Dear Economic History Seminar,

Thank you for taking the time to read this chapter from my forthcoming book *Temp*. It is still in galleys so changes can still be made, and I appreciate any and all feedback that you might have. The book is more history than economics, but strongly engages with the history of economic thought as well as institutional economics.

I was tempted to share the previous chapter that is based on Columbia's PriceWaterhouseCoopers archive on the origin of technology consulting, but thought that, perhaps, not everyone shares my affection for the history of accounting.

This chapter instead, takes the reader from the world of technology consultants remaking firms' use of computers and temps, to Silicon Valley. In Silicon Valley new kinds of labor relations were invented at Apple, HP, and other "tech" firms that relied on a careful hierarchy of subcontracting to create a new sector. The chapter illustrates what I am trying to do in the book: show the transformation of the corporation and the workforce, while tracking how ideas/practices of race/gender/class/citizenship shaped those transformations.

The following chapter traces how this new industrial perspective sets the stage for the rise of the digital economy.

Thanks in advance for your comments and thoughts.

Best regards,

Louis Hyman

LOUIS HYMAN

TEMP

How American Work, American Business, and the American Dream Became Temporary

VIKING

CONTENTS

CHAPTER TEN

Restructuring the American Dream

Ronald Reagan and the neoconservatives may have celebrated supply-side economists, but it was the interpretation sold by McKinsey consultants that became best-selling bibles on how to restructure American business.[1] Consultants offered solutions for what was, from a postwar perspective, an upside-down world where the Japanese made the quality products and American cars didn't run. Whether your firm was restructured because of a hostile takeover, a court order, or Asian competition didn't really matter. You would still hire McKinsey, or BCG, or Price Waterhouse, or Coopers & Lybrand to put the pieces together again. The old promises of the postwar had no claim on this new world, which looked very different than postwar Americans had imagined it would.

"Some time during the 1970s," business guru Peter Drucker declared in 1980, "the longest period of continuity in economic history came to an end. At some point during the last ten year we moved into turbulence."[2] The economic crises of the 1970s—stagflation, inflation, wage stagnation, oil crises—were not aberrations but had become a new normal, what the chairman of the Federal Reserve Alan Greenspan would later famously called the age of turbulence. For most Americans, it was hard to feel like they were still on top. American business was losing ground to countries that, a generation earlier, the U.S. had beaten in war. Germany, and especially Japan, were once again ascendant. While Americans had voted for Reagan's optimism instead of Carter's pessimism, for those who worked outside of Wall Street, Reagan's America was not a new morning, but a drawn-out dusk—except in one place: Silicon Valley.

The agricultural economy was born between two great rivers, the Tigris and Euphrates; the digital economy born between two great highways, US

101 and I-280. Connecting San Jose to San Francisco, these roads define the eastern and western borders of what we now call Silicon Valley, which had, until the 1950s, mostly been fruit orchards. In the '60s, as the electronics industry grew, those trees were cut down to make way for factories and offices. Although today Silicon Valley is known for software, in the '70s and '80s it was still a place where hardware—first transistors and then whole chips—were made. By the '80s, electronics was the largest manufacturing industry in the U.S., and Silicon Valley's factories left Detroit's far behind. As the rest of traditional American manufacturing—and those good jobs—began to dry up, we looked to Silicon Valley as the lone place where American industry could once again deliver the good life.

Moore's law famously predicted (accurately) that twice as many transistors could be crammed on a chip every eighteen months, for the same price. While this pace of miniaturization was astounding, it also made it impossible for firms to earn much money on their products before they had to shrink their components. This punishing cycle drove electronics firms to seek out flexibility in labor and capital in a way that no other industry ever had to do. Airplane plants worked on the same production schedule for decades, car plants for years, while electronic plants only had months. For the first time, industry truly had to be flexible. Investments in electronics factories had investment horizons measured in months, not years or decades.

Short-term investment and flexible production found their natural home in the early electronics start-ups, and Silicon Valley became a model of success for the rest of the country. While Detroit faltered, San Jose thrived. Japan might make better cars, but we made better computers. If American manufacturing was successful, it was in Silicon Valley. The electronics industry validated new thinking about capitalism since, unlike any of the previous leading sectors, it depended on short-time, flexible workforces. Unions were nowhere to be found. Sporadic organizing campaigns in the 1960s, '70s, and '80s all failed.[3] Silicon Valley became the laboratory for a lean American capitalism.

Unlike any previous industry, crucial work in electronics happened outside the firm. From high-paid programmers to barely paid assemblers, software and hardware were built by workers who were not themselves employees. The short-term electronics product cycle could be generalized

to all "correct" corporate organization and capitalist investment in industries that did not have the same production demands as electronics. The organizational success of electronics "proved" the lean management ideas being sold by consultants and gurus.

In Silicon Valley, the big firms like Hewlett-Packard looked to McKinsey for help in becoming even more flexible. In Fremont, California, across the San Francisco Bay from Palo Alto, two Americans companies—Apple and GM—would experiment with new kinds of lean manufacturing, as well as flexible workforces. Theories and sales pitches made since the postwar finally, in the 1980s, became a reality.

Robots and Migrants

Postwar Americans had imagined that the future would be a time of leisure, where robots relieved the tedium of our lives. Working just a few hours a week, our greatest challenge would be figuring out what to do. If any industry would be automated, it would reasonably seem, it would be the high-tech world of electronics. Apple, that iconic Silicon Valley firm, bragged in 1984 that the factory for its new computer, something called the Macintosh, would be the most automated in the world. Yet Apple's factory, like all the other electronic factories, was shockingly old-fashioned. In 1986 only two industries in the entire world, according to *McKinsey Quarterly*, accounted "for 80 percent of installed robots . . . aerospace and automaking."[4] The flexibility of electronics production in Silicon Valley, despite all the technical wizardry, came from workers, not machines.

Apple never produced the good life for its line workers like General Motors had. The story of flexibility in Silicon Valley is not just about the insecurity of the workers on the bottom, but the success of the workers on the top. Venture capitalists moved from start-up to start-up. Software engineers hopped from project to project. From top to bottom, Silicon Valley defined a new flexible model of business even as its own industry—electronics and then software—was unique.

As much as politicians wrung their hands over the disappearing jobs in Detroit, they were largely oblivious to the kinds of jobs being created in Silicon Valley. When Democratic vice-presidential candidate Geraldine Ferraro

spoke at Apple's headquarters in 1984, she told them, "People in your industry have been told for years that the problems in the auto and steel industries are not your problems . . . but that's a narrow gauge of view . . . a strong manufacturing base is essential to a healthy technological base."[5] The irony, unbeknownst to Ferraro, was that there were more robots in Detroit than in Palo Alto.

Ferraro was not alone in contrasting a tech company with a manufacturing company—and this rhetorical distinction helped Silicon Valley employ workers in ways that never would have happened in postwar Detroit. Machines made Apple workers more productive, to be sure, but defining these machines as 'robots' was a very important cultural sleight of hand: humans use machines, while robots work autonomously. Emphasing automation hid the humans who were, by their gender, race, and origin, incompatible with the national imagination of its workforce. In Detroit, the autoworkers were white men, and unionized; in Silicon Valley, the workers were not. Those autoworkers counted as factory workers; the tech workers did not.

To understand the electronics industry is simple: every time someone says "robot," simply picture a woman of color. Instead of self-aware robots, workers—all women, mostly immigrant, sometimes undocumented—hunched over tables with magnifying glasses assembling parts, sometimes on a factory line and sometimes on a kitchen table. Though it paid a lot of lip service to automation, Silicon Valley truly relied upon a "transient workforce" of workers outside of traditional labor relations. Twenty percent of electronics firms had no production automation, and 94 percent of firms had less than half.[6] By 1984, only 30 percent of the *official* Silicon Valley workforce was in production. Managers made up 13 percent of the workforce and professional/technical staff the rest (43 percent).[7] Those numbers should seem odd for a manufacturing industry—and they were.

Subcontracted workers still did the work—they just weren't officially counted as employees of those leading firms. If they were white and native born, they were temps, and if they weren't, then they were laborers who worked by the day or by the piece. Tech firms outsourced labor to temp agencies, and subcontracted sweatshops and overseas factories. If the faces of Silicon Valley were the technologists of Stanford, then the bodies of Silicon Valley were the assemblers of Fremont, the undocumented of San Jose, and the temps of San Francisco.

Migrants had long been at the bottom of the Santa Clara workforce. The fruit pickers of Santa Clara County over most of the twentieth century had been a hodgepodge of Mexicans, Asians (Chinese, Filipino, Japanese), Europeans (Italian, Spanish, Portuguese), and, after the Dust Bowl, midwestern refugees. Migrants from everywhere, of every nationality, found their way to the plum groves and orange orchards of the peninsula. After World War II, that composition began to change. European and white Americans came to the canneries of the coast. Long-standing Chinese and Japanese families bought their own farmland. The existing Anglo planters looked, then, to more desperate migrants to pick their fruit. Over the course of the 1970s, the number of legal Mexicans in Santa Clara County rose from 15,000 to 227,000 in 1980. As the electronics industry took off, it took off in the context of an immigrant workforce in what had been the countryside.[8] These "factories in the country," as historian Glenna Matthews has called them, were one of the secrets of why "the high-tech industry contains almost no unions."[9] Just as Toyota looked to the rural Aichi Prefecture town of Koromo to build its docile factories, IBM looked to cities with no history of organizing, like San Jose. Just as with San Jose, Koromo grew into a massive city. Koromo was renamed Toyota, just as greater San Jose, more or less, was renamed Silicon Valley. Electronics was not the same, of course, as fruit picking. As a leading industrial sector, electronics defined one of the profit centers of the national economy. Its dictates defined what the American economy meant at the most fundamental level. Yet just like the earlier fruit economy, it, too, depended on workers with precarious lives.[10]

In Fremont, Apple opened its flagship Macintosh factory, but here also, GM partnered with Toyota to open the first U.S. factory based on Japanese lean manufacturing principles—the NUMMI plant (where Tesla now builds its cars). In Fremont, worlds—GM and Apple—collided as lean production methods reinforced the new flexible ideas of the corporation. In San Jose, undocumented workers did the jobs that used chemicals too toxic for Americans to do legally.

Temps, meanwhile, managed the logistics and paperwork of these new industries. The flexibility of the workforce was in the offices as well as the factories. A spokesperson for the Silicon Valley temporary agency association said, "When you're dealing with volatile industries like semiconductors

and electronics the role of the temporary has changed to a detached workforce actually planned for by personnel departments."[11] The largest users of temp labor in Silicon Valley, were, of course, the largest firms: Hewlett-Packard, IBM, and Control Data Corporation. Hewlett-Packard even had its own subsidiary temp firm. "The general consensus," he continued, "for a lot of high-tech companies is to have ten to fifteen percent of their labor force temporary." The temps were a "buffer zone," as the executive president of the National Association of Temporary Services, described it. With a slowdown, "you don't have those layoffs that put you on the front page."[12] IBM and Hewlett-Packard could claim never to have had layoffs only because firing a temp was not like firing a real worker.

