

Bachpodding

A paper read to the

Literary Club

23 April 2007

James M. Murray

The best metaphor of my life in technology is that of the wrong way witness. You know the picture: the photographer captures a moment of earthshaking change – the assassination of the Archduke Ferdinand in the streets of Sarajevo, or the lift-off of Apollo 9 over the skies of Florida– and while most onlookers are transfixed by the spectacle, I'm the one looking in the other direction, lost in some self-preoccupation. I am the one absent in the present, looking backwards; in other words, I am an historian.

Yet this was not the obvious, preordained course of my life, for I was fortunate to grow up in the Santa Clara Valley of north-central California just as it was changing from the world's most productive fruit farm into the producer of an even greater abundance of technologies based upon the semi-conducting qualities of silicon. The name Silicon Valley was coined only in 1971, but the seeds of that revolution were already well planted when my family arrived in late 1961, all six of us and a dog packed into a 1959 Ford station wagon that had just completed a three-thousand mile trip from the Chesapeake to the San Francisco Bay. We did not know it then, but we were part of a new wave of immigration to a state once transformed by a migration of gold seekers, but we could not have imagined the forces and forms of the revolution we were to join, or the gold some of us would mine.

My father was typical of the new migrants: born in 1926 in Chicago his life had been shaped first by the Great Depression, which drove his family out of the Windy City and back to his father's family farm in Ontario Province, Canada. They returned to FDR's America in 1936, this time to Joliet, Illinois, where for the rest of his life, my grandfather owned and ran a gas station. The second formative event of my father's life was the Second World War, which enlisted practically the entire body of young men of the graduating class of 1944, in his case into the Army Air Corps, where he was trained as a radio operator/machine gunner in B-17 and B-29 aircraft. He was lucky in his timing, for his class was largely spared the fighting of late 1944 and early 1945, being held in reserve for the invasion of Japan planned for early 1946. Instead, he reached Europe in time to join the occupation forces and spend two years standing guard over a ruined Germany. As it turned out, that military service provided the impetus for the migration of a half-Canadian, depression-scarred kid from a city known chiefly for its prison, to Sunnyvale, California, whose very name seemed a world away from his past.

Before he took the path West, he participated in that other transformation shared by the surviving veterans of WW II the GI Bill of Rights, which offered him and thousands of others the possibility of higher education. It is impossible to underestimate the

importance of this federal initiative in the making of Silicon Valley, for virtually all of our neighbors, all the fathers of my schoolmates, were ex-GIs educated in the late 1940s at government expense, who found work as engineers in the companies that would transform our valley. My father was eager to pursue this educational opportunity, but like many, he was completely ignorant about the organization of universities, since no one in his family had ever set foot in one. And he didn't know what he should study, but he was good at mathematics and with radio, so he chose electrical engineering. With that idea in mind, he took the Rock Island train to the first university he came to, which was the University of Chicago. The year was 1948, the transistor had just been invented at Bell Labs, and my father walked into the registrar's office of the U of C and asked to enroll in their engineering school. He didn't know it, but his request was only slightly less ridiculous than asking to enroll in their agriculture college. So he was politely shooed out the door, and onto the next school up the rail line, which was the Illinois Institute of Technology. There he completed his studies for the practice of double E, which in his case would mean radio in its various permutations across the next forty years.

Two short stops preceded his arrival in California: first, in Chicago where he worked as a junior engineer at Illinois Bell and met and married my mother; and second, in Baltimore, Maryland for a stint with Westinghouse's telecommunications division, and the engendering of four children in five years. The offer of a job at Lenkurt Electric Company of San Carlos, California, the result of the presence there of an old family friend, and my godfather, Thomas Combellick, completed the process of bringing new immigrants to the left coast.

