have a relatively fixed camp at 4300 meters (14 108 feet) on the West Buttress (through which 90% of the modern climbing traffic on mountain travels), staffed with experienced, acclimatized rescuers. Hence, in place of the Denali Medical Research Project, the NPS Denali mountaineering staff established a medical/rescue camp at 4300 meters (14 108 feet) on McKinley for the 1990 mountaineering season.³² This allowed NPS mountaineering rangers and volunteers, in several rotating 3 or 4-week patrols during the mountaineering season, to stay in contact with climbers and coordinate high altitude search and rescue activities.

Prior to the 1991 season, it became clear that the Gulf War would interfere with normal military air support during the months of heavy climber visitation. In order to maintain safe, reliable, and timely air support for high altitude rescues on McKinley, Denali National Park and Preserve contracted an Aerospatiale Lama helicopter to be stationed in Talkeetna for the mountaineering season.³³ The Lama was used on 5 major missions that year, proving its worthiness on 2 successful rescues above 5500 meters (18 045 feet), 1 of which required four landings at 6000 meters (19 685 feet). This small but powerful aircraft has been used by Denali National Park and Preserve for rescue as well as routine high altitude duties during subsequent mountaineering seasons with great success.

The 1992 climbing season on McKinley was record setting in the numbers of climbers on the mountain as well as in the number of mountaineering fatalities. This year marked the most intense period of rescue in the mountain's history, and attracted unprecedented attention by international media.³⁴ Rescue costs soared as 22 rescue or body recovery missions involving 28 climbers were conducted by the Talkeetna NPS mountaineering ranger staff and volunteers.

By the end of the 1994 season, a plan had been for-

mulated and approved that would, beginning in the 1995 season, require climbers on McKinley and nearby 5304 meter (17 400 feet) high Mount Foraker to be charged a mountaineering program fee of \$150 per climber. The intention of the fee was to offset mountaineering administrative costs such as positioning and maintaining the high altitude ranger camp at 4300 meters (14 108 feet) on the West Buttress route, mountaineering salaries, education materials directed at reducing the number of accidents, transportation, and supplies.³⁵ Also initiated for the 1995 season was the requirement that prospective climbers of McKinley and Foraker register with the NPS a minimum of 60 days in advance of intended arrival on the mountain. This new regulation was meant to afford the Denali mountaineering staff an opportunity to provide information to mountaineers on hazards, and how to prepare, equip, and schedule their expedition. Needless to say, these new NPS regulations were far from universally embraced by the mountaineering community.

An analysis performed after the 1999 mountaineering season suggested that the changes implemented in 1995 had, over a 5-year period, significantly reduced the number of mountaineering rescues performed as well as the number of fatalities on the mountain.³⁶ The continuing downward trend in the number of accidents, illnesses, and rescues noted during the last several years on McKinley (since 1999) supports the assertion that the above NPS regulations initiated during the 1995 season were bureaucratic dictates that were well-considered before implementation. They have been shown, over the course of the past 8 seasons, to be impressively effective at accomplishing their intended aims.

References

1. Wickersham J. *Old Yukon: Tales—Trails—and Trials*. St. Paul, MN: West Publishing Co; 1938.
2. Waterman J. *Surviving Denali: A Study of Accidents on Mount McKinley 1903–1990*. Golden, CO: American Alpine Club Press; 1991.
3. Wilson R, Mills WJ, Rogers DR, Propst MT. Death on Denali: Fatalities among climbers in Mount McKinley National Park from 1903 to 1976—analysis of injuries, illnesses and rescues in 1976. *West J of Med*. 1978;128:471–476.
4. *The Rescue Operations at Mount McKinley*. United States Senate Committee on Energy and Natural Resources, S. Hrg. 105-775. Washington: U.S. Government Printing Office; 1998.
5. Beckey F. *Mount McKinley: Icy Crown of North America*. Seattle: The Mountaineers; 1993.
6. Washburn B, Roberts D. *Mount McKinley: The Conquest of Denali*. New York: Abrams; 1991.

7. Crews PB. Accident on Mount McKinley. *Summit*. 1960; 6(Aug):2–7.
8. Whittaker L, Gabbard A. *Lou Whittaker: Memoirs of a Mountain Guide*. Seattle: The Mountaineers; 1994.
9. Whittaker J. *A Life on the Edge: Memoirs of Everest and Beyond*. Seattle: The Mountaineers; 1999.
10. Wilson R. Mountain medicine: Comments on the rescue of climbers on Mount McKinley in May 1960. *Ala Med*. 1960;2:109–111.
11. Wilson R. Medical and personal log, Mt. McKinley climb May 7 to May 25, 1960.
12. *Accidents in North American Mountaineering*. New York: American Alpine Club; 1961.
13. Johnston JH. *Report of Rescue Operations on Mount McKinley Alaska May 17–25, 1960*. Anchorage: Alaska Rescue Group; 1960.
14. Champlin C. Intrepid men vs. mighty Mac. *LIFE* 1960; 48:24–31.
15. Wilson R. Acute high-altitude illness in mountaineers and problems of rescue. *Ann of Intern Med*. 1973;78:421–428.
16. Wilson R. Deaths among climbers of Mount McKinley and Mount Foraker in Denali National Park in Alaska. *Jpn J of Mountain Med*. 1983;3.
17. Ravenhill TH. Some experience of mountain sickness in the Andes. *J of Trop Med and Hyg*. 1913;16:313–320.
18. West JB. *High Life: A History of High Altitude Physiology and Medicine*. New York: Oxford University Press; 1998.
19. West JB. T.H. Ravenhill and his contributions to mountain sickness. *J of Appl Physiol*. 1996;80:715–724.
20. Hall WH, Barila TG, Metzger EC, Gupta KK. A clinical study of acute mountain sickness. *Arch of Environ Health*. 1965;10:747–753.
21. Fitch RF. Mountain sickness: A cerebral form. *Ann of Intern Med*. 1964;60:871–876.
22. Hultgren H, Spickard W. Medical experiences in Peru. *Stanford Med Bull*. 1960;18:76–95.
23. Mosso A. *Life of Man on the High Alps*. London: T. Fisher Unwin; 1898.
24. Houston CS. Acute pulmonary edema of high altitude. *N Engl J of Med*. 1960;263:478–480.
25. Houston CS. Pneumonia or heart failure? *Summit*. 1960; 6(Apr):2–3.
26. Hackett PH, Roach RC, Schoene RB, Hollingshead F, Mills WJ. The Denali medical research project, 1982–85. *Am Alpine J*. 1986;28:129–137.
27. 1984 Mountaineering Summary: Denali National Park and Preserve.
28. 1986 Mountaineering Summary: Denali National Park and Preserve.
29. 1987 Mountaineering Summary: Denali National Park and Preserve.
30. 1988 Mountaineering Summary: Denali National Park and Preserve.
31. 1989 Mountaineering Summary: Denali National Park and Preserve.
32. 1990 Mountaineering Summary: Denali National Park and Preserve.
33. 1991 Mountaineering Summary: Denali National Park and Preserve.
34. 1992 Mountaineering Summary: Denali National Park and Preserve.
35. 1994 Mountaineering Summary: Denali National Park and Preserve.
36. 1999 Mountaineering Summary: Denali National Park and Preserve.