In Silicon Valley, behind the futuristic edifice of automation, these flexible worlds of work intertwined. In the boom years of the 1980s, Silicon Valley would define the bleeding edge of technology—and, with the help of consultants, consolidate new ways to organize workers, restructuring the American corporation. The rise of Silicon Valley, however, played out against a backdrop of broader decline.

Falling Down the Marble Staircase

Fred Herr, though he was a consultant at Coopers & Lybrand, felt like "part of the family" at his longtime client AT&T. The future chief financial officer, Bob Kavner, upon his promotion had invited Fred and his wife up to visit him and his wife in his new office at AT&T headquarters. The Herrs took an elevator, and then ascended a "huge marble staircase" to "this huge office" that took up a quarter of a floor. Kavner joked to them that "there's a big hole in Vermont somewhere where this building came from." But even as he reveled in the trappings of power, harkening back to Rome, Kavner confided to Herr that this kind of corporation could not last. AT&T had to "become more competitive." They could "no longer live with this . . . this kind of structure." The Kavners and the Herrs then left the marble-clad office, down the grand staircase, and went to dinner. The evening was "enjoyable," but also foretold what was to become of AT&T, consulting, and the American corporation.

AT&T typified the old inflexible corporation, and its breakup was

mandated by an antitrust decision in 1982, but Ma Bell restructured like any other corporation—with the help of consultants. It had long been a client of Coopers & Lybrand, so when the court decided to break it up, Coopers & Lybrand was there to help.[13] Herr thought of the AT&T moment as the most challenging of his career, "unbelievably complex." AT&T was so "highly structured [that it was] almost like a civil service structure."[14] Over a hundred partners worked on figuring out how to restructure Ma Bell into its many regional components. And Coopers & Lybrand was not alone at AT&T. As Ma Bell gave birth to the Baby Bells in each region, consultants remade every part of the corporation. One Baby Bell, Pacific Telephone & Telegraph, alone hired ninety firms to help them with the transition.[15] Management Analysis Center consultants helped with the "corporate culture." Coopers & Lybrand promoted an "entrepreneurial spirit." McKinsey, ADL, Booz Allen, and every other firm tried to get a cut of the action, not only at PacTel but everywhere. McKinsey developed Michigan Bell's marketing strategy. Lippincott & Margulies rechristened New York Telephone Company and New England Telephone and Telegraph as the simple NYNEX Corporation. While AT&T workers wondered if their jobs would survive, consultants worked like never before.

AT&T was perhaps the most public restructuring, but it was not unique in being broken up, or becoming a feeding frenzy for consultants. In many ways, it was typical of the ways that corporations and conglomerates were broken up in the 1980s—except for the court order. As the Justice Department reveled in how it had broken the evil, monopolist AT&T, the real horror for Americans was in how their restructured workplaces eliminated jobs. Those with marble offices would not feel the squeeze. Behemoths like AT&T would become more flexible, but this flexibility would come from the increased insecurity of their two million workers, not the Bob Kavners.

Permanent Consultants

The terror of restructuring, while scary for workers, was good for the consulting business. As executives cut workforces, management consulting grew.

The crisis of capitalism in the early 1970s had also been a crisis for consulting—even McKinsey. Revenue per partner fell. Monthly billings fell.

McKinsey cut the number of associates. Net operating profit, even with the inflation, fell by half. As Alonzo McDonald, McKinsey's managing director, addressed its shareholders in Freeport on Grand Bahama Island in 1976, he conveyed a feeling of relief. The crisis seemed to have abated. Profits were two and a half times their level in 1972. Associates were being hired again. Once again McKinsey was growing. Their last meeting had been in London, two and half years earlier, and in a very different world.[16] Oil and food shortages had disrupted the global economy just as badly as inflation and bearish stocks. Currency fluctuations had played havoc with global trade. And somehow, McKinsey and its clients came out the other side. Partners and directors had "agonized" with them; they had "lived with our clients" to make sure that they had "new responses and solutions." McDonald told its shareholders, "In the face of a threatening storm, the Firm acted a superb center of positive direction, cool reflection and analysis, and a source of confidence for our clients."[17]

The resurgence of McKinsey, however, did not come from its existing clients. McDonald noted, in his opening speech, that the firm was not as reliant on the old industries. It had a "new forward momentum" in forward-looking areas such as "operations management," "threshold companies," "compensation, telecommunications and technology." The "entire Insurance Group with Phil Dutter and Dick Neuschel leading the way" received a special acknowledgment.[18] The aim was, by 1980, to have industrials be reduced to "half to two thirds" of the client base, with the rest made up mostly of "service/transportation/financial institutions (20–30 percent)."[19]

The new profits also came from increased billings. Associates were being worked harder and the team sizes had been increased, which together accounted for a third of the increase. The other two thirds came from simply charging more money (even after adjusting for inflation). McKinsey's elite status kept the associates and clients coming in, despite the more intense working conditions for the associates, and the higher prices for the clients.[20]

This push for growth meant compromises. Ron Daniel, a long-standing McKinsey director, gave the closing speech to the shareholder meeting in Monte Carlo the following year. The studies, he had noticed, had become understaffed in an effort to cut costs, which "create[d] tremendous

pressures on our team to perform under what are sometimes impossible conditions and with unrealistic client expectations."[21] McKinsey consultants, he acknowledged, were "achievement-motivated and task-oriented," so that "it is hard for us to not work hard: we always have and we always will." But this ethos had crossed a line. "This pressure," he continued, "grows out of an ill-founded desire to secure assignments, and to secure them at any cost." This shift, he believed, came out of the "serious worldwide recession and great uncertainty," and it left a mark on the firm's culture. He hoped that the firm would "find a more reasonable balance between running scared and behaving like competent, secure professionals."[22] If the switch from security to fear was evident at McKinsey, imagine how it was in the rest of corporate America. Moving from growth to stagnation was economic, but it was also emotional.

The team room, with that particular musk of takeout and young men, was, by 1980, never empty. As large corporations became more flexible in their organizations, they had also become dependent on expensive external consultants to, as one author in the *Harvard Business Review* put it, "patch these cracks."[23] By the 1980s, the most powerful American corporations typically had a continuous set of consultants advising them on matters of business strategy, whether from McKinsey, BCG, or—the new kid on the block—Bain & Company, which had split off from BCG in 1973. Consultants did not simply come in, do a time study, and then leave. A senior Bain partner complained of McKinsey that "they have these deep relationships with senior management that lead companies to return to McKinsey, unquestioned, time and time again."[24] Consultants were the business strategists for the corporations, instead of the corporation's senior leadership.

The *Harvard Business Review* and other business journals and newspapers published articles to advise its readership on the best ways to use consultants. In the case of a small project requiring specialized knowledge, the consultant's fees might be justified, but the main question was how to weigh the "benefits of in-house development against a possible dependency on a consultant."[25] If executives can't plan and carry out long-term plans without assistance, one business writer suggested, then "a new management team, not a surrogate, is needed."[26]

Skeptical business journalists, like *Forbes* writer John A. Byrne, could

not understand why management even needed consultants—at least for strategy. Byrne complained that "executives at big companies everywhere can't pay the bills, hire employees, reorganize, launch new products or plot strategy without outside help." "A small industrial," he wrote, might be "better off asking for help in selling its one consumer product than in hiring a full-time marketing director," but the constant presence of consultants at big corporations made no sense. Byrne was troubled when "outsiders get too involved in a company's basic business." GM, in his example, might need help with real estate, but should not need to ask for any help with cars. Consultants were not useless, but they were overused. Instead of just help in "narrow, technical areas," managers used consultants for "the very heart of their business."[27] Managers who don't make decisions, after all, aren't really managing, they are just paying consultants.

Detractors may have questioned the value of fresh-faced MBAs telling twenty-year veterans how to run their businesses, but it was clear that for the executives, the gains appeared incontrovertible. In a remarkably angry op-ed in the *Boston Globe*, Bruce Henderson of BCG denounced the "punk business reporters" who were critical of consultants simply because they found out that "such a young genius is often paid a multiple of a reporter's pay." Business reporters and management professors, Henderson said, "lampooned" consultants, blaming them—unjustifiably—for the collapse of firms and the demise of industries. Consultancies accomplishments—and growth—spoke for themselves. *Forbes* might cite example after example of consultants failing, but billings just increased. Exposes of consulting could come out every few years, showing how they have given bad advice, but firms kept coming back for more. McKinsey still didn't need to advertise.

That managers used more consultants when the economy became more volatile was not a coincidence. With so many shaky corporations, executive jobs were at risk in a way that they had not been in the postwar. A simple explanation was that the more insecure jobs felt, the more managers needed consultants to shoulder blame if something went wrong. If something went wrong, instead of firing the executive, Byrne observed, "the refrain merely becomes, 'Never hire Glutz & Co again.'" The more investors pushed for restructuring, the more frightened executives looked to consultants for safety.

Bruce Henderson, "A Consultant Speaks Up," Boston Globe (January 4, 1983), 48.

A client might have an ongoing relationship with a partner, but never an associate. The job of partners at big firms was, and is, to sell business and then farm it out. New associates got worked hard, and then most of them were let go. The head of a midsize firm complained that as he used the consulting services of a "Big Eight accounting firm," he met a "very bright young man who was gone in twelve months," only to be replaced by another "bright young man who was also gone in twelve months."[28] Part of the turnover was physical—the result of long hours and exhausting travel. The lifestyle still favored the young. Consultants, McKinsey managing director Fred Gluck told *Fortune*, peaked around forty-five, slowed down around fifty-five, and needed to transition out around sixty. Bower's own life set the model for the firm. But the churn also came from the business model of up or out. Consultants themselves were temps, and they had to reconcile themselves to a worldview that accepted that truth.

The growth of the consulting firms depended, in multiple ways, on turnover. "Firm lore" held, *Fortune* reported, that "McKinsey is a very kind place. McKinsey is a very cruel place." Everyone, from raw business analysts to slick engagement managers to veteran partners, was constantly being evaluated. The head of the New York office told the magazine, "It's a rigorous, constant microscope that we have everybody under. It's impossible to feel secure here." And that was by design. By the 1990s, only one in five associates made partner, and only half of those made director (the position where, finally, there was no up-or-out policy.) To enable this culling, McKinsey overhired. Gluck said that they "hire[d] ten times the number we need."[29]

He also said, "All I know is that every consulting firm anybody talks to always says they're second to McKinsey."[30] While that may have been true in terms of prestige, it was not true by most metrics of influence. McKinsey boasted the highest revenue per consultant ($280,000 in 1986), but it was not the largest. The leader in terms of business was not the bookish McKinsey, but the ubiquitous Arthur Andersen. While top-shelf strategy firms like McKinsey and BCG offered books and frameworks, in the 1980s it was the accountancies that did most of the actual consulting business. In 1982, McKinsey earned $145 million, but Arthur Andersen earned $218 million. BCG, which earned $50 million, may have popularized the 2 x 2, but Price

Waterhouse, which earned $57 million, and Coopers & Lybrand, $79 million, implemented it. Andersen's 3,400 professional consultants dwarfed McKinsey's 800. The Big Nine accountancies captured one third of all management consulting revenues.

