

# EXHIBIT H

# GATES



How  
Microsoft's  
Mogul Reinvented  
an Industry-  
and Made Himself  
the Richest  
Man in America

STEPHEN GATES AND  
PAUL ANDREWS

PARSONS  
EXHIBIT NO. 32  
1-18-07  
C. HAMMER

PUBLISHED BY DOUBLEDAY

a division of Bantam Doubleday Dell Publishing Group, Inc.  
666 Fifth Avenue, New York, New York 10103

*Entrepreneur* and the portrayal of an anchor with a dolphin are trademarks of Doubleday, a division of Bantam Doubleday Dell Publishing Group, Inc.

Library of Congress Cataloging in Publication Data

Manes, Stephen, 1949

Gates: how Microsoft's mogul reinvented an industry and made himself the richest man in America / Stephen Manes and Paul Andrews.

p. cm.

Includes index.

1. Gates, Bill, 1955. 2. Businessmen—United States. Biography. 3. Microsoft Corporation—History. 4. Computer software industry—United States—History. I. Andrews, Paul, 1949.

HD9646 C62G336 1993

ISBN 7-610054-092 dc20

92 15994

[B]

CIP

Book Design by Claire Nealon Adams

ISBN 0 385 42075 7

Copyright © 1993 by Stephen Manes and Paul Andrews

All Rights Reserved

Printed in the United States of America

January 1993

First Edition

Illustration credits: 1. Jon Ball; 2, 3. © *North Times*; 4, 5, 6, 10, 11. Courtesy of Mary and Bill Gates; 7. Wallace Ackerman Studio; 8, 9. Lakeside School; 11. Photo by Jough Jim Productions, courtesy of Paul Gilbert; 13. Photo by Tim Rogers; 15, 1992. Stephen Manes and Paul Andrews; 16. Reprinted from *POPULAR LITERATURE*, January 1975, copyright © 1975, Ziff Davis Publishing Company; 19. The Computer Museum, Boston; 20. Courtesy of Monte Davidson; 22, 23, 28, 29, 30, 31, 32, 34, 35. Courtesy of Bob Wallace; 24. Courtesy of Rex Wiedlund; 25, 26, 33, 34. Courtesy of Microsoft; 27. Courtesy of Miriam Lebow; 36. Courtesy of Jack Sans; 38. Photo by Dale Windheim; © 1992 Stephen Manes and Paul Andrews; 39. Photo by Barry Wong; 40. *North Times*; 40, 50. Courtesy of Charles Sumner; 41. Courtesy of Jill Bennett; 42, 46, 48. © 1984 Ann I. Yoo; 43. © 1986 Ann I. Yoo; 44. © 1990 Ann I. Yoo; 45, 47. © 1988 Ann I. Yoo; 49, 50. © 1987 Ann I. Yoo; 51. © 1992 Ann I. Yoo; 53. Photo by Mark Harems; © *North Times*; 55. Doug Wilson; 56. Copyright © Acrostic Photographers Inc., 1 800-852 4686

Excerpts from Joseph Wizenbaum, *Computer Power and Human Reason*, copyright © 1976, reprinted by permission of W. H. Freeman and Company

smaller office than his own. "I argued that if Vern's butt was too good to sit in a regular-sized office, then mine was too." The Solomonic solution? The company "moved the interior wall over some small amount." Letwin paid for it.

Gates understood that technical guys weren't the only ones who had ideas to contribute. Raburn was a key figure in a project that began with the idea of offering Microsoft FORTRAN and COBOL for the Apple II computer and its underwhelming 6502 chip. As Raburn remembered it, "I was the only Apple user in the whole company. The view of people at Microsoft was that CP/M machines were real machines, the TRS-80 was an interesting toy machine, and the Apple II was a real toy." From the Memorial Day meeting onward, even before he joined the company in June, he kept pushing Gates and Allen to find a way to put FORTRAN and COBOL on the Apple II. "Paul and Bill were busy telling me how hard it was to write a compiler on the 6502 . . . and I kept saying 'Yeah, yeah, yeah, but we gotta get it onto this machine.'"

On the way to lunch with Bill one day, Paul Allen came up with the solution: hardware! Allen proposed a board that would plug into the Apple II and run the Z-80 editions of FORTRAN and COBOL that Microsoft already had. As Raburn recalled, "He said, 'I think what we can do is plug a processor on, and then we can just patch it into the Apple operating system, so that we're actually running on the Z-80, but it looks like you're running under Apple.' And I said, 'Sounds good to me.'"

In the process of doing yet another dull language derived from the mini-computer world, Allen had come up with a radical solution and an entirely new product. The SoftCard, as it would eventually be named, would be the first Microsoft product that wasn't a mere adaptation or extension of some mini-computer language or programming tool. The SoftCard was a different way to skin the cat: Instead of rewriting its compilers, Microsoft would offer hardware that let users run the compilers it had already written.

The SoftCard was one of Microsoft's rare wholly original ideas; Gates would later admit that it probably could and should have been patented. It was a double win: Not only would it likely save precious development time, it would provide a new source of revenue.

But that prospective income was way out in the future. As things turned out, the SoftCard project was anything but simple. For openers, Microsoft did not have a single hardware expert on staff. But there was one hardware engineer who had been hanging around the offices a lot and had developed some cards of his own.

Tim Paterson, an intense, thin, bearded alumnus of the University of Washington and the Retail Computer Store, was an employee at Seattle Computer Products, a mom-and-pop outfit run out of suburban Tukwila by a jack-of-all-trades named Rod Brock and supplying mostly memory cards for S-100.

bu  
bu  
ser  
cer  
yat  
Cc  
his  
ex

bu  
sof  
Sta  
Pat  
bac

floj  
ver  
—  
der  
rur  
the  
80!  
Co

ate  
sta  
chi  
bor  
flav  
get  
on  
did  
the

not  
Pat  
typ  
orig  
so i  
stra  
tra  
tha

bus computers. In late 1978 a sales rep for the local Intel distributor had put a bug in Brock's ear about a seminar covering the forthcoming 8086 chip. The seminar convinced Brock to set Paterson to work on developing a CPU central processing unit card for the S-100 bus. The idea was that you could yank your tired old 8-bit 8080 or Z-80 CPU and replace it with Seattle Computer's state-of-the-art, high-speed 8086 model. But once Paterson had his two-card solution designed and built, there was no software to run on it except his own assembler, debugger, and monitor.

Paterson gave Microsoft a call. No one at Microsoft had ever seen an 8086, but they had a few things almost as important: a commitment to develop software for the chip, the DEC-based simulator of it and an 8086 version of Standalone BASIC that Bob O'Rear had translated from the 8080 edition. Paterson drove up Lake Washington with a Cromemco Z-2 S-100 box in the backseat, and quite possibly the world's only 8086 CPU boardset inside it.

At Microsoft's offices, O'Rear brought his 8086 BASIC down to the 8-inch floppy drives of the Cromemco box and ran it on an actual 8086 chip for the very first time. A couple of minor bugs in his translation from the 8080 version

largely due to errors in the Intel documentation explaining the correspondences between 8080 code and 8086 code initially kept the BASIC from running. With the help of Paterson's homebrewed debugger, the two solved the problems, and by the end of the day Microsoft BASIC was running on the 8086 machine. The feat earned Paterson a trip to the June National Computer Conference in New York.

For the 1979 convention, Microsoft shared a booth with Lifeboat Associates, the biggest vendor of CP/M software. CP/M, for all its claims of being a standard, was a standard only in the most charitable sense of the term. Machines were wildly incompatible buses differed, disk formats differed, keyboards differed, printers differed so there were in effect dozens of different flavors of CP/M, all requiring programs to be adapted in one way or another to get them to run. Microsoft offered CP/M versions of its languages and worked on customizations with its OEM customers, but that left plenty of machines it didn't support directly. Lifeboat licensed the languages from Microsoft and did the tweaking for those machines.

But in the Lifeboat booth that year, the most forward-looking product had nothing to do with CP/M. Microsoft's Standalone BASIC was running on Tim Paterson's 8086 Seattle Computer CPU. The cleanly engineered second prototype was displayed on top of the table, mainly because it didn't work yet. The original version, with gobs of unsightly wire-wrap all over it, actually did work, so it was tucked away inside the computer underneath the table. The demonstration was interesting but not dazzling: since the BASIC was a brute-force translation from 8-bit code, the 16-bit machine didn't appear to be much faster than competitive 8-bitters.

That conference was notable also for Microsoft's first corporate party, complete with bottle rockets being set off from the windows of the Plaza Hotel. Eventually Kay Nishi showed up in the hospitality suite with an assortment of customers from Japan who had not managed to find rooms. Chris Larson, temporary director of entertainment, suavely took charge and ordered seven rollaway beds that were eventually brought to the room by a procession of puzzled bellhops, each of whom Larson grandly gave a \$10 bill. The accommodations were adequate, except for one Japanese gentleman carrying \$20,000 in cash, who insisted on sleeping in the closet. Gates and Company then repaired across the street to the Playboy Club, where his money-saving practice of renewing his membership only in alternate years caught up with him when the doorkeepers noticed that the card had expired.

It was at that conference, over drinks, that Paterson learned about a project Marc McDonald had been working on since the Albuquerque days -- an operating system called MIDAS. Strictly for 8-bit computers, it wasn't something Paterson could run on his 16-bit CPU, but it was designed to have all sorts of nifty features. What interested Paterson wasn't the operating system but its file system -- a variant of McDonald's Standalone BASIC File Allocation Table (FAT) scheme. It interested Paterson because he knew that one of these days he'd need an operating system of his own for his cards. When he'd contacted Digital Research to find out when their version of CP/M for the 8086 chip was coming, he'd been told December.

While waiting for the 16-bit operating system to appear, Paterson had some time on his hands. So Paul Allen hired him as a consultant to develop Microsoft's new hardware product for the Apple II, then dubbed the Z-80 Card. The initial plan was to have the board run customized versions of Microsoft's Z-80 languages in the "background," while the Apple's 6502 chip managed the rest of the show, but when the limitations of Apple's primitive operating system became clear, Raburn came up with the better idea of having the Z-80 chip run CP/M.

Still, the project began as a comedy of errors. As Raburn remembered it: "We went through like 178 different revs [revisions], and we could never get the thing to work. It took us four revs to figure out that the 6502 was a dynamic device," one that would not retain its memory without constant "refresh" signals. "Tim didn't know that, so every time we would switch . . . you know, we'd put the 6502 to sleep, switch to the Z-80, and when we came back to the 6502, the system would crash." For Allen, the hardware enthusiast, it was an unpleasant reminder of the endless delays in the construction of the Traf-O-Data machine.

