

At 11:20 AM, on a gray and overcast January morning, I took off from San Carlos airport, south of San Francisco, in a Socata TB-20 Trinidad, tail number N21AR. My destination was Boulder Municipal airport in Colorado. I had estimated about 5 to 6 hours for the flight. The night before and the morning of the flight, I logged onto DUATS for a weather briefing, and checked the aviation maps on weather.com, and both times the information seemed to indicate a tricky, but not unduly hazardous flight. There were no thunderstorms or significant meteorological impediments along the route, but several layers of clouds, combined with cold temperatures, graced most of the Sierra range and extended into central Nevada, along with another similar situation affecting the Colorado Rockies. My route was going to be direct all the way, relying on the handheld GPS to guide me nonstop to Boulder. The Trinidad has a range of about 1000 nautical miles under no-wind conditions; the distance to Boulder was 895 miles and with a strong tailwind. After takeoff, I was pleased to see that the GPS had me arriving into Boulder in less than 4 and a half hours. I guided the Trin on course, heading straight toward the heart of the Sierra mountains. I had overflown the Sierras on numerous occasions, and with a ceiling of over 16,000 feet, I knew the Trin could overfly even the highest peaks by several hundred feet. My course was then going to take me across the full breadth of Nevada, passing by Salt Lake City, and on into the northern Rockies.

I climbed quickly to 13,500 feet, my chosen cruising altitude, as per VFR guidelines. As I approached the foothills of the mountains, the cloud layers seemed easily defined, with bands of darker color separating those of the white cirrus layers. I continued on, being able to maintain separation from the clouds and thinking I could see a clear layer between cloud layers to navigate through. I passed the last airports and towns west of the Sierra and knew that I was soon going to be committing myself to crossing the mountains. I made frequent checks of the GPS map to keep myself oriented as well as to define my escape route back to clear weather in case I had to turn around.

With a 40 mph tailwind, I was well over normal cruise speeds, moving at a speed of over 200 mph over the ground. Within a few minutes, the layers of clouds seemed to suddenly merge and lose definition. I looked up and could still see patches of blue sky straight above me, but I had suddenly lost visual contact with anything around or below me. I made a turn back to the northwest and toward clear skies, in no way wanting to find myself in a cold milky soup of clouds only a few thousand feet above dangerous and remote terrain.

I reached clear skies quickly and glanced back to the east to see if there was another obvious and clear way over the mountains. I was able to pick out definition in the distance on a course a bit further north than my original one, and so I turned the plane back to the northeast and pressed on. Yet once again, the definition of just moments ago melted into a white blur as the cloud layers defied my visual sense and I was once again in the soup. And again, I could see the sun filtering through the clouds above me, so I tried climbing to try and quickly get above the cloud layer. I pushed the throttle and prop control to the stops and pulled back on the yoke. I reached an altitude of 15,000 feet and I was still engulfed in clouds; in fact, now I was in deeper than before, and with the tailwind barreling me along at tremendous speed, I was suddenly two-thirds of the way across the range, yet utterly blind to the outside world. It was at that moment that I glanced down to the wing's edge just outside my window and saw, to my horror, a half-inch layer of ice solidly attached to the entire leading edge of the wing.

I've been flying for about 15 years now, and although I learned to fly in Florida where the only ice a pilot encounters is in his cocktail, I had the fears of ice accretion hammered into me by my instructors. In the intervening years, having accumulated about 700 hours flying a Piper Arrow and now a Trinidad, throughout the United States and in all manner of conditions, I had never before experienced icing while flying. I had read all the horror stories of pilots encountering ice while flying and barely walking away with their lives, or meeting a fate worse than that, and had totally absorbed the terrors that ice can wreak on planes and on the pilots who command them. So while I had not anticipated ever flying into conditions ripe for ice accretion - having not had any contact with the experience before - I recognized immediately the real and life-threatening dangers it posed when I

made that glance down to the wing. Being over mountainous terrain in the middle of winter did not provide me with any additional comfort.

The vision of that much ice already having formed on the wings shocked me. I became irrational for a moment. I made the immediate decision to turn around and go back precisely the way I came, but in my unthinking haste, and not taking into consideration the aerodynamic deterioration occurring at that very moment, I banked hard to the left, bringing the plane into an almost 60 degree bank.