While the auditing business was profitable, it could not keep pace with the consulting practice. On average, consulting earned 21 percent of revenues for accountancies by 1987, double what it had been in the 1970s. At Andersen, by 1987 consulting was one third of the firm's revenues. As Andersen grew its consulting business through the 1980s, tensions continued to rise between the accountants and the consultants. Computers could automate audit work but not consulting work. Audit hours fell as all those computers boosted productivity, while the demand for consultants proved insatiable—and stubbornly time intensive. No computer could replace a consultant. And as the money from all that consulting piled up, the professional quandaries of men like Marvin Bower could easily be forgotten.

In Search of Excellence

In the midst of Jimmy Carter's malaise, Thomas Peters and Robert Waterman, two directors at McKinsey and Company, had launched a new study of what made the top companies succeed. They were "bored working for big, okay companies that would pay big money, accept our recommendations, and then do a half-assed job of implementing them," and wanted to find out what made their excellent clients so excellent. Their research, underwritten by McKinsey and published in 1982, became a number-one best seller and business classic: *In Search of Excellence*. The book presented a new model of how corporations ought to be restructured to compete in the increasingly globalizing, automating economy—and the answer was by cutting staff. *In Search of Excellence* called for "simple form, lean staff." More than technology, success came from organizational change. Successful firms were moving toward a new kind of workforce that looked more like ad-hocracy than bureaucracy.

McKinsey offered new norms—tight limits to the scope of the firm and even tighter limits on the staff—for how a business ought to be run. *In Search of Excellence* was a primer in the new ways to think about the proper

ordering of the corporation outside of the politically charged language of Reagonomics. Like good consultants, Peters and Waterman drew on the best practices of their clients and disseminated them through the economy. For most readers, the ideas were startling, but *In Search of Excellence* merely synthesized what McKinsey had already been telling its high-paying clients for years.

Peters and Waterman called this the "rule of 100": even the largest firms did not need more than a hundred people at corporate headquarters. Citing numerous corporations with tens of thousands of employees and billions in revenues, they gleefully reeled off how workforces had been reduced from "500 to 100" without a change in the success of the organization. At Wal-Mart, Sam Walton told them that "he believes in empty headquarters" because the answers are in the field. At Intel, Peters and Waterman claimed that there was "virtually no staff. All staff assignments are temporary ones given to line officers." What does it matter, then, whether the temporary assignment comes from a line officer or a McKinsey consultant? At Ore-Ida, where they, as consultants, put together "one of the most thoughtful strategic plans we've seen," the only staff they worked with were the CEO's secretary and part-timers from the CEO's "department and division manager." Though Ore-Ida, a major subdivision of Heinz, was one of America's largest consumer package goods companies—a classic postwar industrial company—the CEO "has no staff, let alone a planning staff."[31]

The postwar middle management and the executive planning staff that oversaw them were no longer necessary. Peters and Waterman lauded Ford president Donald Petersen for cutting 26 percent of his middle management, and believed that Ford would continue. "Reductions in the neighborhood of 50 percent or even 75 percent . . . are not uncommon targets when businessmen discuss what they could honestly do without." This temporary corporation, except for the actual machines that made all those delicious bags of Ore-Ida potato chips, would leverage the ad hoc insights of a constantly recombining planning staff of super-senior executives and management consultants.

The only necessary employee, in this model, was the CEO.

Searching for Excellence at HP

Silicon Valley arguably began in the garage of Bill Hewlett and David Packard, and HP's founders were as committed to job security as any other postwar industrialists.[32] As they steered the company from the postwar through the 1970s, they continued to try to protect their workers (if, at the same time, resisting any kind of unionization). In the '70s, instead of firing workers during a recession, HP reduced employee hours. Executives voluntarily cut their pay. Employees shared work and kept their jobs.[33] Twice, this enabled HP to avoid layoffs.

While AT&T, GM, and GE may have reveled in cutting their workforces, companies like HP had a harder time reconciling their values to the new lean ideal, struggling, for as long as possible, to preserve job security. Job security at HP was so entrenched that human resources had to remind managers that it was okay to fire people. "There is," a memo said at the time, "a prevalent misconception that HP never terminates an individual's employment involuntarily."[34] To prove the point, they cited the sixty people who had, over the last six years, lost their jobs due to absenteeism, job performance, and gross misconduct. Firing ten people a year, in any normal corporation, was inconceivably low. HP bent over backward to avoid layoffs. If you got hired, you rarely got fired.

While *In Search of Excellence* may have promoted a corporation with only a hundred people at corporate headquarters, somebody still needed to do the real work. At the top there might have been teams of consultants, but for the paperwork, which despite the office automation still existed, there was a growing army of temps. In the downturns of the 1970s, cutting-edge firms used temps as a buffer for their employees. By the '80s, using temps as a buffer workforce was becoming the norm. If temps were let go in a downturn, companies could proudly tell the press that they had never laid anyone off—and technically that would be true. Firms that struggled to protect their work forces in the '70s and '80s, like Hewlett-Packard, eventually gave in. If HP could be restructured for flexibility, then any firm could. That moment would come after founder Bill Hewlett passed on the company to John Young.

Though he had an engineering background, Young also had a MBA.

He spoke the language of business as fluently as the language of electronics. In the recession of 1982, he seized the opportunity to force HP to break its commitment to its employees. Instead of cutting jobs this time around, HP shifted into creating a more flexible workforce. For such a fundamental shift, Young looked to McKinsey for help.

Robert Waterman, before he became famous with *In Search of Excellence*, had consulted at many firms across the world, including Hewlett-Packard's computer group, where he had met the soon-to-be CEO Young. Waterman and Young spoke the same language. McKinsey helped HP automate their offices.[35] Waterman, in particular, tried to reorient HP away from focusing on engineering to the exclusion of marketing. HP, in their view, should be more business than products.

In 1984, Young invited Waterman to give a speech at the annual management meeting, laying out HP's strengths and weaknesses as part of the run-up to a McKinsey-run reorganization of HP.[36] The number-one asset of HP, Waterman said, was its culture of "innovative technical, entrepreneurial spirit."[37] Engineers could find their own problems and solve them. Unlike DEC or IBM, HP was a place that "set people free."[38] This freedom was made possible, he thought, by the "security of employment policy, which lets you move people from division to division and across functions without people feeling particularly threatened by it." Security allowed "mobility" and "flexibility" that Waterman had never seen in a firm, "except maybe in Japan." He lauded HP's "technical strength," "can-do attitude" and brand image as well, but before all of that came HP's peoplecentric policies.

Those policies, Waterman thought, were also HP's greatest possible weakness. The job security insulated HP from "competitive analysis."[39] The focus on technical innovation—resulting from that security—increased their "cost position." HP was good at inventing machines, but it was "surprisingly naïve at business fact accumulation and analysis." HP leadership believed in engineering not management. "HP is terrific," Waterman concluded his speech, "and I think that's the biggest single danger."

John Young, however, believed in management. He reorganized HP in line with Waterman's vision, taking it in a new direction. McKinsey. oversaw the fieldwork of the reorganization, consulting with a group of sixty

senior HP executives.[40] McKinsey interviewed HP clients and staff, examining every part of the business. The executives weighed McKinsey's problem statements to find possible alternatives, deciding, in the end, on a new strategic and organizational path for HP. While the press saw a power struggle at HP, internal memos claimed there was only unity. Certainly McKinsey and Young saw eye to eye, as they launched the restructuring of one of Silicon Valley's signature brands.

Planning for Flexibility at HP

At the 1987 annual general manager's meeting, John Young revealed his disappointment over the past few years. HP had not become the company he had hoped it would be after the McKinsey-led 1984 reorganization. The problem, he felt, was "not poor planning or strategy, it was simply weak execution." Their strategy had not been wrong; HP had just not gone far enough. He called for the theme of 1987 to be "excellence in execution," echoing Waterman's speech in 1984. The practical policies were manifold, but focused on cutting costs, consolidating operations, limiting hiring, and "developing a 'buffer' workforce." New products were nowhere mentioned. The workforce would need to become even more flexible.

Hewlett-Packard's internal temp pool, HP Temps Pool, had begun in the late 1970s, positioning itself as an alternative to temporary agencies. These temps could circulate like the temps of the postwar, filling in for sick or vacationing administrative assistants.[41] Often retirees, they knew "HP's style and procedures," as a helpful HP circular explained to employees. Apple, similarly, created its AppleCorps in 1985 with just three people. A hundred temps would come in every day, and many didn't even know how to use a Macintosh, much less understand how Apple operated.[42] Then Apple had a reorganization, as AppleCorps head Gary White recalled, and suddenly they had thirty people filling all the gaps created by the reorganization but not having their own full-time jobs. Some of the internal temps found jobs in the new organization, but not all did. White believed that AppleCorps created "a cost-effective manner of fulfilling Apple's temporary administrative needs *internally*." The roles that these internal temps filled were like those at HP: more independent, sometimes verging on project management. They even

replaced people who went on vacation. White dismissed the notion that temps did "menial labor performed by peasants."

Internal temps at HP and Apple did fill an important service, but only in those areas that looked like old-time postwar emergency replacement. The reorganizations used external temps for exactly the peasant work that AppleCorps would not do, which is why these kinds of services could complement, but could not replace, temp agencies. AppleCorps had a couple of dozen employees. At HP, internal temps were not quite the same as regular personnel since they were classified as internal temp employees, like interns. Personnel, through the early 1980s, may have requested managers to use the internal pool whenever possible, but these requests were frequently ignored. For instance in 1983, at just the corporate offices, HP used 22,580 hours of external temp labor compared to a mere 7,675 hours of HP Temps Pool labor. Like consultants, temps had become a permanent part of the new corporate structure created through the waves of restructuring. Peasant work was outsourced.

The point of temps, by the 1980s, was no longer emergency replacement. It was cyclical replacement. In the face of demands for higher quality, lower cost, and workforce flexibility, the desire for job security and marketplace success were incompatible (at least in the minds of HR professionals). After a hiring freeze in late 1981, and an encouragement to reallocate the existing workforce, HP personnel sent a memo around chastising managers for a 56 percent increase in the use of temp workers.[43] In the first quarter of 1982, the main buildings in Silicon Valley billed 75,848 hours of temp labor, or about a hundred temps per day. Managers simply evaded the hiring freeze by using temporary labor.

In 1987, an HP task force reexamined the problem of job stability at HP.[44] Though HP made use of temps extensively in manufacturing, its office staffing was still 99 percent regular workers. And that was a problem. An internal workforce that was "99 percent fixed" could "not allow a timely reaction to a slowdown in the economy." Those who were already part of the HP workforce needed to be protected from the market. "Flexibility" coming from using "more agency temporary employees" would allow HP to "hold full-time regular positions open until excess employees are available for placement."[45]

New kinds of temps, who didn't get benefits, whose children were not eligible for HP scholarships, were needed. The task force recommended that the company focus on hiring "external and new internal resources instead of hiring regular full-time employees." To that end, HP rolled out pilot sites to find "alternative staffing practices."[46] At HP, they called this the Flex Force.

