The Genesis of Apple

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APPLE CONFIDENTIAL 2.0

THE DEFINITIVE HISTORY OF THE WORLD'S MOST COLORFUL COMPANY

OWEN W. LINZMAYER

The Genesis of Apple

It's only fitting that the tale of Apple begins in the fruit orchards of the Santa Clara Valley just as it was taking on its new name, Silicon Valley. Like many boys in his neighborhood at the time, Stephen Gary Wozniak (born August 11, 1950) was enthusiastic about electronics. Inspired by *Tom Swift* books and his father, who was an engineer at Lockheed, Wozniak began tinkering at an early age. At Homestead High School in Cupertino, he demonstrated his wizardry in an electronics course taught by John McCollum. Beginning in 1968, Wozniak studied electrical engineering for several semesters at the University of Colorado in Boulder; then in 1969 he moved back to the Bay Area, where he took general education classes at De Anza College in Cupertino.

In June 1971, after withdrawing from college, Wozniak and neighbor Bill Fernandez, then a high-school sophomore, built their first computer from parts rejected by local companies for cosmetic flaws. It would one day be dubbed the "Cream Soda Computer," after the beverage they consumed while building their device in the Fernandez family garage. The box of blinking lights burned up its power supply during a demonstration for a local newspaper reporter, but Wozniak was undaunted. He had been bitten by the bug and always dreamt of the day that he would create his very own computer. However, parts remained prohibitively expensive, so he had to satisfy himself with creating designs for computers on paper, always striving for elegant solutions that reduced the chip count.

It was around this time that Fernandez introduced Wozniak to his best friend and classmate, Steven Paul Jobs (born February 24, 1955). Bill correctly assumed that their shared interests in electronics would overcome the difference in the ages of "the two Steves." Homestead High School teacher McCollum recalled Jobs as competent and "something of a loner. He always had a different way of looking at things." At one point, Jobs needed parts for a class project. He located Bill Hewlett's number in the phone book and called the legendary founder of Hewlett-Packard at home. Jobs got the parts he needed, as well as a summer job at HP assembling frequency counters, over the phone!

Shortly after returning to college in the fall of 1971—this time at UC Berkeley—Wozniak began his first commercial venture with Jobs. The two peddled "blue boxes" designed by Wozniak based on information contained in the October 1971 issue of *Esquire*. These handheld electronic boxes allowed illegal phone calls to be made free of charge by emulating signals used by the phone company. Jobs supplied $40 in parts and sold the boxes door-to-door in dorm rooms for $150, splitting the profits with Wozniak. In keeping with the spirit of "phone phreaking," Wozniak assumed the name Berkeley Blue and Jobs, Oaf Tobark. During one demonstration, Wozniak called the Vatican posing as Secretary of State Henry Kissinger and asked to speak to Pope Paul VI. Informed that the pope was sleeping but would

"He was the only person I met who knew more about electronics than me."
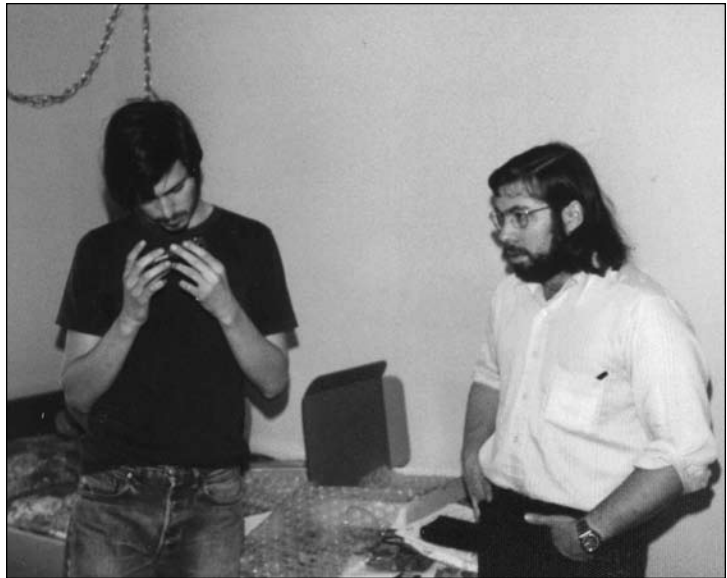**Steve Jobs**, *explaining his initial fascination with Wozniak*

"Steve didn't know very much about electronics."
Steve Wozniak

HP was started by William Hewlett and David Packard in a garage at 367 Addison Avenue in Palo Alto (now California historical landmark #976), not far from Steve Jobs' boyhood home in Los Altos.

Steve Jobs (left) examines a "blue box" that Steve Wozniak (right) designed after reading about such devices in an issue of *Esquire* magazine.

Who could have foreseen that these two would go from making pontifical prank calls to actually meeting world leaders? But that's exactly what happened. In February 1985, Wozniak and Jobs received the National Technology Medal from President Ronald Reagan at the White House. On May 19, 1993, Wozniak presented a PowerBook to Poland's president, Lech Walesa, the former leader of the Solidarity movement. During the Clinton administration, Jobs slept in the White House's Lincoln Bedroom after making a $100,000 donation to the Democratic National Committee.

Atari is equivalent to the chess term *check* in the ancient Japanese game of Go.

be awakened, Wozniak lost his nerve and hung up. Following several close calls with the police and a gun-toting buyer, Jobs and Wozniak quit the business after selling approximately 200 blue boxes.

Through the early 1970s, the paths of Wozniak, Fernandez, and Jobs crossed often. Little did they know that many of the people they met at school and work would soon be drawn into the creation of a remarkable company. To make ends meet in the summer of 1972, Wozniak, Jobs, and Jobs' girlfriend took $3-per-hour jobs at the Westgate Mall in San Jose, dressing up as *Alice in Wonderland* characters. Jobs and Wozniak alternated as the White Rabbit and the Mad Hatter. On February 20, 1973, Wozniak started working at a "real job" in Hewlett-Packard's (www.hp.com) Advanced Products Division, and was soon joined by Fernandez, where the two designed new handheld calculators. For Wozniak, it was a dream just to be working at HP, though he'd tried in vain to join the computer division.

After attending Reed College in Portland, Oregon, for only one semester, Jobs officially dropped out on December 20, 1972, but remained on campus, auditing classes and crashing with friends and in empty dorm rooms. When he finally returned home, Jobs became employee #40 at Atari, the legendary game company founded by Nolan Kay Bushnell in 1972. Jobs earned $5 per hour working as a technician. He was so arrogant and brash with the other employees that his manager, Al Alcorn, rearranged Jobs' schedule so that he would work only nights. As a result, it was easy for Jobs to sneak Wozniak in after hours so that he could play his favorite

Woz's Wanderings

Following the career of Steve "Woz" Wozniak, one can be forgiven if the general impression is of an amiable—perhaps even naive—fellow following his muse over the years, wandering in and out of colleges, marriages, Apple stints, and business ventures. Clearly Woz lacks the single-mindedness and ambition that has driven Steve Jobs to become a billionaire, but Woz has done well enough for himself by trying to do good by others. And in Woz's worldview, that's all that counts.

Woz met his first wife through a popular Dial-a-Joke operation he was running from a bank of phones in his Sunnyvale apartment when he worked at Hewlett-Packard. Normally his answering machine played a Polish joke that he had recorded earlier, but Woz happened to be home when Alice Louise Robertson called, so he picked up the phone, identified himself as Stanley Zeber Zenskanitsky, then blurted out, "I bet I can hang up quicker than you," before slamming down the receiver. Woz won that bet, but Alice called right back and the two hit it off. They were married on January 11, 1976, not long after their playful start. But Wozniak didn't pay as much attention to his wife as he did the electronics that were his life, and on March 1, 1977, she filed for divorce.

After creating the Apple I and II, Wozniak was regarded as the resident genius at Apple, and he was free to tinker on whatever projects interested him. However, by many accounts, it was hard for him to stay focused on the Apple II. After all, it was never his intention to build a company. He originally created the Apple I so that he could satisfy his long-held desire to have a computer of his own. Once he had accomplished that feat, he wasn't particularly challenged by churning out revisions and modifications to his original designs. Woz hated having to attend countless meetings, preferring instead to play practical jokes, fiddle with electronics, drive fast cars, and gamble in Nevada's casinos.

Ever since it became clear to Woz that his ownership in Apple was worth more than he could ever spend, the soft-hearted Woz began giving away 1,000-share blocks of stock to friends, family, and fellow Apple employees whose contributions Woz felt had been overlooked. Woz's generosity was well intentioned, but it inadvertently forced Apple to go public sooner than had been planned. As president Mike Scott explains, "There are some magic numbers in a company's history, and one of them is 500 shareholders. Once you have that many shareholders, you must file all sorts of paperwork with the SEC." Because Woz had been distributing so much stock unbeknownst to Apple's executives, the firm was on the verge of being a de facto public company, so Scott decided to pull the trigger with an IPO on December 12, 1980 (see "Millionaire Mania"). The spectacularly successful IPO minted 40 new millionaires at Apple, from secretaries (or "area associates" as they are known in AppleSpeak) to executives. Woz's ex-wife Robertson certainly couldn't complain. The stock she got in their divorce settlement

Courtesy of Steve Wozniak

Steve Wozniak, shown here with a framed Apple I, was free to follow his muse at Apple, but it was hard for him to stay focused with all the non-engineering demands upon his time.

was reportedly worth $42.4 million when Apple went public. For his part, Woz's remaining shares were valued at $116 million, providing him the funds to fuel his fantasies.

After the IPO, it was even more difficult for Woz to focus on producing at Apple. He was rich beyond his wildest dreams, and he was in love again. In August 1980, Woz had begun dating an Apple employee named Candice Carson Clark, a former member of the U.S. Olympic kayak team that competed in Montreal in 1976. The two were engaged on Christmas, just after the IPO, and although the future must have looked bright at the time, everything was about to change drastically.

Scott was exasperated at Woz's perceived goldbricking. He felt the founder was setting an awful example with his lackadaisical work ethic. Scott asked Randy Wigginton to write an Apple II spreadsheet to compete with Personal Software's VisiCalc, reasoning that Wigginton would in turn solicit the help of his mentor, Woz, which he did. Scott pushed Woz hard in January 1981 to complete the necessary math routines, and Jobs even managed to convince Wozniak to participate with his fledgling Macintosh project.

Taking a break from the pressure at Apple, Woz decided to log a few more hours at the controls of his Beechcraft Bonanza A36TC (he bought the turbocharged, single-engine, six-seat plane for $250,000 the previous November). On the afternoon of February 7, Woz and Clark were joined by Clark's brother and his girlfriend for a flight to San Diego to design wedding rings. While taking off from the Sky Park Airport in Scotts Valley (the airport closed in January 1983), the plane climbed abruptly, stalled, then bounced down the runway, went through two fences, and crashed into an embankment (the NTSB investigation cited premature liftoff and inexperience—Woz had flown only 50 hours—as the probable cause of the accident). Clark's brother and his girlfriend escaped with relatively minor injuries, but Woz and his fiancée were both seriously hurt. Clark recovered quickly after plastic surgery, but Woz had severe facial injuries, a missing tooth, and a concussion that prevented him from forming new memories. Suffering from anterograde amnesia, Woz had no recollection of the accident and would forget who had visited him during his hospital stay.

Just as Apple employees were recovering from the shock of almost losing one of the company's founders, Scott's "Black Wednesday" firings on February 25 decisively woke the company from its IPO-induced dream state. In the aftermath of the layoffs, there was an executive shake-up at Apple that resulted in Scott's removal from power.

Having cheated death, Woz had little interest in the corporate politics at Apple. "The company had become big business, and I missed tinkering. I just wanted to be an engineer," Wozniak told *People.* Upon recovering from his accident after five weeks, Woz took a leave of absence from Apple, though he remained on the payroll with a stipend salary. Wozniak married Clark in Lafayette, California, on June 13 (country singer Emmylou Harris performed). A week after his wedding, Woz enrolled in the University

In early 1981, Wozniak was almost killed while at the controls of his Beechcraft Bonanza, like the one shown here.

"I feel shitty."
Steve Wozniak, on his condition after crashing his plane

The Apple III Fiasco

After two years of development, the Apple III was announced on May 19, 1980, during the National Computer Conference (NCC) in Anaheim, California. With Apple's typical flair for spectacle, the company rented Disneyland for five hours the following night at a cost of $42,000 and transported an estimated 7,000 NCC attendees to the site in British double-decker buses.

The Apple III (shown here with an optional 5MB ProFile hard drive and monochrome monitor) was the firm's first failure.

Apple was proud of the Apple III because it represented many firsts for the company. Foremost, it was the company's first attempt at building a powerful business computer. It was also the company's first major departure from the tried-and-true Apple II architecture. It would prove the company's first bona fide failure. Unfortunately, instead of learning from the experience, Apple repeated many of the same mistakes with the Lisa and the Mac.

The Apple III was sold in two different configurations ranging in price from $4,340 to $7,800. At the heart of each was a Synertek 8-bit 6502A microprocessor running at 2MHz (twice the speed of the Apple II), a maximum of 128K of random access memory (RAM), a built-in keyboard with numeric keypad, and one internal 143K, 5.25-inch disk drive manufactured by Shugart. In effect, the Apple III came standard with everything most people eventually added to the Apple II. If that wasn't enough, there were four internal slots that accepted Apple II peripheral cards, plus you could add additional devices via the two serial ports on the back.

Although it had an Apple II emulation mode, the Apple III worked best with software written specifically to take advantage of its proprietary Sophisticated Operating System and new features, such as a built-in real-time clock and video capable of generating 24 lines of 80-column text and up to 560 by 192 pixels in the monochrome graphics mode. On paper, all the specifications were quite impressive, but implementing them proved a humbling experience for Apple.

Apple originally promised to ship the Apple III in July, but production problems plagued the product throughout the summer and into the fall. Unlike the Apple I and II, which were essentially the work of one man,

The Apple III was code-named Sara after chief engineer Wendell Sander's daughter.

The ProFile (code-named Pippin) cost $700 per megabyte in 1981. Compare that to hard drives selling for less than $1 per gigabyte in 2003!

"We had to put chips in to disable some Apple II features so people's heads would have the right image that Apple IIIs are for business and Apple IIs are for home and hobby."
Steve Wozniak

"The Apple III was kind of like a baby conceived during a group orgy, and [later] everybody had this bad headache and there's this bastard child, and everyone says, 'It's not mine.'"
Apple employee #6
Randy Wigginton
(*Insanely Great, pp. 123–124*)

"[Jobs] could see that horizon out there, a thousand miles out. But he could never see the details of each little mile that had to be covered to get there. That was his genius and his downfall."
Apple's head of human resources
Jay Elliott
(*The Journey Is the Reward, p. 372*)

Steve Wozniak, the Apple III was designed by a committee headed by Steve Jobs, who would demand one thing one day, then the opposite the next. The shipping delays threatened to mar Apple's initial public offering in December (see "Millionaire Mania"), so managers ignored the dire warnings of engineers who knew what would happen if they pushed the Apple III out the door before its time. As soon as units began trickling into distribution in late November, the worst fears of the engineers were realized.

On February 10, 1981, Apple announced that the Apple III would no longer contain the built-in clock and calendar features because National Semiconductor's clock chip didn't meet Apple's specifications. How the flaky parts got into a shipping product nobody was willing to say. Apple dropped the price of the Apple III to $4,190 and gave a $50 rebate to everybody who had purchased an Apple III up to that date.

