


the atmosphere that conspired and converged to create the wind and the deadly cold it carried in its wake. To see those atmospheric forces through the eyes of an Army forecaster who had been trained to fight Indians, follow orders, and apply fixed rules.



"Everything changes; nothing does," the poet James Merrill wrote in a poem called "After the Fire." The effects of disaster, no matter how extreme, do not last forever. We bury our dead, nurse the wounded, rebuild, and get on with our lives. Today, aside from a few fine marble headstones in country graveyards and the occasional roadside historical marker, not a trace of the blizzard of 1888 remains on the prairie. Yet in the imagination and identity of the region, the storm is as sharply etched as ever: *This is a place where blizzards kill children on their way home from school.* To understand why and how the deadliest Midwestern blizzard happened the way it did is to understand something essential about the history of the American prairie—indeed about the history of America itself.

CHAPTER ONE

Departures and Arrivals

 Land, freedom, and hope. In the narrow stony valleys of Norway and the heavily taxed towns of Saxony and Westphalia, in Ukrainian villages bled by the recruiting officers of the czars and Bohemian farms that had been owned and tilled for generations by the same families, land, freedom, and hope meant much the same thing in the last quarter of the nineteenth century: America. Word had spread throughout Europe that there was land—empty land, free land—in the middle of the continent to the west. Land so flat and fertile and unencumbered that a family could plant as soon as they got there and harvest their first season. "Great prairies stretching out as far as one could see," wrote one Norwegian immigrant of the image that lured him and his wife and three sons to America in 1876, "with never a stone to gather up, a tree to cut down, or a stump to grub out—the soil so black and rich that as somebody said, you had only 'to tickle it with a plow, and it would laugh with a beautiful harvest.'" As for the sky

the cold through their thin clothing. They piled on in masses of bodies and they had each other for warmth and a bit of shelter. There was much gleeful screaming as the schoolhouse emptied.

Walter took his responsibility as monitor very seriously. Not until his entire row was accounted for, assembled, and marched outside would he even dream of leaving the school. So he was one of the last ones out. The drays were nearly full by now—there was just room for him at the back of one. Walter scrambled up, the teachers did a final head count and shouted to the drivers that it was all right to start. The men snapped the reins and the five drays began creaking forward, one after the other in the storm, just as they had come out from town.

They hadn't gone ten yards when Walter suddenly hopped off. He had just remembered his precious water bottle. He knew enough about weather to realize that the water inside the fragile perfume bottle would freeze as soon as the schoolhouse stove went cold and then the ice trapped inside would burst the bottle. Without thinking, Walter dropped from the dray and rushed up the wooden steps, down the hall to his room, grabbed the bottle from his desk, and ran back out.

Only then did his thoughts catch up with his body. The drays had been barely creeping when he jumped off. He had assumed that they would still be in front of the school when he got back—or at least close enough to run after and overtake. Ordinarily, he could see for miles out here. Surely someone would spot him stranding there and stop the dray and wait for him.

But that's not how it worked out. In the seconds that it took Walter to get his bottle, the drays had vanished without a trace—out of sight in the whiteout, out of earshot in the screaming wind. "The world is full of nothing" ran inanely through Walter's mind. And now he experienced that little seizure that tightens around the heart when you first realize you've taken a step that you cannot reverse. Snow clogged his nostrils and coated his eyelashes. Snow

blew down the neck of his coat and up his sleeves. The air was so full of powdered ice crystals and it was moving so fast that Walter had trouble filling his lungs. The exposed skin of his face and neck felt seared, as if the wind carried fire not ice. A cottony numbness spread through his body and brain. It did not occur to Walter that he could still take shelter in the schoolhouse. Though he could barely see or breathe, he decided to set out for home.

Once he had made that decision, a door shut behind him. After a dozen steps into the storm, he could not have returned to the schoolhouse if he wanted to.

Countless witnesses wrote that visibility was so poor at the height of the blizzard that you couldn't see your hand in front of your face. It's tempting to dismiss this as hyperbole or a figure of speech—but there is in fact a meteorological basis for these claims. Dr. Louis Uccellini notes that the smaller the particles of the ice crystals, the worse visibility becomes—and there are numerous accounts of how the snow that day was as fine-grained as flour or sand. "There is a phrase used in blizzards of 'zero/zero' visibility," says Dr. Uccellini, "which means you can't see up or horizontally." This would explain how a woman near Sioux Falls froze to death with her key in her hand just steps from her door. And the husband and wife who both perished while blindly circling each other in their farmyard. And David Fyffe, the crusty Scottish cartleman in southwestern Minnesota, who was only able to traverse the 101 feet from his barn to his house (he was very precise about the distance) because by pure luck he stumbled on one of the bobsleds he tied up at the iron pump that was exactly halfway between. Had it not been for that fortunate accident he "would never have been heard of," Fyffe wrote in his memoirs. "There was no house nearer than a mile or more." A young Norwegian farmer, trapped in his barn in Dakota when the storm blew up, described how he "focused his mind on where the house stood in line with the barn" and then set out into the wind with hands out in front of him. It was

only when his fingers caught in his wife's clothesline that he knew where he was. A homesteader in Buffalo County, South Dakota, wrote of a neighbor who was staggering lost between barn and house when he tripped over a snowdrift and fell against the house. The thud of his body hitting the house was loud enough to be heard over the storm and brought the family out to rescue him.

