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Benjamin Franklin: An American Life

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The Wise Men: Six Friends and the World They Made
(with Evan Thomas)

Pro and Con

STEVE JOBS

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The people who are crazy enough
to think they can change
the world are the ones who do.

—Apple's "Think Different" commercial, 1997

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Gil Amelio. Became CEO of Apple in 1996, bought NeXT, bringing Jobs back.

Bill Atkinson. Early Apple employee, developed graphics for the Macintosh.

Chrisann Brennan. Jobs's girlfriend at Homestead High, mother of his daughter Lisa.

Lisa Brennan-Jobs. Daughter of Jobs and Chrisann Brennan, born in 1978; became a writer in New York City.

Nolan Bushnell. Founder of Atari and entrepreneurial role model for Jobs.

Bill Campbell. Apple marketing chief during Jobs's first stint at Apple and board member and confidant after Jobs's return in 1997.

Edwin Catmull. A cofounder of Pixar and later a Disney executive.

Kobun Chino. A Sōtō Zen master in California who became Jobs's spiritual teacher.

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Deborah "Debi" Coleman. Early Mac team manager who took over Apple manufacturing.

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Eddy Cue. Chief of Internet services at Apple, Jobs's wingman in dealing with content companies.

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Jeffrey Katzenberg. Head of Disney Studios, clashed with Eisner and resigned in 1994 to cofound DreamWorks SKG.

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Daniel Kottke. Jobs's closest friend at Reed, fellow pilgrim to India, early Apple employee.

John Lasseter. Cofounder and creative force at Pixar.

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Arthur Rock. Legendary tech investor, early Apple board member, Jobs's father figure.

Jonathan "Ruby" Rubinstein. Worked with Jobs at NeXT, became chief hardware engineer at Apple in 1997.

Mike Scott. Brought in by Markkula to be Apple's president in 1977 to try to manage Jobs.

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Joanne Schieble Jandali Simpson. Wisconsin-born biological mother of Steve Jobs, whom she put up for adoption, and Mona Simpson, whom she raised.

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Alvy Ray Smith. A cofounder of Pixar who clashed with Jobs.

Burrell Smith. Brilliant, troubled hardware designer on the original Mac team, afflicted with schizophrenia in the 1990s.

Avadis "Avie" Tevanian. Worked with Jobs and Rubinstein at NeXT, became chief software engineer at Apple in 1997.

James Vincent. A music-loving Brit, the younger partner with Lee Clow and Duncan Milner at the ad agency Apple hired.

Ron Wayne. Met Jobs at Atari, became first partner with Jobs and Wozniak at fledgling Apple, but unwisely decided to forgo his equity stake.

Stephen Wozniak. The star electronics geek at Homestead High; Jobs figured out how to package and market his amazing circuit boards and became his partner in founding Apple.

Del Yocam. Early Apple employee who became the General Manager of the Apple II Group and later Apple's Chief Operating Officer.

INTRODUCTION

How This Book Came to Be

In the early summer of 2004, I got a phone call from Steve Jobs. He had been scattershot friendly to me over the years, with occasional bursts of intensity, especially when he was launching a new product that he wanted on the cover of *Time* or featured on CNN, places where I'd worked. But now that I was no longer at either of those places, I hadn't heard from him much. We talked a bit about the Aspen Institute, which I had recently joined, and I invited him to speak at our summer campus in Colorado. He'd be happy to come, he said, but not to be onstage. He wanted instead to take a walk so that we could talk.

That seemed a bit odd. I didn't yet know that taking a long walk was his preferred way to have a serious conversation. It turned out that he wanted me to write a biography of him. I had recently published one on Benjamin Franklin and was writing one about Albert Einstein, and my initial reaction was to wonder, half jokingly, whether he saw himself as the natural successor in that sequence. Because I assumed that he was still in the middle of an oscillating career that had many more ups and downs left, I demurred. Not now, I said. Maybe in a decade or two, when you retire.

I had known him since 1984, when he came to Manhattan to have lunch with *Time*'s editors and extol his new Macintosh. He was petulant even then, attacking a *Time* correspondent for having wounded him with a story that was too revealing. But talking to him afterward, I found myself rather captivated, as so many others have been over the years, by his engaging intensity. We stayed in touch, even after he was

ousted from Apple. When he had something to pitch, such as a NeXT computer or Pixar movie, the beam of his charm would suddenly refocus on me, and he would take me to a sushi restaurant in Lower Manhattan to tell me that whatever he was touting was the best thing he had ever produced. I liked him.

When he was restored to the throne at Apple, we put him on the cover of *Time*, and soon thereafter he began offering me his ideas for a series we were doing on the most influential people of the century. He had launched his "Think Different" campaign, featuring iconic photos of some of the same people we were considering, and he found the endeavor of assessing historic influence fascinating.

After I had deflected his suggestion that I write a biography of him, I heard from him every now and then. At one point I emailed to ask if it was true, as my daughter had told me, that the Apple logo was an homage to Alan Turing, the British computer pioneer who broke the German wartime codes and then committed suicide by biting into a cyanide-laced apple. He replied that he wished he had thought of that, but hadn't. That started an exchange about the early history of Apple, and I found myself gathering string on the subject, just in case I ever decided to do such a book. When my Einstein biography came out, he came to a book event in Palo Alto and pulled me aside to suggest, again, that he would make a good subject.

His persistence baffled me. He was known to guard his privacy, and I had no reason to believe he'd ever read any of my books. Maybe someday, I continued to say. But in 2009 his wife, Laurene Powell, said bluntly, "If you're ever going to do a book on Steve, you'd better do it now." He had just taken a second medical leave. I confessed to her that when he had first raised the idea, I hadn't known he was sick. Almost nobody knew, she said. He had called me right before he was going to be operated on for cancer, and he was still keeping it a secret, she explained.

I decided then to write this book. Jobs surprised me by readily acknowledging that he would have no control over it or even the right to see it in advance. "It's your book," he said. "I won't even read it." But later that fall he seemed to have second thoughts about cooperating and, though I didn't know it, was hit by another round of cancer com-

plications. He stopped returning my calls, and I put the project aside for a while.

Then, unexpectedly, he phoned me late on the afternoon of New Year's Eve 2009. He was at home in Palo Alto with only his sister, the writer Mona Simpson. His wife and their three children had taken a quick trip to go skiing, but he was not healthy enough to join them. He was in a reflective mood, and we talked for more than an hour. He began by recalling that he had wanted to build a frequency counter when he was twelve, and he was able to look up Bill Hewlett, the founder of HP, in the phone book and call him to get parts. Jobs said that the past twelve years of his life, since his return to Apple, had been his most productive in terms of creating new products. But his more important goal, he said, was to do what Hewlett and his friend David Packard had done, which was create a company that was so imbued with innovative creativity that it would outlive them.

"I always thought of myself as a humanities person as a kid, but I liked electronics," he said. "Then I read something that one of my heroes, Edwin Land of Polaroid, said about the importance of people who could stand at the intersection of humanities and sciences, and I decided that's what I wanted to do." It was as if he were suggesting themes for his biography (and in this instance, at least, the theme turned out to be valid). The creativity that can occur when a feel for both the humanities and the sciences combine in one strong personality was the topic that most interested me in my biographies of Franklin and Einstein, and I believe that it will be a key to creating innovative economies in the twenty-first century.

I asked Jobs why he wanted me to be the one to write his biography. "I think you're good at getting people to talk," he replied. That was an unexpected answer. I knew that I would have to interview scores of people he had fired, abused, abandoned, or otherwise infuriated, and I feared he would not be comfortable with my getting them to talk. And indeed he did turn out to be skittish when word trickled back to him of people that I was interviewing. But after a couple of months, he began encouraging people to talk to me, even foes and former girlfriends. Nor did he try to put anything off-limits. "I've done a lot of things I'm not proud of, such as getting my girlfriend pregnant when

I was twenty-three and the way I handled that," he said. "But I don't have any skeletons in my closet that can't be allowed out." He didn't seek any control over what I wrote, or even ask to read it in advance. His only involvement came when my publisher was choosing the cover art. When he saw an early version of a proposed cover treatment, he disliked it so much that he asked to have input in designing a new version. I was both amused and willing, so I readily assented.

I ended up having more than forty interviews and conversations with him. Some were formal ones in his Palo Alto living room, others were done during long walks and drives or by telephone. During my two years of visits, he became increasingly intimate and revealing, though at times I witnessed what his veteran colleagues at Apple used to call his "reality distortion field." Sometimes it was the inadvertent misfiring of memory cells that happens to us all; at other times he was spinning his own version of reality both to me and to himself. To check and flesh out his story, I interviewed more than a hundred friends, relatives, competitors, adversaries, and colleagues.

His wife also did not request any restrictions or control, nor did she ask to see in advance what I would publish. In fact she strongly encouraged me to be honest about his failings as well as his strengths. She is one of the smartest and most grounded people I have ever met. "There are parts of his life and personality that are extremely messy, and that's the truth," she told me early on. "You shouldn't whitewash it. He's good at spin, but he also has a remarkable story, and I'd like to see that it's all told truthfully."

I leave it to the reader to assess whether I have succeeded in this mission. I'm sure there are players in this drama who will remember some of the events differently or think that I sometimes got trapped in Jobs's distortion field. As happened when I wrote a book about Henry Kissinger, which in some ways was good preparation for this project, I found that people had such strong positive and negative emotions about Jobs that the Rashomon effect was often evident. But I've done the best I can to balance conflicting accounts fairly and be transparent about the sources I used.

This is a book about the roller-coaster life and searingly intense personality of a creative entrepreneur whose passion for perfection and

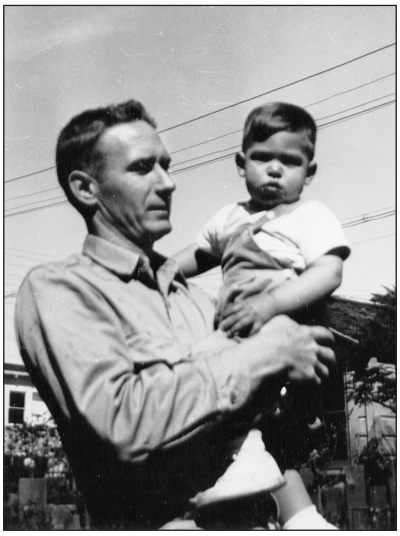
ferocious drive revolutionized six industries: personal computers, animated movies, music, phones, tablet computing, and digital publishing. You might even add a seventh, retail stores, which Jobs did not quite revolutionize but did reimagine. In addition, he opened the way for a new market for digital content based on apps rather than just websites. Along the way he produced not only transforming products but also, on his second try, a lasting company, endowed with his DNA, that is filled with creative designers and daredevil engineers who could carry forward his vision. In August 2011, right before he stepped down as CEO, the enterprise he started in his parents' garage became the world's most valuable company.

