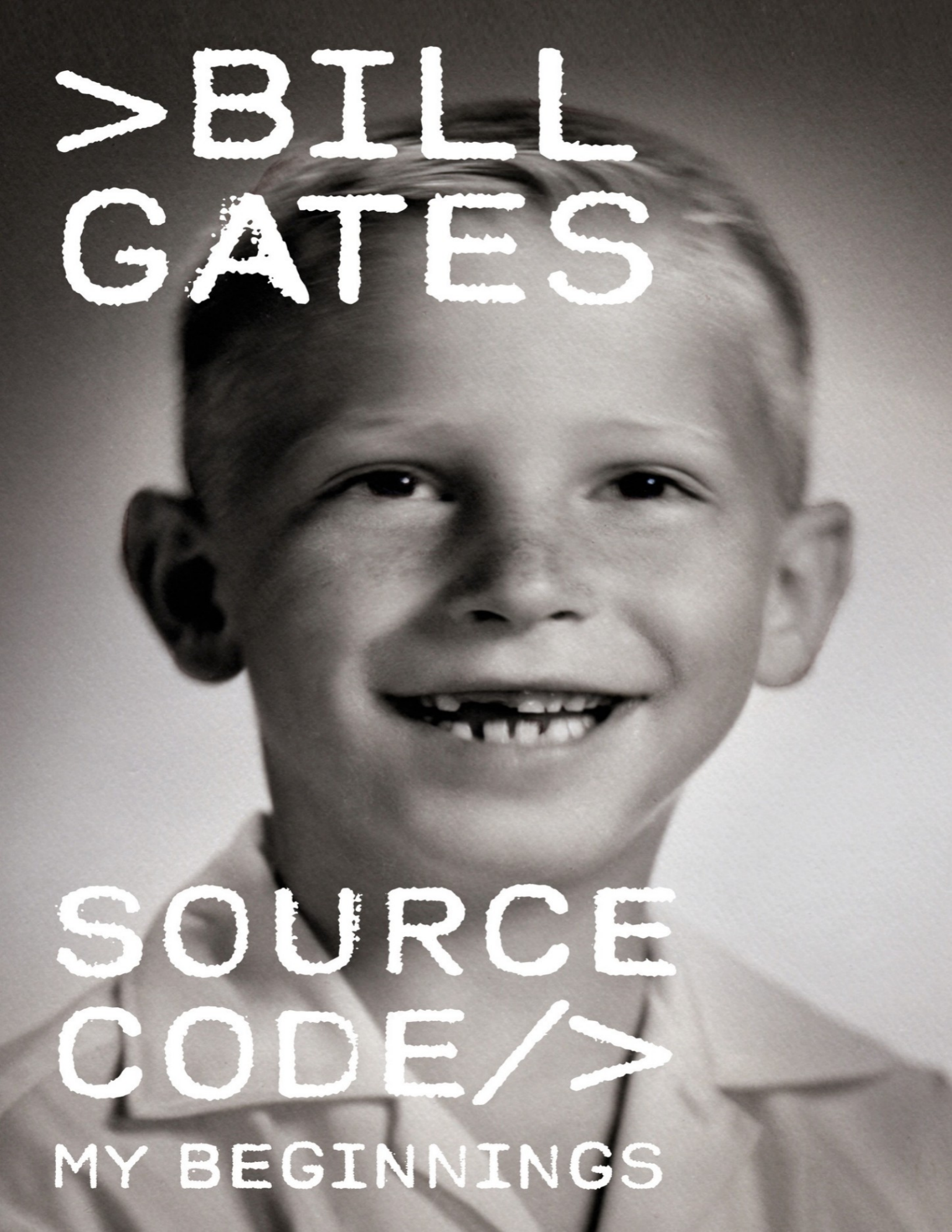
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MY BEGINNINGS

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My Beginnings

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The prize is the pleasure of finding the thing out.

—Richard P. Feynman

Prologue

When I was around thirteen, I started hanging out with a group of boys who met up for regular long hikes in the mountains around Seattle. We got to know each other as Boy Scouts. We did plenty of hiking and camping with our troop, but very quickly we formed a sort of splinter group that went on our own expeditions—and that's how we thought of them, as expeditions. We wanted more freedom and more risk than the trips the Scouts offered.