So it's hardly surprising that eight-year-old Walter Allen became confused and disoriented when he rushed out of the school clutching his perfume bottle and found himself alone in the storm. Even worse than the whiteout was the agony of his eyes when he tried to see through the snow. The fine hard pellets blew into his eyes and made them water. Walter cried and the snow mixed with his tears until it formed a crust between the upper and lower lids. Instinctively he reached up to brush the crust away with the back of his hand. Soon his eyeballs were inflamed, which further distorted his vision. The pain became so acute that it felt better to let the ice crust build. Tears and blowing snow melded together and sealed his eyes shut tightly. There was no way to break the seal except by tearing the tender skin.

Once Walter's eyes were gone, the rest of his face went fast. A mask of ice covered the exposed skin of his face except for holes at the nostrils and mouth. Snow penetrated his clothing and froze into an armor of ice around his body. All of this happened in moments.

Walter stumbled. The sizzle of driving snow hummed in his ears, and the frozen needles cut his face and throat. He knew he was lost. It was probably only a matter of minutes before he collapsed, whether in a gust of wind or because his feet became too frozen to bear his weight or from simple exhaustion we'll never know—and Walter himself didn't know either.

Strangely, once he was down, everything was better. On the ground the snow was softer and the wind didn't blow so hard. Walter curled up in the snow and surrendered.




The south wind had been in Johann Albrecht's face as he walked across the rutted fields to the schoolhouse, though it was soft for a winter wind and carried a smell of something damp and foggy. A fine January day—which only made his mother's tears and pleas more baffling. Peter, his younger brother, had given in, so he would spend the day at home listening to their mother cry and looking after Anna and the two baby brothers. But Johann was glad to be going to school—the English school, as his parents called it. No matter how dull the lessons or how repetitive the eternal chanting, school was better than farm chores. Two recesses a day, which was more than he got at home working for his father. With any luck the Graber and the Kaufmann boys would be there, too, and they'd have enough strong arms for a proper snowball war. The snowballing got fierce when the Schweizer parents of Rosefield Township let all their sons attend school.

For a thirteen-year-old boy like Johann Albrecht, who had walked these southern Dakota fields all his life, the prairie didn't offer much to look at, especially in winter. To the west, the land heaved slightly so that a low rolling ridge blocked the horizon. The vista to the south went on forever. The plowed farm fields were either deep in drifts or crusted furrows, according to the whims of the wind. The saplings that his father and the other Schweizer farmers had planted in their timber claims—cottonwoods given to them by the government, mulberry trees, ash, elm, hackberry—were like crooked poles rising out of the snow. Everything else was sky—sky that seemed to revolve around you in slow circles when you walked out under it alone. Somehow you always felt a little foolish about singing or talking to yourself for fear somebody was watching or listening—though, of course, that was even more foolish, for who on earth could see or hear you out there except God?

There would have been but two columns of smoke in view—one from the neighboring farmhouse and one from the school, both of

Exposure

 The fear came first, but the cold followed so hard on its heels that it was impossible to tell the difference. The two smaller boys, Heinrich and Elias Kaufmann, felt it first. They were *lost*. Their minds might try to shove the word aside, but their bodies knew it was true. Mr. Corton and Peter Graber's two younger brothers were gone. There was no sign of the Grabers' farmhouse at the end of the field. No sign of a barn or a haystack or a fence in the blinding snow. They were lost, the five of them together. They could see from the way the older boys—their brother, Johann, and Peter Graber and Johann Albrecht—stopped and cupped their hands around their eyes and turned in circles that they had no idea where they were, either. Elias, who was only seven, wanted to scream for his mother, but he knew that the others would be angry at him. And what would be the use? Hadn't they all been shouting at the tops of their voices?

In the first flush of panic Elias felt his stomach turn to water and

the cold sweat drip down his ribs and pool at the small of his back. He had worn no hat or gloves or heavy woolen coat when he left for school with Heinrich and Johann in the mildness of the morning. None of them had. The wind found every gap in the homespun cloth, every pore in the woolen socks and underwear, every burr-hole and cuff. Elias hunched his bony little-boy shoulders. Pinpricks of snow lanced his clammy skin and made it tingle. The blood-rich capillaries began to tighten down at his feet and hands and his exposed neck: His body was trying to conserve warmth by removing blood from the lash of the wind and sending it deeper within.

Lost, alone with his terror, too scared to cry, Elias Kaufmann started to shiver.

FR
23
23

In an awful way, the five Schweizer boys who had wandered off when the blizzard struck had become factors, very small and frail factors, in the immense equation of the weather. Physics dictated that their warm body tissues and fluids would eventually reach equilibrium with the cold fluid of the ambient air. It was biology that infinitely complicated the equation. The size and shape, weight, consistency, and age of their bodies; their gender; the actions, both voluntary and involuntary, that their brains initiated; the subtle physical and chemical changes tripped by their emotions—all of these would determine how long they survived. Every living thing fights the physics of freezing to death, whether it wants to or not. Whether the body wins or loses is so complicated, so mysterious a process, as to resemble fate or luck.

When they left the schoolhouse and walked out into the storm, the internal temperature of the boys was presumably 98.6 or close to it. They may have gained a couple of degrees in the first minutes outdoors from the force of their exertions to remain upright in the wind and from the adrenaline rush of striding off into the streaming snow ahead of their teacher. But inevitably, gradually at first

and then more swiftly, their core temperatures began to drop as their bodies lost heat to the air. The same basic physical processes that move heat energy through the atmosphere—radiation, conduction, evaporation, and convection—worked against the boys.