This is also, I hope, a book about innovation. At a time when the United States is seeking ways to sustain its innovative edge, and when societies around the world are trying to build creative digital-age economies, Jobs stands as the ultimate icon of inventiveness, imagination, and sustained innovation. He knew that the best way to create value in the twenty-first century was to connect creativity with technology, so he built a company where leaps of the imagination were combined with remarkable feats of engineering. He and his colleagues at Apple were able to think differently: They developed not merely modest product advances based on focus groups, but whole new devices and services that consumers did not yet know they needed.

He was not a model boss or human being, tidily packaged for emulation. Driven by demons, he could drive those around him to fury and despair. But his personality and passions and products were all interrelated, just as Apple's hardware and software tended to be, as if part of an integrated system. His tale is thus both instructive and cautionary, filled with lessons about innovation, character, leadership, and values.

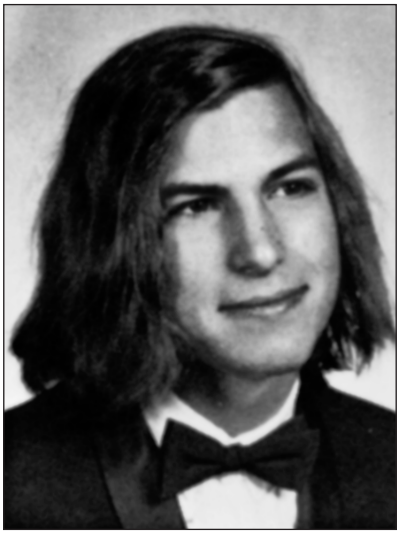
Shakespeare's *Henry V*—the story of a willful and immature prince who becomes a passionate but sensitive, callous but sentimental, inspiring but flawed king—begins with the exhortation "O for a Muse of fire, that would ascend / The brightest heaven of invention." For Steve Jobs, the ascent to the brightest heaven of invention begins with a tale of two sets of parents, and of growing up in a valley that was just learning how to turn silicon into gold.

STEVE JOBS



Paul Jobs with Steve, 1956

The Los Altos house with the garage where Apple was born



In the Homestead High yearbook, 1972

With the "SWAB JOB" school prank sign

CHAPTER ONE

CHILDHOOD

Abandoned and Chosen

The Adoption

When Paul Jobs was mustered out of the Coast Guard after World War II, he made a wager with his crewmates. They had arrived in San Francisco, where their ship was decommissioned, and Paul bet that he would find himself a wife within two weeks. He was a taut, tattooed engine mechanic, six feet tall, with a passing resemblance to James Dean. But it wasn't his looks that got him a date with Clara Hagopian, a sweet-humored daughter of Armenian immigrants. It was the fact that he and his friends had a car, unlike the group she had originally planned to go out with that evening. Ten days later, in March 1946, Paul got engaged to Clara and won his wager. It would turn out to be a happy marriage, one that lasted until death parted them more than forty years later.

Paul Reinhold Jobs had been raised on a dairy farm in Germantown, Wisconsin. Even though his father was an alcoholic and sometimes abusive, Paul ended up with a gentle and calm disposition under his leathery exterior. After dropping out of high school, he wandered through the Midwest picking up work as a mechanic until, at age nineteen, he joined the Coast Guard, even though he didn't know how

to swim. He was deployed on the USS *General M. C. Meigs* and spent much of the war ferrying troops to Italy for General Patton. His talent as a machinist and fireman earned him commendations, but he occasionally found himself in minor trouble and never rose above the rank of seaman.

Clara was born in New Jersey, where her parents had landed after fleeing the Turks in Armenia, and they moved to the Mission District of San Francisco when she was a child. She had a secret that she rarely mentioned to anyone: She had been married before, but her husband had been killed in the war. So when she met Paul Jobs on that first date, she was primed to start a new life.

Like many who lived through the war, they had experienced enough excitement that, when it was over, they desired simply to settle down, raise a family, and lead a less eventful life. They had little money, so they moved to Wisconsin and lived with Paul's parents for a few years, then headed for Indiana, where he got a job as a machinist for International Harvester. His passion was tinkering with old cars, and he made money in his spare time buying, restoring, and selling them. Eventually he quit his day job to become a full-time used car salesman.

Clara, however, loved San Francisco, and in 1952 she convinced her husband to move back there. They got an apartment in the Sunset District facing the Pacific, just south of Golden Gate Park, and he took a job working for a finance company as a "repo man," picking the locks of cars whose owners hadn't paid their loans and repossessing them. He also bought, repaired, and sold some of the cars, making a decent enough living in the process.

There was, however, something missing in their lives. They wanted children, but Clara had suffered an ectopic pregnancy, in which the fertilized egg was implanted in a fallopian tube rather than the uterus, and she had been unable to have any. So by 1955, after nine years of marriage, they were looking to adopt a child.

Like Paul Jobs, Joanne Schieble was from a rural Wisconsin family of German heritage. Her father, Arthur Schieble, had immigrated to the outskirts of Green Bay, where he and his wife owned a mink farm and dabbled successfully in various other businesses, including real

estate and photoengraving. He was very strict, especially regarding his daughter's relationships, and he had strongly disapproved of her first love, an artist who was not a Catholic. Thus it was no surprise that he threatened to cut Joanne off completely when, as a graduate student at the University of Wisconsin, she fell in love with Abdulfattah "John" Jandali, a Muslim teaching assistant from Syria.

Jandali was the youngest of nine children in a prominent Syrian family. His father owned oil refineries and multiple other businesses, with large holdings in Damascus and Homs, and at one point pretty much controlled the price of wheat in the region. His mother, he later said, was a "traditional Muslim woman" who was a "conservative, obedient housewife." Like the Schieble family, the Jandalis put a premium on education. Abdulfattah was sent to a Jesuit boarding school, even though he was Muslim, and he got an undergraduate degree at the American University in Beirut before entering the University of Wisconsin to pursue a doctoral degree in political science.

In the summer of 1954, Joanne went with Abdulfattah to Syria. They spent two months in Homs, where she learned from his family to cook Syrian dishes. When they returned to Wisconsin she discovered that she was pregnant. They were both twenty-three, but they decided not to get married. Her father was dying at the time, and he had threatened to disown her if she wed Abdulfattah. Nor was abortion an easy option in a small Catholic community. So in early 1955, Joanne traveled to San Francisco, where she was taken into the care of a kindly doctor who sheltered unwed mothers, delivered their babies, and quietly arranged closed adoptions.

Joanne had one requirement: Her child must be adopted by college graduates. So the doctor arranged for the baby to be placed with a lawyer and his wife. But when a boy was born—on February 24, 1955—the designated couple decided that they wanted a girl and backed out. Thus it was that the boy became the son not of a lawyer but of a high school dropout with a passion for mechanics and his salt-of-the-earth wife who was working as a bookkeeper. Paul and Clara named their new baby Steven Paul Jobs.

When Joanne found out that her baby had been placed with a couple who had not even graduated from high school, she refused to sign

the adoption papers. The standoff lasted weeks, even after the baby had settled into the Jobs household. Eventually Joanne relented, with the stipulation that the couple promise—indeed sign a pledge—to fund a savings account to pay for the boy's college education.

There was another reason that Joanne was balky about signing the adoption papers. Her father was about to die, and she planned to marry Jandali soon after. She held out hope, she would later tell family members, sometimes tearing up at the memory, that once they were married, she could get their baby boy back.

Arthur Schieble died in August 1955, after the adoption was finalized. Just after Christmas that year, Joanne and Abdulfattah were married in St. Philip the Apostle Catholic Church in Green Bay. He got his PhD in international politics the next year, and then they had another child, a girl named Mona. After she and Jandali divorced in 1962, Joanne embarked on a dreamy and peripatetic life that her daughter, who grew up to become the acclaimed novelist Mona Simpson, would capture in her book *Anywhere but Here*. Because Steve's adoption had been closed, it would be twenty years before they would all find each other.

Steve Jobs knew from an early age that he was adopted. "My parents were very open with me about that," he recalled. He had a vivid memory of sitting on the lawn of his house, when he was six or seven years old, telling the girl who lived across the street. "So does that mean your real parents didn't want you?" the girl asked. "Lightning bolts went off in my head," according to Jobs. "I remember running into the house, crying. And my parents said, 'No, you have to understand.' They were very serious and looked me straight in the eye. They said, 'We specifically picked you out.' Both of my parents said that and repeated it slowly for me. And they put an emphasis on every word in that sentence."

Abandoned. Chosen. Special. Those concepts became part of who Jobs was and how he regarded himself. His closest friends think that the knowledge that he was given up at birth left some scars. "I think his desire for complete control of whatever he makes derives directly from his personality and the fact that he was abandoned at birth," said one longtime colleague, Del Yocam. "He wants to control his environment,

and he sees the product as an extension of himself." Greg Calhoun, who became close to Jobs right after college, saw another effect. "Steve talked to me a lot about being abandoned and the pain that caused," he said. "It made him independent. He followed the beat of a different drummer, and that came from being in a different world than he was born into."

Later in life, when he was the same age his biological father had been when he abandoned him, Jobs would father and abandon a child of his own. (He eventually took responsibility for her.) Chrisann Brennan, the mother of that child, said that being put up for adoption left Jobs "full of broken glass," and it helps to explain some of his behavior. "He who is abandoned is an abandoner," she said. Andy Hertzfeld, who worked with Jobs at Apple in the early 1980s, is among the few who remained close to both Brennan and Jobs. "The key question about Steve is why he can't control himself at times from being so reflexively cruel and harmful to some people," he said. "That goes back to being abandoned at birth. The real underlying problem was the theme of abandonment in Steve's life."

Jobs dismissed this. "There's some notion that because I was abandoned, I worked very hard so I could do well and make my parents wish they had me back, or some such nonsense, but that's ridiculous," he insisted. "Knowing I was adopted may have made me feel more independent, but I have never felt abandoned. I've always felt special. My parents made me feel special." He would later bristle whenever anyone referred to Paul and Clara Jobs as his "adoptive" parents or implied that they were not his "real" parents. "They were my parents 1,000%," he said. When speaking about his biological parents, on the other hand, he was curt: "They were my sperm and egg bank. That's not harsh, it's just the way it was, a sperm bank thing, nothing more."

Silicon Valley

The childhood that Paul and Clara Jobs created for their new son was, in many ways, a stereotype of the late 1950s. When Steve was two they adopted a girl they named Patty, and three years later they moved to a

tract house in the suburbs. The finance company where Paul worked as a repo man, CIT, had transferred him down to its Palo Alto office, but he could not afford to live there, so they landed in a subdivision in Mountain View, a less expensive town just to the south.

There Paul tried to pass along his love of mechanics and cars. "Steve, this is your workbench now," he said as he marked off a section of the table in their garage. Jobs remembered being impressed by his father's focus on craftsmanship. "I thought my dad's sense of design was pretty good," he said, "because he knew how to build anything. If we needed a cabinet, he would build it. When he built our fence, he gave me a hammer so I could work with him."

