PROLOGUE

MOST CHILDREN ARE TOLD fantastic stories, which they gradually come to realize are not true. As I grew up, the fantastic stories I'd heard as a young child turned out to be true. The more I learned, the more fantastic and true the stories seemed.

They were unlike the stories other children heard. They were gruesome, improbable, and sad. I didn't repeat them because I thought no one would believe me. They were the stories of a young man falling out of the sky. Unlike Icarus, who had flown too high, he had not flown high enough. At 27,000 feet, his wing was blown off by a German *Flakbatalion*, which was firing 88-millimeter antiaircraft shells over the rail yards outside of Dusseldorf. And unlike Icarus, he's still alive as I write this.

Federico Gonzales, my father, was a First Lieutenant near the end of World War II. He was piloting a B-17 for the Eighth Air Force, when that organization had evolved into a marvelous machine for turning young men into old memories. He was on his twenty-fifth and last mission, which he was eager to complete, because he and his buddy, David Swift, were going to sign up to fly P-51 Mustang

fighter planes, the knights of the sky. My father was like that, despite having been shot down before. He'd enlisted in the last cavalry outfit before the war. He rode horses at a gallop while emptying the clip of his .45 Model 1911-A, reloading while turning to come back and hit the targets again. When the war started, the cavalry was mechanized, and he began searching for the next best thing. He discovered airplanes. He went out for fighters, but they needed bomber pilots, and as his commanding officer told me forty-five years later, "Your dad had a flair for flying on instruments."

When his B-17 was hit on January 23, 1945, he was the lead pilot for one of those enormous air raids that the United States was conducting at the time. The Commandant of the 398th Bomb Group, Colonel Frank Hunter, had asked my father's regular co-pilot to stand down so that he could fly right seat in the lead plane and see the action. The bombers had taken off in great waves of smoke before dawn, formed up, and churned out over the English Channel from Nuthampstead Base.

They'd reached the target area and were on the bomb run when ground fire from the *Flakbatalion* cut the left wing of my father's B-17 in half just inboard of the number one engine. It was rotten luck. During the bomb run, you couldn't take evasive action or the bombs would go astray. Moreover, his was the first plane in the formation, and the hit was the very first firing. It was a mortal wound to the plane and 90 percent fatal to the crew. The blast was deafening, and my father saw immediately that there was going to be no flying out of this. He turned to his boss beside him and said, "Well, I guess this is it."

Then the plane rolled over, ignoring my father's attempts to right it, and began some sort of inverted flat spin. He couldn't tell precisely what sort, for the world had turned into a nasty soup of unfamiliar colors. He gave the bail-out orders through the intercom to the crew, unsure if the thing was even working or had been shot to pieces by the flak. All the lights, horns, and klaxons were going at once as the plane protested with a great crescendo of

whines, groans, and the howling noise coming through exploded wind screens. My father looked over at Colonel Hunter and realized that he was already dead, hit by flak or some bit of flying metal from the fractured plane.

Upside-down, spinning, he groped for the parachute beneath his seat. They'd started at 27,000 feet and he had no idea how high they were, but knew he had to get out. The fliers were supposed to wear their parachutes at all times, but the salty old dogs, as my father was then at age twenty-three, kept them under their seats, because the damned things were so uncomfortable to sit on for ten hours. And anyway, the choices they gave you were, as the fliers liked to say, exceedingly butt-puckering, inasmuch as a pilot descending beneath a 40-foot canopy made a great target for sharpshooters. Even the farmers came out to try their hand at bagging an American flier. The women and children would be gathering, too, to collect the bounty from a shattered B-17: nylon, wool, plastic, metal of all sorts, and silk from parachutes and from the escape and evasion maps.

He couldn't reach his parachute with the stupid harness on, so he released it. The centrifugal force slammed him into the instrument panel with such force that it nearly knocked him out. It cut off his oxygen supply, which was fed through a thick rubber tube running up his chest to his face mask. Smashed against the instrument panel, losing altitude he knew not how fast, he reached up with a hand that seemed made of lead now and pulled the face mask off to get a breath of air. He saw Hunter flopped over, hanging helplessly in his harness. He took a breath. Damn. Probably still above 20,000 feet, he thought, and passed out from hypoxia.

While he was out, his aircraft broke in two amidships. On the ground, an old woman, Mrs. Peiffer, saw something amazing: boys falling out of the sky. Of the ten-man crew, only my father survived, and he was severely injured, as might be anticipated in a five-mile fall.

When he awoke, the motion had stopped. He was crumpled and jammed beneath the instrument panel down by the big naked aluminum rudder pedals. He saw sky outside the shattered canopy, a placental overcast from which he'd been born. A man appeared in the broken window frame, standing on the stub of the right wing. He pointed a pistol at my father's head. He was a local man, a German peasant. The idea of killing an American pilot was not an unpopular one in those parts. My father watched with detached curiosity as the man pulled the trigger.

IN 1958, when I was ten years old, I worked in a medical school laboratory at the Houston Medical Center. My father was a biophysicist there. I convinced him to take me to work with him so that I could find out what he did, which he didn't seem able to explain. I'd been after him about it since I was very little, and by the time I was five, I had started to think that he might have been in the slow group at scientist school. All the other fathers could explain what they did. When I was eight, he started taking me to the lab with him after school and on weekends and letting me wash glassware and do other menial jobs. But gradually, he gave me more responsibility. I learned to make microscope slides before I learned how to dance.

One of my earliest jobs in the lab was to take the trash to the incinerator. The trash often consisted of cut-up mice and such things as come out of a biological sciences lab. So I'd lug the trash bags down the vast tiled corridor, which was dimly lit from either side by the glass vitrines in which the demonstration specimens floated in their baths of formalin. There was a human head sliced into half-inch thick slabs, neat as you please. There were many fetuses at various stages of development. And there was one lady, headless, armless, her torso cut in half from the top of her sternum to her crotch. She floated in formalin like a nightmare of Botticelli's Venus about to be born on an ocean wave.

I proceeded to the furnace and cranked the steel handle until the heavy rusted door opened to reveal a roaring orange inferno within. I was just about to toss in the trash bags when I saw a human arm sticking up out of the flames. At first I was shocked, then frightened. Then I realized that, of course, that's where Venus' arms must have gone long ago, along with a lot of other spare parts. And I thought: What the heck am I doing here? I couldn't answer the question then, but I can now: I was chasing my father, trying to get some of that righteous stuff he had. What else does a son do but try to learn from his father?

Since he was a scientist, I grew up believing in science. That meant I had, before I even knew it, already embarked on a search for some universal laws—the Rules of Life.

MY INTEREST in survival began early, when I was a child and learned what my father had done in the war. That he had lived while so many others had died seemed to me to have so much meaning. I heard the stories over and over and could never seem to plumb their mystery. His survival made me believe that he had some special, ineffable quality. I felt urgently that I ought to have it, too.

Gradually, I developed the idea that to survive, you must first be annealed in the fires of peril. Even his everyday life seemed a peril. All around him were the dead, yet he lived on, laughing. Eventually, I went looking for my own brand of peril. I deliberately took risks so that I might survive them. We lived on a bayou in southeast Texas, and from about the time I was seven, it was my private wilderness, with alligators and snapping turtles, rattlesnakes and water moccasins, and strange displaced characters. My Irish Catholic German mother had so many babies—who could keep track of them all? I pretty much ran wild.

When I was in the fourth grade, I began writing about the risks I took. By the time I was in my twenties, I was doing it as a jour-

nalist. After thirty years, I realized I'd been writing about survival all along without knowing it. But I'd always come home from a story wondering: Do I have it now? Am I a survivor? Or is there more?

I became a pilot. I began writing about big aviation accidents, that boundary between life and death where my father had made his bones.

With my interest in science, then, I thought there must be some research that could help me to understand the mysteries of survival I'd encountered. I found otherwise rational people doing inexplicable things to get themselves killed—against all advice, against all reason. A perfectly sensible man on a snowmobile is warned not to go up a hill because it will probably produce a fatally large avalanche. He goes up anyway and dies. A firefighter and experienced outdoorsman knows he is going in the wrong direction but persists anyway and winds up profoundly lost in the wilderness. A number of scuba divers are found dead with air in their tanks. They pulled the regulators from their mouths and died. If you had magically transported them to the surface a moment before they removed their regulators and asked them about their impulse, they would have told you that it made no sense: The regulator was necessary for their survival. If you were able to ask them afterward, they would tell you that they didn't intend to take it out. They intended to live.

After reading hundreds of accident reports and writing scores of articles, I began to wonder if there wasn't some mysterious force hidden within us that produces such mad behavior. Most people find it hard to believe that reason doesn't control our actions. We believe in free will and rational behavior. The difficulty with those assumptions comes when we see rational people doing irrational things.

Those who survive are just as baffling. I knew, for example, that an experienced hunter might perish while lost in the woods for a single night, whereas a four-year-old might survive. When five

people are set adrift at sea and only two come back, what makes the difference? Who survived Nazi prison camps? Why did Scott's crew perish in Antarctica while, against all odds, Shackleton's crew survived and even thrived in the same circumstances? Why was a seventeen-year-old girl able to walk out of the Peruvian jungle, while the adults who were lost with her sat down and died? It was maddening to find survival so unpredictable, because after all, science seeks predictability. But as I raked the ashes of catastrophe, I began to see the outlines of an explanation.