There were usually five of us—Mike, Rocky, Reilly, Danny, and me. Mike was the leader; he was a few years older than the rest of us and had vastly more outdoor experience. Over the course of three years or so, we hiked hundreds of miles together. We covered the Olympic National Forest west of Seattle and Glacier Peak Wilderness to the northeast and did hikes along the Pacific Coast. We'd often go for seven days or more at a stretch, guided only by topographic maps through old-growth forests and rocky beaches where we tried to time the tides as we hustled around points. During school breaks, we'd take off on extended trips, hiking and camping in all weather, which in the Pacific Northwest often meant a week of soaked, itchy Army surplus wool pants and pruney toes. We weren't doing technical climbing. No ropes or slings or sheer rock faces. Just long, hard hikes. It wasn't dangerous beyond the fact that we were teenagers deep in

the mountains, many hours from help and well before cell phones were a thing.

Over time we grew into a confident, tight-knit team. We'd finish a full day of hiking, decide upon a place to camp, and with hardly a word we'd all fall into our jobs. Mike and Rocky might tie up the tarp that would be our roof for the night. Danny foraged the undergrowth for dry wood, and Reilly and I coaxed a starter stick and twigs into our fire for the night.

And then we ate. Cheap food that was light in our packs but substantial enough to fuel us through the trip. Nothing ever tasted better. For dinner we'd chop up a brick of Spam and mix it with Hamburger Helper or a packet of beef Stroganoff mix. In the morning, we might have Carnation Instant Breakfast mix or a powder that with water transformed into a western omelet, at least according to the package. My morning favorite: Oscar Mayer Smokie Links, a sausage billed as "all meat," now extinct. We used a single frying pan to prepare most of the food, and we ate out of empty #10 coffee cans we each carried. Those cans were our water pails, our saucepans, our oatmeal bowls. I don't know who among us invented the hot raspberry drink. Not that it was a great culinary innovation: just add instant Jell-O mix to boiling water and drink. It worked as dessert or as a morning sugar boost before a day of hiking.

We were away from our parents and the control of any adults, making our own decisions about where to go, what to eat, when we slept, judging for ourselves what risks to take. At school, none of us were the cool kids. Only Danny played an organized sport—basketball—and he soon quit that to make time for our hikes. I was the skinniest of the group and usually the coldest, and I always felt like I was weaker than the others. Still, I liked the physical challenge, and the feeling of autonomy. While hiking was becoming popular in our part of the country, not a lot of teenagers were traipsing off in the woods for eight days on their own.

That said, it was the 1970s, and attitudes toward parenting were looser than they are today. Kids generally had more freedom. And by the time I was in my early teens, my parents had accepted that I was different from many of my peers and had come to terms with the fact that I needed a

certain amount of independence in making my way through the world. That acceptance had been hard-won—especially for my mother—but it would play a defining part in who I was to become.

Looking back on it now, I'm sure all of us were searching for something on those trips beyond camaraderie and a sense of accomplishment. We were at that age when kids test their limits, experiment with different identities—and also sometimes feel a yearning for bigger, even transcendent experiences. I had started to feel a clear longing to figure out what my path would be. I wasn't sure what direction it would take, but it had to be something interesting and consequential.

Also in those years, I was spending a lot of time with a different group of boys. Kent, Paul, Ric, and I all went to the same school, Lakeside, which had set up a way for students to connect with a big mainframe computer over a phone line. It was incredibly rare back then for teenagers to have access to a computer in any form. The four of us really took to it, devoting all our free time to writing increasingly more sophisticated programs and exploring what we could do with that electronic machine.

On the surface, the difference between hiking and programming couldn't have been greater. But they each felt like an adventure. With both sets of friends I was exploring new worlds, traveling to places even most adults couldn't reach. Like hiking, programming fit me because it allowed me to define my own measure of success and it seemed limitless, not determined by how fast I could run or how far I could throw. The logic, focus, and stamina needed to write long, complicated programs came naturally to me. Unlike in hiking, among that group of friends, I was the leader.

—

Toward the end of my sophomore year, in June 1971, Mike called me with our next trip: fifty miles in the Olympic Mountains. The route he chose was called the Press Expedition Trail, after a group sponsored by a newspaper that had explored the area in 1890. Did he mean the same trip on which the

men nearly starved to death and their clothes rotted on their bodies? Yes, but that was a long time ago, he said.

Eight decades later it would still be a tough hike; that year had brought a lot of snow, so it was a particularly daunting proposition. But since everyone else—Rocky, Reilly, and Danny—was up for it, there was no way I was going to wimp out. Plus, a younger scout, a guy named Chip, was game. I had to go.

The plan was to climb the Low Divide pass, descend to the Quinault River, and then hike the same trail back, staying each night in log shelters along the way. Six or seven days total. The first day was easy and we spent the night in a beautiful snow-covered meadow. Over the next day or two, as we climbed the Low Divide, the snow got deeper. When we reached the spot where we planned to spend the night, the shelter was buried in snow. I enjoyed a moment of private elation. Surely, I thought, we'd backtrack, head down to a far more welcoming shelter we had passed earlier in the day. We'd make a fire, get warm, and eat.