There was also the question of software; nobody at Microsoft had much experience with the Apple machine. But the answer had literally walked through the door a couple of months earlier in the form of Neil Konzen, a big,

I  
t  
e  
o  
f  
e  
  
su  
Kc  
W  
sp  
on  
hir  
sai  
  
on  
har  
oth  
lea  
bor  
tive  
ope  
wo  
ner  
  
at t  
that  
attr  
mar

- 137 -

affable, goofy high school senior who had gotten deep enough into the mysteries of the Apple to have written a program editor for it that he was selling through the mail. When he read in *Brite* that Microsoft, the originators of the amazing Applesoft BASIC, had moved to his hometown of Bellevue, he got on his bike and rode right over.

Konzen was first handed to Mike Courtney: The man who had turned Bill on to APL was now working at Microsoft. Konzen explained that he was working on a project to enhance Applesoft BASIC and that he had disassembled the code-- a task somewhat akin to taking a watch apart to see exactly how it works. He wanted to speed up his programs, so he requested a peck at the Applesoft source code, which would make things easier. Within minutes he had talked his way into audiences with Paul Allen, Ric Weiland, and Bill Gates.

Konzen was a curious character, but he clearly knew his stuff. Still, to Microsoft the source code was the family jewels. Gates agreed to show Konzen the listings provided he would swear not to give away any trade secrets. That evening Konzen was still high from the meeting. "Back then, nobody had heard of this computer stuff. I was beside myself--you know, just being able to go up there and check out these listings! . . . So, naturally I went back under more excuses and guises."

Konzen and Gates hit it off. Neil managed to impress Bill by pointing out such things as a bug in the line-drawing routine for the TRS-80 BASIC. And Konzen was captivated with the adolescent élan of the company and the man. Walking down the hallway or during a slow spot in a meeting, Bill would spontaneously leap in the air and try to touch the ceiling. Konzen and a friend once found Bill bouncing on a minitrampoline in Microsoft's lobby and warned him to be careful or he might hit his head. "I can hit my head if I want to," Bill said without missing a beat. "It's my company!"

Konzen kept going back: Eventually he was offered a part-time job working on the software side of Paul Allen's Apple II hardware venture. But because the hardware wasn't anywhere near ready, Konzen marked time on a variety of other projects. By the end of the year, when the hardware began to work at least some of the time, Konzen began adding enhancements to the rather bare-bones CP/M BASIC, putting in features and color graphics to make it competitive with Applesoft-- and stepping on the toes of other variants being developed at the same time from the single gargantuan BASIC source file. "We would constantly screw each other over," Konzen remembered. "As a beginner, I screwed other people more than they screwed me."

The Z-80 SoftCard had its first public demonstration at Microsoft's booth at the West Coast Computer Faire in March 1980-- leading Zilog to demand that its "Z-80" trademark be deleted from the name forthwith. Still, the booth attracted tremendous crowds despite the product's obvious failings. "The total marketing was one brochure . . . and we had one little round thing that was

- 148 -

and disk space, both quite expensive in this era. Besides, Microsoft had its hands so full customizing versions of BASIC and its other languages to the spate of new machines that kept coming through the door, particularly from Japan, that it was unwilling to divert precious resources to XENIX: At the outset, the XENIX team consisted entirely of Product Manager Bob Greenberg and Program Manager Gordon Letwin. The first version of XENIX, due in November 1980, would be for DEC's PDP-11 machines - which wouldn't be hard, since UNIX had been developed on those very machines, and adaptation was trivial. The harder "ports" adaptations for other machines - were to come later.

And eventually they did. But XENIX did not manage to become the 16-bit standard. What took that prize, what beat out the academic elegance of the UNIX derivative, was a rough-and-ready little operating system that wasn't portable, wasn't terribly versatile, didn't offer even a tenth of the "abundance of auxiliary software that accompanies the XENIX OS," and by the standards of some computer purists wasn't really an operating system at all. It was an operating system known as QDOS, and not even Bill Gates knew about it. At the time the XENIX project began, you could count on the fingers of one hand the worldwide total of people who had ever heard of the Quick and Dirty Operating System.



· 157 ·

Sams, hardware guru Lew Eggebrecht, and a contingent of folks from IBM. As Gates would retell it with his typical flair for exaggeration:

*... They said, "We have a lot of things to do, so let's do them in parallel. We'll have our legal team meet with your legal team, we'll have the purchasing team meet with your purchasing team, we'll have our technical team meet with your technical team, so we can do four or five things at once." Well, that is fine, but that's me who is going to do those things and I can do only maybe two things at once, so we're not going to be able to have five simultaneous meetings.*

One would have to do. Bill Gates signed a consulting agreement that paid Microsoft the sum of \$15,000 for a month's work on "developing a more precise specification of the software requirements for [IBM's] system." For the first time, IBM fully disclosed to Microsoft all the technical minutiae of its plan.

But now one of the foundations of the plan—the use of a 16-bit processor—was being called into question. If IBM couldn't find an off-the-shelf 16-bit operating system, how could it build a 16-bit machine? Sams wondered if Gates knew of a 16-bit alternative. Well, there was XENIX, Gates suggested; unfortunately XENIX wouldn't even begin to run on a low-end machine like the one IBM had in mind. But the Gates luck, sometimes known as Paul Allen, held again. Allen happened to know of a computer engineer who was almost as frustrated with Digital Research as IBM was. Like giant IBM, this mom-and-pop-shop engineer had a 16-bit machine and had been thwarted in trying to buy an operating system for it. The engineer was Tim Paterson of Seattle Computer.

Once it had become clear that Seattle Computer had lost Microsoft's SoftCard business, Paterson had gone back to tinkering with his 16-bit board-set. By April 1980 Digital Research's promised delivery date for CP/M-86 had long since passed, so there was still only one major software product that could run on the Seattle Computer machine: Microsoft's Standalone BASIC with its rudimentary built-in operating system. Since that was kind of limited, Paterson set out to clone CP/M on his own. The result was what he called QDOS—Quick and Dirty Operating System.

QDOS wasn't an absolute clone of CP/M. Remembering his conversation at NCC with Marc McDonald about File Allocation Tables in his unfinished, large, and never-released 8-bit MIDAS operating system, Paterson decided that the FAT scheme was a better way to handle disk information than the way CP/M did it. Paterson also made modest improvements for users. With CP/M, copying a file from drive A to drive B required the goofy syntax Kildall had adopted from old DEC operating systems:

- 158 -

PIP B: A:FILENAME

With QDOS you simply typed

COPY A:FILENAME B:

Paterson also changed CP/M's classic A> prompt to A:, borrowed the idea of a command-line editor from North Star DOS, and added elements from C/DOS, Cromemco's CP/M clone.

But for programmers' convenience, QDOS mimicked every last internal function call of CP/M, along with many other technical aspects. So close a clone was QDOS that the preliminary user's manual for its public unveiling as 86-DOS (Disk Operating System) carried this disclaimer:

*SPECIAL NOTE: 86-DOS is not related to the popular CP/M operating system of Digital Research. Disk directory formatting and space allocation are completely different and incompatible. 86-DOS does, however, provide a utility called RDCPM which will transfer files from CP/M disks to 86-DOS disks. Further, operating system calls and calling conventions have been provided which make possible automatic translation of Z80 programs written for CP/M into 8086 programs that run under 86-DOS.*

In fact, translating old programs or writing them from scratch with Paterson's bare-bones assembler were the only ways to get software running on his new DOS.

Languages were clearly called for, and in early August Paterson wrote Bob O'Rear about adapting Microsoft BASIC for the new operating system. Seattle Computer's general manager, the well-traveled former Boeing sales rep, newspaper editor, and real estate salesman Rod Brock, then wrote Paul Allen to propose a cross-licensing arrangement. Seattle Computer was offering to swap the right to license 86-DOS for the right to license Microsoft's languages. Result: When the IBM emissaries at the August 28 meeting asked about 16-bit operating systems, Bill Gates hinted he might just be able to find one.

Over the next few weeks, in intermittent meetings with IBMers, particularly Eggebrecht, the Microsoft consultants, primarily Gates, Nishi, and O'Rear, forcefully expressed their opinions of what the IBM machine ought to be. With typical wild panache, Nishi grandly pushed for everything he could get: more memory in the box, more colors on the screen, more keys on the keyboard. Gates essentially plumped for a 16-bit version of the Oki machine, minus the built-in printer, plus rudimentary sound capabilities.

On occasion Gates would put in a pitch for the faster 8086 chip, the more

· 169 ·

86-DOS. But there was still no formal deal even after the initial sixty-day agreement period had passed, and the redrafted contract Ballmer sent Brock later in the month omitted the \$10,000 front money that had been originally agreed to. With the restoration of that clause and a few other modifications, the license agreement was signed early in January. On that one, William H. Gates reverted to "style" as president.

From the relative calm of Seattle Computer, Tim Paterson dutifully supplied fix after fix to DOS—such things as better error messages and a change in his A: prompt to the CP/M-like A>—for transmission to the unknown customer and the unseen machine. The only early inkling of the customer's identity came when Rod Brock fielded a question about 86-DOS from someone at IBM. When Brock inquired where the caller had gotten a copy of the program—at the time there were only seventy or eighty in the hands of customers, and Brock didn't recall any having gone out to the Armonk behemoth—the caller hemmed, hawed, and hung up.

At Microsoft, Bob O'Rear methodically adapted 86-DOS to the Chess machine. Every time he got new code from Paterson, he would move it to the prototype machine via a wildly kludgy multistep process that involved a stroll from one end of the building to the other and the use of three different machines, not counting the IBM prototype. But by the beginning of 1981—a month after it had been delivered—the prototype still refused to work reliably. In the heat of the storage room, wires on the circuit boards would randomly disconnect, creating intermittent problems. As O'Rear wrote IBM, "it sometimes takes days to ascertain whether the problem lies with the hardware or the software," and "to prove the hardware is actually failing takes days of our time." The color video cards refused to work, and in the dark some of the components of the power supply actually glowed—before the unit failed entirely.

The phone lines between Bellevue and Boca burned with endless questions, complaints, fixes. The already tight schedules were beginning to slip. It wasn't until late January that O'Rear was able to bring up DOS and BASIC on the prototype machine. By February 2 he asked IBM to take on the responsibility of testing some of the software in order to keep as close to schedule as possible.