Nearly half of their bodies' total heat production radiated through their uncovered heads in the form of infrared energy—invisible wavelengths of electromagnetic energy that travel through the air until they are absorbed by an object in their path. Radiational cooling, as the process is called, is what created the frigid air mass of the cold wave in the first place: During the run of calm, clear nights up in Canada earlier in the month, temperatures dropped quickly at the surface of the earth as the long waves of infrared energy radiated into the atmosphere. With no clouds to reflect the long waves back, they just kept rising and radiating heat up and out into space. On a much smaller scale, the same thing was happening to the body heat rising off the boys' heads.

Their wet clothing sapped away additional body warmth through evaporation and conduction. In order to evaporate—in other words, to change state from liquid to gas—water must absorb heat. Sweat cools the body by whisking away warmth as it evaporates off the skin. The water in the boys' wet clothing acted the same way as sweat does, and the wind greatly exacerbated the heat lost to evaporation. What made it worse was that their clothing never dried because the wind kept plastering them with snow, which the warmth of their skin melted. The wet absorbent material of their shirts and trousers and underwear soaked up even more heat.

Conduction, the process that moves heat directly from one object to another, wicked heat from the surface of the boys' skin to the cold water that saturated their clothing. Since heat is conducted twenty-five times faster in water than in air, the most mortally efficient conduction occurs when a person falls into cold water. Even water at 60 degrees is cold enough to quickly induce a condition known as immersion hypothermia. The boys carried their own frigid streams of

water around their bodies. Later, when they knelt to pray, more heat would be conducted from their legs into the snow.

Most insidious was convection, the process that carried off the small envelope of heated air next to their skin. Convection, the transfer of heat by the movement of the air itself, accounts for why hot soup cools faster if we blow on it: Our breath carries off the hot, steamy air rising off the surface of the soup and replaces it with cooler air; as the soup transfers its heat into the flow of our breath, it cools. In the blizzard, the incessant wind was the breath that stripped away the warmth of the boys' bodies and mixed it into the colder air around them. For a time their bodies kept producing more heat, and the wind kept blowing it away and replacing it with cold air. But eventually they started losing heat faster than their bodies could make it. Again, there is an analogy with water: An icy current would have acted in the same way had the boys fallen into a river. In a sense they were being swept along in a river of air—and the swifter the current, the faster the thin shells of their body heat were peeled from them.

An American explorer and scientist named Paul Siple worked out a formula for how convection kills through a combination of cold and kinetics. He called it the windchill factor: Cold, of course, can kill without wind, but it takes longer. Wind and cold together accelerate the process. To be precise, the amount of body heat lost to wind increases as the square of the wind's velocity. Air moving at 8 miles an hour saps the body of four times more heat than air moving at 4 miles an hour; at winds of 20 miles an hour, twenty-five times more body heat is lost than at 4 miles an hour. Paul Siple had a lot of experience with wind and cold because he spent years working as the biologist on the Antarctic expeditions of Admiral Richard E. Byrd during the 1930s and '40s. It was in the Antarctic that he calibrated windchill through a series of experiments with water in plastic cylinders. Siple's windchill index has since been revised, updated, and recalibrated, most recently by the National Weather Service in 2001, but the fundamentals remain.

Television weathercasters like to say that windchill is what the weather *feels* like. Using the 2001 windchill index, when the wind is blowing 30 miles an hour at a temperature of 25 degrees, it *feels* like 8 degrees. "Feels like" is a fuzzy term for an exact transaction. What windchill means is that it's irrelevant that the thermometer reads 25 degrees: If the wind is blowing at 30 miles an hour, the exposed parts of your body are losing heat at the rate that they would if the temperature were in fact 8 degrees.

When the Schweitzer boys left school late in the morning, the windchill was about 5 degrees above zero. At 9 P.M., four hours after the sun set, the windchill had dropped to 40 below zero. In conditions like that, exposed human flesh freezes in ten minutes.

Ten minutes to turn warm skin and blood to ice. The five boys had been outdoors by that point for over nine hours.

292
293

For a while, shivering kept them warm. The twitching started in their faces and necks and moved down their torsos and out to their arms and legs, rhythmic waves that rippled through their muscles at a frequency of six to twelve cycles every second. As long as their flesh jumped and danced around their bones, their muscles were producing enough heat to keep their bodies warm. Inside, their vital organs went on working normally. But shivering cost them dearly. As they shivered, their consumption of oxygen doubled or tripled, a sign of accelerating metabolism. Heinrich and Elias quickly burned through the calories of their last meal—the coarse bread sweetened by syrup or jam they had carried with them to school that morning. When that was gone their bodies looked for more fuel with which to combat the cold. But there wasn't any—at least nothing they could convert to heat quickly. The boys had expected to be home by now, with a fire and a smiling mother to cook their supper, so they had brought no food but their meager lunches.

Shivering on an empty stomach is like burning your clothes in the stove once the coal and furniture are ash. The energy it took to walk, just to remain upright in the wind, made their body heat dissipate even faster. Fear threw open still more vents. Even mild mental stress hastens heat loss. Terror and exhaustion are as efficient as wind in scouring heat out of the human body.

The Schweizer pioneers frowned on complaining. Their children were raised to be cooperative, to think of others before themselves, to work together for the good of the family and the group—above all, to be humble before God. So it came as a shock to the older boys when Heinrich and Elias started falling behind and whining. They were hungry. They couldn't feel their feet or hands. Their eyes stung from the blowing snow.