Fifty years later the fence still surrounds the back and side yards of the house in Mountain View. As Jobs showed it off to me, he caressed the stockade panels and recalled a lesson that his father implanted deeply in him. It was important, his father said, to craft the backs of cabinets and fences properly, even though they were hidden. "He loved doing things right. He even cared about the look of the parts you couldn't see."

His father continued to refurbish and resell used cars, and he festooned the garage with pictures of his favorites. He would point out the detailing of the design to his son: the lines, the vents, the chrome, the trim of the seats. After work each day, he would change into his dungarees and retreat to the garage, often with Steve tagging along. "I figured I could get him nailed down with a little mechanical ability, but he really wasn't interested in getting his hands dirty," Paul later recalled. "He never really cared too much about mechanical things."

"I wasn't that into fixing cars," Jobs admitted. "But I was eager to hang out with my dad." Even as he was growing more aware that he had been adopted, he was becoming more attached to his father. One day when he was about eight, he discovered a photograph of his father from his time in the Coast Guard. "He's in the engine room, and he's got his shirt off and looks like James Dean. It was one of those *Oh wow* moments for a kid. *Wow, oooh*, my parents were actually once very young and really good-looking."

Through cars, his father gave Steve his first exposure to electronics. "My dad did not have a deep understanding of electronics, but he'd

encountered it a lot in automobiles and other things he would fix. He showed me the rudiments of electronics, and I got very interested in that." Even more interesting were the trips to scavenge for parts. "Every weekend, there'd be a junkyard trip. We'd be looking for a generator, a carburetor, all sorts of components." He remembered watching his father negotiate at the counter. "He was a good bargainer, because he knew better than the guys at the counter what the parts should cost." This helped fulfill the pledge his parents made when he was adopted. "My college fund came from my dad paying $50 for a Ford Falcon or some other beat-up car that didn't run, working on it for a few weeks, and selling it for $250—and not telling the IRS."

The Jobses' house and the others in their neighborhood were modeled on ones built by the real estate developer Joseph Eichler, whose company spawned more than eleven thousand homes in various California subdivisions between 1950 and 1974. Inspired by Frank Lloyd Wright's vision of simple modern homes for the American "everyman," Eichler built inexpensive houses that featured floor-to-ceiling glass walls, open floor plans, exposed post-and-beam construction, concrete slab floors, and lots of sliding glass doors. "Eichler did a great thing," Jobs said on one of our walks around the neighborhood. "His houses were smart and cheap and good. They brought clean design and simple taste to lower-income people. They had awesome little features, like radiant heating in the floors. You put carpet on them, and we had nice toasty floors when we were kids."

Jobs said that his appreciation for Eichler homes instilled in him a passion for making nicely designed products for the mass market. "I love it when you can bring really great design and simple capability to something that doesn't cost much," he said as he pointed out the clean elegance of the houses. "It was the original vision for Apple. That's what we tried to do with the first Mac. That's what we did with the iPod."

Across the street from the Jobs family lived a man who had become successful as a real estate agent. "He wasn't that bright," Jobs recalled, "but he seemed to be making a fortune. So my dad thought, 'I can do that.' He worked so hard, I remember. He took these night classes, passed the license test, and got into real estate. Then the bottom fell out

of the market." As a result, the family found itself financially strapped for a year or so while Steve was in elementary school. His mother took a job as a bookkeeper for Varian Associates, a company that made scientific instruments, and they took out a second mortgage. One day his fourth-grade teacher asked him, "What is it you don't understand about the universe?" Jobs replied, "I don't understand why all of a sudden my dad is so broke." He was proud that his father never adopted a servile attitude or slick style that may have made him a better salesman. "You had to suck up to people to sell real estate, and he wasn't good at that and it wasn't in his nature. I admired him for that." Paul Jobs went back to being a mechanic.

His father was calm and gentle, traits that his son later praised more than emulated. He was also resolute. Jobs described one example:

> Nearby was an engineer who was working at Westinghouse. He was a single guy, beatnik type. He had a girlfriend. She would babysit me sometimes. Both my parents worked, so I would come here right after school for a couple of hours. He would get drunk and hit her a couple of times. She came over one night, scared out of her wits, and he came over drunk, and my dad stood him down—saying "She's here, but you're not coming in." He stood right there. We like to think everything was idyllic in the 1950s, but this guy was one of those engineers who had messed-up lives.

What made the neighborhood different from the thousands of other spindly-tree subdivisions across America was that even the ne'er-do-wells tended to be engineers. "When we moved here, there were apricot and plum orchards on all of these corners," Jobs recalled. "But it was beginning to boom because of military investment." He soaked up the history of the valley and developed a yearning to play his own role. Edwin Land of Polaroid later told him about being asked by Eisenhower to help build the U-2 spy plane cameras to see how real the Soviet threat was. The film was dropped in canisters and returned to the NASA Ames Research Center in Sunnyvale, not far from where Jobs lived. "The first computer terminal I ever saw was when my dad brought me to the Ames Center," he said. "I fell totally in love with it."

Other defense contractors sprouted nearby during the 1950s. The Lockheed Missiles and Space Division, which built submarine-launched ballistic missiles, was founded in 1956 next to the NASA Center; by the time Jobs moved to the area four years later, it employed twenty thousand people. A few hundred yards away, Westinghouse built facilities that produced tubes and electrical transformers for the missile systems. "You had all these military companies on the cutting edge," he recalled. "It was mysterious and high-tech and made living here very exciting."

In the wake of the defense industries there arose a booming economy based on technology. Its roots stretched back to 1938, when David Packard and his new wife moved into a house in Palo Alto that had a shed where his friend Bill Hewlett was soon ensconced. The house had a garage—an appendage that would prove both useful and iconic in the valley—in which they tinkered around until they had their first product, an audio oscillator. By the 1950s, Hewlett-Packard was a fast-growing company making technical instruments.

Fortunately there was a place nearby for entrepreneurs who had outgrown their garages. In a move that would help transform the area into the cradle of the tech revolution, Stanford University's dean of engineering, Frederick Terman, created a seven-hundred-acre industrial park on university land for private companies that could commercialize the ideas of his students. Its first tenant was Varian Associates, where Clara Jobs worked. "Terman came up with this great idea that did more than anything to cause the tech industry to grow up here," Jobs said. By the time Jobs was ten, HP had nine thousand employees and was the blue-chip company where every engineer seeking financial stability wanted to work.

The most important technology for the region's growth was, of course, the semiconductor. William Shockley, who had been one of the inventors of the transistor at Bell Labs in New Jersey, moved out to Mountain View and, in 1956, started a company to build transistors using silicon rather than the more expensive germanium that was then commonly used. But Shockley became increasingly erratic and abandoned his silicon transistor project, which led eight of his engineers—most notably Robert Noyce and Gordon Moore—to

break away to form Fairchild Semiconductor. That company grew to twelve thousand employees, but it fragmented in 1968, when Noyce lost a power struggle to become CEO. He took Gordon Moore and founded a company that they called Integrated Electronics Corporation, which they soon smartly abbreviated to Intel. Their third employee was Andrew Grove, who later would grow the company by shifting its focus from memory chips to microprocessors. Within a few years there would be more than fifty companies in the area making semiconductors.

The exponential growth of this industry was correlated with the phenomenon famously discovered by Moore, who in 1965 drew a graph of the speed of integrated circuits, based on the number of transistors that could be placed on a chip, and showed that it doubled about every two years, a trajectory that could be expected to continue. This was reaffirmed in 1971, when Intel was able to etch a complete central processing unit onto one chip, the Intel 4004, which was dubbed a "microprocessor." Moore's Law has held generally true to this day, and its reliable projection of performance to price allowed two generations of young entrepreneurs, including Steve Jobs and Bill Gates, to create cost projections for their forward-leaning products.

The chip industry gave the region a new name when Don Hoefler, a columnist for the weekly trade paper *Electronic News*, began a series in January 1971 entitled "Silicon Valley USA." The forty-mile Santa Clara Valley, which stretches from South San Francisco through Palo Alto to San Jose, has as its commercial backbone El Camino Real, the royal road that once connected California's twenty-one mission churches and is now a bustling avenue that connects companies and startups accounting for a third of the venture capital investment in the United States each year. "Growing up, I got inspired by the history of the place," Jobs said. "That made me want to be a part of it."

Like most kids, he became infused with the passions of the grown-ups around him. "Most of the dads in the neighborhood did really neat stuff, like photovoltaics and batteries and radar," Jobs recalled. "I grew up in awe of that stuff and asking people about it." The most important of these neighbors, Larry Lange, lived seven doors away. "He was my model of what an HP engineer was supposed to be: a big ham radio

operator, hard-core electronics guy," Jobs recalled. "He would bring me stuff to play with." As we walked up to Lange's old house, Jobs pointed to the driveway. "He took a carbon microphone and a battery and a speaker, and he put it on this driveway. He had me talk into the carbon mike and it amplified out of the speaker." Jobs had been taught by his father that microphones always required an electronic amplifier. "So I raced home, and I told my dad that he was wrong."

"No, it needs an amplifier," his father assured him. When Steve protested otherwise, his father said he was crazy. "It can't work without an amplifier. There's some trick."

"I kept saying no to my dad, telling him he had to see it, and finally he actually walked down with me and saw it. And he said, 'Well I'll be a bat out of hell.' "

Jobs recalled the incident vividly because it was his first realization that his father did not know everything. Then a more disconcerting discovery began to dawn on him: He was smarter than his parents. He had always admired his father's competence and savvy. "He was not an educated man, but I had always thought he was pretty damn smart. He didn't read much, but he could do a lot. Almost everything mechanical, he could figure it out." Yet the carbon microphone incident, Jobs said, began a jarring process of realizing that he was in fact more clever and quick than his parents. "It was a very big moment that's burned into my mind. When I realized that I was smarter than my parents, I felt tremendous shame for having thought that. I will never forget that moment." This discovery, he later told friends, along with the fact that he was adopted, made him feel apart—detached and separate—from both his family and the world.

Another layer of awareness occurred soon after. Not only did he discover that he was brighter than his parents, but he discovered that they knew this. Paul and Clara Jobs were loving parents, and they were willing to adapt their lives to suit a son who was very smart—and also willful. They would go to great lengths to accommodate him. And soon Steve discovered this fact as well. "Both my parents got me. They felt a lot of responsibility once they sensed that I was special. They found ways to keep feeding me stuff and putting me in better schools. They were willing to defer to my needs."

So he grew up not only with a sense of having once been abandoned, but also with a sense that he was special. In his own mind, that was more important in the formation of his personality.