A bailout clause in the contract expired on March 1. When that date passed, it became clear to Microsoft that IBM was not likely to abandon the project. On March 12, after a series of troubleshooting visits from IBM staffers, Ballmer wrote IBM's Harrington reminding him of the sixty days lost before the prototype actually worked and confirming a revised schedule for software delivery.

One of the saviors of the project was Microsoft's set of minicomputer development tools—especially the 8086 simulator that had been begun on spec back in Albuquerque. Those tools allowed programmers to keep cranking code

- 171 -

screen, getting pissed off when a self-described "random little grit" like Konzen came up with a better algorithm for a graphics routine.

Gates and Konzen were responsible for one of the oddest programs IBM ever released: DONKEY, a game in which the player's car tries to avoid hitting the eponymous animals-- one of the few real-life driving experiences Bill Gates seems to have missed. "Sunday afternoon it was the two of us in that sweaty room," Konzen recalled. "I drew the thing. It was supposed to be a cow, and it was a feeble little cow, and we figured, 'Okay, it's a donkey.'" Avoiding the beast was no thrill; hitting it, however, blew a raspberry from the speaker and displayed the message "BOOM! Donkey loses!"

The general weirdness of the program was not lost on the IBM wild ducks, who threw it on the DOS disk anyway. IBM wasn't all that particular about what it sent out to its entry-level customers. With DOS, it would also toss in a rudimentary text editor called EDLIN, written by Tim Paterson back in the Quick and Dirty days and initially unintended for public consumption. It would survive for more than ten years.

IBM was of two minds about Microsoft. On one hand, this outlaw band was clearly violating the cherished security protocols. The IBM cops had already fretted about a possible security gap involving the hotbox closet's false ceiling. At their direction, chicken wire had been installed above it in order to prevent untoward attacks.

But a surprise visit April 9 from Big Blue's security troops revealed more shocking lapses. Parts of the prototype were found outside the locked room; programmers were cavalierly handling IBM confidential information rather than logging it in and out to their offices; the door locks were appallingly flimsy.

And that was just what the IBM police found out about. In truth, virtually everybody in the place knew about the "secret" machine, kids like Neil Konzen were bringing their girlfriends and pals by to see it, and on one occasion, the delay between the time Eggebrecht arrived and the time he actually got to work on the machine led him to suspect that Bill had taken it home.

Yet on the same April day Ballmer was writing IBM to smooth over the security snafus, he sent another letter to sell the company even more software. Typing Tutor II, Time Manager, and Olympic Decathlon were all developed elsewhere but published by Microsoft Computer Products for other machines, and then there was Letwin's Adventure. A fifth product was little more than an idea: a low-end database that could handle Japanese Kanji characters as well as English. Finally, there was Electronic Paper, a VisiCalc knockoff discussed for months but barely off the drawing board.

Ballmer's initial quote for the low-end products was a per-copy royalty on the order of \$3 to \$5, with adaptation fees from \$9,000 to \$30,000. For Electronic Paper, he thought bigger -- a royalty of \$20 per copy, with a mini-

mum of \$1 million over two years, plus an adaptation fee of roughly \$50,000 all for a product that existed solely as a design prototype. IBM said yes to everything. Good old American salesmanship had scored again.

In May, after a falling-out with Rod Brock over Seattle Computer's marketing strategy, Tim Paterson strolled through the door as an employee of Microsoft. Old Retail Computer Store cohort and current Microsoft Pascal wizard Bob Wallace greeted him at the reception desk, had him sign the standard nondisclosure agreement, and ushered him down the hall to a hot little closet. It was there that Paterson got his first glimpse of the machine whose operating system he had been fine-tuning for months and was now virtually complete. Indeed, much of IBM's DOS technical documentation had been lifted directly from Paterson's 86-DOS manuals for Seattle Computer.

At IBM, marketing considerations, not technical ones, were becoming dominant as the machine turned real. One faction wanted to call the machine "Freedom," but the name that stuck was classically simple: the IBM Personal Computer. It would be the first IBM computer marketed without a number, although it had one - 5150 - discreetly on the back. And it would be the flagship product of the new Business Centers of Sears that were not all that different from the Tech Centers Blair Newman had proposed.

Word of the PC was beginning to leak out to the world at large. The code name was changed from Chess to Acorn, but except on official correspondence, no one paid much attention; at Microsoft, the machine was commonly known as HAL, after the computer in the film *2001*.

In May Bill Gates wrote IBM's Estridge proclaiming his enthusiasm for the project and making two requests. First, he and Paul asked to be invited to the official rollout of the machine - a request that Estridge denied. The second request was pure tightwad Bill Gates hustle: He asked for a special group-purchase price on Chess machines - and apparently got turned down on that too.

The news leaks increased. Gates and Ballmer grew frantic about the possibility that IBM might trace the leaks back to Microsoft - which, given their cavalier security precautions, was far from impossible. They had already spilled the beans to venture capitalist and mentor David Marquardt, and he clearly wasn't the only one. By early June an *InfoWorld* report described the machine reasonably accurately. *Electronics* correctly added the fact that "its disk operating system, developed by Microsoft Inc. of Bellevue, Washington is similar to CP/M and will be called IBM Personal Computer DOS." The report was on target: IBM had rechristened 86-DOS to its own taste. Although the IBM Personal Computer Disk Operating System would soon become known familiarly as PC-DOS, neither Microsoft nor IBM ever trademarked or officially used the term.

Suddenly there was a lot of interest in that mysterious DOS. Japanese

cust  
som  
agre  
calls  
dist  
DO  
mor

Orig  
way  
oper  
too.  
syste

his t  
agre  
stick  
with  
since  
buy  
you

I  
gara  
defe  
DOS  
ment  
suspi  
they

t  
CP/M  
some  
some  
atten

S  
ment  
crew  
blank

f  
was f  
injun  
sharir  
woul

- 173 -

customers began contacting Microsoft about the possibility of licensing it—something Microsoft was eminently permitted to do under the terms of its agreements with Seattle Computer and IBM. In June Rod Brock began getting calls too—from Eddie Currie of Lifeboat Associates, the leading independent distributor of CP/M and CP/M software. Currie was offering to make 86-DOS Lifeboat's 16-bit standard, and he was prepared to back the offer with money—a couple of hundred thousand dollars of it.

News of Lifeboat's offer woke Bill Gates up to what he was sitting on. Originally he had looked at this cheesy little operating system as just another way to sell his languages. Now—*Witness the transformation!*—this cheesy little operating system was supporting Microsoft's fledgling applications business too. And if the Japanese clamor was any indication, this cheesy little operating system might just be able to make some money on its own.

This would piss off Gary Kildall, who had for about a year been peddling his true language love, PL/I. Bill Gates viewed that as violating an unstated agreement that Microsoft would stick to languages and Digital Research would stick to operating systems—an agreement he himself had long since breached with XENIX. But it was beginning to be clear that any "agreement" had long since died. Bill was doing DOS; rumors were flying that Gary was planning to buy Gordon Eubanks's Compiler Systems, whose main product was CBASIC. If you messed with BASIC, you were messing where Bill Gates lived.

But now Bill Gates was clanking around in Kildall's operating system garage, and although CP/M-86 was still late, Kildall was not about to concede defeat. Having gotten wind of Microsoft's DOS deal and seen a copy of 86-DOS, he and attorney Gerry Davis were pointing out to IBM's legal department and Don Estridge and anyone else who might listen that there were suspicious similarities between DOS and CP/M—similarities so substantial that they skirted the edges and possibly even breached the bounds of legality.

Under similar circumstances, Digital Research had convinced earlier CP/M clones, such as Cromemco's CDOS, to acquire licenses. The hint of some sort of court action—a delightful little California injunction, perhaps, something that might cast a pall over the initial product rollout, caught the attention of the litigation-shy IBM.

Still, Kildall had little stomach for suing a behemoth whose legal department probably had a bigger payroll than his entire company's. When he and his crew met with Don Estridge, IBM's laid-back engineer confronted them point-blank. What did they *really* want?

Kildall said he wanted CP/M-86 to be offered on the IBM machine. That was fine with Estridge. In exchange for an agreement to drop any thought of injunctive relief, he struck the deal. Bill Gates would shortly find himself sharing the IBM machine with a competitor he thought had disappeared. He would later charge that IBM was "blackmailed into it."

It was time to take off the gloves. On June 25 Paul Allen took the first step to acquire Seattle Computer's 86-DOS outright. In a letter to Rod Brock, Allen proposed that Microsoft buy all rights to 86-DOS for \$30,000, plus a free license to Microsoft's 8086 macro assembler and linker. Microsoft would take over the chore of supporting and revising the product, and SCP would get whatever enhancements Microsoft might make, free of charge. As Allen wrote, "You would be relieved [sic] of the support of SCP DOS and have extra cash to potentially expand your hardware efforts, while we would be able to try to take CP/M-86 to the mat."

On July 10, two days after receiving the \$15,000 payment due from Microsoft for its sublicensing of 86-DOS source and object code to one unnamed customer, Brock made a counterproposal. Tony Gold of Lifeboat, Brock wrote, was offering "a substantial up-front payment, with the guarantee of several \$20,000 royalty payments," for the right to sell 86-DOS. "His interest is also the reason the exclusivity portion of the proposed agreement has such a high price tag." Brock suggested a fee of \$150,000, plus the right to license Microsoft languages at a discount. In return, Microsoft would get the exclusive right to license 86-DOS to all OEM customers except those purchasing SCP's hardware.

Gates, Ballmer, and Allen met to discuss the proposal. High price tag? As Ballmer remembered it, "the \$150,000 number we all agreed was just this mighty grab for gold." Bill saw this whole Lifeboat thing as out of control. The \$150,000 figure would, in typical Gatesian exaggeration, "bankrupt the company"—this from the same Bill Gates who reportedly made \$1 million and paid \$500,000 in federal income tax that very year.

Allen thought something like \$50,000 might get the deal done. That number was fine with Bill. But he insisted that the deal be an outright purchase, not a mere license. He reminded Paul about the hassles involved in their original license with MITS and what had happened when that agreement hadn't worked out. It was better, cleaner, to own a product outright.

"At this stage of the game," according to Ballmer, "we were trying to put together a business arrangement which would allow us to feel comfortable about being aggressive in terms of moving forward with our DOS plans with IBM and with other customers. And in that context, Bill's judgment and gut told him that the best thing is for this to be something that's clearly ours and clearly unencumbered and something where we could have flexibility to do whatever we wanted to do with it."