Johann heard his younger brothers wail over the shriek of the wind and could hardly believe his ears. Crying like babies, screaming for the others to wait for them. Johann saw Elias fall as he stomped through the drifts trying to catch up. Or perhaps Heinrich had pushed him. Then Heinrich stumbled. Both of them were angry and red-eyed. The bickering and crying were signs that the younger boys' bodies were beginning to succumb to the cold.

Irritated as he was, Johann would never have dreamed of abandoning his brothers. The five of them must stay together no matter what. Johann motioned to Peter Graber and Johann Albrecht to stop. The three older boys put their faces together so they could hear each other and talked about what to do. Peter Graber and Johann Kaufmann, the two sixteen-year-olds, took charge. They knew it was essential to keep moving and continue looking for shelter. If the little ones couldn't go on they would carry them. Johann and Peter bent over at the waist and had the small boys climb onto their backs. Now there were three sets of tracks instead of five.

For a time, the exertion did Johann and Peter some good. Or seemed to. The effort of carrying the extra weight sent a ripple of

warmth through their bodies. And shivering contributed its own pitance of heat—for despite the exertion, it was so cold in the wind and their clothes were so thin that they still shivered. Shivering and labor combined to work and warm their muscles. But it was warmth they couldn't afford for very long. The boys were paying for every step and every spasm—paying with precious currency. Without food, without relief from the wind and cold, they were soon bankrupted.

Whenever they stopped moving even for a moment, to catch their breath or peer into the impenetrable air, the tide of warm blood ebbed from their skin and extremities and flowed inward to the centers of their bodies. But the tide was no longer warm enough to boost the temperature inside them. The heat of exertion rose off them and dissipated like steam. Gone. Their core temperatures, the temperature of the blood near their hearts, began to drop. At 95 degrees they exhibited the first signs of mild hypothermia.

Strangely, their minds were affected before their bodies. The boys became peevish. They wanted to argue, but when they opened their mouths to shout over the wind, they had trouble forming the words. Thoughts came slowly and only with exaggerated effort, like moving under water. For the first time, they blamed each other for wandering off from Mr. Cotton and the two younger Graber boys. The three who were still walking stumbled, and they saw each other stumble, and for some reason this filled the boys with annoyance and disgust. Shivering reached a climax as their bodies clung to an internal temperature of 95 degrees, but the uncontrollable twitching of their flesh disgusted them as well.

It is during this first mild stage of hypothermia that mountaineering and exploring parties start to bicker and group solidarity breaks down. Ordinarily docile and cooperative individuals turn waspish and vindictive; leaders make bad choices. Everybody thinks someone else is to blame for the misery of being out in the cold. Mountaineers call it "cold stupid." The dulled mind begins to

throb around a single image—really more a sensation than an image: the craving for warmth.

Johann and Peter were now shivering so violently that it was difficult to hold Heinrich and Elias on their backs. What made it worse was that the younger boys had gone limp on them, like half-empty sacks of peas. Johann kept shouting for his younger brother to grab tightly to his shoulders, but the little boy made not the slightest effort. Again and again he slid to the ground. He just sat in the snow staring dazedly when his brother bent over to pick him up again. Johann could hardly restrain himself from smacking the child.

What Johann did not realize was that Heinrich and Elias had become dangerously chilled while he and Peter were carrying them. Lying inert against the older boys' backs, they had fallen into the apathy of deeper hypothermia.

At outside temperatures of 35 below zero, the body loses a degree of heat every thirty to forty minutes—and far more rapidly than that if the clothing is wet. By evening the windhill temperature began to approach that level in Dakota. As their core temperatures dropped degree by degree, the boys' minds betrayed them more severely and bizarrely. With their body temperatures at 93, amnesia began to cloud their thoughts and impair their judgment. Thoughts oozed slowly out of their brains, and time itself seemed to drag on leaden feet. This is the temperature at which people make foolish, sometimes fatally foolish, decisions. They take the wrong path. They refuse to turn back from their attempt to reach the mountaintop. They lose gloves or hats or discard precious supplies. It's like being insanely drunk with cold. From here on, the boys would remember nothing.

When their internal temperatures hit 91 degrees, they ceased to care what happened to them. Their speech became slurred. Johann Kaufmann and Peter Graber and Johann Albrecht were now as dull and apathetic as the limp younger boys cradled in their arms. Their bodies were so cold that nerve impulses moved sluggishly to mus-

cles, and the muscles failed to respond normally once the impulses reached them. The boys stared down at the frozen blocks of their hands and wondered dimly why they couldn't make them move or feel anything. They had trouble contracting the muscles in their thighs and calves that they needed in order to walk; but once the muscles contracted, they couldn't relax them again. The boys stumbled and staggered. It was the wind that determined where they went, not their numbed brains.



As darkness fell, Maria and Johann Albrecht took some small comfort in the fact that the teacher, Mr. Corton, hadn't come back either. They had gone over it again and again through the long day of waiting and wondering. Mr. Corton, who was boarding with them, must have stayed at the schoolhouse with their son Johann and the other children. That would explain why neither he nor the boy had come home. Albrecht reassured his wife that this was the only possibility. He had been outside himself when the storm hit and he knew how bad it was. Albrecht had never seen anything like this in all their years in Dakota. It would have been madness for the teacher to dismiss school and send the children out into this storm.

Maria Albrecht tried to believe her husband. She agreed that they must not even think of traveling to the school to get Johann until the wind had died down. Now in the darkness the storm was more dangerous than ever. Together they would pray and wait for the morning. But still, whenever she saw Johann's younger brother Peter, Maria could not stop herself from sighing and shaking her head. "O where is my child?" she wailed. "My heart is going to break."