Now some forty five years later, I am conscious of the irony that as an historian I've spent much of my career researching and writing about economic transformation, when from the age of seven I lived through what is perhaps a greater revolution than any I have studied. And for the most part, I hardly noticed. Boyhood is too full of sports, struggles, learning, sibling rivalry to notice the ground shifting under your feet, and only now do I realize that my life in technology commenced when I began third grade at West Valley Elementary School in September 1962. One of my first friends there was a boy so diminutive we called him Maypo after the character, Marky Maypo, the trademark of a breakfast cereal. His real name was Mark Wozniak, and his brother, Steve, was beginning seventh grade at nearby Cupertino Junior High School that autumn. Thus I entered the orbit of one of the founders of Apple Computer.

By the time I reached seventh grade, I met up with the other half of the future Apple team, Steve Jobs, who also went to Cupertino. He remained a classmate through those two years followed by four at Homestead High school, where we were both members of the class of 1972. He made very little impression on me other than a vague knowledge of who he was. No doubt this was because he neither played sports nor music in the school band, two activities that occupied much of my time in those years. We were, however, thrown together in the forced intimacy of advanced placement courses, culminating in Mr. Pelton's senior English class, which was a true rite of passage for seniors. Jobs was never a technology buff; indeed his strengths lay in English and History where I remember him doing well despite apparent disinterest. If I were to categorize the seventeen-year old Jobs, I'd have called him a stoner, deeply enmeshed in the counter-cultural currents of that time, which drew strength and identity from recreational drug use. His senior picture in our yearbook, in fact, has him with

shoulder-length hair, which was still somewhat shocking in that innocent time. I, on the other hand, was a jock intellectual, who read Sartre, Dostoevsky, while pumping iron and butting heads. Needless to say, he went on many more dates than I did.

But neither of us could escape our surroundings despite a general lack of interest in things electronic. Strangely enough, both Jobs and I landed temporary jobs at Hewlett Packard the summer of 1972 after our High School graduation. For me this was a brief stop – roughly four weeks – before I left for the Air Force Academy in Colorado Springs where I had accepted an appointment as a cadet. I worked in the semiconductor division inspecting shipments of chips manufactured in the Far East. I don't know what Jobs was doing that summer for HP. The company at that time was not yet a major manufacturer of consumer electronics, but was quite famous in our valley as a fabulous place to work where most of its employees spent their entire careers. Among engineers like my father, their products were esteemed for their quality and durability from the days that HP produced only test equipment. By the early 1970s the company had branched out considerably, producing one of the first hand-held calculators (the HP 35) as well as fabricating silicon-based semiconductors, and continuing the traditional lines of oscilloscopes and logic analyzers.

Our college choices show clearly how different Jobs and I were at this stage of our lives. I went off to Air Force to play football and discover my complete unsuitability for military life. Jobs went to Reed College in Portland, Oregon, then as now famous for a liberal faculty and student body, with at that time much recreational drug use. Neither of us lasted long at our respective institutions, ending up back in our valley to search for the next thing. For me it was to attend the local junior college briefly before going on to study music and history, which launched me on the path I've followed to the present day. Jobs also went briefly to De Anza College while seeking work in the electronics industry once again. He landed for a time at Atari – the first video game maker -- met Steve Wozniak through the agency of another high school classmate of ours, Bill Fernandez, who became their first head of engineering.

It is well to remember just how unorthodox Jobs and Wozniak remained in the immediate run up to the founding of Apple Computer. I have no reason to doubt that Jobs continued his deep interest in drugs of all kinds. In 1974 he took time off to travel to India with a college friend in search of "enlightenment," but to any of us raised in the late sixties, India was synonymous with cheap and abundantly available drugs. It is also well to remember how close to criminality Jobs operated, and not only for the illegal drugs, but also for the electronic components both he and Wozniak "liberated" from Atari and HP where each was working in 1975. These they used in their first product, a "blue box" a now forgotten gadget that allowed its user to steal long distance calls by imitating the tones used in the AT&T telephone switching system. Only after abandoning this did the two embark on Wozniak's brilliant design of the Apple I and II, which resulted in the founding of their company in 1976, which is now the most venerable, and perhaps only surviving, original manufacturer of personal computers. I last saw Jobs at our tenth high school reunion, two years after the IPO of Apple Computer had made him a rich man, and just as he was beginning the development of the Apple Macintosh, one of the truly revolutionary developments in small computers..