Gates knew the deal had to be done fast. By now the new IBM machine was an open secret, and Brock was sure to have guessed who the unnamed customer was. Still, Brock hadn't yet seen the machine and couldn't possibly understand just how important it was likely to be. Ballmer rushed the deal through, personally delivering the papers to Seattle Computer's offices. "I

- 175 -

went down there . . . as part of the process to get the license signed, get the license signed, get the license signed. Bill had been pushing on me. . . . We knew the IBM Personal Computer and MS-DOS, not 86-DOS, but MS-DOS, would be announced sometime in the not-too-distant future from the end of July. And I wanted to have this agreement signed before the IBM PC was introduced."

The final agreement, signed on July 27, sold 86-DOS outright to Microsoft for an additional payment of \$50,000. In return, Seattle Computer got a royalty-free license back, permitting it to license the use of the software to "purchasers of hardware manufactured by Seller." Seattle Computer would also get "updates and enhancements," half its development costs for a projected multiuser DOS, and licenses to Microsoft's languages at roughly half the usual price.

If Gates was worried about Kildall's legal saber-rattling, he didn't show it. The still-evolving laws continued to indicate that you could sue someone who swiped portions of your source code, but not someone who reverse-engineered it. Microsoft agreed that if DOS somehow infringed on someone's copyright, Seattle Computer would be liable for no more than the amount of the deal.

Brock felt it was a reasonable arrangement. He was in the hardware business, and now he could afford to give his operating system away. "Cash was important. . . . We visualized that we would have a tremendous advantage over any other OEM because we didn't have to pay for the license," and the sweetheart deal for the languages meant he could price those low too. Tim Paterson, still a shareholder and director of Seattle Computer, did know what was going on with IBM, though his nondisclosure agreement as a Microsoft employee kept him from telling Brock. He read the contract and "thought it was a fair deal."

It wasn't just a fair deal for Microsoft. It was the deal of the century. For a grand total of \$75,000—\$25,000 on the first agreement, \$50,000 on the second—the company now owned DOS lock, stock, and barrel—or thought it did. Bill Gates would go on to make DOS the foundation of his empire. But he had not heard the last from Rod Brock.

Gates and Company were beginning to reach an audience outside the computer industry. In June 1981 *Fortune* ran a piece on leading industry figures, including Gates and Allen, pictured with their glasses sardonically perched halfway down their noses. Although still officially a Harvard undergrad, the article noted, "Gates doesn't think he can go back. 'The pace in school,' he says, 'is a little bit different.'" The article was a hit with Steve Ballmer, who distributed a companywide memo pointing out "As slow as progress may seem, some times [sic] we are having an impact."

Ballmer was definitely having an impact. A partnership since its inception, Microsoft finally became a Washington State corporation on July 1, 1981,



- 215 -

Microsoft's team was in virtually daily contact with the Mac group, ironing out scores of programming guidelines, interfaces, standards. Jobs's Pirates and Simonyi's Smart Guys seemed mirror images, young, iconoclastic, pizza-fed, Coke-drenched, fuck-you rock 'n' rollers of the digital world. At one point Microsoft had as many programmers assigned to the project as Apple. This was the computer of the future, everyone was sure of it, and the teams worked with all stops out. "It was the highlight of our career to work with that bunch, and we were like *this*," Simonyi remembered, crossing his fingers emphatically. "We bet everything on graphical interfaces—everything."

But the Macintosh hardware kept changing, complicating the job. The initial 64K of memory was quickly upped to 128K. Then the screen resolution was increased from its initial grainy level, stealing back some of the memory that had been added. Then the disk drive was changed from the Lisa's disastrously unreliable "Twiggy" model to Sony's new 3½-inch hard-cased design.

Microsoft managed to make numerous contributions to the Mac's final software design—although their exact nature is a matter of debate. "We helped them debug their operating system, and we suggested changes and additions," Neil Konzen remembered. "We had ideas for the ROMs and the interfaces and the 'toolbox,' as they called it. We also argued about the user interface guidelines—although we didn't have as much impact on that as we did on the code or the technical stuff."

The Macintosh's developers today downplay Microsoft's role, acknowledging that the Bellevue team suggested improvements, refinements, and fixes, but maintaining that it rarely proposed specific elements. Microsoft programmers proudly rattle off a short list of items to which they claim joint creative ownership—items such as the terms "radio button" and "dialog box," the arrangement and display of some of the pull-down menus, the double-bordering of default selections, the way windows were zoomed to fill the screen. According to Andy Hertzfeld, at least one essential contribution came from the chairman himself: During early discussions in mid-1981, when the Mac was still without a file system, Gates suggested the file allocation table (FAT) scheme he and McDonald had devised for Standalone BASIC and Paterson had adapted for DOS. The Pirates quickly commandeered it for the Mac.

Mike Boich, the original Mac "software evangelist," admitted that the Microsofties "were the first guys trying to do really ambitious applications on top of the operating system, and the operating system was in a very rudimentary state when they first saw it, so they certainly got to say, 'Look, we could do things a lot better if you did X, Y, or Z.' . . . If there's a theme to those discussions, it's that the Microsoft guys were always looking for more power and features; the Apple guys were always looking to keep the stuff just as simple and conceptually pure as possible."

Microsoft was not sitting on its hands with the technological tutorial from

· 229 ·

Tokyo as MSX. MSX was designed for the bottom of the market — home computers costing less than \$300. An MSX machine would include a Z-80 processor, specified sound and graphics chips, a joystick, a slot for a ROM cartridge, color-TV output, and 32K of ROM that included Microsoft BASIC and some special subroutines. The idea was to offer a standard in the 8-bit world much like the one DOS and the IBM PC presented in the 16-bit arena, and to leapfrog Digital Research's CP/M by including all the bells and whistles it lacked. Under MSX, based in part on technology from a Hong Kong outfit called Spectravideo, software developers could develop their game, entertainment, and educational software and be assured that it would run on a variety of machines without reworking.

This was mostly a Nishi enterprise. ASCII's longtime hacker-king Rick Yamashita was the technical wizard behind it — and Bill Gates saw it as a sweet deal. Companies could license MSX from Microsoft for \$100,000 in advance, plus a minimum royalty commitment of \$150,000 against royalties ranging from \$3 down to \$2 per machine depending on volume. In return, they'd get little more than a set of hardware specifications and the code for Microsoft's ROM BASIC interpreter. If they wanted to offer a disk drive, they could pony up an additional fee of \$50,000 against \$5 per copy for something called MSX-DOS, essentially an 8-bit version of MS-DOS that would be written by DOS creator Tim Paterson, who by this time was working as a consultant to Microsoft. It was the old Albuquerque technique: Write it once, sell it often.

In *Microsoft Quarterly*, Bill Gates hailed MSX for allowing "Microsoft to deliver a single form of BASIC to all the newcomers in the low-end market, leaving us free to focus on the office market" — a typically tactful Gatesian hint that MSX customers were not exactly Microsoft's top priority. Still, fifteen Japanese companies, including Matsushita, Hitachi, Sony, Toshiba, and Yamaha, signed up for MSX, giving Microsoft and Nishi's ASCII an instant \$1.5 million cash windfall. In the early going the singular absentee was NEC; its commanding lead in the Japanese arena gave it no incentive to join a me-too consortium. One boost came after the midyear Consumer Electronics Show, where Philips, the Dutch electronics behemoth, joined the bandwagon. At that show, Nishi held up a single-chip integrated version of the MSX hardware — one of his first ventures into chip design, which would become an ASCII specialty and one of his personal hobbyhorses.

Nishi had plenty of those. As a publisher of magazines, he had diversified into becoming a publisher of software. Now he was urging Bill Gates to take the opposite tack — in part to help pave the way for Microsoft's increasingly retail business to get a foothold in outlets it had never reached before. The first venture that looked appealing was *PC Magazine*, which founder Tony Gold had put on the block late in 1982. Seeing himself about to be squeezed out, Bill's old MITS pal David Bunnell, the magazine's editor and publisher, appealed to

▼ Elsewhere in the region was a headquarters in far less fortunate circumstances. Rod Brock's Seattle Computer Products had fallen on hard times. Its multifunction add-on boards for the IBM PC, initially designed by Tim Paterson of DOS fame, did well for a time, but by 1985 Taiwanese boards were selling at retail for about what it cost Seattle Computer to make its own. Brock's Gazelle machine had become a casualty of the push toward IBM compatibility, "a computer that nothing would run on." After a major fire at the headquarters in 1984, Brock began actively looking to unload the company.

Among Seattle Computer's few remaining assets was its free right to license MS-DOS and "updates and enhancements" to purchasers of its hardware. To a clonemaker, that license would mean a chance to undercut the competition by not having to figure Microsoft's DOS license fee into the price. But by pulling such an end run, a clonemaker might piss Microsoft off, which might mean no BASIC, no Windows, no fancy new DOS. Brock offered a finder's fee to peddle the DOS license, but no buyers came forward.

The agreement limited the free license to one copy of DOS per "CPU" purchased. CPU meant "central processing unit"; in the industry it could mean either the main computer—say, an IBM PC—or the chip that ran it. In desperation, Brock decided to "see how far the language would stretch" and offered a tiny board that contained an 8088 chip—a "CPU"—and a bit of circuitry that let users switch between separate banks of memory. Since the chip duplicated the one in a user's machine, and since no packaged software would work with the memory-bank scheme, the board was essentially a ruse to have something with which to bundle a cheap copy of DOS. As Brock recalled, "Microsoft didn't like that."

So maybe, Brock suggested, Microsoft could buy Seattle Computer. On August 14, 1985, Brock wrote Jon Shirley guessing that the MS-DOS license would be worth, about, oh, say \$20 million—and to a reporter from *Information Week* publicly floated his interest in selling. Shirley responded two weeks later in high indignation: "We were shocked to learn of your exaggerated interpretation of SCP's rights under the agreement and the astronomical value you have suggested." In Microsoft's view, he stated, the license was limited to "purchasers of SCP manufactured 8086 chip machines; and it does not authorize any use of Microsoft's trademark 'MS-DOS'"—and besides all that, it was nontransferable.

That was Microsoft's interpretation, though the terms "8086" and "non-transferable" were nowhere in the contract language concerning SCP's rights to license DOS. Moreover, Seattle Computer had in fact been the first company in the world to publicly promote the operating system under the name MS-DOS, with no gripes from Microsoft.

Negotiations went nowhere. In Bill's view, he had already bought the

- 311 -

product; he was not about to buy it twice. So in early February 1986, Seattle Computer filed suit in King County Superior Court, demanding either that Microsoft acknowledge SCP's right to transfer its MS-DOS license or that Microsoft turn over most of the DOS revenues it had earned and declare the agreement null and void. Damages were set at over \$20 million and could conceivably be trebled. For once, contractual language had caught up with Bill Gates.