Shivering is a very demanding way of warming the body. But the body shivers as long as it's able to because the alternative is much

worse. Shivering is the body's last defense against the abyss of deep, potentially fatal hypothermia. Once shivering stops, the chilled body falls quiet and then shuts down rapidly. On a graph of temperature loss plotted against time, the drop from 98.6 to 90 looks like an intermediate ski slope; below 90 is a cliff.

Heinrich and Elias stopped shivering first; then Johann Albrecht; finally Johann Kaufmann and Peter Graber. Their core temperatures were now around 88 degrees. Severe hypothermia had set in.

The functions of their vital organs slowed. The chilled blood thickened. Their hearts turned stiff and frail as the cold penetrated deeper. Like the muscles of their legs and arms, their heart muscles failed to respond efficiently to nerve impulses. Contractions became weaker and weaker; the pumping action was barely forceful enough to push the viscous blood through their veins. A vicious cycle set up as their weakened hearts failed to supply the tissues with the oxygen they were craving: The lack of oxygen made their bodies unable to complete the metabolic cycle, causing lactic and pyruvic acids to accumulate in their tissues; the buildup of these acids made their hearts beat even more feebly and erratically, which in turn spiked levels of the acids.

The deepening cold radically redistributed their bodily fluids. During the first hours, the blood had retreated from their skin and extremities into the core of their bodies to keep the central organs warm. The temporary rise in the volume of blood flowing through vessels deep inside increased the production of urine. Soon the boys were desperate to urinate, but their hands were so paralyzed by cold that they couldn't open their flies. Eventually, as their bladders emptied repeatedly and their core temperatures kept falling, their blood volume began to decrease. The blood itself became increasingly viscous as more and more water was retained in their tissues. Their kidneys were no longer able to conserve water. The boys urinated again and again, probably wetting themselves and adding to

their misery. Dehydration became acute, and this in turn made their blood volume sink even lower.

There was a measure of protection in this shutting down of their internal processes, at least for a time. As their metabolism slowed, their brains required less oxygen, which was fortunate since their bodies were incapable of supplying much. Doctors today routinely induce extreme hypothermia during certain open-heart operations by pumping very cold blood into the body with a heart-lung machine. For an hour or so, the doctors keep the body at the threshold of death while they operate on the cold, motionless heart. The stilled pulse and the barely functioning brain reduce the patients' risk of heart attack or brain damage. Had the boys been rescued at this point and warmed properly, they might have recovered fully from an internal temperature of 88. It's dangerous to be this cold but not necessarily fatal.

But the odds of being rescued diminished steadily as the day wore on. The Kaufmanns and the Albrechts still believed that their sons had stayed in school, as they had been told to do again and again. And the Graber parents, who knew the truth, were too frightened to go out searching in the storm.

At 87 degrees, the boys probably would not have recognized their parents anyway.

Below 87 degrees, they began to lose their grip on reality. They ceased to know or care that they were cold. They gave up looking for shelter.

Hallucinations and delusions set in. Starved of oxygen, unhinged by stress and fatigue, the brain fabricates its own reality—often the fulfillment of desperate prayers. Two hikers stranded on Everest at 28,600 feet in temperatures of -35°C hallucinated together that their supply officer had joined them in their bivouac—the only person in the team who might have brought them dry sleeping bags, food, and oxygen. Sailors who survived the sinking of the USS *Indianapolis* in the eastern Pacific in July 1945 hallucinated that an is-

land was within reach. Some of the men stripped off their life jackets and drowned. The Hans Christian Andersen fairy tale "The Little March Girl" is a classic case of wish fulfillment hallucinations induced by severe hypothermia: a small girl, shivering barefoot in her snow-dampened rags, watches in amazement as a series of fantastic images appears out of thin air every time she strikes a match—a warm stove, a table laden with food, a Christmas tree glittering with candles, the return from the grave of her recently deceased grandmother. The next morning, passersby find the girl dead, with a smile on her face.

Johann, Heinrich, and Elias Kaufmann, Peter Graber, and Johann Albrecht, brought up together in the tight-knit, deeply religious world of the Ukrainian Mennonites, may have hallucinated that Jesus came down in his flowing robes to take them to heaven. Or that their mothers walked out of the storm bearing plates of hot poppy seed cake or pastries stuffed with cheese and onions, the savory dish they called *Käseknöpfe*—literally, cheese buttons.

People freezing to death sometimes find they are unaccountably happy and relaxed. They feel flushed with a sudden glow of well-being. They love the world and everything in it. They want to sing. They hear heavenly music. As the mind and the body amicably part company, the freezing person looks down on himself as if he's hovering overhead or already in heaven or a returning ghost. There is his body, lying miserable in the snow, but somehow he is no longer trapped in it. He's gazing at his corpse and walking on. He's telling the story of his miraculous escape. In his account of the 1996 climbing disaster on Mount Everest, Jon Krakauer wrote that in the depths of exhaustion and hypothermia he experienced a "queer detachment" from his body, "as if I were observing my descent from a few feet overhead. I imagined I was dressed in a green cardigan and wingtips. And although the gale was generating a windchill in excess of seventy below zero Fahrenheit, I felt strangely, disturbingly warm."