When the first volume shipments began in March 1981, it became apparent that dropping the clock chip was just a finger in the dike. Approximately 20 percent of all Apple IIIs were dead on arrival primarily because chips fell out of loose sockets during shipping. Those that did work initially often failed after minimal use thanks to Jobs' insistence that the Apple III not have a fan (a design demand he would make again on the Mac). He reasoned that in addition to reducing radio-frequency interference emissions (a severe problem with the Apple II), the internal aluminum chassis would conduct heat and keep the delicate components cool. He was wrong.

Compounding the problem was that Jobs dictated the size and shape of the case without concern for the demands of the electrical engineers, who were then forced to cram boards into small spaces with little or no ventilation. As the computer was used, its chips got hot, expanded slightly, and slowly worked their way out of their sockets, at which point the computer simply died. Apple's solution was to recommend lifting the front of the computer six inches off the desktop, then letting it drop with the hope that the chips would reseat themselves!

The problems with loose chips were exacerbated by short cables between internal components, non-gold connectors, and the circuit board manufacturer's change in the flux washing process that led to latent corrosion. To its credit, Apple didn't bury the problem; on April 15, 1981, Mike Markkula, president and CEO, admitted to *The Wall Street Journal,* "It would be dishonest for me to sit here and say it's perfect." Apple instituted a liberal repair policy, swapping brand-new Apple IIIs for bad ones on the spot, no questions asked. To everyone's dismay, the replacements often failed, too.

On November 9, Apple announced a revised Apple III with a base price of $3,495. The company steadfastly claimed that the original problems were linked to shortcomings in manufacturing and quality-control procedures rather than the underlying design of the computer. Nonetheless, the new Apple III featured different sockets, updated software, memory expansion up to 256K, and an optional 5MB hard disk drive. Based upon the Seagate

Code Names Uncovered

Peter Stember

Apple's research and development facilities, located on Infinite Loop in Cupertino, are some of the most secure buildings on the Apple campus. Confidential papers are discarded into locked wastebaskets lest they fall into the hands of Dumpster-diving competitors or reporters; guards are posted at all entrances; and employees must pass their electronic identification badges in front of wall plates that verify access privileges and monitor personnel movement. Apple has come a long way from the days when Jobs and Woz eagerly showed off what they were doing in the Los Altos garage, but it hasn't gotten paranoid. Like most high-tech companies, Apple is simply trying to maintain the security of the many new proprietary technologies and products it is constantly designing.

An essential part of security is the use of code names. Before Apple publicly announces a product by its official name, that product is internally referred to by a code name. Usually lead engineers or managers get to name their own projects whatever they want, but a few recurring trends are evident. Early in its incarnation, Apple favored female names for projects. More often than not, the projects were named after the children, girlfriends, or wives of the team members (for example, the Lisa was named after Jobs' first daughter). Jef Raskin rebelled against the sexist notion of female code names and looked instead to apple varieties as the inspiration for his Macintosh project, purposely misspelling McIntosh. For a while, the names of different types of apples (Pippin, Jonathan) were often whispered in the R&D labs. Having exhausted the various types of apples, project managers now tend to choose whimsical code names that either reflect pop culture or contain awful puns. Perusing the list of code names is like walking down memory lane, checking out the fads and trends that swept through Apple cubicles and lab benches over the years.

Apple takes the code-naming business seriously, often assigning the same project different code names—one to be used internally and another for

external use. Also, a single project may have separate code names associated with hardware, software, documentation, industrial design, and marketing. Furthermore, outsiders—such as developers and the press—may be told about the same project, but each will be told a different code name. Just to keep everybody guessing, Apple sometimes changes code names in the middle of a project, or reuses old code names for new projects. Not only does all this create confusion in Apple watchers, it also serves as an audit trail to trace leaks to their sources.

Despite Apple's best efforts to keep this sort of thing from becoming public, I've compiled an extensive list of code names that have escaped from Cupertino and other Mac-related firms over the years. In some cases, I've even been able to uncover why a particular code name was chosen.

If you're an Apple employee or devout Mac fan and you spot a code-name error or omission, please bring it to my attention at owenink@owenink.com for correction or inclusion in a subsequent printing of this book.

Apple II

Apple IIc: Elf, E.T., Moby, Pippin, Teddy (short for Testing Every Day), IIb (for book-sized), IIp (for portable), VLC (Very Low Cost), Yoda, plus Annie, Bert, Chels, Jason, Lollie, Sherry, and Zelda (children of team members)

Apple IIc Plus: Adam Ant (because the team was adamant about keeping the project alive), Pizza (because of its pizza-box shape), Propeller (because a team member had a propeller beanie in his office), Raisin (after the testers won second place for their California Raisins costumes at a Halloween party)

Apple IIe: Diana, LCA (Low Cost Apple), Super II

Apple II File Management Utility: Fishhead, Fishhead in Disguise (after executives objected to original name)

Apple IIGS: Cortland, Gumby (from an Apple Halloween parade impersonation), Mark Twain (abandoned ROM04 prototype), Phoenix (the project was revived after being canceled), Rambo (the design team had to fight for approval)

Apple IIGS Video Overlay Card: Gumby, Pokey

Apple II High Speed SCSI Card: Cocoon

Apple IIx (aborted): Brooklyn, Dove, Golden Gate (referring to the ability to make it a bridge between the Apple II and Mac)

Apple III: Sara (after the daughter of chief engineer Wendell Sander)

The Apple IIc Plus, shown here with an optional color monitor, had many different code names and featured a built-in 3.5" disk drive, more memory, and a much faster CPU.

CPUs

Apple's first RISC project (based on the Motorola 88000 RISC): Jaguar, Tesseract

PowerPC 602: Galahad

PowerPC 603: Wart (King Arthur's trusty aide)

PowerPC 603e/603+/603ev: Stretch, Valiant

PowerPC 603et: Goldeneye

PowerPC 604: Zephyr

PowerPC 604e: Helm Wind, Sirocco, Twister

PowerPC 604eq: Mach 5

Millionaire Mania

Getting a company off the ground always requires sacrifices, and in that regard Apple was no different than any other. To scrape together the cost of producing the original Apple I printed circuit board in 1976, Steve Jobs parted with his red and white Volkswagen bus for $1,500 and Steve Wozniak sold his beloved Hewlett-Packard 65 programmable calculator for $250. The company was hobbling along at the beginning of 1977 when retired businessman Mike Markkula poured $92,000 into Apple's coffers and secured a $250,000 line of credit at Bank of America.

The time and money each of the three sacrificed to make Apple a success were amply rewarded on December 12, 1980, when underwriters Morgan Stanley and Hambrecht & Quist took the company public. Originally filed to sell at $14 a share, the stock opened at $22 and all 4.6 million shares sold out in minutes. The stock rose almost 32 percent that day to close at $29, giving the company a market valuation of $1.778 billion. Jobs, the single largest stockholder with 7.5 million shares, suddenly had a net worth exceeding $217 million. Not too shabby for a college dropout. Woz's 4 million shares were worth a respectable $116 million. Pretty good for a wire-head who never wanted to build a company. Even Markkula couldn't complain. His 7 million shares were valued at $203 million, for an unbelievable 55,943 percent annualized return on his original 1977 stake!

The three founders of Apple Computer Inc. weren't the only ones who did well that fateful day in December. Of Apple's 1,000 employees, more than 40 became instant millionaires thanks to their stock options. (An *option* is a form of compensation that grants an employee the right to purchase stock at a specified exercise price.) Stock options are a way of life in Silicon Valley, and in the late 1970s Apple routinely enticed candidates for employment with options on a few thousand shares of stock with exercise prices of roughly $4.

Each share of stock issued prior to April 1979 was known as a "founder's share." Thanks to the five stock splits prior to the initial public offering (IPO), each founder's share multiplied into 32 shares. So anyone who owned a little over 1,000 founder's shares went to bed a millionaire on December 12, 1980.

But not everyone who helped build Apple was richly rewarded. Stock options were reserved for salaried employees such as engineers, not hourly employees such as technicians. Many of Apple's earliest employees were either too inexperienced or too naive to demand stock options. Let's face it, many of them were just teenagers and college kids. A telling example is Daniel G. Kottke, who had been Jobs' best friend at Reed College and who traveled to India with him in 1974 seeking spiritual enlightenment.

Originally called in to help stuff Apple I circuit boards in 1976, Kottke became employee #12 in June 1977 and was paid minimum wage to assemble and test Apple II motherboards. By 1980, Kottke was doing

Apple's initial public offering was the largest IPO since the Ford Motor Company went public in 1956. Nonetheless, it sold out in minutes. Unfortunately, not everyone was allowed to get in on the ground floor. For fiscal year 1980, Apple showed a profit of $11.7 million, or 24 cents a share, on revenue of $118 million. That priced the IPO at 92 times earnings. Because Massachusetts' securities law didn't allow offerings with prices of more than 20 times earnings, the state banned individual residents from participating in the IPO, deeming it "too risky." After the IPO, the state determined that residents had been made aware of the risks and decided to allow trading. On May 27, 1981, a second offering of 2.6 million shares of stock was completed.

> "When I was 23, I had a net worth of over a million dollars. At 24 it was over $10 million, and at 25 it was over $100 million."
> **Steve Jobs**

Jobs first appeared on the *Forbes* Four Hundred list of richest Americans in 1982. After he sold NeXT to Apple and took Pixar public, *Forbes* estimated his net worth at $710 million in 1997. In the fall of 2002, the 47-year-old Jobs was worth $1.6 billion, according to *Forbes*.

By 1982, certificates featuring the Apple II (inset) had replaced the ornate pre-IPO shares.

much more demanding work, building and troubleshooting the Apple III prototype, but he remained an hourly technician. "I kept my head down and was working in the lab," recalls Kottke. "I was very naive. I just thought I would do good work and eventually get rewarded. What an idiot."

Kottke wanted the title of engineer more than the options that went with the position, but he wasn't a complete idiot. "I wanted to invest in the company. I had been working there since it started and I wasn't intending to leave. I deserved to invest," believed Kottke, who at the time was sharing a house in Cupertino with Jobs and Jobs' former girlfriend (who would later bear Jobs' child, Lisa Nicole).

Rod Holt, engineering VP and employee #5, was so uncomfortable with the inequity of the situation that he personally approached Jobs and suggested they both give Kottke some stock by matching each other's contribution. Jobs reportedly exclaimed, "Great! I'll give him zero."

Even though his "best friend" was unwilling to grant him any options, Kottke eventually managed to get some shares. Holt unilaterally gave Kottke 100 shares out of his own pocket, and just before Apple went public, Kottke went to chairman Markkula and president Mike Scott and told them how unhappy he was because he hadn't gotten any shares. "I told them that I was going to leave the company," recalls Kottke. "They gave me options on 1,000 shares at around $8, but it was too late" for the splits that made others fabulously wealthy.

Kottke's allotment was augmented through the generosity of Wozniak, who felt that it was unfair that many of the earliest Apple

> "I'm the only person I know that's lost a quarter of a billion dollars in one year…it's very character building."
> **Steve Jobs**, *discussing what it's like having so much of your net worth tied to a volatile stock such as Apple*

The Strangest Bedfellow of All

In the late 1970s, Apple was the standout in the crowded personal computer field. The Apple II sold briskly into the home and education markets and had even made headway into business offices, thanks to the popularity of VisiCalc. The entire personal computer industry was enjoying phenomenal growth, and Apple was leading the pack. But Apple knew it was only a matter of time before it faced the most formidable competitor of all, International Business Machines (www.ibm.com) of Armonk, New York. The day of reckoning arrived on August 12, 1981, when IBM introduced its $1,565 personal computer with a single 5.25-inch floppy disk drive and 16K of memory.

"It's curious to me that the largest computer company in the world [IBM] couldn't even match the Apple II, which was designed in a garage six years ago."
Steve Jobs
(InfoWorld, March 8, 1982)

Courtesy of IBM Corp.

The boxy IBM Personal Computer didn't break any new technological barriers, but the mere fact that it came from the world's largest computing firm validated the microcomputer market that Apple had dominated so far.

"I was at Apple the day IBM announced [its PC]. They didn't seem to care. It took them a year to realize what had happened."
Microsoft CEO ***Bill Gates***

At first Apple was confident it could hold its own against IBM. "We're going to out-market IBM," said chairman Steve Jobs. "We've got our shit together." President Mike Markkula was equally upbeat, stating, "We've been planning and waiting for IBM to get into the marketplace for four years. We're the guys in the driver's seat. We're the guys with one-third of a million installed base. We're the guys with a software library. We're the guys with distribution. It's IBM who is reacting and responding to Apple. They'll have to do a lot more reacting and responding. IBM hasn't the foggiest notion of how to sell to individuals. It took us four years to learn about it. They must learn about distribution structure and independent dealers. You cannot reduce time by throwing money at it. Short of World War III nothing is going to knock us out of the box."

"The IBM PC is beneath comment. It's been known for 12 years how to do a good-looking display and IBM didn't put one on its machine. You can't have any favorable comment beyond that. That is the ultimate in know-nothingness."
Apple Fellow ***Alan Kay***
(InfoWorld, June 11, 1984)

Apple actually welcomed IBM into the PC market, but urged "responsible competition."

"As it turned out, the original welcome was like Little Red Ridinghood's welcoming the wolf into her grandmother's home. There is a very fine line between being self-confident and getting cocky about it."
**John Sculley**
(Playboy, September 1987)

"IBM wants to wipe us off the face of the earth."
Steve Jobs
(Fortune, February 20, 1984)

On August 24, Apple responded to IBM's PC introduction in an amazing display of bravado by placing a now-famous, full-page advertisement in *The Wall Street Journal* welcoming the pin-striped corporate behemoth into the market that Apple practically saw as its birthright.
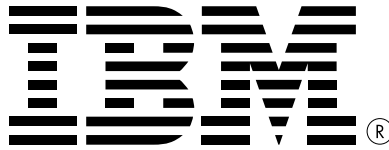
While Apple clearly viewed the IBM PC as second-rate technology, the buying public didn't look much farther than those magic initials, which represented stability, service, and reliability. To them, it didn't much matter what was inside the box; the IBM PC was a serious business machine from a serious company, and it didn't take long for Apple to realize it was in serious trouble. By the end of the year, IBM had sold 50,000 computers, and after two years it passed Apple in dollar sales of the machines. In 1983, Apple's market share of personal computers edged up from 20 to 21 percent, while IBM's rose dramatically from 18 to 26 percent, according to Future Computing, a Texas-based consulting firm.

Apple tried to stem the tide with the January 1983 introduction of the Lisa. By all accounts, the Lisa was a revolutionary computer, but as far as the business community was concerned, it had two major flaws. First, its $9,995 price tag was too expensive. Second, and perhaps most importantly, it wasn't compatible with anything else on the market. The IBM PC and Microsoft's MS-DOS had established a standard to which clone manufacturers flocked, but Apple resisted the temptation to go with the flow. Right or wrong, Apple has always felt that its technology was better, if not the best, and if it just waited long enough, the world would recognize this fact and be willing to pay a premium to buy a computer from Cupertino.