Halfway through the turn I glanced up at the airspeed indicator, my heart already pounding, and saw that the needle was at 60 knots and winding down. Somehow, against all classroom predictions of such a scenario, I managed to level the plane out and was able to gingerly bring the airspeed back up. I may have even stalled, but as I think back to that moment now, with ice accumulating at a terrifying rate on all leading surfaces of the plane, in the middle of a 60 degree bank at 60 knots at 15,000 feet, I realize that those numbers should have been the recipe for my destruction. I will never know why I was able to pull out of that predicament, and I still lie awake at night imagining the plane spiraling down through the clouds and impacting the rugged peaks of the Sierra.

But the epic was far from over. I got the plane back on course, retracing my path exactly with the help of the GPS. But now I was flying into a 40 mph headwind, and my groundspeed waned first to 80 knots, then 75, then 70, then finally 68. I watched with a kind of helpless terror that brought me close to tears as the ice continued to accumulate on the wings, first an inch, then an inch and a half, then two, and still accumulating. Very soon after my turn back to the west, I realized that I was not able to maintain altitude. I let my airspeed dwindle down to about 95 knots and knew I could not let the plane fly slower than that. And against every straining will, wishing the plane to remain aloft, I was forced to put the nose down, losing about 500 feet a minute in order to maintain a safe airspeed. At this point I called Flightwatch, whose frequency was ironically dialed into the radio, and told them I was experiencing severe icing and needed a frequency for radar control. The controller gave me Oakland Center's frequency and I called them up, trying to conceal the borderline panic in my voice. "Oakland Center, Trinidad 21 Alpha Romeo, I'm experiencing severe icing conditions, I have about two and a half inches of ice on my wings, I am not able to maintain altitude, and need to get on the ground as soon as possible."

The nearest airport to me at that time was Pine Mountain, a small airport tucked into the foothills of the Sierras, serving a smattering of houses that lined the runway. At the time that I called Oakland, I was still right over the center of the range, very near Yosemite, and laboring along at a speed slower than highway speed limits. I was still totally immersed in clouds, seeming to grow darker by the moment, still watching the ice accumulate, watching hundreds and hundreds of feet fall off the altimeter, gripped in total fear, entering into a state of ultra-sharp awareness that must come when one feels that death may be only moments away, heightened all the more by the vision of a violent and fiery end. I have never felt more helpless, in such little control over my fate.

It was in this highly conscious, yet highly irrational state that I did something highly stupid. I opened the small window flap next to me, reached out my arm, and tried to scrape off the ice that I could reach with my bare hand. In the freezing air I clawed at the ice but it was fixed as if part of the wing itself, fused through some atomic network of chemical bonds. It was obviously futile. I pulled my arm back in and saw that I had ripped off the entire fingernail of my middle finger, the nail having pulled completely away from the skin beneath, shredding the skin all the way down to my first knuckle, and hanging on only by a few strands of bloody skin. Blood dripped down onto my pants. There was no pain at all, just a fascination with my own stupidity and envisioning the forensic experts puzzling over my bloody finger after pulling me from the wreckage that seemed more and more likely to come at any moment.

With my chances of slipping through the noose becoming thinner, I called Oakland Center again and declared an emergency. I was now down to about 9,500 feet, still losing altitude rapidly, still in the clouds, still over mountainous terrain. My aim in declaring an emergency was not to gain any kind of assistance from the controller, knowing that he could provide very little for me at the time, but so

that when the plane went down, the search and rescue team could be mobilized right away. I started to think through the final moments, thinking that I might pop out of the clouds with a few seconds to spare before impact, a few seconds that could provide me with enough time to maneuver the aircraft to minimize catastrophic damage. I made a mental note of the food I had in the plane with me, and how long I might be able to survive in the frigid mountain air with no heat or adequate clothing. My head danced between the GPS map, altimeter, airspeed indicator, and the wing. I prayed to a god I never knew existed. My heart pounded in my chest with ferocity. Blood dripped from my finger. I forced myself to breathe slowly and focus. And then, as if a new slide had been placed into a projector, I popped out of the clouds and everything went from the grays of blindness to the whites and greens of a mountainous winter. I was about 600 feet above the terrain, now having given way to the gentler western foothills, and although I was still 8 miles or so from the runway, still far from certain deliverance, a tremendous relief washed over me. It was directly related to my sense of vision having been restored. Actually seeing whatever fate awaited me, no matter the nature of its outcome, was like the kiss of life. The thought of ramming into the side of the mountain in total visual obscurity is many times more haunting to me than being able to watch it happen.