This disturbing warmth is another common sensation in advanced hypothermia. Right before the end, the skin may feel like it's on fire. The bliss of merging with the cold is interrupted by a sensation of burning and suffocating. Doctors are not sure why this happens. It may be a delusion manufactured by the oxygen-starved brain or it may be that for some reason in the last minutes of consciousness the body sends a surge of blood back to the constricted capillaries at the surface of the skin. Whatever the cause, the result is that victims of hypothermia suddenly feel so hot and stifled that they strip off their clothes.

A few days after the blizzard, the *New York Tribune* reported in perplexity that a number of the dead were found with torn or missing clothing—collars ripped away from their throats, hats tossed off. The paper's reporter speculated that storm victims had suffocated on the fine powdery snow and wind-borne ice pellets: "In a genuine blizzard the air is filled with fine ice dust, driven with terrible force, which chokes the unfortunate victim in a short time if he attempts to stand against it." But the *Blue Valley Blade* in Nebraska correctly attributed this phenomenon to delusion and hallucination: "At this stage of freezing strange symptoms often appear: as the blood retires from the surface it congests in the heart and brain; then delirium comes on and with it a delusive sensation of smothering heat. The victim's last exertions are to throw off his clothes and remove all wrappings from his throat; often the corpse is found with neck completely bare and in an attitude indicating that his last struggles were for fresh air!"

It sounds bizarre—to wantonly sacrifice warmth and cover just when you need it most—but it's common enough that doctors have given the impulse a name: paradoxical undressing. Before paradoxical undressing was identified, police routinely mistook hypothermic women with torn or missing clothing for victims of sexual assault. The reaction explains a disturbing incident in military history. After a brutal three-day storm in January 1719, hundreds of Swedish sol-

diers were found stripped and dead in the field in the wake of a disastrous campaign against Norway. At the time it was assumed they had been plundered by their comrades, but now doctors believe that they tore off their own clothes as their minds and bodies went mad with cold—a mass outbreak of paradoxical undressing.



For the five Schweizer boys, the end was probably peaceful. "First—Chill—then Stupor—then the letting go—" as Emily Dickinson imagined freezing to death in her poem "After great pain, a formal feeling comes." As their internal temperature dipped below 85 degrees, the hallucinations lost their grip, the imagined music stopped, the sensation of freezing or burning faded. They just wanted to go to sleep. "I was getting so terribly tired," wrote another boy who had gotten lost in this storm at the age of thirteen. "I felt sleepy. I thought if I could only lie down just for a few minutes I would be all right. But I had heard the farmers telling stories about lying down and never getting up again in snow storms. So I kept on, but I finally got to the point where I could hardly lift my feet any more. I knew that I couldn't stand it but a minute or two longer." The farmers were right. When the body sleeps, its core temperature drops, metabolism slows, heat escapes more quickly from the surface, shivering ceases—all of which hastens the loss of the dwindling supply of bodily warmth.

Johann Kaufmann and Peter Graber undoubtedly knew that sleep meant death, and very likely the younger boys did, too. They would have kept moving as long as they could—anything to avoid lying down in the snow. By late afternoon they had been wandering for three to four hours. They had come to the end of their endurance. Their cheeks and eyelids were raw from scraping the ice off their eyes. Their limbs were stiff. Their hands and feet and ears were beyond warming. Johann and Peter were no longer able to carry the younger boys, and Heinrich and Elias were barely drag-

ging themselves through the snow. Every few steps they fell to their knees, struggled to stand, fell again. The older boys waited, turned back to help, shoured, fell down themselves. When they tried to think, words and images drowned inside their skulls before they could break the surface of consciousness. When they spoke they made no sense, to themselves or to each other. With body temperatures at 80 degrees, delirium entirely eclipsed reason. In the profound darkness of night in a storm, hope was impossible.

The younger boys gave out first. At some point Heinrich or Elias fell and couldn't get up again. Nothing Peter or Johann said or did could stir them from their apathy. It's possible the younger boys fell to their knees and the older boys, thinking they were praying, knelt beside them. That's how their families preferred to imagine it. In truth, whether they knelt together or not, it was a tribute to the strength of the bonds between them—and to the heroic efforts of Peter and Johann—that they had remained together at all. Other groups of children caught out in the storm straggled, separated, and dropped alone, one by one. But the five Schweizer boys hung together until the end. And perhaps they did pray with some small, glowing ember of the mind.

By all accounts they were good boys, obedient, cherished by their families. They had been prayed over and instructed in prayer from the moment they were born. Johann Kaufmann, the only one of Anna Kaufmann's first four sons to survive childhood. His younger brothers Heinrich and Elias, born after so much desperate suffering in the New World when their mother hardly dared to hope anymore. Johann Albrecht, the baby born on board the immigrant ship just three days out of New York Harbor—a child blessedly impervious to the noise and danger and heat of the long journey, and to the deprivations of the hard seasons ahead. Peter Graber, not yet four when his mother died of exhaustion and illness that first bitter spring in Dakota and raised to the age of sixteen by his stepmother in a house packed with brothers and sisters.

In the small, closed world these boys had grown up in, the only world they ever knew, the impulse to pray was so powerful and deeply ingrained that it was almost an instinct. And kneeling, if one or more of them had indeed summoned the will to kneel, would have been a blessing in its own right. Folding the body in the middle and bringing the knees close to the chest would have provided some protection.

It was better than lying in the snow.



But in the end that's what they did. One by one, they collapsed onto the frozen ground. With his last surge of will, Johann raised himself and wrapped Elias in his arms. As the snow conducted heat away from their bodies, their heartbeats slowed to an occasional twitch. The boys lost consciousness. Beyond both hope and fear, they felt nothing at all.