By 1984, it was clear that the Lisa was a sales disappointment, and industry pundits were decrying the Apple II as dated technology destined to die any day now (a flawed assessment "experts" would repeat many times over the decade; the Apple II remained on the price list until November 15, 1993). Apple desperately needed a hit to combat IBM, and Jobs had made up his mind to bet everything on the Macintosh. Part of his strategy was to get the public thinking of Apple versus IBM in terms of a two-horse race like Coke and Pepsi, Avis and Hertz, *Newsweek* and *Time*. Never was this strategy executed as effectively as in the landmark *1984* commercial, which heralded the introduction of the Macintosh on January 24, 1984 (see "The Greatest Commercial That Almost Never Aired"). As Jobs put it in a 1985 *Playboy* interview, "It really is coming down to just Apple and IBM. If, for some reason, we make some giant mistake and IBM wins, my personal feeling is that we are going to enter sort of a computer Dark Ages for about 20 years."

Throughout the 1980s, Apple tenaciously fought to maintain its modest market share against encroachment from IBM and the many clone makers, but after enjoying years of gross margins as high as 53 percent, price wars

From Xerox, with Love

Putting the Mac into proper historical perspective is impossible without considering its forerunner, Apple's ill-fated Lisa computer. The Lisa began life in the fall of 1978 when Steve Jobs and William "Trip" Hawkins III, manager of marketing planning, began brainstorming about a next-generation project that would break from the Apple II mold. But it wasn't until July 30, 1979, that the Lisa project really got under way when Ken Rothmuller was hired as project manager. As conceived, the Lisa was nothing like the Mac. For that matter, Lisa, the project, bore little resemblance to Lisa, the product.

In 1979, Lisa existed only as a set of specifications calling for a $2,000 business computer to ship in March 1981 with a built-in green phosphor display, keyboard, and rather traditional user interface. The basic idea of designing the computer around a bit-slice microprocessor was discarded when it became apparent that it would be far too expensive. As it turned out, hardly anything from the original plan made it into the shipping product besides the name. What caused Apple to radically change the Lisa? In a word: Xerox.

In 1970, eager to be on the cutting edge of information technology, the Xerox Corporation (www.xerox.com) gathered many of the best minds in the computer industry and ensconced them in the Palo Alto Research Center (PARC) at 3333 Coyote Hill Road in Palo Alto, California. Its mission was to create the future without worrying about the practicality of actually marketing their creations as commercial products.

By 1973, it had succeeded in giving birth to the Xerox Alto, the embodiment of many computing firsts. It was the first personal computer

> "The primary objective of LISA is to provide the cornerstone around which we can build Apple Computer into a $500 million dollar [*sic*] per year company. In order to do this, the product must allow us to make a unique contribution to a large segment of the small computer marketplace."
> *(Lisa marketing requirements document, April 18, 1980)*

The Xerox Palo Alto Research Center is the birthplace of many computing firsts, including breakthroughs popularized by Apple in the Lisa.

The Alto was a revolutionary creation, but it wasn't a product. If it had been sold commercially with the industry's customary gross margins, it might have cost as much as $40,000.

"It doesn't matter how great the computer is if nobody buys it. Xerox proved that."
Mac documentation leader
Chris Espinosa

Engelbart (www.bootstrap.org) maintains an office at the operational headquarters of Logitech (www.logitech.com), the largest supplier of computer mice in the world.

"The original Lisa was a character-generator machine. I spent days with the Lisa team trying to explain that it could be done all in graphics, like the Alto. In that regard, I had a very strong influence on the Lisa; I was trying to make it more like the Mac. I thought they were headed in the wrong direction."
Father of the Mac project **Jef Raskin**

Courtesy of Xerox Corp. and Brian Tramontana of Xerox PARC

Many Lisa features were borrowed from the groundbreaking Xerox Alto.

in the sense that it was designed to be used by a single person. Rather than putting fully formed characters on screen one at a time, the Alto created both text and graphics out of individually controlled pixels using a process called *bit mapping*. Using Ethernet, another PARC creation, the Alto could network with other Alto computers and laser printers, yet another PARC invention. It had an object-oriented programming language—Smalltalk—with reusable, self-contained modules of code. It also featured a funny pointing device, a three-button mouse, invented in the 1960s by Douglas Carl Engelbart, a researcher at the Stanford Research Institute (www.sri.com) think tank.

Even though the Alto was never sold to the public, it was well known in Silicon Valley. The PARC researchers were proud of their creations and willingly showed them off to many curious visitors who dropped by the campus during the early years. One person in particular who had been impressed with their work was Jef Raskin, an Apple employee who was heading up a small, obscure research project code-named Macintosh. As a visiting scholar at the Stanford Artificial Intelligence Laboratory in the early 1970s, Raskin spent a lot of time at PARC and thought what the researchers and engineers were doing there was wonderful.

Raskin tried convincing Jobs to go see the wonderful stuff at Xerox PARC, but in his binary way of viewing the world, Jobs considered Raskin a "shithead who could do no good," so he ignored Raskin's recommendation. However, Raskin had an ally in software engineer Bill Atkinson, who had been his student at the University of California at San Diego and now worked on LisaGraf primitives, the basic graphics routines of the Lisa (ultimately these would be named QuickDraw, a term Raskin coined in his 1967 Penn State thesis). In Jobs' eyes, Atkinson was a hero who could do no wrong, so when Atkinson pushed Jobs to visit Xerox PARC, Jobs agreed. By then the Smalltalk group had tired of holding open houses, and Xerox had tightened security at the facility. Fortunately, Jobs had just what it took to open the doors.

Jobs approached the Xerox Development Corporation, the copier giant's venture capital branch, and proposed, "I will let you invest a million dollars in Apple if you will sort of open the kimono at Xerox PARC."

The Making of Macintosh

Steve Jobs and the Macintosh are inextricably linked in the minds of most people. So it may come as somewhat of a surprise to learn that the Mac wasn't his idea at all. In fact, he actually wanted to kill the project in its infancy. Lucky for Apple and millions of dedicated Mac users everywhere, he wasn't successful. The story of how the Mac came to be is a fascinating tale of one man's inspiration, another man's ego, and the dedication of a small band of "pirates" that forever changed the way the world computes.

In 2004, when Apple and all the world's Macintosh enthusiasts will be celebrating the Mac's 20th anniversary, one man will be quietly celebrating its 25th. That man is Jeffrey Frank "Jef" Raskin, the true father of the Macintosh.

Raskin, a professor turned computer consultant, wrote the Integer BASIC manual for the Apple II in 1976. When he joined Apple on January 3, 1978 (exactly one year after its incorporation), as employee #31, the 34-year-old Raskin was manager of the publications department. Over time he started a new product review division and an application software division.

In the spring of 1979, chairman Mike Markkula asked Raskin if he would work on a project code-named Annie, the goal of which was to produce a $500 game machine (shades of the ill-fated Bandai Pippin). At the time, Jobs and cohorts were working on the business-oriented Lisa, and the company felt it needed a lower-cost product than the Apple II,

Early Apple employees (from left to right) Michael Scott, Steve Jobs, Jef Raskin, Chris Espinosa, and Steve Wozniak, shown here in a hotel room in 1977.

which was selling for well over $1,000 in a basic configuration without a disk drive or monitor.

"I told him it was a fine project, but I wasn't terribly interested in a game machine," remembers Raskin. "However, there was this thing that I'd been dreaming of for some time which I called Macintosh. The biggest thing about it was that it would be designed from a human factors perspective, which at that time was totally incomprehensible." Markkula was intrigued and asked Raskin to elaborate on his ideas and investigate the feasibility of putting them into practice.

By late May, Raskin had sketched out the basic ideas behind a computer for the "Person in the Street," known as the PITS, for short. Raskin had grown increasingly frustrated at the complexity of the Apple II. Its open architecture was good in the sense that you could fill its slots with anything you wanted, but that flexibility forced the user to be a pseudo-technician and made it extremely difficult for developers to create products that worked with all configurations.

"Considerations such as these led me to conceive the basic architecture and guiding principles of the Macintosh project," explains Raskin. "There were to be no peripheral slots so that customers never had to see the inside of the machine (although external ports would be provided); there was a fixed memory size so that all applications would run on all Macintoshes; the screen, keyboard, and mass storage device (and, we hoped, a printer) were to be built in so that the customer got a truly complete system, and so that we could control the appearance of characters and graphics."

Physically, the computer would be contained in an all-in-one case without cables. Raskin expected people to grow so attached to their Macs that they would never want to leave home without them, so portability was a key concern. He envisioned a weight just under 20 pounds and an internal battery providing up to two hours of operation. His wish list also included an 8-bit microprocessor with 64K of RAM, one serial port, a modem, real-time clock, printer, 4- or 5-inch diagonal screen with bitmapped graphics, and a 200K, 5.25-inch floppy disk drive all built in.

BASIC and FORTH programming languages were to be contained in read-only memory (ROM), as were "self-instructional" programs that were so easy to use, manuals would be unnecessary. Raskin described a user interface in which everything—writing, calculating, drafting, painting, etc.—was accomplished in a graphical word processor-type environment with a few consistent and easily learned concepts. "For example, the calculator abilities will apply to numbers that are entered the same way any text is entered. The traditional concept of an operating system is replaced by an extension of the idea of an on-line editor." While that may not sound much like the Mac as we know it today, his reasoning was that there should be no modes or levels, a concept that has endured.

Raskin even proposed an official name for his Macintosh computer: the Apple V. He figured that it could go into production by September 1981, for sale that Christmas with an initial end-user price of $500. As volume

"Adam Osborne is always dumping on Apple. He was going on and on about Lisa and when we would ship Lisa and then he started joking about Mac. I was trying to keep my cool and be polite but he kept asking, 'What's this Mac we're hearing about? Is it real?' He started getting under my collar so much that I told him, 'Adam, it's so good that even after it puts your company out of business, you'll still want to go out and buy it for your kids.'"
Steve Jobs

Osborne Computer Corp. was founded in 1980 and made a name for itself with a portable computer the size of a sewing machine. The company went bankrupt in 1983 when sales dried up after founder Adam Osborne preannounced an improved model that everyone waited for instead of buying the current one. Adam Osborne died on March 18, 2003, in southern India of a rare organic brain disorder.

Macintosh Insiders

If you've ever cracked open the case of an early Macintosh, you may have noticed a bunch of signatures in raised plastic on the inside back panel. Steve Jobs felt that the Macintosh was a piece of art, and since real artists sign their masterpieces, he and the other employees of the Macintosh division in 1982 affixed their signatures to a large sheet of paper. When everyone had signed, a film negative was made from the paper, and the signatures were chemically etched into the core of the tooling for the inside of the original Macintosh.

Since not everyone has access to an early Mac, the following pages reproduce the internal signatures as they appear on the original master. Mac fanatics will no doubt notice the absence of some prestigious members of the Mac division, such as programmer Steve Capps and graphic designer Susan Kare. They weren't left out on purpose. It's just that they weren't on the team when the signatures were collected in early 1982, a time when Steve Jobs felt that shipping was imminent. Of course, it was almost two years too soon, further proof that almost everything about the Mac was ahead of its time. Please note that some signatures were added (such as Steve Balog) over time and others were dropped (ostensibly to accommodate changes in the case design for the Mac SE).

It's been said that in addition to popularizing the graphical user interface, Apple Computer's greatest contribution to the industry has been as a training ground for high-technology employees who have carried Apple's idealism to other firms. Here's a brief look at the people who created the Mac and an update on what they were doing at the beginning of the 21st century. Silicon Valley is infamous for its "burn and turn" approach to human resources, so don't be surprised if people are no longer at the companies listed.

Apple continued using case molds with signatures until sometime during the production of the Mac SE, at which time signature-free molds were substituted for the classic-style, all-in-one Mac. However, the practice was revived with the Mac IIci and IIcx, both of which contain signatures of the Product Design Team inscribed along the left side of the case, below the motherboard: Gavin Ivester, Pat Jackson, Jimmy Melton, Grant Ross, Terry Smith, Tom Toedtman, Lada Zajicek, and Laszlo Zsidek.

"Going out of the eighties, you know there won't be a Mac group. Burrell [Smith] will be off in Oregon playing his guitar. Andy [Hertzfeld] will be writing the next great American novel. Who knows what. But we'll be scattered all over the globe doing other amazing stuff."
Steve Jobs, prior to the Mac's intro

Peggy Alexio
Then: Area associate
Now: Left Apple; whereabouts unknown

Collette Askeland
Then: Designed the printed circuit board for the main logic board
Now: Left Apple in 1998

Bill Atkinson
Then: Wrote QuickDraw and MacPaint
Now: Left Apple in 1990; cofounded General Magic; now a nature
      photographer (www.billatkinson.com)

Robert L. Belleville
Then: Engineering manager
Now: Left Apple in 1986; retired, built world's most accurate electronic
      pendulum clock

Mike Boich
Then: Software evangelist
Now: Left Apple in 1985; founded Radius, Rendition, and Eazel; now a
      venture capitalist at Alta Partners (www.altapartners.com)

Bill Bull
Then: Worked on "no fan" solution, cables, keyboard, and mouse
Now: Manager of product design for Input Device Group

Matt Carter
Then: Mac manufacturing manager
Now: Left Apple in 1983; starting a new company

Berry Cash
Then: Marketing and sales consultant
Now: Left Apple; venture capitalist at HO2 (www.ho2.com) and InterWest
      Partners (www.interwest.com)

Debi Coleman
Then: Controller of the Macintosh division
Now: Left Apple in 1992; was CEO of Merix (www.merix.com), now a
      venture capitalist and board member

George Crow
Then: Designed the analog board, video, and power supply
Now: Left Apple in 1985; returned in 1998 as dir. prod. engineering

The Greatest Commercial That Almost Never Aired

Every true Macintosh fanatic has seen, or at least heard about, the famous *1984* television commercial that heralded the introduction of the Macintosh. The spot, with its distinctive Orwellian vision, is indelibly imprinted in the minds of Mac users the world over. What you don't know about the commercial will surprise you; what you think you know is probably wrong.

First of all, the commercial was not inspired by the Macintosh. In late 1982, Apple's advertising agency, Chiat/Day (www.chiatday.com), had devised a corporate print campaign featuring the Apple II for *The Wall Street Journal* that was designed to play off George Orwell's totalitarian vision of the future. "Six months before we knew about Mac, we had this new ad that read, 'Why 1984 won't be like *1984*,'" reveals Lee Clow, creative director at Chiat/Day. "It explained Apple's philosophy and purpose—that people, not just government and big corporations, should run technology. If computers aren't to take over our lives, they have to be accessible."

The ad never ran and was filed away, only to be dusted off in the spring of 1983 by Steve Hayden, the agency's copywriter, and Brent Thomas, the art director, who were looking for some hook to make a bold statement about the incredible new Macintosh. With considerable reworking, the Chiat/Day team put together a storyboard of the *1984* commercial they proposed to shoot.

The mini-movie would show an athletic young woman, chased by helmeted storm troopers, bursting into a dank auditorium in which rows

The beautiful, athletic heroine of *1984* embodied Apple's youthful image.

> "Am I getting anything I should give a shit about?"
> **Steve Jobs**, *upon first meeting Lee Clow, creative director for Chiat/Day (West of Eden, p. 87)*

> "Luck is a force of nature. Everything seemed to conspire to make *1984* a hit: the timing, the product, the industry. Using the *1984* theme was such an obvious idea that I was worried someone else would beat us to it, but nobody did."
> **Steve Hayden**, *explaining the commercial's success*

This famous tag line was originally intended for the Apple II, not the Macintosh.

upon rows of slack-jawed, dronelike workers watched an image of Big Brother spouting an ideological diatribe on a huge screen. The heroine, wearing bright-red jogging shorts and a white Mac T-shirt, would smash the screen with a baseball bat (later changed to a sledgehammer for dramatic effect) and a refreshing burst of fresh air would pass over the masses as they literally "saw the light."