School

Even before Jobs started elementary school, his mother had taught him how to read. This, however, led to some problems once he got to school. "I was kind of bored for the first few years, so I occupied myself by getting into trouble." It also soon became clear that Jobs, by both nature and nurture, was not disposed to accept authority. "I encountered authority of a different kind than I had ever encountered before, and I did not like it. And they really almost got me. They came close to really beating any curiosity out of me."

His school, Monta Loma Elementary, was a series of low-slung 1950s buildings four blocks from his house. He countered his boredom by playing pranks. "I had a good friend named Rick Ferrentino, and we'd get into all sorts of trouble," he recalled. "Like we made little posters announcing 'Bring Your Pet to School Day.' It was crazy, with dogs chasing cats all over, and the teachers were beside themselves." Another time they convinced some kids to tell them the combination numbers for their bike locks. "Then we went outside and switched all of the locks, and nobody could get their bikes. It took them until late that night to straighten things out." When he was in third grade, the pranks became a bit more dangerous. "One time we set off an explosive under the chair of our teacher, Mrs. Thurman. We gave her a nervous twitch."

Not surprisingly, he was sent home two or three times before he finished third grade. By then, however, his father had begun to treat him as special, and in his calm but firm manner he made it clear that he expected the school to do the same. "Look, it's not his fault," Paul Jobs told the teachers, his son recalled. "If you can't keep him interested, it's your fault." His parents never punished him for his transgressions at school. "My father's father was an alcoholic and whipped him with a belt, but I'm not sure if I ever got spanked." Both of his parents, he

added, "knew the school was at fault for trying to make me memorize stupid stuff rather than stimulating me." He was already starting to show the admixture of sensitivity and insensitivity, bristliness and detachment, that would mark him for the rest of his life.

When it came time for him to go into fourth grade, the school decided it was best to put Jobs and Ferrentino into separate classes. The teacher for the advanced class was a spunky woman named Imogene Hill, known as "Teddy," and she became, Jobs said, "one of the saints of my life." After watching him for a couple of weeks, she figured that the best way to handle him was to bribe him. "After school one day, she gave me this workbook with math problems in it, and she said, 'I want you to take it home and do this.' And I thought, 'Are you nuts?' And then she pulled out one of these giant lollipops that seemed as big as the world. And she said, 'When you're done with it, if you get it mostly right, I will give you this and five dollars.' And I handed it back within two days." After a few months, he no longer required the bribes. "I just wanted to learn and to please her."

She reciprocated by getting him a hobby kit for grinding a lens and making a camera. "I learned more from her than any other teacher, and if it hadn't been for her I'm sure I would have gone to jail." It reinforced, once again, the idea that he was special. "In my class, it was just me she cared about. She saw something in me."

It was not merely intelligence that she saw. Years later she liked to show off a picture of that year's class on Hawaii Day. Jobs had shown up without the suggested Hawaiian shirt, but in the picture he is front and center wearing one. He had, literally, been able to talk the shirt off another kid's back.

Near the end of fourth grade, Mrs. Hill had Jobs tested. "I scored at the high school sophomore level," he recalled. Now that it was clear, not only to himself and his parents but also to his teachers, that he was intellectually special, the school made the remarkable proposal that he skip two grades and go right into seventh; it would be the easiest way to keep him challenged and stimulated. His parents decided, more sensibly, to have him skip only one grade.

The transition was wrenching. He was a socially awkward loner who found himself with kids a year older. Worse yet, the sixth grade

was in a different school, Crittenden Middle. It was only eight blocks from Monta Loma Elementary, but in many ways it was a world apart, located in a neighborhood filled with ethnic gangs. "Fights were a daily occurrence; as were shakedowns in bathrooms," wrote the Silicon Valley journalist Michael S. Malone. "Knives were regularly brought to school as a show of macho." Around the time that Jobs arrived, a group of students were jailed for a gang rape, and the bus of a neighboring school was destroyed after its team beat Crittenden's in a wrestling match.

Jobs was often bullied, and in the middle of seventh grade he gave his parents an ultimatum. "I insisted they put me in a different school," he recalled. Financially this was a tough demand. His parents were barely making ends meet, but by this point there was little doubt that they would eventually bend to his will. "When they resisted, I told them I would just quit going to school if I had to go back to Crittenden. So they researched where the best schools were and scraped together every dime and bought a house for $21,000 in a nicer district."

The move was only three miles to the south, to a former apricot orchard in Los Altos that had been turned into a subdivision of cookie-cutter tract homes. Their house, at 2066 Crist Drive, was one story with three bedrooms and an all-important attached garage with a roll-down door facing the street. There Paul Jobs could tinker with cars and his son with electronics.

Its other significant attribute was that it was just over the line inside what was then the Cupertino-Sunnyvale School District, one of the safest and best in the valley. "When I moved here, these corners were still orchards," Jobs pointed out as we walked in front of his old house. "The guy who lived right there taught me how to be a good organic gardener and to compost. He grew everything to perfection. I never had better food in my life. That's when I began to appreciate organic fruits and vegetables."

Even though they were not fervent about their faith, Jobs's parents wanted him to have a religious upbringing, so they took him to the Lutheran church most Sundays. That came to an end when he was thirteen. In July 1968 *Life* magazine published a shocking cover show-

ing a pair of starving children in Biafra. Jobs took it to Sunday school and confronted the church's pastor. "If I raise my finger, will God know which one I'm going to raise even before I do it?"

The pastor answered, "Yes, God knows everything."

Jobs then pulled out the *Life* cover and asked, "Well, does God know about this and what's going to happen to those children?"

"Steve, I know you don't understand, but yes, God knows about that."

Jobs announced that he didn't want to have anything to do with worshipping such a God, and he never went back to church. He did, however, spend years studying and trying to practice the tenets of Zen Buddhism. Reflecting years later on his spiritual feelings, he said that religion was at its best when it emphasized spiritual experiences rather than received dogma. "The juice goes out of Christianity when it becomes too based on faith rather than on living like Jesus or seeing the world as Jesus saw it," he told me. "I think different religions are different doors to the same house. Sometimes I think the house exists, and sometimes I don't. It's the great mystery."

Paul Jobs was then working at Spectra-Physics, a company in nearby Santa Clara that made lasers for electronics and medical products. As a machinist, he crafted the prototypes of products that the engineers were devising. His son was fascinated by the need for perfection. "Lasers require precision alignment," Jobs said. "The really sophisticated ones, for airborne applications or medical, had very precise features. They would tell my dad something like, 'This is what we want, and we want it out of one piece of metal so that the coefficients of expansion are all the same.' And he had to figure out how to do it." Most pieces had to be made from scratch, which meant that Paul had to create custom tools and dies. His son was impressed, but he rarely went to the machine shop. "It would have been fun if he had gotten to teach me how to use a mill and lathe. But unfortunately I never went, because I was more interested in electronics."

One summer Paul took Steve to Wisconsin to visit the family's dairy farm. Rural life did not appeal to Steve, but one image stuck with him. He saw a calf being born, and he was amazed when the tiny animal struggled up within minutes and began to walk. "It was not

something she had learned, but it was instead hardwired into her," he recalled. "A human baby couldn't do that. I found it remarkable, even though no one else did." He put it in hardware-software terms: "It was as if something in the animal's body and in its brain had been engineered to work together instantly rather than being learned."

In ninth grade Jobs went to Homestead High, which had a sprawling campus of two-story cinderblock buildings painted pink that served two thousand students. "It was designed by a famous prison architect," Jobs recalled. "They wanted to make it indestructible." He had developed a love of walking, and he walked the fifteen blocks to school by himself each day.

He had few friends his own age, but he got to know some seniors who were immersed in the counterculture of the late 1960s. It was a time when the geek and hippie worlds were beginning to show some overlap. "My friends were the really smart kids," he said. "I was interested in math and science and electronics. They were too, and also into LSD and the whole counterculture trip."

His pranks by then typically involved electronics. At one point he wired his house with speakers. But since speakers can also be used as microphones, he built a control room in his closet, where he could listen in on what was happening in other rooms. One night, when he had his headphones on and was listening in on his parents' bedroom, his father caught him and angrily demanded that he dismantle the system. He spent many evenings visiting the garage of Larry Lange, the engineer who lived down the street from his old house. Lange eventually gave Jobs the carbon microphone that had fascinated him, and he turned him on to Heathkits, those assemble-it-yourself kits for making ham radios and other electronic gear that were beloved by the soldering set back then. "Heathkits came with all the boards and parts color-coded, but the manual also explained the theory of how it operated," Jobs recalled. "It made you realize you could build and understand anything. Once you built a couple of radios, you'd see a TV in the catalogue and say, 'I can build that as well,' even if you didn't. I was very lucky, because when I was a kid both my dad and the Heathkits made me believe I could build anything."

Lange also got him into the Hewlett-Packard Explorers Club, a

group of fifteen or so students who met in the company cafeteria on Tuesday nights. "They would get an engineer from one of the labs to come and talk about what he was working on," Jobs recalled. "My dad would drive me there. I was in heaven. HP was a pioneer of light-emitting diodes. So we talked about what to do with them." Because his father now worked for a laser company, that topic particularly interested him. One night he cornered one of HP's laser engineers after a talk and got a tour of the holography lab. But the most lasting impression came from seeing the small computers the company was developing. "I saw my first desktop computer there. It was called the 9100A, and it was a glorified calculator but also really the first desktop computer. It was huge, maybe forty pounds, but it was a beauty of a thing. I fell in love with it."

The kids in the Explorers Club were encouraged to do projects, and Jobs decided to build a frequency counter, which measures the number of pulses per second in an electronic signal. He needed some parts that HP made, so he picked up the phone and called the CEO. "Back then, people didn't have unlisted numbers. So I looked up Bill Hewlett in Palo Alto and called him at home. And he answered and chatted with me for twenty minutes. He got me the parts, but he also got me a job in the plant where they made frequency counters." Jobs worked there the summer after his freshman year at Homestead High. "My dad would drive me in the morning and pick me up in the evening."

His work mainly consisted of "just putting nuts and bolts on things" on an assembly line. There was some resentment among his fellow line workers toward the pushy kid who had talked his way in by calling the CEO. "I remember telling one of the supervisors, 'I love this stuff, I love this stuff,' and then I asked him what he liked to do best. And he said, 'To fuck, to fuck.' " Jobs had an easier time ingratiating himself with the engineers who worked one floor above. "They served doughnuts and coffee every morning at ten. So I'd go upstairs and hang out with them."

Jobs liked to work. He also had a newspaper route—his father would drive him when it was raining—and during his sophomore year spent weekends and the summer as a stock clerk at a cavernous electronics store, Haltek. It was to electronics what his father's junkyards

were to auto parts: a scavenger's paradise sprawling over an entire city block with new, used, salvaged, and surplus components crammed onto warrens of shelves, dumped unsorted into bins, and piled in an outdoor yard. "Out in the back, near the bay, they had a fenced-in area with things like Polaris submarine interiors that had been ripped and sold for salvage," he recalled. "All the controls and buttons were right there. The colors were military greens and grays, but they had these switches and bulb covers of amber and red. There were these big old lever switches that, when you flipped them, it was awesome, like you were blowing up Chicago."