Mike said we'd take a vote: head back or push on to our final destination. Either choice meant a several-hour hike. "We passed a shelter at the bottom; it's eighteen hundred feet down. We could go back down and stay there, or we could continue on to the Quinault River," Mike said. He didn't need to spell out that going back meant aborting our mission to reach the river.

"What do you think, Dan?" Mike asked. Danny was the unofficial second in command in our little group. He was taller than everyone else, and a very capable hiker with long legs that never seemed to tire. Whatever he said would sway the vote.

"Well, we're almost there, maybe we should just go on," Danny said. As the hands went up, it was clear I was in the minority. We'd push on.

A few minutes down the trail I said, "Danny, I'm not happy with you. You could have stopped this." I was joking—sort of.

I remember this trip for how cold and miserable I felt that day. I also remember it for what I did next. I retreated into my own thoughts.

I pictured computer code.

Around that time, someone had loaned Lakeside a computer called a PDP-8, made by Digital Equipment Corp. This was 1971, and while I was deep into the nascent world of computers, I had never seen anything like it. Up until then, my friends and I had used only huge mainframe computers that were simultaneously shared with other people. We usually connected to them over a phone line or else they were locked in a separate room. But the PDP-8 was designed to be used directly by one person and was small enough to sit on the desk next to you. It was probably the closest thing in its day to the personal computers that would be common a decade or so later—though one that weighed eighty pounds and cost $8,500. For a challenge, I decided I would try to write a version of the BASIC programming language for the new computer.

Before the hike I was working on the part of the program that would tell the computer the order in which it should perform operations when someone inputs an expression such as 3(2 + 5) x 8 − 3, or wants to create a game that requires complex math. In programming that feature is called a formula evaluator. Trudging along with my eyes on the ground in front of me, I worked on my evaluator, puzzling through the steps needed to perform the operations. Small was key. Computers back then had very little memory, which meant programs had to be lean, written using as little code as possible so as not to hog memory. The PDP-8 had just 6 kilobytes of the memory a computer uses to store data that it's working on. I'd picture the code and then try to trace how the computer would follow my commands. The rhythm of walking helped me think, much like a habit I had of rocking in place. For the rest of that day my mind was immersed in my coding puzzle. As we descended to the valley floor, the snow gave way to a gently sloping trail through an old forest of spruce and fir trees until we reached the river, set up camp, ate our Spam Stroganoff, and finally slept.

By early the next morning we were climbing back up the Low Divide in heavy wind and sleet that whipped sideways in our faces. We stopped under a tree long enough to share a sleeve of Ritz crackers and continued. Every camp we found was full of other hikers waiting out the storm. So we just kept going, adding more hours to an interminable day. Crossing a stream,

Chip fell and gashed his knee. Mike cleaned the wound and applied butterfly bandages; now we moved only as fast as Chip limped. All the while, I silently honed my code. I hardly spoke a word during the twenty miles we hiked that day. Eventually we came to a shelter that had room for us and set up camp.

Like the famous line "I would have written a shorter letter, but I did not have the time," it's easier to write a program in sloppy code that goes on for pages than to write the same program on a single page. The sloppy version may also run more slowly and use more memory. Over the course of that hike, I had the time to write short. On that long day I slimmed it down more, like whittling little pieces off a stick to sharpen the point. What I made seemed efficient and pleasingly simple. It was by far the best code I had ever written.

As we made our way back to the trailhead the next afternoon, the rain finally gave way to clear skies and the warmth of sunlight. I felt the elation that always hit me *after* a hike, when all the hard work was behind me.

—

By the time school started again in the fall, whoever had lent us the PDP-8 had reclaimed it. I never finished my BASIC project. But the code I wrote on that hike, my formula evaluator, and its beauty stayed with me.

Three and a half years later, I was a sophomore in college not sure of my path in life when Paul, one of my Lakeside friends, burst into my dorm room with news of a groundbreaking computer. I knew we could write a BASIC language for it; we had a head start. The first thing I did was to think back to that miserable day on the Low Divide and retrieve from my memory the evaluator code I had written. I typed it into a computer, and with that planted the seed of what would become one of the world's largest companies and the beginning of a new industry.

CHAPTER ONE

Trey

In time there would be a big company. And in time there would be software programs millions of lines long at the core of billions of computers used around the world. There would be riches and rivals and constant worry about how to stay at the forefront of a technological revolution.