Most of what I discovered through the years of research and reporting was not new. I acquainted myself with recent research on the way the brain functions, but also with fundamental principles that have been around for centuries—in some cases, thousands of years—as well as with the psychology of risk taking and survival. The principles apply to wilderness survival, but they also apply to any stressful, demanding situation, such as getting through a divorce, losing a job, surviving illness, recovering from an injury, or running a business in a rapidly changing world.

It's easy to imagine that wilderness survival would involve equipment, training, and experience. It turns out that, at the moment of truth, those might be good things to have but they aren't decisive. Those of us who go into the wilderness or seek our thrills in contact with the forces of nature soon learn, in fact, that experience, training, and modern equipment can betray you. The maddening thing for someone with a Western scientific turn of mind is that it's not what's in your pack that separates the quick from the dead. It's not even what's in your mind. Corny as it sounds, it's what's in your heart.

ONE

"LOOK OUT, HERE COMES RAY CHARLES"

IF YOU COULD see adrenaline, then you'd see a great green greasy river of it oozing off the beach at San Diego tonight. You'd see it flowing one hundred miles out toward the stern of the boat—that's what the pilots call it, a boat, despite the fact that it displaces 95,000 tons of water, has a minimum of six thousand people living on board at all times, and is as long as the Empire State Building is tall.

I'm standing with half a dozen sweaty guys on the LSO platform, which at 8 by 8 feet seems very crowded just now. We're steaming into the prevailing wind at "around 30 knots" (the exact speed being classified), and I'm trying not to be jostled toward the 70-foot gulp down to the water. The steel blade of this boat has ripped up the belly of the sea, and I watch for a moment as its curling intestines glisten with moonlight and roll away behind us.

On my left is Mike Yankovich, the landing signal officer (LSO), in his goggles and cranial, his gaze fixed intently about 15 degrees above the horizon. He's got a heavy-looking telephone handset pressed to his left ear, pickle switch held high in his right hand.

It's called the pickle switch because it looks like a large Bakelite kosher pickle with a silver ring enclosing a black trigger. Yankovich has his index finger and thumb poised to press the cut light or wave-off light switches in case he needs to tell the pilot to add power or not to land. The men inadvertently nudge me toward the edge in their enthusiasm to get a look at the F-18 Hornet that's bearing down on us at 150 miles an hour.

A mile out, it doesn't look like much yet, just a black dart, a darker darkness in a sky full of buzz-bomb stars. I know those monster GE engines are burning kerosene faster than a V-2 rocket, but I can't hear them yet. There's just that silent insect shape, unfolding like an origami airplane, a black bat in the bat black night.

I look at the faces around me. Each man has a lump in his cheek from the Tootsie Roll Pops a Marine passed out a few minutes ago. Their white eyes stare intently at the blossoming shape that's chewing up the stars. But they're not staring the way I'm staring. They're different. They're like kids waiting their turn on the roller coaster. And as the plane, 56 feet long, 40 feet wide, heads straight for us, I'm thinking: *We're all going to die.*

The place where that huge machine is meant to land stretches away only a few feet from us. I can see the dashed white foul line shining against the black nonskid deck ("foul" meaning: you step over it, you die). We are standing beside the arrival end of a very short runway built onto the deck of the boat. It stretches away toward the bow at an angle to the keel. The arresting cables, gray and greasy, slither away toward the starboard side. The theory is that the pilot will come in just right and the hook dangling from his tail will catch one of the four wires, which will stop him.

The rest of the deck is a chaos of action as planes refuel and taxi and launch, the A-6s and F-18s and the sexy old Tomcats (last of the stick-and-rudder airplanes), lumbering like slow beasts to the motions of the yellowshirts and the grapes (purple shirts) in their goggles and cranials, who rotate their gauntlet-gloved hands

in cryptic signals as the airplanes taxi and queue up for the cat. In the wild deck lights, with the cacophonous metallic music, it has the air of an atavistic ritual with mighty flaming totems.

If I turn around, I can just see the shooter peering out of his bathyscaph bubble in the deck plates in an eerie sulphur light. There goes another one now—*ka-chunk-whoosh!*—in a sleet storm of metal particles and this amazing hissing scream like someone's tearing a hole in hell. Then two angry afterburner eyes seem to hang motionless in the darkness, as the bat shape shinnies up a pigtail of smoke and is gone.

I hear Yankovich through the headphones inside my cranial and turn back to the F-18 bearing down on us. He's speaking over the telephone handset.

The pilot's quaking voice responds, "Three-one-four Hornet b-b-ball, three-point-two."

"Roger ball, wind twenty knots axial."

He's at a quarter mile, a child in a glass bubble, alone in the night, with the dying yellow stars of deck lights below, the cold wind whittling curls of cloud off the cheesy moon, the whistling thunder at his back, as he hurtles toward the heaving sea, straddling two gigantic flamethrowers.

At last we feel the concussion through our feet. The two-wire, that great fat cable, is turned into a singing liquid instrument by the shock, Ravi Shankar meets the Terminator. It catches the plane like a fish, playing it out 200 feet. The plane shudders all over, as the pilot (Del Rio by name—I had seen it painted on his cockpit rail) hangs in his harness in total G-shock for a moment before he can reach up with a hand that seems to weigh 40 pounds and pull the throttle back to idle. Now the yellowshirts wave him toward the huffer cart where the grapes will refuel him.

So that he can go up and do it again.

. . .

DEL RIO'S performance was a perfect act of survival. There he was, safe on the deck of a big boat. He climbed into a machine full of explosive fuel and had himself shot off into the night with a nuclear steam cat. Then, using only his skill and his superior emotional control, he brought himself back by the remarkable performance of catching a wire that he could not see with a hook that he could not see, using cues that made no natural sense, while going 150 miles an hour in the black-ass night.

Most of us will never get into quite the same jam as Del Rio, but every survival situation is the same in its essence, and so there are lessons to be learned tonight. The first lesson is to remain calm, not to panic. Because emotions are called "hot cognitions," this is known as "being cool." "Cool" as a slang expression goes back to the 1800s, but its contemporary sense originated with African American jazz musicians in the 1940s. Jazz was "cool" compared with the hot, emotional bebop it had begun to overshadow. Some researchers suggest that African American jazz musicians refused to let themselves get hot (get angry) in the face of racism. Instead, they remained outwardly calm and channeled emotion into music as a survival strategy in a hostile environment. They turned fear and anger into focus, and "focus" is just a metaphorical way of saying that they were able to concentrate their attention on the matter at hand.

I'd been searching all my life for that state of cool I'd seen my father exhibit, because it had brought him home in one piece. (Well, a lot of pieces, actually, but they'd knitted back together, more or less, by the time I was born.)

Only 10 to 20 percent of people can stay calm and think in the midst of a survival emergency. They are the ones who can perceive their situation clearly; they can plan and take correct action, all of which are key elements of survival. Confronted with a changing environment, they rapidly adapt. Those are the kind of pilots who

are supposed to be flying off the deck of the *Carl Vinson* tonight. Getting back onto the deck is the final exam.

I'D SEEN Del Rio earlier when he came in a bit late for the 1800 briefing in Ready Nine, a steel room where we were all slouched in comfortable maroon Naugahyde chairs, trying to look like we weren't scared out of our wits. Every few minutes the catapult shook the whole boat—*ka-chunk-whoosh!*—as if we were taking Exocet missile fire. Nobody even flinched. Yankovich had just begun the briefing for these, his students, when Del Rio walked in, having obviously gotten up from a nap. The side of his face still bore the imprint of the pillow.

"Hey, got a little rack burn there," Yankovich remarked. "Practicing for the luge run?" They call it the luge run because when you're trying to sleep in those tiny racks and the boat is churning along through the waves and planes are exploding off the deck over your head, it feels like the Winter Olympics meets World War III.

Yankovich, a square-jawed, athletic-looking youth with brown hair, green eyes, and a big grin, knew he could tease Del Rio, because in such a place of hypervigilance as this, where nothing, no matter how subtle, went unnoticed, everyone knew, without even having to stop and consider it, that to be able to drop off to sleep two hours before your first night carrier landing was to display a righteous and masterful state of coolness.

I'd gone to stay on the *Carl Vinson* as part of my lifelong fascination with that boundary region between life and death, that place where, to stay alive, you have to remain calm and alert. The reason it's a boundary region is that not everyone can do it. Some fail. Some die.

Shortly before I arrived, one of the pilots was on final, heading toward the deck. He let his descent rate get away from him and got low and slow, and well . . . some would use the term "panic," but

that doesn't tell us much. There were plenty of sensory signals screaming at him that he'd better get on the power. (His hand was already on the throttle. All he had to do was move it a few inches.) The LSO had hit the pickle switch, activating those glaring red lights that mean *You are not cleared to land!* The ball, an obvious light in a big Fresnel lens, was right in front of him, telling him he was low. And, of course, the LSO was also yelling in his ear. Somehow none of it got through.

The impact with the tail of the boat cut the plane in two, leaving his WSO (the guy in the rear seat) squashed like a bug on a windshield and sending the pilot skittering across the deck in a shower of sparks, still strapped into his Martin-Baker ejection seat. The pilot lived, and although I'm not sure he got to try that trick again, I'm reasonably certain that he got to have lunch with the captain.