At the wooden counters up front, laden with thick catalogues in tattered binders, people would haggle for switches, resistors, capacitors, and sometimes the latest memory chips. His father used to do that for auto parts, and he succeeded because he knew the value of each better than the clerks. Jobs followed suit. He developed a knowledge of electronic parts that was honed by his love of negotiating and turning a profit. He would go to electronic flea markets, such as the San Jose swap meet, haggle for a used circuit board that contained some valuable chips or components, and then sell those to his manager at Haltek.

Jobs was able to get his first car, with his father's help, when he was fifteen. It was a two-tone Nash Metropolitan that his father had fitted out with an MG engine. Jobs didn't really like it, but he did not want to tell his father that, or miss out on the chance to have his own car. "In retrospect, a Nash Metropolitan might seem like the most wickedly cool car," he later said. "But at the time it was the most uncool car in the world. Still, it was a car, so that was great." Within a year he had saved up enough from his various jobs that he could trade up to a red Fiat 850 coupe with an Abarth engine. "My dad helped me buy and inspect it. The satisfaction of getting paid and saving up for something, that was very exciting."

That same summer, between his sophomore and junior years at Homestead, Jobs began smoking marijuana. "I got stoned for the first time that summer. I was fifteen, and then began using pot regularly." At one point his father found some dope in his son's Fiat. "What's this?" he asked. Jobs coolly replied, "That's marijuana." It was one of the few times in his life that he faced his father's anger. "That was the

only real fight I ever got in with my dad," he said. But his father again bent to his will. "He wanted me to promise that I'd never use pot again, but I wouldn't promise." In fact by his senior year he was also dabbling in LSD and hash as well as exploring the mind-bending effects of sleep deprivation. "I was starting to get stoned a bit more. We would also drop acid occasionally, usually in fields or in cars."

He also flowered intellectually during his last two years in high school and found himself at the intersection, as he had begun to see it, of those who were geekily immersed in electronics and those who were into literature and creative endeavors. "I started to listen to music a whole lot, and I started to read more outside of just science and technology—Shakespeare, Plato. I loved *King Lear*." His other favorites included *Moby-Dick* and the poems of Dylan Thomas. I asked him why he related to King Lear and Captain Ahab, two of the most willful and driven characters in literature, but he didn't respond to the connection I was making, so I let it drop. "When I was a senior I had this phenomenal AP English class. The teacher was this guy who looked like Ernest Hemingway. He took a bunch of us snowshoeing in Yosemite."

One course that Jobs took would become part of Silicon Valley lore: the electronics class taught by John McCollum, a former Navy pilot who had a showman's flair for exciting his students with such tricks as firing up a Tesla coil. His little stockroom, to which he would lend the key to pet students, was crammed with transistors and other components he had scored.

McCollum's classroom was in a shed-like building on the edge of the campus, next to the parking lot. "This is where it was," Jobs recalled as he peered in the window, "and here, next door, is where the auto shop class used to be." The juxtaposition highlighted the shift from the interests of his father's generation. "Mr. McCollum felt that electronics class was the new auto shop."

McCollum believed in military discipline and respect for authority. Jobs didn't. His aversion to authority was something he no longer tried to hide, and he affected an attitude that combined wiry and weird intensity with aloof rebelliousness. McCollum later said, "He was usually off in a corner doing something on his own and really didn't want to have much of anything to do with either me or the rest of the class." He

never trusted Jobs with a key to the stockroom. One day Jobs needed a part that was not available, so he made a collect call to the manufacturer, Burroughs in Detroit, and said he was designing a new product and wanted to test out the part. It arrived by air freight a few days later. When McCollum asked how he had gotten it, Jobs described—with defiant pride—the collect call and the tale he had told. "I was furious," McCollum said. "That was not the way I wanted my students to behave." Jobs's response was, "I don't have the money for the phone call. They've got plenty of money."

Jobs took McCollum's class for only one year, rather than the three that it was offered. For one of his projects, he made a device with a photocell that would switch on a circuit when exposed to light, something any high school science student could have done. He was far more interested in playing with lasers, something he learned from his father. With a few friends, he created light shows for parties by bouncing lasers off mirrors that were attached to the speakers of his stereo system.

CHAPTER TWO

ODD COUPLE

The Two Steves

Jobs and Wozniak in the garage, 1976

Woz

While a student in McCollum's class, Jobs became friends with a graduate who was the teacher's all-time favorite and a school legend for his wizardry in the class. Stephen Wozniak, whose younger brother had been on a swim team with Jobs, was almost five years older than Jobs and far more knowledgeable about electronics. But emotionally and socially he was still a high school geek.

Like Jobs, Wozniak learned a lot at his father's knee. But their lessons were different. Paul Jobs was a high school dropout who, when fixing up cars, knew how to turn a tidy profit by striking the right deal

on parts. Francis Wozniak, known as Jerry, was a brilliant engineering graduate from Cal Tech, where he had quarterbacked the football team, who became a rocket scientist at Lockheed. He exalted engineering and looked down on those in business, marketing, and sales. "I remember him telling me that engineering was the highest level of importance you could reach in the world," Steve Wozniak later recalled. "It takes society to a new level."

One of Steve Wozniak's first memories was going to his father's workplace on a weekend and being shown electronic parts, with his dad "putting them on a table with me so I got to play with them." He watched with fascination as his father tried to get a waveform line on a video screen to stay flat so he could show that one of his circuit designs was working properly. "I could see that whatever my dad was doing, it was important and good." Woz, as he was known even then, would ask about the resistors and transistors lying around the house, and his father would pull out a blackboard to illustrate what they did. "He would explain what a resistor was by going all the way back to atoms and electrons. He explained how resistors worked when I was in second grade, not by equations but by having me picture it."

Woz's father taught him something else that became ingrained in his childlike, socially awkward personality: Never lie. "My dad believed in honesty. Extreme honesty. That's the biggest thing he taught me. I never lie, even to this day." (The only partial exception was in the service of a good practical joke.) In addition, he imbued his son with an aversion to extreme ambition, which set Woz apart from Jobs. At an Apple product launch event in 2010, forty years after they met, Woz reflected on their differences. "My father told me, 'You always want to be in the middle,' " he said. "I didn't want to be up with the high-level people like Steve. My dad was an engineer, and that's what I wanted to be. I was way too shy ever to be a business leader like Steve."

By fourth grade Wozniak became, as he put it, one of the "electronics kids." He had an easier time making eye contact with a transistor than with a girl, and he developed the chunky and stooped look of a guy who spends most of his time hunched over circuit boards. At the same age when Jobs was puzzling over a carbon microphone that

his dad couldn't explain, Wozniak was using transistors to build an intercom system featuring amplifiers, relays, lights, and buzzers that connected the kids' bedrooms of six houses in the neighborhood. And at an age when Jobs was building Heathkits, Wozniak was assembling a transmitter and receiver from Hallicrafters, the most sophisticated radios available.

Woz spent a lot of time at home reading his father's electronics journals, and he became enthralled by stories about new computers, such as the powerful ENIAC. Because Boolean algebra came naturally to him, he marveled at how simple, rather than complex, the computers were. In eighth grade he built a calculator that included one hundred transistors, two hundred diodes, and two hundred resistors on ten circuit boards. It won top prize in a local contest run by the Air Force, even though the competitors included students through twelfth grade.

Woz became more of a loner when the boys his age began going out with girls and partying, endeavors that he found far more complex than designing circuits. "Where before I was popular and riding bikes and everything, suddenly I was socially shut out," he recalled. "It seemed like nobody spoke to me for the longest time." He found an outlet by playing juvenile pranks. In twelfth grade he built an electronic metronome—one of those tick-tick-tick devices that keep time in music class—and realized it sounded like a bomb. So he took the labels off some big batteries, taped them together, and put it in a school locker; he rigged it to start ticking faster when the locker opened. Later that day he got called to the principal's office. He thought it was because he had won, yet again, the school's top math prize. Instead he was confronted by the police. The principal had been summoned when the device was found, bravely ran onto the football field clutching it to his chest, and pulled the wires off. Woz tried and failed to suppress his laughter. He actually got sent to the juvenile detention center, where he spent the night. It was a memorable experience. He taught the other prisoners how to disconnect the wires leading to the ceiling fans and connect them to the bars so people got shocked when touching them.

Getting shocked was a badge of honor for Woz. He prided himself on being a hardware engineer, which meant that random shocks were

routine. He once devised a roulette game where four people put their thumbs in a slot; when the ball landed, one would get shocked. "Hardware guys will play this game, but software guys are too chicken," he noted.

During his senior year he got a part-time job at Sylvania and had the chance to work on a computer for the first time. He learned FORTRAN from a book and read the manuals for most of the systems of the day, starting with the Digital Equipment PDP-8. Then he studied the specs for the latest microchips and tried to redesign the computers using these newer parts. The challenge he set himself was to replicate the design using the fewest components possible. Each night he would try to improve his drawing from the night before. By the end of his senior year, he had become a master. "I was now designing computers with half the number of chips the actual company had in their own design, but only on paper." He never told his friends. After all, most seventeen-year-olds were getting their kicks in other ways.

On Thanksgiving weekend of his senior year, Wozniak visited the University of Colorado. It was closed for the holiday, but he found an engineering student who took him on a tour of the labs. He begged his father to let him go there, even though the out-of-state tuition was more than the family could easily afford. They struck a deal: He would be allowed to go for one year, but then he would transfer to De Anza Community College back home. After arriving at Colorado in the fall of 1969, he spent so much time playing pranks (such as producing reams of printouts saying "Fuck Nixon") that he failed a couple of his courses and was put on probation. In addition, he created a program to calculate Fibonacci numbers that burned up so much computer time the university threatened to bill him for the cost. So he readily lived up to his bargain with his parents and transferred to De Anza.

After a pleasant year at De Anza, Wozniak took time off to make some money. He found work at a company that made computers for the California Motor Vehicle Department, and a coworker made him a wonderful offer: He would provide some spare chips so Wozniak could make one of the computers he had been sketching on paper. Wozniak decided to use as few chips as possible, both as a personal challenge and because he did not want to take advantage of his colleague's largesse.

Much of the work was done in the garage of a friend just around the corner, Bill Fernandez, who was still at Homestead High. To lubricate their efforts, they drank large amounts of Cragmont cream soda, riding their bikes to the Sunnyvale Safeway to return the bottles, collect the deposits, and buy more. "That's how we started referring to it as the Cream Soda Computer," Wozniak recalled. It was basically a calculator capable of multiplying numbers entered by a set of switches and displaying the results in binary code with little lights.