In 1988, HP extended their Flex Force to create two additional job categories, "on-call" and "on-contract," to help strengthen the wall between the permanent workers and the temp market. On-call workers could work only up to 1,400 hours a year, and contractors could work on multimonth contracts, renewable up to two years. These employees would be like temps, working for short periods, but they would be paid directly by HP, but not as W-2 employees. They would file 1099 independent contractor forms for their taxes. These workers would not receive the generous benefit and pay package for which HP was famous. Contractors would "only receive legally mandated benefits" and have "no employment security."[47] By the end of 1988, Flex Force had created, between temps, on-calls, contractors, and consultants, the flexible workforce that HP leadership wanted.

Through Flex Force and similar programs, CEO John Young looked for ways to become leaner. He cut layers of management out of the company in an effort to improve "accountability and flexibility." With fewer middlemen, Young hoped that employees would take more "ownership" of their work. The flexible labor force remained a buffer, but as time went on, the lines between the temps and perms blurred, especially in the minds of high-level corporate strategists. Young told his general managers in 1989 that "managing headcount is a priority." HP would need to "manage headcount by function, including flex-force employees."[48]

Yet HP's needs for flexibility quickly exceeded even its internal pools of on-demand workers. HR representatives pestered managers to reserve "on-call flex force" workers weeks in advance. By 1991, HP entered contracts with two temp agencies, Manpower and Volt Services Group, for its temporary needs. Assignments varied from "several weeks, three to six months, or longer."[49] The placements were in "administrative, manufacturing, and technical functions." "Manpower and Volt," an internal memo related, "are able to provide external temporary workers for all of HP's job

profiles." These external workforces would be cheaper. HP estimated that they would save $20 million a year through these contracts. At two large manufacturing sites alone they would save eight hundred thousand dollars.[50] In short, Manpower and Volt could supply any job position for any length of time for any area of the company.

An representative from each of the agencies sat in the headquarters, "providing an on-site coordinator to facilitate the hiring . . . and to relieve HP personnel from this function." Manpower's representative was Mary Hoffman. Her cubicle was in the staffing office, along with all the rest of the HR department. As "Mary [was] beginning to set up personal interviews with managers who [were] larger users of temporary workers," how could they not imagine that something fundamental had changed at the company? Still, they would know that their jobs were safe. With an expandable workforce of temps, HP would not have to worry about real layoffs.

The Flex Force at HP started as a buffer, but became part of the normal head count, and acted as a rehearsal for permanent temporary positions procured through staffing firms like Manpower. In the midst of the recession of 1991, HP offered voluntary early retirement, shedding thousands of workers. The workforce discipline took its toll on morale, but Young warned that they "need[ed] to protect the investment we've made in getting employment down. If we don't make good on that investment, we'll have to pursue even more aggressive measures next year."

Japanese Management

The explanation for the need for restructuring was not just a competitive market, but a competitive *global* market, by which Americans meant Japan. In the 1980s, Americans widely blamed the Japanese for their industrial misfortunes. While Carter failed to convince Americans of their own cultural failings, Americans were more than willing to credit Japanese success to the Japanese culture. In 1964, Toyota began exporting to U.S. Starting with only four thousand vehicles, exports rose tenfold in three years, to forty thousand. In 1966, Toyota introduced the Corolla, which was a small car aimed at a mass market. Riding the doubling of the average Japanese income by the mid-1960s, Corolla was a total success, and by 1974, the

best-selling car in the world. With global oil prices rising, the gas-efficient Corolla turned heads, not only in Japan, but everywhere. By 1980, Japanese imports accounted for 20 percent of all cars sold, and all the Big Three U.S. companies lost money. Special tariffs to keep out Japanese cars, or even to adjust the value of yen, did little to assuage autoworkers who saw Corollas displace Cadillacs. Business leaders accustomed to decades of a particularly stable, U.S.-centric way of doing things, confronted a new world order that they did not understand. Consultants offered answers.

Yet for all the anti-Japanese sentiment, the basic elements of restructuring were American—even in Japan. The insights that allowed for Japanese quality and Japanese efficiency, had come from the U.S. as part of the postwar rebuilding program. In the aftermath of the war, Japanese industrialists had sought new ways to think about their economy. While American observers lauded the leanness of Japanese just-in-time manufacturing methods, the inspiration for this supply-chain management was American. In charge of managing supply for his division in the 1950s, Toyota manager Taiichi Ohno considered the American supermarket. The supermarket had no inventories in the back, only shelves in the front. Customers could take exactly what they needed, when they needed. Instead of vast heaps of car parts, what if suppliers provided the parts as needed to Toyota, just like a supermarket did to its customers? This just-in-time system would vastly reduce inventories, which would reduce working capital, which would allow for better investment elsewhere in Toyota.

All the way down Toyota's supply chain, this system spread through the Japanese economy, increasing efficiency and integration. Toyota reduced costs and reinvested their capital in ways that allowed them to produce cheaper, better cars. The success of Japanese manufacturing had nothing to do with an ancient Oriental culture; it was managerial. It had nothing to do with samurai, unless there happened to be an American samurai named Edwards Deming.

Deming began his career as a mathematical physicist, working in both academia and in government. After the war, as a U.S. government consultant, he lectured in Japan on statistical controls for manufacturing quality. His lectures were collectively published as *Elementary Principles of Statistical Control of Quality*. Deming was not alone, but he became the most

visible of American engineering evangelists. Donating the profits from his lectures back to the Union of Japanese Engineers and Scientists, the union, in turn, created the Deming Prize in quality management. Deming's ideas quickly circulated in Japan, placing him alongside Frederick Taylor in the Japanese managerial imagination. While Japan could not compete with the U.S. on the cutting edge of technology, they could make sure that what they did make worked well. Deming's lessons on "scientific quality control techniques" disseminated widely in the 1960s in Japanese engineering circles, and by the time that Japanese firms began to seriously export in the '70s, their products were excellent.

Deming brought American management to Japan, but Kenichi "Ken" Ohmae brought it back to the U.S. At the height of American anxieties about Japan, Ohmae, who managed the Tokyo office of McKinsey, emerged as a leading translator of "Japanese" management. Ohmae, who had grown up in Japan, had come to the U.S. in the late 1960s to get a PhD in nuclear engineering at MIT, after which he joined McKinsey. When the firm opened its Tokyo office, Ohmae, moved back home.

Ohmae managed the office through the 1970s and '80s, becoming an intimate, in the way that only a consultant can, of the leading businessmen of Japan. With his perfect knowledge of Japanese and American management, he became a leading translator of Japanese managerial thought for McKinsey, and the first widely read author-consultant to emerge from the firm. In 1975, he published his first management book, *The Mind of the Strategist*. Dozens of books would follow. McKinsey, through Ohmae, acted as a bridge, in many ways, for Japanese organizational ideas to move to North America and then to Europe. While he denounced the exoticization of Japan, he also took advantage of it as much as he could, as Japan's ascendance terrified and fascinated American businessmen.

Japanese firms had a mystique that in some ways was antithetical to the increasingly flexible workforce of the U.S. corporation. Rather than short-term profit, Ohmae wrote in *McKinsey Quarterly*, the Japanese valued the "perpetuation of the enterprise." The stability of the career ladder was essential to that perpetuation. Japanese firms focused on long-term investments and guaranteed jobs for life. Employees were not variable costs, but "fixed assets."

Ohmae emphasized that this peoplecentric capitalism with long-run goals was not an "ancient cultural heritage"—as so many in the West liked to image the Orient—but as a "pragmatic institutional arrangement" that arose out of the scarcity of the postwar, when older communalist values resurged in Japanese life, just as they did in European countries.[51] Confronted by this scarcity, the corporations took on a different flavor. Stockholders in Japan were not seen as "owners" but "moneylenders," like bondholders. The real corporation was the people who worked there. While Toyota, Sony, Mitsubishi, and other Japanese firms advanced short-term product design and manufacturing, they continued to focus on long-term employment and investment. This difference in Japan stemmed, in Ohmae's view, from a continued focus on "the corporation's long-term well-being" in a "real commitment" to business excellence, rather than "strictly financial objectives with only the stockholders in mind."[52] "Stockholders," according to Ohmae, do not matter more than "bankers" or "factory workers." While written by the head of McKinsey's Tokyo office, the quote reads today like something from *The Nation*. For Ohmae, American firms had lost track of maintaining long-term profits—and that was where American capitalism had gone wrong.

Executive leadership in Japan was based on seniority, not cleverness, which produced a different kind of corporation. While corporate planners in American firms "were so smart that they had to spell out every detail of a corporation's strategy for three to five years into the future," in Japan there were no such firm divisions between the "smart people" and the "dumb people [who] never got the big picture."[53] Like Galbraith, Ohmae was convinced that postwar Western corporations, with their top-down "military" organization, were more like "communist and socialist regimes . . . [whose] detailed long-range planning . . . is a remarkably effective way of killing creativity and entrepreneurship."[54] The Japanese corporation, "less planned, less rigid," is more able to adapt to changing circumstances—an essential quality for the Age of Turbulence. Western corporations were choked by "too much strategic planning."[55]

In Japan, new college graduates did not earn more than machinists, unlike the bright young things who got MBAs at Harvard Business School. Because everyone worked their way up the corporate ladder, all employees

were thought to have useful insights—unlike in the hierarchical U.S. The source of this top-down approach, he believed, stemmed from "McNamara syndrome." Robert McNamara famously was one of the whiz kids who brought World War II military planning to post-World War II corporations, like Ford.[56] Described by an "auto man" as "bookish and rather impractical," he became president of Ford at the young age of forty-four, not for his knowledge of engineering, but logistics. Ohmae believed that those in McNamara's stripe believed that they were smarter than other people and thus should set rigid guidelines and plans. Respect, however, was not the same as democracy.

As Toyotaism swept the managerial establishment, Ohmae pushed back against American misunderstandings. "Having worked as a consultant with many of Japan's best known companies," he wrote in 1982, "I often wonder where people get the idea that bottom-up decision making is a hallmark of Japanese corporations." Simply put, he said, "They are wrong." Toyota may have had a suggestion box, but that was not the same as bottom-up control. For three generations, at that point, control of Toyota had passed from father to son. Toyota and other firms had the same top-down management as U.S. firms, if not more so. The difference was in how they thought about their workers. Ohmae said that the corporate truism that "people are our most important asset" was actually believed in Japan, while in the U.S. it was just "pious rhetoric."[57] In Japan, workers were assets, not costs.