But the most mystifying thing was how he could have kept on coming toward the boat in the face of so much information telling him not to. That was the real boundary I was after: What was he thinking? He was smart, well prepared, and highly trained. Something powerful had blocked it all, and something had forced him to reach for the deck despite all the information he had that it was a bad idea. It reminded me of a lot of accidents in the wilderness and in risky outdoor sports (river running, for example), where people ignore the obvious and do the inexplicable. That was the mystery I'd been trying to unravel.

WHAT THE PILOTS on the *Carl Vinson* know is this: Shit does just happen sometimes, as the bumper sticker says. There are things you can't control, so you'd better know how you're going to react to them. Yankovich explained it to me: "The launch bar breaks. The shuttle goes supersonic and hits the water brake. The water brake turns instantly to steam from all that energy and explodes. Deck plates come flying up, and you fly right through

the deck plates as you take off. So you eject and land on the deck." That's what's known in fighter pilot parlance as "Not your day." But there are also the things you can control, and you'd better be controlling them all the time.

So this is how Yankovich began the 1800 briefing in Ready Nine on the *Carl Vinson* that night: "It *will* scare the living shit out of you. If you taxi to the cat and you don't have a knot in your stomach, there's something wrong. It's like walking into a closet. You're going to go right off into a black hole. You're sitting there sucking oxygen, you'd better have a plan. Because if you don't, you're screwed, and then you're fucked."

We'd all seen the two helicopters orbiting out there (in case someone went into the water) and the big yellow crane to pick up planes that got stuck halfway over the side. And those were for the lucky guys. The first rule is: Face reality. Good survivors aren't immune to fear. They know what's happening, and it does "scare the living shit out of" them. It's all a question of what you do next.

The briefing was not about imparting technical knowledge. If those guys didn't know that stuff already, they wouldn't be sitting here with their names stenciled on the backs of their chairs (nicknames, actually: Hairball, Eel, Cracker, Sewdawg, Stubby). Part of the briefing was to remind them of stuff they knew already, the way a hymn does in church, but nothing too complex, because in what psychologists would call their "high state of arousal," nothing too complex was going to get through anyway.

No, the briefing was more about how Yankovich said things, and how he said them was with a dark, dark humor. It was a little ritual, in which everyone was reminded how to look death in the face and still come up with a wry smile. In a true survival situation, you are by definition looking death in the face, and if you can't find something droll and even something wondrous and inspiring in it, you are already in a world of hurt.

Al Siebert, a psychologist and author of *The Survivor Personality*, writes that survivors "laugh at threats . . . playing and laugh-

ing go together. Playing keeps the person in contact with what is happening around [him]." To deal with reality you must first recognize it as such.

In keeping with that view, the pilots on the *Carl Vinson* rarely talked earnestly about the risk this close to flight time. They joked about it instead. Because if you let yourself get too serious, you will get too scared, and once that devil is out of the bottle, you're on a runaway horse. Fear is good. Too much fear is not.

Yankovich continued his briefing: "The steam curtain comes up and you lose the yellowshirt for a minute. You'll be a hero real quick if you have the fold handle in the wrong position, so check that. Spread 'em, five potatoes, and you're all set. Okay, wipeout, the engines come up, see that they match. The safety guys jump up and make sure the beer cans are down. Tension signal. Hands you off to the shooter, and then: head back and four G's. Grab the towel rack. Touch the ejection seat handle and make sure you're not sitting on it. If you lose an engine on the cat, stroke the blowers, twelve-to-fourteen-not-to-exceed-sixteen. Rad Alt: You see you're descending, the wiser man will grab the handle."

What the hell did he just say . . . ?

The first time I heard a briefing like that, I was lost. But that's part of the point: only those who get it get it. A nod is as good as a wink to a blind horse. Just for the record, what Yankovich said was that it would be a very bad idea to try to depart with your wings folded up, as they are for taxiing around on the deck. It takes five seconds for them to lock down into place after you move the handle, so you count off as follows: one-potato, two-potato, three-potato . . . Then, after all the technical bits of the launch process have been checked (the wipeout with the stick to make sure your controls are moving freely, checking to see that the engines are both producing the same amount of power, and so on), you're going to hold onto a metal bar known as the towel rack (because that's what it looks like) to keep yourself from being slammed back by the force of the catapult. And just in case that isn't complicated enough, remember

that one of your engines could quit, in which case you have to put the other engine into afterburner (known as the blower because it blows) to get enough power to keep going up (but don't overspeed it, those engines are expensive). And since nothing ever works out as planned, check the radar altimeter, which will tell you if you're sinking, in which case wisdom would dictate that you depart the aircraft with some haste.

Of course, it would be unthinkable to talk like that because, for one thing, anybody could understand you. For another, it would be terrifying.

And after all that, there is still the little matter of landing the aircraft, because, as my father used to say, takeoff is optional but landing is mandatory. Yankovich explained the most salient points: "You're at a quarter mile and someone asks you who your mother is: *you don't know.* That's how focused you are. Okay, call the ball. Now it's a knife fight in a phone booth. And remember: full power in the wire. Your IQ rolls back to that of an ape."

It sounds as if he's being a smart-ass (he is), but deep lessons also are there to be teased out like some obscure Talmudic script. Lessons about survival, about what you need to know and what you don't need to know. About the surface of the brain and its deep recesses. About what you know that you don't know you know and about what you don't know that you'd better not think you know.

Call it an ape, call it a horse, as Plato did. Plato understood that emotions could trump reason and that to succeed we have to use the reins of reason on the horse of emotion. That turns out to be remarkably close to what modern research has begun to show us, and it works both ways: The intellect without the emotions is like the jockey without the horse.

My father didn't fly after the war, and he hardly ever talked about it as such, but when he did, I listened. He used to say, "When you walk across the ramp to your airplane, you lose half your IQ." I always wondered what he meant, but instinctively I felt it. When I was a new pilot, I'd get so excited before a flight that I'd get tun-

nel vision. I'd look at a checklist and be unable to read beyond the first item: Check Master Switch—Off. Sometimes I'd just sit there in the left seat, hyperventilating. After years of working at it, flying upside down, flying jets and helicopters, and having a few "confidence builders," I got to the point where nearly every flight was almost pure joy. I say almost because, even today, there is the residual anxiety before each flight, the knot in the stomach, that tells me I'm not a fool, that I know I'm taking a calculated risk in pitting my skill and control against a complex, tightly coupled, unstable system with a lot of energy in it. I'll always be the tiny jockey on a half-ton of hair-trigger muscle. Fear puts me in my place. It gives me the humility to see things as they are. I get the same feeling before I go rock climbing or surfing or before I slap on my snowboard and plunge off into a backcountry wilderness that could swallow me up and not spit me out again.

So Yankovich was telling his pilots something that was not only very important to their survival but that is scientifically sound: Be aware that you're not all there. You are in a profoundly altered state when it comes to perception, cognition, memory, and emotion. He was trying to keep them calm while letting them face reality. He'd seen people die. He knew the power of the horse, and these were his precious jet jockeys.

WHAT YOU really need to know for survival purposes—whether it's in a jet or in the wilderness—is that the system we call emotion (from the Latin verb *emovere*, "to move away") works powerfully and quickly to motivate behavior. Erich Maria Remarque described it perfectly in *All Quiet on the Western Front*, in which he fictionalized his experiences at the front in World War I:

> At the sound of the first droning of the shells we rush back, in one part of our being, a thousand years. By the animal instinct that is awakened in us we are led and protected. It is not conscious; it is far quicker, much more sure, less fallible, than consciousness. One cannot explain it. A man is walking along without thought or heed—suddenly he throws himself down on the ground and a storm of fragments flies harmlessly over him—yet he cannot remember either to have heard the shell coming or to have thought of flinging himself down. But had he not abandoned himself to the impulse he would now be a heap of mangled flesh. It is this other, this second sight in us, that has thrown us to the ground and saved us, without our knowing how. If it were not so, there would not be one man alive from Flanders to the Vosges.

Now we can explain it, at least better than we could when Remarque wrote his novel. Emotion is an instinctive response aimed at self-preservation. It involves numerous bodily changes that are preparations for action. The nervous system fires more energetically, the blood changes its chemistry so that it can coagulate more rapidly, muscle tone alters, digestion stops, and various chemicals flood the body to put it in a state of high readiness for whatever needs to be done. All of that happens outside of conscious control. Reason is tentative, slow, and fallible, while emotion is sure, quick, and unhesitating.

The oldest medical and philosophical model, going back to the Greeks, was of a unified organism in which mind was part of and integral to the body. Plato, on the other hand, thought of mind and body as separate, with the soul going on after death. Aristotle brought them back together again. But it seems that people have been struggling with the split for a very long time indeed, probably because they innately feel as if they have minds that are somehow distinct from their bodies. After the Renaissance, a Cartesian model emerged, in which the mind existed alone, had no location, and was completely independent of the body. To the neuroscientist, the brain is no longer seen as separate but is now considered an integral part of the body, no less so than heart, lungs, and liver.

Moreover, many researchers now regard what we experience as mind and consciousness as a side effect (albeit a useful one in evolutionary terms) of the brain's synaptic functioning. Certainly they all agree that the brain is as affected by the body as the body is by the brain. In fact, the brain is created in part by the body (the other main influence being the environment) in the sense that what the brain does or is capable of doing comes from its synaptic connections, and those connections are forged through what the brain comes to know of the body and the environment. Thinking is a bodily function, as are emotions and feelings.