In 1982 I was beginning a three-year teaching stint at Stanford University where I witnessed the quick inroads of the IBM personal computer into the Silicon Valley market. Reviled by the old timers and Apple faithful who derided its off-the-shelf, uninspired design and components, its hardware was complemented by an already antiquated operating system once known as the Quick and Dirty Operating System (a CP/M clone), that was licensed and marketed by an unknown software entrepreneur, Bill Gates. In retrospect, quick and dirty was a fitting name for the entire computer. And not for the first or last time, inferior technology swept the market.

Perhaps only that time and place could have produced such disparate characters as Jobs and me: the one a great visionary of technology and society – a forwards looker -- the other a humble practitioner of the art of writing history – a backwards looker. As ambivalent as I always was and am about Steve Jobs personally, I think he has proven and promises to be the commanding figure of his age of technological advance. In a career that now spans more than thirty years he played an important role in bringing the first Apple computers to market by finding an investor for producing Wozniak's designs in numbers and with the reliability needed in a commercial product, while at the same time creating an aura of whimsical irreverence and artful subversion, like playful elves who produce beautiful shoes whose laces are tied together. And more than that, he and Apple managed to lay claim to the old Hewlett Packard foundation myth of a solitary pair of geniuses laboring in a garage who change the world. Together with that Silicon Valley myth, Wozniak and Jobs's company was and is dedicated to producing surpassingly well-designed and functioning objects, whose ease of use and apparent simplicity conceal complexity and understated power in ways that reassure the neophyte and delight the aficionado. And like the old HP test equipment, one willingly pays more for them for those reasons.

Some of you might well argue that others have a better claim to being the Andrew Carnegie of our time: Bill Gates leaps to mind as a worthy competitor to Jobs. But I would point out that although Gates has made the most money from the computer revolution (estimated at \$56 billion to Jobs's \$5.7 billion (131 spots lower on the Forbes richest list for 2007) much of that has resulted from the adroit establishment and defense of a software monopoly. In this he beat IBM at its own game, which is a feat that perhaps justifies his billions, but in no way does it give Gates a position of central importance in the development of a technological revolution. Quite the contrary, by detaching software so completely from the design and functioning of hardware he has promoted a one-size-fits-all clumsiness that has hobbled both software and hardware design for the past quarter century. In this Gates and Microsoft are much more the Rockefeller and Standard Oil of our time than anything else.

Moreover, no one but Steve Jobs has shown the ability to catalyze new commercial and computer technologies through constant personal reinvention and redeployment. In other words, as both old and new CEO of Apple, Jobs has been at the center of more defining technologies in the course of the last twenty-five years than anyone else. This Jobs began as the driving force behind the development of the Macintosh, the first mass market computer with a graphical user interface (now always called GUI –goeey) a concept Jobs first saw at Xerox's Palo Alto Research Center. When launched in 1984, this new computer was equipped with a mouse, icon-based software, a speaker, scalable fonts, in short many of the features we now take for

granted in our computers. The memorable launch of the Macintosh revealed Jobs's marketing instincts, for Apple purchased the most expensive advertising slot in television (the Superbowl) to show the Orwellian spot with Apple as the Big Brother slayer, and thus liberator of pc-users from the thrall of IBM. For one final memorable moment, Jobs showed the combination of iconoclasm, youthful irreverence, and a faith in the liberating power of technology that was a potent legacy of the 1960s.

You know the rest of the story: Apple had hired John Sculley from Pepsico in 1983. He and Jobs quarreled, the board sided with Sculley and removed Jobs from managerial responsibilities, his resignation followed and in a fit of pique he sold virtually all his Apple stock and cut all ties with the company.