In the closing shot, a solemn voice would intone, "On January 24th, Apple Computer will introduce Macintosh. And you'll see why 1984 won't be like *1984*." The computer itself would never be shown.

After Chiat/Day presented the storyboard to Apple, John Sculley was apprehensive, but Steve Jobs insisted that the Mac deserved such a radical spot. Sculley and Jobs gave Chiat/Day the authorization to shoot the commercial and purchase time to air it during the upcoming Super Bowl.

On the strength of his successful science-fiction films *Alien* and *Blade Runner*, Chiat/Day gave Ridley Scott a budget of $900,000 to direct the *1984* spot as well as a Lisa commercial called *Alone Again*, in which, believe it or not, Apple actually emphasized the fact that the Lisa was incompatible with all established standards.

Drones were played by British skinheads and amateurs paid $125 a day to shave off their hair.

In September, Scott assembled a cast of 200 for a week of filming at London's Shepperton Studios. To play the part of the despondent, bald-headed workers, Scott recruited authentic British skinheads and paid amateurs $125 a day to shave off their hair. Casting the heroine proved trickier. Many of the professional fashion models and actresses had difficulty spinning in place and then accurately throwing the six-pound sledgehammer as called for in the script. In fact, one errant sledgehammer toss almost killed an old lady walking down a path in Hyde Park, where the casting call was being held. As luck would have it, one model, Anya Major, was also an experienced discus thrower. She was hired to play the female lead because she looked the part and didn't get dizzy when spinning around preparing to hurl the hammer.

As *1984* was originally conceived, Big Brother did not have a speaking role, but director Scott wanted to give him some lines. Copywriter Hayden objected at first, but agreed to put something together when Scott threatened to write the lines himself. Apple vehemently denied that the propaganda-spouting Big Brother character in the *1984* commercial represented its $40-billion competitor, IBM. Decide for yourself as you read Big Brother's harangue from the full-length, 60-second commercial:

"We wanted people to say, 'What the hell is this product?' The idea was to use the commercial as a tease, not a product introduction; to make sure the world knew a new product was here and that it was a significant event."
Chiat/Day director of planning
Mary Terese Rainey
(Marketing & Media Decisions, November 1984)

The Mac Meets the Press

When the Macintosh was introduced in 1984, Apple's public relations and marketing departments performed miracles, securing more coverage for its newborn than for any other computer in history. Looking back with the aid of 20/20 hindsight, read the following excerpts from several of the major computer publications of the time and decide for yourself which journalists were on the mark when it came to assessing the original Macintosh.

Byte

"The Lisa computer was important because it was the first commercial product to use the mouse-window-desktop environment. The Macintosh is equally important because it makes that same environment very affordable.

"The Macintosh will have three important effects. First, like the Lisa, it will be imitated but not copied… Those companies that try to imitate the Mac on other machines will have trouble matching its price/performance combination.

"Second, the Macintosh will secure the place of the Sony 3.5-inch disk as the magnetic medium of choice for the next generation of personal computers.

"Third, the Macintosh will increase Apple's reputation in the market… Many business users will stay with the 'safer' IBM PC. However, people new to computing and those who are maverick enough to see the value and promise of the Mac will favor it. The Mac will delay IBM's domination of the personal computer market.

"Overall, the Macintosh is a very important machine that, in my opinion, replaces the Lisa as the most important development in computers in the last five years. The Macintosh brings us one step closer to the ideal of computer as appliance. We're not there yet—at least, not until the next set of improvements (which, in this industry, we may see fairly soon). Who knows who the next innovator will be?"

Gregg Williams

(Byte, February 1984)

"The Mac is the first computer good enough to be criticized."
Apple Fellow **Alan Kay**
(InfoWorld, June 11, 1984)

"Macintosh is going to be Apple's next milestone product in the industry—the Apple II being the first one in 1977, the IBM Personal Computer being the second industry milestone in 1981, and Macintosh being the third industry milestone in 1984."

Steve Jobs

(Personal Computing, April 1984)

Computer & Electronics

"Despite [the omissions of color and a parallel port], Macintosh is an impressive product and worthy of taking the 'less-traveled' road. Apparently, much of Apple's future depends on Macintosh, so its success or failure will truly make 'all the difference.'"

Vanessa Schnatmeier

(Computer & Electronics, March 1984)

Creative Computing

"In its current form, the Macintosh is the distilled embodiment of a promise: that software can be intuitively easy to use, while remaining just as powerful as anything else around… It should be obvious to you now that the Mac does represent a significant breakthrough, both in hardware and in software. It should also be clear that the true concern is whether the machine will live up to its undeniable promise. Fine. It is now time to lay out the 'bads.'

- The Macintosh does not have enough RAM.
- Single microfloppy storage is slow and inadequate.
- There are no internal expansion slots or external expansion busses.
- MacWrite has some severe limitations.
- The system is monochrome only.
- MS-DOS compatibility is ruled out.
- The Macintosh will not multitask.
- You can't use a Mac away from a desk.
- MacPaint has an easel size limitation.
- Forget about external video.
- Macintosh software development is an involved process.

"I simply wonder if this standard can be upheld. The thought first occurred to me as I played around with Microsoft BASIC. A BASIC program running on the Mac looks very much like a BASIC program running on any other machine, except for its windows. Without the icon/window/menu shells, the Mac is reduced to a rather average machine.

"It is up to talented programmers to make the most of Macintosh ROM in every program they develop. With it they can meet the ambitious promise that is the Apple Macintosh. Otherwise the Mac may never develop the staying power it needs.

"We are still quite some distance from the ideal machine Alan Kay envisioned back in 1971 and christened the 'Dynabook.' This is a computer the size of a [Tandy] Model 100 with the power of a hundred Macs. In a recent interview, he rather cynically predicted that it would be the Japanese who would make the Dynabook a reality. He told Allen Muro of *St. Mac* magazine that the Macintosh was in point of fact 'no big deal.'"

"The next generation of interesting software will be done on Macintosh, not the IBM PC."
Microsoft chairman **Bill Gates**
(BusinessWeek, November 26, 1984)

"Anybody who could write a good application on the 128K Mac deserves a medal."
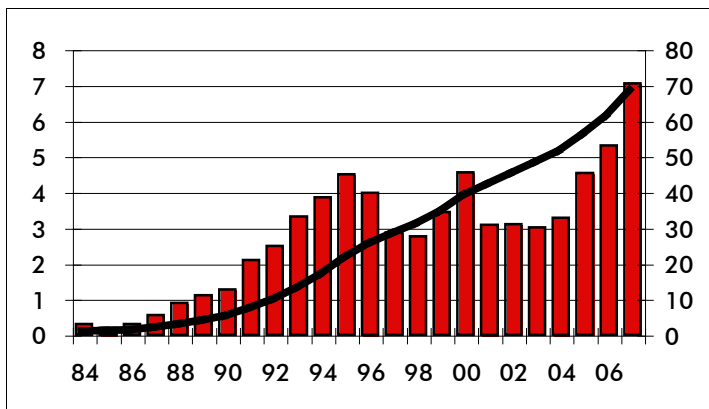**Bill Gates**

Mac Models Timeline

In the infancy of the Mac market, consumers, competitors, and commentators waited eagerly for each new product announcement from Apple. The waits often seemed insufferably long. Creating the original 128K Mac was such an ordeal that after it shipped in January 1984, it was hard to keep the engineers focused on designing upgrades. They weren't resting on their laurels, they were simply exhausted.

The 512K Mac didn't ship until eight months after the original introduction, and the Mac Plus wouldn't make it to market until 1986. Power users desiring an "open" model had to wait until 1987 for the Mac II to break out of the "classic" Mac mold. Apple was giving birth to new members of the Macintosh family so slowly that it was easy to become intimately familiar with each one.

All that changed in 1992 with the introduction of the incomprehensibly numbered Performa line. In an attempt to gain market share, Apple decided to attack every market niche with its own Mac model. As you can see on the following pages, which show every Macintosh model ever made (more than 500 at last count), the result of Apple's accelerated introduction schedule was a product line that proliferated into a bewildering assortment of minutely differentiated models. Potential consumers found it impossible to determine which computer model was right for them, and Apple had a terrible time supporting so many variations on the Macintosh design.

Sanity returned to Cupertino when Steve Jobs took over in 1997. He focused Apple's product line into four quadrants consisting of consumer and professional models of desktop and portable computers, with each new generation of Macs becoming ever faster and more capable.

"We were too tired, too arrogant, too stupid, I don't know what."
*Apple evangelist **Guy Kawasaki**, explaining why Apple took so long to fix some of the early Mac's speed and memory problems*

Mac unit sales (bars, left axis, in millions)

"We thought: It's there, it's beautiful, it can't be improved, we did it. Everyone was burnt out and we wanted to get the hell out of there. Had we stayed and kept the energy up and not mistakenly thought we were done, we could have changed Apple's future. I firmly believe that Gates would only be worth a billion instead of $4 billion today had we all kept our act together and stuck to the Mac."
*Apple Fellow **Steve P. Capps** (MacWEEK, September 19, 1994)*
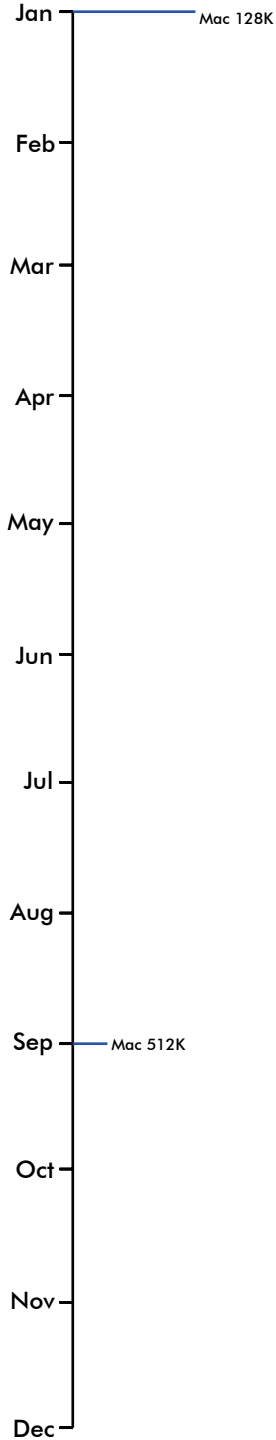
The original Macintosh had only 128K of memory, a 400K 3.5-inch disk drive, and a WYSIWYG monochrome monitor.

Mac Models Timeline 1984

Jan — Mac 128K

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep — Mac 512K

Oct

Nov

Dec

The Mac 512K (shown here with an optional external 3.5-inch disk drive) was nicknamed "Fat Mac" because it came standard with four times the memory of the original.

Why 1985 Wasn't like 1984

In late 1984, Apple didn't have a stunning new product up its sleeve like it had the year before with Macintosh, so it tried to manufacture some excitement over The Macintosh Office, which was essentially the concept of connecting a group of Macs to a LaserWriter and sharing information using a device called a file server. There was only one small problem: the file server, a key component, was nowhere near ready to ship. To his credit, Jean-Louis Gassée, then general manager of Apple France, refused to foist this charade upon his country, not-so-secretly referring to it as "The Macintosh Orifice." Although Apple would not ship a file server until 1987, that didn't stop it from promoting The Macintosh Office in the United States in 1985.

Trying to woo the business market, Apple concocted the concept of "The Macintosh Office," which connected Macs with LaserWriters and a nonexistent file server.

In an attempt to recreate the magic of the phenomenal *1984* commercial (see "The Greatest Commercial That Almost Never Aired"), Apple again turned to the creative team at its advertising agency to whip up something great for the upcoming Super Bowl XIX. Chiat/Day wanted to hire Ridley Scott, who directed *1984*, but he wasn't available, so his brother Tony was given the job instead.

The result was a dark, 60-second commercial called *Lemmings,* in which long lines of blindfolded businesspeople, each with one hand upon the shoulder of the person ahead and briefcase in the other hand, trudge off the edge of a cliff like lemmings into the sea. As they drearily whistle the tune *Hi Ho, Hi Ho, It's Off to Work We Go*, a voice intones, "On January 23rd, Apple Computer will announce The Macintosh Office." At that cue, the last man in the line, presumably a Mac convert, lifts his blindfold and

Director Tony Scott reportedly found fault with the sky over England and flew to Sweden to find just the right clouds to include in the commercial's background.

Lemmings likened DOS users to mindless rodents committing mass suicide.

stops at the brink instead of plunging silently to his death like the others. The narrator continues, "You can look into it, or you can go on with business as usual."

Needless to say, *Lemmings* wasn't your typical commercial. It was thought-provoking, but it lacked the liberating appeal of *1984*. In fact, John Sculley hated it, and in a repeat of the prior year, ordered Chiat/Day to sell back the $1 million Super Bowl slot to ABC, which it managed to do. The creative team at Chiat/Day mounted an intense lobbying effort to get Sculley to reverse his decision, reminding him that Apple disliked *1984*, and that turned out to be a triumph.

Even though he was convinced he had done good work, copywriter Steve Hayden cautioned Apple, "You're going to bite the karmic weenie if you run *Lemmings* and can't deliver The [Macintosh] Office." Sculley left the decision up to marketing manager Mike Murray, who crossed his fingers and went for broke.

Chiat/Day was able to repurchase one minute of airtime at a reduced price of $900,000 (what a bargain!), and the commercial ran in the fourth quarter of Super Bowl XIX on January 20, 1985. Although the San Francisco 49ers were well on their way to crushing the Miami Dolphins 38 to 16, much of the country remained glued to the television because Apple had placed teaser newspaper advertisements warning, "If you go to the bathroom during the fourth quarter, you'll be sorry." In retrospect, it was Apple that was sorry.

Steve Jobs and John Sculley had front-row seats for the disaster as they were both watching the Super Bowl in person at Stanford Stadium. For this event, Apple had filled the notoriously uncomfortable wooden stands


Courtesy of Steve Hayden

Copywriter Steve Hayden warned Apple it risked biting "the karmic weenie."

Telecom Troubles

In many ways, the history of Apple consists of a long string of events in which the company failed to capitalize on emerging markets that it correctly identified years before its competitors. An excellent example is the trouble Apple has had with telecommunications.

Apple's entry into the online world began in 1984 during John Sculley's tenure as an effort to reduce the expense of supporting the company's worldwide network of dealers. An Apple II demo of an online system called Apple Shared Knowledge was developed, but John Ebbs, Apple's head of support and formerly a senior executive at General Electric, convinced management to showcase the Mac's value to corporations by using it to deploy the pricing and product database. His idea was to marry the corporate timeshare capability of General Electric Information Services Co. (which ran a consumer service called GEnie) with the ease of use of a Mac.