These workers didn't have control, but they did have a voice. Japanese employees, even the line workers, who were "of high and fairly even quality," gathered a few times per month to discuss how they made their products. Their ideas were shared and disseminated. They were not managers, but their managers supported their experimentation with methods. With some ideas coming from them and not just from the management, workers were more willing to change how things were done. Developing quality circles took time. While American mangers scrambled to implement *kaizen*, they failed to notice that it was "this philosophy, not the mechanism of QC circles" that produced Japan's "enviable results."[58]

Looking to overcome export restrictions, Toyota opened its first auto plant in the U.S. in a joint partnership with GM in 1983—the NUMMI

(New United Motor Manufacturing Incorporated) plant in Fremont, California. The plant had been one of GM's worst performing, and presumably they felt like they had nothing to lose. Ohmae told the *New York Times*, "It's a smart thing for Toyota to go into the U.S. with a partner."[59] It is difficult to imagine that Ohmae, in McKinsey's Tokyo office, had nothing to do with that smart decision. At the NUMMI plant, the GM Way was dismantled. Detailed contracts and job descriptions were eliminated. Workers were put on teams instead of into slots. Teamwork and flexibility reduced boredom and increased commitment. Absenteeism fell from 25 percent to 2 percent. Quality rose to nearly match Japanese counterparts. Japanese management approaches, because they were not cultural, could be exported as well.

Toyota had come to America, and not just for car production. The language of Toyota production began to infuse American business—*kaizen* [continuous improvement], *kanban* [just-in-time scheduling]. As James Abegglen, who was vice president in BCG's Tokyo office, said, "GM's upside was to see how Toyota runs a factory."[60] GM and other American industrial firms struggled to learn from the competition. In the 1980s, then, there was a flood of assistance in translating these American-cum-Japanese ideas back into English. Ohmae, McKinsey, and other consultants were there to help, bringing ideas of quality and leanness into American corporations.

The world was global, and McKinsey moved ideas around the world. Mobility was, at the same time, foundational to the "one firm" concept. The managing director in 1977 celebrated that the partner who oversaw "the Firm's relationship with the H. J. Heinz Company in Pittburgh" lived in London. Ken Ohmae oversaw studies in Italy and Spain, and Bob Waterman did the same in Japan.[61] Consultants, like capitalism, had to be global. Having "roots," as the managing director said, was antithetical to "mobility."[62] On the one hand was "individual drive and entrepreneurship." and on the other hand was "collaboration and support." Like professional work trading off with personal lives. these binaries, which would not have been framed as such by Bower, did define the globalized, professional world of work that was emerging.[63]

Nowhere were these ideas taken up with as much fervor as at Apple, which opened its first Macintosh factory right across the street from NUMMI in 1983.

Manufacturing Apple

During the Super Bowl's third quarter in January 1984, millions of Americans watched an arresting commercial: rows of gray bald men marched and then sat while listening to the ideological drone of a great leader on an oversized television. Evoking *1984*, the dystopian George Orwell novel, the ad compared the monolith of IBM to a repressive totalitarian state. A woman running in Olympic shorts then spins a sledgehammer into the television's screen to smash it and free the minds of the drones. That hammer was, the commercial told us, the Macintosh computer. "On January 24th, Apple Company will introduce Macintosh," the voice-over said. "And you'll see why 1984 won't be like '1984.'"[64] The liberation of the consuming masses, Apple said as well, would come through individual computers. "We tried to capture the computer age's worst nightmare," Apple said, "where machines control people and show that our alternative empowered people and set them free."[65] During Steve Jobs' first public presentation of the Mac, it showcased its now iconic voice synthesizing ability, joking that, "I'd like to share with you a maxim I thought of the first time I met an IBM mainframe: NEVER TRUST A COMPUTER YOU CAN'T LIFT!"[66] The crowd, of course, went wild—not only for the talking computer, but for the price of that talking computer, which was about $9,000 in today's dollars. The personal computer was to be a tool of business, but also a tool of individual liberation.

Explaining why every desk needed a computer, rather than a mainframe in a big room, took some explaining. Jobs turned to historical analogues. The personal computer was to the mainframe as the VW was to the train, or (more obscurely) as fractional horsepower motors were to "huge motors." In each case, the smaller version allowed the individual to go where they wanted (VW) or to do what they wanted (smaller motors). Jobs claimed that the personal computer would do in the 1980s "for the individual as the big computers did for the corporation in the '60s and '70s." Jobs invoked none other than Alvin Toffler, calling the personal computer a "third wave" tool, like the hoe of agriculture (first wave) and the motor of industry (second wave). This "third wave tool" would "help every individual deal with the complexities of modern life."[67]

Apple's previous hit, the Apple II, could be used by normal people who knew nothing about programming, but it still worked, more or less, through a command line interface. Like IBM computers, they were terrifying. The "average computer user," Apple said, took "over 20 hours just to get comfortable with this new tool," and Apple "knew that office workers were terrified, not overjoyed, by the new devices." The Macintosh was the attempt to reinvent the computer, so that the interface ("file folders, clipboards, a trash can") used familiar objects rather than arcane computer terms.[68]

The first Apple computer to use a point-and-click interface, the Lisa had been far too expensive—$10,000 in 1983 ($25,000 in 2018 dollars).[69] Retailers couldn't sell them. Software companies, in turn, wouldn't develop software for such a niche market. So when Apple thought about designing its next computer, they tried to remake the Lisa "smaller, cheaper, and better . . . at a competitive price."[70] As they designed this next computer, the Macintosh, they did so with an eye toward its production to keep the price down.[71] The most automated, most robotic factory would make that low price possible. Investing $20 million in the Fremont plant, they consolidated all U.S. production in one place "to create the most highly automated factory in the western world"—what Apple called a Robot Factory.[72] Behind that consumer freedom, though, was the new regime of work and machines that made the Macintosh possible, but that was less freeing.

Jobs told Apple shareholders at the 1984 meeting that their new factory in Fremont was the "computer industry's first automated factory."[73] "The factory is based on the ideas of just-in-time delivery and zero defects parts" he said, "which allows extremely high volume production of extremely high quality products." What made this possible? A promotional video shown to shareholders told them the secret, and it wasn't the workforce, it was, as with Toyota, the relationship with vendors. Quality parts plus automated manufacturing equaled the Macintosh. The secret to Apple's manufacturing success was the same as with other '80s firms—drawing a bright line between the supplier and the firm. All Apple needed to know was that the vendor's part was there when it needed it, not how it was made.

Using that vendor's part required a factory for assembly. A small team of engineers designed the computer, coordinating the work of many other teams. The factory to build the Macintosh was designed alongside the

machine itself. Jan Grappel, who had come to Apple from RCA, designed the production line for the Fremont factory, automating the line wherever possible, aiming for a thousand computers per shift.[74] "A Machine Builds Machines," touted Apple about its "Highly Automated Macintosh Manufacturing Facility."[75]

At Apple, the actual builders of the computers were being reorganized. Debi Coleman, head of Worldwide Manufacturing, had shifted production from earlier factories in Dallas, Texas; Garden Grove, California; and Mill Street, Ireland, to new facilities in Cork, Ireland; Singapore; and most important, Fremont. She had gotten her start at Apple as the project controller for the Macintosh in 1981, and with Jobs's support, been promoted to head of worldwide manufacturing. Though she had studied literature at Brown as an undergrad, she had become disillusioned during the Nixon administration, turned from "you-have-to-change-the-world," as she said, to "screaming market share! Market share!" A twenty-month finance program through General Electric, and then an MBA at Stanford taught her how to think in ways that Nabokov—the writer on whom she wrote her thesis—never could have imagined. She joined Hewlett-Packard, where she learned about technology manufacturing, but her promotion was limited by her lack of an engineering background. At Apple she thrived, with Jobs supporting her quick advancement.[76]

At Fremont, her secret was simple: just-in-time production. The just-in-time system rewarded vendors who could provide products at the right time, at the right price, and at the right quality. Coleman viewed "vendors as extensions of our own factories. People said it couldn't be done—that you could not make vendors into partners," but she did. Those that did not become partners lost their contracts. Coleman reduced the vendor list from eleven hundred firms to three hundred. Firms that met requirements found they had more orders.[77] During the tumultuous 1985, Coleman reduced Apple's inventories from $261 million to $107 million, freeing up all that capital to be used elsewhere.

The first few months after Macintosh was introduced were not the success that Apple had hoped; 1984 was a slump year in the computer industry. In April, the Fremont plant was closed for a week, as excess inventory was sold. In Dallas, where Apple manufactured the Macintosh XL, the workers

were all laid off.[78] At the corporate offices, Apple's president, John Sculley, reorganized the company from product lines (Lisa, Apple II, Mac) into functional lines (products and marketing). In the reorganization, twelve hundred employees were let go. By the end of the year, though, Apple was planning for growth. The Fremont factory installed equipment intended to double its capacity from fourty thousand computers per month to eighty thousand.[79] During the downturn, Sculley's approach was straightforward: "centralize, consolidate, streamline, and organize" to increase flexibility.[80] Coleman decided to close the factories that could only produce single products. She kept the ones with the "most flexible machinery." "To be world-class," she said, "[Fremont] would have to handle multiple production in varying volume." "With flexible automation," Coleman continued, "you have robotics with sensors you can reprogram, so you can produce eight to twenty-four products on one line."[81] The flexibility manufacturing system project at Apple, as Coleman said in 1988, was about "reinforc[ing] a focus on automation, on future thinking, on flexibility, and on quality."[82] The new tracking system, done through a Mac, allowed the same person to assemble multiple products on the same production line.

The following year, Steve Jobs was pushed out of Apple as part of Sculley's reorganization of Apple away from products to functions. The intense competitive atmosphere between different products (Lisa, Macintosh, Apple II, etc.) was detrimental to the business. At first the split seemed mutually amicable (Jobs was starting another company), but it quickly soured as Jobs poached top talent for his new company. He succinctly lashed out in a full-page ad in the *Wall Street Journal*: "The personal computer industry is now being handed over from the 'builders' to the 'caretakers'; that is, from the individuals who created and grew a multi-billion dollar American industry to those who will maintain the industry as it is and work to achieve marginal future growth."[83] Reorganizing Apple in this way was exactly what he feared most: "Companies are they grow to become multibillion-dollar entities somehow lose their vision. They insert lots of layers of middle management between the people running the company and the people doing the work."[84] Jobs's complaints parroted, almost verbatim, the text of *In Search of Excellence.*

According to Jobs, the people "doing the work" were him and

(sometimes) cofounder Steve "Woz" Wozniak, but it was another 140 people—mostly women, mostly immigrants—who actually put the Macintosh together. These workers showed up at 5:45 a.m. to spend the day assembling, putting the same sets of connectors, regulators, and capacitors for an entire shift.[85] Sara Trujillo inspected circuit boards before they got baked in the oven.[86] Hung Troung put the computers in boxes. When the line shut down, workers like Therese Deering used those same Macintoshes to track problems in Excel. "This is something new to me," Deering said, but she felt "like I'm contributing something the supervisors need to know."[87] Assemblers tracked the line, just as their Japanese analogues would have done.