In the following twelve years Jobs founded a new computer company with the autobiographical name NeXT, which set out to produce an integrated software/hardware system for high-end computer users. These systems became very popular with scientists and computer engineers, though they were never a commercial success. Yet it was on a NeXT workstation that Tim Berners-Lee in 1990 wrote the first web browser software, marking the practical creation of the World Wide Web. Jobs also invested ten million dollars in the acquisition and capitalization of a division of Lucas films (of *Star Wars Fame*), calling the new company Pixar, whose mission was to design and market both hardware and software applications for complex computer simulation and imaging. Computer animation began as a sideline, but after some success making commercials, the hit movie "Toy Story" remade the company into an animation studio with Disney as partner and distributor. Pixar was acquired by Disney for \$7.4 billion in stock in January 2006, and Jobs's 50% stake converted into a 7% ownership of Disney and a seat on the Board of Directors. But even this financial killing and the possible influence Jobs will have on Disney's future pales in comparison with his return to Apple as CEO in 1997.

At this point I want to reassert the fact that, like all Literary club papers, the subject of this paper is really the author. And you may have detected my profound ambivalence about the life and work of my former classmate. But it is no less true that one measure of Steve Jobs's genius is that he has changed in fundamental ways both my vocation and avocation: that is, the way I practice history and pursue my interest in classical music. Perhaps the truest measure of a revolutionary is if his influence transforms the lives and work of even the professionally backward.

Twenty-five years ago I faced a tight deadline for completing my doctoral dissertation – my advisor was leaving the country for two years and I had precisely ten months to finish five chapters, including the innumerable revisions my demanding advisor would require. It frankly seemed impossible, until my father suggested the loan of his Apple II computer, which was fitted out with two 120-kilobyte disk drives, 48-kilobytes of memory and some serviceable word processing software. I took to that technological lifeboat with the desperation of the drowning, and to make a long dissertation short, I finished with more than a month to spare. I even had time to meet the unreasonable demand of the Dean of the Graduate school, a historian distrustful of computer printers, that I submit two *original* copies of the dissertation. This meant ten hours watching a daisy-wheel printer chug through my text at 30 characters a second.

But I have never gotten over the thrill of finishing an extended piece of writing and then watching it emerge in an unceasing flow of black and white.

Five years ago I published a chapter on “New Technologies and Historical Knowledge,” in which I observed that to be a professional historian required both the use of a computer and a mastery of a variety of auxiliary technologies. That statement is even truer today, and I am continually struck by the growing sophistication of my junior colleagues in the uses of digital technology. Part of this is due to the stunning increase in the power of computing: the Apple laptop delivered to me last week is roughly a million times faster, stores a million times more data, all for a third of the price -- in constant dollars -- of the Apple II. Even more impressive is the power of networked computers, which make up the World Wide Web. Today the Internet is as important a research and teaching tool as the library, a statement that is almost heretical to the traditionalist. But really the distinction between the Web and the Library is increasingly a false one, since I can visit the catalogues of all the world’s great libraries from the keyboard of my laptop. I can even access facsimiles of medieval documents from the websites of some of Europe’s most important archives.

And yet, and yet, the work of the historian remains much the same even if the media have changed. The same cannot be said of the music industry, which has been shaken to its fundamentals by the cumulative power of digital recording technologies and their easy interface with the world of networked computers. Perhaps the clearest indication of this technological revolution is the intransigence of the recording industry, which is throwing millions of dollars into lawsuits against the irresistible wave of file copying and sharing that rivals even pornography as the most popular use of the Internet. And no device of modern times has been as revolutionary in this single industry as has the Apple iPod, which may just be Steve Jobs’s most revolutionary gadget yet. It has even impinged on the listening world of early music aficionados like me.

Although I don’t fully subscribe to Steven Levy’s characterization of the iPod as the “Perfect Thing,” his book on “How the iPod Shuffles Commerce, Culture, and Coolness,” makes a convincing case of just how brilliant a product this deceptively innocent digital player is. First, the numbers are stunning: since the launch of the first model in October, 2001, over 100 million of the devices in ten different models have been sold. Since that date, the iPod’s market share has never fallen below 90%, even though it has always had competition, even from the likes of Sony and Microsoft. Second, its command of the youth market is much nearer 100%, as the case of my sixteen-year old son shows. He has owned no fewer than four iPods, all different models. He has broken two, which is understandable given the rough and tumble of a skateboarder’s life. The other two he acquired through purchase or trade among his peers, for there is a lively secondary market in used (or stolen) iPods – and it is only iPods that enter that market.