Doctors have a brutal phrase they use in treating people found unconscious in the cold: "You're not dead until you're warm and dead." In profound hypothermia, the internal functions become so slow and feeble that the body enters a kind of suspended animation. The pulse is all but gone, the brain barely flickers with activity, the blood moves glacially through the veins and arteries—but there is a window during which an unconscious hypothermia victim can be resuscitated with surprisingly little damage. A fairly wide window, in fact.

Had a rescue team found the five Schweizer boys and moved them exceedingly gently out of the storm and rewarmed them carefully with hot water or heated air, they might still have recovered. Assuming they slipped into unconsciousness around 4 P.M., the boys may still have been alive at 7 P.M., when the temperature had dropped to 10 below zero and the wind out of the northwest

blew at 40 miles an hour. It's conceivable that one or more of them might have been resuscitated as late as 9 P.M.

But nobody found Johann, Heinrich, and Elias Kaufmann, Peter Graber, or Johann Albrecht—not in time to save their lives.

Once their core temperatures fell below 84 degrees, their hearts were beating at less than half the normal rate. With every degree of temperature loss, the heartbeat slowed and weakened. Just as their leg muscles had failed to obey commands to contract and release while they were still able to walk, so their hearts now became less and less responsive to the electrical signals transmitted by their nerves. Fiber by fiber, the cold was paralyzing their hearts. Eventually the signals were so faint that they failed to trigger any cardiac response at all. Circulation ceased. With no oxygen the brain guttered and went dark.

The boys lay on their sides with their arms pulled in tight and crossed on their chests and their knees drawn to their stomachs. By every vital sign, they were dead. They had no pulse, they were not breathing, their eyes were dilated, their brains were void of electrical activity. They were dead, but still they were not entirely gone. The cold that killed them also preserved the possibility of salvation. At normal body temperatures, the brain suffers irreversible damage three minutes after the heart stops beating. But in cases of profound hypothermia, the brain is so cold that it remains intact far longer. Modern doctors have succeeded in resuscitating an individual pulled out of icy water sixty-six minutes after cardiac arrest—full recovery with no brain damage.

Modern doctors.

Even the kindest, wisest rescuer in 1888 would have inadvertently killed the boys.

Before Thursday, January 12, 1888, ended at midnight and Friday the thirteenth began, every bit of moisture in the five young bodies, every cell, every tissue was frozen solid.

FR
23
123

We'll never know how many spent that night out on the prairie. It had to be at least several thousand, most of them in the southern and eastern parts of Dakota Territory, in the eastern half of Nebraska, and in southwestern Minnesota. Northern Dakota was largely spared because the storm blew through so early that people remained home and kept their children in. Iowa, though it received the heaviest snow, also suffered relatively few casualties. The storm didn't hit there until late in the day, when evening was gathering and farmers and their children were back home. But in southern Dakota and Nebraska the timing could not have been worse. Sergeant Glenn estimated that 1 percent of "those overtaken and bewildered by the storm perished" and that of the dead 20 percent were children.

The catalog of their suffering is terrible. They froze alone or with their parents or perished in frantic, hopeless pursuit of loved ones. They died with the frozen bloody skin torn from their faces, where they had clawed off the mask of ice again and again. Some died within hours of getting lost; some lived through the night and died before first light. They were found standing waist deep in drifts with their hands frozen to barbed-wire fences, clutching at straw piles, buried under overturned wagons, on their backs, facedown on the snow with their arms outstretched as if trying to crawl. Mothers died sitting up with their children around them in fireless houses when the hay or coal or bits of furniture were exhausted and they were too weak or too frightened to go for more.

A young Dutch couple in Minnesota died kneeling side by side with their hands held high above their heads.

A nine-year-old Nebraska boy named Roman Hytrek was walking the prairie with his dog when the storm overtook them. That evening the dog turned up scratching at the door of a neighbor's

house. Roman's empty coat was found in March. Eventually a search party recovered the boy's body. Roman had died alone leaning against the side of a hill. They speculated that he had unbuttoned his coat so that he could cradle his dog next to him in it and that the wind ripped it from his shoulders. But it may have been an instance of paradoxical undressing.

William Klemp, a newly married Dakotan in the full vigor of young manhood, left his pregnant wife at home and went out in the storm to care for their livestock. He never returned. A few weeks later, Klemp's wife gave birth to a son. It was spring when they found his body in a sod shanty a mile from the house. Klemp's face had been eaten away by mice and gophers.

In the region that would soon become the state of South Dakota there were deaths in thirty-two of the forty-four counties east of the Missouri River. Every pioneer who wrote a memoir, every family that recorded its history included a story of someone who died in the blizzard. Every story is heartbreaking.

FR
23
123

Lois Royce, a young teacher of a Nebraska country school, huddled on the open prairie all night with three of her pupils—two nine-year-old boys and a six-year-old girl. The children cried themselves to sleep. Lois stretched out on the ground, lying on her side with her back to the wind and the children cradled in the hollow of her body. She covered their sleeping bodies with her cloak. The boys died first. Lois felt one of the bodies cease to breathe and go cold. Then, a few hours later, the other. The boys went in silence. The little girl, Hartie Rosberg, had begged her teacher through the night for more covers to keep her warm. She died at daybreak deliriously crying, "I'm so cold, mamma, please cover me up." When the air had cleared enough to see, Lois left the three dead children lying together and crawled on her hands and knees a quarter of a mile to the nearest farmhouse.