In July 1985, AppleLink debuted. It was the first online service to feature easy-to-use graphics, windows, and icons instead of a command-line text interface. Its extension of the desktop metaphor into the online world was as revolutionary as the Macintosh itself. While originally intended as a bulletproof dealer reference and support system, within weeks of its launch it became the de facto email system for Apple and its dealers. Although it bore Apple's name, it was actually maintained and operated as a joint effort of Apple and GE. As it was released to external customers over the years, users were charged from $10 to $100 per hour, depending on the service they received and their country of residence. Before long, Apple was paying
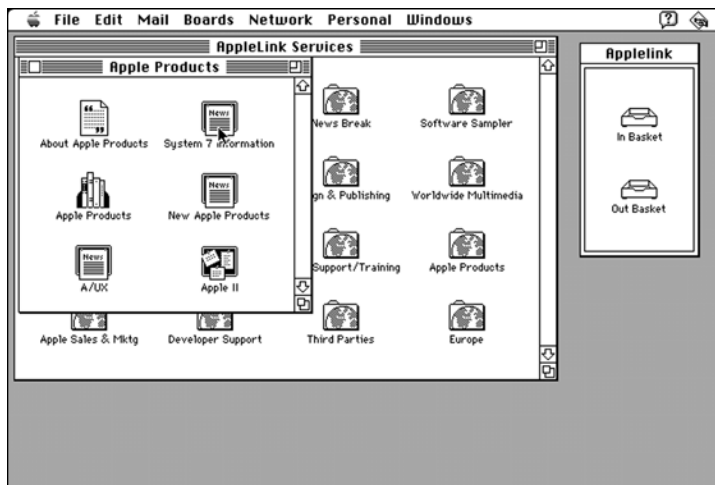
AppleLink was Apple's internal online service, but it was actually run by GE. AppleLink successfully used the Mac's desktop metaphor to make telecommunications simple.

On August 28, 1991, the first true email message from space was sent by the crew of the space shuttle STS-43 Atlantis using a Mac Portable and specially configured AppleLink software. The shuttle crew's message: "Hello Earth! Greetings from the STS-43 Crew. This is the first AppleLink from space. Having a GREAT time, wish you were here,...send cyro and RCS! Hasta la vista, baby,...we'll be back!"

over $30 million a year to GE, although a study demonstrated that use of the service saved Apple at least $100 million annually in reduced costs (paper, personnel, productivity, telephone, travel, etc.).

AppleLink was considered a resounding success, and it occurred to Apple that perhaps it should offer a similar version aimed at reducing consumer support expenses. At the time, a small firm called Quantum Computer Services was running QuantumLink, an online service for Commodore computer users. Apple dallied with the idea of buying Quantum outright for several million dollars, but instead decided to work with it to build a graphical service in the mold of the internal AppleLink, aimed initially at Apple II users but designed with the Macintosh in mind. Code-named Project Samuel, it was a joint venture with Apple providing its interface expertise, marketing muscle, funding, and logo. For its part, Quantum would build and operate the system.

At the AppleFest held in Boston on May 20, 1988, AppleLink—Personal Edition was introduced. For $6 per hour non-prime time, and $15 per hour prime time, subscribers could access Apple-specific resources such as a reference library, software center, and company store. Plus, there were general services such as entertainment, business services, online shopping, and education. Before the Macintosh version was released, Apple and Quantum began quarrelling over the future direction of the service, and Apple underwent another in a long series of reorganizations. Under pressure to eliminate what the new leadership felt were extraneous business commitments, Apple pulled its support for AppleLink—Personal Edition, but compensated Quantum by providing funding to complete the Mac beta and bring it to market without the Apple logo. In October 1991, Quantum renamed itself America Online and opened up its service to everyone, not just those using Apple computers.

AppleLink—Personal Edition came out first on the Apple II and was abandoned before the Mac version shipped.

The Remarkable Rise
and Fabulous Fall of John Sculley

If you're a Macintosh true believer, you probably remember John Sculley (born April 6, 1939) as the man who ripped the heart out of Apple when he dethroned its folk-hero founder, Steve Jobs, in 1985. If you're an investor, you probably remember him as the shrewd businessman who guided and grew Apple through many difficult years only to suffer the same fate he had visited upon Jobs. Neither depiction is entirely fair, nor entirely false. Sculley's ten-year reign at Apple was filled with promise and enthusiasm, intrigue and betrayal, recovery and triumph, anguish and irony.

When Mike Markkula came out of his comfortable early retirement to join Apple in January 1977, he had hoped to bow out gracefully after a few years of helping the young company grow with his seed money, managerial experience, and industry contacts. However, in a corporate power shift in March 1981, Markkula reluctantly assumed the role of president from the first man to hold that position, Mike Scott, and Jobs took Markkula's place as chairman of the board of directors. Markkula was back in the thick of it, but only temporarily.

John Sculley came to Apple from Pepsi, where he mastered marketing.

The search for a new chief executive officer began not long after Markkula was thrust into the presidency at Apple. Jobs wanted someone, unlike Scott, whom he could manipulate, and the board hoped to find an experienced executive who could manage Apple's phenomenal growth. Apple tried unsuccessfully to recruit Don Estridge, the leader of the team that released the IBM PC on August 12, 1981. As IBM's VP of worldwide manufacturing, Estridge was making $250,000 a year in salary and bonuses. To entice Estridge to switch teams, Apple offered him considerably more money and a generous bundle of stock options. Estridge, however, remained "true blue" to IBM and turned down Apple's lucrative offer, but another candidate found the goodies too tempting to pass up. Apple finally found its man in John Sculley, the highly regarded president of Pepsi-Cola USA, the beverage subsidiary of PepsiCo.

Among the people approached to become Apple's CEO was Admiral Bobby Ray Inman, deputy director of the CIA until June 1982. But Inman rightly concluded, "They needed someone with a marketing background and I didn't have it."

"Think of Silicon Valley as Florence in the Renaissance. It's the place where anybody who is excited about doing something to change the world wants to be."
Heidrick & Struggles headhunter **Gerry Roche**, *urging Sculley to accept Apple's offer*
(Playboy, September 1987)

Sculley was once married to the stepdaughter of Pepsi's chairman, Donald Kendall.

"Do you want to spend the rest of your life selling sugared water or do you want a chance to change the world?"
Steve Jobs, *trying to convince Sculley to quit Pepsi and join Apple (Odyssey, p. 90)*

When he moved to California in 1983, Sculley purchased a $1.9 million, 63-year-old, five-bedroom English Tudor house at 1224 Cañada Road in the tony community of Woodside. Sculley renamed it the Blackburn Valley Morgan compound, Blackburn being a Sculley family name and Morgan the type of horse his third wife Leezy (Lee Adams) liked to raise.

After 18 months of wooing, 44-year-old Sculley was named president and CEO of Apple on April 8, 1983. Sculley likes to tell people that what attracted him to Apple was the intellectual challenge of changing the world, but something as banal as money may have had a tiny little bit to do with his decision to hop from one coast to the other. To lure him away from his $500,000-a-year job at Pepsi, Apple offered him $1 million in annual pay (half salary, half bonus), a $1 million signing bonus, a $1 million golden parachute clause, options on 350,000 shares of Apple stock, and the difference in cost to buy a home in California equivalent to the one he owned in Connecticut.

For a while, things were going great for Sculley. He got on board just in time to ride the euphoric wave that was the Macintosh introduction, and he got along famously with Jobs, no small accomplishment. Sculley and Jobs shared a symbiotic professional relationship. Sculley viewed himself as Jobs' marketing and management mentor, whereas Jobs was Sculley's technology tutor. During the good times of 1983 and 1984, the two were inseparable, often referred to as "The Dynamic Duo" in the business press. But the good times didn't last.

Sculley made a name for himself at Pepsi-Cola USA by coming up with the wildly successful "Pepsi Challenge," in which blindfolded consumers professed their preference for Pepsi over Coca-Cola. His reputation as a master of event marketing was enhanced with the critical acclaim lavished on Apple's *1984* commercial, which aired during Super Bowl XVIII (see "The Greatest Commercial That Almost Never Aired"). After the media frenzy surrounding the Mac's introduction began to fade, reality set in at Apple. After spending $15 million on a 100-day advertising blitz, Mac sales tapered off dramatically to roughly 20,000 units a month.

"Some naysayers claim the partnership will never last—that intense, mercurial Jobs, who owns nearly 12 percent of Apple stock (worth almost $200 million at current prices), will drive intense, focused Sculley back East."
(Fortune, February 20, 1984)

"Apple has one leader, Steve and me."
John Sculley, *at a private dinner celebrating his first year at Apple*

"The Dynamic Duo," Steve Jobs and John Sculley, at the Mac's introduction in 1984. Their smiles would soon turn to frowns as Mac sales dropped off.

Windows: What Went Wrong?

Microsoft and its boyish, multibillionaire chairman, William Henry Gates III, are much maligned in the Macintosh community. Many Mac fanatics view Gates as the Antichrist, stuffing inferior products down the throats of the world's computer users in an all-out effort to rule the industry and crush the Mac. Sure, Gates wants it all (he already has a darn big chunk of it), but he is absolutely not a Mac hater. In fact, he's probably the biggest fan of the Macintosh way of computing. Gates' transformation from benevolent co-conspirator to reviled competitor, and how Apple itself is really to blame for the success of Windows, is a fascinating tale.

Early in the life of the Macintosh project, Steve Jobs realized that the Mac would need a full complement of useful programs to be successful. The most important third-party developer then—as now—was Microsoft, which produced not only applications, but also the BASIC programming language that had proved instrumental to the success of the Apple II. Jobs wanted Microsoft's support, but suspected that Microsoft would take what it learned writing Mac software to write similar applications that would run on IBM PCs. Jobs' fear of Microsoft was well founded but misdirected. On January 22, 1982, Jobs forced Gates to agree that Microsoft would not "undertake in any way to sell, lease, license, publish or otherwise distribute…any financial modeling, business graphics or data base program which utilizes a mouse or tracking ball for any computer not manufactured by Apple." Unbelievably, nothing in the agreement precluded Microsoft from writing an operating system that would compete with the Mac. That would prove to be a disastrous oversight.

Bill Gates dictated that Apple kill MacBASIC, which he later called "one of the stupidest deals…ever." Negotiating a Windows license brought redemption.

At Microsoft, Jeff Harbors gave the Macintosh the code name Sand, in reference to Steve Jobs' grandiose vision of Apple's Mac factory consuming raw sand at one end of the highly automated line, turning it into silicon, and eventually churning out finished computers at the other end. Serendipitously, the code name also stood for Steve's Amazing New Device.

"I don't know what is going to happen to Windows, or to VisiOn, but IBM's windowing package will be the standard. We hear it is not that great, but it will be the standard."
Steve Jobs,
betting on the wrong horse
(Personal Computing, *April 1984*)

In return for Gates' promise to develop mouse-based applications exclusively for the Mac until 12 months after its introduction (or January 1, 1983, whichever came first), Jobs provided Microsoft with precious Mac prototypes. True to its word, Microsoft began the most extensive Mac software development effort outside of Apple, but it also began work on Windows for the IBM PC and its clones. Gates was simply hedging his bets. Although he had amassed a fortune with the command-line interface of MS-DOS, he, like Jobs, realized that the future of the industry was in graphical user interfaces. Since Apple was writing its own Mac operating system, Gates wanted to make sure Microsoft got a piece of the action on the PC. For his part, Jobs double-crossed Gates by instructing programmer Donn Denman to begin work on Apple's own programming language called MacBASIC, which was originally scheduled to ship in the second quarter of 1984 for $99.

Eager to steal Jobs' thunder, Gates announced Windows at the Helmsley Palace Hotel in New York on November 10, 1983, and predicted that by the end of 1984, Windows would be used on more than 90 percent of all IBM PC-compatible computers. Just a few months later, when Apple introduced the Mac, Gates stood proudly as a staunch supporter of the Cupertino upstarts and announced the immediate availability of Multiplan and Microsoft BASIC. Microsoft had invested heavily in its Mac software division and was eager to reap the rewards of being the first to market with many of the major applications that would follow in the months ahead. Unfortunately, Gates rushed Microsoft BASIC to completion, and by most accounts it was a dog that didn't even take advantage of many of the Mac's unique features, such as the powerful Toolbox routines. According to Denman, it was "a really crappy, slow implementation," so he felt confident that he had time to perfect MacBASIC, which was widely available in a beta version and receiving very favorable responses.

When Apple's license from Microsoft for Applesoft BASIC came up for renewal in August 1985, the Apple II line was still the company's cash cow and BASIC was absolutely crucial to the venerable Apple II. Failing to grasp the fact that he had the boys from Cupertino over a barrel and was in a position to extract damn near anything he wanted at the negotiating table, Gates simply demanded that Apple halt development of MacBASIC. After a fair amount of huffing and puffing, Apple caved in, correctly reasoning that the Mac was designed as an information appliance for which a hobbyist programming language was hardly a necessity. So Apple got off easy by agreeing to kill MacBASIC. In exchange, it got a new lease on life for the Apple II and the company. Microsoft BASIC never set the world on fire (in fact, it was eventually withdrawn in disgrace), but the Apple II continued to contribute significantly to Apple's bottom line for years to come. Gates would later realize the error of his ways and refer to the whole episode as "one of the stupidest deals I have ever done." Gates would soon redeem himself by obtaining concessions from Apple that would ensure Microsoft's domination of the industry for decades.

The Fallen Apple

In many ways, the story of Newton is very similar to that of Macintosh. Like the Mac before it, the Newton was created largely to satisfy the desire of its designers to own a revolutionary device that only they could conceive. As with the Mac, Newton development began as a small, ill-defined project and grew into a division that some hoped—and many feared—would change the face of Apple forever. The Newton relied heavily on unproven technology and was targeted at new markets, in much the same way that the Mac popularized many computing innovations in an effort to become "the computer for the rest of us." And just as declining Mac sales played a part in Steve Jobs' ouster, so did disappointing market reaction to the Newton help seal John Sculley's fate. Proving that it failed to learn from the Mac experience, Apple was slow to address Newton's initial shortcomings, allowing competitors' derivative devices to dominate the personal digital assistant (PDA) market it had created and ultimately forcing a weakened Apple to discontinue Newton in disgrace.

Just as the Macintosh started with one man, Jef Raskin, the Newton was the brainchild of hardware engineer Steve Sakoman. After helping create and launch the Mac Plus, Mac SE, and Mac II, by March 1987 Sakoman was feeling a bit burned out and was entertaining the idea of leaving Apple to start his own company. He wanted to do something new and exciting, not churn out endless variations of the Macintosh. When he discussed his plans with senior VP of R&D Jean-Louis Gassée, Sakoman was enticed to stay at Apple with the promise that he could start a small special projects group researching wireless networking and cursive handwriting recognition. Sakoman was intrigued, but insisted that he would do so only if Gassée promised that his "skunk works" would retain a startup mentality free from corporate interference and marketing's meddling. Gassée agreed, and Sakoman set out to investigate what it would take to create a new breed of pen-based, mobile, personal information devices.

Every project at Apple needs a code name, so Sakoman choose Newton for his new undertaking, in part because the original Apple logo depicted the 17th-century English scientist sitting beneath an apple tree, but mainly because he believed that "Newton shook up people's ideas about the way things are." Sakoman's plan was to come up with something so radically different from personal computers that it would have a revolutionary effect on the industry, in much the same way that the Macintosh redefined computing three years prior.

By late 1987, Sakoman had staked out his turf in an old chip company's building on Bubb Road in Cupertino and had begun assembling a small team of engineers. He snared his first superstar engineer when he convinced Steve Capps to return to Apple and join the nascent Newton team that November. The flamboyant Capps, who favors shorts and checkerboard-patterned Vans tennis shoes, had left Apple in 1985 to build his own music software

"In five years or less, computers will probably be capable of recognizing handwriting. We will have taken one step forward in understanding the mystery of shapes recognition. No one knows today what intellectual operation or algorithm allows us to reliably recognize a face, a voice, someone's handwriting. There are complex shapes that we can describe fairly completely but without being able to recognize them definitely."
Senior VP of R&D
Jean-Louis Gassée, *writing in 1985*

"I suspect Newton is used as a name because the device can easily be dropped (and probably as easily broken) thus confirming certain precepts of gravitation developed by Isaac Newton."
Industry columnist **John C. Dvorak**

As an Apple Fellow working in the Newton group, Steve Capps tooled around Cupertino in a red Honda Civic SI bearing the vanity plate "NOOTOON."