The timing was exquisite: the existence of the suit had to be disclosed in the public offering prospectus. "The company," Microsoft sniffed, "believes that SCP's interpretation of the agreement is erroneous and intends to vigorously defend this action."

Yet there was another royalty-free license out and about in the world, one that had the potential to do even more damage to the Microsoft empire. Its existence was omitted from the IPO papers even though Bill Gates had discussed it with the license holder just five days before the stock rolled out to an expectant public. The agreement had been negotiated by Paul Allen back in December 1983 and signed by Bill Gates the following March. It was with an outfit called Falcon Technology.

Falcon Technology was, in effect, DOSmeister Tim Paterson, who had started a company to sell hard disk drives and other peripherals. By early 1986 Falcon was on the ropes, its debts amounting to over \$700,000. The company did have a couple of assets--designs for a hard disk controller and a ROM BIOS. It also had a very interesting DOS license.

The agreement had been part of Paterson's consulting fee for developing MSX-DOS. It included free licenses to DOS 2.0 and 2.5 (soon renumbered 3.0), Multitasking DOS, and MS-NET-- and free updates through December 1985. The licenses clearly extended to packaging DOS with hardware products based on just about anything in the Intel 8086-compatible chip family and were explicitly transferable to "any purchaser of substantially all the assets of COMPANY's computer system products business." So when a Taiwanese hardware firm came calling, it was time to see if Mr. Bill might up the ante.

Receiving no satisfaction from a telephone conversation, Paterson sent Gates a contractually required letter on March 17, indicating his intention to sell DOS with a variety of disk controllers. This got Microsoft's attention. House counsel Bill Neukom met with Paterson the following week and disputed his interpretation of the agreement. In a carefully worded letter, Neukom indicated Microsoft's willingness to "reach an understanding" -- an entirely different face from the stonewall the company was presenting to Seattle Computer and Rod Brock.

Gates and Allen met with Paterson toward the end of April. In an earlier agreement for MSX-DOS signed by Steve Ballmer, Gates reminded Paterson, there had been a \$300 minimum requirement on hardware to be shipped with

DOS. "Bill Gates got pretty pissed at me when we first started talking about this: Like 'What are you doing? We think the \$300 value is still in there!'" Paterson stood firm and reminded Bill that the later agreement explicitly "merges all prior and contemporaneous communications."

"He's huffing and puffing," Paterson recalled. And bluffing. Gates snidely wondered where it would all end, suggesting that Falcon might ship DOS with its ROM BIOS -after all, that was hardware, right? No, Paterson shot back: A ROM chip probably wouldn't be covered under the agreement, since the BIOS was software, the ROM just the container. "So I'm going to try and have some integrity here. I'll ship it with things that are real hardware products. But floppy disk controllers are \$17."

Paterson had called Bill's bluff, faced him down, and won. Microsoft agreed to acquire the assets of Falcon Technology for approximately \$1 million. Paterson entered into a two-year employment agreement with Microsoft at \$50,000 a year and ended up with 10 percent of a new entity known as Falcon International and, later, Paterson Labs. For \$500,000, repayable to Microsoft on easy terms, the new company acquired Paterson's BIOS software and disk controller design, as well as a favorable DOS license and Paterson's paid-by-Microsoft services one day a week. Eventually the company was sold outright for about \$10 million worth of stock in BIOS vendor Phoenix Software Associates.

For Bill Gates, it was one license down, one to go. The Seattle Computer case was plodding through the courts, and at first the Gates luck seemed to be holding. The judge who initially drew the case was one Gary Little, a social lion who traveled in Gatesian circles and happened to have been Bill's constitutional law instructor at Lakeside where, he later said, "Trey was one of my best students." Somehow that fact did not bother Little enough for him to recuse himself from the case. Seattle Computer's lawyer Kelly Corr, unaware of the connection and acting on hunch, demanded and got another judge--along with a blistering dressing-down from the imperious Little, who would blow his brains out in his chambers just two years later when his abuses of the law and adolescent males surfaced in the local press.

As readily as it had settled the Falcon license, Microsoft seemed absolutely adamant about taking the Seattle Computer suit to the bitter end. Motions, countermotions, discoveries, and depositions dragged on and on. The Gates deposition in particular was like pulling teeth. Directing a superior smirk at the admittedly untechnical Kelly Corr, the deponent answered with smug sarcasm and petulant sophism.

Asked why the word "hardware" was used in the agreement with Seattle Computer, Gates shot back, "You mean leaving the rest of the sentence alone, like if you put the word 'clown' in there? I don't know what you mean."

Handwritten scribble and the number "6" in the left margin.

Vertical text on the right margin: i, v, e, t, c, v, e, D, a, ju, be, ap, do, W, Mi, pe, see

ng about  
here!'"  
explicitly  
  
s snidely  
OS with  
back: A  
he BIOS  
ve some  
ts. But  
  
icrosoft  
million.  
soft at  
. Falcon  
icrosoft  
nd disk  
aid-by-  
utright  
Associ-  
  
yer  
be  
al lion  
rtional  
y best  
recuse  
of the  
g with  
w his  
n and  
  
lutely  
tions,  
Gates  
it the  
casm  
  
attle  
one,  
"

"You could put 'board' in there," Corr pointed out in exasperation, "you could put 'sets,' you could put 'memory enhancers.'"

"We understood what their hardware was," sneered Bill Gates.

That turned out to be a major issue. Judge Gerard Shellan ruled that the agreement applied only to Seattle Computer's original, long-outmoded hardware. As Tim Paterson remembered it, that "wasn't what anybody had in mind when they wrote it. And I told the Seattle Computer side to ask for my opinion, and they tried to, but the Microsoft side, who of course was my employer, objected and was able to say that my opinion was not relevant because I wasn't one of the parties. . . . Microsoft knew they would be in trouble if I said something." Having Paterson back at Microsoft was turning out to be even better than Gates had imagined.

Despite the judge's restrictive ruling, Microsoft wasn't entirely out of the woods. When the case finally went to trial in late November, the jury was essentially charged with deciding one question: Were recent versions of MS-DOS "versions, updates, or enhancements" of Paterson's original?

Yes, indeed, said many of the witnesses. Not really, others declared. But the balance seemed to be tipping Seattle Computer's way. Corr had found an untechnical analogy to drive home for the jury why upgrades of DOS were covered by the deal. It was as though, he said, Microsoft had promised SCP it could have the pick of the litter every time DOS had puppies. Now it was saying that the DOS upgrades were some other animal entirely. Thereafter, whenever a Microsoft attorney or witness would begin talking about how later DOSes weren't covered by the agreement, Corr would wordlessly haul out a statue of a dog he kept under the table and place it in full view of the jury.

Microsoft, which before the trial had made only token offers to settle, began upping the ante. Gradually, day by day, hundreds of thousands were appearing on the table. But Rod Brock had a number in mind: one million dollars. Rumor would later have it that was Bill's number too.

Taking the witness stand, a smug, cocky Bill Gates came girded for battle. When Corr referred to "your company," Gates asked if Corr meant Microsoft.

Didn't, Corr asked, Gates own about half the company's stock? About 40 percent, Bill said.

"You own about 11 million shares, don't you?"

"Yes."

"The last time I looked, it was about \$50 a share, right?"

"I don't look," Gates declared.

"It's nice to have that luxury, I guess," Corr said pointedly. The jury seemed to get the message.

ou  
es  
ph  
ve  
le  
ed  
at  
ll  
ut

- 476 -

PAGE		PAGE
	Adventure? Gordon Letwin int., Feb. 13, 1992.	139 "We thought . . . about it.": Gates int., Nov. 5, 1991.
134	"I argued . . . small amount.": Ibid.	139 "I think . . . would go.": Mort Meyerson int., June 11, 1991.
134	"I was . . . real toy.": Raburn int., Mar. 15, 1991.	139 "It's this . . . this building": Gates int., Aug. 29, 1991.
134	"Paul . . . this machine.": Ibid.	139 "He had . . . famous pictures.": Gates int., Jan. 18, 1992.
134	"He said . . . to me.": Ibid.	139 "this guy . . . special elevator.": Gates int., Aug. 29, 1991.
134	Gates would . . . been patented.: Gates int., Nov. 5, 1991.	139 "If I . . . you sell?": Gates int., Jan. 18, 1992.
135	Microsoft's Standalone . . . the table.: Tim Paterson int., Apr. 23, 1991.	139 "There was . . . was doing.": Ross Perot int., Sept. 17, 1991.
136	Eventually Kay . . . the closet.: Gates int., Nov. 5, 1991.	139 "I should . . . needle him.": Ibid.
136	Gates and . . . had expired.: Letwin int., Feb. 13, 1992.	139 "I don't . . . your life.": Mary Gates int., Aug. 5, 1991.
136	It was . . . (FAT) scheme.: Paterson int., Apr. 23, 1991.	139 "I sent . . . letter": Gates int., Nov. 5, 1991.
136	The initial . . . "background": Raburn int., Mar. 15, 1991.	140 The highlights . . . in Osaka.: Allen int., Jan. 9, 1992.
136	"We went . . . would crash.": Ibid.	140 "one of . . . a gnat.": Paul Heckel int., July 10, 1991.
137	"Back then . . . and guises.": Neil Konzen int., Aug. 8, 1991.	140 "combative and competitive.": Trip Hawkins, quoted in <i>PC/Computing</i> , May 1991, p. 136.
137	"I can hit . . . my company!": Konzen, Microsoft videotape of Bill Gates's thirtieth birthday party, circa Oct. 28, 1985.	140 He and . . . the problem.: Jim Eillin int., May 30, 1991.
137	"We would . . . screwed me.": Konzen int., Aug. 8, 1991.	141 The state . . . business expense.: Bob Metcalfe, quoted in <i>PC/Computing</i> , May 1991, p. 138.
137 38	"The total . . . something working.": Raburn int., Mar. 15, 1991.	Steve Ballmer, the board member in question, does not recall the incident.
138	"He'd come . . . this card.": Ibid.	141 "by the . . . than \$20.": Home Bus Standard document, undated, circa 1980.
138	"was Bill's . . . we're showing.": Ibid.	141 "a modular . . . of the future.": Ibid.
138	"they used . . . that contract.": Ibid.	141 "Energy Conservation . . . Convenience.": Ibid.
138	"sporadic business . . . suspend business.": Letter, Paul Gilbert to City of Tukwila, May 20, 1980.	141 An outfit . . . ultimately killed.: Bob Metcalfe int., July 9, 1991.
138	Gates would . . . per year.: Gates int. with Ditlea, Aug. 27, 1987.	142 "It all . . . no mistakes.": Metcalfe int., July 9, 1991.
139	The year . . . to Apple : Portia Isaacson int., Oct. 20, 1991.	142 Under the . . . proposal stage: Microsoft draft proposal, June 24, 1980.
139	"He flew . . . amazing thing": Mary Gates int., Aug. 5, 1991.	143 When you . . . to him.:

- 478 -

PAGE		PAGE	
154	"IBM does . . . deemed confidential." <i>Ibid.</i>		WordStar.: Confidential int., Aug. 1991.
154	This time . . . BASIC compiler.: Mark Ursino int., Mar. 26, 1992; Ballmer int., July 29, 1991.	157	They said . . . simultaneous meetings.: <i>PC Magazine</i> , vol. 1, no. 1, undated, circa Jan. 1982, p. 18.
154	"We were . . . software.": Ursino int., Mar. 26, 1992.	157	"developing . . . system.": Letter from Ballmer to Harrington, Aug. 26, 1980.
154	follow-up letter . . . the languages.: Letter from Steve Ballmer, Microsoft to Pat Harrington, IBM, Aug. 26, 1980.	157	Quick and Dirty Operating System.: Tim Paterson int., Apr. 23, 1991.
154-55	Gates first . . . Gary Kildall.: Phil Nelson int., Sept. 17, 1991.	157-58	QDOS wasn't . . . CP/M clone: Paterson int., Apr. 23, 1991; Pat Opalka int., March 21, 1992.
155	Gates told . . . arrange it.: Gates int., Sept. 26, 1991; Ursino int., Mar. 26, 1992; Ballmer int., July 29, 1991; Kildall int., Aug. 13, 1991.	158	SPECIAL NOTE: . . . 86-DOS.: 86-DOS User's Manual, p. 3.
155	"Gary went flying": Treiberger and Swaine. <i>Fue in the Valley</i> , p. 272. "Instead of buying airplanes and playing around like some of our competitors, we've rolled almost everything back into the company." Gates told a reporter for <i>Seattle Business Journal</i> , Oct. 19, 1981, p. 6. As late as 1987, according to a confidential document, Gates was still using the phrase "Gary went flying" to describe DR's lost opportunity.	158	Paterson wrote . . . operating system.: Letter from Bob O'Rear to Tim Paterson, Aug. 5, 1980.
155	At the Victorian . . . Sources regarding the meeting between IBM and Digital Research include Phil Nelson int., Sept. 17, 1991; Jack Sams int., Sept. 17, 1991; G. Gervaise Davis int., Dec. 6, 1991; two confidential ints., Aug. 1991 and Sept. 1991. The version Gary Kildall offered in an interview Aug. 13, 1991, conformed to the version reported in Levering, Katz, and Moskowitz, <i>The Computer Entrepreneurs</i> , p. 240, but not to the recollections of any of the other sources.	158	Seattle Computer's . . . Microsoft's languages.: Letter from Rod Brock to Paul Allen, Aug. 13, 1980.
155	"not serve . . . the other.": Letter from Patrick Harrington to William Gates, July 21, 1980.	158	Over the . . . capabilities.: Lew Eggebrecht int., Aug. 15, 1991.
156	"My God . . . do now?": Sams int., Sept. 17, 1991.	159	"Every time . . . free advice.": Sandy Meade int., Dec. 13, 1991.
156	Seymour Rubinstein . . .	159	"I'm putting . . . of software.": Eggebrecht int., Aug. 15, 1991.
		159	Their secret . . . software designs.: Eggebrecht int., Aug. 15, 1991; Gates int., Nov. 5, 1991.
		160	Frustrated by . . . talking about.: Sams int., Sept. 17, 1991.
		160	"Gotta do . . . do it!": Gates int., Nov. 26, 1991; Ballmer int., Aug. 6, 1991; Allen int., Jan. 9, 1991.
		160	"work in . . . several weeks.": Letter from Rod Brock to Paul Allen, Sept. 24, 1980.
		161	Late the . . . the sun.: Bob O'Rear int., July 13, 1991.
		161	Upon arriving . . . the president.: Bob O'Rear int., July 13, 1991; Ballmer int., Aug. 6, 1991.
		161	"kid that . . . is this?": Edwin Kiser int., Nov. 29, 1991.



- 480 -

PAGE		PAGE	
	Agreement between Seattle Computer Products and Microsoft, Jan. 6, 1981.	173	What did they <i>really</i> want?: Dick Conklin int., Mar. 6, 1991.
169	The only . . . hung up.: Rod Brock int., May 22, 1991.	173	"blackmailed into it.": <i>InfoWorld</i> , Oct. 5, 1981, p. 38.
169	"it sometimes . . . our time.": Letter from Bob O'Rear to Pat Harrington, Jan. 19, 1981.	174	"You would . . . the mat.": Letter from Paul Allen to Rod Brock, June 25, 1981.
169	By February . . . as possible.: Letter from Bob O'Rear to Pat Harrington, Feb. 2, 1981.	174	"a substantial . . . price tag.": Letter from Rod Brock to Paul Allen, July 10, 1981.
169	On March . . . software delivery.: Letter from Steve Ballmer to Pat Harrington, Mar 12, 1981.	174	"the \$150,000 . . . the company": Steve Ballmer deposition, Seattle Computer Products v. Microsoft, Oct. 14, 1986, p. 61.
170	As far . . . we were.: Courtney int., Sept. 11, 1991	174	reportedly made . . . very year.: <i>Money</i> , July 1986, p. 56.
171	"random little grii": Konzen int., Aug. 8, 1991.	174	"At this . . . with it.": <i>Ibid.</i> , p. 70.
171	"Sunday afternoon a donkey.": <i>Ibid.</i>	174 75	"I went . . . was introduced.": <i>Ibid.</i> , p. 76.
171	Parts of . . . appallingly flimsy.: Letter from Ballmer to Pat Harrington, Apr. 17, 1981.	175	"purchasers of . . . enhancements": Agreement between Microsoft and Seattle Computer, July 27, 1981.
171	kids like . . . see it: Konzen int., Aug. 8, 1991.	175	"Cash was . . . the license": Brock int., May 22, 1991.
171	the delay . . . home.: Eggebrecht int., Aug. 15, 1991.	175	"thought it was a fair deal.": Tim Paterson int., Apr. 23, 1991.
171	Yet on . . . more software.: Letter from Ballmer to Jerry Schultz, Apr. 17, 1981.	175	"Gates doesn't . . . bit different.": <i>Fortune</i> , June 29, 1981, p. 87.
172	Old Retail . . . little closet.: Wallace int., Apr. 24, 1991.	175	"As slow . . . an impact.": Microsoft internal memo, Steve Ballmer to "Everyone," June 26, 1981.
172	"Freedom": Rojas int., Aug. 14, 1991.	176	Gates and . . . percent each.: Marquardt int., Mar. 25, 1992.
172	HAL: Bob O'Rear int., July 13, 1991; Bob O'Rear deposition, Seattle Computer Products v. Microsoft, Oct. 17, 1986, p. 37	176	"My stock . . . for years": Ed Johns int., May 21, 1991.
172	In May . . . that too. Letter from Bill Gates to Don Estridge, May 22, 1981.	176	"a lot . . . the overtime.": Confidential int., Feb. 1992.
172	By early . . . reasonably accurately.: <i>InfoWorld</i> , June 8, 1981, p. 1.	176	"straighten the . . . people.": Gates int., Jan. 2, 1992.
172	"its disk . . . DOS.": <i>Electronics</i> , June 16, 1981, p. 33.	176	"I said . . . hire people.": <i>Ibid.</i>
173	Currie was . . . of it.: Eddie Currie int., July 23, 1991.	177	"Even Paul . . . do this?": Ballmer int., Aug. 6, 1991.
173	The hint . . . IBM.: G. Gervaise Davis int., Dec. 6, 1991.	177	"I hire . . . every candidate.": <i>Ibid.</i>
		177	"He wasn't . . . or not.": Mike Slade int., June 24, 1991.

pany:  
 lars.:  
 . 27.  
 '991.  
 years.":  
 rcer, Jan.  
 ou.:  
 1992.  
 are?":  
 1991.  
 r": Ibid.  
 ite  
 l, 1986,  
 bid.,  
 4  
 udette  
 o go.":  
 1991.  
 '": Gates  
 use":  
 H.  
 d.:  
 89,  
 int.,  
 brune,  
 l, Feb.  
 ne.":  
 l.  
 s int.,  
 apped  
 3, 1985.  
 s.":  
 H.

PAGE  
 309 coin flip: Gates int., Apr. 24, 1992.  
 310 "a computer . . . run on." Brock int., May 22, 1991.  
 310 "updates and enhancements": Agreement between Seattle Computer Products, Inc., and Microsoft, July 27, 1981, p. 2.  
 310 Brock offered . . . came forward.: Letter from James Whelan to Rod Brock, Mar. 26 1984; Letter from Rod Brock to Kevin Goharderakhshan, Feb. 27, 1985.  
 310 "see how . . . would stretch": Brock int., May 22, 1991.  
 310 "Microsoft didn't like that." Ibid.  
 310 So maybe . . . \$20 million: Letter from Rod Brock to Jon Shirley, Aug. 14, 1985.  
 310 reporter from . . . in selling Information Week, Aug. 19, 1955, p. 10.  
 310 "We were . . . trademark 'MS-DOS'": Letter from Jon Shirley to Rod Brock, Aug. 29, 1985.  
 311 Damages were . . . conceivably be trebled.: Microsoft prospectus, p. 47.  
 311 "The company" . . . this action.": Ibid., p. 48.  
 311 By early . . . over \$700,000.: Tim Paterson int., Mar. 18, 1992.  
 311 "any purchaser . . . products business.": Agreement between Microsoft Corporation and Falcon Technology, Dec. 15, 1981, in Microsoft v. Very Competitive Computer Products.  
 311 Paterson sent . . . disk controllers.: Letter from Tim Paterson to William Gates, Mar. 17, 1986.  
 311 "reach an understanding": Letter from William H. Neukom to Tim Paterson, Apr. 15, 1986.  
 312 "Bill Gates . . . in there!": Tim Paterson int., Apr. 23, 1991.  
 312 "merges all . . . contemporaneous communications.": Agreement