On the Mac's fifth anniversary, John Sculley congratulated the factory's workforce on making the Macintosh, which he proclaimed a "new concept in computing" with its "focus on the individual—not on the organization."[88] After the congratulations, a few issues later, the cover story of the Apple's *Fremont Flash*, the employee newsletter, featured Joe Mendoza and Dolores La Fauci, two "aces" from the assembly line, smiling broadly. They weren't featured for their skills or their smiles, though. They were featured because they had gone to Singapore for a month to train thirty Singapore assemblers to "build the same products we build."[89] Mendoza was proud that his "fine-tuning tricks" increased production from "400 to 550 units a day." Apple invested deeply in Singapore in 1988, some $38 million, producing all of the new IIGS, IIe, and IIc computers. Like Fremont, it was heavily automated, and had 380 employees. Like Fremont, it adhered to just-in-time principles, with only four hours of small inventory, and one hour of bulky inventory. While the plant was kept busy with variants of the Apple II, the market for that computer was petering out. The Apple IIc was only in production for three months a year, to prepare for school season. In 1988, Fremond was preparing to produce Macintoshes.[90]

Apple was not alone in moving its employees around to train their overseas replacements. Tech companies could bring their overseas workers to the U.S. for training under a B-1 visa.[91] Seagate Technology, which made disk drives and other storage technology, had fired eight hundred employees in 1984, when they opened a factory in Singapore. In 1986, they brought a hundred workers from Singapore to San Jose to "train" in their factory, while actually doing some production work.[92] While here, Seagate officials

took their passports, put them in houses—ten to a house—and gave them a small weekly stipend. Once trained in the manufacturing, those jobs could be shipped to Singapore. Whatever the costs here, the end goal was to have these workers, who earned about $1.00 an hour, do what was now being done in California for $4.40 an hour.

As the 1980s wore on, the tech firms of Silicon Valley prepared for a day when hardware would no longer be made there.

Commodified Temps

Unlike gold, which created the first California rush, silicon is everywhere. Every grain of sand is silicon dioxide. Making that cheap silicon pure enough for electronics, however, costs a lot of money. To do that, there can be no errors—even a slight bit of dust can ruin a batch.

Achieving this purity requires extremely clean rooms, which are called, suitably enough, "clean rooms." The fully contained hazmat suits (bunny suits, in industry parlance) are not to protect the workers wearing them, but to shield the silicon wafers from the impurities of the human body. Smooth, controlled airflow, as well, ensures that the environment is perfect for the silicon wafers' growth. After the growth stage, however, it needs to be altered—etched with acids, reacted with chemicals—and in this next stage, the hazmat suit is no longer needed.[93] Semiconductors and electronics, then, need to be thought of as consisting of two main parts—the hypercontrolled first part, in which the semiconductors are created, and then the second part, in which they are assembled. If the first part is about machines, the second part is about labor.

The first part was done in semiconductor fabrication plants (fabs), and their clean rooms were extremely expensive, requiring massive outlays of capital as well as highly skilled engineers to oversee them. The skilled staff and the large investments meant that they could not be overseas, but they could be built in Texas or Colorado, where everything was less expensive. In making the chips themselves, firms were limited in how much they could cut costs.

When it came to putting the components together, however, high-tech firms had more options. In the production facilities that remained in Silicon Valley, the goal was to keep a very lean workforce which could be

supplemented by temps. No more layoffs were possible—at least for the skilled workforce. As one corporate HR manager said, "We're running so lean right now that we can't afford to go out and say . . . I need five people to go in and layoff. It becomes more cosmetic than anything else."[94] The core skilled technicians of the fab plant could not be let go, but the other workers, who assembled, packed, and tested were more interchangeable. The work could be done in-house, or, as we will see, could be subcontracted.

Firms that did assembly in-house looked to stay flexible. The so-called full-time staff did not have much certainty, either; they had only six-month contracts.[95] Temps were an even better option. By 1984, Santa Clara County, with its 180 temp agencies, had the highest density of temps in the country (1 in 60 workers).[96] In Silicon Valley, Manpower supplied more temps for production worke and electronic assembly than any other tasks.[97]

Temp assembly workers could be ramped up or ramped down, but it is perhaps surprising how consistent their numbers were. Most semiconductor firms got about 10 percent of their production staff through temp agencies. Rather than going from no temps to some temps, firms, like one chip plant, would go from "95 temps to as much as 150 temps." This pattern was "fairly predictable," said a plant manager, "Every quarter, I can tell you exactly."[98] Temps were a "buffer zone," as the executive vice president of the National Association of Temporary Services called it, for the permanent workers, but they were now becoming a permanent part of that workforce as well.[99]

Firms had standing contracts with temp agencies. If they needed those extra temps for the end of the quarter, they could just call them. For the ninety-five temps who were always there, the firm could arrange a "payrolling" system, where employees were shifting to a temp agency. With an average markup of 34 percent, even the more expensive wages of the temps were cheaper than the average cost (benefits, payroll, etc.) of 42 percent above wages that firms paid at the time for full-time workers.[100]

Electronic assembly was not hard. At Convergent Technologies, a computer manufacturer in Santa Clara, about 30 percent of the workforce was temporary, but that number could shift rapidly. From June to September 1984, the number of temps went from 370 to 627, out of 2,200 total workers.[101] These temps were "screwing in disk drives or taking boards and placing them in the chassis of the computer," the kind of work that requires a

screwdriver and five minutes of training. Larger firms used temps in the same way. That same year, HP spent $5 million on temps, using about half of them in assembly. These firms took pride in "never having a layoff," but that was made possible by temps.

The first part of production was straightforward: build an expensive machine and turn sand into semiconductors. The second part of production, though less technological, was far more complicated organizationally. To cut costs and stay flexible, firms became extremely creative about finding cheap workers willing to do toxic work.

Unclean Rooms and Undocumented Workers

After dropping out of his PhD program in sociology in 1980, Dennis Hayes came to Silicon Valley and starting temping, working in the assembly room of a leading audio equipment manufacturer—Ampex.[102] While Blondie and the Bee Gees touted their products, the glamour somehow didn't make its way back to the assembly room. Hayes may have hated temping, but he knew he didn't have the worst job in Silicon Valley. Unlike most of the rest of the *Processed World* writers, Hayes noticed that this futuristic economy rested on a very old idea: give the dirty, dangerous work to people who had no alternative.

Though Hayes worked on the floor of the assembly room, he didn't put anything together. The room, like most assembly rooms in Silicon Valley, contained all women, and mostly women of color. Automation was not an option because the products changed too quickly to recoup the investment in machinery.[103] The tools the women used were primordial—older than transistors, older than screwdrivers, even older than the ax—their fingernails. They grew "two or three strategically long nails" on each hand so that they could more easily maneuver the components onto the circuit boards.[104] Tongs were an option, but fingernails worked better. Some production technologies in Silicon Valley were as much ancient as futuristic.

Ampex was not unique. The much-heralded flexibility in manufacturing in most industries came through low-cost labor, not through autonomous machines. Some of those workers were in Asia, but just as many were immigrants, also from Asia, who now lived in California, where they worked

alongside Mexican immigrants in the subcontractor shops that supplied the electronics manufacturers. The low-end workforce of Silicon Valley mimicked the populations that did assembly work overseas—Taiwanese, Filipinos, and Vietnamese—as well as a large Latino population of 320,000.[105] While electronics firms had their headquarters near Stanford, they had their factories wherever they could find their preferred workers.

Silicon Valley was the most visible part of the electronics industry, but these same work conditions were found elsewhere, especially in Southern California. In the 1970s, more electronics factories were built in Anaheim (464), Los Angeles (367), and San Diego (123) than in San Jose (339) or San Francisco (151). Other top cities included Dallas (276), Chicago (224), and Houston (204).[106] The pattern in these cities was not particularly different than in Silicon Valley.

Investigations in the mid-1980s found that among legally employed electronics production workers most were women (64 percent) and most were Hispanic (57 percent), even though the population of Southern California was only about one fifth Hispanic. Of those Hispanics, about half were foreign born. Foreign-born Asians also made up a substantial percentage of the workforce (10–20 percent). Managers, as they told interviewers, preferred foreign-born workers for being "diligent, hardworking, and loyal."[107] Black workers, they felt, were less reliable, more resistant, and prone to unionization. Help-wanted ads posted phone numbers for Spanish- and English-speaking applicants. On the English line, there were no jobs available, while on the Spanish line, there was always room for new applicants for low-wage assembly positions.[108] Managers wanted obedient employees—preferably immigrant. While technical knowledge, and venture capital, was lauded for the Valley's achievements, that success was made possible by a hidden underworld of flexible, poorly paid labor.

Apple did not run a sweatshop. Inside the highly visible Apple factory, the workforce was legally employed. Workers got paid the minimum wage (or more). The production regimes followed OSHA regulations. Apple made protective safety equipment available. Yet about 40 percent of electronics firms subcontracted to small independent firms, whose production in less visible spaces, while essential, looked very different than in those high-profile factories.[109]

Not all firms were as aboveboard as Apple. In the competitive world of electronics, corners were cut. In 1982, Fermina—not her actual name—had worked for about three years at an electronics assembly plant in Tijuana, where she earned sixty-five cents an hour "soldering gold filaments to nodes neatly marked on printed circuits." She peered hour after hour through her microscope, bonding semiconductors. Then the peso destabilized and Fermina crossed the border to stay with relatives and look for work. After looking in the newspaper, she called a number to inquire about jobs like the one she had left behind—and she could even do it in Spanish! She found her old job, bonding semiconductors, but this time it was in an assembly plant in San Diego that made parts for personal computers. Instead of sixty-five cents an hour, she now got five dollars. In the plant, hundreds of Mexicans worked alongside Fermina, many of them undocumented just like her. For Fermina, it was a good paying job. For the firm, Fermina and those like her led to great profits. In 1983, it was the fourth largest supplier of personal computers in the U.S., with sales of $75 million—and profits of $13 million.[110]

When an INS raid occurred in November 1984, Fermina hid in a supply closet, terrified. She escaped, but fifty of her coworkers, nearly all Mexican women, were put in vans for deportation.[111] "I came to this country to work hard but now I live torn between duty and shame," she told an interviewer.[112] Fermina was not alone. Other high-profile INS raids found firms had employed, on average, about half their assembly workforces illegally. Scholars estimated that a hundred thousand—many undocumented—Hispanic women worked in electronics just in Southern California.

Back in Silicon Valley, Hayes's job at Ampex was not to put the components together but to drop off and gather chassis panels, nuts, and screws made in Ampex's factory from subcontractors who processed them in "metal shops in Silicon Valley." High-end audio at Ampex was made possible by low-end subcontracting. "They'd just give me an address and a car," Hayes said, "and I would go out and get this stuff."[113]

Hayes drove to a "a dirt-floor Quonset hut in Santa Clara," inside of which "were Hispanic workers in rubber boots, gloves, and aprons—and without respirator masks." The toxic labor of electronics manufacturing was outsourced. Chip fabrication had to take place in clean rooms, but electronic assembly could take place nearly anywhere.[114] The front and back doors of

the hut were open, some passively turning fans were on the ceiling, but otherwise there was no ventilation. The workers "moved about quickly, stoking fires beneath vats of chemicals, climbing up and down the jerrybuilt platforms that gave access to the vats. Some of them boiled; others, untouched by the fires, yielded the smoke of chemical reaction." The subcontracted workers dipped metals and printed circuits into their vats. Hayes, only there for minutes at a time, wrote, "the foul metallic odors made me want to hold my breath." He never talked directly to the workers, only to the boss, who spoke to him in English while commanding the workers in Spanish.