As Antonio R. Damasio points out in his best-selling book on the brain, *Descartes' Error*, "I think, therefore I am" has become "I am, therefore I think." The brain is the only organ that has no clear function. It makes you breathe, but it's not part of the respiratory system. It controls blood pressure and circulation, but it's not part of the circulatory system either. The concept of body has no meaning without the brain and its extensive network of projections that reach to nearly every cell. As an eminent neuroscientist, Damasio is as qualified as anyone to define the brain, and he calls it an "'organ' of information and government." He put the word "organ" in quotes because it's not exactly an organ either.

The information he writes about is of three kinds: information about the environment, information about the body, and information about the good or bad consequences of interactions between the two. The term "government" refers to the fact that the brain's functions are largely regulatory in nature. The brain provides a continuously changing kaleidoscope of images concerning the state of the environment and the state of the body. It receives images from receptors in the body and from the sense organs that take in the outside world. (The images can be smells, sights, sounds, or feelings). At the same time, the brain provides a stream of outputs that shape the body's reactions to the environment and to itself, from adjusting blood pressure to mating. So the brain reads the state of the body and makes fine adjustments, even while

it reads the environment and directs the body in reacting to it. In addition, that process continually reshapes the brain by making new connections. All of this is aimed at one thing only: adaptation, which is another word for survival.

The brain does that job mostly through unconscious learning. It learns, or adapts, by strengthening the electrochemical transmissions among neurons and creating new sites at which neurons can communicate with each other. Axons (the fibers that send signals) grow and form new branches and synapses. Memory is the result.

Doing almost anything generates new links among neurons. The process of learning something and the essence of memory has been observed by neuroscientists in the lab: Genes make new proteins in order to store information, and they make new proteins in order to bring that information back as a memory. This process is called "reconsolidation," because, as Joseph LeDoux, a neuroscientist and author of *The Synaptic Self*, put it, "the brain that does the remembering is not the brain that formed the initial memory. In order for the old memory to make sense in the current brain, the memory has to be updated." This is one reason why memory is notoriously faulty.

There is a new split, too, between cognition and emotion. "Cognition" means reason and conscious thought, mediated by language, images, and logical processes. "Emotion" refers to a specific set of bodily changes in reaction to the environment, the body, or to images produced by memory. Cognition is capable of making fine calculations and abstract distinctions. Emotion is capable of producing powerful physical actions.

The human organism, then, is like a jockey on a thoroughbred in the gate. He's a small man and it's a big horse, and if it decides to get excited in that small metal cage, the jockey is going to get mangled, possibly killed. So he takes great care to be gentle. The jockey is reason and the horse is emotion, a complex of systems bred over eons of evolution and shaped by experience, which exist for your survival. They are so powerful, they can make you do things you'd never think to do, and they can allow you to do things

you'd never believe yourself capable of doing. The jockey can't win without the horse, and the horse can't race alone. In the gate, they are two, and it's dangerous. But when they run, they are one, and it's positively godly.

The horse can be amazingly strong. On Mother's Day 1999, Saint John Eberle and his partner, Marc Beverly, were climbing in New Mexico's Sandia Mountain Wilderness when a rock weighing more than 500 pounds fell on Eberle, pinning him. Beverly watched as Eberle lifted the rock off of himself. Of course, no one can lift a 500-pound rock. Then again, Eberle did it. When I was reporting on airline accidents in the 1980s, an investigator told me of finding dead pilots who had ripped the huge control columns out of jumbo jets while trying to pull up the nose of a crippled plane.

That horse can either work for us or against us. It can win the race or explode in the gate. So it is learning when to soothe and gentle it and when to let it run that marks the winning jockey, the true survivor. And that is what the dark humor of various subcultures is all about: It's about gentling the beast, keeping it cool; and when it's time to run, it's about letting it flow, about having emotion and reason in perfect balance. That's what characterizes elite performers, from Tiger Woods to Neil Armstrong.

There are primary emotions and secondary emotions. Primary emotions are the ones you're born with, such as the drive to obtain food or the reaction of reaching out to grab something if you feel yourself falling. But the emotional system of bodily responses can be hooked up to anything. Remarque's soldiers learned to connect a deeply instinctive emotional response to the whistling of a shell. There were no high-explosive shells when emotion evolved, but it is handily recruited into the task of avoiding them after only a few experiences to make the connection. The connection, once made, is so profound that taking the necessary action requires no thought or will; it works automatically. The proof that it's a secondary and not a primary emotion is that the new recruits didn't have the same reaction, and they died by the score as a result.

Remarque's observation, and the neuroscience that has confirmed it, can illuminate the way accidents happen. If an experienced river runner is pitched into the water, he will turn on his back and float with his toes out of the water, riding on the buoyancy of his life vest. An inexperienced one, like a drowning swimmer, will reach up to wave or try to grab something. Raising his arms causes his feet to sink.

Forty-four-year-old Peter Duffy died on June 16, 1996, while rafting on the Hudson River, and his accident illustrates how important it is not only to control emotions but to develop the appropriate secondary emotions. "He [Duffy] fell into the river," wrote Charlie Walbridge, who publishes *River Safety Report*. "Facing upstream, he attempted to stand, caught his right foot between two rocks, and was pushed under. His life jacket was stripped off, and he was trapped under three feet of water. . . . Foot entrapment rescues are very difficult. You might as well step in front of a speeding car as get your foot caught in a fast moving river. The victim was warned, but failed to follow instructions." Duffy knew, intellectually, what he should have done. But knowing was no match for emotion.

FEAR IS but one emotion. The instinct to reproduce is another, and it initiates a remarkably similar set of visceral responses, though with striking differences involving the sex organs and glands. Anyone who has ever fallen in love, fallen hard, knows what Yankovich means when he says, "Your IQ rolls back to that of an ape." Emotion takes over from the thinking part of the brain, the neocortex, to effect an instinctive set of responses necessary for survival, in this case reproduction.

During a fear reaction, the amygdala (as with most structures in the brain, there are two of them, one in each hemisphere), in concert with numerous other structures in the brain and body, help to trigger a staggeringly complex sequence of events, all aimed at pro-

ducing a behavior to promote survival; freezing in place, for example, followed by running away. When the reaction begins, neural networks are activated, and numerous chemical compounds are released and moved around in the brain and body. The most well-known among them is the so-called adrenaline rush. Adrenalin is a trade name for epinephrine, and adrenaline is a synonym for it, but neither is used much in scientific circles. Epinephrine and norepinephrine, which come from the adrenal glands, are in a class of compounds called catecholamines, which have a wide range of effects, including constricting blood vessels and exciting or inhibiting the firing of nerve cells and the contraction of smooth muscle fibers. But it is norepinephrine (not adrenaline or epinephrine) that is largely responsible for the jolt you feel in the heart when startled. Cortisol (a steroid), which is released from the adrenal cortex, also amps up fear, among its other effects. The net result of all the chemicals that come streaming through your system once the amygdala has detected danger is that the heart rate rises, breathing speeds up, more sugar is dumped into the metabolic system, and the distribution of oxygen and nutrients shifts so that you have the strength to run or fight. You're on afterburner. The knot in the stomach Yankovich mentioned results from that redistribution (as well as from contractions of the smooth muscle in the stomach), in which the flow of blood to the digestive system is reduced so that it can be used elsewhere to meet the emergency. (Excellent descriptions of this very complex system can be found in Joseph LeDoux's books, *The Emotional Brain* and *The Synaptic Self*. He refers to the amygdala as "the centerpiece of the defense system.")

Evolution took millions of years to come up with emotional responses. It has not yet had time to come up with an appropriate survival response for Navy fighter pilots on quarter-mile final, trying to land a 50,000-pound stovepipe on the heaving deck of a ship.

Peter Duffy's lack of control over his emotional response allowed him to drown himself in the Hudson River. The fighter pilot who slammed into the back of the *Carl Vinson* was the victim of a similar effect. A secondary emotion got the best of him on the approach to the boat. For whatever reason, he was not exercising the necessary control, and he let the plane get too low. I know how it works. I've done it myself. Most pilots have. Fear in the cockpit, as Yankovich put it, is a knife fight in a phone booth. You literally have to fight to move your frozen hand to correct the mistake that you see developing before your eyes. You are split.

Many times before, the pilot must have had the sensation of turn-buckle twisting terror, followed by the cool flood of relief upon landing. Even as the hormones produced under stress disrupt perception, thinking, and the formation and retrieval of memories, they set a potentially dangerous trap by exciting the amygdala. They help to dampen explicit (conscious) memory even while creating and recalling implicit (unconscious) memories with greater efficiency. As the fear rises, you become more unable to deal with it because you're not even aware of the learning that's propelling you. LeDoux refers to this as a "hostile takeover of consciousness by emotion" as the "amygdala comes to dominate working memory." The body knows where safety is, and when you're a rookie and really afraid, any successful landing carries with it an explosive, almost orgasmic sense of release. The pilot had developed a powerful secondary emotion, which told him that safety and even ecstasy could be found on the ground (or the deck) and that if he could just *get the hell down*, he'd be all right. He had a true and physical memory of that sensation, which was a powerful motivator of behavior developed by coupling that experience with a primary emotional state. He also had an intellectual knowledge that if you land when you're already low and slow, you might die. Unfortunately, he had no secondary emotion for that, since he had no experience of it. It was an abstract idea, forebrain stuff. It could not compete as a motivator of behavior.