When it was finished, Fernandez told Wozniak there was someone at Homestead High he should meet. "His name is Steve. He likes to do pranks like you do, and he's also into building electronics like you are." It may have been the most significant meeting in a Silicon Valley garage since Hewlett went into Packard's thirty-two years earlier. "Steve and I just sat on the sidewalk in front of Bill's house for the longest time, just sharing stories—mostly about pranks we'd pulled, and also what kind of electronic designs we'd done," Wozniak recalled. "We had so much in common. Typically, it was really hard for me to explain to people what kind of design stuff I worked on, but Steve got it right away. And I liked him. He was kind of skinny and wiry and full of energy." Jobs was also impressed. "Woz was the first person I'd met who knew more electronics than I did," he once said, stretching his own expertise. "I liked him right away. I was a little more mature than my years, and he was a little less mature than his, so it evened out. Woz was very bright, but emotionally he was my age."

In addition to their interest in computers, they shared a passion for music. "It was an incredible time for music," Jobs recalled. "It was like living at a time when Beethoven and Mozart were alive. Really. People will look back on it that way. And Woz and I were deeply into it." In particular, Wozniak turned Jobs on to the glories of Bob Dylan. "We tracked down this guy in Santa Cruz who put out this newsletter on Dylan," Jobs said. "Dylan taped all of his concerts, and some of the people around him were not scrupulous, because soon there were tapes all around. Bootlegs of everything. And this guy had them all."

Hunting down Dylan tapes soon became a joint venture. "The two of us would go tramping through San Jose and Berkeley and ask about Dylan bootlegs and collect them," said Wozniak. "We'd buy brochures

of Dylan lyrics and stay up late interpreting them. Dylan's words struck chords of creative thinking." Added Jobs, "I had more than a hundred hours, including every concert on the '65 and '66 tour," the one where Dylan went electric. Both of them bought high-end TEAC reel-to-reel tape decks. "I would use mine at a low speed to record many concerts on one tape," said Wozniak. Jobs matched his obsession: "Instead of big speakers I bought a pair of awesome headphones and would just lie in my bed and listen to that stuff for hours."

Jobs had formed a club at Homestead High to put on music-and-light shows and also play pranks. (They once glued a gold-painted toilet seat onto a flower planter.) It was called the Buck Fry Club, a play on the name of the principal. Even though they had already graduated, Wozniak and his friend Allen Baum joined forces with Jobs, at the end of his junior year, to produce a farewell gesture for the departing seniors. Showing off the Homestead campus four decades later, Jobs paused at the scene of the escapade and pointed. "See that balcony? That's where we did the banner prank that sealed our friendship." On a big bedsheet Baum had tie-dyed with the school's green and white colors, they painted a huge hand flipping the middle-finger salute. Baum's nice Jewish mother helped them draw it and showed them how to do the shading and shadows to make it look more real. "I know what that is," she snickered. They devised a system of ropes and pulleys so that it could be dramatically lowered as the graduating class marched past the balcony, and they signed it "SWAB JOB," the initials of Wozniak and Baum combined with part of Jobs's name. The prank became part of school lore—and got Jobs suspended one more time.

Another prank involved a pocket device Wozniak built that could emit TV signals. He would take it to a room where a group of people were watching TV, such as in a dorm, and secretly press the button so that the screen would get fuzzy with static. When someone got up and whacked the set, Wozniak would let go of the button and the picture would clear up. Once he had the unsuspecting viewers hopping up and down at his will, he would make things harder. He would keep the picture fuzzy until someone touched the antenna. Eventually he would make people think they had to hold the antenna while standing on one foot or touching the top of the set. Years later, at a keynote presenta-

tion where he was having his own trouble getting a video to work, Jobs broke from his script and recounted the fun they had with the device. "Woz would have it in his pocket and we'd go into a dorm . . . where a bunch of folks would be, like, watching *Star Trek*, and he'd screw up the TV, and someone would go up to fix it, and just as they had the foot off the ground he would turn it back on, and as they put their foot back on the ground he'd screw it up again." Contorting himself into a pretzel onstage, Jobs concluded to great laughter, "And within five minutes he would have someone like this."

The Blue Box

The ultimate combination of pranks and electronics—and the escapade that helped to create Apple—was launched one Sunday afternoon when Wozniak read an article in *Esquire* that his mother had left for him on the kitchen table. It was September 1971, and he was about to drive off the next day to Berkeley, his third college. The story, Ron Rosenbaum's "Secrets of the Little Blue Box," described how hackers and phone phreakers had found ways to make long-distance calls for free by replicating the tones that routed signals on the AT&T network. "Halfway through the article, I had to call my best friend, Steve Jobs, and read parts of this long article to him," Wozniak recalled. He knew that Jobs, then beginning his senior year, was one of the few people who would share his excitement.

A hero of the piece was John Draper, a hacker known as Captain Crunch because he had discovered that the sound emitted by the toy whistle that came with the breakfast cereal was the same 2600 Hertz tone used by the phone network's call-routing switches. It could fool the system into allowing a long-distance call to go through without extra charges. The article revealed that other tones that served to route calls could be found in an issue of the *Bell System Technical Journal*, which AT&T immediately began asking libraries to pull from their shelves.

As soon as Jobs got the call from Wozniak that Sunday afternoon, he knew they would have to get their hands on the technical journal right away. "Woz picked me up a few minutes later, and we went to the

library at SLAC [the Stanford Linear Accelerator Center] to see if we could find it," Jobs recounted. It was Sunday and the library was closed, but they knew how to get in through a door that was rarely locked. "I remember that we were furiously digging through the stacks, and it was Woz who finally found the journal with all the frequencies. It was like, holy shit, and we opened it and there it was. We kept saying to ourselves, 'It's real. Holy shit, it's real.' It was all laid out—the tones, the frequencies."

Wozniak went to Sunnyvale Electronics before it closed that evening and bought the parts to make an analog tone generator. Jobs had built a frequency counter when he was part of the HP Explorers Club, and they used it to calibrate the desired tones. With a dial, they could replicate and tape-record the sounds specified in the article. By midnight they were ready to test it. Unfortunately the oscillators they used were not quite stable enough to replicate the right chirps to fool the phone company. "We could see the instability using Steve's frequency counter," recalled Wozniak, "and we just couldn't make it work. I had to leave for Berkeley the next morning, so we decided I would work on building a digital version once I got there."

No one had ever created a digital version of a Blue Box, but Woz was made for the challenge. Using diodes and transistors from Radio Shack, and with the help of a music student in his dorm who had perfect pitch, he got it built before Thanksgiving. "I have never designed a circuit I was prouder of," he said. "I still think it was incredible."

One night Wozniak drove down from Berkeley to Jobs's house to try it. They attempted to call Wozniak's uncle in Los Angeles, but they got a wrong number. It didn't matter; their device had worked. "Hi! We're calling you for free! We're calling you for free!" Wozniak shouted. The person on the other end was confused and annoyed. Jobs chimed in, "We're calling from California! From California! With a Blue Box." This probably baffled the man even more, since he was also in California.

At first the Blue Box was used for fun and pranks. The most daring of these was when they called the Vatican and Wozniak pretended to be Henry Kissinger wanting to speak to the pope. "Ve are at de summit meeting in Moscow, and ve need to talk to de pope," Woz intoned.

He was told that it was 5:30 a.m. and the pope was sleeping. When he called back, he got a bishop who was supposed to serve as the translator. But they never actually got the pope on the line. "They realized that Woz wasn't Henry Kissinger," Jobs recalled. "We were at a public phone booth."

It was then that they reached an important milestone, one that would establish a pattern in their partnerships: Jobs came up with the idea that the Blue Box could be more than merely a hobby; they could build and sell them. "I got together the rest of the components, like the casing and power supply and keypads, and figured out how we could price it," Jobs said, foreshadowing roles he would play when they founded Apple. The finished product was about the size of two decks of playing cards. The parts cost about $40, and Jobs decided they should sell it for $150.

Following the lead of other phone phreaks such as Captain Crunch, they gave themselves handles. Wozniak became "Berkeley Blue," Jobs was "Oaf Tobark." They took the device to college dorms and gave demonstrations by attaching it to a phone and speaker. While the potential customers watched, they would call the Ritz in London or a dial-a-joke service in Australia. "We made a hundred or so Blue Boxes and sold almost all of them," Jobs recalled.

The fun and profits came to an end at a Sunnyvale pizza parlor. Jobs and Wozniak were about to drive to Berkeley with a Blue Box they had just finished making. Jobs needed money and was eager to sell, so he pitched the device to some guys at the next table. They were interested, so Jobs went to a phone booth and demonstrated it with a call to Chicago. The prospects said they had to go to their car for money. "So we walk over to the car, Woz and me, and I've got the Blue Box in my hand, and the guy gets in, reaches under the seat, and he pulls out a gun," Jobs recounted. He had never been that close to a gun, and he was terrified. "So he's pointing the gun right at my stomach, and he says, 'Hand it over, brother.' My mind raced. There was the car door here, and I thought maybe I could slam it on his legs and we could run, but there was this high probability that he would shoot me. So I slowly handed it to him, very carefully." It was a weird sort of robbery. The guy who took the Blue Box actually gave Jobs a phone number and

said he would try to pay for it if it worked. When Jobs later called the number, the guy said he couldn't figure out how to use it. So Jobs, in his felicitous way, convinced the guy to meet him and Wozniak at a public place. But they ended up deciding not to have another encounter with the gunman, even on the off chance they could get their $150.

The partnership paved the way for what would be a bigger adventure together. "If it hadn't been for the Blue Boxes, there wouldn't have been an Apple," Jobs later reflected. "I'm 100% sure of that. Woz and I learned how to work together, and we gained the confidence that we could solve technical problems and actually put something into production." They had created a device with a little circuit board that could control billions of dollars' worth of infrastructure. "You cannot believe how much confidence that gave us." Woz came to the same conclusion: "It was probably a bad idea selling them, but it gave us a taste of what we could do with my engineering skills and his vision." The Blue Box adventure established a template for a partnership that would soon be born. Wozniak would be the gentle wizard coming up with a neat invention that he would have been happy just to give away, and Jobs would figure out how to make it user-friendly, put it together in a package, market it, and make a few bucks.

CHAPTER THREE

THE DROPOUT

Turn On, Tune In . . .

Chrisann Brennan

Toward the end of his senior year at Homestead, in the spring of 1972, Jobs started going out with a girl named Chrisann Brennan, who was about his age but still a junior. With her light brown hair, green eyes, high cheekbones, and fragile aura, she was very attractive. She was also enduring the breakup of her parents' marriage, which made her vulnerable. "We worked together on an animated movie, then started going out, and she became my first real girlfriend," Jobs recalled. As Brennan later said, "Steve was kind of crazy. That's why I was attracted to him."

Jobs's craziness was of the cultivated sort. He had begun his lifelong experiments with compulsive diets, eating only fruits and vegetables, so he was as lean and tight as a whippet. He learned to stare at people without blinking, and he perfected long silences punctuated by staccato bursts of fast talking. This odd mix of intensity and aloofness, combined with his shoulder-length hair and scraggly beard, gave him the aura of a crazed shaman. He oscillated between charismatic and creepy. "He shuffled around and looked half-mad," recalled Brennan. "He had a lot of angst. It was like a big darkness around him."