Before all of that, there was a pack of cards and a single goal: beat my grandmother.

In my family there was no faster way to win favor than to be good at games, especially card games. If you were confident in rummy or bridge or canasta, you had our respect, which made my maternal grandmother, Adelle Thompson, a household legend. “Gami’s the best at cards” was something I heard a lot as a kid.

Gami had grown up in rural Washington, in the railroad town of Enumclaw. It’s less than fifty miles from Seattle, but it was a world away in 1902, the year she was born. Her dad worked as a railroad telegraph

operator and her mother, Ida Thompson—we called her Lala—would eventually earn a modest income by baking cakes and selling war bonds at the local lumber mill. Lala also played a lot of bridge. Her partners and opponents were the society people in town, the wives of bankers and the owner of the mill. These people may have had more money or higher social standing, but Lala leveled some of the difference by handily beating them at cards. This talent got passed on to Gami and to a degree to my mom, her only child.

My initiation into this family culture started early. When I was still in diapers, Lala started calling me "Trey," the card player's lingo for three. It was a play on the fact that I was the family's third living Bill Gates, after my dad and grandfather. (I am actually number four, but my dad chose to go by "junior" and in turn I got called Bill Gates III.) Gami started me off at age five with Go Fish. In the coming years we would play thousands of hands of cards. We played for fun, and we played to tease each other and pass the time. But my grandmother also played to win—and she always did.

Her mastery fascinated me back then. How did she get so good? Was she born that way? She was religious, so maybe it was a gift from above? For a long time, I didn't have an answer. All I knew was that every time we played, she won. No matter the game. No matter how hard I tried.

When Christian Science rapidly expanded across the West Coast in the early 1900s, both my mother's and father's families became devout followers. I think my mother's parents drew strength from Christian Science, embracing its belief that a person's true identity is found in the spiritual and not the material. They were strict adherents. Because Christian Scientists don't track chronological age, Gami never celebrated her birthday, never disclosed her age or even the year she was born. Despite her own convictions, Gami never imposed her views on others. My mom didn't follow the faith, nor did our family. Gami never tried to persuade us to do otherwise.

Her faith probably had a role in shaping her into an extremely principled person. Even back then, I could grasp that Gami followed a strict personal code of fairness and justice and integrity. A life well-lived meant living

simply, giving your time and money to others, and, most of all, using your brain—staying engaged with the world. She never lost her temper, never gossiped, or criticized. She was incapable of guile. Often she was the smartest person in the room, but she was careful to let others shine. She was basically a shy person, but she had an inner confidence that presented as a Zen-like calm.

Two months before my fifth birthday my grandfather, J. W. Maxwell Jr., died of cancer. He was only fifty-nine years old. Following his Christian Science beliefs, he had declined modern medical interventions. His last years were filled with pain, and Gami suffered as his caregiver. I learned later that my grandfather believed his sickness was somehow the result of something Gami had done, some unknown sin in the eyes of God, who was now punishing him. Still, she stoically stood by his side, supporting him until the end. One of my sharpest memories from childhood was how my parents wouldn't let me attend his funeral. I was hardly aware of what was going on, other than the fact that my mother, father, and older sister got to see him off while I stayed behind with a babysitter. A year later, my great-grandmother Lala died while visiting Gami at her home.

From that point on, Gami channeled all her love and attention into me and my older sister, Kristi—and later my sister Libby. She would be a constant presence in our young lives and have a profound effect on who we would become. She read to me before I could hold a book and for years after, covering the classics like *The Wind in the Willows, The Adventures of Tom Sawyer,* and *Charlotte's Web.* After my grandfather died, Gami started to teach me to read for myself, helping me sound out the words in *The Nine Friendly Dogs, It's a Lovely Day,* and other books in our house. When we had worked through all of those, she drove me to the Northeast Seattle Library to load up on more books. I was aware that she read a lot and seemed to know something about everything.

My grandparents had built a house in the upscale Seattle neighborhood of Windermere big enough to accommodate grandkids and family gatherings. Gami continued to live there after my grandfather died. On some weekends Kristi and I would stay over, alternating who got the

privilege of sleeping in Gami's room. The other one slept in a nearby bedroom where everything from walls to curtains was pale blue. Light from the street and passing cars painted eerie shadows in that blue room. I got scared sleeping there and was always glad when it was my turn to stay in Gami's room.