When a pilot hits the "round down," as they call the back of the boat, it's called a "ramp strike." As one pilot who flew in the war on Iraq said, "Those are bad and deadly." He explained the way it

happens. The pilot focuses too much on the thing that he feels is most important at that moment: the deck. Home. It's called "spotting the deck," because it breaks up the natural flow of his scan, which ought to include his meatball, line-up, airspeed, altimeter, and angle of attack. Once he fixes on his landing area, he's done for.

The pilot's rising curve of fear went off the charts in one direction, while the rising curve of his motivation toward the deck went off the charts in the other. The jockey lost control of the horse in the gate.

Experienced travelers in the wilderness and people who engage in risky activities understand. In 1910, two British explorers, Apsley Cherry-Garrard and Robert Falcon Scott, set off for the South Pole. Scott died on that expedition. In praising his traveling companions, Cherry-Garrard wrote that they "displayed that quality which is perhaps the only one which may be said with certainty to make for success, self-control." How well you exercise that control often decides the outcome of survival situations. Whether it means making a split-second decision while scuba- or skydiving or keeping your head while stranded in the wilderness, it is the most important skill to take along. And with more and more novices going into the wilderness for fun, the severe penalties that come with a failure of control are becoming evident in the increasing number of search and rescue operations that are launched to save them or recover their bodies.

STRESS RELEASES cortisol into the blood. It invades the hippocampus and interferes with its work. (Long-term stress can kill hippocampal cells.) The amygdala has powerful connections to the sensory cortices, the rhinal cortex, the anterior cingulate, and the ventral prefrontal cortex, which means that the entire memory system, both input and output, are affected. As a result, most people are incapable of performing any but the simplest tasks under stress. They can't remember the most basic things. In addition,

stress (or any strong emotion) erodes the ability to perceive. Cortisol and other hormones released under stress interfere with the working of the prefrontal cortex. That is where perceptions are processed and decisions are made. You see less, hear less, miss more cues from the environment, and make mistakes. Under extreme stress, the visual field actually narrows. (Police officers who have been shot report tunnel vision.) Stress causes most people to focus narrowly on the thing that they consider most important, and it may be the wrong thing. So while the fighter pilot was fixed on landing, he very well might not have seen the lights or even heard the LSO's voice telling him to go around. The organism was doing what it knew how to do best: escape danger and get to safety as fast as possible. The rest of the input became irrelevant noise, efficiently screened out by the brain. So he hit the boat.

I did something very like that when I was a new pilot. I was on approach to landing at my home airport when the controller told me I was on a collision course with another plane. But I was so focused, so fearful, that I literally didn't hear him. I heard nothing, and I didn't even see the plane. He called me on the radio three times, and fortunately, my friend Jonas, who was sitting beside me, told me that the controller wanted an immediate right turn. The task of just getting the hell down had become so important—so emotionally motivated—that it occupied what neuroscientists call "working memory" (which in effect means consciousness or attention) to the exclusion of other stimuli. Only because Jonas was so close to me and could command my attention by punching me in the arm was he able to break the lock I had put on working memory.

Emotions are survival mechanisms, but they don't always work for the individual. They work across a large number of trials to keep the species alive. The individual may live or die, but over a few million years, more mammals lived than died by letting emotion take over, and so emotion was selected. For people who are raised in modern civilization, the wilderness is novel and full of unfamiliar hazards. To survive in it, the body must learn and adapt.

Although strong emotion can interfere with the ability to reason, emotion is also necessary for both reasoning and learning. Emotion is the source of both success and failure at selecting correct action at the crucial moment. To survive, you must develop secondary emotions that function in a strategic balance with reason.

One way to promote that balance is through humor.

EVERY PURSUIT has its own subculture, from hang gliders and steep creek boaters to cavers and mountain bikers. I love their dark and private humor, those ritual moments of homage to the organism, which return us to a protective state of cool. It unequivocally separates the living from the dead.

When I was fighting fires with the Chicago Fire Department, trying to learn something about how to be cool while going up in flames, I asked one of the men why he became a firefighter. "I like to wreck things," he said. As we smashed windows after putting out a house fire, I believed him, too. We had an old-timer at the firehouse I was working out of, Bernie was his name, who wouldn't even put on his Kevlar turnout coat. He'd fall asleep in the truck on the way to a fire, and when one of us commented on it, Bernie said, "I could sleep with my dick slammed in a door."

Bernie wasn't the only one, either. The guys called the big beer cooler in the kitchen "the baby coffin." They had dozens of names for different types of corpses—"crispy critters," "stinkers," "floaters," "dunkers," and "Headless Horsemen," just to name a few.

Butch Farabee, national emergency services coordinator for the National Park Service, told of taking his friend, Walt Dabney, on his first body recovery in Yosemite (there are a lot of them). They found the man they were looking for, Rick, after he'd been dead a week. "It was just terrible," Farabee said. "His body was quivering with maggots. He was as stiff as a basted turkey, too; we had to break his arms to get him into the body bag. When we lowered the body bag over a cliff, we dropped him. Walt and I had to spend the night out there with the body. I started talking to it, saying, 'Hey, Rick, how's it going today? Sorry about dropping you.' Walt thought I was either terribly disrespectful or out of my gourd. The fact is you have to deal with these things to the best of your ability. If you don't work with it, it'll get you. A dead body is not something you get used to."

Some high-angle rescue workers call body bags "long-term bivvy sacks." It sounds cruel, but survivors laugh and play, and even in the most horrible situations—perhaps especially in those situations—they continue to laugh and play. To deal with reality you must first recognize it as such, and as Siebert and others have pointed out, play puts a person in touch with his environment, while laughter makes the feeling of being threatened manageable.

The grotesque humor of the fighter pilots, then, that secret language, contains truths we don't even know we know. Moods are contagious, and the emotional states involved with smiling, humor, and laughter are among the most contagious of all. Laughter doesn't take conscious thought. It's automatic, and one person laughing or smiling induces the same reaction in others. Laughter stimulates the left prefrontal cortex, an area in the brain that helps us to feel good and to be motivated. That stimulation alleviates anxiety and frustration. There is evidence that laughter can send chemical signals to actively inhibit the firing of nerves in the amygdala, thereby dampening fear. Laughter, then, can help to temper negative emotions. And while all this might seem of purely academic interest, it could prove helpful when your partner breaks his leg at 19,000 feet in a blizzard on a Peruvian mountain.

It is not a lack of fear that separates elite performers from the rest of us. They're afraid, too, but they're not overwhelmed by it. They manage fear. They use it to focus on taking correct action. Mike Tyson's trainer, Cus D'Amato, said, "Fear is like fire. It can cook for you. It can heat your house. Or it can burn you down." And Tyson himself said that fear was "like a snap, a little snap of light I get when I fight. I love that feeling. It makes me feel secure

and confident, it suddenly makes everything explosive. It's like: 'Here it comes again. Here's my buddy today.'" It's a dangerous place to be, too. Control can easily slip away, as Tyson's unusual behavior will attest.

I've spent the better part of my life working around people who risk dying a horrible death of their own making. They see it. They're near it. They all have friends who have gone that way. And they all have a strategy for avoiding it—a strange amalgam of superstition, knowledge, illusion, and confidence. But everyone begins with the same machinery, the same basic organism, and when it's threatened, whether in pursuit of pleasure, for duty and honor, or by accident, the organism reacts in predictable ways. It is only by managing and working with those predictable, inborn reactions that you're going to survive. You can't fight them, because they are who you are.

RIGHT BEFORE the planes launched off the *Carl Vinson*, following the 1800 briefing in Ready Nine, I went to dinner with Mike Yankovich and a group of fliers in the officers' mess, ensuring that we'd have that knot in our stomachs. After we'd finished eating, a waiter in a white coat came to the table, and every officer sitting around me said one word to him: "Dog."

When they'd finished, the waiter turned to me and asked, "Dog, sir?"

"Sure," I said. Then, as the waiter left, I asked Mike, "What's dog?"

"Auto-dog," he said. "It's soft-serve ice cream. Like Dairy Queen."

I asked why it was called dog.

"Go over and watch it come out of the machine," he said.

Survival, then, is about being cool. It's about laughing with an attitude of bold humility in the face of something terrifying. It's about knowing the deepest processes of the brain, even if, as non-

scientists, we can explain them only through the darkest humor imaginable.

So here they are, these F-18 pilots, about to go up and possibly die doing something horribly risky in the unholy night, and they are joking that for dessert they eat feces.

It's an old habit. Remarque wrote, "We make grim, coarse jests about it, when a man dies, then we say he has nipped off his turd, and so we speak of everything; that keeps us from going mad; as long as we take it that way we maintain our own resistance."

AN HOUR after dinner, I stand on the LSO platform and Yankovich holds the pickle switch high, the heavy telephone handset pressed to his ear. We watch a nervous pilot come wobbling in. I haven't even mentioned the remarkable skill and perception it takes for Yankovich to know, by eyeball alone in the asphalt night, whether or not the black bat we see unfolding before us is going to hit the correct wire. But this pilot's approach looks really bad. Even I can tell.

Through my headphones I hear Yankovich say, "Look out, here comes Ray Charles."

As he releases the pickle switch trigger to send the pilot around for another try, Yankovich does a few dance steps, his head lolling around like a blind man's, reeling there on the tiny LSO platform seven stories above the heaving of the meterless sea.

Yankovich and I turn and watch the jet shoot off the other end of the boat, engines roaring. The plane dips a bit, and we wait until it's securely back in the air. Then Yankovich says to me, "Boy, did you see him *settle*? He'll be picking the seat cushion out of his asshole about now."