Steve Capps, a veteran of the original Mac team, was instrumental in the early development of the Newton project.

company and had just invented the Jaminator, the ultimate air guitar/synthesizer. He had cowritten the Mac's Finder with Bruce Horn and knew what it was like to be involved in the startup phase of a promising project. Capps was concerned that the Newton would end up just another expensive yuppie toy, but Sakoman assured him that wouldn't happen.

Sakoman originally envisioned a small, lightweight computer and communicator that organized ideas and information at a cost of $2,495, the same as the original Mac. Unencumbered by management oversight, the engineers kept upping the ante, and as Capps feared, the resulting feature creep turned the product into "a monster in a box." The Newton group was an engineer's dream: you could research whatever you wanted without pressure to produce an actual product that might some day turn a profit. If a new technology seemed like it was cool, it found its way into the specification. The device grew to a slate code-named Figaro, which measured 8.5 by 11 inches, had a touch-sensitive, active-matrix screen, a pen for handwriting recognition data input, a hard disk, plus an infrared port for beaming data across vast distances. Estimated cost: $6,000 to $8,000.

By 1989, the Newton group was generating ferment on the Apple campus. Just as the Apple II division resented the coddling of the Macintosh development team back when the Apple II was carrying the company, now it was the Mac team that felt slighted. The Mac was Apple's bread and butter, yet resources were being poured into the Newton team, and they had little to show for it. The Newton's secrecy contributed to the paranoia, since few outside the group really understood what they were working on. Critics feared that the Newton would compete with the Macintosh Portable, which was to be released on September 20, 1989. As far as many people at Apple were concerned, the Figaro mock-up created by outside industrial designer Giorgetto Giugiaro was just a portable computer with a pen for an input device. Despite Gassée's initial promises, Sakoman found himself increasingly having to defend Newton at the corporate level, probably because Gassée's star had begun to fade.

Gassée had been named president of Apple Products in August 1988, placing him just below Sculley in the corporate hierarchy. With their

What Jobs Did NeXT

After being stripped of all operational responsibilities on May 31, 1985, Steve Jobs had little to do at Apple, so he began canvassing the country's colleges asking them to describe their ideal university computer. In early September, Jobs had lunch with Paul Berg, Nobel laureate and Stanford University biochemist. When Berg complained of the difficulty of performing "wet-lab" research on gene splicing, Jobs suggested simulating the experiments on a computer. Berg was supposedly so enthusiastic about the idea that Jobs felt he was onto something big. Within weeks, Jobs decided to launch a startup with five other Apple employees: Susan Barnes (senior controller for U.S. sales and marketing), George Crow (engineering manager), Dan'l Lewin (higher education marketing manager), Rich Page (Apple Fellow), and Guy "Bud" Tribble (manager of software engineering).

When Jobs announced his plans to Apple's board of directors, it initially expressed an interest in investing in the new venture, Next Inc. (later changed to NeXT Computer, Inc.), but the board went ballistic when Jobs revealed the names of the five employees who would be joining him. Jobs resigned as Apple chairman, and Apple sued him for dereliction of duties. Apple eventually dropped the suit in January 1986, when Jobs agreed to a six-month moratorium on hiring Apple employees. Curiously, Apple insisted on a non-compete clause that required any computers created by Jobs' new company to be more powerful than any of Apple's offerings.

Nobody has ever accused Jobs of frugality. When it came to choosing a logo for his new company, he spared no expense. He met with four noted designers, but none was deemed worthy. Ultimately, Jobs decided he wanted 71-year-old Yale professor Paul Rand to design the NeXT logo. Widely considered the grand master of American graphic arts, Rand had previously designed logos for such business institutions as ABC, IBM, UPS, and Westinghouse. In fact, it was Rand who, in the 1960s, convinced International Business Machines to drop its full name and use only initials. Rand continued to consult for IBM, so initially he declined to work for Jobs, citing a conflict of interest. Amazingly enough, Jobs convinced IBM vice chairman Paul Rizzo to release Rand of his obligation.

Perhaps Rand had heard about how mercurial Jobs could be, because before accepting the commission, he insisted on being paid $100,000 in advance to create only one design, and he would be under no obligation to revise his work if it failed to please Jobs. Jobs accepted the terms, and in June 1986, Rand produced a logo reminiscent of a child's wooden block tilted at a precise 28° angle, bearing the letters of the company, each in a different color, perhaps inspired by artist Robert Indiana's *Love* painting that was popularized by a 1973 postage stamp. The bizarre capitalization of the company's name was Rand's idea, who explained that the lowercase *e* would stand out and could represent "education, excellence, expertise, exceptional, excitement, e = mc^2."

"It is hard to think that a $2 billion company with 4,300-plus people couldn't compete with six people in blue jeans."
Steve Jobs, on Apple's suit following his resignation
(Newsweek, September 30, 1985)

For the first four months of its life, NeXT operated out of Jobs' Woodside mansion at 460 Mountain Home Road (the iron-gated entrance is actually on Robles Drive). The first formal offices were in the Stanford University Industrial Park on Deer Park Road in Palo Alto, not far from Xerox PARC. The company eventually moved to an office complex in Redwood City, where it remained until Apple purchased it in 1996.

At the time he left Apple, Jobs owned roughly 6.5 million shares of stock (11.3 percent of the company). Jobs immediately began liquidating his massive holdings at what would prove to be fire-sale prices. According to SEC records, Jobs dumped 4.028 million shares in 1985 for $70.5 million. By February 1986, Jobs was completely divested (he retained one share so that he would still receive Apple's annual reports). Assuming that he managed to sell at the highest price realized by February, the most he could have grossed was $135 million. Jobs' timing couldn't have been worse, since Apple's stock has never again traded as cheaply as when he was selling.

To be sure, Jobs needed some seed money to buy Pixar and fund NeXT, but he could have made do with the proceeds from selling a small fraction of his Apple position (Pixar cost $10 million and Jobs' initial investment in NeXT was just $7 million). Jobs' assertion that he was selling because he had lost faith in Apple's executives was certainly valid. However, had he held on for just five more years, his holding would have been worth $952 million when the stock peaked on April 12, 1991. Including dividends, Jobs left over $836 million on the table when he cashed out of Apple.

"He told me that we're going to hit one out of the ball park."
Steve Jobs, on Perot's investment (Accidental Millionaire, p. 214)

NeXT began life in late 1985 with a $7 million stake from Jobs, but was operating at a ferocious burn rate that would leave it virtually penniless by the end of 1986. Rather than dig into his own pockets again, Jobs distributed a prospectus throughout the venture capital community, which he had spurned when NeXT was founded. Now Jobs was only too willing to accept their investments. He sought $3 million for a ten percent stake in NeXT, giving the productless, revenueless NeXT a ludicrous $30 million valuation. Not surprisingly, there were no takers.

As luck would have it, H. Ross Perot was watching television one night in November 1986 when he came across John Nathan's *The Entrepreneurs*, a documentary in which NeXT was featured. Perot was so fascinated by the young startup that he called Jobs the following day and casually remarked, "If you ever need an investor, call me." Not wanting to appear too eager, Jobs waited a week before inviting Perot to come take a look at his firm and meet its employees. Instead of focusing on the hard numbers, which would never stand up to due diligence, Jobs insisted Perot consider the intangibles during his January 1987 visit to NeXT's empty factory in Fremont. The approach appealed to Perot, who essentially opened his checkbook and asked Jobs how much he wanted.

Apparently Jobs was running a very special sale that day just for Texas billionaires. Jobs demanded $20 million for 16 percent of NeXT, giving the firm an unbelievable valuation of $125 million. In February 1987, Perot accepted without blinking and became the company's largest investor and a board member. "Do the math," said one venture capitalist, "and you have to assume that Perot is investing more out of emotion than prudence." Perot justified the price by responding, "I'm investing in quality." Stanford University and Carnegie Mellon also invested $1.3 million for a one percent combined share in NeXT.

It wasn't until October 12, 1988, that Jobs unveiled the NeXT Computer to an eager crowd of 4,500 assembled at Louise M. Davies Symphony Hall in San Francisco. Even that was premature, because the final version of the NEXTSTEP operating system (originally called NeXTstep) didn't ship until September 18, 1989. Jobs, however, didn't see the NeXT Computer as late. He insisted it was "five years ahead of its time."

The specifications certainly were impressive: 25MHz Motorola 68030 processor, 8MB of memory expandable to 16MB, 250MB Canon optical disc drive, Motorola 68882 math coprocessor, and Motorola 56001 digital signal processor to drive real-time sound, array processing, modem, fax, and encryption functions. All this was housed in a 12-inch cube, with a detached 17-inch Sony monochrome monitor, keyboard, and mouse. The NeXT Computer ran a UNIX 4.3–based Mach operating system and featured a powerful object-oriented development environment. Also included on disc were the complete works of Shakespeare, a dictionary, a thesaurus, a book of quotations, the documentation, WriteNow, Mathematica, a relational database server, an artificial intelligence language, a C compiler, a personal information manager, and email with integrated voice capabilities.

The Pixar Phenomenon

Like Apple, the story of Pixar starts in a garage in the mid 1970s with two young men sharing a passion. As a child, Edwin E. Catmull wanted to be an animator for Walt Disney, but he realized that he lacked the necessary artistic skills. He went into computer graphics instead, and eventually wound up at the impressive-sounding New York Institute of Technology (NYIT), a vocational school where he worked in the Computer Graphics Laboratory out of a renovated four-car garage on a large estate. It was in Old Westbury on Long Island in 1975 that Catmull met the man who would become his partner in Pixar a decade later, Alvy Ray Smith (www.alvyray.com).

At "New York Tech," Catmull and Smith worked for an eccentric multimillionaire by the name of Alexander Schure. Even with a rich benefactor and the freedom to experiment with cutting-edge computer graphics routines and equipment, their dream of producing a computer-generated animated feature film was a long way from reality. Nonetheless, every year the two made a pilgrimage to Disney to gauge its interest in tackling the task, and every year they were turned down. The two knew that as chips become ever more powerful and less expensive, it was only a matter of time before an animated feature was financially feasible. In the meantime, they'd have to keep themselves happy laying the groundwork necessary to fulfill their vision.

Around the time Catmull and Smith joined forces, motion picture director George Walton Lucas Jr. established Industrial Light & Magic (ILM) in Northern California to produce special effects for *Star Wars*. Back then, the state-of-the-art in special effects required detailed scale models,

Courtesy of Alvy Ray Smith

Early Pixar employees, from left to right: Loren Carpenter, Bill Reeves, Ed Catmull, Alvy Ray Smith, Rob Cook, John Lasseter, Eben Ostby, David Salesin, Craig Good, and Sam Leffler.

computer-controlled cameras, and hand-painted individual frames of film. Looking to automate the tedious ILM work and revolutionize the way motion pictures were made, Lucas set up a computer division of Lucasfilm Ltd. In 1979, Lucas hired Catmull as the director of the division, who in turn hired Smith as director of computer graphics. The two thought they were going to get a chance to create special effects using computer graphics, but Lucas' vision wasn't that farsighted. He wanted them to design and build digital versions of the traditional tools of filmmaking: an audio synthesizer, video editor, and optical printer.

Smith took employees Loren Carpenter and Rodney Stock to a burger joint in Ignacio for a brainstorming session to name their optical printer project. Smith recalls, "I set the stage by suggesting that I would like a name like 'laser' that was a noun but looked like a verb, explaining that I grew up in New Mexico, surrounded by Spanish and that Spanish verbs all end in -ir, -er, or -ar. I suggested, for example, 'pixer,' meaning to make pictures, but to be used as a noun." One of Smith's companions pointed out that "radar" had a very high-tech feel to it and suggested "pixar." Smith thought that worked just fine because -ar was also a verb ending. Their project now had a name: Pixar.

While they worked on building the machines Lucas requested, Smith and Catmull also assembled a dream team of top computer graphics researchers and scientists in their division of Lucasfilm. But a few weeks before the May 25, 1983, release of *Return of the Jedi*, they got a wake-up call when George and Marcia Lou Lucas (née Griffin) announced their intention to divorce after 14 years of marriage. Under California law, each was entitled to half of the combined marital assets. George wanted to retain his various movie-making interests and Marcia was willing to settle for cash, which meant that he had to come up with an estimated $35 to $50 million.

Catmull and Smith feared that Lucas would split up or close their division. The two proposed that Lucas spin them out as a separate company (the audio and editing machines were eventually spun off into a company called Droid Works). Hungry for cash and not appreciating the many revolutionary ways their work on computer graphics could be applied to filmmaking, Lucas agreed. From NYIT to Lucasfilm, Catmull and Smith had gone from one wealthy patron to another, and now they hoped they could find a third.

Two years passed, and the computer division was still on the block with Lucasfilm asking $30 million, an amount Smith thought "incredibly high." In April 1985, the computer division—now named Pixar—unveiled the Pixar Image Computer (PIC), a prototype of the digital optical printer. Able to process graphics at a speed of 40 million instructions per second, the "computer" was really a special-purpose, pixel-based graphics machine that had to be integrated into a host system such as a DEC or Sun Microsystems workstation. The PIC's four processors could work simultaneously on the red, green, blue, and transparency of a single pixel, creating stunningly realistic images.

When the computer division of Lucasfilm was being shopped around, it needed a more manageable name. Smith pointed out that everyone was starting to associate the name of their digital optical printer, the Pixar, with the division that created it. In the absence of any strong alternatives, they decided to name themselves Pixar (www.pixar.com).

The Star Trek Saga

The idea of porting the Mac OS to run on Intel processors wasn't new (Dan Eilers, Apple's director of strategic investment, first proposed the idea in 1985), but it gained a renewed sense of urgency after Apple shipped System 7 in May 1991 and it failed to make headway against Microsoft Windows 3.0. Ironically, it wasn't a determined Apple engineer or insightful executive who finally got the ball rolling. That honor goes to a company that few outside of the industry have ever heard of: Novell of Provo, Utah.

Networking giant Novell (www.novell.com) wanted to provide an alternative to Windows by creating a Mac-like interface for its DR-DOS that ran on Intel-based IBM PC clones but feared getting sued by Apple (at the time, Apple's copyright infringement suit against Microsoft was still very much alive). Rather than risk an infestation of lawyers at its headquarters, Novell decided to find out whether Apple was willing to work together on such a project. On Valentine's Day 1992, Darrell Miller, Novell's VP of strategic marketing, met with several Apple software managers to reveal his company's plan. Excited by the possibilities, the Apple contingent obtained CEO John Sculley's blessing, and the two companies immediately began working together on a project that came to be called Star Trek, because it would boldly go where no Mac had gone before: the Intel platform. When Bill Gates heard of Apple's plan to put the Mac OS on an Intel machine, he responded by saying it would be "like putting lipstick on a chicken."

A group of 4 engineers from Novell and 14 from Apple was put together by Gifford Calenda in suite 400 of a Novell marketing office called Regency One in Santa Clara, directly across the street from Intel's headquarters. That was no accident. Sculley had met with Intel CEO Andy Grove, who agreed to help the Star Trek project because, ever paranoid, he didn't want to be so dependent on Microsoft. Each Star Trek engineer was given an office with a Mac and a 486 PC clone donated by Intel.