Jobs had begun to drop acid by then, and at one point he turned on

with Brennan in a wheat field just outside Sunnyvale. "It was great," he recalled. "I had been listening to a lot of Bach. All of a sudden the wheat field was playing Bach. It was the most wonderful feeling of my life up to that point. I felt like the conductor of this symphony with Bach coming through the wheat."

That summer of 1972, after his graduation, he and Brennan moved to a cabin in the hills above Los Altos. "I'm going to go live in a cabin with Chrisann," he announced to his parents one day. His father was furious. "No you're not," he said. "Over my dead body." They had recently fought about marijuana, and once again the younger Jobs was willful. He just said good-bye and walked out.

Brennan spent a lot of her time that summer painting; she was talented, and later she did a picture of a clown for Jobs that he kept on the wall. Jobs wrote poetry and played guitar. He could be brutally cold and rude to her at times, but he was also entrancing and able to impose his will. "He was an enlightened being who was cruel," she recalled. "That's a strange combination."

Midway through the summer, Jobs was almost killed when his red Fiat caught fire. He was driving on Skyline Boulevard in the Santa Cruz Mountains with a high school friend, Tim Brown, who looked back, saw flames coming from the engine, and casually said to Jobs, "Pull over, your car is on fire." Jobs did. His father, despite their arguments, drove out to the hills to tow the Fiat home.

In order to find a way to make money for a new car, Jobs got Wozniak to drive him to De Anza College to look on the help-wanted bulletin board. They discovered that the Westgate Shopping Center in San Jose was seeking college students who could dress up in costumes and amuse the kids. So for $3 an hour, Jobs, Wozniak, and Brennan donned heavy full-body costumes to play Alice in Wonderland, the Mad Hatter, and the White Rabbit. Wozniak, in his earnest and sweet way, found it fun. "I said, 'I want to do it, it's my chance, because I love children.' I think Steve looked at it as a lousy job, but I looked at it as a fun adventure." Jobs did indeed find it a pain. "It was hot, the costumes were heavy, and after a while I felt like I wanted to smack some of the kids." Patience was never one of his virtues.

Reed College

Seventeen years earlier, Jobs's parents had made a pledge when they adopted him: He would go to college. So they had worked hard and saved dutifully for his college fund, which was modest but adequate by the time he graduated. But Jobs, becoming ever more willful, did not make it easy. At first he toyed with not going to college at all. "I think I might have headed to New York if I didn't go to college," he recalled, musing on how different his world—and perhaps all of ours—might have been if he had chosen that path. When his parents pushed him to go to college, he responded in a passive-aggressive way. He did not consider state schools, such as Berkeley, where Woz then was, despite the fact that they were more affordable. Nor did he look at Stanford, just up the road and likely to offer a scholarship. "The kids who went to Stanford, they already knew what they wanted to do," he said. "They weren't really artistic. I wanted something that was more artistic and interesting."

Instead he insisted on applying only to Reed College, a private liberal arts school in Portland, Oregon, that was one of the most expensive in the nation. He was visiting Woz at Berkeley when his father called to say an acceptance letter had arrived from Reed, and he tried to talk Steve out of going there. So did his mother. It was far more than they could afford, they said. But their son responded with an ultimatum: If he couldn't go to Reed, he wouldn't go anywhere. They relented, as usual.

Reed had only one thousand students, half the number at Homestead High. It was known for its free-spirited hippie lifestyle, which combined somewhat uneasily with its rigorous academic standards and core curriculum. Five years earlier Timothy Leary, the guru of psychedelic enlightenment, had sat cross-legged at the Reed College commons while on his League for Spiritual Discovery (LSD) college tour, during which he exhorted his listeners, "Like every great religion of the past we seek to find the divinity within. . . . These ancient goals we define in the metaphor of the present—turn on, tune in, drop out."

Many of Reed's students took all three of those injunctions seriously; the dropout rate during the 1970s was more than one-third.

When it came time for Jobs to matriculate in the fall of 1972, his parents drove him up to Portland, but in another small act of rebellion he refused to let them come on campus. In fact he refrained from even saying good-bye or thanks. He recounted the moment later with uncharacteristic regret:

> It's one of the things in life I really feel ashamed about. I was not very sensitive, and I hurt their feelings. I shouldn't have. They had done so much to make sure I could go there, but I just didn't want them around. I didn't want anyone to know I had parents. I wanted to be like an orphan who had bummed around the country on trains and just arrived out of nowhere, with no roots, no connections, no background.

In late 1972, there was a fundamental shift happening in American campus life. The nation's involvement in the Vietnam War, and the draft that accompanied it, was winding down. Political activism at colleges receded and in many late-night dorm conversations was replaced by an interest in pathways to personal fulfillment. Jobs found himself deeply influenced by a variety of books on spirituality and enlightenment, most notably *Be Here Now,* a guide to meditation and the wonders of psychedelic drugs by Baba Ram Dass, born Richard Alpert. "It was profound," Jobs said. "It transformed me and many of my friends."

The closest of those friends was another wispy-bearded freshman named Daniel Kottke, who met Jobs a week after they arrived at Reed and shared his interest in Zen, Dylan, and acid. Kottke, from a wealthy New York suburb, was smart but low-octane, with a sweet flower-child demeanor made even mellower by his interest in Buddhism. That spiritual quest had caused him to eschew material possessions, but he was nonetheless impressed by Jobs's tape deck. "Steve had a TEAC reel-to-reel and massive quantities of Dylan bootlegs," Kottke recalled. "He was both really cool and high-tech."

Jobs started spending much of his time with Kottke and his girlfriend, Elizabeth Holmes, even after he insulted her at their first meet-

ing by grilling her about how much money it would take to get her to have sex with another man. They hitchhiked to the coast together, engaged in the typical dorm raps about the meaning of life, attended the love festivals at the local Hare Krishna temple, and went to the Zen center for free vegetarian meals. "It was a lot of fun," said Kottke, "but also philosophical, and we took Zen very seriously."

Jobs began sharing with Kottke other books, including *Zen Mind, Beginner's Mind* by Shunryu Suzuki, *Autobiography of a Yogi* by Paramahansa Yogananda, and *Cutting Through Spiritual Materialism* by Chögyam Trungpa. They created a meditation room in the attic crawl space above Elizabeth Holmes's room and fixed it up with Indian prints, a dhurrie rug, candles, incense, and meditation cushions. "There was a hatch in the ceiling leading to an attic which had a huge amount of space," Jobs said. "We took psychedelic drugs there sometimes, but mainly we just meditated."

Jobs's engagement with Eastern spirituality, and especially Zen Buddhism, was not just some passing fancy or youthful dabbling. He embraced it with his typical intensity, and it became deeply ingrained in his personality. "Steve is very much Zen," said Kottke. "It was a deep influence. You see it in his whole approach of stark, minimalist aesthetics, intense focus." Jobs also became deeply influenced by the emphasis that Buddhism places on intuition. "I began to realize that an intuitive understanding and consciousness was more significant than abstract thinking and intellectual logical analysis," he later said. His intensity, however, made it difficult for him to achieve inner peace; his Zen awareness was not accompanied by an excess of calm, peace of mind, or interpersonal mellowness.

He and Kottke enjoyed playing a nineteenth-century German variant of chess called Kriegspiel, in which the players sit back-to-back; each has his own board and pieces and cannot see those of his opponent. A moderator informs them if a move they want to make is legal or illegal, and they have to try to figure out where their opponent's pieces are. "The wildest game I played with them was during a lashing rainstorm sitting by the fireside," recalled Holmes, who served as moderator. "They were tripping on acid. They were moving so fast I could barely keep up with them."

Another book that deeply influenced Jobs during his freshman year was *Diet for a Small Planet* by Frances Moore Lappé, which extolled the personal and planetary benefits of vegetarianism. "That's when I swore off meat pretty much for good," he recalled. But the book also reinforced his tendency to embrace extreme diets, which included purges, fasts, or eating only one or two foods, such as carrots or apples, for weeks on end.

Jobs and Kottke became serious vegetarians during their freshman year. "Steve got into it even more than I did," said Kottke. "He was living off Roman Meal cereal." They would go shopping at a farmers' co-op, where Jobs would buy a box of cereal, which would last a week, and other bulk health food. "He would buy flats of dates and almonds and lots of carrots, and he got a Champion juicer and we'd make carrot juice and carrot salads. There is a story about Steve turning orange from eating so many carrots, and there is some truth to that." Friends remember him having, at times, a sunset-like orange hue.

Jobs's dietary habits became even more obsessive when he read *Mucusless Diet Healing System* by Arnold Ehret, an early twentieth-century German-born nutrition fanatic. He believed in eating nothing but fruits and starchless vegetables, which he said prevented the body from forming harmful mucus, and he advocated cleansing the body regularly through prolonged fasts. That meant the end of even Roman Meal cereal—or any bread, grains, or milk. Jobs began warning friends of the mucus dangers lurking in their bagels. "I got into it in my typical nutso way," he said. At one point he and Kottke went for an entire week eating only apples, and then Jobs began to try even purer fasts. He started with two-day fasts, and eventually tried to stretch them to a week or more, breaking them carefully with large amounts of water and leafy vegetables. "After a week you start to feel fantastic," he said. "You get a ton of vitality from not having to digest all this food. I was in great shape. I felt I could get up and walk to San Francisco anytime I wanted."

Vegetarianism and Zen Buddhism, meditation and spirituality, acid and rock—Jobs rolled together, in an amped-up way, the multiple impulses that were hallmarks of the enlightenment-seeking campus subculture of the era. And even though he barely indulged it at Reed, there

was still an undercurrent of electronic geekiness in his soul that would someday combine surprisingly well with the rest of the mix.

Robert Friedland

In order to raise some cash one day, Jobs decided to sell his IBM Selectric typewriter. He walked into the room of the student who had offered to buy it only to discover that he was having sex with his girlfriend. Jobs started to leave, but the student invited him to take a seat and wait while they finished. "I thought, 'This is kind of far out,'" Jobs later recalled. And thus began his relationship with Robert Friedland, one of the few people in Jobs's life who were able to mesmerize him. He adopted some of Friedland's charismatic traits and for a few years treated him almost like a guru—until he began to see him as a charlatan.

Friedland was four years older than Jobs, but still an undergraduate. The son of an Auschwitz survivor who became a prosperous Chicago architect, he had originally gone to Bowdoin, a liberal arts college in Maine. But while a sophomore, he was arrested for possession of 24,000 tablets of LSD worth $125,000. The local newspaper pictured him with shoulder-length wavy blond hair smiling at the photographers as he was led away. He was sentenced to two years at a federal prison in Virginia, from which he was paroled in 1972. That fall he headed off to Reed, where he immediately ran for student body president, saying that he needed to clear his name from the "miscarriage of justice" he had suffered. He won.