FIFTEEN

THE DAY OF THE FALL

THAT VECTOR LEADING to survival, which Joe Simpson and Steve Callahan took, stretches back into childhood. To enter the wilderness, to challenge the forces of nature, we must be worthy, and worthiness doesn't come from a weekend survival school, the Eagle Scouts, or even a few years in the military. Peter Leschak wrote, "In fire and other emergency operations, you must not merely tolerate uncertainty, you must savor it. Or you won't last long. The most efficient preparation is a general mental, physical, and professional readiness nurtured over years of training and experience. You live to live. Preparing is itself an activity, and action is preparation." He's talking about making himself worthy of survival, and his way of doing it in the wilderness is with the added burden of fire, just as my father's manner of flying, itself an act of survival, was to do it while people were shooting at him.

I first learned about being worthy from my father. I learned again when I became a pilot. And again when I became an instrument pilot, a commercial pilot, and then an aerobatics pilot. Flying bush pilot planes in the Arctic regions of Alaska—the Brooks Range and on up the coast past Wainwright to Barrow—I learned, too, about indifferent forces that punish inattention or arrogance. When I was competing with the International Aerobatics Club, even as I saw those around me being killed, I realized that I had to be at once bold and humble, that I had to open my mind to this energetic world, which never sits still, the complex churning of its materials, from which I'd made my own Braille language of life.

My father was too badly injured in his crash to continue as a pilot and went back to school to become a medical school professor, a scientist. I followed him to the University of Texas, then to Baylor Medical School and at last to Northwestern, and grew up working in his labs, eventually operating an electron microscope and peering with him into the very machinery of human cells. I'd go to his classes so that I'd be able to speak his language, the language of science. When he took the podium, he always began by saying, "Fellow students . . ." He taught me the humility of knowing that we were all, always, students, and that to stop being a student was to stop living.

When he turned seventy years old, I was hot and heavy on the contest circuit with the International Aerobatics Club. I took him up for his birthday to show him my routine of spins, loops, rolls, hammerheads, Cuban eights, Immelmans, and split-S's, a continuous corkscrewing of the airplane, which let one maneuver lead into the next in a sort of high-octane gasoline ballet.

A plane is a noisy, stinking thing to those on the ground, but to the pilot it can sometimes seem absolutely silent, like a sailboat (until you hear the wrong sound, and then it gets your prompt attention). On that flight, my father sat quietly in the tandem seat as I ripped the plane through four and five G's, climbing, descending, rolling, and falling through the hard air, switching blue sky for green earth a dozen times a minute as the smooth beauty of the whirling world filled me with wonder and joy. It didn't feel as if I flew the plane. It felt as if I'd become the plane; the wingtips had nerves.

My brother Michael, one of my father's students and a physician, had expressed some concern that the G-forces might be bad for our father at his age. But when I was done and my wheels barked onto the asphalt, my father climbed out and said, "You're a really good pilot." He did not give praise idly. It was one of the most important moments in my life. I was worthy. Air worthy.

WHEN PEOPLE hear about my father's survival, they think of the long fall from the sky or the moment when that German peasant, standing on the stub of wing, pulled the trigger on his old pistol and it misfired. But those singular events are not the point.

Sure, it takes luck to be a survivor, and luck is nothing more than the accumulation of circumstance throughout a life. One year, I arrived in Glacier National Park to watch the biggest snow clearing operation in the United States. The big bend near the apex of Going To The Sun Road can be 100 feet deep in snow, and the road is only two lanes wide. Avalanches regularly rip through there, sometimes sweeping men and machines off into the couloirs. As the weather warms, the cliffs calve rocks the size of automobiles. As I settled in with the crew, the snow boss told me that the previous season, on the day the road opened, a 30-ton rock had fallen onto a car, killing a Japanese tourist while sparing his wife in the passenger seat next to him. And I thought: All his life he drove along roads to get to that exact spot at that exact moment. And so did his wife, who survived. But her survival didn't end at that moment, it began there. Her task was to survive the terrible event, to go on and live her life. So with my father. The lesson of survival that I took from his story was not that he was so lucky as to fall 27,000 feet and not die. It was that he had to have the strength to go on and live sixty more years after losing his beloved brothers, his crew, after breaking his body into so many pieces, after prison camp. He was twenty-three years old and had to forge a strategy for surviving everything else. I'd seen many of his fellow combatants simply give up, collapsed old men, walking ghosts. That the German peasant's old and badly abused pistol jammed was sheer chance. Everything after that was not.

As he lay there in a heap by the rudder pedals, my father watched his would-be assassin with a sort of dim, swooning amusement as the man tried to get the firing mechanism sorted out. Then my father began laughing, which infuriated the German, who was cursing a blue streak. My father was able to understand German reasonably well and was struck by the movie-like quality of the scene. It was all a bit much: to get blown out of the sky and fall 27,000 feet without a parachute—and survive—only to land in the exact spot where there's a pissed-off farmer with a gun. He couldn't stop laughing. It was the beginning of his salvation, not the end. Humor was the key.

A German officer appeared and told the farmer that he could not shoot the American pilot, who was officially a prisoner of the German Reich. There was an argument. Harsh words. The peasant said that the pilot deserved to die for bombing them, and anyway, he wasn't going to live long. Look at him. Indeed, his nose had been cut off, he was bleeding profusely, and he was crumpled in a bloody, mangled heap. He was obviously delirious. Look, he's laughing.

While they were arguing about his fate, Mrs. Peiffer came out from her farmhouse outside the town of Neuss (now a suburb of Düsseldorf). The front half of the B-17 had come down on the side of a railroad embankment that bordered her land, and she was hopping mad. (The aft portion of the plane had crashed about half a mile away with some of the crew, one of whom had lost his legs somewhere in the sky.) She'd seen the whole thing from her house. For some time now she had refused to take shelter against the air raids. The German soldiers were all young, and the woman took advantage of her age, ordering them to care for the wounded pilot.

. . .

MY FATHER awoke in the snow, laid out with some of his dead crew. "I was in and out of consciousness," he told me. "But I was deliriously happy. Maybe it was because of my injuries. Maybe someone had given me morphine. I don't know. But I felt no pain, and I was just happy to be alive."

But to his left was Colonel Hunter, his commandant and co-pilot for the day. My father was captain of the ship, and as such, he was responsible for the safety of all on board. Now Hunter lay dead in the newly fallen snow, and the lieutenant couldn't help feeling guilty about how happy he was to be alive when all the rest were dead.

While he struggled with the confusing emotions, he began vomiting blood. He concluded that he must have internal injuries. Suddenly, his joy turned to terror as he realized that he was going to die. After all that, to perish in the snow. He began crying, and a German soldier, himself no more than a boy, came over to see what the trouble was. He reached down and flipped the American boy's nose back into place for him. Although it had been cut off by flying glass or metal, it had been hanging by a flap of skin, and now my father understood: He'd been lying on his back, swallowing all the blood from his flesh wound. That's why he was throwing up. Once more, he was overcome with joy: He was going to live!

He passed out again.

Mrs. Peiffer ordered the German soldiers to carry the wounded American lieutenant into her house, and when he awoke the next time, they had laid him before her fireplace. She gave him tea and a cigarette. As both his arms, both hands, both feet, both legs, and numerous ribs were broken, she had to hold the tea and help him smoke his cigarette. And he thought: This isn't going to be so bad. Maybe this is what German prison camp is like, tea and cigarettes before a cozy fire.

Then a truck was pulled up to the house and he was thrown into the back of it and driven overland. "As soon as we started bouncing across that frozen ground," he said, "I could feel the broken bones grinding against each other." The pain was so excruciating that he couldn't stop screaming until he mercifully passed out once more. But each time he came to, he awoke screaming.

At last they arrived at the prison camp near Gerresheim, where he was thrown in a basement with prisoners from all over Europe and America. By chance, one of them, Dr. Géri, was a member of the French Resistance. He was a surgeon and had been allowed some meager medical supplies with which to treat the wounded. There were also a few male nurses who were allowed to work in the crude lazaret.

Dr. Géri wired my father up with piano wire and plastered him all over until he looked like a great albino spider hanging from the basement ceiling beneath a single bare globe, which was strung on a length of electric cord.

In the ensuing days and weeks, Dr. Géri would have to tighten the wires—to tune the piano—and my father would scream as he had not screamed since the truck ride from the crash site to the cellar. When he begged for morphine, Dr. Géri told him, "Is that the way the babies scream when you bomb them? Morphine is for heroes. Not for American fliers who bomb babies." Then he'd turn a wire tighter, and my father would scream louder. Dr. Géri was a pacifist. So strange, thought my father, to be tortured by the Allies, not the enemy. He had to love and hate Dr. Géri.

The Eighth Air Force continued to stage its bombing raids on the area, and when the bombers rumbled overhead, the light globe above my father's bed would start swinging as the 500-pounders detonated around the camp. He'd watch the light bulb and listen to his piano wires play a bizarre and dissonant tune, like Bartók; a prelude, it seemed, to a direct hit that would blow them all to bits. If the bombs were close enough, the light would swing so hard that it would shatter against the ceiling and shower him with broken glass.