PAGE  
 between Microsoft Corporation and Falcon Technology, Dec. 15, 1983.  
 312 "He's buffing and pulling": Paterson int., Apr. 23, 1991.  
 312 "So I'm . . . are \$17.": Ibid.  
 312 "Trey was one of my best students." Kelly Corr int., Aug. 16, 1991.  
 312 who would . . . the local press.: Seattle Post Intelligence, Aug. 19, 1988, p. 1; Seattle Times, Aug. 19, 1988, p. 1.  
 312 "You mean . . . hardware was": Bill Gates deposition, Oct. 8, 1986, Seattle Computer v. Microsoft.  
 313 "wasn't what . . . said something." Tim Paterson int., Apr. 23, 1991.  
 313 Corr had . . . of the jury.: Corr int., Aug. 16, 1992.  
 313 one million dollars.: Brock int., May 22, 1991.  
 313 When Corr . . . said pointedly.: Seattle Times, Dec. 9, 1986.  
 314 When the . . . Microsoft stock.: Corr int., Aug. 16, 1991.  
 22 "WE DAMN WELL CAN"  
 315 "This is . . . what's right": Letwin int., Feb. 13, 1992.  
 315 "Something that . . . artistic control.": Ibid.  
 315 16 This was . . . like that.": Ibid.  
 316 "you make . . . it up.": Ibid.  
 316 If the . . . code out.: Ibid.  
 316 "there were . . . programming.": Jacobucci int., Feb. 20, 1991.  
 316 "At IBM . . . the docks.": Ibid.  
 316 The developers . . . works there.: Ibid.  
 316 "Microsoft programmers . . . as artists": Ibid.  
 316 "big development tools": Ibid.  
 317 "Why does . . . the machine?": Ibid.  
 317 "IBM was really fragmented groups". Ibid.

(OLE),

90

437,

2, 158,

editing),

171

100,

18

ence

152

91-

255

see also

d

er

see also

50, 369,

318-19,

363,

2, 387,

09,

3

409

400

1.0),

5-18,

version 1.0 (CP-DOS 1.1), 430  
 31, 345, 356, 364  
 version 1.1, 311, 365-67, 374-  
 75  
 version 1.3, 383, 399  
 version 2.0, 483, 367, 397, 399,  
 400, 432, 433, 435-36  
 version 3.0, 399  
 DOS and, 333, 397  
 compatibility box, 318, 349, 375  
 Extended Edition, 331, 332, 356,  
 377, 387, 395, 421, 428  
 Gates and, 281-82, 285-86, 315,  
 317, 318, 321-24, 366-68,  
 369, 367-88, 395, 433  
 IBM and, 7, 315-19, 320-24, 331,  
 345, 363, 365-67, 369, 370,  
 371, 380, 383, 387-89, 395,  
 397, 399-401, 418-19, 423  
 24, 433, 438, 439  
 Joint Development Agreement and,  
 285-86  
 memory requirements, 365, 375,  
 387-88  
 naming of, 329  
 NeXTStep and, 375-76  
 NT project and, 383, 400  
 OEM customers and, 285, 374,  
 332  
 OSF and, 369  
 SAA and, 320-21, 330  
 sales, 377, 396, 420  
 strategies, 332, 401, 432, 435  
 46  
 Software Development Kit (SDK),  
 349  
 Standard Edition, 331, 332, 395  
 Taligent and, 428, 430  
 TopView and, 318-19, 321  
 Windows and, 7, 9, 315, 318,  
 319-23, 331, 346, 348-49,  
 369, 382, 387-89, 396-98,  
 399-401, 405, 418-19, 423,  
 438, 439  
 OS-9 (operating system), 337, 338  
 OSF (Open Software Foundation),  
 369, 375, 381  
 Ovation (program), 256  
 Overlapping windows, 255, 274, 282,  
 346, 362, 384  
 Ovid, 317  
 Ovez, Michael, 449  
 P-code (pseudocode), 108  
 Microsoft applications and, 184-85,  
 214, 218, 223, 250, 258  
 P-machine (pseudomachine), 185  
 P-system, 192  
 Pacific National Bank (Seattle), 17  
 Pacific Northwest Bell, 17  
 PageMaker (program), 348, 369, 177,  
 384  
 Paine Webber, 416  
 Paint (program), 282, 291  
 Paintbrush (program), 388, 404  
 Palantir company, 319  
 Palenque (program), 338  
 Palo Alto Research Center. See Xerox  
 PARC  
 Paper tape (storage medium), 28

Paperback Software, 160  
 Paper, Seymour, 142  
 Parade, 114  
 "Parasite companies," 83, 93, 152  
 PARC. See Xerox PARC  
 Parker, Rachel, 460  
 Pascal (programming language), 98  
 See also Microsoft Pascal;  
 Turbo Pascal  
 Paterson, Tim  
 Falcon Technology and, 311-17  
 Paterson Labs and, 313  
 Seattle Computer and, 134-35,  
 150, 157-58, 175, 310, 313  
 SoftCard and, 136, 157  
 software development  
 DIBS (DIBS, 86-DIBS), 157-  
 58, 169, 172, 175, 315  
 FDI (8), 171  
 MSX-100S, 239, 311  
 Patent Partners, 399  
 Pavey, Jane, 250  
 PC-DOS. See DOS  
 PC Draw (program), 287  
 PC magazine, 70, 190, 192, 217, 228,  
 30, 294, 326, 327  
 PC Tech Journal, 327  
 PC Week, 242, 403, 421  
 PC World, 230  
 PCjr Booster, 347  
 PCjr computer (IBM), 246, 334  
 PDP-1 computer (DEC), 59  
 PDP-8 computer (DEC), 32, 38, 39,  
 65, 73  
 PDP-10 computers (DEC), 29, 32-35,  
 37, 39-40, 52-54, 56, 59,  
 69, 72, 74, 76, 78, 79, 88,  
 107, 171  
 PDP-11 computer (DEC), 52-54, 61,  
 145, 231  
 Peddle, Chuck, 99, 100, 106, 115,  
 194, 210  
 Peep, Frank, 19-40  
 Penelope, Bud, 52, 54  
 Pen-based computing, 405, 405, 420,  
 437  
 Pennsylvania, University of, 411  
 Pentium (software), 399, 420  
 Penthouse, 59  
 PenWindows. See Windows for Pen  
 People, 250, 251  
 People's Computer Company, 80, 84, 92,  
 93, 106  
 Pepsi Challenge, 290  
 Pepsi-Cola company, 238, 289, 290  
 Peripheral Interlace Program (PIP),  
 14, 158  
 Perot, Ross  
 Gates and, 6, 138-39, 226, 444,  
 448, 457  
 Steve Jobs and, 218, 176  
 NeXT and, 176  
 Pershing, General John J., 13  
 Personal computers, prehistory of,  
 65-66  
 Personal Computer forums, 359  
 Personal Computing, 97, 107, 108  
 Personal Holding Company tax, 304  
 Personal Software, 216. See also  
 VisiCorp

Microsoft merger discussions with,  
 132  
 Perot Computer Corporation, 101,  
 105, 310  
 PET computer. See Commodore PET  
 Peterson, Bryce, 150, 373  
 Petrohl, Charles, 327  
 Philips  
 CD-I and, 315, 337, 338, 408-9  
 CD-ROM and, 314, 408-9  
 CP/M-86 and, 240  
 MSX and, 239, 335, 347  
 Phoenix Software Associates, 265, 312  
 Physio-Control, 19  
 PIF (Program Information File), 283  
 Pink (code name), 428  
 Pina Code names, 267, 281  
 PIP (Peripheral Interlace Program),  
 14, 158  
 Piper Jaffray & Hopwood, 405  
 Piracy. See Software piracy  
 "Pirates" at Apple, 196, 214-15,  
 224, 273, 276, 298  
 Pivet, Andrew, 165  
 PL/I (programming language), 69,  
 120, 156, 173, 180, 366  
 Plafon, 54, 352  
 Playboy Club (New York), 126  
 Playboy Resort and Country Club  
 (Lake Geneva SW), 189  
 Plaza Hotel (New York), 136, 241  
 PM. See Presentation Manager  
 PM Lite, 387-89  
 PM/Script, 386, 387  
 Pollack, Andrew, 190  
 Polymorpher company, 101, 109  
 Pong (game), 58  
 Pwale, Tansen and Martin, 82, 111,  
 113  
 Popular Computing, 242  
 Popular Electronics, 63, 66, 70, 73, 93  
 Portable OS/2, 391  
 Portland Trail Blazers, 8, 410  
 PostScript, 329, 373, 384-87, 405  
 Powell, Colin, 327  
 PowerPC computer (Apple), 438  
 PowerPoint (program), 344, 345, 405,  
 421  
 Presentation Manager (PM). See also  
 OS/2  
 API, 330  
 applications and, 369, 375, 399  
 CUIA and, 380  
 development of, 330-31, 345,  
 365-67, 374-75, 380  
 device drivers, 374-75, 386  
 DOS and, 387  
 Microsoft University and, 394  
 naming of, 329, 371  
 NeXTStep and, 375-76  
 PM Lite, 387-89  
 SAA and, 320-21, 330  
 UNIX and, 368  
 Windows and, 318, 319-23, 330,  
 331, 346, 348-49, 363, 369-  
 70, 377, 382, 387-89  
 as Workbench, 322-23, 324  
 Presley, Elvis, 402  
 Prime Computer, 231  
 "Printer of Darkness," 9

- Princeton University, 52, 176  
 Printer drives, 384, 486  
 Printers, computer, b, 32, 80, 96,  
 140-41, 222-24  
   *Isasi*, 165, 166, 167, 187, 275,  
 294, 298, 384-87  
 Printing terminals, 96  
 Processor technology, 77, 85, 89, 93,  
 99, 101, 106, 109, 125  
 Procter and Gamble, 142  
 Productivity and computers, 455  
 Program Information File (PIF), 263  
 Programmer's Bookshelf, 409  
 Project Chase, 161, 168  
 Project for Windows, 170, 405  
 Promotes, 89  
 Pronto Computer, 264  
 Protected mode of 286 chip, 282,  
 283 n2  
 Prusky, Jonathan, 257, 379  
 PS/1 computers, 409  
 PS/2 computers, 341, 343, 356, 409,  
 430  
 Pseudocode As Pseudo  
 Pseudocompiled language, 109  
 Parafurniture, 185  
 "Psycho" kernel, 384  
 "Puff" model, 255, 274  
 Punch cards, 26, 38  
 "Push" model, 255, 274  
 Puzzle (program), 282-84  
  