Those weekend visits were special. Her house was just a couple of miles from ours, but spending time there felt like a vacation. She had a pool and compact mini golf course we'd play in the side yard, set up by my grandfather. She also allowed us the treat of television—a tightly controlled substance at our own house. Gami was up for anything; thanks to her, my sisters and I became avid game players who made anything—Monopoly, Risk, Concentration—into a competitive sport. We'd buy two copies of a jigsaw puzzle so we could race to see who finished first. But we knew her preference. Most nights after dinner, she dealt the cards and then proceeded to kick our butts.

I was about eight when I got my first glimmer of how she did it. I still remember the day: I'm sitting across from my grandmother at the dining room table, Kristi next to me. The room has one of those huge old wooden radios that even then was a relic of the past. Along another wall is a big cabinet where Gami stored the special dishes that we used every Sunday for dinner.

It's quiet, except for the slapping of cards on the table, a frenzy of drawing and matching cards in rapid fire. We're playing Pounce, a fast-paced, group form of solitaire. A serial Pounce winner can keep track of what's in their hand, what cards are showing in all the players' individual piles, and what's in the communal piles on the table. It rewards a strong working memory and the pattern-matching ability to instantly recognize how a card that comes up on the table fits into what you hold in your hand. But I don't know any of this. All I know is that whatever it is that's needed to turn luck in your favor, Gami has it.

I am staring at my cards, my head racing to find matches. Then I hear Gami say: "Your six card plays." And then, "Your nine card plays." She's coaching my sister and me while also playing her own hand. She somehow

grasps everything happening at the table and even seems to know the cards we're each holding—and it's not magic. How is she doing it? To anyone who plays cards, this is basic stuff. The more closely you can track your opponent's hand, the better your chances of winning. Still, to me at that age, it's a revelation. I see for the first time that for all the mystery and luck in a game of cards, there are things that I can learn to increase my chances of winning. I realize Gami isn't just lucky or talented. She's trained her brain. And I can too.

From that time on, I would sit down to a game of cards with an awareness that each hand dealt offered the chance to learn—if only I would take it. She knew it too. That didn't mean she made the path easy. She could have sat me down and walked me through the do's and don'ts, the strategies and tactics of various games. That wasn't Gami's way. She wasn't didactic. She led by example. So we played and played.

We played Pounce, gin rummy, hearts, and my favorite, sevens. We played her favorite, a complicated form of gin she called Coast Guard rummy. We played a little bridge. We played our way through a volume of Hoyle's, front to back, dealing games popular and not—even pinochle.

All the while, I studied her. In computer science there's a thing called a state machine, a part of a program that receives an input and, based on the state of a set of conditions, takes the optimal action. My grandmother had a finely tuned state machine for cards; her mental algorithm methodically worked through probabilities, decision trees, and game theory. I couldn't have articulated these concepts, but slowly I started to intuit them. I noticed that even at unique moments in a game—a combination of possible moves and odds she probably had never seen before—she usually made the optimal move. If she lost a good card at some point, later in the game I'd see she had sacrificed it for a reason: to set herself up for a win down the road.

We played and played and I lost and lost. But I was watching, and improving. All along, Gami continued to gently encourage me. "Think smart, Trey. Think smart," she'd say as I weighed my next move. Implicit

was the idea that if I used my brain, stayed focused, I could figure out the right card to play. I could win.

One day I did.

There was no fanfare. No grand prize. No high fives. I don't even remember what game we were playing the first time I won more games in a day than she did. I do know my grandmother was pleased. I'm pretty sure she smiled, an acknowledgment that I was growing.

Eventually—it took about five years—I was winning consistently. By that point I was almost a teenager, naturally competitive. I enjoyed the mental wrestling, as well as the deeply satisfying feeling you get from learning a new skill. Card playing taught me that no matter how complex or even mysterious something seems, you often can figure it out. The world can be understood.

—

I was born on October 28, 1955, the second of three kids. Kristi, born in 1954, was twenty-one months older; my sister Libby wouldn't appear on the scene for nearly another decade. As a baby, I was dubbed "Happy Boy" for the wide grin I seemed to always display. It wasn't that I didn't cry, but the joy I apparently felt seemed to override all other emotions. My other notable early trait might be described as excess energy. I rocked. At first on a rubber hobby horse, for hours on hours. And as I grew older, I kept it up without the horse, rocking while seated, while standing, anytime I got to really thinking about something. Rocking was like a metronome for my brain. It still is.

Early on, my parents knew that the rhythm of my mind was different from that of other kids. Kristi, for one, did what she was told, played easily with other kids, and from the start got great grades. I did none of those things. My mother worried about me and warned my preschool teachers at Acorn Academy what to expect. At the end of my first year, the director of the school wrote: "His mother had prepared us for him for she seemed to feel that he was a great contrast to his sister. We heartily concurred with her