By the time spring came to the German farm fields, my father's bones had knitted, and one of the very muscular male nurses, a French prisoner named Henri Moreou, would carry him upstairs like a baby and set him in the sun beneath a blanket. One day in April, he was sitting in his chair in the sun, the blanket over his knees. It was a perfect day, with just a few high clouds. A front had come through and cleared away the smells of war, which sometimes hung over them. The sun was warm and the air was cool. My father was left alone with the guards, who were scattered about some distance away. He watched the far hills, daydreaming and almost dozing off. Most of the dreams were about food. The German guards ate potatoes, which was all that was left in the war-torn countryside, and they gave the potato peelings to the prisoners to make a thin soup. Slowly starving, my father found that he had become obsessed with mayonnaise, which he loves to this day. At other times, he'd daydream about his mother, Rosa, who grew roses and painted and made pottery, or the girl back home, his fiancée and eventually my mother, Anna Marie Mosher (whose grandfather was a railroad worker and had been run over by his own train—on his sixtieth birthday).

My father would remember his old dog, whose name was GI, and his father, Agustín, coming home to Rosa after work, where he made barbecue in a stone pit over a mesquite wood fire and sold it to the workers in the area. Agustín would sweep the front porch and steps in the afternoon light and then continue sweeping down the sidewalk to the dirt street in the barrio where they lived, sweeping and sweeping, between the rows of Rosa's roses.

My father could hear the soft snap of playing cards to his left, where two guards were engaged in a game. To his right, some others were just standing, staring into space, and two more were sharing a cigarette. The hills were turning green. He felt calm, almost happy, and quite distant from the incessant pain of an empty stomach and knitting bones.

Something caught his eye on the top of the farthest hill. He saw

something move. As he watched, a figure seemed to grow out of the hill. A man under a burden, walking, coming from the far side, now cresting the hill, now advancing over its near side. The figure was still too far away for my father to tell anything about it, but even at that distance, something about it struck my father as odd. Nothing ever came over those hills. And there was just something familiar in the movement. Impossible. He was too far away to distinguish any details except that the man labored under a large pack and other gear.

But my father was idle, dozing, and he had nothing to do other than watch as the figure came on and on. He didn't know how long he watched the figure grow out of the new green landscape. It fell into a depression between two hills and vanished for a while. Then it reappeared over the next rise, larger, more distinct, and my father knew that there was definitely something about it. He sat forward in his chair: something about the man's burden that my father just couldn't put his finger on. He wondered if he was hallucinating from starvation.

Then the guards noticed, too; the card game stopped and the others stood at the ready. A soldier ground out a cigarette with the toe of his boot and blew a thin stream of blue smoke into the windless air. His hand came up to shade his eyes as he watched. They formed a still tableau as the lone figure advanced across the hills, coming now through an open field of yellow flowers perhaps an eighth of a mile wide. He was dressed in green-gray, that much was now clear, and he was armed. The top of his head was round, and suddenly my father could see why: He wore a helmet. The field of yellow blossoms seemed so enormous and bright, as if the figure floated on a bowl of liquid sun.

The guards drew together into a group and placed their Schmeizers at the ready. Everyone was fixed so intently on that lone figure, that personage, arriving, arriving, taking so long to arrive, and the accumulation of detail and meaning as he grew larger, and the vast landscape around him and the yellow field of

flowers that seemed alternately to swallow and offer him up as if he floated on an ocean wave. He might be an ant for all his mass, and yet how he commanded their attention, as if they were the members of a primitive cult awaiting at long last the returning god of their mythology.

Perhaps those boys knew long before my father did what they were looking at. The man was only 200 yards off when the injured flier began to put together in his mind what he was seeing. And yet his muddled mind would not believe it, and so he just stared dumbly.

Then he could hear the clanking, canteen and bayonet, the tinkling of dog tags, P-38, tin cup. All the gear made a sort of rattling, atavistic music, and the big rucksack shifted, boots shuffling, with that inimitable slack-limbed indolence—no, no one else can walk like that, pose like that; it was unmistakable, for there was only one breed of human being the whole world over who could be so unstrung yet graceful. Movies have been made, novels written, about nothing more than that insouciant walk, that very carefree nonchalance with which he ambled toward them, that cool.

He was a mere 50 yards off when my father's mind finally engaged, and at that moment he looked around at the guards, fully expecting to see them draw back the slides on their weapons and open fire. But what he saw instead was the young faces, upturned, the slack expressions, not of fear, but the relief of thank-God-it's-over, and as the lone figure advanced, they threw their weapons to the ground and put their hands in the air.

The single GI sauntered straight and cool and casual toward them, and the guards stood stock-still in their surrender, as the American Army scout crossed the compound yard toward my father, came right up to him, and cast his shadow over him so that my father could at last see his face—big, crooked teeth in a leather grin; soft, indefinite-colored hair falling across his tanned face under his helmet; M-1 rifle slung casually over his arm.

Chewing gum.

He grinned down, hardly glancing at the Germans. He shook a smoke out of a pack of Luckies and offered the wounded flier one. My father reached out and took it with his left, his good hand, and the GI flicked a Zippo with that inexpressible dexterity of the combat veteran and lit the two smokes, his own, then my father's, cupping his hands tenderly around my father's thin fingers. They both blew smoke out and stared at each other.

"Hello, GI," the GI said.

"You're a sight for sore eyes," my father said.

"You look like you could use a bite."

"Sure could." He was shaking all over, beset by a fever of unknown origin.

The GI dropped his pack, dug around in it, and came up with cheese and a chunk of coarse bread. He tore off some bread, handed it to the starving flier, and flicked out his gravity knife like a switchblade to cut a thick slice of cheese. My father fell to eating it like a dog, gnawing furiously, groaning out loud because he couldn't help himself, glancing up from bite to bite as if someone might snatch it from him. He noticed how sad the GI's grin was, and in it he saw how bad he must look, a ghost of himself, this flier in a threadbare uniform, torn and bloodstained. He had been taken prisoner weighing 170 pounds and went home at 119.

FAMILIES, TOO, develop their own survival rituals, their codes of integrity, ideas of what it means to be worthy. When I was growing up, my mother would make a special dinner every January twenty-third to celebrate the date my father was shot down, and each year I'd hear a little bit more of his improbable story. (I'd sometimes hear my father wake up screaming at night, too.) And although I knew the stories were true, I'm not sure I could ever quite square the image I had of that boy falling out of the sky with the man he would become. The proof was always before me. His right arm, the one that was fixed with a stainless-steel pin, moved only a few

degrees at the elbow. When he dove off the diving board into the swimming pool, I could see how crooked it was. (Amazing that he could walk, let alone dive.) And when I was very little and came up only to his knees, I saw the horrible scars running the length of his shins. His feet were so deformed from the impact that they caused one of my brothers, Philip, to burst into tears as a toddler. My father had to have special shoes made just to walk without pain.

The lesson, which it took me many decades to learn, was that he was here among us because he was cool. He was cool now and had been cool at the moment of his death, saying nothing more than had to be said: "This is it," and, "Bailout, bailout, bailout," as prescribed on the checklist before him. As prescribed by the pilot's unspoken Stoic code of conduct. He received the Distinguished Flying Cross not for that last flight but for an earlier time when he was shot down and saved his crew through cool and skill and naked nerve. With two engines out, his radios gone, his plane's wings and tail shot to pieces, leaking fuel at a prodigious rate, he was inexorably descending through an overcast, recognizing that he'd have to order his crew to bail out, probably into the icy English Channel. They had no idea where they were, when he spied a rocket punching through the overcast and turned toward the pink glow. His wheels barked onto the asphalt runway somewhere in Belgium, just in time for everything on his airplane to quit. His happy crew partied there until dawn, when the sound of wooden clogs stirred them to head for bed as the local people went to work.

I have a photograph of him with three members of his crew, taken at the base in Nuthampstead before a flight in 1944. Charles Kahouri, who at that time was pilot to my father's co-pilot, stands on his right. To his left are Jack Layden and Jack Kutchback, both of whom flew the last mission. Those three men are neat and severe in their regulation uniforms, their hats on straight, their postures military. They look, well, nervous, if not afraid, even as they try to smile. My father, by contrast, is not only out of uniform, he has no shirt on. He wears Ray-Ban Aviators, his hat

cocked at a rakish angle, one foot swung out before him as if he's about to do a little dance step. He's grinning like the devil that I'm told he was. I always looked at that photo and thought: What in hell was he thinking? Many years later, I looked at it again and realized that the other three were dead and he was alive.

He hadn't let his injuries stop him, either. Sunday morning, early, he'd suddenly appear in the kitchen with a top hat and cane, doing a soft shoe and singing, "Gimme that old . . . soft . . . shoe . . . ," making drum sounds and whistling the backup band arrangement. We'd squeal and clap, and then he'd twirl the cane around his finger like Diamond Jim the Riverboat Gambler. He'd throw down the cane, grab up three eggs from among the dozen my mother was about to cook for breakfast, and he'd begin juggling, even as she protested that if he broke them, he'd have to go out and get some more, and she wasn't about to clean this floor again, either.

Break them? Unthinkable.

Just to prove it, he'd juggle them behind his back. I had no doubt that he had been granted all of those abilities in one fell swoop by flying an airplane and being shot down. He had gone out to meet something terrible, and he had mastered it and had come back to be treated like a king by all those around him, to sit and smoke and to be suave, smart, handsome. The same innate focus and attention that kept him from dropping the eggs, that same ability to be an elite performer, had also allowed him to read the *Journal of Cell Biology* while five (and then six, and then seven) sons raged around him, wreaking havoc. That couldn't be any harder than reading an emergency checklist inverted at 27,000 feet with your left wing shot off while you were spinning hard enough to suck your eyeballs out.