I still had to clear a few high ridges before I knew that I could make the runway. As I navigated toward it, huge chunks of ice started breaking off from the fuselage and slapping the windshield and other surfaces. The plane flew like it was in a vat of glue, the controls heavy and sluggish and unnatural. I thought that maybe the gear might be frozen and that I'd have to make a belly-up landing, but even that thought was more comforting than the fate I'd been imagining a few moments earlier. I saw the runway in the distance, cleared the last ridge by less than a hundred feet, and knew I was going to make it. Only later did I read that most icing-related accidents occur on approach. And only later did I learn to not drop the flaps in a situation such as this. I dropped the landing gear and got three in the green, and more relief poured over me. I dropped some flaps in and felt the aerodynamics behave in a way I'd never felt before, like someone was holding the wing-tips and fighting me with every control input I tried to feed the surfaces. I told the controller I was going to make it before losing contact as I approached field elevation. Despite the airplane behaving erratically and sluggishly, I managed to maneuver the plane down onto the runway and made a sloppy, shaky landing, and ran it out almost to the end before slowing enough to taxi off.

The airport was deserted. I parked, shut down, opened the door, and sat there for a moment, shaking, savoring the overwhelming sense of relief soaking my body. I silently thanked the Trinidad for saving my life (for I think another lesser plane would not have fought so hard) and got out. I looked at the wings. Even though some of the ice had already melted off, there was about a three-inch thick slab of it hanging off the leading edges. There was also ice on the bottom of the plane and on the elevator control surface. I walked to the small terminal lounge and found a payphone and called 911. By now, the pain in my finger was starting to kick in pretty hard, and being an EMT myself, knew that it needed to be properly cleaned and bandaged. Then I called my wife from my cell-phone and told her what had happened, my voice shaking as I relayed the story. "I don't want you flying anymore," she said through tears. "Get back to San Francisco and buy a ticket for a commercial flight, okay?" The EMT drove up right then and I told her I'd call her back later.

The EMT bandaged me up as I again relayed the events of the last half-hour. A pair of EMTs arrived in a fire truck to make sure everything was okay, and then all four of us went back out to the plane so they could see the ice buildup. They were pretty stunned by the amount of it, now half of it broken on the ground. I picked up a piece and pondered its innocent state now compared to its earlier responsibility for almost ending my life. The EMTs left and I was alone with my thoughts on a cold gray afternoon with my original destination still many miles away. I thought, reflected, and analyzed my options and decided to keep flying. By now I could knock away all the ice accumulation, leaving a completely healthy plane underneath. I took off uneventfully and navigated well to the south to avoid the weather stubbornly hanging over the Sierras. I finally got around it all and made the turn east, flew over Las Vegas, before finding myself in central Utah in fading light with ominous clouds and

dark patches waiting to greet me along my intended path. Having cheated death once already that day, I made a detour and landed at Bryce Canyon airport and spent the night in the hotel. It took me hours to fall asleep, images of terror and helplessness flashing in my mind, playing out the story if I had made any decisions differently, if I had indeed stalled out completely when making that turn back, or if I'd been in a different plane, or if I had kept on going, or if a million other scenarios. Finally, at 2:30 AM, fatigue overtook my taxed body and I fell asleep.

The following morning was temperate with a layer of broken clouds scattered along the horizon. I refueled, took off, and spent the next two and a half hours navigating over the Rockies, weaving my way through a labyrinth of thick patches of cumulus clouds, before crossing the divide and dropping down onto the plains. A 35 knot wind coming down off the mountains made for a jerky landing, but shutting down the plane that afternoon, thus ending one of the most epic experiences of my life, caused me to cherish every element of the world around me, to savor every feeling and sensation, even the intense throbbing in my finger. My wife came to pick me up, giving me a long, tight hug before we drove home.

Flying is in my blood, the practice and expression of a deep longing to soar above the earth, and while I hope to keep flying for as long as I'm able, I'll always remember how small and helpless I felt in the face of raw nature. The laws of nature allow for an airplane to fly and perform as it has been designed, yet in the time it takes to preflight, those same laws can rob the same plane of its airborne privileges. The challenge of the pilot is to discern between the two, to respect both, and to allow his passions to occupy the space in between.