In the early 1980s, there was a dawning awareness of the health risks of working in the semiconductor industry. Investigators found that occupational illnesses were three times higher in semiconductor manufacturing than in other manufacturing industries.[115] Today, Santa Clara County has more EPA-designated superfund sites—twenty-three—than any other county in the United States.[116] The most illustrious names of Silicon Valley—Fairchild, Intel, Raytheon, Teledyne, Westinghouse, National Semiconductor—dot the EPA's map of toxic waste sites. Clean-room employees, over the years, began suing their companies. Environmental and labor groups with long acronyms staged protests.[117] This formal workforce certainly suffered, but the informal workforce, less documented, less studied, probably suffered much worse.

Subcontracting avoided American wage laws, but also American safety laws. The tort-liable work was outsourced with a network of temps to act as intermediaries. No permanent employee of Ampex delivered or picked up the panels, nuts, and screws, so no official employee of Ampex could ever *really* know the conditions under which the chemistry took place. Ampex was not alone.

In Silicon Valley, the clean rooms of high-end technology were built atop a foundation of poisonous Quonset huts. Never in one place for too long, there were no superfund sites—except of course for the workers themselves. If there was a legal problem at one hut, it would have been easy to disappear into another anonymous shop—or even a home.

The bottom rung of the electronics industry was not in small factory or a Quonset hut, but a kitchen. Investigators found that somewhere between 10 and 30 percent of electronics firms subcontracted to "home workers."[118]

Like garment workers taking in sewing, electronics workers could assemble parts in their kitchen. A mother and her children gathered around a kitchen table putting together components for seven cents apiece.[119] These little shops put together the boards and that went to big companies.[120] California labor inspectors turned a blind eye:

> A Mexican or a Vietnamese can take home a thousand coils for wiring one evening, and put every close neighbor and family member to work, and return the next day to the plant. . . . It's not even worth our time trying to wipe it out. When there are people eager to work for pennies, you can expect that kind of thing to happen.[121]

While the image of Silicon Valley was futuristic, it methods harkened back to the nineteenth-century. The component assemblers of the 1980s—poor immigrants—would have been hard to tell apart from piecework seamstresses of the 1880s living in tenements. These homeworkers offered firms a cheaper labor force, but their real appeal was, of course, flexibility. Chip processing fluctuated.[122] Like cars, computer demand varied through the year for consumers (holidays and new school terms) and as a result of changes in technology (new chips). As demand went up and down, firms had no obligation to the homeworkers.[123] So kitchen and Quonset-hut workers would open and close shop as needed.

The exact numbers—how many firms, how many chips—are hard to point down precisely because it was a subterfuge. Behind the big expensive plants were vast networks of other workers. Tellingly, more firms, in the various surveys, subcontracted to homeworkers than to offshore plants.[124]

Hayes was not the only one to notice the relationship between undocumented labor and electronics.

The INS Comes to Silicon Valley

In 1984, John Senko, an eighteen-year veteran of the INS, opened its first office in San Jose and began to oversee immigration issues in Silicon Valley. The INS believed that as much as 25 percent of the Silicon Valley workforce (approximately two hundred thousand workers) was undocumented.

Senko's task was simple, and yet impossible: eliminate illegal labor in Silicon Valley. The office had only four investigators and was chronically underresourced. He said, "It's difficult to make people realize that because of the nature of the industry, illegal aliens are working here." Because "high technology is a sophisticated industry," it was easy, Senko said, to believe that no part of the production process was unskilled.[125]

The INS at first broadly investigated the use of illegal labor in electronics by raiding Quonset-hut operations and even large factories. General Technology, for instance, had 10 percent of its workforce (forty-six people) seized by the INS on a raid.[126] It turned out, according to their arrests, that the actual number of undocumented workers was much lower than the 25 percent initially believed, and was in fact closer to about 8 percent.[127] What mattered, of course, was not the percentage, but the way in which some segments of the electronics industry relied so heavily on undocumented labor.

The INS encouraged companies to cooperate. At Circuit Assembly Corporation in San Jose, the INS asked for the names of its noncitizen employees. Of the 250 names, the company thought that "20 or 30 of them could be using forged papers."[128] The actual number was 187. The company, because it cooperated, received no sanctions or penalties, and according to Senko, replaced those 187 with legal workers.

The San Jose local government pushed back against the INS in the name of defending "Chicano citizens" against harassment, passing a resolution against "the unwarranted disruption of the business community."[129] Harassment was all too real. Over the first year and half of Senko's administration, the INS raided not just workplaces but neighborhoods. In Menlo Park, just near Stanford, INS agents blocked the streets and removed "Hispanic males" from cars and from homes, checking them for proof of citizenship. In Santa Cruz, the INS went door-to-door checking Hispanic citizenship.[130] Senko and his agents believed that they did not need warrants that named names ahead of time.[131] They were "surveying."

San Jose, Senko complained, "didn't want us weeding out illegal aliens anyway."[132] They didn't, but it wasn't just to defend the rights of San Joseans. The city attorney tried to stop the raids. Police refused to cooperate with INS. In 1985, a San Francisco district judge issued an injunction to stop the raids, requiring the INS to have names of the illegal aliens ahead of

time. In December of that year, San Francisco declared itself a "sanctuary" and directed its police and officials not to assist the INS in finding "law-abiding" but "undocumented" migrants.[133] In 1986, though a judge in the Ninth Circuit ruled that the INS could conduct its "surveys" without naming warrants, the INS and Senko were still blocked politically. Senko, due to a lack of staff, was not "going to rush out" to conduct workplace raids.[134]

This local resistance did not, however, improve the working conditions of those Chicanos or Vietnamese or Filipinos or Taiwanese. The INS surveillance quickly became just another instrument of worker repression, as Hayes noticed at the time. Business owners could selectively check green cards against an INS database, or simply hand over "troublemakers." Attempts to organize the electronics factories proved unsuccessful. The spokesperson for the International Association of Machinists explained that whenever they tried to organize, the company "threatened to have anyone who joined the union deported."[135]

Deportation hearings did not happen the next day, but could take place months, and sometimes years, after someone was arrested.[136] Those who agreed to deportation could leave quickly, but those who appealed could languish in detention for months. Mexicans, on average, left within a few days, while those from Central America stayed longer, since they were less eager to return to the civil wars going on back home. While the INS operated seven main detention camps, it also subcontracted detention to a thousand different companies, with names like Corrections Corporation of America or Behavioral Systems Southwest. These detention facilities varied from overcrowded hotel rooms to overcrowded jails. The miserable conditions encouraged the detainee to agree to deportation without a hearing.[137]

Unprotected Workers, Undocumented Workers

"This economy," former INS head Leonel Castillo told a newspaper, "was built on the assumption and reality of a heavy influx of illegal labor."[138] Castillo was not just referring to the electronics industry, but the entire economy of the America West. California conducted a study in 1979, using scientific sampling methods, that found that 81 percent of Hispanic garment workers and 75 percent of Hispanic restaurant workers were undocumented.[139] The

Wall Street Journal estimated that in Houston by the 1980s, one third of all construction workers were "illegals, doing jobs that nowadays most citizens refuse: lugging pots of hot tar to rooftops, pulling nails from concrete forms and clearing debris." INS agents, on just one random Thursday, could stop by a Ryan Homes site to get "three drywallers," and then that same day, and only a short drive away, pick up "three illegals pouring a sidewalk for No. 4-ranked U.S. Home Corp." After that, they made two more arrests, then went to have barbecue for lunch. They arrested another undocumented worker from the behind the counter.[140] Undocumented workers were everywhere—not just the fields.

Legal workers could demand rights that illegal workers did not.[141] A subcontractor who was supervising a crew of illegals explained: "Whenever there's an accident on the site, the Chicano (Mexican American) will stay home and ask for worker's compensation. The Mexicans, they work."[142] Illegal aliens still had the right to join unions, and actually had most other labor rights as well, like minimum wage and overtime laws. They could bring suit in courts. Of course, if they were discovered, then they could be deported. As much as illegal aliens were protected in theory, they were not protected in practice.

For women, legal statuses sharply divided the Mexican American workforce, especially for those who were born in the U.S. Undocumented workers did not compete with native-born Chicanas as much as they competed with recent legal immigrants, especially women. Mexican women who were undocumented and legal immigrants were six and seven times as likely to work in electronics as native-born Chicana women, who tended, like most Americans, to work in retail.[143] Among the estimated undocumented in Los Angeles in the 1980 census, 29 percent worked as "textile sewing machine operators" and 33 percent worked as "other machine operators, assemblers, and inspectors." Native-born women rarely did these jobs, working instead (51 percent) in "administrative support occupations, including clerical." Only 1 percent of native-born women worked on a sewing machine. While legal immigrants also worked on sewing machines (27 percent), fewer worked in the more capacious "other machine operators, assemblers and inspectors" category (18 percent). The competition for these jobs was between undocumented and legal migrants, not native-born Chicanas.[144]

Native-born Chicano men faced competition from both legal and illegal migrants.[145] For men, the occupational distribution was much more similar across legal statuses. Most common were "machine operators, assemblers, and inspectors" for undocumented (38 percent), legal immigrant (32 percent), and native-born citizen (21 percent), as well as the construction trades (7.4 percent, 5.6 percent, and 9.8 percent respectively). This competition, however, did not mean than Chicano men earned less than women. Undocumented men had incomes roughly half ($8,485) that of the average Angelino ($16,875). Legal immigrant and native-born Chicanos had roughly comparable incomes ($12,047 and $13,185), which, while lower than average, were not half. Perhaps explaining why Hispanic women worked less than Hispanic men, undocumented women ($4,774), legal immigrants ($5,881), and native-born ($6492) women all earned less than even undocumented men and less than the average Angelina woman ($8,438).[146]

A more satisfying solution to illegal employment would be to penalize the employers who seek to subvert our laws and exploit those without recourse. This plan was first tried—and failed—in California in the early 1970s. Knowingly employing illegal aliens in California, after November 1971, when Governor Ronald Reagan signed the Arnett Bill, became illegal. Employers faced sanctions (between two hundred and five hundred dollars per offense).[147] In reality, however, this law failed. In the decade after its passage, no one in California had been prosecuted under the law. As Gaylord Grove, of the San Diego office of the Labor Commission told an interviewer in 1982, "Oh, we don't enforce that law. . . . It's a dead law."[148] After the law's passage, instead of increasing enforcement funding, the number of California Labor Commissioner field investigators dropped from twenty to six.[149] The Commission, as immigration scholar Kitty Calavita noticed, cut funding for eighty positions. With so few staff (the entire Central Valley had but one investigator, nicknamed the "Lone Ranger"), the law was born dead. Its passage was purely symbolic. Employers, whether agricultural or industrial, had no incentive to obey a law that was clearly not being enforced. No employer was ever successfully fined under the law.