I knew that there was little hope that I would ever have such righteous stuff. Certainly, he was never going to explain it to me. Aviators didn't chat like that. But the whole thing was irresistible. I was a child, but before I could even put a name on it I was determined to steal my share.

So it was that I ended up riding dirt bikes at 125 miles an hour on a dry lakebed in the Mexican desert in a whiteout dust storm. So it was that I wound up on a knife-edge cliff in a blizzard with no tent in the middle of the night on the highest point east of the Rockies. So it was that I found myself on a naked heap of chert somewhere above the Arctic Circle, clutching an automatic shotgun jammed with nine rounds of alternating double-ought buck and deer slugs, awaiting the approach of a grizzly bear who'd caught the scent of our fresh caribou meat. So it was that I wound up flying upside down, 10 feet off the ground, going 150 miles an hour, through an obstacle course in the Santa Susana Mountains in California. Then I'd write about it as best I could and give it to my father. Every ex-combat pilot has what they call an "I-Love-Me Room." In my father's den are his wings and memorabilia and the photos of him and his dead crew from the bad old Army Air Corps days. Across from that wall of glory, on a bookshelf, he keeps all the things I've written. My daughters tell me that I have the job every thirteen-year-old boy wants. My ex-wives tell me that I never grew up.

Once he was shot down, my father's survival was not a matter of crawling up a mountain or catching fish in the Atlantic, as it was for Joe Simpson or Steve Callahan. But I have to think that his whole life had led him to that one point in an unconscious sequence of circumstances, judgments, and acts, which combined in the thrall of the forces that Clausewitz called friction and chance, the bipolar pull that circumscribes and defines the universe. The road that leads a Japanese tourist to drive beneath a falling 30-ton rock in Glacier National Park stretches back to the first divisions of a zygote, even as it begins scrawling out the definition of itself in lines of sugarcoated DNA.

That doesn't mean everything is fated; indeed, just the opposite. It means the systems we live with are unpredictable and therefore have profound and unexpected results. But there are patterns in there, too. The same boy who rode his bicycle off a garage roof to

see what would happen, who joined the cavalry in high school to feel the heat of the horse and the kick of the gun, had at last achieved what Leschak calls "an almost mystical plane of awareness" in learning to lean on the wind, accept the speed and noise and smoke, and to aim carefully and shoot straight while both calming and thrilling to the complex ballet of which he was the silent center, the jockey to the horse. To fly, then, he had to do the same again in the smell of oil, in the heat and smoke, and then once more teach his spirit to fly straight and level and calmly terrified while explosions rocked his ship and razor-sharp, red-hot fragments of supersonic flak penetrated the thin aluminum skin of his aircraft, punching smoky fingers of light into the darkness within. And when one of those fingers pointed out a man, it would mean to select him for sacrifice. The sweet, sharp, continuous anguish of such learning had allowed him to will himself alive in the impossible dream of air. "He worked out his own salvation."

Survival is a continuous spiritual and physical act that spans a lifetime. Riding his bicycle off the roof and all the rich spinning of a whirlwind childhood taught my father how to fall. Saving his crewmen in Holland made him worthy to lose them over Neuss. With good-hearted determination, he not only rebuilt his own life, he rebuilt his crew, siring eight sons. Sadly, the first died in infancy. But with my father as captain, our family made nine, which was the very number of men he had lost.

FIRST LIEUTENANT Federico Gonzales was liberated from the Gerresheim camp on April 17, 1945. It was almost exactly thirty-four years later that I was writing for *Playboy* magazine, doing research on airline crashes and studying the flaws of one particularly notorious airplane, the McDonnell Douglas DC-10, a popular jumbo jet that had suffered more catastrophic in-flight failures than any other modern jetliner. As a contributing editor for the magazine, I was planning to join my colleagues on a trip to the

American Booksellers Association Convention in L.A. Shel Wax, our managing editor, was going. His wife, Judy, was going with him to promote her first book, which had just been published. Our fiction editor, Vickie Chen Haider, was going, as well as our foreign rights editor, Mary Sheridan. I was planning to join them on American Flight 191 to Los Angeles on the afternoon of May 25, 1979. But when I found out the airplane was a DC-10, I told Shel I'd thought better of it. He laughed and said I'd been reading too much. He was right, I had. Although I'd been flying in and out of crowded airspace in a small Piper aircraft for several years by then, the idea of getting on a DC-10 terrified me.

That morning, I sat in Shel's office on the tenth floor of the old Palmolive Building, where *Playboy* had its headquarters. I was talking to Judy, who was a good friend. She signed a copy of her book for me. I said good-bye to Vickie, who had a one-year-old son. She and I often rode the bus to work together. I stopped in to see Mary, too, and wish her a good trip. I watched Shel and Judy go out to the Art Deco elevators walking arm in arm. I remember thinking how cool it was that they were still so in love, whispering and laughing like teenagers as they waited for the elevator.

The flight lasted thirty-one seconds and crashed in an open field, just missing a fuel-tank farm and a trailer park. The plane rolled nearly inverted before it hit the ground. Everyone was killed, 273 people, making it the worst aviation disaster in American history even now, nearly a quarter century later. I lived only twenty minutes from the crash site and was there to report on it just after the fire was put out. Vickie, beautiful Vickie, with her straight black Chinese hair, had to be identified by a bit of dental-work.

The event launched me into an even more intense period of flying and writing about aviation. But I was always haunted by how close I'd come to making my life exactly match my father's. I had always followed him, followed his example, tried to be like him. I thought of myself as the hero's apprentice. But later on, I began to

see that I had it all wrong. He was no hero. He was a survivor. And somehow I had worked out my own salvation, my survival, in a long series of acts, conditions, and judgments leading up to the single word I spoke to Shel when he found me sitting on his raw silk couch with his wife and asked me if I didn't really want to come with them to L.A. that afternoon. My answer was: No. I had come to be a survivor, too, and not even the old man was the old man any more.

ALL OF the acts, conditions, and judgments of a lifetime had put my father on a vector toward a spot in space and time where an 88-millimeter shell happened to be rising toward 27,000 feet above mean sea level on January 23, 1945. People have long accepted, at an unconscious level, the essence of theories such as chaos and complexity. Many stories have been written about what would happen if you could travel back in time and change just one thing, no matter how trivial. The doggerel verse that begins: "For lack of a nail a shoe was lost/ For lack of a shoe a horse was lost . . ." captures the idea. If Colonel Hunter had elected to fly left seat instead of right that day, I would not have been born, and you would not be reading this book. If I had been assigned to another story in 1973 instead of airline safety, I wouldn't have known about the DC-10 and would have gotten on that plane with Shel and Judy. And you would not be reading this book.

But survival in the moment, or over hours or days or months, whether that survival comes about by chance or effort or an inexplicable combination, must be followed once more by the same struggle that led to that point. As Solon pointed out to Croesus, a life cannot be judged until it is complete. My own survival in not going with Shel and Judy, Vickie and Mary, and in all sorts of other situations, is something I'm still working out. If my father's fall planted the seeds of this book, then the crash of American Flight 191 fertilized them and made them grow. In a world gov-

erned by an ineluctable order, which pushes through Newtonian physics, Einsteinian relativity, thermodynamics, and quantum theory with all the certainty of gravity or any other encroaching natural law, nothing can truly be said to happen by chance, which is just a word we invented to explain the troublesome boundary between order and chaos. Fate, then, turns out to be the struggle, the tension, between the natural law that dictates that everything should proceed toward disorder (entropy) and the natural law that dictates that everything should be self-organizing (complexity theory). If those are, indeed, the two overarching natural laws, then everything becomes clear and we go forward into the past to find the Chinese concept of yin and yang.

Certainly, my father's survival did not end with his falling from the sky. I watched it take shape, even as it shaped me and my world. It began there, a man with broken legs and broken arms and broken feet and ribs, his nose stuck back on almost as an afterthought by a boy who happened by as he was weeping. Then he was packaged and shipped home. (He told me that the most fearsome flight he'd ever had was not when his wing was shot off. It was the flight home when they encountered a thunderstorm and he sat watching the wings make wild excursions up and down, emptying the ashtrays on that old DC-3.)

He picked himself up and strove endlessly to grasp the world in which he found himself. I saw him rise from the grave and earn a Ph.D., find a job at a prestigious medical school, publish scientific papers, send platoons of new doctors out the door to heal, and in his spare time, learn to become an excellent potter, to paint and draw and sing and play piano, carve sculptures out of wood, build model planes, tinker together our first stereo set, and drive his noisy family all over the continent in a 1956 Volkswagen bus looking for adventure. I saw him constantly and hungrily grappling with his world, trying everything, sampling everything, tasting the world, to understand, to feed his insatiable curiosity, even as he

sat in darkness and peered through an electron microscope at the inner secrets of a cell.

We spent one whole summer carving boomerangs out of various kinds of wood and studying the aerodynamics to explain why they returned instead of doing what Newton said they'd do: keep going.

He was the only man I knew who'd read *Finnegans Wake* from cover to cover. He reminded me of the Great Santini, who told his son, "Eat Life, or Life will eat you." In his Zen fashion, my father would say, when I did something inexplicably wild, "Okay, but if you break your leg, don't come running to me."

I saw that catastrophe had not broken him. He was the student who learned how to duck and therefore no longer needed swordsmanship. Adversity annealed him. It gave him endless energy. He taught me the first rule of survival: to believe that anything is possible.