Friedland had heard Baba Ram Dass, the author of *Be Here Now*, give a speech in Boston, and like Jobs and Kottke had gotten deeply into Eastern spirituality. During the summer of 1973, he traveled to India to meet Ram Dass's Hindu guru, Neem Karoli Baba, famously known to his many followers as Maharaj-ji. When he returned that fall, Friedland had taken a spiritual name and walked around in sandals and flowing Indian robes. He had a room off campus, above a garage, and Jobs would go there many afternoons to seek him out. He was entranced by the apparent intensity of Friedland's conviction that a state

of enlightenment truly existed and could be attained. "He turned me on to a different level of consciousness," Jobs said.

Friedland found Jobs fascinating as well. "He was always walking around barefoot," he later told a reporter. "The thing that struck me was his intensity. Whatever he was interested in he would generally carry to an irrational extreme." Jobs had honed his trick of using stares and silences to master other people. "One of his numbers was to stare at the person he was talking to. He would stare into their fucking eyeballs, ask some question, and would want a response without the other person averting their eyes."

According to Kottke, some of Jobs's personality traits—including a few that lasted throughout his career—were borrowed from Friedland. "Friedland taught Steve the reality distortion field," said Kottke. "He was charismatic and a bit of a con man and could bend situations to his very strong will. He was mercurial, sure of himself, a little dictatorial. Steve admired that, and he became more like that after spending time with Robert."

Jobs also absorbed how Friedland made himself the center of attention. "Robert was very much an outgoing, charismatic guy, a real salesman," Kottke recalled. "When I first met Steve he was shy and self-effacing, a very private guy. I think Robert taught him a lot about selling, about coming out of his shell, of opening up and taking charge of a situation." Friedland projected a high-wattage aura. "He would walk into a room and you would instantly notice him. Steve was the absolute opposite when he came to Reed. After he spent time with Robert, some of it started to rub off."

On Sunday evenings Jobs and Friedland would go to the Hare Krishna temple on the western edge of Portland, often with Kottke and Holmes in tow. They would dance and sing songs at the top of their lungs. "We would work ourselves into an ecstatic frenzy," Holmes recalled. "Robert would go insane and dance like crazy. Steve was more subdued, as if he was embarrassed to let loose." Then they would be treated to paper plates piled high with vegetarian food.

Friedland had stewardship of a 220-acre apple farm, about forty miles southwest of Portland, that was owned by an eccentric millionaire uncle from Switzerland named Marcel Müller. After Friedland

became involved with Eastern spirituality, he turned it into a commune called the All One Farm, and Jobs would spend weekends there with Kottke, Holmes, and like-minded seekers of enlightenment. The farm had a main house, a large barn, and a garden shed, where Kottke and Holmes slept. Jobs took on the task of pruning the Gravenstein apple trees. "Steve ran the apple orchard," said Friedland. "We were in the organic cider business. Steve's job was to lead a crew of freaks to prune the orchard and whip it back into shape."

Monks and disciples from the Hare Krishna temple would come and prepare vegetarian feasts redolent of cumin, coriander, and turmeric. "Steve would be starving when he arrived, and he would stuff himself," Holmes recalled. "Then he would go and purge. For years I thought he was bulimic. It was very upsetting, because we had gone to all that trouble of creating these feasts, and he couldn't hold it down."

Jobs was also beginning to have a little trouble stomaching Friedland's cult leader style. "Perhaps he saw a little bit too much of Robert in himself," said Kottke. Although the commune was supposed to be a refuge from materialism, Friedland began operating it more as a business; his followers were told to chop and sell firewood, make apple presses and wood stoves, and engage in other commercial endeavors for which they were not paid. One night Jobs slept under the table in the kitchen and was amused to notice that people kept coming in and stealing each other's food from the refrigerator. Communal economics were not for him. "It started to get very materialistic," Jobs recalled. "Everybody got the idea they were working very hard for Robert's farm, and one by one they started to leave. I got pretty sick of it."

Many years later, after Friedland had become a billionaire copper and gold mining executive—working out of Vancouver, Singapore, and Mongolia—I met him for drinks in New York. That evening I emailed Jobs and mentioned my encounter. He telephoned me from California within an hour and warned me against listening to Friedland. He said that when Friedland was in trouble because of environmental abuses committed by some of his mines, he had tried to contact Jobs to intervene with Bill Clinton, but Jobs had not responded. "Robert always portrayed himself as a spiritual person, but he crossed the line from

being charismatic to being a con man," Jobs said. "It was a strange thing to have one of the spiritual people in your young life turn out to be, symbolically and in reality, a gold miner."

. . . *Drop Out*

Jobs quickly became bored with college. He liked being at Reed, just not taking the required classes. In fact he was surprised when he found out that, for all of its hippie aura, there were strict course requirements. When Wozniak came to visit, Jobs waved his schedule at him and complained, "They are making me take all these courses." Woz replied, "Yes, that's what they do in college." Jobs refused to go to the classes he was assigned and instead went to the ones he wanted, such as a dance class where he could enjoy both the creativity and the chance to meet girls. "I would never have refused to take the courses you were supposed to, that's a difference in our personality," Wozniak marveled.

Jobs also began to feel guilty, he later said, about spending so much of his parents' money on an education that did not seem worthwhile. "All of my working-class parents' savings were being spent on my college tuition," he recounted in a famous commencement address at Stanford. "I had no idea what I wanted to do with my life and no idea how college was going to help me figure it out. And here I was spending all of the money my parents had saved their entire life. So I decided to drop out and trust that it would all work out okay."

He didn't actually want to leave Reed; he just wanted to quit paying tuition and taking classes that didn't interest him. Remarkably, Reed tolerated that. "He had a very inquiring mind that was enormously attractive," said the dean of students, Jack Dudman. "He refused to accept automatically received truths, and he wanted to examine everything himself." Dudman allowed Jobs to audit classes and stay with friends in the dorms even after he stopped paying tuition.

"The minute I dropped out I could stop taking the required classes that didn't interest me, and begin dropping in on the ones that looked interesting," he said. Among them was a calligraphy class that appealed to him after he saw posters on campus that were beautifully drawn. "I

learned about serif and sans serif typefaces, about varying the amount of space between different letter combinations, about what makes great typography great. It was beautiful, historical, artistically subtle in a way that science can't capture, and I found it fascinating."

It was yet another example of Jobs consciously positioning himself at the intersection of the arts and technology. In all of his products, technology would be married to great design, elegance, human touches, and even romance. He would be in the fore of pushing friendly graphical user interfaces. The calligraphy course would become iconic in that regard. "If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts. And since Windows just copied the Mac, it's likely that no personal computer would have them."

In the meantime Jobs eked out a bohemian existence on the fringes of Reed. He went barefoot most of the time, wearing sandals when it snowed. Elizabeth Holmes made meals for him, trying to keep up with his obsessive diets. He returned soda bottles for spare change, continued his treks to the free Sunday dinners at the Hare Krishna temple, and wore a down jacket in the heatless garage apartment he rented for $20 a month. When he needed money, he found work at the psychology department lab maintaining the electronic equipment that was used for animal behavior experiments. Occasionally Chrisann Brennan would come to visit. Their relationship sputtered along erratically. But mostly he tended to the stirrings of his own soul and personal quest for enlightenment.

"I came of age at a magical time," he reflected later. "Our consciousness was raised by Zen, and also by LSD." Even later in life he would credit psychedelic drugs for making him more enlightened. "Taking LSD was a profound experience, one of the most important things in my life. LSD shows you that there's another side to the coin, and you can't remember it when it wears off, but you know it. It reinforced my sense of what was important—creating great things instead of making money, putting things back into the stream of history and of human consciousness as much as I could."

CHAPTER FOUR

ATARI AND INDIA

Zen and the Art of Game Design

Atari

In February 1974, after eighteen months of hanging around Reed, Jobs decided to move back to his parents' home in Los Altos and look for a job. It was not a difficult search. At peak times during the 1970s, the classified section of the *San Jose Mercury* carried up to sixty pages of technology help-wanted ads. One of those caught Jobs's eye. "Have fun, make money," it said. That day Jobs walked into the lobby of the video game manufacturer Atari and told the personnel director, who was startled by his unkempt hair and attire, that he wouldn't leave until they gave him a job.

Atari's founder was a burly entrepreneur named Nolan Bushnell, who was a charismatic visionary with a nice touch of showmanship in him—in other words, another role model waiting to be emulated. After he became famous, he briefly sported a Rolls-Royce and occasionally held staff meetings in a hot tub while his staff smoked dope. As Friedland had done and as Jobs would learn to do, he was able to turn charm into a cunning force, to cajole and intimidate and distort reality with the power of his personality. His chief engineer was Al Alcorn, beefy and jovial and a bit more grounded, the house grown-up

trying to implement the vision and curb the enthusiasms of Bushnell. Their big hit thus far was a video game called Pong, in which two players tried to volley a blip on a screen with two movable lines that acted as paddles. (If you're under thirty, ask your parents.)

When Jobs arrived in the Atari lobby wearing sandals and demanding a job, Alcorn was the one who was summoned. "I was told, 'We've got a hippie kid in the lobby. He says he's not going to leave until we hire him. Should we call the cops or let him in?' I said bring him on in!"

Jobs thus became one of the first fifty employees at Atari, working as a technician for $5 an hour. "In retrospect, it was weird to hire a dropout from Reed," Alcorn recalled. "But I saw something in him. He was very intelligent, enthusiastic, excited about tech." Alcorn assigned him to work with a straitlaced engineer named Don Lang. The next day Lang complained, "This guy's a goddamn hippie with b.o. Why did you do this to me? And he's impossible to deal with." Jobs clung to the belief that his fruit-heavy vegetarian diet would prevent not just mucus but also body odor, even if he didn't use deodorant or shower regularly. It was a flawed theory.

Lang and others wanted to let Jobs go, but Bushnell worked out a solution. "The smell and behavior wasn't an issue with me," he said. "Steve was prickly, but I kind of liked him. So I asked him to go on the night shift. It was a way to save him." Jobs would come in after Lang and others had left and work through most of the night. Even thus isolated, he became known for his brashness. On those occasions when he happened to interact with others, he was prone to informing them that they were "dumb shits." In retrospect, he stands by that judgment. "The only reason I shone was that everyone else was so bad," Jobs recalled.

Despite his arrogance (or perhaps because of it) he was able to charm Atari's boss. "He was more philosophical than the other people I worked with," Bushnell recalled. "We used to discuss free will versus determinism. I tended to believe that things were much more determined, that we were programmed. If we had perfect information, we could predict people's actions. Steve felt the opposite." That outlook accorded with his faith in the power of the will to bend reality.

Jobs helped improve some of the games by pushing the chips to