The failure of the California statute went unnoticed. The logic of employer sanctions, with its moral high ground, became a model for national

policy, starting with President Carter in 1977. From the early 1970s through the mid-1980s, employers resisted the passage of such laws—ostensibly because of fears of going to jail for simple clerical errors. Arnett, who had sponsored the California bill, himself doubted the ability to enforce the law. He feared that the law, by depending on Social Security cards, would allow employers to be "harassed" and liable for employees with fake papers, since Social Security cards were "so freely issued, [so] easily forged."[150]

Mexican Americans feared that rules against hiring *indocumentados* would simply mean "turn[ing] away," as the California Senator S. I. Hayakawa said, "all those with brown skin instead of going through the process of checking the credentials of a possible employee." Sanctions would not actually pass Congress until 1986, as part of the Immigration Reform and Control Act (IRCA). But they had little to worry about. Thanks to the lobbying of the contracting associations (as they proudly told their memberships), the law contained so many loopholes that no one would be going to jail—for anything.

IRCA combined elements of both Castillo and Chapman, of Carter and Ford. Employer sanctions came along with a broad citizenship amnesty intended to finally seal the border, apply universal labor laws, and improve the lives of the undocumented. Studies of the amnesty applicants after IRCA would, for the first time, provide an accurate picture of undocumented life in the U.S. and then the effects of amnesty on the undocumented. The studies confirmed what Chapman had claimed in the 1970s: the undocumented filled in the gaps in the service economy. Only a handful (5 percent) of illegal immigrants had worked white-collar jobs. Most undocumented (55 percent) had worked blue-collar jobs—as laborers (15 percent), factory operatives (25 percent), and craft workers (15 percent). Only 19 percent worked on farms. Even just considering Mexican illegal migrants, still only 27 percent worked in the fields. The agricultural rhetoric of the illegal migrant simply wasn't true.

At Apple, for instance, HR vice president Kevin Sullivan was committed to complying with the new immigration law—but only for official employees and contractors. Before anyone got paid, Apple had to "receive proof of a new hire's (or independent contractor's) identity and right to work."[151]

Sullivan issued a memo to that effect, and half of it regarded independent contractors, who were an increasing part of the Apple workforce. The independent contractor needed to make sure that the "Human Resource liaison" had the verification information. Equally important, Sullivan pointed out, Apple did "not discriminate against foreign nationals." No one was to be asked about their status "until a job offer has been accepted." Outside parts suppliers, of course, were not part of this careful system.

It was a brief victory. In the first few years, cases against employers rose to a peak of about seventeen hundred a year in 1989, but then fell—quickly. By 1994, IRCA sanctions numbered a thousand a year, crashing to less than two hundred by 2000. The law was rarely enforced. IRCA had almost no effect—it neither reformed nor controlled immigration. Employer sanctions were supposed to end the flood of illegal laborers, but they did almost nothing. It did not even particularly help those who received amnesty. They were still part of the same economy as before. On average, wages of formerly undocumented migrants went up a little (approximately 10 percent), but not as much as advocates hoped.[152] Understanding the wage increase, moreover, required looking past the averages. Skilled workers benefited the most from legalization. Uneducated or unskilled workers hardly benefited at all. For new undocumented migrants, the pull of *el norte* remained, and employers had very little difficulty in hiring them. The undocumented workforce may have lived in the shadows, but their work was part of the legal economy.

In theory, IRCA affected every business with more than three employees, but in practice it had little effect. In Houston, the celebrated Ninfa's Mexican Restaurant told the *Houston Chronicle* that it had no trouble at all, despite its "mainly Hispanic workforce," for the same reason that any large employer in Houston had no problem: the law only applied to new workers.[153] Ninfa's had a "stable workforce." Only workers moving in and out of work, or the firms that employed them, would have difficulty with the new law. And then, of course, they could simply turn to subcontractors.

Following the letter of the law was safe, but actively discriminating against noncitizens was not. Employee, it turned out, excluded "independent contractors." As long as the worker was at arm's length, the employer

could not be held responsible for their immigration status. Congress, under pressure from contractors, adjusted the law so that employers could only be held liable when they hired subcontractors "to obtain the labor of an alien in the United States knowing that the alien is an unauthorized alien." Hiring in this way made employers safe.

In April 1987, the leading white-shoe Houston law firm, Fulbright & Jaworski, gave a presentation to the Associated General Contractors of Houston to apprise them of "employer responsibilities under the Immigration Reform and Control Aact of 1986."[154] The law made it easy—though it was not stated as such—to hire undocumented workers. Employers were not liable unless they knew they were hiring an alien unauthorized to work. Penalties for first offenses were light—"$250 to $2000 per unauthorized alien"—but rose, by the fifth offense, to up to six months in jail. Even then, employers had many ways around the law. Only new employees were affected by IRCA and any worker employed before 1986 could still be employed. In fact, Fulbright & Jaworski counseled, "discharge because of non-citizenship may violate civil rights laws." In every market that employed undocumented workers, these kinds of legal seminars took place.

At the end of one of the AGC's many Q&As on the new immigration law, a simple question was asked: "What if I decide just to give up and have no one in my business other than independent contractors and leased employees?" The answer was equally simple: As long as you did not knowingly hire "leased employees from an agency which you knew was utilizing illegal aliens" you would be free and clear.[155] Avoiding the immigration law was as simple as subcontracting your entire labor force.

For John Senko, his time in San Jose was "the worst three years of my life."[156] He came to believe that if he was actually successful in deporting undocumented workers from Silicon Valley "we'd have a revolution."[157] In 1987, he transferred from San Jose to the border for what would be, he thought, a lower-stress job. He preferred, he said, businesses to cooperate rather than to have to raid them, but that missed the point. The low cost of the undocumented, as well as their willingness to work in illegal conditions, made them too valuable to the Silicon Valley economy.[158]

No Company Is Safe

In Search of Excellence was such a successful book that it eventually drove Peters and Waterman out of McKinsey, when they refused to share all the earnings with the partnership. Waterman, who had spent twenty-one years in the firm, joined a chorus of detractors: "McKinsey thinks it sells grand strategies and big ideas, when really its role is to keep management from doing a lot of dumb things. They do great analysis, but it won't get your company to the top."[159] By the end of the 1980s, despite a decade of restructuring and leaning, it was not clear what exactly would get any company to the top. Thomas Peters wrote another bestseller, *Thriving on Chaos: Handbook for a Management Revolution*, though it was only on the best-seller list for a year this time.[160] Opening with grim epigraph from the *Financial Times* that simply said, "Can America make it? A huge trade imbalance, a sliding currency, falling real wages and a dismal productivity record."[161] Unlike his earlier work, Peters said, "There are no excellent companies. . . . No company is safe. IBM is declared dead in 1979, the best of the best in 1982, and dead again in 1986." Chaos had become the new order. While *In Search of Excellence* had a well-measured argumentative arc, *Thriving on Chaos* was a spastic series of examples and aphorisms in what he called "prescriptions for a world turned upside down."[162] In part, he had helped turn that world upside down by embracing the new lean model of the corporation.

As nowhere before, electronics' flexible labor propelled an industry. This "itinerant worker," Dennis Hayes wrote, could be a "temporary worker, the immigrant worker, even the skilled 'professional'" moving from product to product at different companies. We should not be surprised that coincident with the rise of temps and the ideology of lean corporations, the labor movement, at least in the private sector, precipitously collapsed. As much as good union jobs defined the postwar, the absence of unions defined the age of turbulence. Easily replaced workers don't demand higher wages. They don't organize. The *indocumentados* were Americans, if only temporarily. Some went home every year, like in the braceros, but millions stayed on, at the margins of society and at the bottom of the economy. For American industry, these workers formed a key component of the new flexible labor regime, without benefits and without workplace safety. At the

intersection of these three worlds of consultants, temps, and illegals would be a new kind of capitalism, where the borders of the firm were more porous than ever before. Just-in-time production promised parts when you needed them for the assembly line, and at the same time, the ability to ignore where those parts came from.

"Silicon Valley's labor practices," Peters wrote, "except for engineers, often make Detroit's look humanistic."[163]

NOTES

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PWC PricewaterhouseCoopers Records, 1891–2000, Columbia University, New York, NY
CITI Citigroup Archives, New York, NY
9to5 9to5 papers, Schlesinger Library, Harvard University, Cambridge, MA
APL Apple Computer, Inc. records 1977–1998, Special Collections, Stanford University, Palo Alto, CA
HP Hewlett Packard Enterprise Archives, Palo Alto, CA
AGC Associated General Contractors of Houston, Houston, TX
USCIS Immigration and Customs Enforcement Library, Washington, D.C.

Introduction: **How We All Became Temps**

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Chapter Ten: **Restructuring the American Dream**

1. Here I am pushing back on the literature that sees economists as the primary intellectual agents behind the changes in American capitalism in this period. Clearly economists matter, especially the portfolio theorists,] and the omnipresent Milton Friedman. I don't think their ideas simply skipped from journals into corporations. Consultants were paid to remake firms. Their journals, unlike *Econometrica*, were read by the entire C-suite. Business people, more than academics, made these changes happen. For outstanding histories (with different perspectives) of the economists' ideas, see Brian Domitrovic, *Econoclasts: The Rebels Who Sparked The Supply-Side Revolution and Restored American Prosperity* (Wilmington, DE: Isi Books, 2009); Nancy MacLean, *Democracy in Chains: The Deep History of the Radical Right's Secret Plan for America* (New York: Penguin, 2017); Angus Burgin, *The Great Persuasion: Reinventing Free Markets Since the Depression* (Cambridge, MA: Harvard University Press, 2012).
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"Mexicano." The term leaves nationality undecided (unlike Mexican American) and emphasizes the shared cultural life, even across lines of citizenship. Official histories, as historian Mireya Loza writes, like those offered by "NMAH [National Museum of American History], the Bracero Justice Movement, and policy makers thus have engaged in the solidification of a 'bracero' identity that purposely divorces itself from that of the undocumented laborer. But acknowledging that the flow of Mexican temporary workers was intricately tied to that of undocumented workers, or how easy it was to move in and out of these categories, would have made creating a cohesive narrative about bracero history difficult" (Loza, 173). Inclusion of legal braceros, she points out, is an important step toward a broader narrative of the U.S. Nonetheless, excluding the undocumented people who did the labor that made our economy possible, seems to me a gross gap in the historical narrative, however inconvenient it is for an uncomplicated story, as Loza agrees. I also agree with Pitti that the shared cultural background is important, but just as important are the very real differences in legal and economic power between those who are native-born, legal migrants and illegal migrants. Mireya Loza, *Defiant Braceros: How Migrant Workers Fought for Racial, Sexual, and Political Freedom* (Chapel Hill: University of North Carolina Press, 2016) and Stephen Pitti, *The Devil in Silicon Valley* (Princeton, NJ: Princeton University Press, 2003).

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Chapter Eleven: **Permatemp**

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