 QDOS (Quick and Dirty Operating  
 System), 148, 157-58 *See also*  
 DOS  
 Quarterdeck Office Systems, 220,  
 241, 269, 344  
   Microsoft offer for, 295-344  
 Quasar (code name), 217  
 Quattro, 352  
 Quick and Dirty Operating System  
*See* QDOS  
 QuickBASIC (programming language),  
 261, 326-28  
 QuickC (programming language), 428,  
 452  
 QuickBASIC (hand), 352  
 Quill (program), 211  
  
 R4000 microprocessor (MIPS), 483,  
 423  
 Rahurn, Vern  
   Gates and, 125, 132-33, 179, 184,  
 340, 394  
   Microsoft and, 125, 132-34, 136,  
 38, 176, 184, 217, 245, 344,  
 345, 398-99, 420  
 Radio Shack *See also* family  
   Corporation  
   Color Computer, 149, 417  
   Model 2 computer, 197, 240  
   Model 16 computer, 144, 45  
   Model 160 computer, 208-9, 234  
   Model 2000 computer, 246  
   Jon Shirley and, 234-36, 261, 441  
   software reading and, 125  
   TRS-80 computer, 111-14, 119,  
 127, 131, 134, 149  
   BASIC, 113-14, 116, 133, 157  
   Windows and, 236, 241  
   Audio-Electronics, 65, 66, 93  
   Baikes, Jeff, 195, 213, 231, 236, 258,  
 288, 297, 340, 373, 436  
   Rainbow computer (DEC), 204-5  
   RAM (random-access memory),  
   defined, 68  
   Ramada Inn (Bellevue WA), 233, 252  
   RAMCard, 200  
   Rappaport, Irving, 284, 291, 358, 359  
   RAS (Reliability, Availability,  
   Serviceability), 316  
   Raskin, Rick, 450  
   Raskin, Jef, 183, 186  
   Rasmussen, Kristiane, 15  
   Rathmann, George, 415-16  
   RCA, 337-38, 407-8  
   RDICPM utility, 158  
   Read-only  
   media, 329  
   memory *See* ROM  
   Reagan, Ronald, 163  
   Reality distortion field, 186, 188, 254  
   Realty, Raj, 450  
   Reduced Instruction Set Computing  
   (RISC), 383, 428, 438, 450  
   Reed, David, 423  
   Reed College, 239, 251  
   Retawig, Lee, 400, 419, 423  
   *Release 1.0*, 244  
   Remala, Rao, 221  
   Retail Computer Store (Seattle), 94,  
 122, 134, 172  
   Revenue bomb, 185, 210, 214, 216,  
 231, 365  
   Reversi (program), 283  
   Reynolds, Aaron, 205, 267  
   Richardson, Steve, 450  
   Richman, Sheldon, 297  
   Riech, 126, 130, 211  
   Ringmaster (code name), 266  
   RISC (Reduced Instruction Set  
   Computing), 383, 428, 438,  
 450  
   Risk (board game), 19, 440  
   Roach, John, 114, 116, 234  
   Roark, Raleigh, 221, 22, 301, 334,  
 335, 407-8  
   Roberts, H. Edward  
   Paul Allen and, 74-76, 87  
   Gates and, 70, 71, 82-83, 89, 92,  
 105, 109  
   MITN and, 63-64, 66-67, 68, 85-  
 87, 93, 101, 119  
   ROMS (Real Time Operating and  
   Dispatch System), 52, 53-57,  
 309, 442  
   Rogers, Jack, 150  
   Rosen, David, 340-41, 355  
   Rosen, Peter, 341  
   "Roll On, Columbus," 52  
   Rohung, Mark, 236-37  
   ROM (Read-Only Memory), 94-95.  
   *See also* CD-ROM  
   BASIC  
   Commodore PET, 100, 114-15  
   IBM, 162-63, 169-71, 203, 205  
   MSX, 229  
   NEC PC-8001, 140  
   TRS-80, 113-14  
   BIOS (Basic Input/Output System)

- Seattle Computer Products  
DOS (Q-DOS, 86-DOS) and, 148,  
157-58, 160-61, 162, 168-  
69, 172, 173, 174-75, 193  
suit against Microsoft and, 310-  
11, 312-14  
hardware, 135-36, 147, 157, 310  
Seattle Convention Center, 406  
Seattle Mariners, 436  
Seattle National Bank, 13  
Seattle Pacific College, 68  
Seattle Sun, 14  
Seattle Tennis Club, 186  
Seattle Times, 216  
Seattle World's Fair (1962), 15-16  
SEC (Securities and Exchange  
Commission), 301  
"Second and Final Letter, A," 94-95  
Second sources, 318  
Secrecy agreements, 83  
Seegas Computer, 241, 264  
Segmented architecture, 153  
SelectaVision, 337  
Siffish Gate, The, 390  
Separate Peace, A. S., 46  
"Sermon on the Mount," 19, 450  
Setlma, Jim, 58  
Sevhold Desktop Publishing  
Conference, 386  
Shaffer, Peter, 55  
Shakespeare, William, 342, 375  
Shellan, Gerard (judge), 313  
Shepard, Alan, 15  
Shirer, Paul M., 421  
Sherlund, Rick, 419, 429  
Shirley, Jon  
Steve Ballmer and, 234-36, 272,  
346  
Excel and, 276, 346  
Gates and, 234-36, 237-38, 270,  
272, 278, 392, 436, 444  
IBM and, 285  
IHS and, 411  
Steve Jobs and, 278  
Lotus and, 365  
Microsoft and  
charitable activities, 237  
division between applications and  
systems, 350  
initial public offering, 301-2,  
306  
management style, 217-38  
marketing strategy, 236, 238-39,  
441  
move to Redmond campus, 271,  
307-8  
product pricing, 261, 328  
Radio Shack, 208, 234-36  
retirement from, 392-93  
salary, 305  
Seattle Computer DOS license,  
310  
stock holdings, 307  
Word, internal adoption of, 309  
OS/2 and, 346  
Windows and, 256, 274, 289-90,  
292-93, 389, 397  
Shirley, Mary, 392  
Shirley's Temple (boat), 392  
Short, Anthony, 282  
Shrayer, Michael, 106  
Shugart Associates, 140  
SideKick (program), 263  
Sidoli, Ken, 124  
Siemens, 423  
Sigma (code name), 276  
Sigma V computer (Xerox Data  
Systems), 37  
Silicon Graphics, 423  
Silverberg, Israel, 349, 398  
Simonyi, Charles  
architecture and, 411  
Brain and, 165-67, 221-23  
doctoral dissertation, 178  
Gates and, 166-68, 187-88, 198,  
216  
graphical user interface and, 165-  
67, 215, 231  
"Hungarian" naming convention,  
178  
meta-programmer concept, 178  
Microgames and, 340, 341  
Microsoft and  
business plan for applications,  
167, 217  
Excel, 258, 260  
Macintosh, 186, 187-88, 214-  
15, 275  
Scott McGregor, 240  
Mouse, 222  
Multi-User Interface, 185-86,  
201-2  
Multiplan, 154-86  
p-cards, 184-85, 214  
recruitment, 176-78, 240, 378  
revenue bomb, 185, 210, 214,  
231, 365  
stock holdings, 176, 307  
"war room," 275  
Word, 222-23, 329  
work ethic, 299  
Vision and, 216  
Xerox and, 165-67, 187, 199, 240  
Smatra, Frank, 85  
Siris (Victor) computer, 194, 202,  
210, 227  
Sixteen bit microprocessors, 127,  
147-48. See also specific  
microprocessors  
"Sizzle" of cattle, 323, 367  
Skell, McKelvey, Henke, Evenson &  
Uhlmann, 14  
Slade, Mike, 177, 196, 276, 277, 300,  
322, 342, 347, 377, 378-79,  
389  
Slate Corp., 420  
"Slow burn," 293, 175  
Smalltalk (programming language),  
429  
Suart terminals, 96, 101  
Smith, Roger, 9  
Smith, Steve, 115, 130, 194  
"Smoke-and-mirrors" demo, 271,  
225-26, 326  
Snyder, Steve, 267  
Soak 'em (game), 18  
SoftCard, 134, 137-38, 151, 154,  
178, 200-1, 217  
SoftCard Plus, 201  
Softtech, 192  
"Solier software," 251, 439  
Software. See also specific individuals  
and products  
applications, 106, 132-31, 167  
biotechnology and, 390, 416-17,  
455-56  
bugs, 25, 29-32, 35, 52, 55, 73,  
78-79, 81, 83, 88, 89-91,  
94, 102, 115-16, 135, 137,  
168, 170, 205, 217, 231,  
248-49, 263, 268, 275, 293-  
94, 311, 327, 375-79, 371,  
396, 398, 430  
bundling with hardware, 95, 151,  
183, 184, 188, 194, 223,  
282, 310, 346, 351, 401,  
404, 438  
computer-created, 390  
consumer electronics and, 426, 437  
"content" and, 449  
embedded control, 437  
future of, 437, 455-56  
hardware and, 4, 28, 35, 50, 53,  
71, 97, 185, 187, 191, 320  
21, 382-83, 398, 426, 427,  
437, 455  
unintegrated, 248, 256-57, 259-60,  
328  
as intellectual product, 2, 3, 4  
network, 267-69, 282, 376-77,  
426  
piracy, 3, 81, 86, 135  
copy protection and, 273, 296  
97, 347  
Gates and, 83, 90-93, 94-95,  
111, 152, 201, 296-97, 360  
pricing, 1, 4, 38, 77, 83, 111, 202,  
256, 262, 303, 426, 433, 439  
productivity and, 455  
profitability, 252, 262, 303  
testing, 94, 116, 168, 170, 217,  
231, 248-49, 272, 329, 373,  
398, 430  
utility, 107, 193  
Software Arts, 111, 146, 244  
Software Bus-86 (SB-86), 192. See also  
DOS  
Software Engineering Institute, 411  
Software Publishers Association (SPA),  
297  
Software Publishing, 247, 248  
Software Systems, 222  
Sokol, Dan, 81  
Sol computer, 106, 125, 150  
Solid State Music, 85  
Solid State Technology, 146  
Solitaire (program), 398  
Solution Series (programs), 433  
Sony  
CD-i and, 335, 357, 408-9  
CD-ROM and, 334, 408-9  
Data Discman, 412  
Gates and, 449  
Macintosh and, 215, 288  
MSX and, 229, 335, 337  
Sord, H. J., 126  
Source code, 38-39  
Southwest Technical Products (SWTP),  
87, 89, 125