To put these numbers into perspective, in less than six years the iPod has surpassed the number of registered handguns in the U.S., and this from a computer company that has never commanded more than a small percentage of the personal computer market. Indeed, sales of iPods have fueled purchases of Apple computers even after the iPod and its software, iTunes, were adapted for the Windows platform. This is a dramatic turnaround for a company that many had given up for dead before

Jobs's return in 1997. This decade of renaissance at Apple was capped with a change in the company's name, from Apple Computer to Apple, Inc., symbolizing its metamorphosis into a "consumer products company." Thus the company itself has been transformed by this "Perfect Thing" as has everything it has touched.

If there is perfection in the iPod it is in the sum of a number of elements, most of which are not really technological or cutting edge at all. Levy calls this the "coolness factor," but that hardly defines its attractiveness. I must confess to have fallen for the iPod's charms the first time one nestled in my hand: it is a delight to look at, and that model fit my palm perfectly being precisely the size of a deck of cards. And once it's cradled in your hand its design features are even more impressive, with a circular click wheel that allows access to your music literally with a flick of the thumb. Yet none of this accounts for the affection – even adoration – the iPod evokes, emotions so strong that they have caused major problems with batteries, rapid obsolescence, a persistent high price, to be as easily forgiven by owners as bad pet behavior. And the key to emotion lies in the music itself.

Viewed dispassionately, the iPod is much like the old dumb terminals of main frame computing days, for its enabling software runs only on a personal computer, which treats the iPod as a remote hard drive. The genie in the bottle is iTunes, a "digital player media application" to use the jargon, which is as slick a piece of software and sales tool as was ever created and given away on the Internet. It acts as a media appliance, allowing one to gather audio and video files from cds and dvds, organize them as a data base, download them to an iPod or create custom-made cds, or playlists. But there is much more than that, for iTunes is also the gateway to an on-line store where songs and videos of all kinds are on sale and ready for instant download in return for a credit card number. Your shopping history and artificial intelligence logarithms provide a constant flow of advice on logical new acquisitions to your collection, and iTunes is diabolically good at organizing and selling all kinds of popular music, most for ninety-nine cents a song.

Behind this vampire-like effectiveness lies one of the great business coups of recent times: Steve Jobs's success in convincing the moguls of the recording industry to allow their music to be downloaded via the iTunes web site. It required someone with the swagger and name recognition of Jobs to turn an industry that was even in the midst of those negotiations launching a Holy War against sharing of digital music files over such on-line sites as Napster. Many executives in the music business considered any digital player to represent the certain death of their industry, and they struck out like wounded animals even at individuals who dared share their music collection with friends. One after another, file-swapping sites were shut down with messianic fervor and huge fines. Jobs's pitch, delivered in the full pomp of his Cupertino headquarters, was to offer music only to Macintosh owners, and only if it was locked up with proprietary software making unauthorized file sharing impossible. That this agreement gave the iPod a monopoly on downloads in this format was perhaps an unintended, but certainly profitable, coincidence. By 2002, all was in place for what will become the future of music and video distribution.

But what is Bachpodding? At first it was my unreasonable desire to put the entire corpus of J.S. Bach's musical production on my new iPod. How many gigabytes would

Bach fill, I wondered? How would it affect the way I listened to his music? Or, as my son put it, “you just thought it would be a cool thing to do.” But how to do it? If I were seeking to collect the Rolling Stones, Led Zeppelin, or, the Beastie Boys, all that would be required would be some navigating of the iTunes store and sufficient room on my credit card. The music would flow at broadband speed to computer and iPod. But even if there has been a switched-on Bach, there is as yet no downloadable Bach. Some of this is Bach’s fault, for he wrote an enormous amount of music in a stunning variety of instrumentations, styles, and settings. One musicologist estimates that it would require forty years for a copyist to reproduce all the sheet music, which may explain in part why Bach had so many children. So, while I could find much of the most popular Bach music on line, I was forced to revert to a more old fashioned method of acquisition – the CD.