On July 17, the Trekkie team was given until Halloween to come up with a working "proof of concept." As an indication of the importance Apple placed upon the project, each engineer would receive a bonus of between $16,000 and $25,000 if they succeeded. "We worked like dogs. It was some of the most fun I've had working," recalls team member Fred Monroe. Free of managerial meddling, the small team not only succeeded in getting the Mac's Finder to run on the PC clones, it also managed to get QuickTime and some of QuickDraw GX working, as well as the "Welcome to Macintosh" startup greeting. Having met their deadline, the Trekkies collected their bonuses and took off for a well-deserved vacation in Cancun, Mexico. In their minds, they had laid the groundwork for a product that could save Apple by allowing it to compete head-to-head with the inferior Microsoft Windows on its own turf: Intel-based computers.

Now it was up to team leader Chris DeRossi and Roger Heinen, VP of software engineering, to convince Apple's executive staff that Star

DR-DOS was created by Digital Research Inc. (DRI), which had been sued by Apple in 1985 after it released GEM Desktop, an operating system that grafted a Mac-like interface onto PC clones. Too small to fight Apple, DRI settled the suit by altering its interface, and it was eventually acquired by Novell.

After working together on Star Trek and QuickTime, Fred Monroe and Fred Huxham eventually went on to form fredlabs inc. (www.fredlabs.com) in San Francisco. At the Macworld Expo in January 1997, fredlabs garnered considerable attention for its VirtualMac, which allowed users to run Mac applications within the BeOS running on a Power Mac.
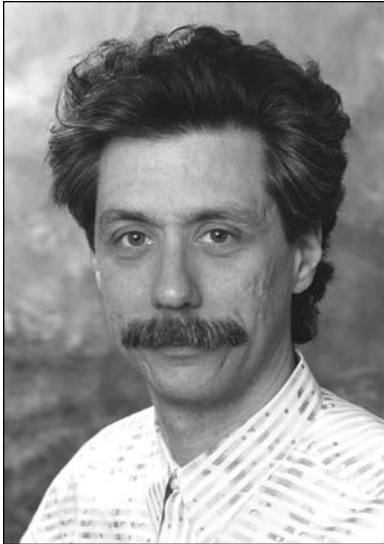
"All the MBAs in the world can't convince us it's a good model."
Manager of Mac software architecture **Roger Heinen**, *when asked in March 1992 about making System 7 run on Intel processors*

Trek was worth pursuing. On December 4, they presented the Star Trek prototype to the assembled staff, many of whom couldn't believe their eyes. From all outward appearances, here was the fabled Mac OS running on an Intel computer; Star Trek had managed to penetrate deep behind enemy lines. Fred Forsyth, head of Apple's manufacturing business and hardware engineering, saw his career flash before his eyes. If Apple was successful in getting the Mac OS to run on Intel, demand for Apple's hardware would likely slump. Furthermore, the company was committed to moving the Macintosh to the PowerPC, and the Star Trek project was perceived to be a threat to that effort as well. How would it look to partners IBM and Motorola if Apple was porting the Mac OS to Intel processors at the same time it was collaborating on the PowerPC? Over these objections, Heinen was given the go-ahead to have his team attack the detail work to make Star Trek fully functional.

Armed with the executive staff's approval, Mark Gonzales, the project marketing manager, made the rounds of PC clone vendors to gauge their interest in bundling Star Trek on their systems. Most were intrigued, but argued that they couldn't afford to pay much for it because their contracts for Windows 3.1 forced them to pay a royalty to Microsoft for every computer shipped, regardless of what operating system it contained. (This anticompetitive practice eventually landed Microsoft in trouble with the Department of Justice.)

Dave Nagel (above) took over Star Trek when manager of Mac software architecture Roger Heinen left Apple for a position at Microsoft.

Worse than the clone makers' tepid reception to Star Trek was Heinen's defection to Microsoft at the beginning of 1993. Without Heinen around to protect the Trekkies, in February the project was moved back onto Apple's campus at Bandley 5 and placed under the control of David C. Nagel, then head of the Advanced Technology Group. The project ballooned from 18 people to 50, and most were forced to write detailed specifications and white papers instead of concentrating on writing code. Then COO Michael Spindler instituted a round of belt tightening. After Nagel had allocated his budget to revising the OS for the PowerPC and updating System 7, there was not enough money left over to fund the completion of Star Trek, which was estimated would take 18 months and $20 million by some accounts. Nagel considered merging Star Trek with another project just getting under way. Code-named Raptor, it was an alternative to the Pink OS mired in the bickering at Taligent and was intended to run on any CPU, not just Intel or Motorola processors. However, the merger plan was deemed infeasible, and Star Trek disappeared

From Diesel to Doctor

Although Michael H. Spindler joined Apple in September 1980 as marketing manager for European operations, the native of Berlin, Germany, didn't pop up on the radar screens of most Apple watchers until January 29, 1990, when he moved to Cupertino to assume the role of chief operating officer, taking over the worldwide manufacturing and marketing units that had previously reported to Jean-Louis Gassée. Nicknamed "The Diesel" because of his ability to attack complex problems head-on with no-nonsense management experience, Spindler was chugging down a career path that would take him to the highest executive office at Apple. In stark contrast to Steve Jobs and John Sculley, Spindler is a passionately private man who, according to one former executive, "did not get where he is by showing his butt in public." As a result, most people would be hard pressed to recall a single thing he accomplished while at the helm of Apple. That's a shame, because had he achieved his ultimate goal, its effect would have been more profound than anything anyone else at Apple had ever accomplished: The firm would have ceased to exist.

"I'm a Mike Spindler fan. In my personal opinion, he's clearly CEO material, and maybe the board brought him in for that." *Jean-Louis Gassée, upon announcing his intention to leave Apple (San Jose Mercury News, March 3, 1990)*

Almost since the moment he arrived in Cupertino, Michael Spindler tried to merge Apple with a variety of different corporations.

"We used to have a joke that you don't sit in the first ten rows at a Spindler speech, because you might drown from all the sweat and spit." *Apple sales manager John Ziel*

Upon arriving in Cupertino, Spindler was instructed by CEO Sculley to begin a secret search for a way to pair Apple's brand name and superior software with the market muscle and boardroom credibility of a larger company. Sculley felt that the Mac market would slowly erode and that Apple's only hope was to create new revenue streams from products such as the Newton personal digital assistant and Pippin set-top box, but developing these products to the point of self-sufficiency would require the resources of a larger company.

"This isn't anything new. Since 1986, we held serious discussions with DEC, Kodak, Sony, Sun, Compaq, IBM, and a few other companies I'd rather not name now. They were very thoughtful discussions. We considered everything from 'Let's trade technology' to 'Let's put the companies together' with each one of them." *Chairman Mike Markkula, on 1996 merger speculation*

Sun Microsystems CEO Scott McNealy wanted to merge with Apple as far back as 1988.

Sun Microsystems, an up-and-coming workstation manufacturer, had been trying to merge with Apple since 1988, and by the fall of 1990, a deal was all but finalized when, out of the blue, IBM president Jack Kuehler called Spindler and proposed working together on RISC (reduced instruction set computing) chips. Under the Sun deal, Spindler faced demotion when Sun CEO Scott G. McNealy took over as COO of the combined companies. Working with IBM, however, offered Spindler a way to save his high-powered job, so Apple left Sun at the altar.

Shortly after Spindler became president of Apple in November 1990, Sculley managed to convince IBM, the world's largest computer company, to partner with Apple and Motorola on the PowerPC chip, as well as on Taligent (to develop the Pink operating system) and Kaleida (to develop ScriptX multimedia tools). On July 3, 1991, Apple and IBM issued a preliminary press release but didn't consummate the deal until October 2, when executives signed the papers during a press conference at the Fairmont Hotel in San Francisco (see "The Strangest Bedfellow of All").

Although it had reached a historic alliance with its former archenemy, Apple was still anxious to merge. Throughout the summer of 1992, Apple was in serious talks with photography giant Eastman Kodak, but that deal fell apart over cultural differences. At the beginning of 1993, it looked like Apple had found the perfect partner in AT&T. Executives from both companies met frequently in hot and heavy discussions on how to combine the two firms, and it looked like a deal was imminent. But the merger collapsed at the end of April because AT&T was still smarting from its botched purchase of NCR and was preparing to snap up McCaw Cellular Communications for $11.5 billion.

"I am not available or interested in being CEO of IBM."
John Sculley
(The Wall Street Journal, *March 11, 1993)*

While Apple was in discussions with AT&T, Sculley was also considering switching coasts to accept the position of CEO of IBM. It was the last straw for Apple's board. It felt that in spending so much time on the expensive Newton project and helping the Clinton campaign, Sculley had taken his eyes off the ball to the point where Apple was preparing to announce its largest quarterly loss to date. On June 18, 1993, Sculley stepped

The Clone Quandary

Apple's greatest strategic mistake may have been its refusal to license the Macintosh hardware and operating system until it was too late. Many observers reason that when the Mac was introduced in 1984, it was so far superior to anything the competition offered that the only thing that held Apple back from domination of the personal computer industry was the company's stubborn policy of going it alone.

Macs rely heavily on Apple's proprietary read-only memory (ROM) and custom-designed chips called ASICs, short for Application-Specific Integrated Circuits. This prevents companies from producing Mac clones without Apple's blessing. Some vendors (such as Colby, Dynamac, and Outbound Systems) have tried to get around this problem by building clones with motherboards into which users were expected to insert a ROM that came from a legitimate Mac and then obtain and install the necessary operating system. Needless to say, this was often more work than it was worth and never caught on. If you wanted to legally build a Mac clone, you had to get Apple's permission, and Apple simply refused to cooperate.

After Mac sales tapered off in late 1984, Apple faced a serious problem because management had essentially bet the future of the company on the new computer. One thing holding back sales was the perception that Apple was still an upstart company. As the sole source of Macs, it didn't represent a safe bet when it came to purchasing equipment. That's when the idea of licensing the Mac to others was first kicked around in the halls of Apple's Cupertino campus. If multiple vendors sold Macs, there would be more choice, and buyers wouldn't be dependent upon a single source, reasoned supporters. Strangely enough, one of the strongest supporters of the licensing effort was none other than Microsoft CEO Bill Gates. On June 25, 1985, Gates sent a detailed memo to Apple CEO John Sculley and Apple Products president Jean-Louis Gassée, begging them to consider licensing the Mac OS to outsiders.

"If Apple had licensed the Mac OS when it first came out, Windows wouldn't exist today."
Robertson Stephens analyst
Jon van Bronkhorst
(San Francisco Chronicle, August 8, 1994)

Gates' Most Amazing Memo

To: John Sculley, Jean Louis Gassée
From: Bill Gates, Jeff Raikes
Date: June 25, 1985
Re: Apple Licensing of Mac Technology
cc: Jon Shirley

Background:
Apple's stated position in personal computers is innovative technology leader. This position implies that Apple must create a standard on new,

"When the Mac came out in 1984, we wrote letters to Sculley, and we told him who to go to at HP and who to go to at AT&T to license the machine because we'd really bet our future on the Mac. We stopped doing DOS application development and did all our work in the graphical environment, so we were very worried in 1985 when Mac sales slowed down actually from the first year and we were trying to make all these suggestions. It's probably too late to make a licensing program work."
Microsoft CEO **Bill Gates***, during a January 30, 1996, speech*

advanced technology. They must establish a "revolutionary" architecture, which necessarily implies new development incompatible with existing architectures.

Apple must make Macintosh a standard. But no personal computer company, not even IBM, can create a standard without independent support. Even though Apple realized this, they have not been able to gain the independent support required to be perceived as a standard.

The significant investment (especially independent support) in a "standard personal computer" results in an incredible momentum for its architecture. Specifically, the IBM PC architecture continues to receive huge investment and gains additional momentum. (Though clearly the independent investment in the Apple II, and the resulting momentum, is another great example.) The investment in the IBM architecture includes development of differentiated compatibles, software and peripherals; user and sales channel education; and most importantly, attitudes and perceptions that are not easily changed.

Any deficiencies in the IBM architecture are quickly eliminated by independent support. Hardware deficiencies are remedied in two ways:

- expansion cards made possible because of access to the bus (e.g. the high resolution Hercules graphics card for monochrome monitors)
- manufacture of differentiated compatibles (e.g. the Compaq portable, or the faster DeskPro).

The closed architecture prevents similar independent investment in the Macintosh. The IBM architecture, when compared to the Macintosh, probably has more than 100 times the engineering resources applied to it when investment of compatible manufacturers is included. The ratio becomes even greater when the manufacturers of expansion cards are included.

Conclusion:
As the independent investment in a "standard" architecture grows, so does the momentum for that architecture. The industry has reached the point where it is now impossible for Apple to create a standard out of their innovative technology without support from, and the resulting credibility of other personal computer manufacturers. Thus, Apple must open the Macintosh architecture to have the independent support required to gain momentum and establish a standard.

The Doctor's Strong Medicine

Dr. Gilbert Frank Amelio's tenure as Apple's CEO was short and sour. When he took over the company, it was in the worst shape in its rocky history. He calmly surveyed the landscape, devised a no-frills recovery plan, and methodically went about its implementation. His efforts were often stymied by entrenched Apple executives, unforgiving market realities, and meddling outsiders. He probably could have overcome all of these obstacles had he not been blindsided by an advisor he himself brought back into the Apple fold with the gutsy purchase of NeXT: Steve Jobs.

Courtesy of HarperBusiness and David Powers

Dr. Gil Amelio was given only 17 months to restore Apple to health before being booted out by the board of directors.

Amelio had earned a reputation as a "transformation manager" by helping reverse the fortunes of Rockwell International and National Semiconductor, the fourth-largest computer chip manufacturer. When he arrived at National Semiconductor on February 1, 1991, as chairman, president, and CEO, the firm was near bankruptcy, having suffered four consecutive years of losses totaling $320 million. In 1995, it reported its third straight year of profits, earning a record $264 million on sales of $2.4 billion. While it hadn't enjoyed the same growth as the overall booming chip market, National Semiconductor had clearly been pulled from the fire. Apple needed a man with Amelio's talents and so elected him to the board on November 9, 1994.

The situation at Apple continued to deteriorate during 1995 under the leadership of CEO and chairman Michael H. Spindler. By December the rumor mill was operating around the clock, producing fresh reports of takeover and merger possibilities. Sensing that Spindler was mortally wounded, Jobs paid an unprecedented call to National Semiconductor and asked Amelio to back his bid to return to Apple as CEO, stating, "There's only one person who can rally the Apple troops, only one person who can straighten out the company. Apple is on its way out of business. The only thing that can save it is a strong leader, somebody who can rally employees, the press, users, and developers." Of course, Jobs considered himself that person, but when Amelio pressed him for details on his recovery plan, Jobs

"Apple is a lot like Italy. It's a highly creative company, but with that comes chaos."
Marketing executive **Regis McKenna**

"If [Apple's board] had called me, I would have recommended that Amelio was absolutely the wrong man for the job. He left National in a disaster."
Former National Semiconductor CEO **Charles Sporck**

"You know, I've got a plan that could rescue Apple. I can't say any more than that it's the perfect product and the perfect strategy for Apple. But nobody there will listen to me."
NeXT and Pixar CEO **Steve Jobs**
(Fortune, September 18, 1995)

"The cure for Apple is not cost-cutting. The cure for Apple is to innovate its way out of its current predicament."
NeXT and Pixar CEO **Steve Jobs**

"It's nice to work for a CEO whose idea of technology is not how to put 64 ounces of sugar water in a plastic bottle."
Apple Fellow **Guy Kawasaki**,
praising Amelio while dissing Sculley

failed to provide any concrete solutions and left without Amelio's support. The significance of the meeting was lost on Amelio at the time, but Jobs wouldn't forget.