In Dakota's Beadle County, six miles southwest of Huron, where Sergeant Glenn staffed the Signal Corps observing station, Robert Chambers, a farmer in his early thirties, was outside waiting cattle with his two sons and their Newfoundland dog when the weather turned. The older boy, who was eleven, suffered from rheumatism, so Chambers sent him home before the storm got bad. He thought that he and nine-year-old Johnny could drive the cattle to the barn themselves. The dog would know the way. But, in Sergeant Glenn's words, father and son were overtaken and bewildered. When Chambers realized there was no hope of finding their farmhouse, he burrowed into a drift, wrapped Johnny in his jacket and vest (neither of them had come out with overcoats), and told the boy to get into the hollow out of the wind. Robert Chambers stood in the storm shouting for help as long as his voice held. The dog barked frantically. But no one heard them over the wind.

By evening Chambers was too cold to do anything but lie down in the snow next to his son. He put the dog beside them for extra warmth. Johnny could feel how frigid his father's body was. He urged his father to get up and to look for the line of the trees they had planted by the house. But Chambers would not leave his son.

As the night wore on, father and son talked about death. Chambers assured Johnny that they would survive and repeated over and over that the boy must lie still. Johnny knew that his father was freezing to death. At some point the boy dozed off. When he woke, his father was still alive, but barely. Chambers told his son to pray and that he would pray with him.

At daylight a rescue party heard the Newfoundland barking and found them. The snow had drifted so deeply that Johnny was entirely buried but for a small opening by his mouth. The dog was standing guard. Robert Chambers was dead.



The Westphalen girls, Eda and Matilda, also died in the night. Though born five years apart, the daughters of German immigrants, the girls had grown close to each other in the tragedies that had befallen their family during the past few years. Diphtheria struck the Westphalens in the winter of 1883. Two days before Christmas, six-year-old Frederick died. Six weeks later, their father, Peter, deranged by grief, hanged himself. Since then their mother had managed alone with six children. The winter of the blizzard, Eda was thirteen, Matilda, eight. The storm hit when the girls were at their country school in a hilly section of eastern Nebraska near the railroad town of Scribner (named by an Eastern railroad official for his son-in-law, New York publisher Charles Scribner). The teacher, Nellie Forsythe, told the children to go home. Eda and Matilda left together. The schoolhouse was halfway up the side of a smooth rounded hill; their house was a mile due north at the bottom of a valley cut by a creek. Usually it was an easy walk downhill across the fields. But in the storm the girls had the wind in their faces. No matter how they struggled against it, the northwest wind pushed them east into a series of ravines. For a while they wandered in circles. Then they drifted east and south with the wind. Only when they came to a wire fence did Eda realize they had gone in the wrong direction. They needed to turn around—but turning meant walking into the wind. Matilda failed, and Eda took off her wraps and covered her younger sister.

Most victims of hypothermia curl up on their sides and die in a fetal position. Eda and Matilda died facedown. Very likely they dropped while fighting to walk into the wind. Once they fell, they must have lost consciousness very quickly. They lay on the snow a few feet apart on the side of a hill. The windward side. All night the wind blew snow over their bodies, covering them and laying them bare again.



In the course of the night, the haystack in which Etta Shatnuck had taken refuge became her prison. The hay had become so compacted and heavy with drifting snow that it pinned Etta in the small hollow she had dug for herself. As the temperature plunged, the fibers tightened. Etta's torso stayed fairly warm, but the cave was so shallow that she was unable to shelter her legs or feet. Exposed to the cold, her legs turned to blocks of wood. She was powerless to escape.


Etta drifted in and out of consciousness, but she never fell into a deep sleep. She felt mice rustling through the stack and nibbling at her wrists and somehow that comforted her. It seemed miraculous that something else was alive in the storm. When she was most alert, Etta prayed. She moved her lips and tried to summon the voice to sing hymns. She ran the words through her mind, but the sound that came from her mouth was hardly more than labored breathing. She was glad as never before that she had found God. God had brought her to the haystack; she was sure of it. God would guide the steps of a rescuer. Etta had faith. She knew she would be saved.

At some point in the night the wind died down enough for her to hear coyotes howling. That keening yelp. Or maybe it was still the wind. Etta's eyes fluttered open and the air looked a little brighter. It must be morning. Whoever had forked the prairie grass into this stack would come. Etta tried her voice to see if she could cry out for help. She could move her mouth and neck and shoulders. But her body was caught in the vise of the frozen haystack and her legs were paralyzed. The hymns and prayers would keep her going until someone came and pulled her out.

If nothing else, as long as she could sing and pray, Etta could ward off deep sleep—the sleep from which she would never rouse herself.

CHAPTER NINE

Prairie Dawn

 Weather goes on forever with no direction or resolution, but a storm, like a story, has a beginning, a middle, and an end. The conditions that made the storm will in time unmake it. The seeds of destruction are present from the start. It is the nature of raging low-pressure systems to drag down calm, stable highs. Winds must relax as temperature and pressure gradients dissipate. Once the front moves through, cold air deepens. The clash of contrasting air masses continues—but somewhere else. Another story. On yesterday's battleground falls the hush of equilibrium. Air aloft dries as it spreads and sinks. Clouds break up. After the worst storms, the most beautiful weather often shines down on the scene of devastation.

Before dawn on Friday, January 13, 1888, the blizzard had pretty much blown itself out over the Dakotas, Nebraska, and southwestern Minnesota. The last gusts put the final touches on drifts and hollows, and then the atmosphere subsided in a deep sigh