Fortunately, someone had anticipated my desires – Das Gesamtwerk – the complete works were available in a single 160-CD set by a Dutch company. I of course bought it on line, receiving an impressive parcel in the mail. Over the next several months I fed the collected disks one by one into iTunes in a process known in the vernacular as “ripping.” One by one the cantatas, organ works, violin partitas, fugues, lute sonatas, and hundreds of other works were swallowed and digested in this new, alien environment. The translation is not without its strangeness: all of Bach’s works in iTunes are referred to merely as “songs” which is a bit like calling the works of Michelangelo interior decorating. Yet much of Bach’s best music is either song or dance, so I don’t mind the terminology much. However, I am staggered a bit by the startling incongruity of it all.

In my opinion, Bach was the last and greatest medieval composer, whose work and life had much more in common with the masters of polyphony of the thirteenth through sixteenth centuries than our own age. He made music for the same reason masons laid brick, or cobblers made shoes: because it was the work he was born to as were his father and grandfather before him. As a musical craftsman, he wrote music as ordered by his employer, so the form his works took had much to do with whether he was working for a prince or church at the time. He was an efficient worker, reusing musical scraps or adapting his own or others’ musical ideas to new forms and settings. Sometimes he just had to get the weekly cantata out, and if that meant scrimping here and there, so be it. But even the most deadline-pressured composing was likely better than teaching Latin to the choirboys and other children of the parish, which was part of his duties as cantor of the St Thomaskirche. Such had been the musician’s life since the Middle Ages.

Now with 10 gigabytes of Bach on my iPod I can encompass his oeuvre anywhere and anytime I wish. Consider that Bach had to walk sixty miles to hear the great organist and composer Dietrich Buxtehude, or that in order to play his church’s organ he required the services of someone to operate the bellows. And I can even defy Bach’s wishes in playing his music, for iTunes gives me the power to organize Bach’s “songs” anyway I wish, so that an achingly beautiful aria from a cantata can follow an organ fugue, or I can arrange to have all his works from a particular era played front to back, and back to front again. I can also listen to Bach side by side with Josquin, or Monteverdi, composers of genius who preceded him. But most of all, in common with most iPod users, I often choose the “Shuffle” function that wanders randomly through the

music, mysteriously linking pieces I would never have thought to juxtapose. This can sometimes bring horror as well, when a song from one of my son's favorite Rock and Roll bands blasts through the headphones having escaped my efforts to prevent musical cross contamination.

iPod and iTunes have certainly changed and enhanced my enjoyment of music, and they have begun to change other facets of the Classical Music World as well. To end with one recent example: the English pianist Joyce Hatto had enjoyed a modest solo career before a cancer diagnosis forced her to give up the recital hall and to retire with her recording engineer husband to a cottage near Cambridge. There the two of them began an epic recording venture producing nothing less than 120 cds of some of the most difficult music in the piano repertoire, all to considerable critical acclaim. She seemed to have become an astonishing piano prodigy not in youth but in old age, and when she died last year at age 77, she left a superlative "posthumous" rendition of Beethoven's Sonata 26, "Les Adieux" as a last memento. Then something funny happened: a report surfaced of an attempt to load one of Ms. Hatto's recordings into iTunes only to have the program inform the user that the tracks were already in the library, just under a different pianist's name. Soon dozens of other purloined pianists were identified in Ms. Hatto's discography. What iTunes's electronic sampler discovered, which no critic ever had, was that all the Hatto recordings were stolen from other pianists, usually young, relatively unknown ones. Hatto and her husband's sole accomplishment was impeccably good taste in what they stole.

It's time to bring this personal history of a life in technology to a close. I'm sure all of you have stories more or less similar to mine. Even the venerable Literary Club has an interesting history of struggles with technology, that of the typewriter a century ago, and now with computer-generated papers, possibly downloadable from our club web site if we so choose. Whatever our collective or individual choices, the forces unleashed by digital technology will continue to bring changes beyond imagining. As for me, I am content with my gadgets, and grateful for a boyhood spent in that rich loam of revolution, the Santa Clara Valley, even if I was looking in the wrong direction.