As Jobs had predicted, Apple's board was indeed dissatisfied with Spindler's performance. He had failed to find an acceptable merger partner for Apple and had presided over a series of quarterly losses and declining market share. During a January 31, 1996, emergency meeting of Apple's board at the New York law firm of Shearman and Sterling, Spindler was replaced by Amelio, who brought considerable managerial experience and technical knowledge to the position. He holds 16 patents and coinvented the world's first charge-coupled device (CCD), which is used in most video cameras produced today. Amelio earned a Ph.D. in physics from the Georgia Institute of Technology, entitling him to be addressed as "Doctor Amelio."

Amelio stated he took the difficult job because, "I was frustrated by the deficiencies of the product and the organization behind it. I'm trying to help one of America's all-time great companies." To help convince him to take the position, the board agreed to a lucrative compensation package. Amelio negotiated a salary of $990,000, which was $296,000 more than he was earning at National Semiconductor. He was also to receive a two-part bonus. The first component was based on performance, with a range from $324,000 to $1,900,000 for 1996 (he got $1,134,000). By way of comparison, Spindler earned a total of $1.42 million in his last year at Apple. Amelio was also given a $200,000 signing bonus, a $5 million loan, an agreement to reimburse Aero Ventures for the business use of his Israeli Industries twin-engine Astra Jet at a rate of $1,695 per hour, and a guaranteed payment of $10 million if the company was sold within a year and the acquiring company terminated his employment or he elected to quit within 30 days. In addition to all these goodies, he was to receive $1 million a year for five years to be credited against the loan, plus options on one million shares with an exercise price of $26.25, which would vest over five years based upon performance objectives. According to Pearl Meyer, a New York compensation consultant, Amelio's total compensation package was worth from $10 to $12 million a year, depending on performance. Angry shareholders initially filed a class-action suit against Apple in March 1996, charging that Amelio's pay package was "wildly excessive," but it was never pursued seriously. Amelio initially defended his pay, saying, "Frankly, it was a very competitive package, in the 75th percentile of executive compensation." Looking back on the issue a year after he left Apple, Amelio acknowledged it was a mistake to draw such a large salary, at least from a PR standpoint. "You don't expect your religious leaders to be making big bucks," he said, "and I was leading a religion."

When he arrived on the Apple campus on February 5, Amelio resolved "to build a business as great as our products," but it wouldn't be easy. As he recalls, "When I walked in the door, I was facing five crises: We were dangerously low on cash; the quality of our products was poor; the

"I don't think anyone can manage Apple."
Former Apple CEO **John Sculley**,
on the mess Amelio inherited

The Copland Crisis

Even before the Mac celebrated its tenth anniversary in 1994, it was clear that its operating system was in need of a major overhaul if it was to remain ahead of Windows in terms of functionality, stability, and ease of use. That it continued to work so well a decade after its creation was testimony to its original elegance and the hard work of Apple's engineers in adding features without sacrificing backward compatibility. But there's just so much you can pile onto an old foundation before it starts cracking. Apple wanted a next-generation OS to beat Windows 95 (code-named Chicago) to market in 1995 that would offer intelligent agents, a customizable interface, and a relational database engine for the Finder. Realizing that Taligent's Pink (see "The Strangest Bedfellow of All") was unlikely to ever see the light of day, a band of Apple engineers set about creating just such an advanced OS under the code name Copland (at the outset, the project was called V1, Faraday, and Maxwell), to be followed in 1996 by Gershwin (known internally as Edison), adding preemptive multitasking and memory protection. Nobody could have predicted then what a mess Copland would become, or that a humbled Apple would one day find itself at the mercy of its two greatest visionaries in exile, both promising salvation with their own operating systems.

Copland was first announced publicly in March 1994 at the premiere of the Power Mac line and fell behind schedule almost immediately as managers responded to Microsoft's inroads by heaping new features onto the Copland specification. At the Macworld Expo held in Boston in early August 1995, just weeks before Microsoft unleashed Windows 95, David C. Nagel, senior VP and chief technologist, promised that Copland "would be in users' hands by mid-1996." On November 17, Apple celebrated the first beta release of Copland to some 50 Mac developers. At the time, Apple had announced its intention to ship a final version to consumers in 1996, but as a former engineer then confessed to *BusinessWeek*, "There's no way in hell Copland ships next year. I just hope it ships in 1997." By the beginning of 1996, Apple had dedicated 500 engineers and a $250 million annual budget to the project. Then on April 26, Nagel bailed on Copland when he signed on as the first president of the new AT&T Laboratories. Apple product manager Peter Lowe promised that, even with Nagel's departure, Copland would ship in January 1997.

Apple had been touting Copland as a revolutionary new operating system that could thrust the company back into the forefront of the computer industry, so customers and developers were understandably disappointed when the project kept slipping. Coupled with the $740 million loss announced April 17, 1996, they began questioning whether Apple had the wherewithal to ever get it out the door. At the Worldwide Developers Conference (WWDC) held in San Jose on May 13, after just 100 days as CEO, Gil Amelio announced that rather than ship a monolithic Copland

"I still have not met anyone at Apple who was working on Gershwin. Which gave me a clue that it's not soup yet."
Apple's chief technology officer **Ellen Hancock**, *at the* MacWEEK *MVB conference on January 6, 1997*

After leaving AT&T Labs, David Nagel joined the board of PalmSource (www.palmsource.com) and later became president and CEO.

"It's not like wine; it doesn't age very well."
*Apple CEO **Gil Amelio**, on Copland*
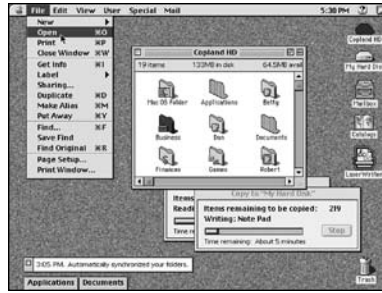
Several Copland features, including the platinum appearance, tabbed windows, and multitasking Finder, shown here in an early Copland screen shot, survived in Mac OS 8.

as a single mega-release, pieces of its technology would ship continuously beginning with the January 1997 release of Harmony (System 7.6). That would be followed by a release known as Tempo (Mac OS 8.0) in July, which was supposed to add multitasking and multithreading, two features that improve performance by letting the operating system do multiple tasks at once.

By August, Apple's new executive VP, R&D and chief technology officer, Ellen M. Hancock, recognized Copland for the bloated piece of inferior vaporware that it was (it didn't adequately address the Internet and lacked memory protection) and froze all aspects of its development not directly related to the Harmony and Tempo releases. The developer community, which had invested years of effort working on Copland and had stuck by Apple through tough times, freaked. Amelio promised to announce Apple's revised OS strategy at the upcoming Macworld Expo in San Francisco on January 7, 1997.


Apple executives began a frantic scramble to locate a technology partner. One of the first places they turned to was Be Inc., a small Menlo Park, California, company started by Jean-Louis Gassée after he resigned as president of Apple Products on September 30, 1990. Gassée had tried to sell Be to Apple's then-CEO Michael Spindler in 1995. "I told Mike that Copland might develop a flat tire on the road to greatness and they might want to buy some insurance," claims Gassée.

As predicted, Copland started bogging down, and the nimble Be began generating very favorable press. On October 3, 1995, Be introduced the BeBox, a computer powered by two 66MHz PowerPC 603 processors and up to 256MB of RAM. It boasted a SCSI II bus, 16-bit CD-quality sound, three PCI slots, four MIDI ports, four serial ports, and five ISA slots. The BeBox ran a multithreaded, memory-protected, object-oriented, preemptively multitasking operating system. A bare-bones box cost only $1,600, and a moderately configured model would set you back just $3,000.

Happily Ever Apple?

After demanding that Gilbert F. Amelio resign as CEO and chairman on July 5, 1997, Apple's board turned to part-time advisor Steve Jobs and asked him to take over as CEO. "I thought about it, but decided it wasn't what I wanted to do with my life," Jobs later revealed. "I declined, but agreed to step up my involvement with Apple for up to 90 days, helping them until they hire a new CEO." The board then asked Jobs to be chairman, which he also refused to accept. "I agreed to be a board member, and that's all I can give. I have another life now." Industry watchers felt Apple would have a tough time filling the vacant CEO position as long as Jobs remained on the board of directors, and they were right.
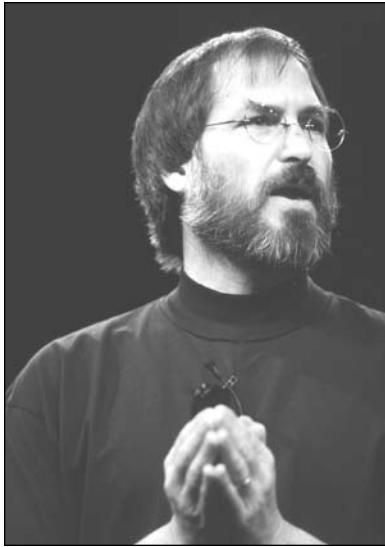
Steve Jobs initially refused to accept the board's request to take Gil Amelio's place as CEO and chairman of Apple, but he agreed to run the place while a new CEO was sought.

Until Apple could find a permanent CEO, Jobs was the company's de facto leader. As he saw it, there was a ton of work to do. "It's like turning a big tanker. There were a lot of lousy deals that we're undoing," said Jobs. To boost morale, Jobs recommended the board reprice employee stock options to $13.25 so that they would be above water. When the directors resisted, he urged them to resign. On July 25, Delano E. Lewis, president and CEO of National Public Radio, did just that, citing pressing time demands at NPR. Apparently he felt it was better to jump than be pushed.

On August 6, at the Macworld Expo in Boston, Jobs announced some shocking news. First, Apple's board underwent a wholesale reorganization. Gone were all but two former directors: Gareth C. Chang (president of Hughes International) and Edgar S. Woolard Jr. (retired chairman of E.I. DuPont de Nemours & Company), who had been instrumental in removing Amelio. Resigning from the board were Bernard Goldstein, Katherine M. Hudson, and Mike Markkula. Throughout Apple's history, the only constant had been Markkula. At various times Markkula held the positions of president, chairman, and CEO, and even though he shunned the spotlight, behind the scenes he orchestrated the ouster of every Apple leader: Mike Scott, Steve Jobs, John Sculley, Mike

"If I were running Apple, I would milk the Macintosh for all it's worth—and get busy on the next great thing. The PC wars are over. Done. Microsoft won a long time ago."
Steve Jobs
(Fortune, February 19, 1996)

"Right now the job is so difficult, it would require a bisexual, blond Japanese who is 25 years old and has 15 years' experience!"
*Be CEO **Jean-Louis Gassée**,*
describing the ideal CEO candidate
(Forbes, August 11, 1997)

"Apple is a company that still has opportunity written all over it. But you'd need to recruit God to get it done."
Western Digital CEO
***Charles Haggerty***
(Forbes, August 11, 1997)

"Apple desperately needs a great day-to-day manager, visionary, leader and politician. The only person who's qualified to run this company was crucified 2,000 years ago."
California Technology Stock Letter
*editor **Michael Murphy***
(San Francisco Chronicle,
September 11, 1997)

Since leaving Apple's board, Mike Markkula has kept himself very busy. He's vice chairman of Echelon (www.echelon.com), a distributed intelligence control systems firm he founded in 1988 to extend the power of networking to everyday devices. Markkula is also a director of the San Jose Jet Center (www.sjjc.com), a private jet services facility located at Mineta San Jose International Airport. In addition, he is the owner of San Jose–based ACM Aviation (www.acmaviation.com), which specializes in aircraft management and private charter. Markkula also owns Rana Creek Habitat Restoration (www.ranacreek.com), which specializes in all aspects of native plants and grasses. Finally, he and his wife provided the endowment for the Markkula Center for Applied Ethics at Santa Clara University, where he has been a trustee since 1989. On June 12, 2003, he was elected chairman of the board of trustees.

Almost immediately upon assuming control of Apple, Amelio had tried to patch up relations with Microsoft. One stumbling block was Apple's insistence that Windows 95 violated some of its patent rights, despite having lost its look-and-feel lawsuit on August 24, 1993. The two firms attempted to put that dispute behind them with a settlement that would allow them to go from combatants to collaborators, but Gates refused to grant Amelio the one concession he desperately wanted: a commitment to develop Microsoft Office for Rhapsody.
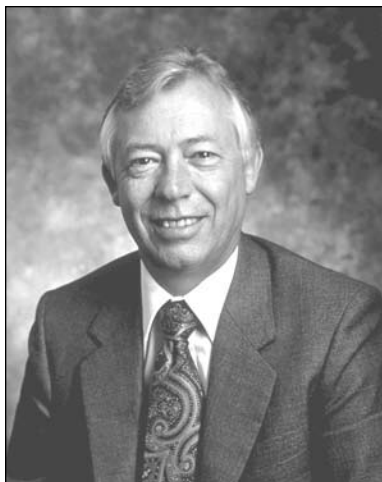
Mike Markkula had been with Apple since its incorporation in 1977, but after twenty years, Jobs sent him packing.

Spindler, and Gil Amelio. Now it was Markkula's time to go, along with most of the rest of the board that had sat back and dithered as Apple withered on the vine. Jobs handpicked a new board full of friendly faces: William V. Campbell (president and CEO of Intuit), Lawrence J. Ellison (chairman and CEO of Oracle), and Jerome B. York (vice chairman of Tracinda Corporation and former CFO of IBM and Chrysler). The new board decided not to name a chairman until a new CEO was selected, but clearly Jobs was now firmly in control of Apple. Less than two years before, Jobs and Ellison had considered a hostile takeover of Apple, and now they were running the show. Best of all, instead of Jobs having to spend billions, Apple actually paid him hundreds of millions to return by buying NeXT Software.

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More shocking than the board shakeup was the announcement that Apple had entered into patent cross-licensing and technology agreements with Microsoft. The finished agreement was faxed from Seattle to Boston just three hours before Jobs announced it to the public. "Thank you for your support of this company," Jobs told Gates. "I think the world's a better place for it." For its part, Microsoft agreed to continue making Mac versions of its Microsoft Office and Internet Explorer products for five years. In return, Apple would bundle Internet Explorer with the Mac OS as the default browser. In addition to giving its word to continue development for the Mac, Microsoft gave Apple an undisclosed amount (rumored to be $100 million) to settle patent infringement claims and paid $150 million for 150,000 shares of Apple series A, nonvoting, convertible preferred stock that could not be sold for at least three years. (Starting in 2000, Microsoft converted these into 18.2 million shares of common stock for an effective purchase price of $8.25 when Apple's stock was publicly trading at many multiples of that price.)

When Bill Gates' face appeared on screen during the keynote address, the crowd erupted in boos and hisses. Jobs berated the crowd for its childish behavior, saying that "Apple has to move beyond the point of view that for Apple to win, Microsoft has to lose." Apparently Wall Street agreed. Within hours of the announcement, Apple's stock jumped 33 percent to